Impact of Egypt's economic reform programme on the stock market performance

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THE IMPACT OF EGYPT’S ECONOMIC REFORM PROGRAMME ON THE STOCK MARKET PERFORMANCE

by

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DOCTOR OF PHILOSOPHY
IN FINANCE

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Dedication

To my Family, especially

Dad and Mum

For their moral support

And special dedication to my

Supervisor, John Pointon
THE IMPACT OF EGYPT’S ECONOMIC REFORM PROGRAMME ON
THE STOCK MARKET PERFORMANCE

MOHAMMED OMRAN

ABSTRACT

The objective of this thesis is to highlight the Egyptian experiment concerning its economic reform programme, and to determine whether this programme has affected Egypt's stock market performance. Using 18 years of data, which covered the period 1980/81 to 1997/98 and incorporates time periods prior to and after adopting the economic reform programme, the thesis empirically investigates three main issues. Firstly, there is an examination of whether the Egyptian government succeeded in implementing its economic reform programme by looking to the main economic indicators: nominal interest rates, real interest rates, the inflation rate, exchange rate stability, the real GDP growth rate, per capita income and the budget deficit in Egypt after 1991, and comparing them with the same indicators prior to this period. Secondly, the thesis considers the changes in Egypt's stock market after the introduction of the economic reform programme by measuring the changes in four main dimensions: market activity, market size, market liquidity and market concentration. Thirdly, and this is the main part of the thesis, the research concentrates on examining the impact of Egypt's economic reform programme on its stock market performance.

For the first two issues, several logistic regressions are performed to determine whether the data prior to 1991 can be separated from the data relating to the period after 1991. The results from this analysis indicate clearly that both type of data series witnessed dramatic changes after 1991.

As to the third issue, cointegration analysis is used to model the relationship between economic reform programme variables and the stock market performance variables within an error correction model form. Generally speaking, the results from this analysis demonstrate that economic variables have an impact upon various features of market activity, market size, market liquidity and market concentration. An important observation in this thesis is that Egypt still needs to accelerate its rate of growth, as it was the only independent variable, which did not show any significant change or significant impact upon the stock market performance variables.
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AUTHOR'S DECLARATION

At no time during the registration for the degree of Doctor of Philosophy has the author registered for any other University award.

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The following activities were undertaken in connection with the programme of study:

- Attendance at a number of courses on data analysis, selected lectures in econometrics, in particular, time series analysis and a workshop of data analysis using SPSS.
- Attendance and participation in research seminars, during which research work was presented.
- Presentation of a paper will take place as follows:


Signed ........................................

Date ............2.9.1999.
Chapter One
Introduction
1.1 Introduction: -

Following the end of the second world war, the world was divided into two groups; one was represented by the United States and the other western countries, whereas the Ex-Soviet Union and Eastern Europe countries lead the other side. The first group followed the capitalism direction, which emphasises a market-based economy and gives more chance for private initiative and investment, while the other group concentrated on centrally planned economies. Despite the conflict between these two ideologies and economic thinking, the last two decades has indicated, arguably, that the free market economy or capitalism is the preferred way to manage any economy for any given society. Most of socialism and communism economies followed the capitalism way by adopting several economic reform programmes in order to save their economic situations from corruption. It can be noticed that all Eastern Europe countries, Ex-Soviet Union, China, Latin America, Africa, Middle East, and many other regions and countries realised the importance of such programmes, which were mainly supported by the international organizations such as the International Monetary fund and the World Bank.

As economic reform programmes became the new phenomena within the last two decades, Egypt like most developing countries experienced the same programme aiming at achieving a stabilization in its economy. However, following the July revolution in 1952, Egypt adopted a new economic policy based upon a centrally planned economy for nearly 20 years. But starting from 1974, a different philosophy has been adopted, which is called an "open door policy", as the Egyptian economy was on the edge of collapsing. Even though this new policy had a positive effect upon the Egyptian economy in the short-run, given a long period of time,
precisely, by the mid 1980s, Egypt faced many difficulties due to the sharp decrease in oil prices as well as the decrease in both Suez Canal dues and workers' remittances.

In the light of the above, by late 1990, a well-tailored economic reform programme was cumulatively implemented covering the whole economic spectrum, with full support from the International Monetary Fund and the World Bank. The programme was aimed at improving both monetary and fiscal policy, since the indicators showed that Egypt suffers from a hyper-inflation rate, which was more than 20 per cent, negative interest rates, around minus 6 per cent, and a huge budget deficit, nearly 20 per cent as a percentage of GDP. Fiscal and monetary reforms constituted the core of the programme in its first stage, whereas structural reforms of the real sector constituted the core of the rest of the programme. However, like much economic reform programmes, the main objectives in the long-run are to accelerate the rate in growth of the economy and to increase the standard of living of the society. To achieve that, an increasing level of investment is required, which, it can be argued, needs a strong stock market that is capable of attracting both local and foreign investments.

In market-based economies, the stock market is an important means of mobilizing savings and reallocating of resources, an avenue for domestic and foreign investment promotion, and a significant source of capital formation and business financing. With reference to the contemporary Egyptian economy, the market's role is of particular significance as a means of privatization and extending economic assets' ownership to broaden the base of investors, thus achieving economic goals and objectives. Consequently, in 1990 an economic reform program was implemented covering the whole economic spectrum. As such, the role of the stock market became very important in facilitating the valuation of the public sector enterprises through objective comparable evaluation measures. Also, it can generate public support for the transformation programme by widening the ownership base via public offerings.
To facilitate policy making with regard to future developments of stock markets, the following questions needs to be answered: "What is the impact of Egypt’s economic reform programme on the stock market performance?". Of course, many other aspects will be examined in order to answer this question; determining whether the Egyptian government succeeded in implementing its economic reform programme as well as measuring the performance in Egypt’s stock market after the introduction of Egypt’s economic reform programme.

1.2 Research objectives: -

This research will be designed to achieve the following three main objectives: -

1-Assessing the success of the economic reform programme in Egypt.
2-Assessing the stock market performance in Egypt as a reflection of the introduction of the economic reform programme.
3-Examining the impact of the economic reform programme variables upon the stock market performance variables.

1.3 Research hypotheses: -

In order to achieve the objectives shown above, three main hypotheses are drawn to attention as follows: -

1-The Egyptian Government succeeded in implementing its economic reform programme.

The economic reform programme variables are assessed in terms of interest rates, real interest rates, inflation rate, exchange rate stability, real GDP growth rate, per capita income and budget deficit. In fact, these variables tend to be the common measures for any economic reform for a given society, as well as they are the basis of Egypt’s economic reform
programme agreement with the international organizations. To test the above hypothesis, many other sub-hypotheses need to be examined as seen in the following figure:

**Figure 1.1**
Indicators of the success of the Egyptian economic reform programme

<table>
<thead>
<tr>
<th>The success of the Egyptian government in implementing its economic reform programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>This can be evaluated through examining the impact on the following variables</td>
</tr>
<tr>
<td>Decreasing the interest rates</td>
</tr>
</tbody>
</table>

As seen from the above figure, the economic reform programme variables will be tested to indicate whether these variables changed significantly. Where these variables indicate a significant change, the main hypothesis, in this case, cannot be rejected.

2- Egypt's stock market performance increased significantly after the introduction of the economic reform programme.

The examination of this hypothesis will contain testing many other sub-hypotheses which represent all stock market performance areas as seen in the following figure:
Figure 1.2
Testing for the significant change in the stock market performance

<table>
<thead>
<tr>
<th>The change in Egypt’s stock market performance after the introduction of the economic reform programme</th>
</tr>
</thead>
<tbody>
<tr>
<td>This can be evaluated through examining the performance of the following areas</td>
</tr>
<tr>
<td>Market activity variables</td>
</tr>
<tr>
<td>Market size variables</td>
</tr>
<tr>
<td>Market liquidity variables</td>
</tr>
<tr>
<td>Market concentration variables</td>
</tr>
</tbody>
</table>

Performance can be assessed in terms of several criteria, in particular, market activity, market size, market liquidity and market concentration. Each area of the stock market performance contains several variables: market activity contains value of trade, volume of trade, number of transactions, number of traded companies, value of new issues (including capital increases) and value of new issues (including capital increases) as a percentage of GDP. Market size contains market capitalization, market capitalization as a percentage of GDP, number of listed companies, volume of shares listed and number of financial intermediaries. Meanwhile market liquidity encapsulates total value traded to market capitalization, total value traded to GDP and volume of shares traded to volume of shares listed. Lastly, market concentration contains two variables: percentage of the 10 biggest companies’ share in market capitalization and the percentage of the 10 biggest companies’ share in value traded. In turn, the performance of each separate variable will be examined as a sub-hypothesis in order to test for the main hypothesis, which was stated previously. Where the stock market performance variables indicate a significant increase, the main hypothesis cannot be rejected.

3-There is a significant relationship between the economic reform programme variables and the stock market performance variables.
To test for this hypothesis, several sub-hypotheses will be examined as well, however, the following figure can summarize the various relationships between the variables, which will be tested in order the examine the main hypothesis.

**Figure 1.3**
Testing for the impact of the economic reform programme on the stock market performance

The relationship between the economic reform programme variables and the stock market performance variables.

This can be evaluated through examining each one of the following economic reform programme variables:

- The interest rate
- The real interest rate
- The inflation rate
- The exchange rate stability
- The real GDP growth rate
- Per capita income
- The budget deficit

on each one of the following stock market performance variables:

- **Market activity**: - (value of trade, volume of trade, number of transactions, number of transactions, number of traded companies, value of new issues (including capital increases) and value of new issues (including capital increases) as a percentage of GDP).
- **Market size**: - (market capitalization, market capitalization as a percentage of GDP, number of listed companies, volume of shares listed and number of financial intermediaries).
- **Market liquidity**: - (total value traded to market capitalization, total value traded to GDP and volume of shares traded to volume of shares listed).
- **Market concentration**: - (percentage of 10 biggest companies' share in market capitalization and percentage of 10 biggest companies' share in value traded).

As seen from the above figure, each economic reform programme variable will be tested as an independent variable with each stock market performance variable as a dependent variable, where significant relationships between the explanatory variables and the stock market performance variables exist, the main hypothesis in this case cannot be rejected.
1.4 Data collection: -

The data of this research will cover the period from 1980/1981 to 1997/1998, which incorporates the periods prior to and after the introduction of the economic reform programme. The data will be based on annual figures because of the availability of data collection sources. For the economic reform programme variables, the Central Bank of Egypt, the Egyptian Cabinet Information and Decision Support Center, the International Monetary Fund, the World Bank and the Egyptian Ministry of Public Enterprises were the main sources to collect these data, while the Central Bank of Egypt and Egypt Capital Market Authority were the main sources to collect data about Egypt’s stock market.

1.5 Data analysis: -

To examine the hypotheses shown previously, statistical and econometric techniques will be used. With regard to the first two hypotheses, which tend to look for a significant change in both economic reform programme variables and stock market performance variables, logistic regression will be used to test for the change in the environmental conditions from 1991 in both type of series. The intention from using this analysis is to examine whether the data prior to 1991 can be separated from the data relating to the period from 1991, in another words, to show whether both the Egyptian's economy and Egypt's stock market witness a significant improvement after 1991 compared with the previous period.

Secondly, the analysis will deal with the relationships between the independent economic reform programme variables and the hypothesized dependent stock market performance variables.

On the other hand, the data analysis to test for the third hypothesis will be based upon modelling the various relationships between the economic reform programme variables and
the stock market performance variables. In fact, there are two stages for this analysis: one will be based upon a bivariate relationship where as the other will deal with multivariate analysis. For this purpose, cointegration analysis will be used to test for a long-run relationship between the variables on a bivariate basis, besides this, error correction models will be employed to support or refute the results from the cointegration analysis and to point out both long-run and short-run relationships between the variables. On the other hand, multiple regression will be used for the multivariate analysis, followed by step-wise regression in order to eliminate any insignificant variables from the multivariate models.

1.6 Research limitation:

It is worthwhile to mention again that this research will deal with the Egyptian experiment regarding its economic reform programme, which had started by late 1990. In turn, the data of this research will encapsulate two periods: one prior to 1991 and the other after 1991. With respect to the importance of the length of the time series for the analysis, this research will cover only 18 years, which represents annual figures from 1980/81 to 1997/98 because this is the only available data about both economic indicators and stock market indicators as well. The economic reform programme contains many aspects: quantitative and qualitative, however, the intention here is to examine the most important variables, which can be measured. In turn, the economic reform programme variables have been assessed in the light of the literature review, which indicated that these variables are common to most other economic reform programmes. In the meantime, these variables represent the core agreement between Egypt and both the International Monetary Fund and the World Bank. On the other hand, performance of the stock market also contains many quantitative and qualitative aspects,
but in this research, the variables have been chosen in the light of the literature review, as well as from the macro outlook about the stock market as a whole.

1.7 Research outline:

This research can be classified into two parts. First the theoretical part, which contains three chapters, will deal with the literature review concerning the economic reform programme, the stock market and the relationship between these two variables. The second part will contain the last three chapters, which will concentrate on the Egyptian experiment and analyze the time series of this research, followed by conclusions and recommendations.

Chapter One: Introduction.

Chapter Two: The economic reform programme.

This chapter will deal with the various definitions of the economic reform programme, through explaining many points of view and mentioning the alternative expressions for the economic reform phenomena, drawing attention to the importance and the aims of such programmes. In addition, the chapter will mention the reasons behind adopting a programme of economic reform, pointing out its urgency for most developing economies to accelerate their rate of growth and put the problem of poverty under control. Besides these, many other aspects will be discussed: determining the main variables of the economic reform programme and how to measure these variables to assess the performance of such programmes. In the meantime, the process of the economic reform programme will be discussed as well, mentioning the advantages and disadvantages of shock therapy and gradualism, which refer to the speed of implementing economic reforms. Finally, a brief outlook concerning the experiments in other
regions in the world will be given, with particular emphasis on the Latin America region as it has similar features to Egypt, where this research focuses on.

Chapter Three: The stock market.

The chapter will start with some definitions concerning the stock markets, highlighting the various ways that can be used to distinguish between the various types of these markets. Afterwards, it will be pointed out the importance of stock markets and their role in any economy, followed by determining the stock market performance variables, which will be used in this research and how these variables can be measured. Great attention will be then given to the term emerging markets, where Egypt can be considered as one of this category, with comparisons between the feature of the stock markets in both developed and emerging economies. The chapter, finally, will deal with many empirical studies, which have concentrated upon various emerging stock markets around the world.

Chapter Four: The relationship between the economic reform programme and the stock market performance.

The aim of this chapter is to investigate the empirical studies, which examined the relationship between these variables. In turn, the chapter will be divided, mainly, into seven sections, each one of them will concentrate upon the relationship between one of the economic reform programme variables upon the stock market performance, except for the first section as both interest rates and real interest rates will be grouped into one section. In fact, one main objective from these studies is to show whether there is a valuable contribution from this research and to build the research hypotheses in the light of the previous studies, moreover, to compare the results from this research with the other findings in the literature review.
Chapter Five: Egypt’s economic reform programme and the stock market: preliminary investigation.

In this chapter, the empirical part of the research will focus upon data relating to the Egyptian economy and the stock market in order to point out the Egyptian experiment as a whole. In order to achieve that, two main points will be covered in this chapter: the Egyptian economic situation prior to and after the introduction of the economic reform programme, and the other point will highlight the situation of Egypt’s stock market under the economic reform programme umbrella. For the first point, the attention will be paid to the Egyptian economy in the recent history starting from 1952 until the present time. The reason behind that is to show the development of Egyptian economic history and to indicate why it was necessary for Egypt to adopt an economic reform programme by late 1990 and the benefits from this programme. In addition, the development of Egypt’s stock market will indicate to what extent this sector suffered after 1952, and how it has benefited strongly from the introduction of the economic reform programme.

Chapter Six: A time series analysis of the impact of Egypt’s economic reform programme on the stock market performance: A statistical and econometric modelling analysis.

This chapter will point out the data of this research and formulate the hypotheses, which should be examined in order to achieve the research objectives. The statistical and econometric techniques shown in this chapter will be used to test the research hypotheses. Logistic regression will be used to test for the change in environmental conditions prior to and after 1991 in both series for the economic reform programme and the stock market performance variables. The econometric techniques will concentrate upon investigating the relationship between the economic reform programme variables and the stock market performance
variables based on bivariate relationships. For this purpose, cointegration analysis through error correction models will be employed. For the multivariate analysis, multiple regression then step-wise regression will be used to determine the most important variables, which affect the stock market performance variables.

Chapter Seven: Conclusion.

The chapter will summarize the findings in this thesis, but mainly concentrate upon the results from the empirical part of this research. Additionally, brief recommendations will be made regarding the potential direction for further research studies arising from the conclusions derived from this research.
Chapter Two
The Economic Reform Programme
2.1 Introduction: -

Over the past two decades, there has been a major change in economic thinking and development strategy in both developed and developing countries. The essence of this change is the movement away from government control and directing economies toward policies and practices that allow market forces to work and encourage the private sector to be the prime mover of economic growth. Policies of state control over economy, suppression of market forces and discouragement of the private sector have failed universally. The most dramatic failure, of course, has happened in Eastern Europe and the former Soviet Union economies in which state control over economic activity was the most rigorous. In fact, economic failure in several other developing countries has also shown a remarkable correlation with the degree of state control; countries, which had somewhat less state control, have suffered less (Malas 1996).

So, economic reform has become a global stamp. Countries of every geographic region, income level, and ideology have jointed the rush: Asians, Europeans, Latin Americans, and Africans; countries once among the richest in the world and countries near the bottom; capitalists, socialists, and those in between (Williamson 1994).

It is noticeable that there are many factors, which push any government to adopt a programme of economic reform. These factors can be political, social, and economic factors. This research will concentrate on the economic factors.

In the light of the above, this chapter will deal with many aspects of the economic reform programme, starting with various definitions of the economic reform programme, the importance and the aims of this programme, and then, determining the main variables and
measurements of any programme of economic reform, the economic reform process, and finally, a literature review about many regions in the world which already have adopted such a programme to improve their economies.

2.2 Definition of the economic reform programme:

Firstly, it is important to indicate that, through the literature review, there are many interchangeable words, which have the same meaning as economic reform programme. Many authors use the same expression "economic reform programme" (see Aghion 1993, Butter 1995, Dougherty 1995, Marks 1995 and Edwards 1997). Others use another expression "transition" (see Coricelli and Ferretti 1993, Kolodoko 1993, Menshikov 1994, Nove 1994, and Lavigne 1995). On the other hand, many other authors use a different expression "transformation" for the same meaning as economic reform programme and transition (see Blommest and Marrese 1991, Murrel 1991, Kupeka 1992, Wyplosez 1993, and Ellman 1994). Finally, there are also many authors who call this process "economic adjustment, stabilization, and regime" (see Addison 1987, Adeniyi 1990, Alderman 1990, Ayako 1990, Gomulka 1991, Brabent 1992, Haggard and Kaufman 1992, Przeworski and Limong 1993, Balcerowicz and Gelb 1994, Sachs 1994).

In fact, most authors are accustomed to use the first two expressions "economic reform programme and transition". Through the literature review, it was found that most articles and books, which deal with the Eastern Europe region, used the expression "transition", defining this programme as "the economic, political, and social changes in the whole society from the socialist model to the capitalist model" (see Brabant 1980, Kornai 1992, Jeffries 1993, Aslund 1994, and Balcerowicz 1994).
In contrast, the expression of "economic reform programme" is generally used when mentioning the Middle East region. This kind of difference can be due to a significant reason, namely political aspects. In Eastern European countries, the transition process involved, besides economic changes, other kinds of change, especially, the political system. It is the case that the political aspects led to economic changes in this region. In the Middle East countries (Egypt, Israel, and Jordan), the kind of changes merely focus on economic aspects, whereas the political aspects grew out of these changes. Since this research will concentrate on Egypt, so, the expression economic reform programme will be used in this research.

There are many definitions of economic reform programme. According to the Oxford English Dictionary, the meaning of reform is "to make better by the removal or abandonment of imperfections, faults, or error" (Sandford 1993). In the same manner the Organization for Economic Co-operation and Development (OECD 1996a) defines the economic reform programme as "an attempt to eliminate a number of market rigidities".

A similar definition to the above regards the economic reform programme as a corrective action to the macro economic policies, which seek to correct the weaknesses in the economic structure (Mosley 1992).

Another broad point of view defines the economic reform programme as a fundamental shift in the way that directs all aspects of economic sectors from a social-oriented economy to an open-market economy (Stuart 1996).

In conclusion, the economic reform programme can be defined as follows: "it is the economic programme which is adopted to achieve a significant improvement in the economic situation".
of any society by addressing problem areas on all sides of this economy, aiming to accelerate the rate of growth and to improve the welfare of the society as a whole.

2.3 Importance and aims of the economic reform programme: -

In the early 1980s, it became clear that the nations that had based their development on centrally planned directives and inward-looking programmes were not only failing to provide their peoples with rising standards of living but, in some cases, were retrogressing.

In many developing nations, the 1980s was the decade of debt crisis and high inflation. Nations rich in natural and human resources found themselves virtually unable to earn enough foreign exchange to satisfy their people's needs. The contrast between the fortunes of these nations-most of the developing countries of Africa, Asia and Latin America as well as the centrally planned economies of Eastern Europe-and those that followed more market-oriented strategies-the newly industrializing countries (NICs) of southeast Asia-became painfully obvious, as the latter caught up with and surpassed the former in virtually every measure of economic and social well-being (CIPE 1992a).

A few years ago, many of these developing nations were attempting to transform their societies by adopting market-oriented mechanisms in the hope of making up for lost time. The countries of East and South-East Asia, the countries of Central and Eastern Europe and the former Soviet Union, and the countries of Latin America and Africa have undertaken a broad economic reform programme, embarking on an historic journey to transform their economies and societies from public sector domination to ones where entrepreneurialism can flourish in response to market signals (Bgcolor 1996).

In the East European economy, for example, there are many economic problems: shortages and general weakness on the supply side of the economy, soft budget constraints at the level of
both individual enterprises and the economy as a whole, repressed inflation which resulted in other manifestations of excess aggregate demand, hidden unemployment, which was reflected in low labour productivity, and a substantial level of unproductive rent-seeking activity. So, it became urgent to adopt a programme of economic reform to treat the deficiencies in these economic activities (Bird 1992).

Through the literature previously mentioned in this chapter, there are also many negative factors in the aggregate economy which make the economic reform programme very important for the countries, which are suffering from these problems. These deficiencies in the economy can be summarized as follows: an imbalance in an economy which is usually reflected in the prevalence of high inflation and balance of payments deficits, on the one hand, and low rates of employment and growth, on the other hand. These imbalances can be due to a variety of factors, but one common element that generally characterizes them is an excessive or unsustainable expansion in aggregate demand. In most instances, variations in aggregate demand and expenditure- associated, as they often are, with a relatively stable aggregate supply function- are the major causes of fluctuations in output, prices, and the balance of payments, especially in the short-run. Fiscal imbalances stemming from levels of expenditure that exceed the public sector's revenue raising capacity often lie behind the unsustainable expansion in aggregate demand and consequent weakness in the balance of payments. Correction of these imbalances normally requires an economic reform programme to restrain the expenditures or to raise the revenues or to do both of them together (see, Gold 1980, Goreux 1980 and Killick 1982).
The higher inflation rate can be considered also as one of the most important factors, which push the government to make macro economic reforms. In another words, the high inflation rate makes countries act. So, it can be stated that "broader reforms were the children of high inflation crisis" (Easterly and Bruno 1996).

To indicate to what extent the economic reform programme is important, Fisher, Sahay, and Vegh (1996) found that the countries that suffered a high inflation crisis, which means more than a 40 per cent rate of inflation over the last 2-4 years, virtually suffered from the sharp fall in growth during the inflation crisis period. However, the growth rate after the end of a high-inflation crisis was higher than before this crisis. GDP growth was positive after the inflation rate tended to decline. At the same time, it was noticeable that GDP growth became more and more positive from year to year up to 3 per cent after 7 years following the reform in many countries.

To show the importance of what an economic reform programme represents in terms of economic freedom, the following study by Gwartney and Lawson (1996) indicated the effect of economic freedom on the growth rate of the economy. In fact, this study tests the relationship between money and inflation, government operation and economic structure, "takings" and discriminatory taxation, international trade, and the rate of growth. The study was designed to cover 82 countries from less developed countries (LDCs) and also covered the years 1975, 1980, 1985, 1990, and 1993-1995. The study suggests that the following four items have a significant effect on the rate of growth of the economy as follow: -

Money and inflation, government operations and economic structure, "taking" and discriminatory taxation, and international trade.
• Money and inflation: this item reflects the expansion of the money supply and the general rate of price increase. The four components of this item are:

- the average annual rate of growth of the money supply during the last five years minus the potential rate of growth of real GDP,
- the standard deviation of the annual rate of inflation during the last five years,
- the freedom of a citizen to own a foreign currency bank account domestically, and
- the freedom of a citizen to maintain a bank account abroad.

• Government operations and economic structure: this item tends to identify the extent that resources are directed by personal choice and markets rather than political planning and coercion. The six components of this item are:

- general government consumption expenditure as a per cent of total consumption,
- the role and per cent of government-operated enterprises,
- price controls- the extent that businesses are free to set their own prices,
- freedom of private businesses and cooperatives to compete in markets,
- equality of citizens under the law and access of citizens to a non discriminatory judiciary, and
- freedom from government regulations and policies that cause negative real rates of interest.

• "Takings" and discriminatory taxation: this item indicates the degree to which governments protect income and property rights rather than engage in plunder activities. The three components of this item are:

- transfer and subsidies as a per cent of GDP,
- the top marginal tax rate and income threshold at which it applies.
- the use of conscripts to obtain military personal.

• International trade: this item tends to indicate the consistency of policies with free trade.

The four components of this item are:
- tax on international trade as a per cent of exports plus imports,
- differences between the official exchange rate and the black market rate,
- the actual size of the trade sector compared with the expected size, and
- restrictions on the freedom of citizens to engage in capital transactions with foreigners.

The above four items contain 17 components, which are designed to calculate the index of economic freedom. To make it easier to compare countries, the study assigned a letter grade based on the summary index rating. Countries with an index rating of 8.0 or more were given an "A" grade. Ratings between 7.0 and 7.9 were assigned a "B". Below that point, one letter grade was subtracted for each decline of 1.0 in the summary rating. Thus, countries with ratings between 6.0 and 6.9 were assigned a grade "C", and so on (Gwartney and Lawson 1996). Table 2.1 presents the 1993-1995 rating for the 82 less developed countries:

Table 2.1
Ratings and grades of economic freedom for less developed countries (1993-1995)

<table>
<thead>
<tr>
<th>Less developed countries</th>
<th>Rating of economic freedom</th>
<th>Grade of economic freedom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong</td>
<td>9.0</td>
<td>A+</td>
</tr>
<tr>
<td>Singapore</td>
<td>8.2</td>
<td>A</td>
</tr>
<tr>
<td>Malaysia</td>
<td>7.1</td>
<td>B</td>
</tr>
<tr>
<td>Thailand</td>
<td>6.9</td>
<td>C</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>6.8</td>
<td>C</td>
</tr>
<tr>
<td>Taiwan</td>
<td>6.8</td>
<td>C</td>
</tr>
<tr>
<td>Panama</td>
<td>6.8</td>
<td>C</td>
</tr>
<tr>
<td>South Korea</td>
<td>6.7</td>
<td>C</td>
</tr>
<tr>
<td>Belize</td>
<td>6.3</td>
<td>C</td>
</tr>
<tr>
<td>Argentina</td>
<td>6.2</td>
<td>C</td>
</tr>
<tr>
<td>Chile</td>
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<td>C</td>
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<td>C</td>
</tr>
<tr>
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<td>C</td>
</tr>
<tr>
<td>Bolivia</td>
<td>6.1</td>
<td>C</td>
</tr>
<tr>
<td>Jamaica</td>
<td>6.1</td>
<td>C</td>
</tr>
<tr>
<td>Mauritius</td>
<td>6.1</td>
<td>C</td>
</tr>
<tr>
<td>El Salvador</td>
<td>6.0</td>
<td>C</td>
</tr>
<tr>
<td>Philippines</td>
<td>6.0</td>
<td>C</td>
</tr>
<tr>
<td>Country</td>
<td>Score</td>
<td>Grade</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Trinidad &amp; Tobago</td>
<td>6.0</td>
<td>C</td>
</tr>
<tr>
<td>Paraguay</td>
<td>5.9</td>
<td>D</td>
</tr>
<tr>
<td>Fiji</td>
<td>5.8</td>
<td>D</td>
</tr>
<tr>
<td>Portugal</td>
<td>5.8</td>
<td>D</td>
</tr>
<tr>
<td>Malta</td>
<td>5.8</td>
<td>D</td>
</tr>
<tr>
<td>Indonesia</td>
<td>5.8</td>
<td>D</td>
</tr>
<tr>
<td>Mexico</td>
<td>5.7</td>
<td>D</td>
</tr>
<tr>
<td>Botswana</td>
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<td>D</td>
</tr>
<tr>
<td>Peru</td>
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<td>D</td>
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<tr>
<td>Honduras</td>
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<td>D</td>
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<tr>
<td>Ecuador</td>
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<td>D</td>
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<tr>
<td>Colombia</td>
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<td>D</td>
</tr>
<tr>
<td>Czech Republic</td>
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<td>D</td>
</tr>
<tr>
<td>Pakistan</td>
<td>5.2</td>
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</tr>
<tr>
<td>Dominican Republic</td>
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</tr>
<tr>
<td>Greece</td>
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</tr>
<tr>
<td>Cyprus</td>
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<tr>
<td>South Africa</td>
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<td>F</td>
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<td>Jordan</td>
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<td>F</td>
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<tr>
<td>Sri Lanka</td>
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<td>F</td>
</tr>
<tr>
<td>Poland</td>
<td>4.8</td>
<td>F</td>
</tr>
<tr>
<td>Gabon</td>
<td>4.7</td>
<td>F</td>
</tr>
<tr>
<td>Chad</td>
<td>4.5</td>
<td>F</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>4.4</td>
<td>F</td>
</tr>
<tr>
<td>Ghana</td>
<td>4.4</td>
<td>F</td>
</tr>
<tr>
<td>India</td>
<td>4.4</td>
<td>F</td>
</tr>
<tr>
<td>Tunisia</td>
<td>4.3</td>
<td>F</td>
</tr>
<tr>
<td>Turkey</td>
<td>4.2</td>
<td>F</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>4.2</td>
<td>F</td>
</tr>
<tr>
<td>Israel</td>
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<td>F</td>
</tr>
<tr>
<td>Egypt</td>
<td>4.2</td>
<td>F</td>
</tr>
<tr>
<td>Mali</td>
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<td>F</td>
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<tr>
<td>Slovakia</td>
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<tr>
<td>Cameroon</td>
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<td>Malawi</td>
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<td>F</td>
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<tr>
<td>Kenya</td>
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<td>F</td>
</tr>
<tr>
<td>Senegal</td>
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<td>F-</td>
</tr>
<tr>
<td>Central African Rep.</td>
<td>3.9</td>
<td>F-</td>
</tr>
<tr>
<td>Venezuela</td>
<td>3.9</td>
<td>F-</td>
</tr>
<tr>
<td>Morocco</td>
<td>3.9</td>
<td>F-</td>
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## Continue Table 2.1

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<thead>
<tr>
<th>Country</th>
<th>Rating</th>
<th>Grade</th>
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<tbody>
<tr>
<td>Sierra Leone</td>
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<td>F-</td>
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<tr>
<td>Benin</td>
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<td>Niger</td>
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<td>F-</td>
</tr>
<tr>
<td>Rwanda</td>
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<td>F-</td>
</tr>
<tr>
<td>Togo</td>
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<td>F-</td>
</tr>
<tr>
<td>Congo</td>
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<td>F-</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>3.0</td>
<td>F-</td>
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<tr>
<td>Hungary</td>
<td>3.0</td>
<td>F-</td>
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<td>Nepal</td>
<td>3.0</td>
<td>F-</td>
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<td>Madagascar</td>
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<td>F-</td>
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<tr>
<td>Nigeria</td>
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<td>F-</td>
</tr>
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<td>Cote d'Ivoire</td>
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<td>F-</td>
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<td>F-</td>
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<td>F-</td>
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<td>Uganda</td>
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<td>F-</td>
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<tr>
<td>Romania</td>
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<td>F-</td>
</tr>
<tr>
<td>Burundi</td>
<td>3.0</td>
<td>F-</td>
</tr>
<tr>
<td>Brazil</td>
<td>2.0</td>
<td>F-</td>
</tr>
<tr>
<td>Nicaragua</td>
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<td>F-</td>
</tr>
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<td>Syria</td>
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<td>F-</td>
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<td>Algeria</td>
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<td>F-</td>
</tr>
<tr>
<td>Iran</td>
<td>1.0</td>
<td>F-</td>
</tr>
<tr>
<td>Zaire</td>
<td>1.0</td>
<td>F-</td>
</tr>
</tbody>
</table>


As seen from the table, the economy of Hong Kong was the highest rated between 1993-95. Among the other less developed countries, Singapore, Malaysia, Thailand, Costa Rica, Taiwan and Panama received the highest ratings in 1993-95. At the other end of the spectrum, the index indicates that the economies of Romania, Burundi, Brazil, Nicaragua, Syria, Algeria, Iran and Zaire were the world's least free in the each to mid-1990s.

Chart 2.1 and 2.2 present the average per capita GDP and growth figures by grade level. It is clear from these figures that both the per capita GDP (chart 2.1) and its growth rate (chart 2.2) are positively linked to a country's economic freedom.
**Chart 2.1**  
The relationship between economic freedom grade and average per capita GDP

![Bar chart showing the relationship between economic freedom grade and average per capita GDP in 1995.](chart1)


**Chart 2.2**  
The relationship between economic freedom grade and average growth rate of real GDP

![Bar chart showing the relationship between economic freedom grade and average growth rate of real GDP in 1985-1995.](chart2)

The economic freedom has a positive impact on growth and eventually the level of income achieved, this means that the income and growth figures are positively correlated with the index rating. This positive correlation suggests that countries that follow policies more consistent with economic freedom reap a payoff in the form of more rapid economic growth that leads to higher living standards.

The study also tested the change in a country's rating over time, which can be considered as more important than the rating at a particular point in time. Once viewed over a lengthier period, however, moves toward economic liberalization should exert a positive impact on the growth of income. Correspondingly, shifts away from economic freedom are likely to be associated with sluggish growth and perhaps decline in income. The study used the index ratings to determine the countries that improved the most as well as those that regressed the most during the 1975-90 period. Chart 2.3 indicates the 12 less developed countries that registered the largest gains in economic freedom between 1975 and 1990. Chile, Jamaica, Malaysia, Turkey and Pakistan head this list. Chart 2.4 presents similar data for the 11 countries with the largest declines in economic freedom during the same period. Nicaragua, Somalia, Iran, Honduras and Venezuela head the list of those that regressed the most between 1975 and 1990.
Chart 2.3
The relationship between the change in economic freedom grade and the change in per capita GDP

<table>
<thead>
<tr>
<th>Country</th>
<th>Change in Economic Freedom Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chile</td>
<td>2.9</td>
</tr>
<tr>
<td>Jamaica</td>
<td>2.0</td>
</tr>
<tr>
<td>Malaysia</td>
<td>2.0</td>
</tr>
<tr>
<td>Turkey</td>
<td>1.9</td>
</tr>
<tr>
<td>Pakistan</td>
<td>1.9</td>
</tr>
<tr>
<td>Egypt</td>
<td>1.8</td>
</tr>
<tr>
<td>Portugal</td>
<td>1.7</td>
</tr>
<tr>
<td>Singapore</td>
<td>1.7</td>
</tr>
<tr>
<td>Mauritius</td>
<td>1.7</td>
</tr>
<tr>
<td>Thailand</td>
<td>1.4</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1.4</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>1.4</td>
</tr>
<tr>
<td>Average</td>
<td></td>
</tr>
</tbody>
</table>

Changes in rating 1975-1990 are in parentheses


Chart 2.4
The relationship between the change in economic freedom grade and the change in per capita GDP

<table>
<thead>
<tr>
<th>Country</th>
<th>Change in Economic Freedom Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nicaragua</td>
<td>-4.4</td>
</tr>
<tr>
<td>Somalia</td>
<td>-1.8</td>
</tr>
<tr>
<td>Iran</td>
<td>-1.8</td>
</tr>
<tr>
<td>Honduras</td>
<td>-1.4</td>
</tr>
<tr>
<td>Venezuela</td>
<td>-1.4</td>
</tr>
<tr>
<td>Congo</td>
<td>-1.2</td>
</tr>
<tr>
<td>Zambia</td>
<td>-1.1</td>
</tr>
<tr>
<td>Tanzania</td>
<td>-1.0</td>
</tr>
<tr>
<td>Algeria</td>
<td>-0.8</td>
</tr>
<tr>
<td>Morocco</td>
<td>-0.7</td>
</tr>
<tr>
<td>Panama</td>
<td>-0.7</td>
</tr>
<tr>
<td>Average</td>
<td>-1.2</td>
</tr>
</tbody>
</table>

Changes in rating 1975-1990 are in parentheses

All 12 of the countries with the largest increases in economic freedom achieved impressive growth rates during 1985-94. In fact, the slowest growth of per capita GDP among this group was the 2.1 per cent registered by both Jamaica and Costa Rica. On average, the per capita GDP of the nations in the most improved category grew at an annual 4 per cent between 1985 and 1994. At this rate, per capita income would double every 18 years.

The economic record of the countries that restricted economic freedom during 1975-90 stands in stark contrast to that of economies moving toward liberalization. In the 11 countries for which the index of economic freedom fell the most, the annual rate of real per capita GDP declined, on average, at an annual rate of 1.2 per cent during 1985-94. Seven of the 11 countries that moved toward more restrictive practice experienced reductions in real per capita GDP. None achieved an impressive growth rate. The best among these countries was the 0.5 per cent growth rates of Morocco and Tanzania. So, the study indicated the importance of monetary stability, taxes and gains from trade. Among the 12 less that made the largest moves toward economic liberalism during the 1975-90 period, all except Turkey and Jamaica avoided the monetary expansion and high inflation. Moreover, with the exception of Mauritius, it is now legal for citizens in each of these countries to maintain foreign-currency bank accounts whereas twenty years ago all but two countries banned them. These accounts provide nationals with a means of holding money as a store of value and makes it much easier to deal with monetary and price instability. As an integral part of this liberalization strategy, each of these countries also substantially and persistently reduced the top marginal tax rate applicable to personal income. In 1975, the top rate in all 12 countries was 50 per cent or more. Except for Turkey, by 1994 this was no longer the case. During the last two decades, Chile's top marginal rate was sliced from 80 per cent to 48 per cent, Jamaica's from 60 per cent to 25 per cent, Malaysia's from 50 per cent to 34 per cent, and Portugals from 82 per cent to 40 per cent.
Finally, the study used data for tariffs, exchange rate controls (the size of the black-market exchange rate premium) and the size of the trade sector to reflect the presence of trade restrictions. Changes in the relative size of the trade sector (using the formula of one-half of exports plus imports as a share of GDP) also reflect the relaxation of various trade barriers. During the last two decades, the relative size of the trade sector has increased in every one of the 12 "most improved" countries. In several cases, the increase has been dramatic. For example, the trade sector as a share of the economy either doubled or almost doubled in Jamaica, Malaysia, Turkey and Thailand. Given their size and population, the trade sectors of Egypt, Singapore and Indonesia were already quite large, giving them high ratings in this area. From all the above, it is clear that the economic reform programme became a crucial factor to protect the economy of any society against more deterioration, specially, when this society faces many problems such as; a debt crisis, high inflation rates, an imbalance in payments, a budget deficit, and a deterioration in the rate of growth. In summary, an economic reform programme became important ascending to its capability to correct the deficit and treat or solve the economic problem of a given country.

Also, Borensztein and Ostry (1996) indicated that the economic reform programme had a significant effect on the one of the most socialist countries, which is China. Table 2.2 can declare this effect.

**Table 2.2**
The China's economy before and after the economic reform

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>5.9</td>
<td>9.2</td>
</tr>
<tr>
<td>Net investment / GDP</td>
<td>19.9</td>
<td>24.8</td>
</tr>
<tr>
<td>Total factor productivity</td>
<td>- 0.7</td>
<td>3.8</td>
</tr>
</tbody>
</table>

*These figures are according to the official estimates.*
Without doubt, the main target of any programme of economic reform is to accelerate the rate of growth of the economy, and to increase per-capita income in order to enhance the welfare to the society as a whole (see Cobbs 1994, and Laban and Sturzenegger 1994 and Lissowska and Swaan 1996). Also, Angelove (1992) indicated that the most important objective of any programme of economic reform is to provide an appropriate economic climate making it possible to achieve a new quality of growth. It means that growing economic efficiency should become the most important engine for the future growth rate. To achieve the main target of an economic reform programme, there are many subsidiary aims, which will now be outlined.

The challenge which faces reforms, which can be considered as aims of the economic reform programme, can be stated briefly as follows: "it is to raise the aggregate supply and more effectively manage the aggregate demand". However, this brief statement dramatically understates the size of the challenge also the aims of the economic reform programme. Virtually, in most case, the success in meeting the above will involve an almost total change in the nature of economic, political, and social systems (Bird 1992). Giffith (1990), Kenen (1990) and Graham (1994) understand that the process of an economic reform programme aims at: raising aggregate supply and controlling aggregate demand. At the most general level, these will cover fiscal policy, monetary policy, industrial structure and competition policy, social policy and trading and currency policies.

- Fiscal policy reform has ramifications for both the supply side and the demand side of the economy, and for both the micro and macro dimensions. It includes measures to change (raise) individual prices, as subsides will be reduced or removed, to increase tax revenues as the tax system will also be reformed, and to reduce fiscal deficits as the increase in tax revenues are accompanied by reducing government expenditure.
Monetary policy reform also comprises micro, institutional and macro elements. In one way, monetary policy reform is a necessary adjunct to the move toward a market-based economy, since money clearly facilitates the operations of the price system. But, more specifically, financial reform is needed in all the countries, which wish to adopt a programme of economic reform in order to provide better intermediation between savers and investors. However, failure to provide an increased array of financial assets as people dissave and move out of money will limit the available range of substitutes for real goods and services and will therefore emphasize inflationary pressures which may themselves discourage future saving. A danger is clearly either that excesses of domestic investment over domestic saving will lead to foreign borrowing and balance of payments and debt problems, or that domestic investment will have to be kept in line with domestic saving. Failure to achieve monetary policy reform may also hit new firms, which often rely on credit and upon which future economic growth depends. At the macro level, the need will be to achieve monetary stability and to avoid the undoubted pressures that will arise to soften fiscal constraints by financing deficit through credit creation.

There are also reforms aimed at improving industrial structure and competition, including privatization. Within developing countries’ economies, which adopted a programme of economic reform, where state enterprises have been perhaps particularly inefficient, it will clearly be most important that privatization does not merely alter the ownership of enterprises without doing anything to improve their management and economic performance. Increased efficiency appears to depend crucially on being able to increase significantly the degree of competition. In fact, industrial and competition policy has to deliver a supply response that is large enough to fulfil the aspirations that the economic reform programme generates.
Instilling greater efficiency through competition will, however, also rely heavily on trade and currency policy. The end of a trading monopoly, a move away from trading arrangements, and the introduction of currency convertibility appear to be vital steps in this context, although a relaxation in attitudes to foreign investment will also be required in order to facilitate inward technology transfer. In fact, developing countries under an economic reform programme must do other than rely heavily on imported technology. It is important to them to concentrate on the human capital. For this reason, they need to pay attention to social policy, education, health and housing, as well as the environment.

Kennan and Stevens (1992) see that the aims of any programme of economic reform can be summarized by: drastically cutting budget expenditure and to combating the inflation rate both directly, via monetary policy, and indirectly by breaking up monopolies and encouraging competition. They added that the two cornerstones of the economic reform programme are a severely restrictive monetary policy, designed to reduce sharply the stock of money, and the introduction of interest rates in line with inflation rates. From another point of view, Gomulka (1993) observes that the economic reform programme package usually consists of the following measures:

- Price liberalization: this can be achieved through the reduction of subsidies and the deregulation of price fixing, accompanied by the liberalization of domestic trade.
- Balancing the government budget: it can be achieved through increasing taxes, and cutting government spending (beyond reducing price subsidies).
- A restrictive monetary policy: through an increase in the Central Bank interest rate so as to restore a positive real rate of interest, and introducing a direct regulation of bank lending.
- Foreign trade liberalization: this item can be achieved through the lifting of export and import licenses, and through giving permission to all enterprises to engage in foreign trade;
through tariffs, which were meaningless in the previous system of administered trade, and the same time became active instruments of trade policy, and were lowered so as to express the commitment to trade liberalization.

- Convertibility of the domestic currency: this mean that domestic enterprises and society in general can buy or sell freely the foreign currency for any purposes.
- Launching privatization and the dismantling of the former state monopolies.
- Setting up a market environment: this can be achieved through reforms in the banking and financial sectors and tax reform.

The above two points of view tend to be similar. Both of them mainly concentrate on both fiscal and monetary policies.

In a similar view, Colijn (1991), and Grosfied and Hare (1991) determined the aims of an economic reform programme when they were studying the case of Czechoslovakia as follows:

- Removing the legislation restrictions on private economic activities, encouraging foreign investment, and preparing the denationalization of state enterprises.
- Amending the existing law on joint ventures to allow 100 per cent foreign ownership of enterprises.
- Introducing fiscal reform to achieve a budget surplus through a decrease or, at least, a restraint on government expenditure.
- Devaluation of the exchange rate of the currency. This must be accompanied by an increase in the level of exports and a decrease in the level of imports.
- Introducing a programme of retraining and a relocation of displaced workers.

According to this point of view, the aims of the economic reform programme look to be broader than the previous perspectives. The economic reform programme here tends- beside its concentration on fiscal and monetary polices- to focus firstly on the climate of investment,
through denationalization of state enterprises and permission to foreign investors to own enterprises up to 100 per cent. Secondly, this point of view took into account the social dimension through noting the importance of creating a programme of retraining and a relocation of displaced workers. Finally, this point of view also focused on the importance of increasing the level of exports and decreasing the level of imports.

Also, Mihalyi and Smolik (1990) perceive the same aims of an economic reform programme, which are highlighted in the following points:

- Stopping the decline of the official economy in order to: contain the inflation rate, mobilize domestic and foreign investment funds and allocate them efficiently, improve living conditions, and prevent a further marginalization of the middle class.

- Transformation of the state enterprises and co-operatives into joint stock companies, ownership being transferred to external owners including foreign investors. Promotion of competition, which includes a large package of different measures affecting product and factor markets and the behaviour of the state sector.

- Establishing a social fund to limit the negative impact of the economic reform programme on the welfare of the population. Higher prices resulting from subsidy cuts are to be offset by increased pensions and family allowances. Provision are to be made for budget allocations for unemployment compensation, employment services, and retraining programmes. All of these are to counter the effects of higher unemployment, particularly during the first period of the economic reform process.

On the other hand, the International Monetary Fund (IMF) summarized the aims of the economic reform programme in two main dimensions as follows:
First there are stabilization policies, which seek to reduce domestic demand and external
deficit through restrictive monetary and fiscal policy and devaluation, and second, there are
structural adjustment policies, such as price liberalization, financial reform, and privatization,
which are intended to make the economy more responsive to market signals (see Nsouli and

In the same manner, Mosley (1992) divided the aims of an economic reform programme into
two categories: stabilization aims and structural adjustment aims. The aims of each stage are
expounded as follows:

- Stabilization aims: reduction of government expenditure, limitations of money supply or
  internal credit resulting in higher rates of interest, and a reduction in real wage levels, can be
  achieved either directly through public sector wage cuts and lower legislated minimum wage
  levels, or indirectly through the downward pressure exercised by the rising unemployment
  associated with falling output levels. A stabilization programme addresses temporary
  imbalances by reducing the level of economic activities, without affecting the system's
  structural characteristics. Equilibrium can be achieved through a reduction in the level of
demand.

- Structural adjustment, on the contrary, aims at balancing the economy through an expansion
  of supply, which can be achieved by overcoming existing bottlenecks and distortions. In fact,
  three broad components are present in most structural adjustment programmes:
  - increased openness of the national economy to international trade, this can be achieved
    through a reduction of export taxes and import tariffs and also more effective by a devaluation
    in the currency exchange rate;
  - liberalization of the price system in order to favour an efficient allocation of resources. This
    step usually involves a liberalization of rates of interest, a reduction in government subsidies
to specific goods and services, as well as an elimination of tariffs and restrictions on the currency exchange rate;

- reform of the revenue and expenditure structure of the public sector. This step includes a reduction of price subsidies and international trade taxes, a greater role for direct taxation (income and property) and a smaller role of the state in both regulation and direct involvement in productive activities, of which the latter can be achieved through prevarication programmes. Leaving aside specific aspects tailored to the situation of individual countries, six economic policies can therefore be associated with structural adjustments: -

- a reduction in export taxes, a reduction in import tariffs, a stabilization of exchange rates and rates of interest, an elimination of price subsidies, and an increase in direct taxation.

Finally, Kennan and Steven (1992) set out the aims of the economic reform programme in the following items:

- To achieve budgetary balance, this is can be done through increasing tax revenues, reducing government investments and reducing government subsidies.

- Tight monetary policy with positive real rates of interest to eliminate the hidden subsidies from household savers to state enterprises via low rates of interest in the banking sectors.

- Eliminating controls on prices in the various activities of the economy.

- Rescheduling foreign debts.

Liberalization of foreign trade; this is can be achieved through the lifting quantitative and licensing restrictions, the lowering of tariffs, export incentives including export-related income tax relief, a foreign exchange retention system, and deregulation of state enterprises.
In conclusion, there are many different points of view relating to the aims of an economic
reform programme. The main reason for this variation can be due strongly to the nature of the
regions or countries on which the authors concentrated their studies or investigations. Despite
this variation, there are common aims of any programme of economic reform. These common
aims can be summarized mainly in two dimensions: Fiscal policies and monetary policies.

2.4 Measuring the economic reform programme performance:

One of the most important issues of an economic reform programme is measuring its success.
To assess the performance of any programme of economic reform, it is important firstly to
determine the variables, which should be used as measurements to reflect the performance of
an economic reform programme.

From the literature review, it was found that there is some variation among the authors in their
choice of the variables of an economic reform programme. The programme of economic
reform according to many authors, for example, Charemza (1991), Hare and Hughes (1991),
Hrmeir and Klacek (1991), and Landesmann (1991) can be measured through the following
variables: price liberalization, exchange and trade liberalization, and privatization
accompanied by aspects of fiscal and monetary policy and incomes policy.

On the other hand, Lavigne (1995) selected the following variables of an economic reform
programme:

• the inflation rate,
• the government budget,
• the balance of payments,
• the rate of growth,
• the liberalization of prices,
• the currency exchange rate, and
• the privatization process.

According to Lavigne, all these items can be treated as performance measures of an economic reform. For example, the rate of inflation should decrease after a once-for-all sharp rise in prices following the ending of subsidies, the budget deficit should be reduced, and the balance of payments situation should be improved. Along with these expected positive effects, a deterioration in real indicators is anticipated, with a drop in output, consumption and investment, but this is supposed to be a rather limited and short-lived phenomenon, with a quick recovery following the implementation of economic reform. So, the rate of growth of the economy should tend to increase.

It has been argued earlier that other authors regarded several slight sensory differences as criteria as measures of the performance of an economic reform programme, as indicated by the following variables:
• the inflation rate,
• rates of interest,
• the government budget,
• the Current account,
• the balance of payments,
• the trade liberalization (imports and exports),
• the convertibility of domestic currency,
• the rate of employment, and
• the privatization process.
In one empirical study, the Center for International Private Enterprise (CIPE 1992a) determined nine key policy categories as economic reform programme indicators: trade liberalization, foreign exchange management, financial market liberalization, wages and prices, fiscal and monetary policy, privatization, foreign investment, free flow of information and the existence of an enabling environment.

As mentioned in the previous section, where there are variations in determining the aims of an economic reform programme, there are also variations among the authors in determining the variables of an economic reform programme. In fact, the variables of an economic reform programme, which are considered as a criteria to assess the performance of this programme, must reflect the aims of an economic reform programme which are already determined. So, it is noticeable that the variation among the authors in determining the aims of an economic reform programme led to the same kind of variation in determining the variables of an economic reform programme. This is because every author determined the variables of an economic reform programme according to his previous perspective on the aims of this programme.

In conclusion, while it is possible to identify the main targets of an economic reform programme, the details of any specified economic reform variables will differ from one country to another. This is can be due to the fact that the economies of the countries are not homogeneous and this implies that there will be variations on the theme of economic reform variables.

Having considered the above studies, it is noticeable that there are many common variables of any programme of economic reform:
• the inflation rate,
• the interest rate,
• the foreign exchange rate,
• the government budget,
• the privatization process, and
• the balance of payments

According to the above, this research will consider the first five variables beside another three variables: the real interest rates, the real GDP growth rate and per capita income, as measurements of the performance of the economic reform programme. This is because these variables ought to have a significant effect on the performance of the stock market compared with the other variables (see chapter 4, the relationship between the economic reform programme and the stock market performance).

The point now is: how to measure the performance of an economic reform programme giving the variables, which have been selected.

In 1990, the Center for International Private Enterprise (CIPE 1992b) began a comparative survey of the reform process in 28 developing and 4 former socialist countries from all of the regions in the world, i.e. Africa, Eastern Europe, Latin America and South and East Asia, to examine the transition to market economies (i.e. economic reform programmes).

To ascertain the extent of the economic reform programme in a country, two time periods, a pre-economic reform programme and an economic reform programme period, were established, based on decisive policy changes, such as a new reform programme or some other indicator of change or intent to change.
Essentially, the survey data are not to be construed as hard numbers measuring the success of a country's implementation of economic reform programme. However, they do provide an interesting indicator of general trends in commitment to the economic reform programme ideal, in terms of deregulation, trade and the other policy areas. It means that the model was not designed to measure an economy's response to the economic reform programme policies, but a country's commitment to this programme of the economic reform ideal.

On the other hand, Guitian (1982) provided a variety of standards to measure the performance of the economic reform programme. These standards or measurements can be classified into three categories.

The first standard is the positive or practical standard: this method can be used to measure the performance of the countries' economies under an economic reform programme by comparing their results to the situation that prevailed in the economy prior to the introduction of this programme. This positive or practical standard amounts to a measure of what is relative to what was.

The second standard can be called a normative standard: this standard tends to measure the performance of the countries' economies under an economic reform programme by comparing the actual results, which were achieved under the economic reform programme period, to the targets which were already specified when the economic reform programme was introduced. This second or normative standard compares, in a sense, what is with what should be.

The third standard is a standard that might be called a conjectural or judgmental standard: this kind of standard aims to compare the actual performance of adopting an economic reform programme with the outcome that would have taken place in the absence of the economic reform.
reform programme. In fact, this third standard, or conjectural standard, focuses on a comparison of what is versus what would have been.

In fact, all of these standards can be used to measure or evaluate the performance of the economic reform programme, but this is dependent on the nature and intent of the assessment.

The second standard, the normative standard, which compares the results of the economic reform programme to the targets of this programme, allows for a measure of judgement. It can enable an evaluation of the performance of any programme of economic reform, through determining to what extent the economic reform programme achieved its targets, which were already determined at the start of this programme. The problem, which related to this standard, can be summarized in two points: firstly, the targets of any programme of economic reform may be changed from time to time according to the circumstance of the economic situation of a given country. Secondly, many governments, when announcing an economic reform programme, tend to set ambitious targets in order to influence the society through this programme; however, these targets may be over-stated. In other circumstances, these targets tend to be under-stated in order to show that the government has succeeded in achieving, at least, the targets of its economic reform programme. So, the comparison between the targets and the results of the economic reform programme in these circumstances would not be meaningful or even relevant.

The third standard, the conjectural or judgmental standard, can be considered as the most controversial standard from many points of view (Khan and Langmead 1990). This may be due to the fact that the objective of most assessments to compare what has happened with what would have happened in the absence of the economic reform programme. For example, with some counterfactual reports, which may be approximated in a variety of ways, the results are unavoidably controversial, since the counterfactual cannot be observed and depends on
assumptions made. Otherwise, it will be difficult, in circumstance of implementing a programme of economic reform, to determine the situation of the economy of a given country, if this country did not adopt the economic reform programme.

Finally, the first standard, the positive standard, can be considered as the least controversial because this kind of standard simply compares sets of factual information.

From the stand-point of the objectives and hypotheses of this research, which tend to evaluate to what extent the economic reform programme succeeded in improving the economic situation in Egypt, the first standard (positive standard) compared with the other two standards, can give a more straightforward assessment, especially since this research aims to state the actual performance in the economic situation under the economic reform programme compared with its situation prior to adopting this programme.

As shown above, there are many common variables that can be used to measure the performance of the economic reform programme. To achieve the objectives of this research, the following features will be considered in measuring the positive standard:

• To what extent interest rates decreased to encourage the investment process in Egypt.

• To what extent the real rates of interest have become positive.

• To what extent the inflation rate has decreased.

• To what extent the exchange rate became stable.

• To what extent the real GDP growth rate increased.

• To what extent the per capita income increased.

• To what extent the government succeeded in decreasing the budget deficit.

• To what extent the government succeeded in implementing the privatization process.
2.5 The economic reform programme process: -

In theory, as long as the real rate of return on investment financed from external borrowing is equal to, or greater than, the real rate of interest, no debt problems should arise. This, however, does not appear to have been borne out in an increasing number of countries, whose external debt obligations have exceeded their ability to service them. In fact, the problems of debt serving have arisen for a variety of reasons. Firstly, the overly ambitious nature of government expenditure programmes has given rise to excessive borrowing. Secondly, the real rates of return on investment of the resources from external borrowing have been inadequate compared with the real rates of return on these debts. Thirdly, there has been a lack of central control and monitoring of the contracting of external debts. And finally, the general balance of payments problems, whether caused by domestic policies or exogenous factors or both of them together, led to reductions in foreign exchange resources and thus put some sort of constraints on the ability of certain countries to meet their contractual obligations on their outstanding external debt. For all the above reasons and others, an increasing number of countries have been faced with debt serving problems (Nowzad 1982).

According to the debt problem, debt reduction is surely going to be needed. So, the first step in an economic reform programme, in fact, represents relieving a stake of these debts. In essence, many years ago, the International Monetary Fund and the creditor governments had not yet acknowledged the role of debt reduction. The International Monetary Fund was still insisting on debt serving, despite the obvious potential harm of such an approach. The debt crisis erupted into global consciousness in dramatic fashion with the announcement by Brazil and Mexico in 1982 that they were unable to maintain debt service payments (Dixon, Narman Simon and Spengen, 1995). Also Bolivia eventually cut short the debate, saying "look, we
cannot pay, and we are not going to pay", a message which was sent to the International Monetary Fund (see Grindle and Thomas 1991 and Feinberg 1992).

Eventually, after heated arguments, the International Monetary Fund acknowledged the need for a complete standstill on debt serving and the cancellation of a substantial part of the debt. In 1987 the International Monetary Fund became the sponsor of many countries’ debt buy-back operations with the commercial banks.

The second step in an economic reform programme, which can be considered related to the first step, is international assistance.

According to Lavigne (1995), foreign assistance can take one or more of the following forms:

- Humanitarian aid, in the form of emergency supplies of food and medicine.

- Technical assistance, such as training, and providing consultancy and macro-economic policy advises.

- Macroeconomic multilateral financing, which can include the drawing on International Monetary Fund facilities.

- Special balance of payments financing, which comprises debt write-offs, rescheduling and concessionary restructuring.

- Financing of specific projects on concessionary terms.

- Providing a stabilization fund to help establish the currency convertibility.

- Granting of export credits on concessionary or non-concessionary terms. In fact, the non-concessionary terms may be considered as assistance, as many countries in an economic reform period would not be able to get credits on normal commercial terms due to their lack of credibility.

- The provision of investment guarantees.
However, most of the developing countries were starting their economic reform programmes due to the debt-rescheduling scheme with the International Monetary Fund.

Through the literature review, it can be seen that the rescheduling of debt and foreign aid played a key role in the economic reform programme in many countries. Mexico for example, can be considered as the World Bank's second largest customer—with $19 billion in loans outstanding at the end of 1991. These aids were crucial in helping Mexico to "get off to a good start". Also, the strength and coherence of Chile's economic reform programme in the 1980s can be due, partly, to the external help. In fact, Chile was a major beneficiary of international assistance after 1982. Between 1983 and 1987, official loans to Chile went from $1.2 billion to $3.9 billion, an increase of 16 per cent of Chile's average GNP over the four years, or an average of 4 per cent per year. Also critical for Poland was the two-stage debt cancellation, which was engineered in 1991 by the Group of Seven with resolute United States leadership. The strength of that deal lay not only on the financial lift that it gave Poland and in the hope that it offered to the Polish people, but also in the key tactical fact that it came in two parts. Part of the debts were cancelled in 1991; the remainder was cancelled in 1993.

In addition, a very successful economic reform programme happened in Turkey during the 1980s, following the financial collapse at the end of the 1970s. In fact, Turkey's financial recovery also owes much to timely international assistance. In 1979 Turkey's financial fragility was of enormous strategic concern to the United States, Germany, and the North Atlantic Treaty Organization (NATO). The Organization for Economic Co-operation and Development (OECD) countries coordinated massive financial assistance to Turkey, so that during 1979-1982 Turkey never had to make net resource transfers to the rest of the world. Israel, which had a successful economic reform programme in 1985, also has had very extensive
international backing. During the first of its economic reform programmes, the United States gave an extra $1.5 billion in aid, above the usual $3 billion per year. This was in the form of grant money that amounted to about 6 per cent of Israel’s GNP.

Finally, Indonesia also was the recipient of an extremely generous debt cancellation deal in 1969 (Williamson 1994).

From all the above examples, it is clear that both debt rescheduling and foreign or international aids can be considered as a cornerstone of any programme of economic reform. Once the agreement has been made with the International Monetary Fund, the process of the economic reform programme starts to take place.

2.5.1 Shock therapy or gradualism: -

However, there are two methods to implement an economic reform programme: shock therapy and gradualism. To choose between these two methods, a comparison between the costs and benefits of discrete, sudden and large-scale change versus those of ongoing and piecemeal change must be done. Both Edwards (1990) and Nelson (1990) understand that the case for gradualism is usually made on the grounds that the fixed cost of the economic reform programme is spread over a longer period of time, reducing its short-run cost. The claim is then made that this makes the economic reform programme more acceptable politically and therefore more achievable. But the counter-claim, however, is that this method does not carry credibility with it. The commitment to change is doubted, the expectation is that the economic reform programme will be reversed and the needed behavioural responses are therefore not necessarily forthcoming. This implies that while the short-run costs may be minimized, longer-run benefits will not be achieved. In fact, the failure to generate benefits brings about further
pressure on the authorities to reverse the economic reform programme. On the other side, shock treatment is, for these reasons, argued to be a more effective method in implementing the Programme. The economic reform programme needs to be deep enough to break inertia and alter expectations. Advocates of shock therapy, as a method to implement the economic reform programme, further argue that the empirical evidence is on their side. Postponing the economic reform programme results in an increase in its eventual costs. Moreover, previous piecemeal attempts at the economic reform programme within Eastern Europe have been largely unsuccessful (Bird 1992).

In the same way, Lavigne (1995), and Sachs and Lipton (1993) see that a shock therapy "big bang" can be viewed as a kind of insurance against any temptation to look for another way. The choice of shock therapy means that the policy-maker of the economic reform programme excludes any move back to the past, and capitalizes on the political and social consensus so as to impose drastic measures, which would immediately lower the standard of living, with the promise of a quick recovery, instead of a muddling through. Poland and Czechoslovakia can be considered as countries, which had precisely this profile. In both countries, the shock was embodied in instant measures such as freeing prices and cutting subsidies. Conversely, in Hungary, for example, the communist power had already collapsed even before 1990 through internal divisions and was totally discredited. Also, Hungary had, for many years, already been on the road to a market economy, so there was no need to follow the method of shock therapy. In the light of this, Hungary adopted the gradualism method in implementing its economic reform programme (see Abel and Bonin 1992, Mural 1992 and Maize 1993). A step-by-step process and the possibility of learning-by-doing, that is, reversing mistake policies, are often considered as a major advantage of gradualism. In contrast, partial steps
introduce new inconsistencies. For example, partial price reforms are likely to distort resource allocation. Learning-by doing is slow, costly and not necessarily a conversion process towards the ultimate goal. A big-bang approach or shock therapy may be undesirable in the short-run, but a complete reform package is needed at the same time (Gros and Steinherr 1995).

According to the above, it is clear that the variation in the speed of implementing the economic reform programme and to choose between the shock therapy method and the gradualism method, in fact, depends on the circumstance of the country's economy. For instance, the Center for International Private Enterprise (1992b) conducted a survey to test if the economic reform programme follows a pattern in all countries. The economic reform survey covered economic reforms that had been instituted in 32 countries throughout the developing world. The analysis found a distinct pattern in the economic reform programme process in 25 of the 32 countries surveyed. The general pattern was first stabilizing the economy, followed by a structural adjustment programme to change the way the government goes about regulating the economy through tax, trade, monetary and fiscal policies, and finally consolidating structural adjustment gains into institutional changes. This economic reform pattern struck varying degrees of resonance within the different regional discussion groups:

• The Latin American and Caribbean group generally agreed that stabilization, structural reforms and institutional consolidation are three phases that constitute the economic reform programme process, although they might not occur in clearly defined stages.

• The Central and Eastern Europe group found that the economic reform programme pattern of their region might follow the results of the survey, although by and large events there were not far enough along to be certain of clear patterns.
In the African countries, economic reform programme patterns were not seen to be so clear cut. Stabilization efforts were usually begun first, but not achieved before structural adjustment and institutional consolidation was underway. After a decade of the economic reform programme, most of the countries of the region are still struggling with stabilization while simultaneously attempting structural adjustment.

East Asian countries, with the exception of the Philippines, generally followed a different pattern than that outlined by the survey. Most of the countries in the region have undertaken structural adjustment and institutional change without ever experiencing the economic crises that required stabilization measures to be taken. In addition, economic reform efforts were generally begun much earlier and carried out consistently over a long period of time.

The South Asian countries were seen as following an economic reform programme pattern not characterized by a linear progression of events. The economic reforms in the region were introduced sporadically and largely forced by political events.

Another study had been done to determine the best way of implementing the economic reform programme (The Economist 1996a). The study found that the fast reformers of Central Europe, such as Poland and the Czech Republic suffered deep recessions in the early 1990s. Now, though, their economies are growing apace and have the basic look of a market economy. In Central Asian countries, such as Tajikistan and Uzbekistan, the economic reform programmes have been slow and piecemeal, and output has continued to decline. Although China, for example, adopted the gradualism method in implementing its economic reform programme, this gradual market reforms has brought a booming economy.

In 1996, the world development report, published by the World Bank, studied this variation in economic performance. The Bank's report is the first comprehensive attempt to compare
Chinese, ex-Soviet and East European experiences and to sort out which strategies have worked and which have not. Shock therapy is best exemplified by Poland, the Czech Republic and Estonia. Prices and trade were liberalized fast, inflation was choked by tight monetary policy and the privatization and demonopolization of industry was started quickly. China, on the other hand, epitomizes gradualism: It freed one or two areas of the economy first and is exposing the rest only slowly to market mechanisms. At first sight the Chinese way looks much the more successful.

The former Soviet Union had huge and inefficient industrial sectors. China's financial system was also underdeveloped: rising incomes increased bank deposits and the demand for money. This in turn allowed the government to print money to finance state firms without causing rampant inflation.

Former Soviet economies were more magnetized. Indeed, they had a "monetary overhang" because their government had been printing money while keeping prices fixed; so once prices were freed, subsidizing state firms through the banking system sparked high inflation. Moreover, the economic reform programme of the former Soviet Union and East Europe combined political with economic collapse; in China the Communist party stayed in full command. Still, the report concludes that in the 26 economies of Eastern Europe and the former Soviet Union, quick reform and faster growth have gone hand-in-hand. Speedy reformers suffered smaller falls in output and returned to growth more quickly. Those that controlled inflation more effectively also grew faster. This means that there is a strong link between the speed of the economic reform programme and economic success, but some countries in the former Soviet Union and Eastern Europe reform rapidly and others not. This is a crucial point that the World Bank does not address. Recently, Aslund, Boone, and Johnson
(1996) argued that the choice between shock therapy and gradualism depended on political forces: post-communist struggles for power determined a country's pace of economic reform and thus its economic performance.

In light of the above, it can be concluded that the method which can be followed to implement an economic reform programme can differ from one country to another. This, in fact, depends on the circumstance of each country, and its economic situation prior to implementation.

Since this research aims to evaluate the economic reform programme in Egypt through many selected variables, which have already been mentioned in the previous section, it will be useful to highlight on how these variables can be controlled.

- Interest rates:
  The real rates of interest must be positive to encourage society to save although the interest rates should not be high in order to encourage firms to finance their businesses, and other investors to establish a new business, which help to accelerate the rate of growth. In many developing countries in the past, the rate of inflation was higher than the rates of interest, so, the real rates of interest were negative and this, in fact, led to distortion and discouragement in financial savings and intermediation. To avoid this circumstance, an economic reform programme seeks to provide a link between the rate of inflation and the rates of interest. Many developing countries, which adopted an economic reform programme, progressed to a completely liberalized interest rate regime, preferring to rely on gradual reductions in the rate of inflation and an upward adjustment in nominal rates of interest to bring about lower negative real rates of interest in the short-term, and then to have positive real rates of interest.
in the long-term. As a consequence, in many developing countries, the real rates of interest became positive (Choksi and Papageorgiu 1986).

- Inflation rate:

Inflation is traditionally defined as a situation in which too much money is chasing too few goods and services. Thus, the options to decrease the rate of inflation are few: it is necessary either to reduce the amount of money doing the chasing or to increase the amount of goods and services being chased. As long as the latter alternative usually takes too much time, then demand restriction seems to be the only solution in the short-term. It is also useful to mention that the reason for the difficulty in increasing the output can be due to the fact that society needs new investment to expand the amount of goods and services where the capacity is fully utilized in all major economic sectors. As the investment requires a gestation period, output could increase only some time after the initial investment. However, many developing countries have considerable excess capacity in their industrial sector and often in the rest of their non-traded goods sectors as well. In fact, this capacity can be mobilized without any gestation period for investment, since the physical plant and equipment are already in place. Naturally, mobilization of this potential additional supply is not instantaneous, but neither is demand a restriction. Thus, in the more realistic situations of many developing countries, there is scope for an expansion of supply in very much the same time frames as there is scope for a reduction of demand (Schydlowsky1982).

Midwinter and Mair (1987) argued that, having controlled and reduced the rate of inflation, a central macroeconomics objective of the economic reform programme, then control of the growth in the money supply can be considered as a central policy mechanism for accomplishing it.
Currency exchange rates:

It is important for any country to minimize the fluctuation in its local currency against foreign currencies. In fact, fluctuations in the exchange rate may change the attractiveness of investment in the domestic market compared with other markets. Also, the exchange rate has an important effect on the trade balance. For instance, Bahmani and Malixi (1992) tested the effects of a change in effective exchange rates of less developed countries on their trade balances. This was assessed by estimating a trade balance model for 13 developing countries from Asia, Europe, and Latin America with quarterly data covering 1973-1985 in order to determine the short-run response of the trade balance to devaluation. Some times the trade balance deteriorates at first, followed by an improvement in time as in the cases of Brazil, Greece, India, and Pakistan. On the other hand, in the case of Egypt, Korea, Mexico, and the Philippines, the trade balance improves after devaluation, then deteriorates for a while, and starts improving again. Although the short-run effects of devaluation on the trade balance differed across countries, its long-run effects are found to be favourable for most countries.

Many developing countries had a multiple exchange rate (MER), which involved the adoption of different exchange rates for different transactions. This type of policy of exchange rate featured at one time or another in the arsenal of economic policy instruments of several developing countries. Over the last 20 years, many developing countries adopted MER to try to influence current account transactions and lower the foreign exchange costs of the public sector. Countries' attempts to influence current account transactions, and to limit budgetary costs through the use of MER, were undermined by the inability to address comprehensively the underlying financial imbalances (El-Erian 1994). Under an economic reform programme these countries needed a unified exchange rate set at a level sufficiently competitive to induce a rapid growth in exports, and managed so as to assure exporters that this competitiveness will
be maintained in the future (Claassen 1991). In fact, many developing countries under the economic reform programme, with over-valued exchange rates, made substantial progress in reducing over-valued exchange rates. Also these countries have recently been willing to move to a more explicit market-oriented basis for exchange rate determination which takes greater account of the parallel market and unifies of the official and parallel rates as an objective, so, the spread between official and parallel market rates have been reduced substantially (Mosley 1992).

- **Budget deficit:**

To treat the deficit in government budgets, countries try to increase their revenues, and decrease their expenditures. To achieve this, many developing countries under the economic reform programme started by cutting or reducing both subsidies and investment, and at the same time those countries used the taxes as an instrument to raise their revenues. Although these methods have a bad effect on the investment climate, this can be considered as an appropriate procedure in the short-run until stability in the government budget is achieved. Also, since the main source of financing budget deficits is money creation, many developing countries, which adopted a programme of economic reform, tend to borrowing on domestic financial markets by issuing government securities. Hungary, Bulgaria, and Russia can be viewed as examples in the Eastern Europe region (see Lavigne 1995, Brada 1993). It is also worthwhile mentioning the importance of the privatization programme in relieving the burden of the state-owned enterprises’ losses, by selling off state assets.
Privatization process:

In fact, criticisms of the state-owned enterprises reflect their lack of efficiency and profitability, which can be due to a bad allocation of resources, and poor management. The productivity of the state sector enterprises is generally lower than the productivity of the private sector. In many developing countries, the governments used the state sector enterprises to achieve social objectives, such as to supply goods and services with lower prices compared with the cost of these goods and services, and also to provide opportunities to reduce unemployment (Liu 1995). Consequently, the state sector enterprises can be considered as a contributor to the government budget deficit (Bouin and Michalet 1991). Furthermore, Davies (1971), Yarrow (1986) and Boardman and Vining (1989) concluded that private enterprises are more efficient and more profitable than the state sector enterprises.

According to the above, the privatization process became a crucial point in improving the performance of these enterprises. So, the privatization process can be considered as one of the most important issues in any programme of economic reform.

Privatization can be defined as a legal transfer of property rights from the state to the private agent (Uvalic 1992). In the same way, Peacock (1984) defines privatization as the transfer of state owned industries to the private sector. While both Beesley and Littlechild (1983) claim that privatization means, in general, the sale of at least 50 per cent of the shares to private shareholders. Shackleton (1984), Pirie (1985), Dunleavy (1986), Haritos (1987), Dodgson and Topham (1988) and Clague and Rausser (1992), take broadly the same meaning of privatization, the process of transferring the state-owned enterprises to the private sector through the sale of some, or all of the government assets to the private sector.
A broader definition of privatization includes all measures contributing to the decentralization of economic activity. In this sense, privatization may be consistent with a large state-owned sector, provided state enterprises are managed according to market rules and exposed to competition. Accordingly, most of the present state sector in developed economies, with the possible exception of public utilities, would qualify as already privatized. Marketization or commercialization of state-owned enterprises would thus mean privatization; similarly, the transformation of standard socialist cooperatives to genuine market-type cooperatives would also mean a shift toward privatization (Levigne 1995).

In conclusion, from all the above definitions, the privatization process includes not only the transfer of state-owned enterprises to the private sector, but also the change in the style of management from the socialist style to an open market style.

The objectives of the privatization process vary from one author to another. The objectives of privatization are to reduce the burdens to the exchequer and reduce the state’s budget deficit; to consolidate the social and political grip of capitalism by building up popular capitalism; to make the economy more competitive; to reduce the interference of politics in the working of commerce; to bring workers into share ownership, to encourage more widespread share ownership, and to speed up the development of the capital market (Letwin 1988). Grosfeld (1991) and Lieberman (1994) claim that the privatization process seeks to achieve many objectives. One aspect of these objectives is direct, such as reducing the deficit in the government budget, and raising cash from selling the state assets. Another aspect is indirect, which includes increasing efficiency, and introducing new technology. Also Stevens (1992) indicated that the privatization process aims at improving the efficiency of the economy to reduce the government’s financial burden, and to contribute to the development of
the domestic financial market. On the other hand, Bornstein (1992), and Jackson (1992) indicated that the privatization process in developing countries under the economic reform programme in a broad sense might pursue different aims. Politically, it means taking away property from the state and creating a new class of capitalists and entrepreneurs. Equity considerations suggest returning property to those who have been forcibly deprived of it during the nationalization process, or giving priority to employees for buying shares in their enterprises, or even giving away state assets to citizens. Also, privatization may be pursued for efficiency reasons, through creating a better management of existing state enterprises, which may increase productive static efficiency. As in market economies entering into the privatization process, the aims may be financial. If conducted through capital markets, privatization process generating revenues to the state.

The point now is how the privatization process can be followed?. According to Abdelfatah (1997) a variety of methods of the privatization process is available and can be applied to the economies under an economic reform programme. These methods can be grouped under three headings: public flotation, direct sales, and vouchers. Public flotation can take two forms: a fixed price offer for sale in the stock exchange market, and a sale by tender on the stock exchange market. The second method of the privatization process, which is a direct sale, can also take two forms: a direct sale for a third party, and an employee buy-out. The voucher method of the privatization process is usually associated with mass privatization. Vouchers are certificates that are distributed to the citizens so that they may convert them into shares in the state-owned enterprises through some form of auction process (OECD 1995). It relies on the free distribution of state assets among the population (Mizasei 1992). These vouchers entitle
the holder to a share of all state-owned enterprises. They may also confer the ownership rights directly to an individual or indirectly through a financial intermediary, which in turn has ownership rights in a particular enterprise (Ferguson, 1992). In fact, the best method of privatized state-owned enterprises is the management and/or employee buy-out, which is probably more desirable for promoting wider employee share ownership, a lower cost of transaction, and being effective in improving the performance of the enterprise (see Bos and Nett 1991, and Bogetic 1993).

2.6 The economic reform programme experiments: -
As mentioned previously, economic reform programme have been adopted throughout many developing countries in the world in the last two decades. In fact, there are many regions in the world which have adopted this programme: Africa, South and East Asia, Eastern Europe, Latin America, Middle East, and Sub-Saharan Africa. Essentially, the Eastern European region, as mentioned in the first section of this chapter, embarked on this programme reflecting the political change. Also, the Asian-pacific area has already achieved an excellent result compared with other regions, which may indeed be due to the nature of the people in these countries. Most countries of this region caught up in the development of their human resources. For example, Korea had a literacy rate of roughly 30 per cent in the mid-1950s, but by the early 1990s, Korea’s literacy rate had increased to over 95 per cent (Camedssus 1997a). The following tables summarize several major economic indicators in various regions in the world between 1987-1997.
Table 2.3
Real GDP in specific regions in the world between 1987-1997

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Table 2.4
Inflation rate in specific regions in the world between 1987-1997

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Table 2.5
Central government fiscal balance in specific regions in the world between 1987-1997
(In percent of GDP)

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</table>


These essential features from the tables can be made clear from the following charts:
Chart 2.5  
Real GDP in many regions in the world between 1987-1997


Chart 2.6  
Inflation rate in many regions in the world between 1987-1997

Chart 2.7
Central government fiscal in many regions in the world between 1987-1997

As seen from the above tables and charts, every region achieved noticeable progress in its economy after implementing an economic reform programme, but the degree of performance varies from one region to another.

From the preceding tables, it is clear that South and East Asia achieved a significant performance compared with other regions. It had a strong rate of growth over this time as shown in Table 2.3 and Chart 2.5 and also, it had a lower rate of inflation as revealed in Table 2.4 and Chart 2.6 and had a small deficit in its central government fiscal balances (Table 2.5 and Chart 2.7). In contrast, Central and Eastern Europe can be considered the worst region in the world since it achieved a poor performance compared with other regions. However, Sub-Saharan Africa, which also achieved a good performance, faces a big problem because the ratio of its external debt to GDP reached 111.7, 101.1, and 95.2 per cent from 1994-1996 respectively (see World Economic Outlook 1995). One of the most important reasons for this
variation can be due to the national saving. For example, the national saving as a per cent of GDP in South and East Asia reached 34 per cent in 1997 compared with 19.2 per cent for Africa, 19.9 per cent for Latin America, and 21 per cent for the Middle East and the European region. At the same time the rate of investment in South and East Asia reached 35.1 per cent in 1997 compared with 24.5 per cent in Africa, 22.4 in Latin America, and 21.8 in the Middle East and Europe (see World Economic Outlook 1997). At the same time, the exports from this region to the world have doubled over the last decade (see Camdessus 1997a). In fact, Latin America and Africa, in which Egypt is located, tend to be similar, so, the following section will highlight the Latin American experiment in implementing the economic reform programme.

2.6.1 Latin American experiment: -
Starting with Chile in 1973 and then with many other countries in the decade from the mid-1980s, most countries in Latin American embarked on episodes of economic reform, which in many cases were quite radical. Inflationary, inward looking and distortionary policies were, for the most part, abandoned. Countries in the Latin America region were replaced by fiscal probity, which reduced the chronically high inflation rates that were a characteristic of this region. Trade reforms removed quantitative restrictions and lowered and simplified tariffs. Financial reform removed financial repression. Exchange rate restrictions were replaced by policies that often included full convertibility and large scale privatizations reducing state ownership in most countries (Holand and Rajapatirana 1997). In fact, the economic reform programme in this region can be classified into two stages: First generation reforms, concentrate on changes in the macroeconomic variables, and second generation reforms, or
reforms at the micro economic level are needed to ensure that the changes brought about by
the first generation reforms are sustainable (Holden and Rajapatirana 1995).

2.6.1.1 First generation reforms and outcomes: -

As mentioned above, Latin America started the economic reform programme with Chile in the
eyear 1970s, which were implemented from mid 1980s onwards in most other Latin American
countries. Reform tended to be followed by recovery, then subjected to stress, which needed a
correction, which was then followed by post reform sustainability. Chile, which has had the
longest period of time for reform to have shown results, appears to have completed the first
generation reforms well and put the economy on a self sustaining path but it now needs to
complete the second generation agenda (Inter-American Development Bank 1996). The
following table can summarize the economic reform programme in Latin America:

Table 2.6
The economic reform programme in Latin America between 1975-1996

<table>
<thead>
<tr>
<th>Country</th>
<th>Reform</th>
<th>Recovery</th>
<th>Stress</th>
<th>Correction</th>
<th>Post Reform</th>
</tr>
</thead>
</table>


In mid eighties, most countries in Latin America were in the throes of severe macroeconomic
disequilibrium. Starting with the Mexican debt crisis of 1982 and continuing through most of
the 1980s, inflation had become rampant with Argentina, Brazil, and Bolivia experiencing
hyperinflation. Current account deficits had become unsustainable. Nearly all countries, with
the exceptions of Colombia and Uruguay, had suspended debt service payments. Unemployment was widespread. Real wages had plummeted in most countries despite
indexation. Appreciated exchange rates, biases arising from import restrictions and softening world prices, combined to keep export revenues low and declining. Imports came to be severely restricted to accommodate the falling exports and to generate surpluses to pay off the high external debt that had been accumulated and capital flight was large (Holden and Rajapatirana 1997).

Holden and Rajapatirana (1997) indicated that financial markets were severely controlled; interest rates were fixed administratively and selective credit controls were widely used which resulted in severe financial market repression in many countries. There were some exceptions. Indexation of financial instruments allowed for market determined interest rates in Brazil. In the late 1980s, Uruguay maintained an open capital account to encourage foreign capital inflows that made interest controls non-viable. Chile was recovering from its severe financial and banking crisis, with the state taking over many of the non-performing assets and forcing the commercial banks to adjust their portfolios to more viable positions (World Bank 1997).

Also, Holden and Rajapatirana (1997) added that most Latin American countries have progressed rapidly toward opening up their economies although not all countries liberalized their trade regimes at the same time or to the same extent. Chile again led the way, followed by Bolivia, Argentina, Mexico, Peru, and Uruguay. Most countries in Latin America are more open today than at any time before. As a result both imports and exports have grown rapidly. For example, except for Mexico and Argentina in 1995, imports grew at 9 per cent on average in the 1992-1997 period. Similarly, exports grew at about 7-8 per cent during the decade and the composition of exports changed towards manufactured goods. The increase in exports was supported to some extent by the regional trading agreements. One example of exceptional growth in bilateral trade is between Colombia and Venezuela. Not all the increases in such trade have been beneficial, since the sources of imports are not at lowest cost. This entails
some trade diversion and has created new forms of protection arising from the enforcement of "rules of origin." In joining the General Agreement for Trade and Tariff (GATT) and its successor, the World Trade Organization, (WTO) these countries have agreed to further reduction in tariffs and the adoption of the World Trade Organization’s rules (Rajapatirana 1995).

Financial repression was common place in Latin America in the 1980s. However, in most countries financial reforms have focused on reducing or eliminating directed credit programmes, letting interest rates be market determined, lowering reserve requirements and introducing regulations that lead to prudential management of banks. In addition, many banks have been privatized. These reforms have gone the farthest in Chile, Peru, and Argentina (Holdan and Rajapatirana 1997).

Privatization and the adoption of neutral regulatory environments that have broken the link between ownership and regulation have been widespread. These reforms have been adopted to increase cooperation in the non-tradable sectors, where trade liberalization does not result in more competition. Privatization was undertaken on a large scale in Mexico, Argentina, Peru, and Paraguay, but was more limited in Uruguay, Ecuador, Brazil, and Venezuela. Sales of government assets have ranged from telecommunications privatization, in Mexico, Argentina, Venezuela, and Chile, to the privatization and down sizing of railways in Argentina and power generation and port services in Uruguay. Since privatization often results in private operators obtaining monopoly positions, a framework for regulation had to be developed in most countries in the region. The state has become the regulator rather than the owner (Holdan and Rajapatirana 1997). In fact, the large scale privatization programme helped in cutting the budget deficit dramatically in Latin America (The Economist 1995).
2.6.1.2 Second generation agenda and reform strategy -

According to Holden and Rajapatirana (1997), second generation issues relate to property rights, the legal system, and institutions. Most of them have public goods characteristics and therefore involve the state. Thus a key aspect of the second generation agenda is to define and structure the role of the state. In the past, many of the problems that arose in the region could be traced to the excess intervention of the state in some areas of economic life and its near total absence in others. The second generation agenda therefore begins with a re-evaluation of the role of the state in the economy. In the past, the state in Latin America has over-extended itself in areas of regulation and control of economic activity.

Also Holden and Rajapatirana (1997) focused on five aspects of the second agenda. The first aspect of the second generation agenda is to re-define the role of the state to:

- let it undertake those activities that are public goods or quasi public goods;
- ensure that regulation leads to competitive solutions;
- exit from those activities in which it has no comparative advantage.

On the other hand, Camdessus (1997b) indicated that it is difficult to distinction between these two generations of reform. Many countries have already begun to take measures associated with the second generation of reform, even though the reform programmes associated with the first generation have yet to be fully completed.

In some countries radical free-marketers have been in charge (Argentina, Mexico); others have been run by more gradualist reformers (Brazil, recently Chile). But everywhere, the direction of policy has been the same: to reduce the size of the state. And everywhere, the results have been similar: inflation is down, and foreign investment is up (The Economist 1996a).
The Inter-American Development Bank suggests that the view of the economic reform programme in Latin America is too pessimistic, deregulation, freer trade and a consistent attack on inflation have contributed to a long-term increase in growth and investment. So, these policies coaxed foreigners to pour record sums of money into Latin America last year (1996). Moreover, the pay-off from market reform should edge up in the next few years (The Economist 1997a). Also Camdessus (1997b) indicated that the results of the economic reform programme in Latin America have been remarkable. Average growth in Latin America rose from less than 1.5 per cent in 1988-89 to 5 per cent in 1994, the highest rate since 1980. And although the Mexican crisis, growth is now once again close to 5 per cent for the region as a whole. Meanwhile, average inflation in the region has fallen from a breathtaking 233 per cent in 1988 to 13 per cent in 1997. Private capital inflows have increased from close to zero in 1989 to over US$70 billion last year -3.5 per cent of the region’s GDP- and the gross international reserves of the region as a whole have increased fivefold over the same period. In short, the countries of Latin America are generally performing well than at any time in the past twenty years. Against this general background, there have been some outstanding achievements in the last few years. Mexico’s rapid recovery from the 1994-95 crisis, Argentina’s success, with its currency board arrangement, and Brazil’s accomplishments under the Real Plan come immediately to mind. And, of course, in many ways, Chile continues to show the way for the continent (Camdessus 1997b). In the same direction, The Organization for Economic Co-operation and Development (1996a and b) indicated that Latin America after the Mexico crisis adopted an adjustment programme, involving further devaluation, the phasing-out of price and exchange controls, strong fiscal adjustment and monetary tightening which were announced in April 1996. This programme is expected to receive considerable
external support, principally from the International Monetary Fund, the World Bank, and the Inter-American Development Bank.

In fact, despite bumps along the way—most notably Mexico's currency and banking troubles of 1994-95—the gains are undeniable. One is the slaying of inflation, that most insidious of taxes on the poor, which fell from a regional mean of 129 per cent in 1991 to just 19 per cent in 1995. Fiscal discipline has slashed the average budget deficit by two-thirds, from 5.5 per cent of GDP in 1988 to 0.8 per cent in 1995.

In conclusion, the fundamental economic outlook is favourable. But the poor need to see some sort of progress in their style of life. The people in this region see that the region's traditionally wide gap between incomes is widening further. The reforms of the early 1990s did reduce the percentage in poverty, but population growth ensured that the absolute number soared. Real wages have fallen. Unemployment in most countries is now higher than in 1990. The reforms have not yet delivered the kind of sustained growth needed to wipe out poverty. True, the region's GDP grew 3.6 per cent in 1991 after the reforms started. But growth fell to 0.8 per cent last year after Mexico's crash, from about 3 per cent in 1996. It may not be enough. Many economists reckon growth of 6 per cent will be needed to reduce poverty as populations continue to rise (see, The Economist 1996a).

Camdessus (1997b) also reaches the same conclusion: the frustration over widespread poverty, income inequality, and the generally slow pace of social progress. Despite the recovery in recent years, inequality remains pronounced, and it is estimated that more than one third of all households, or more than 200 million people, continue to live in poverty. Of course, there are some exceptions; poverty is less prevalent in the countries of the southern cone, and Chile is
making a measurable dent in poverty levels. But the overall picture of growth and social progress in Latin America over the last 30 years is clearly less than satisfactory.

As mentioned previously at the beginning of this section, Latin America’s chronically low rate of national saving (Chile with 25 per cent is the only exception) is primarily the consequence of the region’s history of low and volatile economic growth. By the same token, high saving rates in the Asian "miracle" economies of more than 30 per cent are because of their high and less volatile rate of economic growth. So, Latin America, like another regions in the world except Asia needs strongly to increase its national saving to accelerate its economic growth on one hand, and to avoid any external shock from the hot capital on the another hand.

Lastly, it is important to mention that Chile remains a unique paradigm in Latin America for its open market, privatization, and preferential trade agreements. In fact, its economic stability continues to be a standard for other nations throughout the region (see Turner 1997). The country has experienced 14 consecutive years of economic growth, and has averaged annual GDP growth in excess of 6 per cent since 1985. Also, the budget of Chile is in surplus, and investment continues to pour in as exports pour out. Since 1974, exports comprised about 12 per cent of Chile’s Gross Domestic Product; that chart stands now at about 35 per cent. Inflation, which hit an astronomical 505 per cent in 1974, hovered around 9 per cent in 1994 (Naff 1995).

From all the above, it is clear that local saving, the rate of investment, and exports are playing a crucial role in accelerating the economic reform programme; in fact, this is the conclusion from the South and East Asia region and the other regions which had adopted an economic reform programme.
2.7 The chapter summary: - 

This chapter covered many aspects, which relate to the economic reform programme. The main points of this chapter can be summarized as follows:

1- The economic reform programme became a global phenomenon in the last two decades. This programme had been adopted by many developing countries.

2- There are many expressions to the economic reform programme: transition, transformation, economic adjustment, stabilization and regime. The economic reform programme as an expression will be used in this research.

3- The main concept of the economic reform programme represents changing the direction of any economy from a closed or socialist economy to an open or capitalist economy.

4- The economic reform programme can be considered as a vehicle to direct the economy from recession to growth.

5- The main target of any programme of economic reform represents accelerating the rate of growth, and increasing per-capita income in order to enhance the welfare of its society as a whole.

6- The variation between authors in identifying the aims of the economic reform programme can be due to the nature of the regions or countries on which the authors concentrated their studies or investigations. But the common aims can be summarized in broadly two dimensions: fiscal policies and monetary policies.

7- The variation among the authors in identifying the aims of the economic reform programme has led to a similar kind of variation in determining the variables of the economic reform programme.
8- The economic reform programme variables which will be considered in this research have been identified as: the interest rates, the inflation rate, the foreign exchange rate, the rate of growth, per-capita income, the privatization process and the budget deficit.

9- There are three main methods which can be employed to measure the performance of any programme of economic reform: the positive standard, which measures what is relative to what was; the normative standard which compares what is with what should be; and the third standard, which is called the conjectural or judgmental standard, aims to compare what is versus what would have been. This research will use the positive standard to measure the performance of the economic reform programme in Egypt.

10- Both the rescheduling of debt and foreign aids have played a crucial role in many programmes of economic reform.

11- There are two methods, which can be used to implement the economic reform programme: shock therapy and gradualism. The choice between these two methods depends on the economic situation of each country.

12- The South and East Asia can be considered as a miracle in implementing its economic reform programme compared with the other regions in the world. This appears to be strongly related to the higher national savings, investment, and exports.
Chapter Three
The Stock Market
3.1 Introduction: -

The recognition of the importance of capital markets as being central to the creation of an efficient and competitive economy, is a key aspect of the overall changes in the developing countries' economies. Countries which have decided to rely on market signals to direct the allocation of productive resources need efficient capital markets to realize the benefits of independent, market-based economic decision making. While much progress has been made to develop local capital markets over the past 15 to 20 years, this progress has been uneven. Some countries have made substantially greater progress than others have in developing their capital markets, and the measures which these have taken to further capital market development have varied (Malls 1996).

This chapter will deal with many aspects which relate to the stock markets, starting with various definitions of the stock markets, the importance of the stock markets, various definitions of the emerging stock markets, and finally a literature review about many emerging stock markets in the world.

3.2 The stock markets definitions: -

According to Stapley (1986), in a free economy, any market in any commodity, be it vegetables, antiques or houses, must offer choices and prices within the market are determined ultimately by supply and demand, so it is with the stock market. It is simply a highly sophisticated market place where the traded commodity is stocks and shares. The same principles of supply and demand apply, which in turn lead to movement in prices. Thus, when demand appears to be outstripping the source of supply, because the buyers are more than sellers are, the prices will rise and vice versa. In fact, this can explain why the stock market is said to be the barometer of any economy; anticipation of a healthy, expanding economy will
attract investors wishing to participate in this growth, while a depressed outlook for the economy will bring about a corresponding fall in confidence and in turn in the stock exchange prices.

In fact, there are many financial markets and many financial instruments as well. These financial instruments come in a variety of maturities. Firms, banks, and individuals trade these financial instruments in many different financial markets.

Miller and Hoose (1997) have argued that economists and traders have adopted the convention of classifying the financial markets into two broad groups based on the maturities of the financial instruments exchanged in those markets. Thus, separating financial markets by maturity is a way of grouping together sets of markets as follows:

- Money Markets: This term refers to the markets for financial instruments with short-term maturities, which mean less than one year. According to the above, the money markets includes markets for short-term treasury securities such as 3 and 6 month treasury bills. These markets also include markets for banks’ 6-month certificates of deposit. On the other hand, the market for repurchase agreements also can be considered as a money market, because nearly all repurchase agreements have relatively short maturities. Indeed, many repurchase agreements have one-day maturities.

The trading in money markets typically is very active, because many buyers and sellers enter the market with offers each day. As a result, the financial instruments, which traded in the money markets, tend to be very liquid. Because there are so many potential buyers in these markets, a seller of a financial instrument usually can find someone who is willing to buy that instrument at a mutually agreeable price.

- Capital Markets: The term capital market refers to markets for financial instruments with maturities of one year or more. In fact, the reason behind this name is that instruments with
such long maturities are most likely to be associated directly with funding capital investment projects.

The trading in capital markets certainly can be very active. Compared with money markets, in general, there are relatively fewer buyers and sellers interacting in these markets within a given day. As a consequence, the financial instruments, which are traded in the capital markets, are less liquid compared with the financial instruments in the money markets.

In this research, it is proposed to leave aside the term money markets and to concentrate on capital markets. According to Miller and Hoose (1997), capital markets can be classified as follows:

- Primary Markets: A primary market is a financial market in which newly issued financial instruments are purchased and sold. For instance, consider a newly formed business that offers to sell shares of ownership; commonly called stocks. It sells these shares in a primary financial market. Indeed, the first attempt by a business to issue ownership shares to the public in the primary market is called an initial public offering (IPO). While businesses could attempt to manage an initial public offering on their own, many rely on the assistance of investment banks. These investment banks, in fact, represent institutions that specialize in marketing initial ownership shares offered by new businesses. Indeed, these investment banks typically underwrite such issues, which means that they guarantee the businesses fixed share prices. Essentially, the investment banks temporarily purchase the shares of the businesses. In turn, they attempt to resell these shares in the primary market at a slightly higher price. They keep the difference between the purchase price and the resale price as a profit.

- Secondary Markets: Most financial instruments, which have already been sold in primary markets, have maturities that range from several months to many years. Since this part concentrates, essentially, on capital markets, it will deal with the financial instruments, which
have maturities of one year and more. Shares of ownership in firms have no set maturities. In contrast, bonds, for example, issued by the United States Treasury have fixed maturities in excess of 10 years. Indeed, a time may be reached at some point following the initial purchase of such ownership shares or bonds, but before their maturity dates, when the original owner may sell them in a secondary market. This can be considered as simply a market for financial instruments that were issued at some point in the past.

Indeed, secondary markets are very important to primary markets. The presence of secondary markets contributes to the efficient functioning of primary markets. The reason behind this is that secondary markets have the ability to purchase or sell previously issued financial instruments, this in turn makes such financial instruments much more liquid than they otherwise would be. For instance, persons contemplating purchasing shares of ownership in a fledgling company are much more likely to buy such shares if they know that there is a ready market in which they can sell them, if they later wish to access their funds or become dissatisfied with the performance of the company.

It can be noticed that, much as investment bankers facilitate the functioning of primary markets, on the other hand, brokers assist in matching borrowers and lenders in secondary markets. Typically, brokers specialize in secondary markets in which they have developed the greatest knowledge of the factors that influence risk, costs, and returns relating to financial instruments exchanged in these markets.

In the same way, Elton and Gruber (1995) suggested that the capital market securities include financial instruments with maturities greater than one year and those with no designated maturity at all. The capital markets are generally divided according to whether the financial instruments contain a promised set of cash flows over time, or offer participation in the future profitability of the company. The first sector is usually referred to as a fixed income market,
on the other hand, the second sector is usually referred to as the equity market. In contrast, preferred stock can be considered as a financial instrument that has some of the characteristics of each of the other two sectors.

They stated that there are a number of ways to classify markets as follows:

- The first way is to classify markets as a primary market or a secondary market as explained earlier.

- The second way is to classify markets as a call market or a continuous market. In a call market trading takes place at specified time intervals. One structure for a call market has prices announced verbally. In a verbal market, prices are announced and the participants indicate the amount they are willing to sell or purchase at that price. In fact, this price is changed until a price is determined that most closely matches intended sales with intended purchases, at which time transactions are executed at that price. Typically, a call market uses a computer to determine prices, at which investors wish to buy or sell are entered into the computer and a preliminary price is displayed. In fact, investors can change their orders or enter new orders until a specified execution time when the price that best matches buying and selling is determined. In the case of no price that completely matches buying and selling, an allocation method is needed. One method in that case is called first-come first-serve, which tends to fill the oldest orders on the side with the surplus first.

In fact, the same system is applied in the Egyptian stock market, where investors enter their orders whether to buy or to sell. Then, the computer can match orders once both buying orders and selling orders are at the same price level. In the meantime, investors can change both quantity and price of shares at any time, or they can even cancel their orders if they were willing to do this. Also, the computer system for the Cairo and Alexandria stock exchange is applied the method called first-come first-serve.
It can also be noticed that some other call markets have a provision that limits the movement from the prior price. The reason behind this is to prevent a temporary order imbalance from dramatically moving the price. Also, market orders are allowed in most call markets, and all market orders are filled at the clearing price. There is a greater price uncertainty for market orders in a call market than there is in a continuous market. In particular, the price movement between calls is likely to be greater than the price change in a continuous market from the time an order is placed until it is executed. Also, the trade need not be executed if the market has price limits and the clearing price exceeds the price limits. For instance, the New York Stock Exchange opens the market with a trade very much like those found in a call market, though it then becomes a continuous market. Some other stock markets, for instance in Austria and Belgium, are call markets and Germany and Israel have call markets at some point in the day.

The stock market in Egypt has put a restriction on the movements of share prices in order to prevent any dramatic increase or decrease in share prices. In fact, the Capital Market Authority in Egypt (CMA) determined what is called a ceiling price. The Egyptian Market Capital Authority has argued that the maximum and the minimum movement in the prices of shares must be only 5 per cent over or down during the day, and 20 per cent over the week as a whole.

- The third way to classify markets is to determine whether they are dealer or broker markets. In a broker market, a broker acts as an agent for an investor and buys or sells shares on the investor's behalf. Also, in a broker market shareholders are trading with other shareholders albeit utilizing an agent. On the other hand, in a dealer market, the dealer purchases or sells shares for the investor utilising the dealer's own inventory. Also, in a dealer market, investors’
trade is not made directly with other investors but with the dealer, who serves as an intermediary between buyers and sellers.

According to the above, the stock market in Egypt can be considered a broker market, where no investor can directly buy or sell any marketable securities in Cairo or Alexandria stock exchange without financial institutions, which mainly, brokerage companies.

- The fourth way to classify markets is to determine whether the trading is executed by human or done electronically. For example, execution on the New York Stock Exchange involves people. In contrast, for instance, execution on the Toronto stock exchange, Paris, Australia, and for some other stock markets on the Tokyo stock exchange is done electronically. In fact, one advantage of an electronic market is that the power of the computer allows complex conditional trades to be handled. For example, electronic trading would allow an order to be executed conditional of the value of the market index.

Essentially, Cairo and Alexandria Stock exchange can be considered as an electronic market where all kinds of transactions are done electronically.

In fact, regardless of the classifications of the markets, there are a number of characteristics that are desirable for any market to have. According to Elton and Gruber (1995) these characteristics are:

- Firstly, since investors buy and sell assets based on information, and the useful market information includes past prices, volume, current bids and offers, and the amount of short sales outstanding, it is very important that this market information be promptly and accurately available to investors.
- Secondly, essentially, markets differ according to trading costs, thus, the lower the costs of trading shares in the market, the better the market and vice versa.

- Thirdly, the market should be liquid. Liquidity refers to the ability to transact a large number of shares at prices that do not vary substantially from past prices unless new information enters the market. In fact, liquidity is often subdivided into continuity and depth. Price continuity means that an investor can expect to transact some shares at prices close to those at which the security recently traded without any new information in the market place. A deep market is one that has a large number of buyers and sellers willing to trade at close to the current transaction price, so that a large number of shares can be transacted without a substantial change in price.

- Fourthly, markets differ in the speed with which new information is incorporated in share prices. The speed of reflection of this new information in the prices of shares, the better the market.

On the other hand, markets can be classified also in stock markets and bond markets. Unlike this, in Egypt, there is one market where both stocks and bonds are traded, and no distinction between security markets based on whether it is stock or bond.

Concentrating on the stock markets, both Elton and Gruber (1995) argued that there are a number of organized stock markets in the world. For instance, in The United States, there are many organized stock markets where stocks are traded, as well as an over the counter market and the so-called third and fourth markets. For a stock to be traded on an organized exchange it must be listed on the exchange. In fact, listing is primarily determined by the wishes of the company, the size of the company, and the trading activity of the stock. In contrast, unlisted stocks are traded in the over the counter market (OTC). The third market involves trading
listed securities in the over the counter market, where the fourth market refers to the direct trade between institutions without using an exchange.

In Egypt, where this research focuses on, there is only one kind of organized market. It refers to Cairo and Alexandria stock exchange. In fact, the companies should be listed in order to allow their securities to be traded in this market, besides this, some other stocks are traded on the basis of over-the-counter since these stocks are not yet listed in the formal table (Table A), but they are trading in the same market, and in this case it is called a parallel market. Otherwise, there is no specified market for non-listed stocks such as in the over the counter market in the United States, but all the stocks should be listed in order to be traded in the Egyptian stock market. The listed stocks, which are listed in the formal table (Table A) are traded in the formal market, and unlisted stocks in the formal table are traded in the informal market (parallel market), but once these companies meet the requirements for list in the formal table, trading can take place in the formal market. In fact, both types of securities are still traded in Cairo and Alexandria stock exchange.

Also, Alexander, Bailey, and Sharpe (1995) have argued that one way of distinguishing security markets is to determine the span of life of a financial asset. According to this, there are money markets, which typically involve financial assets that have a span of life of one year and less. On the other hand, capital markets typically involve financial assets that have a span of life greater than one year. Thus, for instance, Treasury bills are traded in money markets, while Treasury bonds are traded in a capital market.

As stated earlier, the distinction between the primary and secondary market is also important. On the other hand, the primary market itself can be subdivided into seasoned and unseasoned new issue. Seasoned new issues can be defined as it refers to the offering of an additional
amount of an already existing security, while an unseasoned new issue involves the initial offering of a security to the public. Unseasoned new issues are generally referred to as initial public offerings (IPO's).

Indeed, the same kind of distinction between seasoned and unseasoned securities can be noticed in the Egyptian stock market.

Alexande, Bailey, and Sharpe (1995) have noted that there are as well a third and fourth market in the United States.

- The third market: Until the 1970s, the New York Stock exchange required its member firms to trade all New York Stock exchange-listed stocks at the exchange and to charge fixed commissions. For large institutions this was expensive. In particular, the existence of a required minimum commission rate created a serious problem, since it exceeded the marginal cost of arranging large trade. Brokerage firms that were not members of the exchange faced no restrictions on the commission they could charge and thus could complete effectively for large trades in New York Stock exchange-listed stock. Such transactions were said to take place in the third market. More generally, the term third market now refers to the trading of any exchange-listed security in over-the-counter market. The existence of such a market is enhanced now by the fact that their trading hours are not fixed, and they can continue to trade securities.

- The fourth market: Many institutions have dispensed with brokers and exchanges altogether for transactions in exchange-listed stocks and other securities. In fact, trades of this type, where the buyer and seller deal directly with each other, are sometimes said to take place in the fourth market.

Unlike the system in the United States, and as mentioned previously, Egypt has only an organized stock market. There are no fixed commissions for the transactions in the Egyptian
stock market; so, there is no need to create a third market as in the United States. On the other hand, according to the Egyptian Capital Market Authority regulations, it is not allowed for any brokerage firm to work in the stock market without a listing, which requires a license from the Capital Market Authority in Egypt to work as a financial intermediary. In the meantime, it is not allowed for any transaction, either between individual investors or even between institutions, to take place without financial intermediaries. So, this may explain why Egypt does not use terms third or fourth markets.

Jones (1994) has also indicated the importance of classifying a capital market into a primary market and a secondary market. He mentioned that some securities issued are outstanding before the new sales occur; therefore, these sales are called seasoned new issues. On the other hand, in the case of selling securities for the first time; these are referred to as initial public offerings (IPOs). Some secondary equity markets are auction markets, involving an auction process in a specified physical location. In these markets, investors are represented by brokers and intermediaries, who represent both buyers and sellers and an attempt is made to obtain the best price possible for either in a transaction. On the other hand, brokers collect commissions for their efforts and generally have no vested interest in whether a customer places a buy order or a sell order, or, in most cases, in what is bought or sold. Also Jones (1994) noted that usually common stocks, preferred stocks and warrants are traded in the equity markets.

It can be noticed that the same system is applied in the Egyptian stock market, where there is a specified physical location and, also, investors are represented by brokers, intermediaries who represent both buyers and sellers and attempt to obtain the best price possible for either in a transaction. But on the other hand, only common stocks are traded in the Egyptian stock
market, and no preferred stocks or warrants are traded in this market like other equity markets in many countries in the world.

The other type of secondary equity market is called a negotiated market, involving a network of dealers who make a market by standing ready to buy and sell securities at specified prices. Unlike brokers, dealers have a vested interest in the transaction because the securities are bought from them and sold to them as well, and they earn a profit in these trades by the spread, or difference, between the two prices. For instance, the United States auction markets include the New York Stock exchange, the American Stock exchange, and the regional stock exchanges. On the other hand, negotiated markets involve over-the-counter market.

In fact, auction markets are concerned with trading stocks of companies listed. Furthermore, these companies must meet specific requirements of the market in order to be listed. In contrast to auction markets, the over-the-counter market is a negotiated market. Transactions, which are not handled in an organized stock market, are handled in this market. In turn, this means that this market, essentially, handles unlisted securities, or securities not listed on a stock market. In fact, the over-the-counter market has become a major player in the securities markets and in all likelihood will continue to gain in importance. Based on dollar volume, it already is the second largest United States equity market and the third largest in the world after the Tokyo Stock Exchange and the New York Stock Exchange. Unlike the New York Stock Exchange, the over-the-counter market does not have a specific location. Rather, it is a way of doing business. It consists of a network of dealers linked together by communications devices, including the latest equipment. These dealers conduct transactions directly with each other and with customers.
As mentioned previously, the Egyptian stock market can be considered as an auction market, not a negotiated market, where the market in Egypt is concerned with trading stocks of companies listed in the stock exchange, and where all transactions take place through financial intermediaries called brokerage firms, and brokers collect commission for their efforts, and no kind of transactions can take place in the stock market in Egypt through dealers directly.

It is worthwhile mentioning the financial institutions, such as commercial banks and saving and loans trusts, which also participate in the primary market when they make loans to business firms and even to individuals for business or home construction (Hauges 1997). In fact, these institutions stand as an intermediary between individual savers and the borrowers of the funds. The intermediaries act as agencies who collect information, which might not otherwise be publicly disclosed, from borrowers, analyze information, using techniques and skills which might not be available to the general public.

In fact, the banks sector plays a key role in the stock market in Egypt in both the primary and secondary market as well. In the primary market, it can be noticed that, most of the initial public offerings are done through the banking sector. They convey to the investors pertinent about companies, and all the stages of subscription are done through banks. Unlike the system in the United States, the commercial banks, not the investment banks, are responsible for these transactions. Indeed, these banks do a great promotion in order to sell the securities issued, in the meantime, they help in offering the individual investors financial aid to buy these securities. They offer about 60 per cent from the total value of a security to investors as a loan. In turn, investors need to pay only 40 per cent from the total value of their purchases. On the other hand, these banks also, provide investors 60 per cent from the market value of their own portfolio as a loan in order to encourage them to invest in the stock market. In this way, these
banks participate in making the secondary market more active through providing more liquidity to investors.

On the other hand, Curry and Winfield (1994) provided a brief definition of the stock exchange as follows:

"The stock exchange is an institution where quoted investments (stocks and shares) may be exchanged between buyers and sellers". 
(Curry and Winfield (1994), P. 25)

Another point of view, argued that the word "stock", at least in its North American usage, means equity or ownership in corporation, And these stocks are traded in a market called the stock exchange (Tweles and Bradley 1987).

Finally, Johnson (1983) suggested that

"The stock markets are a complex of institutions and mechanisms through which funds for purposes longer than one year are pooled and made available to business, government, and individuals and through which instruments already outstanding are transferred. The stock markets are well organized and are local, regional, national, and world-wide in scope ".
(Johnson (1983), P. 32).

From all the above definitions, it can be argued that the stock markets can be defined as follows: -

"The stock markets are an organized place, which involve individual investors who represent both demand side and supply side for marketable securities as buyers or sellers, firms, whose securities are traded in these markets, and financial intermediaries who facilitate the transactions to take place between buyers and sellers in an orderly manner at fair prices".

In Egypt, where this research focuses on, there are only two stock markets: Cairo stock exchange, and Alexandria stock exchange. Essentially, both of these markets are working
under the same regulations and all companies-listed are the same in both markets, and there is an electronic link between them. They can be considered as one market.

3.3 The importance of the stock markets: -

It is noticeable that private investment in the free enterprise system is central to any capitalist economy. In fact, the expansion of any economy depends, mainly, on the ability of the firms to attract funds from the private sector. A delicate balance exists between the suppliers who provide funds, and the users of these funds in the economy. Virtually, suppliers of capital funds will only be attracted if the total rate of return in terms of an interest or dividend yield and perceived capital appreciation is sufficient to reward the suppliers for the degree of risk they assume.

Because the stock markets deal with long-term investment instruments, they play a key role in the economy's capital-formation process. It can be seen that funds raised through debt instruments by businesses and individuals are primarily invested in fixed assets and inventories. Furthermore, the stock markets for long-term and permanent funds, such as equity items, include securities, and there are also other market securities with non-equity items such as bonds. Equity items such as common stocks, unlike corporate bonds, are mainly held by individual investors, although institutions are gaining a greater percentage of the holding of common stocks. A large share of the funds placed by individual investors in common stocks is being channelled through investment companies (Johnson 1983).

Cottle, Dodd and Graham (1962), argued that the stock markets are so important, they can provide a continuous and liquid market for the exchange of outstanding issues. The stock markets can also provide a means for determining fair prices, and indirectly aid in financing
industry by giving liquidity to publicly held security issues. National stock markets assure the investors of basic financial information and protection. These markets require that a company provides its shareholder with a statement of earnings and with balance sheet information as well in order to give them a summary of the financial position of the company. In fact, national stock markets must register with the Securities and Exchange Commission, which afford added protection for stockholders. It can see that security exchanges are auction markets because brokers for sellers deal directly with brokers for buyers in competitive bidding and offering. The buyer’s broker tries to obtain the lowest possible price; on the other hand, the seller’s broker tries to obtain the highest possible price. Thus, this can explain why prices change from one sale to other. On the other hand, prices may change according to the volume of securities offered and bid.

On the other hand, a securities exchange provides a continuous market for security issues. The market depends upon a large volume of sales and a narrow price range between the selling price and the buying price. A well functioning securities market insists upon the rapid execution of orders, and the rules of most stock markets encourage the implementation of these functions.

In the meantime, the stock market assists in determining the fair price for the marketable securities. Johnson (1983) argued that, since the price of a stock or bond is established by an auction market, there is no price set by traders on the floor of the exchange or by negotiations off the floor. Since prices are established through bidding, the price at any one time tends to reflect a fair-market appraisal of the stock. Accordingly, securities may be used as collateral for loans since the stock market is continuous and the price is established by supply and demand. The stock markets can also provide the investors with all the available information about any stock through the financial institutions, which work in these markets. In fact, since the fair-market appraisal of any security is generally determined by supply and demand,
regulatory agencies insist that all information on a security be available to the investing public before security transactions are made. Often when significant information is announced, there may be either a substantial increase or substantial decrease in the price of the security. This fluctuation is in response to the investment community's attempt to arrive at a new fair-market value for the company. Since the market place can be emotional, stock prices tend to swing in a wide range around a generally accepted value of the security. To an extent, stock markets can protect investors and make them trusted in these markets, and this in turn, can assist in attracting investments, thus, making the economy of a given country more strong.

By the same manner, Miller and Hoose (1997) suggested that stock markets help direct financial resources from the owners of these resources to those who use them to finance productive activities. The owners of financial resources are individuals who accumulate resources rather than spending them each year. These individuals are savers of financial resources. When other individuals or businesses make use of financial resources to finance productive endeavours, they are investing these resources. In fact, the stock markets bring the two groups -those who save and those who invest- together.

Jones (1994) suggested that primary markets are absolutely vital to capitalist economies if they are to function properly, since they serve to channel funds from savers to borrowers. Furthermore, they provide an important allocate function by channelling the funds to those who can make the best use of them, presumably, the most productive. Essentially, the chief function of the stock markets is to allocate resources optimally. A stock market with this character is said to be allocationally efficient.

He added that business firms need tremendous amounts of capital to finance their operations. To grow and expand, they must invest capital in amounts that are beyond their capacity to
save in any reasonable period of time. Similarly, governments must borrow large amount of money in order to provide the goods and services to its society. The stock markets permit both business firms and government to raise the needed funds by selling securities. Simultaneously, investors with excess funds are able to invest and earn a return, with the intention of enhancing their welfare.

Stapely (1986) also argued that the stock markets could provide convenient, centralized sources of raising capital for government, public authorities, and industry. However, once an initial issue has taken place and the money required has been raised, the issuing body in no way receives any direct financial benefit from any subsequent dealings between buyers and sellers of those stocks in the stock markets. But, it can be said that, these dealing facilitate investors to move from securities to cash and vice versa, and this in turn, encourages investors to deal in the stock markets.

Adding a further perspective, Levine (1996) indicated that a stock market is very important for any economy. It should have a significant effect on the economic development of any society. Through an empirical study that has been done by Levine (1996) on 38 countries from developed and developing countries, the results indicated that the stock markets might affect economic activity through the creation of liquidity. Many profitable investments require a long-term commitment of capital, but investors are often reluctant to relinquish control of their savings for long periods. Liquid equity markets make investment less risky-and more attractive- because they allow savers to acquire an asset-equity- and to sell it quickly and cheaply if they need access to their savings or want to alter their portfolios. At the same time, companies enjoy permanent access to capital raised through equity issues. By facilitating longer-term, more profitable investments, liquid markets improve the allocation of capital and enhance the prospects for long-term economic growth. Further, by making investment less
risky and more profitable, stock market liquidity can also lead to more investment. Put succinctly, investors will come if they can leave.

Levine added that there are alternative views about the effect of liquidity on long-term economic growth. However, some analysts argue that very liquid markets encourage investor myopia because they make it easy for dissatisfied investors to sell quickly, liquid markets may weaken investors' commitment and reduce investors' incentives to exert corporate control by overseeing managers and monitoring firm performance and potential. According to this view, enhanced stock market liquidity may actually hurt economic growth.

The empirical evidence, however, strongly supports the belief that greater stock market liquidity boost -or at least precedes- economic growth. To see how, Levine (1996) used many measurements to determine the market liquidity.

One of them is the total value of shares traded on a country's stock exchanges as a share of GDP. This ratio does not directly measure the costs of buying and selling securities at posted prices. Yet, averaged over a long time, the value of equity transactions as a share of national output is likely to vary with the ease of trading. In other words, if it is very costly or risky to trade, there will not be much trading. This ratio is used to rank 38 countries by the liquidity of their stock markets in four different groups. The nine countries with the most illiquid markets are in the first group; the nine countries with the most liquid markets, that is, with the largest ratio of value traded to GDP are in the fourth group; the second and third groups, each of which contains 10 countries, fall between the two extremes of liquidity. The following chart can illustrate how stock markets' liquidity (total value of shares traded to GDP) can affect the economic growth.
Chart 3.1
Initial value-traded ratio (1976) and subsequent economic growth (1976-1993)


As seen from the above chart, countries that had relatively liquid stock markets in 1976 tended to grow much faster over the next 18 years than countries with illiquid markets. The second measure of liquidity is the value of traded shares as a percentage of total market capitalization (the value of stocks listed on the exchange). This turnover ratio measures trading relative to the size of the stock market. Chart 3.2 can show the relationship between this variable and the economic growth.
As seen from the above chart 3.2, the greater turnover predicted faster growth. The more liquid their markets in 1976, the faster countries grew between 1976 and 1993.

The third measure is the value-traded-ratio divided by stock price volatility. Markets that are liquid should be able to handle heavy trading without large price swings. Chart 3.3 shows the effect of this variable on the economic growth.
From the chart shown above, it can be noticed that countries whose stock markets were more liquid in 1976 -countries with higher trading-to-volatility ratios- grew faster over the next 18 years than countries with less liquid markets. As a conclusion, it can say that there is a strong link between stock market liquidity and economic growth, so the stock market development explains future economic growth.

Also, the Financial Times newspaper (1996) in one of its studies indicated that liquid stock markets encourage banks to lend, giving investment a further boost. This, in fact, is specially important in poor countries since successful stock markets can dramatically improve the information that is available about companies, which ought to give creditors confidence. That may be one reason why the ratio of bank loans to GDP tends to rise as stock markets became
more liquid, in turn, this will raise the level of investment, and should lead to raising the economic growth.

Another study has been done by Leigh (1997) to test the relationship between the stock markets and the rate of growth of a given economy. This study emphasised Singapore. Leigh, in order to do this study, conducted causality tests. These tests, in fact, are not concerned with policy analysis or prediction, nor are they testing for a causal link based on structural restrictions from any theoretical model. In fact, these tests are interested in the implications of whether past growth in the value of the stock market helps to explain current growth in output that has not been explained by past growth in output already.

The results indicated that current growth in the value of the stock market in Singapore is a reasonable indicator of the future growth in real output in Singapore. Thus, developments in the Singapore stock market appear to be systematically related to the Singapore economy. In principle this should imply that the stock market could serve as a leading indicator of the intertemporal behaviour of the Singapore economy.

In conclusion, the stock markets are very important for the economic growth of any society. There are two sides: the supply side, which refers to those individuals who have a surplus of funds, and the demand side, which refers to those who have a deficit in their funds, then both of them needs the other. In fact, the supply side needs to invest and the demand side knows how to invest, so both of them should meet in one place, this place is the financial markets. The stock markets can help in providing the required finance to firms, at the same time, they can provide investment opportunities to the individuals with a surplus of funds. This can be done in either the primary market or secondary market. The primary markets can help the new firms to acquire what is necessary from finance through initial public offerings, and also the companies already listed to increase their capital. On the other hand, the secondary markets
can help in trading securities, which enable investors to change from securities to cash and vice versa, so it can provide them with the required liquidity, and determine the fair value of securities. In summary, all of this leads to a better allocation of financial resources, raising the level of investment, which in turn, should lead to economic development.

3.4 Measuring the stock markets performance:

Through the literature review, it is noticeable that most studies, which dealt with the performance of the stock markets concentrated, mainly, on measuring the stock price indices as a reflection of the stock markets performance (see the literature review in this chapter, also, the next chapter, which will deal with the relationship between the economic reform programme and the stock market performance).

In fact, it is argued that, the measurement of the stock markets may vary from one author to another, depending on the aim of the study and the perspective of each author.

The World Bank (1995) argued that there have been no common measures of stock market development. World Bank researchers have assembled just such an array of stock market indicators, using data from 41 countries for 1986-1993. They suggested the following measuring tools:

- Market size: This variable can be measured by relative market capitalization and the number of listed companies. The market capitalization ratio can be determined by dividing the value of all shares listed on a stock market by the GDP.

- Liquidity of the market: This variable refers to the ability to buy and sell securities easily, and also this variable can be determined by two measures. One is the total value of shares traded on the stock market divided by GDP. The second measure of liquidity is the turnover ratio, which refers to the value of total shares traded divided by market capitalization.
Market volatility: This variable can be measured by using a 12-month rolling standard deviation estimate based on market returns. Even though volatility is not necessarily a sign of more or less stock market development, lower volatility, in general, reflects a more developed stock market.

Market Concentration: This variable can be determined by computing the share of market capitalization for the 10 largest stocks on the stock market, and also, by computing the share of total value traded for the 10 largest stocks in the stock market.

Since this research focuses on determining the performance of the stock markets in Egypt prior to and following the implementation of the economic reform programme, the following criteria will be considered to compare the situation of the stock markets in Egypt:

Market activity: This dimension contains several variables; value of trade, volume of trade, number of transactions, number of traded companies, new issues (including capital increases) and new issues (including capital increases) as a percentage of GDP.

Market size: several variables are included in this dimension; market capitalization, market capitalization as a percentage of GDP, number of listed companies, number of financial intermediaries and volume of shares listed.

Market liquidity: three variables will be used to refer to this dimension; total value traded to market capitalization, total value traded to GDP and volume of shares traded to volume of shares listed.

Market concentration: the explanatory variables here are; the percentage of the 10 biggest companies’ share in market capitalization and the percentage of the 10 biggest companies’ share in value traded.

Development of the stock market index.
3.5 The emerging stock markets definitions:

The emerging stock markets became very important to the world’s economy. The following chart indicates the participation of emerging stock markets in the world’s stock market as a whole.

**Chart 3.4**
Emerging stock markets’ capitalization between 1985-1995

![Chart showing the capitalization of emerging stock markets between 1985 and 1995.](chart)


As seen from the previous chart, over the past 10 years, between 1985-1995, the total value of stocks listed in the emerging stock markets rose from $168.600 billion to $1945.600 billion, and this in fact, was generally in line with the increase in listings, and new issues by already-listed companies. In the meantime, the share of total world capitalization represented by the emerging markets also increased also significantly. The following chart can illustrate this point.
The above chart indicates that the emerging stock markets have participated in the total world capitalization by only 4 per cent in 1985, and this ratio jumped to 13 per cent in 1995, which means that these markets are promising and tend to be more participated in the world financial markets. In addition, trading in the emerging stock markets also surged, this can be indicated through the following chart.
From the above chart, it is noticeable that the value of shares traded in the emerging stock markets climbed from around 3 per cent in 1985 of the world total to 17 per cent in 1995.

In spite of this importance of the emerging stock markets, through the literature review, it can be noticed that little attention has been paid to the term emerging markets.

According to the International Finance Corporation (IFC 1997), which is considered as a private sector arm of the World Bank Group, all stock markets in developing countries are considered to be "emerging". Developing countries are those classified by the World Bank as either low- or middle-income economies, regardless of their particular stage of development. Low- and middle-income economies are currently defined as those with 1995 per capita GNP of $9,385 or less.
Another definition which is similar to the above see emerging markets as

"The places were financial institutions and multinational companies see profitable opportunities for investment or speculation in what used to be called the Third World". (Stephen 1997, P.32),

Thus the term "emerging market" most often is intended to mean stock markets based in developing economies. But even by this definition emerging stock markets vary in many aspects such as size, liquidity, and sophistication.

In fact, many emerging markets have come into existence in the last few years as a result of the transition from communism. Another category are the reborn markets, such as Egypt, which existed in principle for a century but only recently began operating again as a real marketplace for capital.

Stock markets currently categorized as "emerging" include some of the largest and most liquid markets in the world, several long-established markets where trading still takes place over tea, and many markets where the latest technology has been installed to expedite trading, settlement, portfolio management, market supervision, and information dissemination.

Divecha, Drach, and Stefek (1992) argued that the term emerging stock markets is frequently a matter of opinion. Narrowly defined, an emerging market:

- has securities that trade in a public market,
- is not a developed market,
- is of interest to global institutional investors, and
- has a reliable source of data.

Birinyi (1995) argued that it is so difficult to find out if the market is indeed emerging or not. For instance, Hong Kong is neither a developing economy or an emerging market; it has
arrived. Also, it is not possible to lump Taiwan with India or Brazil; many times, daily volume in Taiwan exceeds that on the New York Stock exchange. Birinyi added that markets, which can give quality information and where there is a significant futures and options activity, are not emerging; they have emerged. Also, many other stock markets should be termed re-emerging. Egypt, for instance, was the fifth largest stock market in the world before World War II.

Also Kalotay and Alvarez (1994) argued that the term emerging markets is commonly used in the literature to denote the stock markets of all developing countries, except Hong Kong and Singapore, and all economies in transition. They added that this term by this definition is difficult to handle, because it applies to three distinct groups of countries.

- The first category consists of such countries as Malaysia, the Republic of Korea, Taiwan Province of China or Thailand. These countries and territories share several common characteristics with developed markets, including a low rate of inflation, relative stability of exchange rates, developed domestic financial and banking systems, easy access to international bond and equity markets as a consequence of the former characteristics important trading volumes in stock exchanges and relatively sophisticated securities’ compensation and trading systems.

In fact, two indicators may illustrate the relative importance of this group in the global financial marketplace. In terms of value traded, the Taiwan province of China is the world’s fifth most active market just after Japan, Germany, the United Kingdom, and the United States of America, well before France and Switzerland, which have trading volumes comparable to that of the Republic of Korea. Mexico, in turn, equals the Netherlands, Australia, and Spain, while Thailand compares with Canada and Hong Kong.

In terms of market capitalization, Mexico leads the emerging group, with a level comparable to that of the Netherlands and Australia, followed by the Republic of Korea, Taiwan province
of China and Malaysia which compare with Spain and are larger markets than Belgium, Denmark, Sweden and the smaller Organization for Economic Co-operation and Development countries.

In fact, this first group of emerging markets is not yet considered to be on the same level as the developed ones. This is may be because they have not been able to totally consolidate their achievements and to eliminate their vulnerability to changes in the global market. Also, as an indication of domestic economic problems, these markets have not been able to overcome the difficulties faced by small and medium-sized domestic enterprises in fulfilling the listing requirements confined to large internationalized companies.

- The second category of the emerging markets may be called emerging markets in a narrower sense. Typically countries of this group are: Argentina, Brazil, India, Nigeria, and the Philippines. These countries have already embarked on the road to qualitative change, expansion in size and sophistication, in contrast to markets, which are small and give little appearance to change (IFC 1992). If the latter are still underdeveloped, it is because of the relatively small size of their domestic economies, manifested in low volumes of transactions, and small values of market capitalization. From the technical point of view, low levels of development are observed -as is the case of most emerging markets- in terms of compensation and settlement for securities, dissemination of information, as well as the degree of automation attained on the floor. As regards economic background, in general terms emerging stock markets face such cyclical and structure problems as a high rate of inflation and income concentration, external disequilibria reflected in currency devaluation, and an unsatisfactory development of money market. As far as access to international markets is concerned, it is highly selective for them, and thus the situation varies from one country to another (Kalotay and Alvarez 1994).
- The third category of the term emerging stock markets, in a broader sense, refers to any other country that is not part of the group of developed market economies, such as developing countries and territories, countries in Central and Eastern Europe, members of the commonwealth of independent states and other countries that belonged to the former Union of Soviet Socialist Republics, and socialist countries in Asia. Typical examples of this group are Ecuador, Ghana, Guatemala, and the Russian Federation.

In the light of the above, Egypt, as a developing country, can be classified in the second group. Egypt, in fact, has embarked on the road to economic reform since 1991, and still has the same characteristics of this group, relative small size of its domestic economy, low value of transactions, and small value of market capitalization.

Papaioannou and Duke (1993) suggested that the term emerging markets refer to these markets in the developing countries and economies in transition around the world. They added that these stock markets, most of which evolved in the late 1970s and early 1980s, have emerged as part of the development process in many countries and have only just begun to be accepted in the global marketplace. In fact, many emerging stock markets, which were characterized by low liquidity, high volatility, and reduced efficiency, have become increasingly active due to increases in the types and volume of securities they offer, more stability in governmental macroeconomics policies, and decreased regulation that allows easy access to investment information.

As a result of the above points of views about the emerging stock markets definitions, it is difficult to find universally shared characteristics of a generally applicable proposal. But in general, it can be concluded that the term emerging stock markets refers, mainly, to these
stock markets in the developing countries. In the meantime, these markets are different in many characteristics compared with mature or sophisticated stock markets in the developed countries. So, it has become especially visible when the emerging stock markets are contrasted with the developed stock markets. It is suggested to compare the emerging stock markets with the stock markets in the developed countries in many areas, for instance, market size, market activity, market volatility, market growth, investors’ confidence and the age of the market.

- Market size: According to Hartmann and Khambata (1993) market size consists of two dimensions: total market capitalization, which measures the total market value of all the shares listed on a given exchange; and the number of listed companies, which can indicate how thinly that value is spread among the listed firms. Beside these two dimensions, market capitalization per GDP can be considered as an indicator of the market size as well.

The following table can show the market capitalization in some emerging and developed stock markets.

Table 3.1
Market capitalization in emerging and developed stock markets by region (1992)

<table>
<thead>
<tr>
<th>Regions</th>
<th>Number of countries represented in each region</th>
<th>Market capitalization (billions of US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Absolute figure</td>
</tr>
<tr>
<td>Emerging markets</td>
<td>40</td>
<td>837.34</td>
</tr>
<tr>
<td>Latin America</td>
<td>12</td>
<td>296.91</td>
</tr>
<tr>
<td>South and East Asia</td>
<td>12</td>
<td>489.80</td>
</tr>
<tr>
<td>Middle East</td>
<td>6</td>
<td>26.65</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>5</td>
<td>2.97</td>
</tr>
<tr>
<td>Europe</td>
<td>5</td>
<td>21.01</td>
</tr>
<tr>
<td>Developed markets</td>
<td>23</td>
<td>10095.89</td>
</tr>
</tbody>
</table>


These essential features from the above table can be made clear in the following chart:
As seen from the above table and chart, emerging stock markets are characterized by smaller market capitalization compared with stock markets in developed countries. Also, it can be noticed that emerging stock markets in South and East Asia are too large compared with emerging stock markets in other regions. On the other hand, the average market capitalization in stock markets in Sub-Saharan Africa is very small compared with other emerging stock markets.

In the meantime, market capitalization per GDP can also be used as a measure of market size. In fact, this dimension refers to the depth of stock markets. The following table shows market capitalization per GDP in the emerging stock markets classified by region and those stock markets in developed countries as well.
Table 3.2
Market capitalization per GDP in emerging and developed stock markets by region (1991-1992)

<table>
<thead>
<tr>
<th>Regions</th>
<th>Number of country represented in each region</th>
<th>Market capitalization per GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerging markets</td>
<td>22</td>
<td>32%</td>
</tr>
<tr>
<td>Latin America</td>
<td>7</td>
<td>36%</td>
</tr>
<tr>
<td>South and East Asia</td>
<td>6</td>
<td>40%</td>
</tr>
<tr>
<td>Middle East</td>
<td>3</td>
<td>28%</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>2</td>
<td>3%</td>
</tr>
<tr>
<td>Europe</td>
<td>2</td>
<td>14%</td>
</tr>
<tr>
<td>Developed markets</td>
<td>3</td>
<td>82%</td>
</tr>
</tbody>
</table>


The above table can be made clear in the following chart.

Chart 3.8
Market capitalization per GDP in emerging and developed stock markets by region (1991-1992)

![Market capitalization per GDP chart](image)


As can be seen from the above table and chart, market capitalization per GDP in emerging stock markets do not compare with those stock markets in developed countries: it was only 32
per cent in emerging stock markets; on the other hand, it was 82 per cent in stock markets in
developed markets. In fact, the average market capitalization per GDP in emerging stock
markets is less than 40 per cent of the corresponding indicator for the stock markets in
developed countries. Also, it can be noticed that emerging stock markets in South and East
Asia have a larger market capitalization per GDP compared with other emerging stock
markets. On the other hand, emerging stock markets in Sub-Saharan Africa have a low level of
deepening compared with other emerging stock markets; this in fact may reflect the lack of
access for companies to listing and trading.

The other dimension of the market size is the number of listed companies. The following table
indicates number of listed companies in many emerging stock markets classified by region,
and in stock markets in developed countries as well.

**Table 3.3**
**Number of listed companies in emerging and developed stock markets by region (1992)**

<table>
<thead>
<tr>
<th>Regions</th>
<th>Number of countries represented in each region</th>
<th>Number of listed companies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Absolute figure</td>
</tr>
<tr>
<td>Emerging markets</td>
<td>40</td>
<td>13312</td>
</tr>
<tr>
<td>Latin America</td>
<td>12</td>
<td>1874</td>
</tr>
<tr>
<td>South and East Asia</td>
<td>12</td>
<td>9727</td>
</tr>
<tr>
<td>Middle East</td>
<td>6</td>
<td>1015</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>5</td>
<td>322</td>
</tr>
<tr>
<td>Europe</td>
<td>5</td>
<td>374</td>
</tr>
<tr>
<td>Developed markets</td>
<td>23</td>
<td>19032</td>
</tr>
</tbody>
</table>


The following chart can reflect the above figures in Table 3.3 as follows:
Chart 3.9
Average number of listed companies in emerging and developed stock markets by region (1992)

From the previous table and the above chart, it is clear that emerging stock markets as a whole are characterized by fewer listed companies than the stock markets in developed countries. But it can also be noticed that the stock markets in South and East Asia are similar to those stock markets in developed countries. On the other hand, Sub-Saharan Africa has fewer listed companies compared with other emerging stock markets. So, in terms of market size, there is a difference between emerging stock markets and stock markets in developed countries. The emerging stock markets are, in general, smaller in size than those in developed countries. At the same time, emerging stock markets are not similar in size; for instance, South and East Asia’s markets are bigger in terms of market size compared with other regions, in particular, Sub-Saharan Africa. Also, stock markets in many countries in South and East Asia are similar in size to, and in some cases, larger than many stock markets in developed countries. For instance, market capitalization in Republic of Korea and Taiwan was 107.66 and 100.17
billion US $ in 1992 as sequence, compared with Sweden, Belgium (76.17 and 64.09 billion US $), and also many other stock markets in Europe (IFC 1992).

- Market activity: this dimension may contain, beside total value traded, many other variables which may consider to be related to market liquidity and market concentration, as they refer to the activity of markets as well.

The following table can show the total value traded in both emerging stock markets and stock markets in developed countries.

**Table 3.4**

*Market trading value in emerging and developed stock markets by region (1992)*

<table>
<thead>
<tr>
<th>Regions</th>
<th>Number of countries represented in each region</th>
<th>Market trading value (billions of US $)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Absolute figure</td>
</tr>
<tr>
<td>Emerging markets</td>
<td>40</td>
<td>605.02</td>
</tr>
<tr>
<td>Latin America</td>
<td>12</td>
<td>98.53</td>
</tr>
<tr>
<td>South and East Asia.</td>
<td>12</td>
<td>492.46</td>
</tr>
<tr>
<td>Middle East</td>
<td>6</td>
<td>10.64</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>5</td>
<td>0.06</td>
</tr>
<tr>
<td>Europe</td>
<td>5</td>
<td>5.32</td>
</tr>
<tr>
<td>Developed markets</td>
<td>23</td>
<td>5161.34</td>
</tr>
</tbody>
</table>


The figures in the above table can be shown in the following chart.
Chart 3.10
Average market trading value in shares in emerging and developed stock markets by Region (1992)

The above table and chart demonstrate that emerging stock markets are of smaller trade value compared with stock markets in developed markets. As indicated in market size, emerging stock markets in South and East Asia are more active in terms of market trading value compared with other emerging stock markets. On the other hand, emerging stock markets in Sub-Saharan Africa are very small compared with other regions. Also, both emerging stock markets in the Middle East region and the European region are very small as well in terms of market trading value. In fact, these regions can not be compared with emerging stock markets in South and East Asia.

The second measure of market activity is turnover ratio, which refers to the ratio of total value traded to market capitalization. The following table shows turnover ratio in many emerging stock markets classified by region, and in stock markets in developed countries.
Table 3.5
Turnover ratio in emerging and developed stock markets by region (1992)

<table>
<thead>
<tr>
<th>Regions</th>
<th>Number of countries represented in each region</th>
<th>Turnover ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerging markets</td>
<td>40</td>
<td>72 %</td>
</tr>
<tr>
<td>Latin America</td>
<td>12</td>
<td>33 %</td>
</tr>
<tr>
<td>South and East Asia</td>
<td>12</td>
<td>100 %</td>
</tr>
<tr>
<td>Middle East</td>
<td>6</td>
<td>39 %</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>5</td>
<td>2 %</td>
</tr>
<tr>
<td>Europe</td>
<td>5</td>
<td>25 %</td>
</tr>
<tr>
<td>Developed markets</td>
<td>23</td>
<td>51 %</td>
</tr>
</tbody>
</table>


This table can be illustrated clearly in the following chart.

Chart 3.11
Turnover ratio in emerging and developed stock markets by region (1992)


The previous table and the above chart indicate that the average turnover ratio in emerging stock markets as a whole is bigger than those in developed countries. But it can be noticed that, except for stock markets in South and East Asia, the other emerging stock markets are
characterized by a lower turnover ratio compared with those stock markets in developed markets. In fact, if the stock markets in South and East Asia are eliminated from the above table, the average turnover ratio of the emerging stock markets as a whole will be only 33 per cent compared with 51 per cent for stock markets in developed countries. Also, it is noticeable that stock markets in Sub-Saharan Africa are very poor in their turnover compared with other emerging stock markets. This, in turn, means that even stock markets are not the same in many features.

The last measure of market activity is market concentration, which reflects whether the market concentrates its trading on a limited number of companies, and whether market capitalization can be represented by a small number of companies. The following table shows the percentage of biggest companies' share in value traded in many emerging stock markets classified by region and in stock markets in developed countries as well.

**Table 3.6**
Percentage of biggest companies' share in value traded in emerging and developed stock markets by region (1991-1992)

<table>
<thead>
<tr>
<th>Regions</th>
<th>Number of countries represented in each region</th>
<th>Biggest companies' share in value traded ( % )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerging markets</td>
<td>36</td>
<td>74%</td>
</tr>
<tr>
<td>Latin America</td>
<td>11</td>
<td>60%</td>
</tr>
<tr>
<td>South and East Asia</td>
<td>12</td>
<td>54%</td>
</tr>
<tr>
<td>Middle East</td>
<td>5</td>
<td>80%</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>3</td>
<td>82%</td>
</tr>
<tr>
<td>Europe</td>
<td>5</td>
<td>64%</td>
</tr>
<tr>
<td>Developed markets</td>
<td>21</td>
<td>41%</td>
</tr>
</tbody>
</table>


These essential features from the above table can be made clear in the following chart:
From the previous table and the above chart, it can be noted that emerging stock markets tend to concentrate their trade on a small number of companies. Thus, these markets are narrow compared with stock markets in developed countries, because most transactions which take place in emerging stock markets concentrate only on the top companies. This ratio was 74 per cent in emerging stock markets compared with only 42 per cent in stock markets in developed countries. On the other hand, stock markets in Sub-Saharan Africa followed by Middle East have a larger concentration on value traded compared with other emerging stock markets. Also, stock markets in South and East Asia have the lower concentration on value traded compared with other regions, in fact, the stock markets in this region tend to be similar with stock markets in developed countries.

Also, the following table illustrates the biggest companies' share in market capitalization in emerging stock markets classified by region and stock markets in developed countries.
Table 3.7
Percentage of biggest companies’ share in market capitalization in emerging and developed stock markets by region (1991-1992)

<table>
<thead>
<tr>
<th>Regions</th>
<th>Number of countries represented in each region</th>
<th>Biggest companies’ share in market capitalization (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerging markets.</td>
<td>36</td>
<td>60 %</td>
</tr>
<tr>
<td>Latin America.</td>
<td>11</td>
<td>55 %</td>
</tr>
<tr>
<td>South and East Asia.</td>
<td>12</td>
<td>46 %</td>
</tr>
<tr>
<td>Middle East.</td>
<td>5</td>
<td>65 %</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>3</td>
<td>78 %</td>
</tr>
<tr>
<td>Europe.</td>
<td>5</td>
<td>58 %</td>
</tr>
<tr>
<td>Developed markets</td>
<td>21</td>
<td>45 %</td>
</tr>
</tbody>
</table>


The following chart can reflect the above figures in the previous table as follows:

**Chart 3.13**
Percentage of biggest companies’ share in market capitalization in emerging and developed stock markets by region (1991-1992)

![Chart showing percentage of biggest companies' share in market capitalization by region](chart.png)

As indicated in the previous table and chart, and from the above table and chart it can argued that the top companies in emerging stock markets represent 60 per cent of market capitalization of these markets compared with only 45 per cent in stock markets in developed markets. In fact, this can reflect, as indicated previously, that emerging stock markets tend to concentrate on a small number of companies, which represent the top companies in the market. Also, at the one extreme, emerging stock markets in South and East Asia tend to be similar to stock markets, where the ten biggest companies’ share in market capitalization was 46 per cent, nearly the same as for developed markets (45 per cent). At the other extreme, emerging stock markets in Sub-Saharan Africa are in the last position compared with other emerging stock markets.

From the above measures in market activity, it can be concluded that emerging stock markets also have three additional characteristics: small traded value, low turnover, and high market concentration, which shows that emerging stock markets’ activity are small in both absolute and relative terms when compared to other stock markets in developed countries. In addition, the largest listed companies in these markets tend to dominate both traded value and market capitalization, which leads to further observation that market activity in the emerging stock markets is primarily limited to the shares of the largest and most widely traded companies.

- Market volatility: This variable can be measured by the standard deviation of returns, and it can show to what extent these returns are fluctuating about their average level. The following table presents the annualized standard deviation of monthly total returns between 1987-1991 in many emerging stock markets, classified by region, and in stock markets in developed countries as well.
Table 3.8
Market volatility: annualized standard deviation of monthly total return in emerging and developed stock markets by region (1987-1991)

<table>
<thead>
<tr>
<th>Regions</th>
<th>Number of countries represented in each region</th>
<th>Standard deviation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerging markets</td>
<td>31</td>
<td>47 %</td>
</tr>
<tr>
<td>Latin America</td>
<td>9</td>
<td>60 %</td>
</tr>
<tr>
<td>South and East Asia</td>
<td>11</td>
<td>34 %</td>
</tr>
<tr>
<td>Middle East</td>
<td>4</td>
<td>61 %</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>3</td>
<td>23 %</td>
</tr>
<tr>
<td>Europe</td>
<td>4</td>
<td>55 %</td>
</tr>
<tr>
<td>Developed markets</td>
<td>22</td>
<td>19 %</td>
</tr>
</tbody>
</table>


These figures in the previous table can be presented in the following chart.

Chart 3.14
Market volatility: annualized standard deviation of monthly total return in emerging and developed stock markets by region (1987-1991)

From the preceding table and the above chart, it is noticed that emerging stock markets during the five years period between 1987-1991 have been significantly more volatile than those stock markets in developed countries. Also, from the above figures and chart, it is argued that among the emerging stock markets, the market volatility has been, in general, high in Latin America and the Middle East. The reason behind this volatility may be due to the hyperinflation rate in both regions compared with other emerging stock markets. Beside this, it is remarkable that emerging stock markets in Sub-Saharan Africa have a low standard deviation compared with other emerging stock markets, which means that this region has less market volatility. In fact, it tends to be similar to those stock markets in developed countries. The reason behind this may be due to the market limitation in this region in terms of market capitalization and value of shares traded, so the stock markets in this region tend to be not active, and this in turn, does not allow the price of shares to be volatile like other stock markets which are more active than stock markets in this region.

The Economist (1997b) indicated that since 1978, when the International Finance Corporation started to calculate its index, emerging stock markets have indeed shown an annual gain of 16 per cent, around double the 7 per cent average rise in stock markets in developed countries. But emerging stock markets have been much more volatile. In only three of the past eight years between 1988 and 1996, they have notched up bigger gains than stock markets in developed countries. On the one hand, in 1993 alone, emerging stock markets jumped by 75 per cent. On the other hand, emerging stock markets fell 10.3 per cent in 1995 after a 13.8 per cent fall in 1994 (Banker 1996). Indeed, emerging stock markets are very volatile; these stock markets can double investors' returns one year and halve them the next (Gartland 1995).
Market growth: This variable refers to what extent the stock markets increased in terms of growth in the value of shares traded and in market capitalization as well.

The following table shows the rate of growth in value shares traded in both emerging stock markets, classified by region, and those stock markets in developed countries as well.

**Table 3.9**

**Growth of value in shares traded in emerging and developed stock markets by region (1992-1993)**

<table>
<thead>
<tr>
<th>Regions</th>
<th>Number of countries represented in each region</th>
<th>Change in value traded (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerging markets</td>
<td>31</td>
<td>170 %</td>
</tr>
<tr>
<td>Latin America</td>
<td>9</td>
<td>41 %</td>
</tr>
<tr>
<td>South and East Asia</td>
<td>11</td>
<td>260 %</td>
</tr>
<tr>
<td>Middle East</td>
<td>4</td>
<td>88 %</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>3</td>
<td>79 %</td>
</tr>
<tr>
<td>Europe</td>
<td>4</td>
<td>470 %</td>
</tr>
<tr>
<td>Developed markets</td>
<td>22</td>
<td>61 %</td>
</tr>
</tbody>
</table>


The essential features from the above table can be made more clear in the following chart:
Chart 3.15
Growth of value in shares traded in emerging and developed stock markets by region (1992-1993)

<table>
<thead>
<tr>
<th>Region</th>
<th>Rate of growth in value of shares traded between 1992-1993</th>
</tr>
</thead>
<tbody>
<tr>
<td>Developed markets</td>
<td>61%</td>
</tr>
<tr>
<td>Europe</td>
<td>470%</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>79%</td>
</tr>
<tr>
<td>Middle East</td>
<td>88%</td>
</tr>
<tr>
<td>South and Eastern Asia</td>
<td>260%</td>
</tr>
<tr>
<td>Latin America</td>
<td>41%</td>
</tr>
<tr>
<td>Emerging markets</td>
<td>170%</td>
</tr>
</tbody>
</table>


Both the previous table and the above chart indicate that emerging stock markets show an extreme variety compared with those stock markets in developed countries. It can be suggested that as the emerging stock markets are relatively new markets as with a less established market capitalization level compared with those stock markets in developed countries, their average speed in terms of value of shares traded is faster compared with stock markets in developed countries. Also, it can be noticed that within this average, there are very fast emerging stock markets such as those markets in South and East Asia, and Europe. Regarding the emerging stock markets in Europe, the reason behind the speed in value shares traded (470 per cent between 1992-1993) may be due to the economic reform in these countries since most countries in this sample are countries in a transition economy.
The other dimension of market growth is the rate of growth in market capitalization. The following table shows the rate of growth in market capitalization between 1985-1995 in both emerging stock markets and in stock markets in developed countries.

**Table 3.10**
Growth rate of market capitalization in emerging and developed stock markets (1985-1995)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerging markets</td>
<td>168.600</td>
<td>1945.600</td>
<td>1053 %</td>
</tr>
<tr>
<td>Developed markets</td>
<td>4521.400</td>
<td>13254.400</td>
<td>193 %</td>
</tr>
</tbody>
</table>


The following chart shows the figures in the previous table more clearly.

**Chart 3.16**
Growth rate of market capitalization in emerging and developed stock markets (1985-1995)

From the preceding table and the above chart, it can be argued that emerging stock markets are very speedy in market capitalization compared with other stock markets in developed countries. Between 1985-1995 the market capitalization in the stock markets in developed countries has grown by only 193 per cent compared with 1053 per cent for the emerging stock markets.

So, the emerging stock markets, according to the above, are characterized by faster market growth compared with other stock markets in developed markets. The emerging stock markets have been growing faster in both value of shares traded and market capitalization.

- Investors' confidence: This variable refers to the price-earnings ratio, which can be calculated by the inverse of earnings per share/share price. The lower the ratio, the cheaper the shares. So, if this ratio is low, it means that the investors' confidence in the market is low and vice-versa. The following table presents the price-earnings ratio in many emerging stock markets and in stock markets in developed countries as well.

Table 3.11
Price-earnings ratio in emerging and developed stock markets (1991-1992)

<table>
<thead>
<tr>
<th>Stock markets</th>
<th>Price-earnings ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emerging markets</td>
<td>17.76 %</td>
</tr>
<tr>
<td>Developed markets</td>
<td>25.6 %</td>
</tr>
</tbody>
</table>


These figures in the previous table can be made clear in the following chart.
From the previous table and the above chart, it is clear that the price-earnings ratio, which refers to the investors' confidence, in emerging stock markets is lower than for stock markets in developed countries. In fact, this may be due to the investors' thinking that the emerging stock markets are more risky than stock markets in developed countries. Essentially, one common way to assess the value of shares is to compare a stock market's price-earnings ratio with the economy's expected rate of growth over the next five years. On this basis, emerging stock markets look cheap both historically and next to stock markets in developed countries. Most emerging stock markets have price-earnings ratio-to-growth ratios of between two and four compared with nine to eleven in stock markets in developed countries (The Economist 1996b).
- Market age: Most emerging stock markets can be considered as newly created markets compared with those stock markets in developed countries. In fact, there are many emerging long-established stock markets, such as those in India (1887) Brazil (1890), and other stock markets in Central and Eastern European countries, where stock markets reopened their doors in the 1990s, after many years of suspended activities (Kalotay and Alvarez 1994). In turn, the Egyptian stock market had been created in the 1890s, but this market was destroyed for a period, before being reopened, again and became active only after the Egyptian government undertook the implementation of the economic reform programme in 1991.

All the above indicators can be considered as quantitative criteria, but as a qualitative criterion, it can noticed that there is almost no availability of derivative products in most emerging stock markets (Duyn 1993). Also, there is a lack in institutional development, restrictions on openness to foreign portfolios and financial disclosure in emerging stock markets (Hartmann and Khambata 1993).

In conclusion from all the above tables and charts, it is argued that: Emerging stock markets refer to those markets in developing countries. These markets have many features, which can be contrasted with stock markets in developed countries:

- Small market size, which is measured by total market capitalization, market capitalization per GDP, and the number of listed companies;

- Low market activity, which is measured by total value traded, the turnover ratio, and market concentration (percentage of ten biggest companies’ share in value traded and market capitalization);

- high volatility, which is measured by the annualized standard deviation of the monthly total return;
- high market growth, which is measured by the growth in value of shares traded and the growth of market capitalization;

- less investors’ confidence, which is measured by the price-earnings ratio;

- recent market age, which refers to the creation age of the market, and

- many qualitative criteria such as lack in institutional development, restrictions on openness to foreign portfolio, and financial disclosure).

In the meantime, it is argued that the disparities, that exist between the emerging stock markets and the stock markets in the developed countries, and also among the emerging stock markets themselves, are largely confined to differences in the degree to which each market displays the common characteristics. The reason behind this is that all developed stock markets and emerging stock markets lie on a two dimensional continuum which stretches from an emerging extreme to a developed one, and those two dimensions as mentioned previously are: quantitative criteria, and qualitative criteria. In the light of this, for instance, it is not possible to put emerging stock markets in South and East Asia on the same level with emerging stock markets in Sub-Saharan Africa. They can be considered as advanced emerging stock markets; they have already emerged. In turn, they also can be considered on the road to being like those stock markets in the developed countries. In fact, many emerging stock markets in South and East Asia have, as mentioned previously, a market size and market activity larger than many stock markets in developed countries. In contrast, emerging stock markets in Sub-Saharan Africa can be considered in the last level compared with other emerging stock market; they are in fact, on the preliminary stage to the stock markets.

Egypt, on which this research focuses, can be considered as an emerging market. In fact, as shown previously, the stock market in Egypt was the third stock market to be founded in the
world and it was ranked as the fifth active stock market world-wide before World War II. So, the stock market in Egypt can be called a "re-emerging market" (see chapter five for more details about the stock market in Egypt).

3.6 Literature review about empirical studies on emerging stock markets:

Like the emerging stock markets’ definitions, little attention has been paid to the empirical studies about the emerging stock markets. In fact, this may be because the term emerging stock markets can be considered as a recent term. In fact, this term became known after the International Finance Corporation started to calculate the market index for these emerging regions (IFC 1996).

Essentially, most empirical studies about emerging stock markets concentrated on testing the availability to invest in these markets, and on testing the benefits from portfolio diversification in these markets. This kind of concentration, in fact, may be due to the importance of the emerging stock markets as new places to invest, since these markets, in comparison with the stock markets in the industrial countries, can offer better economic performance, higher earning growth, and neutral valuations (Agtmael 1993).

So, the portfolio investment for emerging stock markets has been increased strongly (see Bekaert 1993, Buckberg 1993, Diwan, Errunza, and Senbet 1993, and Teasar and Werner 1993). For instance, portfolio investment to emerging stock markets increased from 6.2 billion US$ in 1987 to 37.2 billion US$ in 1992, and reached 26.9 billion $ in the first half of 1993 (Carbo and Hernandez 1993).

Many studies focused on ranking emerging stock markets. Dyne (1993) carried out a large study on 50 emerging stock markets from various regions in the world in order to rank these markets. The study measured the maturity and efficiency of these markets and examined
objective criteria, such as size of the market, liquidity, market concentration, and market openness. The study, as well, polled institutional investors and equity researchers, asking them to give their opinion on countries, which they have experienced. To rank the emerging stock markets in the sample of the study, the total score was calculated by adding the scores attained in each category. For example, the country with the highest market capitalization received 30 points in that category. By contrast, the country with the smallest market capitalization received zero. Beside this, no points were given for categories for which there was no available data. This study depended on information obtained from stock markets in various countries, and this was supplemented by data from the International Finance Corporation (Emerging Markets Data Base "EMDB").

To measure market size, some indicators have been used such as, market capitalization and the number of listed stocks. The higher these figures, the bigger the market size, and then the higher the score. On the other hand, the main liquidity indicator is the ratio of total value traded over the last 12 months to market capitalization. The higher the ratio, the more liquidity in the market, and in turn, the higher the score. Market concentration is measured by considering the share of market capitalization of the 10 largest stocks and the share of the value traded of the 10 largest stocks. The higher the percentage, the higher the market concentration, the lower the score. Market openness is measured by whether there are restrictions on foreign investments, taxes, such as withholding tax and capital gain tax, and repatriation controls.

The results indicated that Taiwan emerges top with a total score of 164.14, followed by the Republic of Korea with a total score of 161.52, and then Malaysia with a total score of 158.89. In fact, these results show a consistency with that mentioned in the previous section, that the emerging stock markets in South and East Asia could be considered as advanced emerging stock markets compared with other regions. In contrast, Tunisia was in the last position with a
total score of only 22.42, followed by Bangladesh with a total score of 27.59 and then Cote d’avoire with total score 29.75.

Egypt, on which this research focuses, was in position 20 out of 50 countries with a total score of 90.71, which means that Egypt can be considered in the middle ranking of the emerging stock markets.

Urrutia (1995) used the variance-ratio method of Lo and Mackinlay (1989) to test the hypothesis that Latin American emerging equity market prices follow a random walk. The data are monthly index prices in local currency from December 1975 to March 1991 for Argentina, Brazil, Chile, and Mexico. At the same time, the study tested for weak-form market efficiency using a runs test, which is a non-parametric test used for detecting the frequency of the changes in the direction of a time series. The run test determines whether the total number of runs in the sample is consistent with the hypothesis that the changes are independent. The data of this study were correlated with monthly national stock index prices expressed in local currency. The data sample obtained from the International Financial Corporation (IFC) covers December 1975 to March 1991.

The results reject the random walk hypothesis for the four Latin American emerging equity markets. In general, the empirical evidence found against the random walk process for Latin American emerging equity markets, which seem to be similar with that reported for developed markets by other authors (see Summers 1986, Fama and French 1988, Poterba and Summers 1988, and Lo and Mackinlay 1989). On the other hand, these results contrast to those of Claessens, Dasgupta, and Glen (1993), who rejected the null of random walk only for Chile.

The different variance-ratio results may be due to the type of data used. Claessens, Dasgupta, and Glen (1993) worked with returns in US dollars instead of returns in local currencies. Returns on local currencies are more meaningful, since these markets were practically closed
to outside portfolio investment during the period studied. In addition, Claessens, Dasgupta, and Glen (1993) used only two- and four-month periods, but this study extended the variance-ratio tests to include a longer period, so some long-term behaviour can be captured.

Also, the results indicated that the four Latin American emerging equity markets are weak-form efficient. In fact, this result seems to be consistent with Howell (1996) who argued that emerging stock markets, in general, are not efficient.

A similar empirical study has been done by Spyrou (1997) to examine some issues that are related to the efficiency of the emerging equity markets. Firstly, he tested the random walk hypothesis of stock price changes, and secondly, he concentrated on two seasonal effects; one monthly (the January effect) and one daily (the weekend or Monday effect).

In fact, the theory of random walks is related to weak-form efficient market hypotheses: if prices follow a random walk, then price changes over time are random (independent). It means that the price change of today is unrelated to the price change of yesterday, or any other day. At the same time, if any new information arrives randomly in the markets, and investors react immediately according to this information, then price changes should be also random. In the light of this, in effect when one tests for random walks, one simultaneously tests for weak form efficiency (Spyrou 1997).

The sample of the study consists of ten emerging equity markets from two different geographical regions: the Central and Latin America region and the Asia and Asia-Pacific region. More specifically, the study used the national equity indices of Brazil, Argentina, Chile, Mexico, India, South Korea, Malaysia, Taiwan, and Philippines. This study utilized two tests for testing for the magnitude of the random walk component in the emerging equity markets indices, the first was based on the analysis of Cochrane (1988), and the second test was the variance ratio test for random walks (Lo and Mackinlay 1989).

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The results of the two-variance tests indicated that the data reject the random walk hypothesis for the emerging market data, a clear violation of the weak form of the efficient market hypothesis. Both Cochran's persistence measure and the variance ratio test rejected the notion that equity price changes follow a random walk, thus suggesting that price changes in the emerging equity markets are not random and might be predictable. Furthermore, the study reported that mean daily returns in emerging equity markets exhibit a strong seasonal pattern manifesting in a negative Monday return -this was in 90 per cent of the sample- and a positive Friday return -also, this was in 90 per cent of the sample-. This, in fact, can be considered as consistent with other empirical studies on stock markets in developed countries (see Gross 1973, French 1980, Gibbons and Hess 1981, Lakonishok and Levi 1982, Jaffe and Westerfield 1985, Condoyianni and Hanlon 1987, and Chang, Pinegar, and Ravichancran 1993).

Both tests utilized confirmed that finding. Also, other empirical findings such as the positive returns of the last three weekdays (Wednesday, Thursday, and Friday) were found to be the case for the emerging equity markets as well. This evidence contradicted both the calendar time hypothesis and the trading time hypothesis, and suggested inefficiency and predictable patterns in daily returns.

On the other hand, for the monthly data, the non-parametric test indicated no significant seasonal pattern in the mean monthly equity returns of the emerging equity markets, with two exceptions: Malaysia and the Philippines. The parametric test, on the other hand, indicated that there is a January effect in the mean returns of Chile and India, and a July and August effect for the Philippines. Thus, this study argued that there is very weak evidence of a January effect. This, in fact, contrasts with Rozeff and Kinney (1976) who found that there is a significant effect of the month of January on the rate of return of the New York Stock Exchange. The month of January provided a very high rate of return compared with other months; and the same result was also found by Gultekin and Gultekin (1983).
Overall, the evidence presented in this study suggested that for the emerging equity markets data, the weak form of the efficient market hypothesis be violated. Equity prices in the emerging equity markets do not appear to follow a random walk process. Furthermore, a strong daily pattern was detected, thus suggesting that the equity returns in the emerging equity markets are predictable.

Another study has been done by Hung and Cheung (1995) to test the existence of the long-term relationship among five Asian emerging equity markets during the period 1980-1990. The study used weekly data from the stock markets indices of these countries. The five Asian emerging equity markets in the sample of this study are Hong Kong, Korea, Malaysia, Singapore, and Taiwan. The study used the multivariate test for cointegration and the vector error correction model, which developed by Johansen (1988, 1991), and Johansen and Juselius (1990, 1991).

The results indicated that there is no evidence that these five Asian emerging equity markets are cointegrated. When the stock prices of these markets are measured in US $, the five Asian emerging equity markets tend to be cointegrated during the second sub-period 1987-1991. In fact, this relationship may be due to the depreciation of the US $ during the late 1980s. As a general result, the study concluded that the benefits of international diversification by investing in the stock markets in the Asian-Pacific region might be limited.

A similar study has been done by both Garrett and Spyrou (1996) to investigate the existence of common trends in the increasingly important emerging equity markets of the Latin American and Asia-Pacific regions.

The data used in this study are drawn from the emerging market indices constructed by the International Finance Corporation. The study used monthly data over the period January 1976 to December 1984 for Brazil, Argentina, Chile, and Mexico (the Latin American region), and
over the period January 1985 to December 1994 for India, Malaysia, the Philippines, South Korea, Taiwan, and Thailand (Asia-Pacific region). All indices of these markets are expressed in terms of US $.

In order to evaluate whether the potential benefits from diversification that accrue in the short term persist over the long term, the study needs to analyze whether common stochastic trends are present in the two emerging equity market regions under investigation. In order to do this, the study also used the Johansen technique (1990) and Johansen and Juselius (1990) to test for cointegration amongst these emerging equity markets.

The results indicated that, considering Latin American emerging equity markets first, the null hypothesis of no cointegration is clearly rejected. This suggested that there is one common stochastic trend driving emerging equity markets in the Latin American region. In fact, the same conclusion emerges for the Asia-Pacific region as well.

It can be noticed that the result of this study tends to be similar to the previous one, which indicated that the five emerging equity markets in the Asian region appear to be cointegrated during the second sub-period 1987-1991, when the stock prices are measured in terms of the US $, and also, there are no benefits from portfolio diversification in these markets.

Besides this, this result, in fact, tends to be consistent with other empirical studies, which have been done on stock markets in developed markets. These studies indicated that when the stock markets of two or more countries are cointegrated, then they share, at least, one common stochastic trend such that they will tend to drift together over time. The implication of this is that any benefits that arise from diversification will be eradicated in the long term, and therefore, investors with long horizons may not actually benefit from diversifying their portfolios internationally (Corhay 1993, Rad and Urbain 1993). Also, Taylor and Tonks (1989), and Kasa (1992) argued that benefits to diversification must be reduced substantially in the long run. The reason behind that may be due strongly to the fact that if stock markets
are cointegrated, they will drift together towards some equilibrium that implies that movements in stock markets that share a common trend will be very highly correlated over long horizons.

On the other hand Chan, Cup, and Pan (1992) used unit root and pairwise cointegration tests to examine the relationship among the emerging equity markets in the Asian-Pacific region, and the study concluded that these Asian emerging equity markets are not cointegrated. The results of this study are contrasted with the above one. This in fact, may be due to the fact that this study measured the equity prices in local currencies; also, this study used a daily indices, in turn when daily indices are used, the problem of off-line trading becomes serious because these indices may be influenced by some thinly traded stocks, and this is in turn may lead to an erroneous representation of the true relationships among these markets (Hung and Cheung 1995).

Also, some other empirical studies have argued that there is a benefit from diversification through investing in emerging equity markets in the Asian countries. For example, Cheung and Ho (1991) and Cheung (1993) examined intertemporal patterns of the correlation coefficients among the stock markets in developed countries and the emerging stock markets in Asian countries. Even though, these studies found that the correlation coefficients are unstable over time, but they affirm the benefit of diversification of investing in this region.

Meanwhile, Claessens (1993) argued that even though the degree of integration between the emerging stock markets and those stock markets in developed counties has increased over time, and that there are significant benefits from diversifying into emerging stock markets. Santis (1993) has also argued the same point of view.
Another kind of study focused on testing the volatility of emerging stock markets. Richards (1996) tested the volatility in the emerging stock markets and in stock markets in the developed countries (mature markets). The study used data from the Emerging Market Data Base produced by the International Finance Corporation, this were for emerging stock markets, and the data for stock markets in developed countries from the Morgan Stanley Capital International (MSCI).

The data covered the period from 1975-1995 for 16 emerging and 16 developed stock markets. The results of this study indicated that the emerging stock markets are more volatile than those stock markets in the developed countries, but the results also suggested that the emerging stock markets have become less volatile after liberalization. The results of this study tend to be consistent with Kim and Singal (1993) who argued that there has been no increase in volatility over time, and the volatility of the emerging stock markets has tended to decrease after market liberalization. Also Bekaert and Havery (1995) argued the same result. In contrast, Lavine and Zervo (1995) suggested that volatility in the emerging equity markets might increase after market liberalization.

Lastly, Kunt and Huizinga (1996) examined the performance of 18 emerging stock markets by investigating the impact of direct and indirect barriers to capital mobility, and how these barriers have affected emerging stock markets performance. The study used monthly stock return observations for these markets between 1988-1992, and the data were collected from the Emerging Market Data Base.

The evidence of this study suggested that the direct and indirect barriers, such as capital gains holding taxes on non-residents and transaction costs, represent effective barriers to portfolio flows, because they increase the required pre-tax equity returns significantly. On the other hand, dividend withholding taxes tend to be insignificant barriers.
The paper also introduced three main policy recommendations for developing country governments that wish to attract foreign investment to their local emerging stock markets:

"(I) Developing countries should tax capital gains lightly in comparison to repatriated dividends if they wish to take advantage of the more generous foreign tax credits provided for foreign source dividend taxation; (II) Capital gains taxes should be indexed to avoid an unintended taxation of inflationary gains; (III) Policies aimed at the further development of equity markets should be adopted to bring about a decrease in the rates of return required by investor".
(Kunt and Huizinga, 1996, P. 402)

3.7 The chapter summary: -

In this chapter various aspects, which relate to stock markets in general and emerging stock markets in particular, have been covered. The main points in this chapter can be summarized as follows:

1- Capital markets can be considered a central creation of an efficient and competitive economy.

2- There are various methods to classify the stock markets: primary market and secondary market, call market and continuous market, dealer market and broker market, human trading market and electronic trading market, auction market and negotiated market, and organized market, over-the-counter market, third market, and fourth market.

3- The stock market in Egypt, on which this research focuses, can be considered an organized, call, broker, electronic trading, and auction market.

4- The stock markets can be considered organized places involving individual investors who represent both the demand side and supply side for marketable securities as buyers or sellers, firms, whose securities are traded in these markets, and financial intermediaries who facilitate the transactions taking place between buyers and sellers in an orderly manner at fair prices.

5- The stock market is very important for any economy. It can provide investment opportunities to the individuals with a surplus of funds, and it can help in providing the
required finance to firms. In turn, it can be considered as a vehicle to the investment process and then to the economic growth for society as a whole.

6- The criteria which will be considered in this research to evaluate the Egyptian stock markets performance are five main areas: market activity, market size, market liquidity, market concentration and development of the stock market index.

7- The term emerging stock markets refers, mainly, to those stock markets in developing countries.

8- The emerging stock markets have many features which make these markets vary with other stock markets in developed countries. These features are both quantitative, such as: small market size, low market activity, high volatility, high market growth, less investors' confidence, and recent market age, and qualitative, such as: lack of institutional development, restrictions on openness to foreign portfolios and financial disclosure.

9- The emerging stock markets in the South and Eastern-Asia region can be considered as top emerging stock markets compared with other regions, they are indeed on the road to becoming mature markets. In contrast, the emerging stock markets in the Sub-Saharan Africa region can be considered being in the last position compared with other regions.

10- Egypt, on which this research focuses, can be considered as a re-emerging stock market.

11- Most empirical studies, which deal with emerging stock markets have concentrated on testing the availability to invest in these markets, and whether these markets can provide potential investors the opportunity to invest, and also the benefits from portfolio diversification in these markets. This kind of concentration, in fact, may be due to the importance of the emerging stock markets as new places to invest, offering better economic performance, higher earnings growth and neutral valuations.
Chapter Four
The Relationship between the Economic Reform Programme and the Performance of the Stock Market
4.1 Introduction: 

As mentioned previously in the second chapter, any programme of economic reform aims, mainly, to accelerate the rate of growth of a given society. To achieve this aim, increasing the level of investment is required, in turn, the stock market can play a vital role in attracting both local and foreign investments. So, it is argued that an economic reform programme should have a great effect on the performance of the stock market.

Through the literature review, it is noticeable that, apart from stock returns and prices, little attention has been paid to investigating the relationship between other stock market performance variables and the economic reform programme.

This chapter will deal with the empirical studies, which concentrate on the examination of how the performance of the stock market in terms of stock returns and prices has been affected by the impact of economic reform programme variables. These have been determined previously in the second chapter, namely, interest rates, the inflation rate, the exchange rate, the rate of growth, per capita income, the budget deficit and the privatization programme.

4.2 The relationship between interest rates and stock market performance: 

In the theory of finance, one widely used approach to evaluate the stock prices is discounted cash flow models. In fact, these models are based on the concept that the value of stock is equal to the expected present value of cash flow, which can be received from the stock.

In the light of the above framework, it can be noticed that one of the most important parameters in this approach is the required rate of return or "discount rate", and which is a form of interest rate. In fact, investors who are considering the purchase of a stock must assess
the minimum required rate of return, which represents the opportunity cost (Jones 1994). So, investors will include any changes in interest rates in their consideration when evaluating stock prices. Thus, it is expected that any rise in rates of interest will reduce the present value of the expected cash flows which will be received by investors through dividends or realised capital gains, and this in turn, will reduce the value of stock prices and vice-versa.

At the same time, any increase in the rates of interest means that the required rate of return on all marketable securities will, in general, increase, in turn, bond prices will decrease, hence bonds will be more attractive to the investors compared with stocks, in conclusion, this will lead to depression in stock prices.

The relationship between interest rates and stock prices has been widely examined in many empirical studies. Ritter, Sliger, and Udell (1997) used the discounted cash flow model to explain the relationship between interest rates and stock prices. They used the following equation to determine the value of a stock under the constant dividend valuation model.

\[
P = \frac{D}{1 + r} + \frac{D}{(1 + r)^2} + \frac{D}{(1 + r)^3} + \cdots
\]

Equation (4.1)

Where:

\( P \): the price of a stock,

\( D \): the dividend of a stock received at the end of each period, and

\( r \): the annual compound rate used to discount the dividend payments.

The formula simplifies to:

\[
P = \frac{D}{r}
\]
By following Gordon’s growth model (1962):

\[
P = \frac{D_0(1+g)}{(1+K)} + \frac{D_0(1+g)^2}{(1+K)^2} + \frac{D_0(1+g)^3}{(1+K)^3} + \ldots \ldots \ldots \ldots
\]

\[
= \frac{D_0(1+g)}{(1+K)} + \frac{D_0}{(1+K)^2} + \frac{D_0}{(1+K)^3} + \ldots \ldots \ldots \ldots
\]

Equation (4.2)

Where:

\( P \): the price of a stock,

\( D \): the annual dividend of a stock received, which has just been paid,

\( K \): the annual compound rate used to discount the dividend payments, and

\( g \): the constant growth rate of the dividend.

In fact, the equation (4.2) is a geometric progression with common ratio \((1+g)/(1+k)\). For \( k > g \), the series converges and so:

\[
P = \frac{D_0(1+g)}{K-g} = \frac{D_1}{K-g}
\]

Equation (4.3)

According to Sharpe (1964), the capital asset pricing model (CAPM) would indicate that the required mean rate of return should be:

\[
\bar{r}_j = r_f + (\bar{r}_m - r_f)\beta_j
\]

Equation (4.4)

Where:

\( \bar{r}_j \) = the required mean rate of return,

\( r_f \) = the risk free rate of interest,

\( \bar{r}_m \) = the mean rate of return on the efficient market portfolio, and
\( \beta_j \) = the beta coefficient, i.e. sensitivity of the security to overall market movements, where 
\( \beta = 1 \) represents an average stock.

According to the above formulas, they suggest that when the interest rates increase, the required rate of return will increase, in turn, the stock price will decrease and vice-versa. Another explanation which is related to the above, is that, since stocks are riskier than government bonds, so, investors will require higher expected returns from stocks than government bonds in order to compensate for the investor’s risk aversion. In turn, when the bond yield increases, which represents here the interest rate, the required rate of return will increase, and this will lead to lower values in stock prices, and vice-versa. Also, Baye and Jansen (1995) supported the same relationship. They indicated that there is an inverse relationship between interest rates and stock prices.

Peavy (1992) pointed out that there is a negative relationship between interest rates and stock prices. He noticed that the Standard and Poor (S&P) 500 moves are in direct linear proportion with corporate profits and in inverse linear proportion with interest rates. He added that:

"The actual increase in S&P 500 dividends to approximately $11 by 1989, combined with the decline in the required dividend yield (due to interest rate decreases) to 3.20 per cent, results in an explosion in the value of the S&P 500 to 343.75. The interactive effect of a 95 per cent increase in cash dividends and a 25 per cent decrease in interest rates could produce a 218 per cent gain in S&P 500, or approximately 96 per cent of the 227 per cent actual change in the index over the past decade. The implication is that changes in cash dividends and interest rates do not have a linear effect on stock prices. Instead, the interactive effect of these variables has a multiplicative effect on the stock market".

(Peavy, (1992), P. 11).

Najand and Rahman (1991) used a Generalized Autoregressive Conditional Heteroscedesticity (GARCH) model to investigate the relationship between interest rates and stock returns for the US, Germany, the UK, and Canada. They found a statistically positive relationship between interest rate volatility and stock returns volatility.
Also, Giovannini and Labadie (1991) solved and simulated the cash-in-advance models, developed by Lucas (1982), and Savessson (1985) to investigate the relationship among interest rates and the inflation rate as independent variables, and stock returns as the dependent variable. They found that the interest rate is an extremely good predictor of subsequent stock returns. Asprem (1989) investigated the same issue in a macroeconomics variables model for 10 European countries. In general, he found that the relationship between interest rates and stock prices is negative as predicted by the present value model.

On the other hand, Beltratti and Shiller (1992) pointed out two issues in present value models. The one is that if changes in long-term interest rates reflect primarily inflationary expectations, these changes may perhaps have little impact on stock prices. The other one is that these changes might carry information about changes in future dividends. In turn, the effect of this information may offset the tendency of a negative relationship between stock prices and bond yields. Hence they asserted that there should indeed be a generally slightly negative correlation between changes in long-term interest rates and real stock prices.

Spiro (1990) also examined the relationship between interest rates and stock prices by concentrating mainly on the dividend yield. He ran regressions starting in the 1950s and found that the nominal interest rates rather than the real interest rates have a significant effect on the dividend yield for earlier time periods. On the other hand, in the 1980s, the study found that the real interest rates appear to be more significant in forecasting the dividend yield than an alternative based on the nominal interest rates. In conclusion, the study pointed out that the real interest rates have significant effects on the volatility of stock prices.

Solomon (1997) argued that there is a negative relationship between interest rates and stock prices. He added that:
"Earnings alone are no longer enough to propel stock higher. Lower interest rates are essential to sustain equity valuation level".
(Solomon, (1997), P. 12).

Goldman (1996) suggested that there is a neat relationship between interest rates and stock prices; lower expected rates equal higher stock prices. He noticed this relationship through two distinct periods, March 1995 to March 1996, and May 1996 to December 1996. In both periods, he concluded that S&P 500 tracked the expected short-term interest rates very closely. However, the same relationship for the shifted period (April 1996), was not noticeable. He argued that the reason behind this relationship is that:

"Short-term interest rate represents the cost of leverage; that is, the cost of borrowing money in order to acquire physical assets. The lower the cost of leverage, the greater the incentive to borrow in order to buy equity".
(Goldman, (1996), P. 173).

On the other hand, many other studies tended to examine the effect of changes in interest rates on several industry categories under the assumption that the impact of changes in interest rates may differ from company to company depending on the kind of industry.

In this framework, Bauman, Jensen, and Johnson (1997) examined the degree to which short and long-term stock returns associated with discount rate changes differ across industries. The study covered the period from 1968 through 1991. During this period there were 73 changes in the Federal Reserve discount rate, 40 decreases and 33 increases. The study period began with the discount rate change on August 16, 1968 and ended in 1991. To measure stock returns, the study used the Center for Research in Security Prices (CRSP) equally weighted index and 16 equally weighted industry indices. In fact, the industry indices were formed according to the Standard Industrial Classification (SIC) groupings adopted by Fama and French (1986) and employed by DeFusco, Johnson and Zorn (1991), among others. The mean return was calculated as the annualized geometric mean return over the period August 1968 through 1991. The study used equal weights for the industry indices.
The short-term results supported the previous studies, which indicated that the finance industry reacted very strongly to discount rate changes. On the other hand, the long-term results provided evidence supporting the theory that industries with a significant import or export component will also be strongly influenced by changes in monetary policy. In particular, the apparel, retail, durables, and business equipment industries all exhibited return patterns stronger than the market. These industries are all strongly affected by changes in import/export conditions.

The study suggested that the reason behind that is that:

"The discount rate changes may alter security prices through two means: by influencing the level of expected future firm cash flows and by changing the rate employed in discounting firm cash flows. Discount rate increases are frequently identified as signals of tighter money, and hence, higher future interest rates and decreases in the level of economic activity. In contrast, rate decreases signal an easier future monetary environment". (Bauman, Jensen, and Johnson (1997), P. 629).

They provided an explanation of the short-term effect on various kinds of industry, they argued that:

"The construction and finance industries are frequently identified as interest rate sensitive industries. Construction activity frequently fluctuates with interest rates as building projects are frequently financed with borrowed funds, thus a larger than average reaction is anticipated from the construction industry. The short-term returns for the finance industry are consistent with the nominal contracting hypothesis as the finance index experienced a significantly larger reaction to discount rate changes than the average stock. A change in interest rates generally has a larger than average impact on financial firms as their cost of funds tends to adjust more rapidly than the return on their assets, thus their profit margins fluctuate with interest rate changes. Finally, a change in future interest rates impacts retail companies significantly due to two effects. First, retail purchases financed with credit would become more or less costly, and therefore, the level of retail business would change with a change in interest rates. Second, the costs of carrying inventory for the retailer would change with a change in interest rates.

The relatively small reaction by the oil industry suggests that factors other than monetary policy changes play a more important role in determining performance. For example, political and economic uncertainties in oil exporting countries are dominant factors in the performance of oil companies. Overall, the short-term results are consistent with expectations and previous findings".

Concerning the long-term effect, they argued that:
"The long-term results demonstrate that the apparel, retail, durables, construction and business equipment industries exhibited significantly stronger than average stock patterns. In contrast, the food, utility, metal and oil industries displayed weaker than average patterns. The evidence suggests that investors expected discount rate changes to have the strongest implications for the retail, construction and finance industries and the weakest implications for the oil industry. The long-term realized returns correspond with the short-term reactions for the retail, construction and oil industries but not for the finance industry. In addition, stronger than average long-term patterns occurred in the apparel, durables and business equipment industries despite the fact that these industries did not react differently from the average stock at the time of the rate change announcement".  
(Bauman, Jensen, and Johnson (1997), PP. 630-631).

The same results tend to be consistent with Karen (1987). He suggested that some stocks are more sensitive to interest rates than others. In particular, these stocks include financial, utility, and consumer staple stocks. Also, Greenwald (1994) suggested that when interest rates tend to rise, investors should move away from rate-sensitive stocks like insurance companies, and toward economically sensitive stocks like automobile manufactures.

In fact, the results of Jensen, Johnson, and Bauman (1997) about the short-term reaction of financial markets to Federal Reserve discount rate changes has been found in several other studies. Waud (1970) performed the first rigorous analysis of the security market’s reaction to changes in the discount rate. He found strong evidence of an announcement effect as the stock market reacted positively to discount rate decreases and negatively to rate increases. Several researchers subsequently confirmed the discount rate change announcement effect identified by Waud.

In a recent analysis, Jensen and Johnson (1993,1995) deviated from previous discount rate change studies by examining long-term market performance following discount rate changes. The authors found that stock returns following discount rate decreases are higher and less volatile than returns following rate increases. These relationships were shown to exist across different Federal Reserve monetary policy regimes and rate change motives.
Also, Saunders and Yourougou (1990) show that differences in stock returns are partially explained by the interest rate sensitivity of firms' underlying assets and liabilities. In particular, they find securities that are claims on real assets (industrial firm stocks) are less sensitive to unexpected changes in nominal interest rates than those that are claims on monetary assets (financial intermediary stocks). Substantial evidence exists regarding the interest rate sensitivity of financial intermediary stocks.

In addition, Cook and Hahn (1988) and Smirlock and Yawitz (1985), reported evidence supporting the favourable signal sent by rate decreases and the unfavourable signal sent by rate increases as the short-term stock market reaction (announcement effect) is negative to rate increases and positive to rate decreases. These studies of short-term stock returns establish that rate changes produce announcement effects in the financial markets and the reaction to the rate changes is very rapid. The results also suggested that even the monetary policy affected the stock prices, but not all fields of industries experienced the same effect. Some kinds of industries are more sensitive to the changes in the rate of interest than others.

Beside these, several other empirical studies found a significant influence of Federal Reserve monetary policy on security returns. In particular, these studies concluded that there is a negative relationship between interest rates and stock prices (see for example, Sprinkel 1964, 1971, Palmer 1970, Karant 1971, Homa and Jaffee 1971, Hamburger and Kochin 1972, and Modigliani 1972).

From all the empirical studies mentioned above, it can concluded that even though the changes of interest rates do not affect all stocks by the same degree, but, in general, the relationship between the interest rates and stock prices should be expected to be negative. The reasons behind that can be summarized in the following points:
- Using discounted cash flow models, it is noticeable that the interest rate, expressed as a discount rate, or required rate of return, can be considered as one of the most crucial parameters in these models. When interest rates change, investors will presumably incorporate these changes into account when evaluating stock prices, thus, a rise/fall in interest rates will reduce/increase the present value of future cash flows, therefore, this will lead to a reduction/increase in stock prices.

- Another explanation is that a rise/fall in rates of interest implies a reduction/increase in bond prices, so, this means an increase/decrease in bond purchases and in turn, a decrease/increase in the demand for stocks, assuming that stocks and bonds are held to be close substitutes in investors' portfolios. This switch from stocks to bonds and vice-versa will depress/raise stock prices.

- The last explanation, not mentioned in the empirical studies, is that changes in rates of interest will affect the interest paid from firms to banks. In the case of new loans or variable-rate old loans; the rise/fall in interest rates will raise/decrease the interest paid on the loans, then decrease/increase the firm dividends, ceteris paribus, and thus, arguably decrease/increase stock prices.

However, all the empirical studies which examined the relationship between interest rates and stock market performance concentrated, mainly, on stock prices and returns. It is argued that changes in rates of interest may also -besides affecting stock prices and returns- affect other aspects of stock market performance, such as market activity, market size, market liquidity, and market concentration. In fact, these other aspects will be examined in the empirical part of this research.
4.3 The relationship between the inflation rate and stock market performance:

In the classical theory of macroeconomics, the rate of inflation means an increase in the general level of prices, and since common stocks can be considered as capital goods, so, the stock prices should be invariant to the general level of prices. Also, the traditional theory argued that the rate of return on equity should be invariant with respect to nominal variables such as inflation. However, when the general inflation rate increases, the common stocks should also increase to compensate investors regarding the decrease in the value of money. In this framework, it is expected there is a positive relationship between the inflation rate and stock prices.


Feldstein (1980a) argued that the inflation rate is a crucial cause of all the fall of common stock prices in the US. He pointed out that any increase in the inflation rate has reduced the expected real returns to investors from holding stocks, thereby depressing stock prices. In fact, the inverse relationship between a higher inflation rate and lower common stock prices according to Feldstein (1980a) results from basic features of US tax laws, particularly, historic cost depreciation and the taxation of nominal capital gains. He added that:

"The simple model developed in this paper conveys the idea of how a higher rate of inflation can cause a substantial reduction in the ratio of share prices to pre-tax earnings. The higher effective rate of tax on corporate income caused by historic-cost depreciation and the tax on the artificial capital gains caused by inflation both reduce the real net yield that investors receive per unit of capital. Although the real net yield on bonds is also reduced, for many shareowners this is outweighed by the fall in the equity yields". (Feldstein (1980a), P. 843).
Feldstein and Summer (1977), Feldstein (1980b, 1982) have introduced the same explanation. Also, Summer (1981 a, b) claimed that the main sources of the effect are the historic cost method of depreciation and the taxation of nominal capital gains, both of which cause the net return from stocks to fall when inflation rises. Pindyck (1984) also argued the same explanation.

Fama (1981) investigated the relationship between the inflation rate and stock prices. Covering the period from 1954-1976, he argued that since the relationship between real activity and common stock returns is positive (this relationship will be illustrated later in this chapter), and there is a negative relationship between the inflation rate and real activity, in turn, the relationship between the inflation rate and stock returns should be expected to be negative. To measure stock returns, the study used year end (December) data, output growth, using annual average data, and the inflation rate using year end (December) data. To test for an effect of inflation on real stock returns, the study regressed real stock returns against the year’s output growth and this year’s inflation rate. The study offered a proxy hypothesis for the negative relationship between the inflation rate and stock returns which stated that, in fact, this relationship is a proxy for the positive relationship between real variables (that are more fundamental determinants of equity value) and stock returns. He also suggested that the positive relationship between real economic activity and stock returns combine with the negative relationships between the inflation and the real activity that come out of the monetary sector, to induce spurious negative relationships between the inflation rate and stock returns. The study estimated regression models for testing the implication of the proxy effect that measures the real activity that should dominate measures of the inflation when both are used as explanatory variables in real stock return regression. The empirical evidence of this study
indicated that, in monthly, quarterly and annual data, the growth rates of money and real activity eliminated the negative relationships between the expected inflation rate and real stock returns. On the other hand, in the annual stock return regressions it is found that unexpected inflation loses also its explanatory power when placed in competition with future real activity, even though the study argued that, in general, the inflation rate depresses common stock prices.

Benderly and Zwick (1985) extended Fama's efforts to show that the negative simple correlation between the rate of inflation and real stock returns as spurious. The study covered the period between 1954-1981. Following Fama's technique, the study concluded that a negative simple correlation existed between the contemporaneous inflation rate and real stock returns over the 1954-1981 period. Unlike Fama's explanation, the authors of this study suggested that the relationship between the inflation rate and real stock returns is fully consistent with long-run invariance between nominal and real variables as well as with market efficiency. They added that this is because a structural relationship between the inflation rate and stock returns arising from the real balance effect pertains only to a period of adjustment rather than long-run equilibrium. In fact, the real balance effect is a short-run disequilibrium phenomenon, operating only prior to the full adjustment of inflation to money supply growth.

Both Bottazzi and Corradi (1991) investigated the variability of the risk premium in the Italian stock market over the period 1978-1989. Using two different approaches; AutoRegressive Conditional Heteroskedasticity in Mean (ARCH-M) model, and nonparametric models, the study found that the acceleration of the inflation is negatively related to the stock prices. They added:
"Since equities are claims against physical assets, whose returns are not affected by inflation, they should be considered as an ideal hedge against inflation ". (Bottazzi and Corradi (1991), P. 338).

Also, both Titman and Warga (1989) indicated that there is a negative relationship between the inflation rate and stock returns. They argued that inflation increases are apparently not only bad for stock prices, but they also predict a further negative response in market prices.

Jaffe and Mandelker (1976) used the returns on an equally-weighted portfolio of all securities listed on the New York Stock Exchange and estimated several regressions in which many forms of inflation are put as explanatory variables. They used monthly data for the period January 1953-December 1971, and yearly data for the period 1875-1970. The lagged values of inflation are defined as anticipated inflation, and the differences between the inflation and risk free rate are defined as unanticipated inflation. For the period 1953-1971, the study found that the returns on stocks are significantly negatively related to the anticipated rate of inflation. However, for the period 1875-1970, the study found that the yearly returns on stocks appear to be independent of the anticipated rate of inflation. As well, the study found a negative relationship between the unanticipated rate of inflation and the returns on common stocks.

Bodie (1976) explored the effectiveness of common stocks as an inflation hedge as the extent to which they can be used to reduce the risk of an investor’s real return, which stems from an uncertain inflation rate. He also found that real returns on equity are negatively related to both the anticipated and unanticipated rate of inflation, at least, in the short-run, which means that common stocks should be sold short to hedge against inflation.

Nelson (1976) investigated the relationship between the inflation rate and returns on common stocks over the post-war period. The study found uniformly negative and generally statistically strong correlation.
Fama and Schwert (1977) examined to what extent various assets were hedged against the expected and unexpected components of inflation during the period 1953-1971. Even though, the other assets that they analyzed are, at least, partial hedges against the expected inflation, and common stock returns are negatively related to the expected inflation, which means that common stocks are rather perverse as hedges against inflation.

In (1986) Chan, Roll, and Ross used monthly data for the period 1958-1984 to test the impact of the inflation rate on stock prices. They defined three variables related to the inflation rate: expected inflation, the change in expected inflation, and unanticipated inflation. They used a model, which included the above three variables of inflation as the explanatory variables on stock returns besides other variables in their model. They concluded a significantly negative relationship between the inflation variables and stock prices. In fact, both Chen and Jordon (1993) found the same result for the same variables.

Asprem (1989) and Wasserfallen (1989) explored the relationship between macroeconomic variables, and stock prices and asset portfolios in European countries. They found a negative relationship between the inflation rate and stock prices. Also, Najand and Rahman (1991) argued that the volatility of inflation increases the volatility of stocks, thus in turn causing a higher required rate of return on stocks, which means a fall in stock prices.

Both Dokko and Eldelstein (1987) examined this relationship in the US market by using the Mundell (1963) wealth-effect hypothesis, and the Darby (1975) tax-effect hypothesis. The study used semi-annual data and covered the period from June 1955 through June 1980. The results of the study indicated that a negative relationship exists between the level of expected inflation and the expected real stock market returns. Also, the real required return for common

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stocks seems to have increased in response to heightened inflation uncertainty, which may account for relatively depressed real stock prices in the US during recent inflationary periods.

On the other hand, recently other empirical studies have examined this issue in the short and long-term. Both Boudoukh and Richardson (1993) investigated the relationship between the inflation rate and stock returns in both short and long-term. The study used annual data on inflation, stock returns, and short and long-term interest rates over the period 1802-1990. Covering both the UK and US markets, the data are obtained from Siegel (1992) and Schwert (1990a). To look at the contemporaneous relationship between the inflation rate and the stock market, the study regressed one-year stock returns on the one-year inflation rate, and five-year stock returns on the five-year inflation rate. The results of this study pointed out negative relationship between the inflation rate and stock returns in the short-term, but as a long-horizon, this relationship tends to be positive.

Again, Boudouk, Richardson, and Whitelaw (1994) investigated the cross-sectional relationship between expected inflation and the industry sorted stock returns. Using monthly data for the period 1953-1990, sorting the firms into 22 industry sectors, and using regression analysis, they found that the direction of relationship between expected inflation and the industry group is linked to cyclical movements in industry output, and specifically, stock returns of cyclical industries covary negatively with expected inflation, while the non-cyclical industries covary positively. They also pointed out the negative relationship at short horizons and the positive relationship at long horizons.

Moosa (1986) approached the issue in a different way. He used the variables in a standard common stock valuation model to investigate the effect of inflation on real equity yield, real earnings and dividend growth rate. He found that these three variables are highly negatively
correlated with inflation, and suggested that this negative net distribution effect is mainly dominated by the persistent negative influences of tax rules governing depreciation allowances.

In fact, all the above empirical studies focused on the relationship between the inflation rate and stock returns and prices in the developed countries, especially, the UK and the US. In turn, little is known about the impact of inflation rates on a broader menu of countries. In this framework, Erb, Harvey, and Viskanta (1995) examined the interaction between the inflation rate and both the time-series and cross section of expected stock returns in 41 developed and emerging equity markets. The result of this study confirmed the negative time-series relationship between realized inflation and realized asset returns when examined country by country. Other studies, however, have indicated that the relationship between the inflation rate and stock returns tend to be positive in the long horizons (Boudoukh, Richardson 1993, Boudoukh, Richardson and Whitelaw 1994), The study found that the negative relationship is maintained when longer horizon returns are examined, otherwise, when this study investigated the relationship between long-term inflation and long-horizon asset returns, it did not find a positive relationship between both variables, hence, this suggested that international equity returns fail to serve as an inflation hedge, even if the equities are held over long horizons. Furthermore, on a country-by-country basis, equity returns do not serve as an inflation hedge.

From all the empirical studies shown above, it can be concluded that contrary to economic theory and common sense, a significant negative relationship between the rate of inflation and stock returns is found. The reason behind this can be summarized in the following points:
- The increase in the rate of inflation reduces the expected real net return to investors from holding stocks, thereby depressing stock values and vice-versa.

- When the rate of inflation rises, the stock prices fall because of the effect of the historic cost method of depreciation and the taxation of nominal capital gains, both of which cause the net return from stocks to fall. Although it needs to be mentioned that in recent decades the UK tax system has allowed indexation of capital gains.

- Since there is an inverse relationship between the real activity and the inflation rate, and there is a positive relationship between real activity and common stock returns, sequentially, the relationship between the inflation rate and stock returns should be expected to be negative.

- However, when the rate of inflation tends to increase, most investors prefer to acquire real estate instead of equity, in turn, the demand for equity will decrease, and this will depress stock markets.

As mentioned previously in examining the relationship between rates of interest and the stock market, the empirical studies concentrated, mainly, on stock prices and returns as indicators of stock market performance. However, it is argued that the changes in the inflation rate may also affect other aspects of stock market performance, such as market activity, market size, market liquidity, and market concentration, in turn this research will examine these other aspects.

4.4 The relationship between the exchange rate and stock market performance;

Since the introduction of the flexible exchange rate system in the 1970s, a new risk factor of investment has been introduced as well. Considering the associated increase in risk for international investment, this adds an important dimension to the overall portfolio decision. The required rate of return of an investment should reflect both the domestic required rate of
return and the expected changes in the value of the currency in which the investment is
denominated.

In fact, the changes in exchange rates will affect both multinational and domestic firms.
Considering firstly multinational firms, it is suggested that any changes in exchange rates will
affect the foreign operations of these firms resulting in losses or profits. In turn, this will be
reflected in evaluating the monetary assets of these firms, hence, it will affect firm valuations,
thus, equity prices of these firms.

On the other hand, the domestic firms which have a foreign operation, either exported or
imported, will be affected as well by the changes in exchange rates. For example, any
devaluation in the local currency will be reflected in increasing the volume of sales as exports,
in turn, this should lead to more profit, thus increasing firm valuation. On the other hand, if the
firm tends to import from outside, this means that the price of its products are likely to be
higher than the same products produced from local materials, so this should give the local
products relative competitiveness compared with those products with imported materials, in
turn the volume of sales should decrease and the firm’s profit should also decrease. Thus, the
firm valuation should eventually decrease.

Even though firms whose entire operations are domestic in nature may be affected by
exchange rates, if their input prices, output prices or demand for their products are influenced
by currency movements (Alder and Dumas 1984).

In conclusion, the effect of changes in exchange rates on stock prices will differ from firm to
firm depending on whether the firm is benefiting or losing from these changes.

It is also suggested that the relationship between exchange rates and stock prices may be
indirect. If inflation increases, the currency value tends to decrease, and as mentioned in the
previous section, the relationship between the inflation rate and stock prices is negative, then, the relationship between the exchange rate and stock prices should be expected to be positive. Another explanation, which tends to be consistent with this research, concentrates on the effect of exchange rate stabilization on stock markets. Fluctuations in exchange rates may change the attractiveness of the domestic stock market compared to other markets, resulting in changes in the demand for domestic stocks by foreign investors. These changes should decrease stock prices.

Through the literature review, it is noticed that little attention has been paid to an examination of the effect of changes in exchange rates on stock prices. Jorion (1990) argued that even though exchange rates are several times more volatile than inflation or interest rates, the association between firm value and exchange rates has not been the subject of much empirical research.

In the meantime, most of the early empirical studies, which examined the effect of changes in exchange rates on stock prices, fail in finding a significant statistical relationship. For instance, Jorion (1990) examined the monthly stock returns of 287 US multinational corporations from 1971-1987, and he concluded that the effect of exchange rate changes on stock returns is statistically insignificant.

Once again, Jorion (1991) in a subsequent study analyzed the monthly returns on twenty industry portfolios formed from the universe of New York Stock Exchange (NYSE) stocks, and reported that most industry portfolios do not exhibit statistically significant exchange exposure. He concluded that foreign exchange risk is not priced and that hedging is unnecessary. In fact, these findings are consistent with the studies of Amihud (1993) and Bodnar and Gentry (1993). Concerning the first study, Amihud reported no significant contemporaneous exchange-rate exposure for the 32 largest US exporting firms from 1982 to
Similarly, the second study, which classified all the firms on the Center for Research in Security Prices (CRSP) file into two-digit industry portfolios, noted that only 11 of 39 industries exhibited significant exchange-rate exposure from 1979 to 1988.

Recently, Chow, Lee, and Solt (1997) examined the exchange-rate risk exposure of US stocks and bonds from March 1977 to December 1989 over 1- to 48-month horizons. They concluded that the impact of exchange-rate changes on bond returns would be predominantly driven by the correlation between exchange rate and interest-rate changes. But for stock returns, the impact will depend on how exchange-rate changes are correlated with changes in cash flows as well as interest rates.

Essentially, in international finance, a firm's cash-flow exposure is described as transaction or economic exposure (Shapiro 1992). Transaction exposure is the risk that exchange rates can change in the short term between the time a foreign currency transaction is entered into and when it is settled, or gains or losses arising from the settlement of investment transactions stated in foreign currency terms. On the other hand, economic exposure is the risk that exchange-rate changes will alter the long-term future cash flows of a firm and, thereby, the value of the firm.

The results of this study indicated that the effects of real exchange-rate changes on expected returns are different for bonds, which have fixed income streams, from those for stocks, which have variable cash-flow streams. Bond returns are responsive both to short-run and long-run changes in real exchange rates, while stock returns are responsive only to long-run changes. The exchange-rate exposure of bonds is primarily due to changes in interest rates associated with unexpected changes in the real exchange rate. Since bond prices are inversely related to interest rates, the negative correlation should be documented between interest rates and
unanticipated exchange-rate changes resulting in a positive interest-rate-exchange-rate exposure effect. For horizons of less than 1 year, industry stock returns are, on average, uncorrelated with exchange-rate changes. But for horizons of 1 year or more, there is a statistically significant positive correlation between industry stock returns and exchange-rate changes. The number of industries significantly exposed tends to increase with horizon length. At the 48-month horizon about 80 per cent of the 65 industries are exposed. Chow, Lee, and Solt added that:

"A possible rationalization for the absence of empirically significant exchange exposure is that firms hedge exchange-rate risk so well that firm value is invariant to unexpected changes in exchange rates. For current cash flows, where the short-term impact of exchange-rate changes is easily assessed, the presumption of hedging effectiveness is reasonable. But for future cash flows, where the long-term effects of exchange-rate changes are difficult to ascertain, hedging effectiveness is doubtful". (Chow, Lee, and Solt (1997), P. 106).

Nance, Smith, and Smithson (1993) have found the same results in the short-term horizon. They found that many firms use readily available financial instruments - such as forwards, futures, options, and swaps for hedging exchange-rate changes - and argued that hedging yields real benefits by diminishing the variance of firm value, which thereby reduces the expected costs of financial distress.

Also, much prior research that focused on monthly stock returns may have failed to detect exposure because short-horizon returns contain errors made by investors in forecasting the long-term effects of current exchange-rate changes. Bartov and Bodnar (1994) found evidence that investors do not use all freely available information (past changes in the dollar and past relations between dollar changes and firm value) to predict future changes in firm value from current exchange-rate changes. Consequently, estimation errors are corrected and reflected in stock returns only when information about the effects of exchange-rate changes on future cash flows is revealed over time. Utilizing long-horizon exchange-rate changes and asset returns
may be more informative about the relationship between these variables than short-horizon measures because of the complexity faced by the investor with modelling and forecasting the relationship between firm value and fluctuations in the exchange rates.

Donnelly and Sheehy (1996) examined the relationship between the movement in the foreign exchange rate and the market value of large exports. The study identified firms that had at least 40 per cent of their total sales accounted for by foreign sales. The sample, which met this criterion, contained 39 companies from the Financial Times All Share index. The study collected share price data of these 39 companies on a monthly basis from January 1975 to August 1992. On the other hand, the exchange rate used in the study was a trade-weighted exchange rate for sterling against the currencies of the UK’s major trading partners. This index is compiled by the Bank of England and is based on IMF’s multilateral exchange rate model. Using a regression analysis, the study pointed out that the coefficient on sterling returns is negative and significant, and there is a contemporaneous relationship between the exchange rate and the value of a portfolio of export intensive companies.

Ma and Kao (1990) used monthly stock indices of six major industrialized countries and corresponding monthly exchange rates from the United Kingdom, Canada, France, West Germany, Italy, and Japan, to test the impact of exchange rate on stock prices. The sample period of this study was from January 1973 to December 1983. Using the regression analysis, the study indicated that there are two possible impacts of changes in a country’s currency values on stock price movements. Primarily, the main effect is the financial effect, which states that investment may become more attractive when it is denominated in a strong currency, as high exchange rate levels are associated with favourable stock price movements because foreign investors expect to receive an ultimately higher rate of return after the payoff is converted into their own currency. Consequently, this will create excess demands for
domestic stocks. On the other hand, the economic effect from exchange rate changes suggests that, for an export-dominant country, the currency appreciation reduces the competitiveness of export markets and has a negative effect on the domestic stock market. Conversely, for an import-dominated country, the currency appreciation will lower import costs and generate a positive impact on the stock market.

Recently, Martin (1997) indicated that in the wake of Asia's currency devaluation in late 1997, most Asian stock market indices lost a big percentage. For instance, the Hang Sing index of 625 listed companies has lost about 13 per cent of its value between August and September 1997.

In conclusion, even the early empirical results indicated insignificant relationships between exchange rates and stock prices and returns, and many other recent studies argued that there is a statistically significant relationship. As mentioned previously, the reason behind this may be due to the early empirical studies focusing on the short-term impact, and stock markets may take a while to respond to exchange rate changes.

In fact, with regard to exchange rates, the direction and the meaningfulness of the relationship between exchange rates and stock returns and prices depends on the exposure of the firm to exchange rate risk.

For the purpose of this research, the suitable explanation of the relationship between exchange rates and stock returns can be illustrated through international investments or capital inflows and outflows. Essentially, the movements in exchange rates may change the attractiveness of domestic stock prices compared to other countries resulting in changes in the demand for domestic stocks by foreign investors. These changes in demand may also affect stock prices.
So, it is argued that exchange rate fluctuations have an effect, not only on stock returns and prices, but also on many aspects of stock market performance such as market activity, market size, market liquidity, and market concentration. In turn, this impact will be examined in this research.

4.5 The relationship between the rate of growth and stock market performance: -

According to the theory of finance, a high rate of growth in outputs raises the average real rate of return on capital, and thus encourages capital expenditure. In turn, high capital expenditure will eventually raise stock returns.

In the meantime, the quantity of investments, which have higher expected rates of return than the cost of capital, is the main determinant of firm values, hence equity values. As firms exploit such investment opportunities, their net values, and in turn the prices of their stocks, will increase. Therefore, the relationship between the variables representing real economic activity, such as capital expenditure and output, and stock returns, should be expected to be positive.

Many empirical studies have investigated this relationship. For example, Fama (1981) investigated the relationship between real activity, inflation, and money, and stock returns. The study used annual data from post 1953 to 1977. Using regression analysis, the results indicated that there is a strong positive relationship between real economic activity and stock returns. In fact, regarding this positive relationship, the real variable, which showed the strongest contemporaneous relation with stock returns, was the rate of growth of industrial production.

Kwok (1992) tested the causal relationship between real output, exports, and stock returns in both Taiwan and South Korea. The study used quarterly figures over the period 1975 through 1990. Using Granger’s causality test, the results indicated that there is no relationship between
real exports and real output. Moreover, the links between real output and stock returns, and real exports and stock returns were ambiguous. While the results assured a significant positive relationship between real output and stock returns, it failed in finding any significant relationship between real exports and stock returns. In fact, this may be due to no clear link between real output and real exports. The author argued that:

"Economic indicators may not have any significant influence on stock returns. This may be a characteristic of a closed market. As the market becomes more mature and efficient, the link between real sector and financial sector will become clearer".

(Kwok (1992), P. 344).

James, Koreisha, and Partch (1985) used a Vector AtutoRegressive Moving Average (VARMA) model, and Lee (1992), using a multivariate Vector AtutoRegressive (VAR) analysis, also found evidence that stock returns are strongly positively correlated with real activity, measured by the growth rate of industrial production, and the stock market rationally signals or leads changes in real activity.

Fama, again in a later study (1990) investigated the same issue for the period 1953-1987. He regressed the monthly, quarterly, and annual growth rate of industrial production on contemporaneous stock returns and used up to 7 lags in quarterly real stock returns. He also regressed real stock returns on the growth rate of industrial production in the same way by using lagged values. He concluded that real activity could explain large fractions of stock return variation for a longer return horizon. The results of this study showed also that, for the industrial production regression, the $R^2$ rose from 0.14 for monthly production growth rates to 0.30 for quarterly production growth rates and to 0.44 for annual production growth rates. In parallel the $R^2$ for stock return regressions were 0.06, 0.20, and 0.43 for monthly, quarterly, and annual stock returns respectively. To explain this puzzling result, Fama stated that information about the production of a given period is spread over many previous periods,
therefore, a given short horizon return has information about the production growth rates of many future periods, but adjacent returns have more information about the same production growth rates.

Schwert (1990b) expanded the study of Fama by using an additional 65 years of data and he concluded that, even though the positive relationship between future production growth rates in the 1889-1952 period and stock returns is not as strong as in Fama’s 1953-1987 period, the 100 years of data strengthens Fama’s conclusions.


On the other hand, Jones (1994) argued that there is a positive relationship between the situation of the economy and stock market prices. Stock prices, in general, tend to decline as a recession is likely or underway, in turn, the recession heavily depresses the stock market, Conversely, if a strong economic expansion is underway, stock prices will be heavily affected, and in general, tend to increase. Thus, the status of economic activity has a major impact on overall stock prices.

In the meantime, McQueen and Roley (1993) used economic announcements in the period September 1977-May 1988, which provided evidence that the news of higher-than-expected real activity results in lower stock prices when the economy is already strong, whereas the same surprise in a weak economy is associated with higher stock prices. He explained this result as when the economy is booming, a real economic activity surprise could result in a
larger increase in discount rates than cash flows, since high capacity utilization employment may constrain a further increase in output, consequently, cash flow.

Also, Park (1997) examined the hypothesis that strong economic activity has a negative influence on stock prices. In particular, this hypothesis contains news that high economic activity reduces stock prices in a booming economy, but increases stock prices when economic conditions are weak, since further expansion in a booming economy is likely to result in high inflation rather than fast output growth. More precisely, this study asserted that the effects on inflation and corporate cash flows may differ across macroeconomic variables, and the rationality of the stock market implies that stock prices should respond negatively to economic variables that are related more to future inflation and less to future corporate cash flows, hence, stock prices should respond positively to economic variables that are related more to future corporate cash flows and less to future inflation. The study used monthly, quarterly, and annual data between 1956 and 1995 to examine the contemporaneous relationship between real stock returns and macroeconomic variables. This reflected real economic activity and the lagged effects of the same macroeconomic variables on inflation and corporate cash flows, since the effect of economic variables on stock returns are generally consistent with the effects on future inflation and future corporate cash flows. The measure of stock returns in this study was the real rate of return (price appreciation plus dividends) on S&P 500 Index stocks. Corporate cash flows were proxied by the real growth rate of dividends on S&P 500 Index stocks, and inflation was measured by the change in the US Consumer Price Index (CPI). The annualized growth rate of non-farm payrolls "employment", gross domestic product "GDP", private investment, industrial production and retail sales have also been cited by the financial press and previous studies. The above study regressed stock returns on the five macroeconomic variables. Based on annual data, the results are generally consistent with the
hypothesis that the response of stock prices to an economic variable depends on the variable’s effects on future corporate cash flows and inflation. Concerning the five macroeconomic variables, it is found that stock returns respond negatively to employment growth, which has the weakest positive correlation with future cash flows and the strongest positive correlation with future inflation. On the other hand, stock returns respond positively to GDP growth, which shows a strong effect on cash flows and a weak effect on inflation. Regarding other variables, they too show a positive effect on stock returns, but this effect was, in general, insignificant. On the other hand, results are weaker with monthly and quarterly data than with annual data. The author explains this issue, that:

"One explanation of these weaker results is high volatility of most variables in the short run. More importantly, monthly and quarterly data may capture the effects of economic variables on contemporaneous rather than future corporate cash flows and inflation". (Park (1997), P. 55).

From all the empirical studies shown above, it can be concluded that since the higher economic activity, in general, increases the companies’ cash flows, the relationship between real economic variables, in particular, investment expenditure, industrial production, and GDP growth, and stock returns should be expected to be positive. However, GDP growth may not only lead to increase stock returns, hence stock prices, but also affects many other aspects related to stock market performance, such as market activity, market size, market liquidity and market concentration. This kind of relationship will be investigated in this research.
4.6 The relationship between per capita income and stock market performance: -

Even though the literature review did not advocate attention to the effect of per capita income on stock market performance, it is argued here that higher per capita income may affect many aspects of stock exchange market performance.

One possibility of this argument is that, since the rate of growth of a given economy increases, *ceteris paribus*, per capita income should increase, and since there is a positive relationship between the rate of growth and stock market performance, it is expected, as well, that there is a positive relationship between per capita income and stock market performance.

Another possibility of this relationship is that once per capita income increases, this implies that individuals have the opportunity to save more money, in turn, they will invest their savings, and one way for this investment will be through stock markets. Hence, this will lead to more injection of money, more finance for companies, and more demand for financial assets. In conclusion, this will increase market activity, market size, market liquidity, market concentration and the market index. So, it is suggested that there is a positive relationship between per capita income and stock market performance, and this will be examined in this research.

4.7 The relationship between the budget deficit and stock market performance: -

Many theoretical studies argued that both monetary and fiscal policy have a great impact on stock prices (see Tobin 1969, Blanchard 1981, and Shah 1984), even though, very little attention has been paid to determine the effect of fiscal policy on stock prices.

In fact, most of the theoretical and empirical studies, which concentrated on examining the effect of fiscal policy on stock prices, primarily, dealt with the relationship among fiscal policy, inflation rate, and interest rates. In this framework, the deficit in governmental budget
can lead to an increase in the inflation rate, and in turn, an increase in interest rates (Friedman 1968).

On the other hand, Modigliani (1961), Blinder and Solow (1973), and Carlson and Spencer (1975) asserted that given the level of government expenditures, a substitution of debt for tax financing would raise interest rates and reduce private investment. In turn, since both interest rates and the inflation rate have a negative effect on stock prices and returns, and as mentioned above the relationship between budget deficit and both interest and inflation rates is positive, it is expected there will be an indirect negative effect of budget deficit on stock returns and prices.

Many empirical studies have examined the link between fiscal policy, in terms of budget deficit, inflation rate, interest rates and asset prices. Using quarterly data from the period 1954-1978, Plosser (1982) investigated the relationship between government financing decisions and asset prices. The results of this study did not support the proposition that an increase in government debt would drive asset prices down and yields up. In the meantime, Boothe and Ride (1989) found the same result by using monthly data from 1967-1984. In their study, concentrated on Canada, they measured fiscal policy by unanticipated movements in privately-held Federal government debt and Federal government expenditures on goods and services. They concluded that fiscal policy has no significant impact on excess holding period returns, and by implication, on interest rates.

On the other hand, Hoelscher (1986) analyzed the connection between budget deficits and long-term interest rates. The study used annual data, covering the period 1953-1984. It is found that there is a significantly strong relationship between budget deficit and interest rates. Also, Wachtel and Young (1987) investigated the relationship between deficit announcements
and interest rates for the period 1980-1986 and showed that forecasts of larger budget deficits raised interest rates in all maturities. In addition, Abell (1990) in his study on the US market from the period 1979-1985 indicated that there is causality running from deficits to long-term interest rates. Also, many other authors argued that the increase in budget deficit leads to increase in interest rates (see for example, Idenaud and Sturrock 1989, US government 1997).

In the light of the above, the impact of budget deficits on stock prices can be explained through the effect of budget deficits on interest rates. As mentioned previously, there is a negative relationship between interest rates and stock prices, so, if changes in budget deficit affect interest rates, this will lead to changes in stock prices. Therefore, there is an indirect relationship between budget deficit and stock prices. As shown from the above empirical studies, even, there is no consensus about this issue; it seems that an increase in budget deficit may raise interest rates, hence, depress stock market.

On the other hand, beside the indirect relationship between budget deficit and stock prices, there may also be a direct relationship, through signalling changes about the economic activity or economic prospects.

In fact, the empirical studies, which investigated the direct effect of budget deficit on stock prices seems to be very rare.

Darrat (1988, 1990, and 1994) has done most of the empirical studies, which investigated the direct effect of budget deficit on stock markets. Starting with his study in 1988, he examined the effect of a number of macro economic variables, including both monetary and fiscal policy, on stock market returns. The study used quarterly data from the Canadian market and covered the period from 1960-1984. He used the budget deficit to represent the fiscal policy, and concluded that:
"Changes in the stance of fiscal policy play an important role in determining stock returns, even when the path through interest rates is excluded. In particular, after controlling for the effects of fiscal policy on the required return to capital, the empirical results indicate the presence of a significant lagged relationship between the fiscal measure and current stock returns. Further tests show that fiscal policy actions anticipated from an ex-ante equation have significant lagged effects on current stock returns in addition to those on required returns".

(Darrat (1988), P. 361).

In a later study, Darrat (1990a) investigated the relationship between fiscal policy and stock returns in Canada again. Using the monthly data for the period from January 1972 through February 1987, he firstly employed multivariate Granger causality tests in conjunction with Akaike’s final prediction error criterion, then he regressed the changes in stock returns on cyclically adjusted budget deficit and other macroeconomic variables. Three monthly lags of the budget deficit variable are found empirically appropriate, and its coefficients are found statistically significant. He again concluded that the fiscal policy exerts a significant lagged effect on Canadian stock prices even when the paths through interest rates and their volatility, real income, inflation, monetary policy, and exchange rates are all excluded. Employing the same methodology and using quarterly data for the period 1961-1987 he (1990 b) concluded similar results for the federal debt of the US.

Once again, Darret in co-operation with Brocato (1994) investigated the efficiency of the US stock market as it pertains to a number of major macrofinance variables that suggested to be important in rational stock prices decisions. The authors’ methodology employed a seven-variable vector Autoregressive (VAR) model in conjunction with the Granger concept of causality. The authors chose variables that theory and empirical evidence suggested should influence stock prices. Specifically, the paper investigated the linkages between stock returns and six other macrofinance factors; namely, federal budget deficits, industrial production, inflation rate, monetary base, term structure, and risk premium. The model is tested using monthly data spanning the period January 1968 through December 1989. Concentrating on the
link between budget deficit and stock prices and returns, the results of this study indicated that current stock prices, as measured by the S&P 500 index, fully reflect all available information on the industrial production index, the inflation rate, and base money. On the other hand, the most striking finding is that federal budget deficits exerted a significant lagged impact on current US stock returns, even when information on industrial production, inflation rate, base money, term structure, and default risk are taken into account. In addition, it appeared that the rises in the federal budget deficit depress the stock market in general.

Also, Caporale and Thorbecke (1993) examined the relationship between budget deficit and stock returns in the framework of arbitrage pricing theory (APT). The study used a non-linear regression technique, and used monthly data covering the period from 1981-1988 for a 43-industry portfolio, in addition, to the unexpected budget deficit. Unexpected changes in the budget deficit were measured by using recursive residuals that the budget deficit was regressed on 12 lags of itself, and 12 lags of the monetary base, and the residuals of this model were used as unexpected changes in the budget deficit. On the other hand, excess stock returns, as dependent variable, were calculated by subtracting the one-month Treasury bill rate from each portfolio total monthly returns. The result of the study pointed out that 40 out of 43 unexpected budget deficit exposures were negative; in turn, the authors concluded that the budget deficit is a priced factor in the APT and that unexpected increases in the budget deficit lower stock returns.

Recently, Rippe (1997) compared the standard deviation in the 12 month returns on 3 asset classes: stocks (from the S&P 500), long-term Treasury bonds (with a maturity of 20 years), and intermediate Treasury bonds (with a maturity of 5 years). The study covered 4 periods; 1960-1969, 1970-1979, 1980-1989, and 1990-1996. The results of this study indicated that:
- The standard deviation of returns on equities was lowest in the 1960s (3.2 per cent) and 1990s (3.1 per cent). They were higher in both the 1970s (4.1 per cent) and 1980s (4.2 per cent).

- For intermediate bonds, the standard deviation of returns was lowest in the 1960s (0.7 per cent), higher in the 1970s and 1990s (at 1.2 per cent in both cases), and highest in the 1980s (2.0 per cent).

- For long-term bonds the pattern is similar to that for intermediate bonds. The 1960s had the lowest volatility (1.3 per cent), the 1980s the highest (3.8 per cent), and the 1970s and the 1990s in the middle (2.2 per cent).

The biggest change that occurred was in long-term bonds: at their decade high, the standard deviation of returns was almost three times that in the 1960s, making bond volatility in the 1980s nearly equal to that of stocks.

So, the correspondence with the budget situation showed that the decade with the smallest deficits coincides with the lowest volatility (i.e., the 1960s) and the highest volatility coincides with the largest deficits (the 1980s).

In conclusion, the study argued that increases/decreases in budget deficit lead to depressing/boosting stock markets.

From all the empirical studies mentioned above, it can be concluded that the deficits in budget have both indirect and direct effects on stock returns and prices. The explanation of the indirect effect is that an increase in the budget deficits might lead to:

- An increase in expected future taxes to cover the spending shortfalls, and this in turn, will affect the private investment, thus depress stock markets.
- An increase in expected inflation due to expected debt monetization, so, a high inflation rate will result in a decrease in stock returns.

- An expected increase in the interest rates as a result of an expected increase in government borrowing from financial markets, in turn, high interest rates will lead to a decrease in stock returns and prices.

- An increase in various risk premia associated with deficit-induced financial market uncertainty, so, this will depress stock markets.

As Darrat and Brocato (1994) mentioned, these channels are based on information that alters investors’ expectations regarding future cash flows and/or the discount rate, both of which are arguments in the conventional discounted cash flow model of stock price determination. Concerning the direct effects, it is argued that it may occur through signalling changes about the future real activity or economic prospect.

In general, the empirical studies found a negative relationship between budget deficits and stock markets. In addition, it is suggested in this research that since the deficits in budget affect stock returns and prices, they may also affect many other aspects of the stock market performance, such as, market activity, market size, market liquidity and market concentration, thus, these dimensions will be tested in the empirical part of this research.

4.8 The relationship between privatization programme and stock market performance: -

In theory, the privatization programme needs an well-organized stock market to take place. This is in fact because without an exchange there would be nowhere to trade the shares of the newly privatized companies.

On the other hand, it is argued that a privatization programme has a great effect on many aspects of stock exchange markets. For example, a privatization programme helps in
increasing the market capitalization, market activity, and also market liquidity; since these programmes attract many foreign investors as well as local investors, so, new companies will be listed, and there will be a greater increase in the supply and demand side as well. In this framework, Mclindon (1996) suggested that privatization can attract direct and portfolio investment from abroad, which opens the international capital markets to local companies and fosters the globalization of capital markets. In addition, privatizing countries is attractive to foreign investors because of the possibilities of appreciation of share prices, risk diversification, and a broader range of available securities.

In addition, as mentioned previously in the second chapter, the privatization of state-owned enterprises to be managed like the private sector, should lead to more efficiency and more profitability, in turn, this should increase stock returns of the newly privatized companies, hence, raising stock prices. Therefore, it is expected that a privatization programme has a positive effect on stock markets.

In fact, not many empirical studies have focused on asserting the impact of privatization programme on stock markets, and most articles which have dealt with this matter, have just mentioned briefly some indicators about the effect of a privatization programme on stock markets.

Mclindon (1996) pointed out that economic reforms, including privatization, have helped capital markets to emerge in many developing countries. For instance, the market capitalization for 59 developing countries soared from $ 171.2 billion in 1985 to $ 1.9 trillion in 1994, an eleven fold increase.
Agovino (1996) mentioned that the combination of improving macroeconomic indicators and an extraordinarily successful privatization push in 1995 has catapulted the Budapest stock exchange (BUX) index up 57 per cent so far this year to 2405.26.

In the meantime, Hatton (1997) pointed out that Portugal's stock market boom has been substantially driven by the ambitious privatization programme that has brought an infusion of new, high-quality stock issuers, as well as greater liquidity and variety, to the market.

Drummor (1996) investigated whether privatization shares performed better than the shares of other companies. The study used a global index of privatization shares which contains 204 privatized companies, and measured the stock market performance of companies which have been privatized since 1980; with the list set to grow as new privatization occurs. The index is denominated in US$ and weighted by market capitalization. Over 100 of the constituent companies are European, including 39 UK firms. A quarter is Asian, and a few companies from Australia, Africa, and North and South America are also included. In conclusion, the index archives global coverage mixed together with data from developed and emerging markets. With the calculation back to 1990, the result indicated that the constituents of the index of privatization shares performed better than those of the FT/ S&P Actuaries World Index over the period from 1990-1995. However, the result implies that the privatization programme may affect the stock market index as a whole. In fact, one explanation of the increase of the privatized stock compared with others, is that the governments used to sell their state-owned companies to investors at an undervalued price in order to attract them, in turn, in the secondary market, the prices of these shares tend to increase sharply compared with other shares. For instance, Drummond (1996) stated that:

"Early privatization were popular because the share sell-offs blatantly undervalued the enterprises".
( Drummond (1996), P. 16).
In fact, by looking at the appreciation in share prices for some 1980s privatization confirmed this: British Aerospace: + 405 per cent; British Telecom: + 167 per cent; Krung Tahi Bank: + 767 per cent (all figures as at January 1996) (Drummond 1996).

Another study has been done by Claessens (1997) who investigated the impact of the style of ownership of mass privatization in Czech and Slovak Republic on the prices of shares of the privatized companies. The study covered 1491 firms. Using regression analysis, the results indicated that most of the shares of these firms are increased when traded in the secondary market. In addition, the results pointed out that more concentrated ownership was associated with higher prices. Also, a majority ownership by domestic investors was associated with even higher prices and thus appears to be especially useful in changing the way firms are managed. On the other hand, firms with state and foreign majority owners do not have higher prices, the reason behind that, according to the author, is that control by these investors entails costs for minority shareholders through decreased firm efficiency or dilution of property rights.

However, the results of this study tends to be consistent with the theoretical background, which indicated that the privatization programme leads to changes in the style of managing the firms to be like those in the private sector, and this in turn, leads to more efficiency and more profitability, hence, increasing stock prices of these firms.

Eckel, Eckel, and Singal (1997) analyzed the effect of privatization on the performance of British Airways by examining the privatization’s impact on airfares and competitors’ stock prices. In particular, the impact of British Airways’ privatization on US airlines was identified as its close competitors in international markets. The results of this study indicated that stock prices of British Airways’ competitors fell abnormally, and the degree of this falling depended on the degree to which they competed with British Airways. For instance, US competitors’ stock prices fell a significant 7 per cent upon British Airways’ privatization. This means that
privatization leads to an increase in efficiency, eroding the profitability of rival firms. In the meantime, the airfares on routes served by British Airways decreased significantly relative to control groups. In turn, this implies an improvement in firm productivity irrespective of the change in firm objectives. Further, an overall improvement in British Airways' efficiency was indicated by an increase in its market share after privatization. For the three years prior to privatization, British airways' market share was 3.0 per cent. In the three years after privatization, its average market share was 3.3 per cent for the year ended March 1990. In conclusion, the study argued that when a firm is privatized, several factors change simultaneously: the ownership changes from the government to private hands, the firm's objective changes to profit maximization, and changes in regulation designed to enhance competition in product markets are likely to take place. In turn, the results suggested that a change from government to private ownership improve economic efficiency.

Megginson, Nasha, and Randenborgh (1994) in a broader study compared the pre and post-privatization performance of 61 companies in 18 countries, out of which 6 were from developing countries and 12 from developed countries, in 32 industries that experienced full or partial privatization through public share offerings during the period from 1961-1990. In fact, the study just concentrated on those companies that were sold to the public through a share issue, and the reason behind that is that companies that are sold to the public remained independent and continued to generate comparable post-issue financial and accounting data. The results of this study indicated that, for most companies of the sample, there was a significant increase among newly privatized companies in profitability, efficiency, capital investment spending, employment, and dividend payout. However, it is also argued that overall financial and operating performances of the privatized firms will be reflected in firms' values, and in turn, the stock prices of these firms.
Lastly, Plane (1997) explored the effect of a privatization programme, which has been adopted by 35 developing countries between 1988-1992 on the rate of growth of the GDP. Using regression analysis, the results showed a significant positive effect of the privatization programme on economic growth, and this effect tends to be stronger when the privatization programme takes place in industry or infrastructure institutions.

In the light of the above study, it is argued that a privatization programme has a positive effect on stock market performance through its effect on economic growth, since there is a positive relationship between economic growth and stock market performance as mentioned previously.

Stonham (1993) argued that the privatization would increase Europe’s stock market capitalization by 10 per cent. He added that:

"Privatization can be good for Equity markets because it stimulates investors’ interest, increases liquidity, focuses minds on profit motive, and widens opportunities to raise capital". (Stonham (1993), P. 55).

However, Jenkins (1996) pointed out that investments in privatization’s shares are not feasible in all case. On the other hand, a $1000 investment in the 20 largest UK privatizations since 1982 -a $20,000 commitment overall- would now in 1996 be worth $148,000. Also privatized shares have been done well in Russia. On the other hand, investors who bought an equal weight of each of the 13 French privatizations since 1992 are sitting on a loss of 3 per cent, in the mean-time, China’s privatization has been even worse.

He concluded that, in the first case, the UK and Russia, the reason that privatization stocks out perform their local markets over the long term is the dramatic cultural change that occurs at the companies, in particular, new managements, which introduced proper marketing and commercial strategy. In addition, these new managements have an incentive to look at ways of
increasing productivity. On the other hand, in the case of France, China, and other countries, the governments were more interested in raising money than improving corporate efficiency.

In the light of the literature review shown above, it is noticeable that the privatization programme has a great effect on all aspects of stock exchange markets. It helps in increasing the supply and creating a demand for stocks by individuals and institutions, increasing the liquidity of the market as there will be more listed companies and more foreign and local investors attracted through the privatization programme, increasing market capitalization, and the number of listed companies, in turn, creating a variety of stocks in the market.

Even though, most of empirical studies focused only on the movements of privatized stocks, and did not pay attention to the effect of privatization on other aspects of stock market performance, hence, this will be considered in this research.

In fact, all of the above empirical studies dealt with the effect of each variable on stock market performance, in particular, stock returns and prices. And as mentioned previously in the beginning of this chapter, little attention has been paid to examining the impact of the economic reform programme on stock market performance.

But a recent study has been done by Levine (1996) who suggested that there is an impact of economic reform, in terms of liberalization, on the performance of stock markets. He argued that liberalization can lead to liberalizing controls on international capital flows, and also may involve easing restrictions on capital flows or reducing impediments to repatriating dividends or capital. In either case, reducing barriers to cross-border capital flows can affect the functioning of emerging stock markets: first, by enhancing the integration of emerging markets into world capital markets, thereby bringing the prices of domestic securities into line with
those elsewhere; and, second, by forcing domestic firms seeking foreign investment to upgrade their information disclosure policies and accounting systems. Moreover, the entry of more foreign investors into emerging markets may lead to pressure to upgrade trading systems and modify legal systems to support more trading and the introduction of a greater variety of financial instruments. Through all of these channels, the removal of barriers to foreign investment can improve the operation of domestic capital markets. He studied the impact of liberalization on stock market performance in 14 emerging stock market. The following figure indicates the situation of the stock market in 14 countries after liberalization.

**Figure 4.1**
The stock market performance after liberalization in some emerging markets around the world

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<table>
<thead>
<tr>
<th>Country</th>
<th>Year of Liberalization</th>
<th>Size</th>
<th>Liquidity</th>
<th>Volatility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>1989</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>1983</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chile</td>
<td>1980</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Colombia</td>
<td>1989-91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>India</td>
<td>1990-92</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jordan</td>
<td>1987</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Korea</td>
<td>1981-92</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaysia</td>
<td>1986</td>
<td></td>
<td></td>
<td>n.a.</td>
</tr>
<tr>
<td>Pakistan</td>
<td>1990</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Philippines</td>
<td>1986</td>
<td></td>
<td></td>
<td>n.a.</td>
</tr>
<tr>
<td>Portugal</td>
<td>1986</td>
<td></td>
<td>n.a.</td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>1986</td>
<td></td>
<td>n.a.</td>
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</tr>
<tr>
<td>Turkey</td>
<td>1990</td>
<td></td>
<td>n.a.</td>
<td></td>
</tr>
<tr>
<td>Venezuela</td>
<td>1983</td>
<td></td>
<td>n.a.</td>
<td></td>
</tr>
</tbody>
</table>


Note: Arrows indicate increases; dashes indicate no significant change; n.a. indicates data were not available.
As shown in the above figure, stock market size rose in 5 out of 14 countries, and none of these 14 countries indicated any drop in size after liberalization. Stock market liquidity also rose significantly in 12 out of 14 countries that liberalized controls on international capital flows. None of the 14 countries experienced a statistically significant drop in liquidity following liberalization. The figure also indicates, however, that stock market volatility rose in 7 out of 11 countries following liberalization. Volatility did not fall significantly in any of the 11 countries following liberalization. Thus, while easing international capital flows restrictions may increase size, it may also increase both liquidity and volatility. However, the intention in this research is to examine the impact of the economic reform programme on the stock market performance applied in Egypt, as one of the emerging stock markets.

4.9 The chapter summary: -

This chapter dealt with many empirical studies, which examined the relationship between economic reform programme variables and stock market performance. The main points of this chapter can be summarized as follows:

1- The empirical studies pointed out that there is a negative relationship between the rates of interest and stock market performance, in terms of stock returns and prices. However, changes in interest rates do not affect all stocks negatively, but, in general, there is an inverse relationship between these two variables. On the other hand, it is expected that changes in interest rates may affect many other aspects of stock market performance, beside its effect on stock returns and prices.

2- As well, the empirical studies showed a negative relationship between the inflation rate and stock returns, hence stock prices. Besides this, it is expected there is a negative impact of the inflation rate on other stock market performance.
3- The impact of changes in exchange rates on stock returns and prices differs from one economy to another and from industry to industry as well, and it depends on the exposure of the firm to exchange rate risk. But, in general, the movement in exchange rates may change the attractiveness of domestic stock prices compared to other countries; resulting in changes in the demand for domestic stocks by foreign investors. These changes in demand may affect stock prices negatively. So, it is argued that exchange rate fluctuations have an effect, not only on stock prices, but also on many aspects of stock market performance.

4- The empirical studies found that GDP growth has a positive effect on stock returns and prices, since the higher GDP growth increases the companies' cash flows. However, GDP growth may not only lead to an increase in stock returns, hence stock prices, but may also affect many other aspects related to stock market performance.

5- It was noted in the literature review that attention was not paid to the impact of per capita income on stock market performance, but it was argued that there is a positive relationship between per capita income and stock market performance, since higher per capita income will result in more saving for individuals, in turn, more investment, which means more injection of money into stock markets.

6- The empirical studies suggested that deficits in budget have a negative effect on stock returns and prices, and this effect can be direct or indirect. The direct effect is through signalling changes about the future real activity or economic prospect. The Indirect effect can be explained through the effect of deficits in budget on both interest and inflation rates; since deficits in budget expect to increase the inflation rate, and a higher inflation rate has a negative impact on stock returns and prices, it is expected that there is a negative relationship between deficits in budget and stock returns and prices. On the other hand, deficits in budgets may be financed with borrowing from the financial markets and this may cause an increase in interest
rates due to the excess fund demand of the state; higher interest rates will result in a decrease in stock returns and prices, so it is expected that the same impact will occur from deficits in budget on stock returns, hence on stock prices.

7- The empirical studies asserted a positive impact of a privatization programme on stock prices. On the other hand, much of the literature review showed that a privatization programme has a great effect on all virtually aspects of stock markets. It helps in increasing the supply and creating a demand for stocks by individuals and institutions, increasing the liquidity of the market as there will be more listed companies and more foreign and local investors who are attracted through a privatization programme, increasing market capitalization, and the number of listed companies, in turn, creating a variety of stocks in the market.

8- A recent empirical study suggested that an economic reform programme, in terms of liberalization, might affect stock market performance: increases market size, market liquidity, and also market volatility.

9- Since, it is rare in the literature review to find studies, which have concentrated on examining the impact of an economic reform programme on stock market performance, in the following chapters this research will investigate this relationship, in detail, with an emphasis on Egypt.
Chapter Five
Egypt’s Economic Reform Programme and the Stock Market Performance: Preliminary Investigation
5.1 Introduction:

Small countries with large external debt and low rate of economic growth are often advised by economists to cut back the size of the public sector and reduce the government debt. In fact, such policies would give more chance for private initiative and investment, in turn, they can boost the rate of economic growth and reduce government debt (Ploeg 1996).

Even though the transformation from centrally planned economies to market-based economies appears to be a complicated process, however, Egypt took the risk and since the early years of this decade, Egypt has been witnessing major and radical changes in all areas of its national life; political, legal, economic and social. In the beginning, these changes were implemented due to the debt-rescheduling scheme with the International Monetary Fund (IMF). After this, the Egyptian government began to implement its economic reform programme out of conviction rather than dictation. Consequently, a very impressive positive result has been achieved, thus laying the groundwork for a very attractive investment climate. This means that Egypt, since 1991 entered a new era in its economic development that is resulting in a higher growth rate and in bringing the stock market to the attention of foreign investors (see, Hegazy 1997, El-Hilaly 1997).

On the other hand, under the economic reform programme, the stock market in Egypt began to be active again. This can be considered as a benefit of this programme, and furthermore the revival of the Egyptian stock market is vital to the Egyptian economy (see, Butter 1997, El-Ahmady 1997, and the Economist 1996c).

In the light of the above, this chapter will concentrate, mainly, on two points. The first is the Egyptian economic situation prior to and after the economic reform programme. The second point will highlight the situation of the Egyptian stock market and its performance under this reform programme.
5.2 Egyptian economy: -

5.2.1 Introduction: -

Following the revolution in July 1952, the recent history of Egypt began in many areas; political, social, legal and economic. Leaving aside other areas and focusing on the economic situation, it can be mentioned that the project was to nationalize all major industrial, financial and commercial business, whether foreign or Egyptian, to become the foundation of a vast state sector to act as the strategic motor of development (Mahjoub 1990).

The early economic policy for the revolutionary regime was to encourage private capital to develop the national economy. As a result of the failure of private capital (domestic and foreign) in playing its assumed role in developing the national economy, because of distrust and uncertainty concerning the new regime, the state became a critical factor in the economic life of the society to achieve the tasks of developing and modernizing the national economy.

The first and major step in the nationalization programme in Egypt was of the Suez Canal company in 1956. Before the end of 1957, it was announced that "Democratic Cooperative Socialism" was to be the path for the national economy. In turn, the largely private enterprise system, which had existed before 1952, was systematically transformed into a state-owned enterprise. In fact, this was achieved through nationalization of foreign assets as well as mainly local-owned businesses (banks, insurance companies and large enterprises have been nationalized). In the same year (1957) the Egyptian government embarked on a new economic policy of a centrally planned economy.

In 1962, "Charter of National Action" was introduced as the official version of the revolution. The Charter proclaimed that Egypt was on a course based on the principles of scientific socialism. By the year 1963, state ownership had extended to all public utilities, transport, construction, larger industries, department stores and hotels. As well, the export-import trade and selling of major crops were taken over by the state (Hopwood 1982).
5.2.2. The "open door policy":

Starting from 1974, a quite different philosophy had been adopted for the Egyptian economy. The main reason for this dramatic change was because the Egyptian economy appeared to be on the edge of collapsing for many reasons. Firstly, there was inefficiency and unprofitability of state-owned enterprise because of the political and social purposes which made the government employ more workers than the economic efficiency required by these companies (Lloyds Bank 1986). Secondly, the Egyptian involvement in the Yemen war drained its foreign exchange reserves away from development projects. Thirdly, the 1967 war resulted in the loss of two of the major foreign currency earners; the Suez Canal and the Sinai oil fields. Fourthly, there was the dramatic increase in the military expenditure after the 1967 defeat. Finally, the government subsidy system increased quickly because of the rapid increase in population growth and the use of the unrealistically high official exchange rate (Abdelfatah 1997).

After the 1973 war, a fresh economic strategy was introduced with the aim of accelerating the economic growth as well as modernizing the Egyptian economy. Since this would require technical and financial resources in excess of those that Egypt possessed, a particular encouragement has been given to foreign investment. In turn, the law No. 43 of 1974 has been introduced. This law provided investment incentives, including guarantees against expropriation and nationalization, five years’ exemption from taxable profits, exemption from some import duties and allowance for repatriation of capital over a number of years. In the meantime, a number of free zones were to be established, where the companies could bring in components and materials to be manufactured into goods for re-export and could establish warehouses and other support facilities. Indeed, the relaxation of investment regulations attracted large-scale investment from Gulf States, United States and Western Europe. It was
presumed that the investments would finance new industries that would, in turn, utilize Egyptian raw materials, supply consumer goods for domestic use and exports and employ Egyptian workers, but conditions in Egypt and the Middle East as a whole have countered some of these objectives.

Although by the early 1980s, the Egyptian economy had benefited significantly from the "open door policy" in terms of rate of growth, it had at the same time become heavily dependent on foreign aid. In the meantime, other resources such as: oil exports, Suez Canal dues and workers' remittances, were not on their own sufficient to finance the ever-rising imports needed to feed the population, provide new equipment and raw materials for industry and, at the same time, an infrastructure programme was urgently required (Road 1997). When foreign exchange earnings began to fall off, in particular, after the oil prices' collapse of 1986, the Egyptian government found itself in serious financial difficulties. Foreign exchange earnings from Egypt's staple sources were seriously affected such as, Suez Canal dues, oil and workers' remittances, which fell by 3.6 per cent in the year 1987 (McDogall 1988). On the other side, the foreign debt put Egypt in the front rank of third world debtor nations. Its debt-service ratio was one of the highest among all developing countries. Additionally, government expenditure had risen faster than revenues, and the state-owned enterprises had to borrow heavily from local banks to finance their deficit (Lloyds Bank 1986).

5.2.3. The economic reform programme period:

According to the bad situation of the Egyptian economy by the mid of 1980s, the Egyptian government launched the first agreement with the International Monetary Fund (IMF) aiming at saving its economy from corruption. This agreement was cancelled after only three months
because of the failure of the Egyptian government to meet the International Monetary Fund's requirements.

In late 1990, it became obvious that the Egyptian economy could not face the needs of the society without external aids. In the meantime, Egypt faced a big problem with its creditors, as it was not able to maintain debt service payments.

The following key indicators can show to what extent the Egyptian economy was in crises by late 1990:

- Total external debt around US $ 49 billion.
- Total external debt to GDP 150%.
- Budget deficit around 20% of GDP.
- Rate of inflation more than 20%.
- Negative real interest rate around 6%.
- Reserves were just over three weeks of imports.

Beside these indicators shown above, by the late 1990s Iraq invaded Kuwait. The immediate effect of this invasion was to create further financial difficulties, as remittances from Egyptians working in the Gulf were directly affected significantly, as well as Suez Canal dues and tourist revenues (Road 1997).

In the light of the above, Egypt was obliged to turn to the International Monetary Fund (IMF) for help, in turn, another round of negotiations, which concluded in an economic reform programme by the end of 1990.

The key elements of this programme were as follows (see Ash 1993, Youssef 1996 and Road 1997):

- Reduce the size of the public sector through privatization.
- End controls over investment and eliminate most tariffs on imports.
- Sell manufactures at market prices.
• Raise energy and transport prices to realistic levels.
• Reduce consumer subsidies and target them towards the poorest group.
• Deregulate private investment and encourage private sector activity in all sectors including financial services.

In the meantime, the new agreement with the World Bank and the International Monetary Fund asked the Egyptian government to introduce several measures immediately, including (Middle East Executive Report 1992): -

• Removing ceilings on interest rates.
• Freeing up exchange rates.
• Introducing a new sales tax.

As mentioned in the second chapter, the first step in any economic reform programme is to relieve a stake in the external debt. Egypt's stand on the Gulf War did, however, have other positive results; in particular, it led to increase external financial support- bilateral as well as multilateral. Aid from the Gulf States flowed in for the first time since 1979 combined with writing off long-term debt to Gulf States (US $ 7 billion). In the meantime, the United States wrote off a substantial amount of its military debt (US & 6.7 billion), while the Paris Club Agreement, reached with the other major official creditors (17 main creditors governments), provided that 50 per cent of their outstanding commercial debt would be written off in stages over the succeeding three years, depending on Egypt carrying out its agreement with the International Monetary Fund’s economic reform programme (Central Bank of Egypt 1992 and Road 1997). The second International Monetary Fund agreement was concluded in 1993 and at the end of 1996 the third agreement triggered the final stake of commercial debt reduction and was supported by a further 24 month financial standby arrangement.

In conclusion, the agreement with the international organizations combined with the benefits, which flowed into Egypt as a result of its support for the allied cause, following the Iraqi
invasion of Kuwait, represents the corner-stone of the beginning of the economic reform programme in Egypt.

From the late 1990, when the economic reform programme started until the end of 1996, substantial debt forgiveness for Egypt has been done as follows:

- Writing off long-term debt to the United States (US $ 6.7 billion).
- Writing off long-term debt to the Gulf States (US $ 7 billion).
- Writing off 50 per cent of Egyptian commercial debt via Paris Club as follows:
  - 1991, The first stake represents 15 per cent, which equivalent to (US $ 3 billion).
  - 1993, The second stake represents 15 per cent, which equivalent to (US $ 3 billion).
  - 1996, The third stake represents 20 per cent, which equivalent to (US $ 4 billion).

In fact, the International Monetary Fund, at the beginning of the programme asked Egypt to be quick in implementing it (shock therapy), while the Egyptian government was willing to implement this programme at a slower pace (gradualism) in order to reduce any side-effect and then avoid any negative effect upon their living standards in its society.

However, Egypt implemented its economic reform programme gradually. The measure of the success achieved by Egypt's economic reform programme since the end of 1990 can be shown in the following table.

**Table 5.1**

**Some economic indicators under the economic reform programme period**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total external debt</td>
<td>US $ 49.2 billion</td>
<td>US $ 26.6 billion</td>
</tr>
<tr>
<td>Total external debt as a percentage of GDP</td>
<td>151%</td>
<td>37.7%</td>
</tr>
<tr>
<td>Real interest rate</td>
<td>(6%)</td>
<td>5%</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>23.6%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Budget deficit as a percentage of GDP</td>
<td>18.2%</td>
<td>0.06%</td>
</tr>
</tbody>
</table>

*Source: - Central Bank of Egypt, The Egyptian Cabinet Information and Decision Support Center (Cairo: CBE and IDSC, Various issues, 1992-1998).*
These indicators shown in the previous table and other indicators will be explained as follows.

5.2.3.1 Total external debt: -

In terms of external debt, the above figures can be made clearer in the following chart.

**Chart 5.1**
**Total external debt between 90/91-97/98**

![Bar chart showing total external debt between 1990-1991 and 1997-1998.]

**Source:** Central Bank of Egypt, The Egyptian Cabinet Information and Decision Support Center (Cairo: CBE and IDSC, Various issues, 1992-1998), Own Diagram.

From the previous table and the above chart, it can be seen that the Egyptian external debt has been decreased significantly from US $ 49 billion in 90/91 to only US $ 26.6 billion in 97/98, which means a rate of decrease of 46 per cent. In fact, this significant improvement can be due, mainly, to debt forgiveness from the Gulf States (US $ 7 billion), United States (US $ 6.7 billion). It can also be due to the agreement with the International Monetary Fund and the
World Bank, which allowed Egypt to negotiate with 17 main creditors via the Paris Club and acquire debt forgiveness as well (US $ 10 billion).

5.2.3.2 Total external debt as a percentage of GDP: -

In terms of total external debt as a percentage of GDP, the figures in the Table 5.1 can be made clear in the following chart.

**Chart 5.2**
**Total external debt as a percentage of GDP between 90/91-97/98**

From the previous table and the above chart, it is noticeable that debt ratio as a percentage of GDP has decreased significantly from 151 per cent in 90/91 to only 37.7 per cent in 97/98, which represents 75 per cent as an improvement in the debt situation in Egypt. Indeed, this kind of improvement can be due to the significant decrease of total external debt, as
mentioned previously, as well as to the acceleration of GDP growth in Egypt after adopting the economic reform programme.

5.2.3.3 Interest rates:

In terms of real interest rates, as mentioned in the second chapter, the real rates of interest should be positive in order to encourage any society to save. As in the case of Egypt, the inflation rate was so high, in fact, higher than the nominal interest rates, which cause negative real rates of interest. The following charts can show the interest rates and the real interest rates between 90/91 to 97/98.

Chart 5.3
Interest rates in Egypt between 90/91-97/98

As it is seen from the above charts, the real interest rates in Egypt prior to the economic reform programme were negative, in turn, with the introduction of this programme, Egypt linked the interest rates with the inflation rate in order to avoid this circumstance.

By January 1991, official limits in interest rates were lifted, and treasury bills auction were introduced. These were followed by elimination of lending limits to the private and public sectors in 1992 and 1993 respectively (Handy and Subramanian 1997). In turn, as a result of removing the ceilings on interest rates and making them freely dependent on market forces, the gap between the nominal interest rate and the inflation rate became narrow at first. Furthermore, with the sharp decrease in the inflation rate, the real interest rates became positive at 5 per cent in 97/98 compared with a negative rate of interest at 6 per cent in 90/91.
Indeed, this dramatic change in the real interest rates assisted the financial institutions, in particular banks, in attracting more savings from society and to invest these savings in many projects inside Egypt. In addition, even though, the increase in interest rates depressed the business environment in the beginning, but this was followed by inverse direction in the movement in interest rates as the inflation rate decreased sharply, indeed, the interest rates now are reasonable and attractive for both money supply and demand.

5.2.3.4. Inflation rate: -

In terms of inflation, one of the main problems for the Egyptian economy was the hyper-inflation rate. The following chart can show the development of the inflation rate in Egypt between 90/91-97/98 as seen in the previous Table 5.1

**Chart 5.5**

*Inflation rate in Egypt between 90/91-97/98*

![Chart showing inflation rate in Egypt between 90/91-97/98](chart)

As seen from the previous chart, the rate of inflation has declined sharply from 23.6 per cent in 90/91 to only 4.1 per cent in 97/98, which means 83 per cent as a rate of decrease.

In fact, it was vital for the Egyptian economy to depress the high inflation rate in the first stage of the economic reform programme period. In turn, the government chose to restrict the demand for goods and services by putting the inflation rate under control in the short term, since the other alternative, which representing in increasing the supply of goods and services, usually, needs a long time. In the light of this, the Egyptian government introduced treasury bills in 1991 followed by treasury bonds (5-10 years) in 1995. In the meantime, the rates of interest liberalized and real interest rates became positive, and in turn, all these procedures helped in absorbing the level of liquidity. As a conclusion, the liquidity growth declined from over 27 per cent in 90/91 to only 8.7 per cent in 97/98 (Central Bank of Egypt 1998).

On the other hand, the decline in the budget deficit combined with a relatively stable exchange rate, as will be discussed later, assisted in decreasing the rate of inflation.

5.2.3.5 Exchange rates: -

It is important for any country to minimize the fluctuation in its local currency against other foreign currencies; as the greater the fluctuation in exchange rates, the less attractiveness is the investment in the domestic market compared with other markets.

In fact, Egypt, like many other developing countries, has a multiple exchange rate system (MER). In turn after adopting the economic reform programme, decree No. 119 of 1991 has been introduced. Under this decree, the former multiple exchange rate system was replaced by a single-rate, market-oriented system with full floating of the Egyptian Pound for all public and private transactions. In the meantime, for the first time non-bank dealers were permitted to participate in the foreign exchange market (Central Bank of Egypt 1992).
Indeed, Egypt, under the economic reform programme, made substantial progress in reducing over-valued exchange rates. The following table shows the movements in the Egyptian pound during the economic reform programme period.

**Chart 5.6**

The value of Egyptian pound against US $ between 89/90-97/98

As seen from the above chart, the Egyptian pound under the economic reform programme became more stable compared with the period prior to the economic reform programme. In fact, by March 1991, the Egyptian government unified the official and commercial rates into a new free market rate. A 12 per cent devaluation in the exchange rate has been made to meet the free market rates.

Although the Egyptian Pound depreciated sharply during 1991, whilst the exchange rate reform was being implemented, the currency then remained more or less stable in the range...
L.E. 3.35 - 3.41 to US $1 from the third quarter of 1991 until the present (the fourth quarter of 1998). In the meantime, it is useful to mention that the Central Bank of Egypt regularly entered the market starting from 1992, using its foreign reserves to keep the Egyptian pound at its level and to prevent the currency from sharp depression thereby threatening foreign investment, or sharp appreciation thereby threatening the competitiveness of the country’s exports. In fact, the exchange rate was boosted at this time by extensive debt relief as well as the high returns on the Treasury bill, which led to a flood of capital inflows from abroad.

Indeed, both the World Bank and the International Monetary Fund had long held the position that the Egyptian currency was over-valued by up to 30 per cent (Euromoney 1996). The Central Bank of Egypt argued that the majority of the country’s foreign exchange earnings came from tourism, Suez Canal revenues, worker’s remittances and oil sales, and that they were denominated in US $ and unaffected by local exchange rate movements. Also it is argued that any devaluation would therefore have little effect on foreign exchange earnings, but would push up the cost of imports and it would also impact upon the budget. Additionally, this devaluation will depress foreign investment and make the Egyptian markets unattractive.

It can be argued that the Central Bank of Egypt was right, as the devaluation in exchange rates has had a bad effect on the attractiveness of a market and the most obvious proof in the recent period have been the Asian crises and the Russian Rouble crisis as well, which made foreign investors liquidate their investments.

The Central Bank of Egypt stood well with its foreign reserve. With the huge foreign reserve compared with 1990, the Central Bank of Egypt has an important instrument to intervene in the market to support the Egyptian Pound.

The following chart shows the total foreign reserve prior to and after the economic reform programme.
As seen from the above chart, the foreign reserve has been increased significantly from only 3.6 billion of US $ in 90/91 to 21.8 billion of US $ in 97/98, which means more than 500 per cent as a rate of increase.

In fact, this huge reserve has given the Central Bank of Egypt the ability to play a key role in maintaining the Egyptian Pound’s stability and to prevent any depreciation to the currency in case of any speculation.

Another vital factor has made the Egyptian Pound substantially stable. As mentioned previously, the real interest rates were sharply negative, in turn, there was a strong incentive to borrow in the domestic currency and to increase the dollar balance. Therefore, confidence in the economy was ebbing, reflecting in growing dollarization with a high fraction (nearly 50
per cent) of total liquidity accounted for by foreign currency deposits, but the reverse occurred in early 1991 when ceilings on interest rates were eliminated. The sharp rise in interest rates encouraged the reduction in dollar holdings in favour of the tax-free high interest paying savings accounts in domestic currency. In turn, it became worthwhile for investors to save in the local currency and to transfer their foreign currencies to the Egyptian pound, as the gap in the rates of interest between the Egyptian pound and US $ was 15 per cent in 1991 (18 per cent for the Egyptian pound against only 3 per cent for US $) and it now stands at 5 per cent. In conclusion, the percentage of foreign deposits just represents 21 per cent of total deposits in 1997/98 (Handy and Subramanian 1997, The Egyptian Cabinet Information and Decision Support Center 1998a).

5.2.3.6 Real GDP growth rate: -

In terms of the real GDP growth rate, the following chart will show the development of the GDP in Egypt under the economic reform programme period.
As can be seen from the above chart, the real GDP growth rate, which declined sharply in the first two years of the economic reform programme period to 1.9 per cent and 2.5 per cent respectively because of tight monetary and fiscal policy, rebounded quickly and was followed, with a one-year lag by a reduction in inflation. Indeed, since 1993, the real GDP growth rate has grown steadily, reaching 5.7 per cent in 97/98 (Central Bank of Egypt 1998, The Egyptian Cabinet Information and Decision Support Center 1998a).

5.2.3.7 *Per capita income*: -

As mentioned previously, the real GDP growth rate has grown steadily, combined with low inflation rate. In the meantime, the rate of growth in the population has decreased from 2.7 per cent in 90/91 to only 2.1 per cent in 96/97 (United Nations 1997). In turn, this made the per
capita income increase under the economic reform programme period. The following chart

can reflect the development of per capita income in Egypt within the 1990s.

**Chart 5.9**
**Per capita income in Egypt between 90/91-97/98**

[Chart showing per capita income trends from 1990/91 to 1997/98]


From the previous chart, it is clear that even per capita income decreased slightly in 91/92 in the first step of the economic reform programme period because of tightening monetary and fiscal policy, as mentioned previously, but the trend increased after this. Indeed, per capita income increased from only US $ 600 in 90/91 to US $ 1460 in 97/98, which means 143 per cent as a rate of increase. As mentioned previously, this impressive achievement in the standard of living in Egypt can be due to the increase in GDP growth rate and the decrease in rate of growth in the population. In spite of this, Egypt is still ranked as a low-income country (IFC 1997).
5.2.3.9 Budget deficit: -

In terms of the budget deficit, the essential figures in Table 5.1 can be made more clearly in the following chart.

**Chart 5.10**  
**Budget deficit as percentage of GDP in Egypt between 90/91-97/98**

As seen from the above chart and the previous table, the overall deficit as a percentage of GDP has declined sharply from about 18.2 per cent in 90/91 to only 0.06 per cent in 97/98, which represents 97 per cent as the degree of improvement in the government budget.

In fact, the reduction in the overall deficit was obtained through both increasing the revenues and reduction in the expenditure.

The largest single element of the policy effort on the revenue side was the exchange rate change in 1991. This raised revenue from Suez Canal receipts by about 2 per cent on average, from oil receipts, and from taxes on international trade, In addition, the introduction of the
sales tax and its subsequent expansion in 1991 contributed to about 1.4 per cent in the total revenue (Central Bank of Egypt 1998).

On the other hand, the expenditure has been cut by the total amount of 7.5 per cent of GDP. This cut was distributed, mainly, between current and investment expenditures in the ratio of 16 and 64 per cent respectively. Within investment expenditure, the share of spending accruing to the social services sectors remained unchanged, allaying concerns that the burden of fiscal adjustment would fall on poorer sections of the society. The bulk of the investment cuts was in the economic sphere as the government cut back on projects in the electricity and tourism sectors (Handy and Subramanian 1997).

Concerning current expenditure, which reduced by 1.2 percent of GDP, subsidies and transfers witnessed a decline of about 2.4 per cent, while wages and salaries saw a modest reduction of about 0.6 per cent. Although, interest expenditures on domestic debt were about 2.1 per cent higher during the economic reform programme period, Egypt's foreign interest bill was substantially reduced as a result of the debt forgiveness and Paris Club rescheduling agreement (Handy and Subramanian 1997).

Besides these, the state-owned enterprises can be considered as major contributors to the government budget deficit; in turn, the privatization, as will be discussed later, assisted in relieving the burden of the state-owned enterprises’ losses.

5.2.3.9 Privatization programme: -

Since the 1960’s, public sector companies have handled most of Egypt’s economic activity under the direction of the various ministries. Among their objectives, they have been expected in the past to create as many employment opportunities as possible. The poor management and weak capitalization of the state-owned enterprises, inevitably had an effect on their efficiency and financial viability (Road 1997 and Banker 1990). Reduction in size of the
public sector through privatization has therefore been an important part of the economic reform programme. This is now the special responsibility of the Minister for the Public Enterprise Sector and the Public Enterprise Office.

In 1991 Public Enterprise Law No. 203 was introduced as a transitional measure. The main features of this law are the following

1. The holding company shall take the form of a joint stock company, and shall be considered as one of the special persons in law.

2. Holding companies shall invest their funds through their affiliated companies and many undertake the investment themselves when needed.

3. Holding companies shall contribute to the development of the national economy in their field of activity and through their subsidiary companies, with the framework of the public policy of the state.

4. To accomplish its objectives, a holding company may:

   • Establish joint stock companies by itself (alone) or in participation with public or private artificial entities or individuals.

   • Purchase or sell shares of joint stock companies or participate in their capital.

   • Form and manage a portfolio of the company with its included shares, stocks, debentures and any other financial instruments or assets.

   • Undertake all actions that would help to achieve all or part of its objectives (official journal, 1991).

The immediate purpose of the previous law was to give autonomy to state-owned companies and, by guaranteeing to their new boards an increased level of accountability for their operations, promote the conduct of business according to market principles. However, it will eventually be merged with companies Law No. 159 in a new unified law, so that all
enterprises, both public and private, will become subject to a single code applicable to the business sector as a whole.

In October 1991, the executive regulations of "the public business sector companies law" were issued by the Prime Minister's Decree No. 1590. They included three main components as follows:

1. The holding companies: this component focuses on the incorporation, the board, the general assembly, and the financial system of the holding company.

2. Companies Affiliated to the Holding Companies: this component deals with the foundation, the board, the general assembly, and the financial system of affiliated companies.

3. General Provisions: this component concerns auditing the holding companies, affiliated companies' accounts and evaluating their performance, control on companies and the rights of access to registers and books, merging and dividing the holding companies and their affiliated companies and, finally conditions and procedures for terminating the service of workers in companies governed by the law, by resignation of the workers or their medical unfitness for service (official Journal 1991).

The first stage in the privatization process, which started in May 1991, was to cut off subsidies to the state-owned enterprises, followed by the removal of public enterprises from direct ministerial control (Field 1995). The three hundred and fourteen public sector companies, were grouped in 1991 under twenty-seven holding companies (now reduced to sixteen), responsible for all the affiliates in a particular sector.

A new body, the Public Enterprise Office (PEO), which was created to deal with the privatization of state assets, appointed a Chairperson and General Assemblies for each of the holding companies. Representatives on these Assemblies were drawn from both the private and public sector, with the power to manage their own portfolios. Holding companies set up to coordinate the activities of their subsidiary companies no longer receive public fund. Each one
is evaluated for listing on the stock exchange. The PEO and the holding companies have been undertaking the valuation of the subsidiary companies in preparation for their sale or restructuring with the help of international and local consultants (Road 1997 and Timewell 1991).

Under the government’s strategy for divestment of public sector holdings, two approaches have been taken. The first is sales of shares through the stock market, and the second is sales of a strategic stake of shares to anchor investors through public auction (Mckinney 1996). Besides these two approaches, liquidation of companies has taken place for those companies that suffer from a huge debt burden and cannot adjust anymore.

On the other hand, the Egyptian government announced that the state-owned enterprises would be classified into three categories:

- Strategic companies that are vital for the Egyptian society and cannot be sold to the private sector, in turn, these kinds of companies are not going to be privatized.
- Less strategic companies that are still important to the Egyptian society and the majority of their capital should still be in the government’s hand. This kind of companies is going to be privatized up to 40 per cent only and the rest will be in the Government’s hand.
- Other companies are going to be fully privatized (Al-Ahram 1994).

The performance of the Egyptian privatization programme can be seen in the following table.
Table 5.2
Number of privatized companies in Egypt

<table>
<thead>
<tr>
<th>Description</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of companies of which more than 51% of equity sold to private sector.</td>
<td>57</td>
</tr>
<tr>
<td>Companies sold to the public (through the stock market).</td>
<td>34</td>
</tr>
<tr>
<td>Companies sold to anchor investors.</td>
<td>8</td>
</tr>
<tr>
<td>Companies sold to labor unions</td>
<td>15</td>
</tr>
<tr>
<td>Number of companies sold as assets</td>
<td>17</td>
</tr>
<tr>
<td>Number of companies of which less than 50% of equity sold to date</td>
<td>18</td>
</tr>
<tr>
<td>Number of companies of which more than 40% of its equity sold through the stock market</td>
<td>9</td>
</tr>
<tr>
<td>Number of companies of which less than 40% of equity sold through the stock market</td>
<td>9</td>
</tr>
<tr>
<td>Total number of companies covered by the privatization programme</td>
<td>92</td>
</tr>
</tbody>
</table>


As seen from the above table, the number of privatized companies reached 92 companies by the middle of 1998, out of which 314 companies represent the whole state-owned enterprises, which means 28 per cent of the state-owned enterprises has been privatized partially or fully.

On the other hand, in terms of total value of privatized companies, the following table can illustrate this point since 1994 until present (June 1998)
### Table 5.3
Value of privatized companies in Egypt between 1994 - June 1998

<table>
<thead>
<tr>
<th>Years</th>
<th>Value of privatized companies (million of L.E.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>970</td>
</tr>
<tr>
<td>1995</td>
<td>1086</td>
</tr>
<tr>
<td>1996</td>
<td>3161</td>
</tr>
<tr>
<td>1997</td>
<td>3306</td>
</tr>
<tr>
<td>June 1998</td>
<td>2347</td>
</tr>
</tbody>
</table>


The essential figures in the above table can be made clear in the following chart.

### Chart 5.11
Value of privatized companies in Egypt between 1994-June 1998

As seen from the above table and chart, the privatization programme started in 1994, it was slow at the beginning where minor stakes (10 per cent to 20 per cent) were allowed to be sold, but starting from mid 1996, when the new Cabinet was appointed, the privatization programme was accelerated. The new cabinet began to spread a new message and attract international interest in Egypt. To improve the supply of stocks on the exchange, for the first time since starting the privatization programme, the government sold more than 50 per cent of its stakes in state-owned enterprises, in turn, the value of privatized companies has accelerated significantly. Indeed, the total value of privatized companies reached L.E. 10.853 billion

**5.2.3.10 Other measures:**

* A unified tax law No. 187 was introduced in 1993. This law reduced marginal tax rates, simplified the tax structure and administration.

* Tax incentives were introduced. Tax holidays granted by General Authority of Investment and others are operating under the umbrella of the Ministry of Economy and Foreign Trade. The duration of the tax holiday depends on whether the benefiting enterprise operates inside or outside free zones, where there are eight free zones in operation at present. Outside the free zones, approved projects can obtain tax holidays of 5 years to 15 years on corporate income tax and moveable capital revenue respectively. In fact, the standard tax holiday is 5 years, but a 10 year tax holiday is granted for land reclamation projects and projects in new industrial cities and remote areas. In the meantime, a 15 year tax holiday, which can be extended for an additional five years, is granted to low and middle income rental housing built in new cities. Under the Income Tax Law, general investment incentives for corporations include a 25 per cent investment allowance on new machinery and equipment, a paid-up equity capital deduction, a lower statutory rate for industrial and exporting firms, a rollover of capital gains on sales of real assets, and an interest income exemption on publicly-subscribed bond issues
and bank deposit interest. Also, investors engaged in land reclamation could claim a 10-year tax holiday and a tax holiday can be granted to projects utilizing new technology, or to those that increase exports or reduce imports. With a firm and strong political and economic base, Egypt offers investors not only attractive tax incentives, but also the challenges and high yields of an emerging market economy. In addition, Egypt has concluded double taxation treaties with certain countries, which a potential investor should bear in mind when assessing the viability of the Egyptian market (Shawki 1997). As a conclusion of investment incentives offered by the government, the private sector’s contribution to the Egyptian economy became more than 70 per cent compared with less than 30 per cent in the past period (General Authority of Investment 1998).

* A sales tax has been introduced in order to reduce the budget deficit. As well, customs and stamp duties were raised and petroleum and electricity prices increased. Besides these, the dual pricing system has been eliminated and there has been a progressive reduction of subsidies.

* The prohibited import list has been cut by two thirds. In the meantime, all new investment projects pay a flat rate of customs duty of 5 per cent on imports of machinery and equipment, which have to be approved by the Investment Authority. The import tariff has been reduced from a maximum of 120 per cent to only 70 per cent and then to 50 per cent. Indeed, Egypt is going further to more reduction in the tariff gradually until the year 2005 to meet the GATT’s requirements.

* A Social Fund for Development was established in 1991 by president decree No. 40, to alleviate hardship caused by the economic reform programme. This is being financed by international organizations, as well as by grants from creditor countries. The main aim of this fund is to create jobs, counter unemployment and develop rural areas (Road 1997). In turn, the Fund was intended to assist, in the short term, the low income population groups most directly
affected by the economic reform measures; and in the medium term, strengthen the Government's institutional capacity to design and monitor poverty alleviation policies. In these endeavours, the Fund combines the attributes of an effective private enterprise in its flexibility, with a strong sense of social purpose. Phase one, valued at US $ 613 million, began in March 1991 with phase two, valued at US $ 717 million, began in 1997. According to the Fund, some 14.4 million people have benefited directly from fund projects by the end of 1995. Indeed, the Fund created up to 180000 permanent and 80000 temporary jobs (The Egyptian Social Fund for Development 1998).

Even though with all these remarkable changes, Egypt is still at the beginning of the road. In fact, many other areas did not show any improvement in Egypt. Still the gap between exports and imports is too high, in turn, the trade balance is still suffering from a huge deficit. The level of exports increased under the economic reform programme period, but as well, the level of imports increased by a rate more than the increase in exports. As a result, the balance of trade deteriorated from L.E. 6.62 billion in 90/91 to L.E. 9.8 billion in 97/98 (United Nations 1996, The Egyptian Cabinet Information and Decision Support Center 1998b).

On the other hand, even though the rate of growth picked up as stabilization took hold, it was not strong enough to generate substantial gains in improving the standard of living in Egypt, or to make a dent in rising unemployment, which stood at 11 per cent (United Nations 1996, The Egyptian Cabinet Information and Decision Support Center 1998a). In fact, the level of investment at only 18 per cent of GDP is below the average level for developing countries (26 per cent of GDP), and the average for the fast growing Asian countries (31 per cent of GDP). In turn, Egypt needs, indeed, to raise the level of investment between 25-30 per cent of GDP to achieve a rate of growth between 7-8 per cent in the following few years in order to create
500000 new job opportunities which are needed yearly to meet the increasing rates of the work force entering the market every year (The Egyptian Ministry of planning 1998).

According to the World Bank report (1998), current estimates place unemployment between 10-13 per cent, and the labour force is growing at around 3 per cent annually. However, if Egypt is able to increase and sustain real growth at above 6 per cent annually, the unemployment rate is likely to decline to 7 per cent by the year 2000. The report added that to achieve and sustain these levels of growth, Egypt should overcome the challenges of low levels of domestic saving and investment, slow growth of export, and reliance on external resources that are vulnerable to shocks (such as remittances, oil gas exports and foreign aid).

5.3 Egyptian stock market: -

5.3.1 Introduction: -

The stock market activity in Egypt goes back as far as 1881. Alexandria stock exchange has been the fifth established in the world after those of Inverness (1536), Amsterdam (1608), London (1666), and Paris (1808). Cairo stock exchange was later established in 1903 (Egyptian Capital Market Authority 1996a).

Since their inception, the two exchanges were active in truly reflecting the performance of the Egyptian economy. Through the late 1950’s, privately owned companies, many of which were publicly held through public offering, led the economy. These companies constituted the core of the Egyptian market, which was the pre-eminent source of funding for business for over 50 years. In fact, Cairo stock exchange was ranked as the fifth most active exchange world-wide in the early 1950’s (Egyptian Capital Market Authority 1996a).

However, a significant change has affected the stock market in Egypt in the late 1950s. Law No. 71 has been introduced. According to this law, the maximum dividends for any company
should not exceed more than 10 per cent of its dividends in 1958. In the meantime, the year 1960 witnessed the start of massive and successive waves of nationalization that had radically changed the structure of the economy. Besides these, the nationalization of the 93 most active companies in the stock market had transferred their stocks to governmental bonds with 4 per cent annual interest rate for 15 years, which had a devastating effect upon the stock market as the stock exchanges collapsed and the primary market became rudimentary. For the following 20 years, the stock market dwarfed and stagnated.

The following table can show to what extent the Egyptian stock market has been depressed because of the massive nationalization programme.

Table 5.4
Some stock market indicators between 1958-1974

<table>
<thead>
<tr>
<th>Description</th>
<th>1958</th>
<th>1974</th>
<th>Rate of change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market capitalization as a percentage of GDP</td>
<td>13%</td>
<td>1%</td>
<td>-92%</td>
</tr>
<tr>
<td>Number of listed companies</td>
<td>275</td>
<td>55</td>
<td>-80%</td>
</tr>
<tr>
<td>Total value traded</td>
<td>66.7 million</td>
<td>4 million</td>
<td>-94%</td>
</tr>
<tr>
<td>% of new capital required by private and public sector offered by the stock market</td>
<td>56.2%</td>
<td>2%</td>
<td>-96%</td>
</tr>
<tr>
<td>Number of stock brokers</td>
<td>55</td>
<td>15</td>
<td>-73%</td>
</tr>
</tbody>
</table>


The essential features in the above table can be seen more clearly in the following chart.
As seen from the previous table and the above chart, in terms of market size, market capitalization as percentage of GDP, the number of listed companies, and the number of stock brokers have decreased significantly. For the first item, the ratio decreased from 13 per cent in 1958 to just 1 per cent in 1974, which means 92 per cent as a rate of decrease, where the number of listed companies decreased from 275 in 1958 to only 55 in 1974, which represents 80 per cent rate of decline. As well, the number of stock brokers has declined sharply between 1958 and 1974, from 55 to 15, which means 73 per cent rate of decrease.

On the other hand, in terms of market activity, the sharp decline in this variable can be seen through the decline in total value traded and percentage of new capital required by private and public sector offered by the stock market. For the first item, the value of trade has collapsed from L.E. 66.7 million in 1958 to only L.E. 4 million in 1974, which represents 94 per cent as
a rate of decrease. In the meantime, the importance of the market as a source of new capital required by the private and public sector has been shrinking from 56.2 per cent in 1958 to only 2 per cent in 1974, which means 96.5 per cent as a rate of decrease.

In conclusion, the nationalization process had a devastating effect on the Egyptian stock market. But despite the inevitable slowdown in the Egyptian stock market, it remained open but with an inactive market until the open door policy started in mid 1970s.

5.3.2 Resurrection of the stock market in Egypt (open door policy): -

With the introducing of "open door policy", by mid 1970s, reforms were implemented to reactivate the private sector and aimed to attract foreign investment and mobilize domestic investment as well.

In order to encourage the private investment, tax encouragement for investors has been introduced, for example, according to the law No. 57 for 1981, 50 per cent of stock profits are tax exempt. In the meantime, the Egyptian Capital Market Authority has been established by late 1970s in order to organize and manage the stock market in Egypt. Besides these, the economic situation in Egypt witnessed the rise of world oil prices in the late 1970s and early 1980s. In turn, Egypt enjoyed a sizeable increase in foreign exchange earnings and high rates of economic growth. In fact, these short-term gains gave little incentive to the government to pursue consistent efforts to mobilize budgetary resources. In the meantime, both imports and the rate of consumption increased. Besides these, the drop of oil prices of mid 1980s has further aggravated the economic situation in Egypt. The government resorted to foreign borrowing and relied heavily on deficit financing. In fact, such an environment was not conducive for the development of the stock market.
According to the Capital Market Authority (1996b), additional reasons have also arrested the development of the stock market and caused its relative insignificance during the period 1975-1990. They were:

"The bias in the tax code against investment in securities, structural deficiencies and practices, the absence of a governing securities law, the inadequacy of accounting, auditing and financial disclosure, and the lack of protection to small investors". (Capital Market Authority (1996b), P. 6).

In conclusion, the role of the stock exchange remained minimal during this period.

5.3.3 Egypt’s stock market under the economic reform programme umbrella: a new era: -

5.3.3.1 Introduction: -

In recognition of the role of the capital market in economic development, a programme was initiated aiming at the revitalization of the capital market.

As mentioned in the third chapter, in market-based economies, the capital market is an important means of mobilizing savings and allocation of resources, an avenue for domestic and foreign investment promotion, and a significant source of capital formation and business financing. With reference to the contemporary Egyptian economy, the market’s role is of particular significance as a means of privatization and extending economic asset ownership to a broader base of investors, thus achieving economic goals and objectives. Consequently, in 1991 an economic reform programme was implemented covering the whole economic spectrum. Fiscal and monetary reforms constituted the core of the programme.

As such, the role of the capital market became instrumental for the success of the economic reform programme. Therefore, and as part of the comprehensive economic liberalization, a plan to revitalize the capital market was designed to remove any constraints hindering the development of the capital market.

The plan had at its core the following objectives:

- Improving operational efficiency and boosting public confidence in the securities market.
• Creating professionally managed investment vehicles and intermediary firms managed by private sector.

• Regulating the market and the market participants through monitoring and law enforcement.

• Reorganizing the Capital Market Authority (CMA) powerful regulatory agency.

In fact, the development of Egypt's stock market can be divided into three distinct periods as follows:


* Since July 1996: The re-emergence of the stock market.

5.3.3.2 The legal framework reform (1992-1993): -

A critical component of Egypt's economic reform programme has been the re-activation of its capital markets with an emphasis on the stock exchange.

Prior to 1992, companies Law No.159 for 1981 and the stock exchange Law of 1959, which were two overlapping pieces of legislation, governed the Egyptian securities industry. In fact, prior to June 1992, several laws and rules regulated the stock market and have proved inadequate for the demands of market-oriented economy. In order to end the duplication of responsibilities and simplify the regulatory environment, the capital market law has been enacted to replace the multiplicity of laws. In turn, a new law (Law 95) for capital market was introduced in June of 1992 and put into force in April 1993 through the issuance of its executive regulations.

This law was aimed at encouraging investments of private savings, increasing investors protection, and enhancing the banks' role in simulating the capital markets through the establishment of mutual funds (El-Safwa Brokerage company 1998, Hermes and Egyptian Financial Group Brokerage 1998).
The Main points of the law No. 95 of 1992 are:

- The Capital Market Authority has been designed as the sole body responsible for regulating and rationalizing the legal, institutional and operational aspects of the stock market.

- Any company that wishes to issue a financial instrument has to notify the Capital Market Authority, which then has six months in which to raise any objection.

- No public offering is allowed except through the Capital Market Authority, and this public offering should be issued by means of a proper prospectus approved by the Capital Market Authority with relevant background documentation.

- There are two registers. To be included in the official register, 30 per cent of the company has to be taken up by not less than one hundred and fifty entities. Additionally, over a three months period, the number of shareholders cannot be less than one hundred. On the other hand, the unofficial register contains all those Egyptian companies not qualifying for the official register.

- The sale of listed shares may only be transacted through a licensed broker, who has to be approved by the Capital Market Authority, and is required to have sufficient capital, competent staff and subscribe to an insurance fund (Official Journal 1992).

The new law led to diversification of financial products, major recognition of the market, and the introduction of new participants.

Participants in the market were classified into several categories: brokerage firms, fund management companies, venture capital companies, clearing houses, portfolio management firms and rating companies. Consequently, the number of market participants increased. In addition, the law led to recognition of the market. This included unification of the market to facilitate accurate price discovery between the Cairo and Alexandria exchanges, new registration procedures, improvement of the clearance and settlement system, and better regulation of financial intermediaries. Transfer of ownership was done immediately following
the trade while clearance and settlement was to take place within three days as compared to a much longer period before the law was enforced (El-Safwa Brokerage company 1998).

5.3.3.3 A transition period (1994-June 1996):

The economic reform initiated by the government in the early 1990's finally started to affect the performance of Egypt's stock market. In fact, the foreign exchange liberation, the removal of subsidies, the improvement in the economic indicators, as well as privatization all had a strong positive effect on the stock market. The removal of restrictions on foreign ownership of Egyptian securities, as a result of liberalization of trade in securities' financial services within the context of the recent General Agreement on Trade in Services (GATS), to which the Egyptian government is a signatory, supported the keen interest of the Capital Market Authority to accelerate the development of the stock market. The offering of tax incentives was also beneficial. These reforms, combined with the introduction of a new legal framework, justify the excellent performance of the Egyptian market during 1994.

Consequently, a number of regional fund managers started to focus the opportunities offered in Egypt's stock market. By 1995, this interest had spread to encompass managers of international emerging markets funds as well. In mid 1994, Dow Jones Telerate started to broadcast information concerning the Cairo stock exchange to the rest of the world.

A new computerized trading system was introduced in February 1995 with a higher capacity allowing for automatic matching between buyers and sellers. Also, trading hours were increased by 50 per cent. Furthermore, new instruments were introduced to the market, which helped portfolio diversification. In May 1994, Hoechst Orient launched the first corporate bond while the second was in March 1995 by Victoria United Hotels (The Egyptian Capital Market Authority 1996c, El-Safwa Broker Company 1998).
5.3.3.4 The re-emergence of the stock market (since July 1996): -

This period started with cancelling the capital gains tax of 2 per cent, which was levied on security investments in 1992. The Capital Market Authority decided to increase trading hours by another two hours or by 67 per cent. As a result, foreign participation in the market increased dramatically to 30 per cent of total traded volume in 1996. As of November, there were 712 funds, international and regional financial institutions investing in the market. By the end of the year 12 funds, including three offshore funds, all launched in 1996, were exclusively investing in Egypt's stock market.

Furthermore, a new clearing and settlement system was introduced. This was followed by the introduction of a central depository, which allow for real time, electronic confirmation and transfer of title in an immobilized environment. As a result, a new type of intermediary was created- the bookkeepers. Their role is to interface with the central depository, thereby allowing registration, confirmation, and transfer of ownership to occur smoothly.

By mid 1996, the privatization programme witnessed the first privatized company with more than 75 per cent of its share to offer to the public. In the meantime, the year 1996 witnessed the first issue of Egyptian securities overseas, called Global Depositary Receipts (GDR), which reached five issues by the end of 1997. In terms of disclosure, the Capital Market Authority required quarterly instead of semi annual reports. The abolition of the 49 per cent ceiling on non-Egyptian ownership in private and joint venture banks was also a major factor in increasing the market liquidity.

Finally, the investment grade rating by Standard and Poor (S&P) in January 1997 reinforced positive investor perceptions of the Egyptian market. This grade was followed by an IMF report in March, which also praised Egypt's economic reform programme. All these positive steps taken by the Egyptian Government over the last few years pushed the International Finance Corporation to launch an Egyptian index in November 1996. This event was followed

As a conclusion, the stock market in Egypt witnessed major changes starting from 1991, when the economic reform programme was introduced.

The following table indicates the dramatic changes in the stock market in Egypt between 1991/92 until 1997/98.

**Table 5.5**

**Stock market performance in Egypt between 1991/92-1997/98**

<table>
<thead>
<tr>
<th>Description</th>
<th>91/92</th>
<th>97/98</th>
<th>Rate of change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Market Activity:-</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Value of trade (Millions of L.E.)</td>
<td>427.8</td>
<td>24219.8</td>
<td>5561%</td>
</tr>
<tr>
<td>Volume of trade (Millions of shares)</td>
<td>22.7</td>
<td>372.5</td>
<td>1541%</td>
</tr>
<tr>
<td>Number of transactions</td>
<td>10305</td>
<td>1225351</td>
<td>11791%</td>
</tr>
<tr>
<td>Number of traded companies</td>
<td>218</td>
<td>416</td>
<td>91%</td>
</tr>
<tr>
<td>Value of new issues (including capital increases) (Millions of L.E.)</td>
<td>1335</td>
<td>18289.6</td>
<td>1270%</td>
</tr>
<tr>
<td>Value of new issues (including capital increases) as a percentage of GDP</td>
<td>1.2%</td>
<td>7.1%</td>
<td>492%</td>
</tr>
<tr>
<td><strong>Market Size:-</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market capitalization (Millions of L.E.)</td>
<td>8845</td>
<td>70873</td>
<td>701%</td>
</tr>
<tr>
<td>Market capitalization as a percentage of GDP</td>
<td>7.8%</td>
<td>27.7%</td>
<td>255%</td>
</tr>
<tr>
<td>Number of listed companies</td>
<td>627</td>
<td>650</td>
<td>3.5%</td>
</tr>
<tr>
<td>volume of shares listed (Millions of shares)</td>
<td>394.1</td>
<td>1854.2</td>
<td>370.5%</td>
</tr>
<tr>
<td>Number of financial intermediaries</td>
<td>12</td>
<td>213</td>
<td>1675%</td>
</tr>
<tr>
<td><strong>Market Liquidity</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total value traded to market capitalization</td>
<td>4.8%</td>
<td>34%</td>
<td>608%</td>
</tr>
<tr>
<td>Total value traded to GDP</td>
<td>0.38%</td>
<td>9.4%</td>
<td>2374%</td>
</tr>
<tr>
<td>Volume of shares traded to volume of shares listed</td>
<td>5.8%</td>
<td>20%</td>
<td>245%</td>
</tr>
<tr>
<td><strong>Market Concentration</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percentage of the 10 biggest companies' share in market capitalization</td>
<td>80%</td>
<td>52%</td>
<td>-35%</td>
</tr>
<tr>
<td>Percentage of the 10 biggest companies' share in value traded</td>
<td>48%</td>
<td>31%</td>
<td>-35%</td>
</tr>
</tbody>
</table>


*N.B.* Financial values are expressed in money terms, i.e, they have not been adjusted for inflation.

The essential figures shown in the above table can be made clear in the following charts.
In terms of market activity, as seen from the above chart and the previous table, market activity; which reflects the ability of the market to provide the required finance to demand side and investment opportunities to the supply side; increased sharply between 91/92 and 97/98.

Value of trade increased from L.E. 427.8 million in 91/92 to L.E. 24219.8 million in 97/98, which means 5561 per cent. In the meantime, volume of trade, which refers to the total number of shares traded, increased from 22.7 million shares in 91/92 to 372.5 million shares in 97/98, which represents 1541 per cent as a rate of increase. The number of transactions increased sharply from only 10305 transactions in 91/92 to 1225351 transactions in 97/98, which means 11791 as a rate of increase. In fact, this dramatic change in number of transactions may be due to the increase of the number of individual investors in Egypt within
this period. As shown previously in Table 5.5, the number of listed companies increased slightly, in turn, as can be seen, the number of traded companies did not follow the same trend of increase as other variables of market activity, as it increased from 218 companies in 91/92 to 416 companies in 97/98, which reflects only 91 per cent as a rate of increase. Besides these, the ability of the market to create the required finance to companies increased significantly. Value of new issues (including capital increases) jumped from L.E. 1335 million in 91/92 to L.E. 18289.6 million in 97/98, and as a percentage of GDP, increased from 1.2 per cent in 91/92 to 7.2 per cent in 97/98, which means 1270 per cent and 492 per cent as a rate of increase respectively for both variables. Indeed, this reflects the opportunity for companies to find the required finance for their projects, also this means an increase of investment via the stock market in Egypt under the economic reform programme period.

In terms of market size, the essential figures in the previous Table 5.5 can be made clear in the following chart

**Chart 5.14**  
The development of market size in Egypt between 91/92-97/98

![Chart 5.14](image)

**Source:** - The Egyptian Capital Market Authority, *Unpublished reports*, (Cairo: CMA, 1998), Own Diagram.
As seen from the above chart and previous Table 5.5, a dramatic change has occurred under the economic reform programme period.

Market capitalization, which measures total market value of all shares listed on a given exchange, increased significantly from only L.E. 8845 billion in 91/92 to L.E. 70873 billion in 97/98, which means 701 per cent as a rate of increase. In the meantime, market capitalization as a percentage of GDP increased also from only 7.8 per cent in 91/92 to 27.2 per cent in 97/98, which means 255 per cent as a rate of increase. Meanwhile, volume of shares listed, which refers to total number of shares for all companies listed in the market, increased from 394.1 million share in 91/92 to 1854.2 million share in 97/98, which means 370.5 per cent as a rate of increase. On the other hand, it can be seen that the number of listed companies just increased from 627 companies in 91/92 to 650 in 97/98, which means only 3.5 per cent as a rate of increase. In turn, this variable did not follow the same trend of increase as other variables of market size. In fact, this can be due to two reasons; firstly, the Capital Market Authority assured that any company without transactions within six months would not be included in the stock market. In fact, this was in order to de-list companies, which do not trade actively and are listed solely for the purpose of tax benefits. In turn, many companies have been cancelled from the listed companies in the stock market. Secondly, the increase in other variables of market size can be due to the increase of market value of listed shares, the capital increase of the listed companies and new issues from new capital. In addition, these were combined with cancellation of many companies from the stock market, which can be considered small companies and have minor market share compared with the new companies, listed within this period.

Concerning the last variable of market size, it can be seen that the number of financial intermediaries has increased sharply from only 12 in 91/92 to 213 in 97/98, which means 1675 per cent as a rate of increase. In fact, the sharp increase of financial intermediaries can
be due, mainly, to the dramatic increase in other market size variables, as well as the increase in market activity as shown previously.

In conclusion, as it can be seen from the previous analysis of market size and market activity, the rate of increase in most variables of market activity is higher than rate of increase of market size's variables. One possibility to explain this differentiation is that the stock market in Egypt had already many companies listed with good opportunities to invest, but the climate before the economic reform programme was discouraging any investment. With the economic reform programme, Egypt's stock market enjoyed an attractive investment climate, which attracted individuals and financial institutions to convert their way of investment to stock market. To prove this point, it should be mentioned that the value of foreign trading in Egypt's stock market was Zero in 91/92, and became L.E. 2600 million by June 1998.

In terms of market liquidity, the essential figures in Table 5.5 can be made clear in the following chart.
Chart 5.15
The development of market liquidity in Egypt between 91/92-97/98

From the above chart and the previous Table 5.5, it can be noticed that market liquidity, which refers to the ability to buy and sell securities easily, increased sharply between 91/92 and 97/98. Total value traded to market capitalization increased from 4.8 per cent in 91/92 to 34 per cent in 97/98, which means 608 per cent as a rate of increase. In the meantime, total value traded to GDP increased sharply from only 0.38 per cent in 91/92 to 9.4 per cent in 97/98 reflecting 2373 per cent as a rate of increase. These two variables were combined with the increase in volume of shares traded to volume of shares listed. The increase was from 5.8 per cent in 91/92 to 20 per cent in 97/98 reflecting 245 per cent as a rate of increase.

In fact, the increase in market liquidity can reflect the increase in market activity, as more shares can be traded easily, increasing number of investors, new injection of money in the stock market, and more investment confidence in the market.

In terms of market concentration, the essential figures in Table 5.5 can be made more clear in the following chart.

**Chart 5.16**
**The development of market concentration in Egypt between 91/92-97/98**

As seen from the above chart and previous table, market concentration, which reflects whether market capitalization can be represented by a small number of companies and whether the market concentrates its trading on a limited number of companies, decreased under the economic reform programme period. The percentage of the 10 biggest companies' share in market capitalization decreased from 80 per cent in 91/92 to 52 per cent in 97/98, which means 35 per cent as a rate of decrease. As well, the percentage of the 10 biggest companies'
share in value traded decreased by the same percentage, from 48 per cent in 91/92 to 31 per cent in 97/98. In fact, the decrease in these ratios reflects the activity of the market, as there is a wide spread of traded and listed companies.

On the other hand, the market index of the Egyptian stock market has benefited since its establishment in August 1993. The following chart illustrates the development of the market index since August 1993 till August 1998.

**Chart 5.17**  
The development of Egyptian stock market index between August 1993-August 1998

![Chart showing the development of the Egyptian stock market index between August 1993 and August 1998.](image)


As it seen from the above chart, the stock market index increased from 100 points in August 1993 to 363 points in August 1998, which means 263 per cent as a rate of increase.

In fact, even though the stock market index suffered many times from stagnation in prices because of increasing the supply side, inevitable corrections of stock prices, and the Luxor
massacre in 1997, but the index benefited from improvement in macro economic indicators, hence, attracting more foreign and domestic investors, individuals and institutions.

In conclusion, it seems that dramatic change has happened in all areas of the stock market: activity, size, liquidity, concentration and in terms of stock prices as well. It is assumed that the economic reform programme has affected the stock market performance in Egypt, in turn, this will be examined statistically in the next chapter.

5.4 The chapter Summary: -

This chapter dealt, mainly, with the economic reform programme in Egypt and the stock market performance as well. The main points of this chapter can be summarized as follows:

1- The Egyptian economy since 1952 after the revolution, witnessed three major systems; a socialism and nationalism period, an open door policy period, and an economic reform programme period.

2- Egypt's economic reform programme was started by late 1990 as a result of the bad economic situation after the oil prices collapse in mid 1980s, and Gulf war in 1990.

3- Under the economic reform programme umbrella, Egypt enjoyed a positive economic climate as its total external debt had declined from US $ 49.2 billion in 90/91 to US $ 26.6 in 97/98 due to debt forgiveness from Gulf States (US $ 7 billion), United States (US $ 6.7 billion), and 17 creditors countries via Paris Club (US $ 10 billion). In the meantime, the ratio of total external debt to GDP declined from 151 per cent to only 37.7 per cent within the same period.

4- Other macro economic indicators witnessed impressive progress. Real interest rates changed from negative 6 per cent in 90/91 to 5 per cent in 97/98, combined with sharp decline in inflation rate from 23.6 per cent to 4.1 per cent within the same period. In the meantime,
exchange rates enjoyed a high level of stability since 1991, while budget deficit as a percentage of GDP declined significantly from 18.2 per cent 0.06 per cent from 91/92-97/98.

5- Even though the real GDP growth rate declined sharply in the first two years of the economic reform programme implementation, it recovered quickly and reached 5.7 per cent in 97/98 compared with 3.6 per cent in 90/91. Meanwhile, per capita income increased from US $ 600 in 90/91 to US $ 1460 in 97/98.

6- The privatization programme started in 1994 with a slow movement at the beginning, but it became quicker by mid 1996. The number of companies, which had been privatized reached 92 companies by mid 1998, with a total value L.E. 10.853 billion.

7- Despite all these impressive works, Egypt still faces many problems: a high rate of unemployment, a high deficit in balance of trade and a low ratio of domestic saving and a low ratio of investment to GDP.

8- To face the problems mentioned above, Egypt needs to increase the ratio of investment to GDP via attracting more foreign investment and encouraging domestic saving in order to accelerate the rate of growth and make it between 6-7 per cent per year.

9- Egypt’s stock market was the fifth established market in the world, and it was ranked as the fifth active one before 1952.

10- Egypt’s stock market has been affected significantly starting from 1957 due to the massive nationalization programme in Egypt. With the open door policy by the mid 1970s, Egypt’s stock market survived again, but its role remained minimal until 1991.

11- Under the economic reform programme umbrella, the stock market in Egypt witnessed an impressive improvement in many areas. Market size, market activity, market liquidity, market concentration, and market index improved significantly throughout the economic reform programme period.
Chapter Six
A Time Series Analysis of the Impact of Egypt’s Economic Reform Programme on the Stock Market Performance:
A Statistical and Econometric Modelling Analysis
6.1 Introduction: -

The previous chapter gave a preliminary investigation concerning the changes in the Egyptian economy due to the adoption of the economic reform programme and the effect of this programme on the stock market performance in Egypt.

Although the changes in both Egypt's economy and its stock market performance were so clear as mentioned in the previous chapter through the comparison prior and after the introduction of the economic reform programme, both statistical and econometric analyses are needed to support these preliminary findings.

Since this research is aimed at examining the impact of Egypt's economic reform programme on its stock market performance, there are two stages to the analysis. Firstly, an examination will be made of the environmental conditions from 1991, which refers to the introduction of the economic reform programme, in both series for the economic reform programme and the stock market performance variables. Secondly, the analysis will deal with the relationships between the independent economic reform programme variables and the hypothesized dependent stock market performance variables.

For the first stage of the analysis, several logistic regressions will be performed to assess whether both the Egyptian economy and Egypt's stock market has changed after 1991.

The second stage of the analysis will be based upon modelling the various relationships between the economic reform programme variables and the stock market performance variables. For this purpose, cointegration tests will be run to examine whether there is a long-run static relationship between the variables.

In the light of the above, this chapter will consist of many points, starting with the data set, research hypotheses and then tests for hypotheses and the results of the analysis.
6.2 Data set: -

The data of this research covered the period from 1980/81 to 1997/98, which incorporates time periods prior to and after the introduction of the economic reform programme.

Data have been collected from various sources: with regard to the economic reform programme, it comprised 8 variables; interest rates, real interest rates, inflation rate, exchange rate stability, real GDP growth rate, per capita income, budget deficit and privatization programme. The Central Bank of Egypt, the Egyptian Cabinet Information and Decision Support Center, the International Monetary Fund, the World Bank and the Egyptian Ministry of Public Enterprises have been consulted as the sources of these data.

Concerning the real interest rate, it has been calculated depending on the Fisher equation (1930) of the interest rate. Consider firstly the nominal rate of interest as given in Davis and Pointon (1994): -

\[(1 + n) = (1 + i)(1 + r)\]  

Equation (6.1)

Where:

\(n\) = nominal interest rate,

\(i\) = inflation rate, and

\(r\) = real interest rate

Then, real interest rate can be calculated as follows: -

\[
\frac{1 + n}{1 + i} = 1 + r
\]

\[
\therefore r = \frac{1 + n}{1 + i} - 1
\]

\[
= 1 + n - (1 + i) \frac{n}{1 + i} = \frac{n - i}{1 + i}
\]
\[ r = \frac{n - i}{1 + i} \]  
\text{Equation (6.2)}

congering exchange rate stability, this variable has been calculated as follows:

\[ \text{ERST} = \frac{x_t - x_{t-1}}{x_{t-1}} \]  
\text{Equation (6.3)}

Where:

\[ \text{ERST} = \text{exchange rate stability}, \]
\[ x_t = \text{cross rate in the current year}, \] and
\[ x_{t-1} = \text{cross rate in the previous year}. \]

With respect to the privatization programme, which was supported from the literature review that it may affect the stock market performance, this variable had to be excluded from the analysis since the privatization programme just started in Egypt in 1994. In turn, because of the short time series of the privatization data, using such data in the analysis will be inadvisable.

On the other hand, the stock market performance, which represents the dependent variable has been categorized into five areas: market activity, market size, market liquidity, market concentration and market index. Regarding the market index, this variable has to be excluded since it was established in August 1993. Each area of the four remaining areas contains several variables. Concerning market activity, the explanatory variables were the value of trade, the volume of trade, the number of transactions, the number of traded companies, the value of new issues (including capital increases) and the value of new issues (including capital increases) as a percentage of GDP. For market size, the explanatory variables were market capitalization, market capitalization as a percentage of GDP, the number of listed companies, the volume of shares listed and the number of financial intermediaries. For market liquidity, the explanatory
variables were the total value traded to market capitalization, the total value traded to GDP and the volume of shares traded to the volume of shares listed. For market concentration, the explanatory variables were the percentage of the 10 biggest companies' share in market capitalization and the percentage of the 10 biggest companies' share in value traded. Egypt Capital Market Authority and the Central Bank of Egypt were the source of these data. Because of the limitation of the availability of the data, annual figures will be used in the analysis (full details about the data in Appendix A).

6.3 Research hypotheses: -

As one main reason to adopt the economic reform programme in Egypt was the bad situation of its economy by late 1980s, macro-economic stability was the core element of this programme, in turn, one of the main hypothesis of this research is to test whether this objective has been achieved. The following hypothesis can test for this point: -

Hypothesis No. 1

The Egyptian government succeeded in implementing its economic reform programme.

To test for this hypothesis, many sub-hypotheses are to be examined as follows: -

1/1-There is a significant decrease in the interest rates after the introduction of the economic reform programme.

1/2-There is a significant increase in the real interest rates after the introduction of the economic reform programme.

1/3-There is a significant decrease in the inflation rate after the introduction of the economic reform programme.
1/4-There is a significant stability in the exchange rate stability after the introduction of the economic reform programme.

1/5-There is a significant increase in the real GDP growth rate after the introduction of the economic reform programme.

1/6-There is a significant increase in per capita income after the introduction of the economic reform programme.

1/7-There is a significant decrease in the budget deficit after the introduction of the economic reform programme.

However, the stock market was necessary to attract both local and foreign investment, which will assist in helping Egypt to achieve its long-term economic development. In turn, this research is focusing, in one of its angle, on testing whether Egypt’s stock market has been affected after the introduction of the economic reform programme.

Hypothesis No. 2

Egypt’s stock market performance increased significantly after the introduction of the economic reform programme.

To test for this hypothesis, many sub-hypotheses are to be examined as follows:

* Market activity hypotheses: -

2/1-There is a significant increase in the market activity after the introduction of the economic reform programme.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows:

2/1/1-There is a significant increase in the value of trade after the introduction of the economic reform programme.
2/1/2-There is a significant increase in the volume of trade after the introduction of the economic reform programme.

2/1/3-There is a significant increase in the number of transactions after the introduction of the economic reform programme.

2/1/4-There is a significant increase in the number of traded companies after the introduction of the economic reform programme.

2/1/5-There is a significant increase in the value of new issues (including capital increases) after the introduction of the economic reform programme.

2/1/6-There is a significant increase in the value of new issues (including capital increases) as a percentage of GDP after the introduction of the economic reform programme.

* Market size hypotheses: -

2/2-There is a significant increase in the market size after the introduction of the economic reform programme.

The above sub-hypothesis can be, in turn, divided into sub-sub-hypotheses as follows: -

2/2/1-There is a significant increase in the market capitalization after the introduction of the economic reform programme.

2/2/2-There is a significant increase in the market capitalization as a percentage of GDP after the introduction of the economic reform programme.

2/2/3-There is a significant increase in the number of listed companies after the introduction of the economic reform programme.

2/2/4-There is a significant increase in the volume of shares listed after the introduction of the economic reform programme.

2/2/5-There is a significant increase in the number of financial intermediaries after the introduction of the economic reform programme.
* Market liquidity hypotheses: -

2/3-There is a significant increase in the market liquidity after the introduction of the economic reform programme.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows: -

2/3/1-There is a significant increase in the total value traded to market capitalization after the introduction of the economic reform programme.

2/3/2-There is a significant increase in the total value traded to GDP after the introduction of the economic reform programme.

2/3/3-There is a significant increase in the volume of shares traded to the volume of shares listed after the introduction of the economic reform programme.

* Market concentration hypotheses: -

2/4-There is a significant increase in the market concentration after the introduction of the economic reform programme.

The above sub-hypothesis can be, in turn, divided into two sub sub-hypotheses as follows: -

2/4/1-There is a significant decrease in the percentage of the 10 biggest companies' share in market capitalization after the introduction of the economic reform programme.

2/4/2-There is a significant decrease in the percentage of the 10 biggest companies' share in value traded after the introduction of the economic reform programme.

As mentioned previously, for the above two hypotheses, logistic regression will be made of the environmental conditions from 1991 in both series for the economic reform programme and the stock market performance variables.

It has been concluded from chapter four that the empirical studies pointed out that most macro-economic variables have a significant affect on the stock market performance, in terms
of stock returns and prices. Besides this, Lavine (1996) indicated that there is an impact of economic reform, in terms of liberalization, on the performance of stock market, precisely, market size, market liquidity and market volatility. In the light of this framework, this research will devote a great deal of attention to examine the impact of Egypt’s economic reform programme on its stock market performance through the following hypothesis: -

Hypothesis No. 3

There is a significant relationship between the economic reform programme variables and the stock market performance variables.

To test for this hypothesis several sub-hypotheses will be examined as follow: -

Concerning the interest rates

3/1-The stock market performance increases as the interest rates decrease.

This hypothesis will be examined through the following sub-hypotheses: -

* Market activity hypotheses: -

3/1/1-The market activity increases as the interest rates decrease.

The above sub-hypothesis includes many sub sub-hypotheses as follows: -

3/1/1/1-The value of trade increases as the interest rates decrease.

3/1/1/2-The volume of trade increases as the interest rates decrease.

3/1/1/3-The number of transactions increases as the interest rates decrease.

3/1/1/4-The number of traded companies increases as the interest rates decrease.

3/1/1/5-The value of new issues (including capital increases) increases as the interest rates decrease.

3/1/1/6-The value of new issues (including capital increases) as a percentage of GDP increases as the interest rates decrease.
* Market size hypotheses: -

3/1/2-The market size increases as the interest rates decrease.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows: -

3/1/2/1-The market capitalization increases as the interest rates decrease.

3/1/2/2-The market capitalization as a percentage of GDP increases as the interest rates decrease.

3/1/2/3-The number of listed companies increases as the interest rates decrease.

3/1/2/4-The volume of shares listed increases as the interest rates decrease.

3/1/2/5-The number of financial intermediaries increases as the interest rates decrease.

* Market liquidity hypotheses: -

3/1/3-The market liquidity increases as the interest rates decrease.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows: -

3/1/3/1-The total value traded to market capitalization increases as the interest rates decrease.

3/1/3/2-The total value traded to GDP increases as the interest rates decrease.

3/1/3/3-The volume of shares traded to the volume of shares listed increases as the interest rates decrease.

* Market Concentration hypotheses: -

3/1/4-The market concentration decreases as the interest rates decrease.

The above sub-hypothesis can be, in turn, divided into two sub sub-hypotheses as follows: -

3/1/4/1-The percentage of the 10 biggest companies’ share in market capitalization decreases as the interest rates decrease.

3/1/4/2-The percentage of the 10 biggest companies’ share in value traded decreases as the interest rates decrease.
Concerning the real interest rates: -

3/2-The stock market performance increases as the real interest rates increase.

This hypothesis will be examined through the following sub-hypotheses: -

* Market activity hypotheses: -

3/2/1-The market activity increases as the real interest rates increase.

The above sub-hypothesis includes many sub sub-hypotheses as follows: -

3/2/1/1-The value of trade increases as the real interest rates increase.

3/2/1/2-The volume of trade increases as the real interest rates increase.

3/2/1/3-The number of transactions increases as the real interest rates increase.

3/2/1/4-The number of traded companies increases as the real interest rates increase.

3/2/1/5-The value of new issues (including capital increases) increases as the real interest rates increase.

3/2/1/6-The value of new issues (including capital increases) as a percentage of GDP increases as the real interest rates increase.

* Market size hypotheses: -

3/2/2-The market size increases as the real interest rates increase.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows:-

3/2/2/1-The market capitalization increases as the real interest rates increase.

3/2/2/2-The market capitalization as a percentage of GDP increases as the real interest rates increase.

3/2/2/3-The number of listed companies increases as the real interest rates increase.

3/2/2/4-The volume of shares listed increases as the real interest rates increase.

3/2/2/5-The number of financial intermediaries increases as the real interest rates increase.
* Market liquidity hypotheses: -

3/2/3-The market liquidity increases as the real interest rates increase.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows:-

3/2/3/1-The total value traded to market capitalization increases as the real interest rates increase.

3/2/3/2-The total value traded to GDP increases as the real interest rates increase.

3/2/3/3-The volume of shares traded to the volume of shares listed increases as the real interest rates increase.

* Market Concentration hypotheses: -

3/2/4-The market concentration decreases as the real interest rates increase.

The above sub-hypothesis can be, in turn, divided into two sub sub-hypotheses as follows:-

3/2/4/1-The percentage of the 10 biggest companies’ share in market capitalization decreases as the real interest rates increase.

3/2/4/2-The percentage of the 10 biggest companies’ share in value traded decreases as the real interest rates increase.

Concerning the inflation rate: -

3/3-The stock market performance increase as the inflation rate decreases.

This hypothesis will be examined through the following sub-hypotheses: -

* Market activity hypotheses: -

3/3/1-The market activity increases as the inflation rate decreases.

The above sub-hypothesis includes many sub sub-hypotheses as follows: -

3/3/1/1-The value of trade increases as the inflation rate decreases.

3/3/1/2-The volume of trade increases as the inflation rate decreases.

3/3/1/3-The number of transactions increases as the inflation rate decreases.
3/3/1/4-The number of traded companies increases as the inflation rate decreases.

3/3/1/5-The value of new issues (including capital increases) increases as the inflation rate decreases.

3/3/1/6- The value of new issues (including capital increases) as a percentage of GDP increases as the inflation rate decreases.

* Market size hypotheses: -

3/3/2-The market size increases as the inflation rate decreases.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows: -

3/3/2/1-The market capitalization increases as the inflation rate decreases.

3/3/2/2-The market capitalization as a percentage of GDP increases as the inflation rate decreases.

3/3/2/3-The number of listed companies increases as the inflation rate decreases.

3/3/2/4-The volume of shares listed increases as the inflation rate decreases.

3/3/2/5-The number of financial intermediaries increases as the inflation rate decreases.

* Market liquidity hypotheses: -

3/3/3-The market liquidity increases as the inflation rate decreases.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows: -

3/3/3/1-The total value traded to market capitalization increases as the inflation rate decreases.

3/3/3/2-The total value traded to GDP increases as the inflation rate decreases.

3/3/3/3-The volume of shares traded to the volume of shares listed increases as the inflation rate decreases.

* Market Concentration hypotheses: -

3/3/4- The market concentration decreases as the inflation rate decreases.

The above sub-hypothesis can be, in turn, divided into two sub sub-hypotheses as follows: -
3/3/4/1-The percentage of the 10 biggest companies’ share in market capitalization decreases as the inflation rate decreases.

3/3/4/2-The percentage of the 10 biggest companies’ share in value traded decreases as the inflation rate decreases.

**Concerning the exchange rate stability:**

3/4-The stock market performance increases as the exchange rate stability increases.

This hypothesis will be examined through the following sub-hypotheses:

* **Market activity hypotheses:**

3/4/1-The market activity increases as the exchange rate stability increases.

The above sub-hypothesis includes many sub sub-hypotheses as follows:

3/4/1/1-The value of trade increases as the exchange rate stability increases.

3/4/1/2-The volume of trade increases as the exchange rate stability increases.

3/4/1/3-The number of transactions increases as the exchange rate stability increases.

3/4/1/4-The number of traded companies increases as the exchange rate stability increases.

3/4/1/5-The value of new issues (including capital increases) increases as the exchange rate stability increases.

3/4/1/6-The value of new issues (including capital increases) as a percentage of GDP increases as the exchange rate stability increases.

* **Market size hypotheses:**

3/4/2-The market size increases as the exchange rate stability increases.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows:

3/4/2/1-The market capitalization increases as the exchange rate stability increases.

3/4/2/2-The market capitalization as a percentage of GDP increases as the exchange rate stability increases.
3/4/2/3-The number of listed companies increases as the exchange rate stability increases.

3/4/2/4-The volume of shares listed increases as the exchange rate stability increases.

3/4/2/5-The number of financial intermediaries increases as the exchange rate stability increases.

* Market liquidity hypotheses: *

3/4/3-The market liquidity increases as the exchange rate stability increases.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows: -

3/4/3/1-The total value traded to market capitalization increases as the exchange rate stability increases.

3/4/3/2-The total value traded to GDP increases as the exchange rate stability increases.

3/4/3/3-The volume of shares traded to the volume of shares listed increases as the exchange rate stability increases.

* Market Concentration hypotheses: *

3/4/4- The market concentration decreases as the exchange rate stability increases.

The above sub-hypothesis can be, in turn, divided into two sub sub-hypotheses as follows: -

3/4/4/1-The percentage of the 10 biggest companies’ share in market capitalization decreases as the exchange rate stability increases.

3/4/4/2-The percentage of the 10 biggest companies’ share in value traded decreases as the exchange rate stability increases.

Concerning the real GDP growth rate: 

3/5-The stock market performance increases as the real GDP growth rate increases.

This hypothesis will be examined through the following sub-hypotheses: -

* Market activity hypotheses: *

3/5/1-The market activity increases as the real GDP growth rate increases.
The above sub-hypothesis includes many sub sub-hypotheses as follows:

3/5/1/1-The value of trade increases as the real GDP growth rate increases.
3/5/1/2-The volume of trade increases as the real GDP growth rate increases.
3/5/1/3-The number of transactions increases as the real GDP growth rate increases.
3/5/1/4-The number of traded companies increases as the real GDP growth rate increases.
3/5/1/5-The value of new issues (including capital increases) increases as the real GDP growth rate increases.
3/5/1/6- The value of new issues (including capital increases) as a percentage of GDP increases as the real GDP growth rate increases.

* Market size hypotheses: -

3/5/2-The market size increases as the real GDP growth rate increases.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows:

3/5/2/1-The market capitalization increases as the real GDP growth rate increases.
3/5/2/2-The market capitalization as a percentage of GDP increases as the real GDP growth rate increases.
3/5/2/3-The number of listed company's increases as the real GDP growth rate increases.
3/5/2/4-The volume of shares listed increases as the real GDP growth rate increases.
3/5/2/5-The number of financial intermediaries increases as the real GDP growth rate increases.

* Market liquidity hypotheses: -

3/5/3-The market liquidity increases as the real GDP growth rate increases.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows:

3/5/3/1-The total value traded to market capitalization increases as the real GDP growth rate increases.
3/5/3/2-The total value traded to GDP increases as the real GDP growth rate increases.

3/5/3/3-The volume of shares traded to the volume of shares listed increases as the real GDP growth rate increases.

* **Market Concentration hypotheses:** -

3/5/4- The market concentration decreases as the real GDP growth rate increases.

The above sub-hypothesis can be, in turn, divided into two sub-hypotheses as follows: -

3/5/4/1- The percentage of the 10 biggest companies’ share in market capitalization decreases as the real GDP growth rate increases.

3/5/4/2- The percentage of the 10 biggest companies’ share in value traded decreases as the real GDP growth rate increases.

**Concerning per capita income:** -

3/6- The stock market performance increases as per capita income increases.

This hypothesis will be examined through the following sub-hypotheses: -

* **Market activity hypotheses:** -

3/6/1- The market activity increases as per capita income increases.

The above sub-hypothesis includes many sub-sub-hypotheses as follows: -

3/6/1/1- The value of trade increases as per capita income increases.

3/6/1/2- The volume of trade increases as per capita income increases.

3/6/1/3- The number of transactions increases as per capita income increases.

3/6/1/4- The number of traded companies increases as per capita income increases.

3/6/1/5- The value of new issues (including capital increases) increases as per capita income increases.

3/6/1/6- The value of new issues (including capital increases) as a percentage of GDP increases as per capita income increases.
* Market size hypotheses: -

3/6/2-The market size increases as per capita income increases.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows: -

3/6/2/1-The market capitalization increases as per capita income increases.

3/6/2/2-The market capitalization as a percentage of GDP increases as per capita income increases.

3/6/2/3-The number of listed companies increases as per capita income increases.

3/6/2/4-The volume of shares listed increases as per capita income increases.

3/6/2/5-The number of financial intermediaries increases as per capita income increases.

* Market liquidity hypotheses: -

3/6/3-The market liquidity increases as per capita income increases.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows: -

3/6/3/1-The total value traded to market capitalization increases as per capita income increases.

3/6/3/2-The total value traded to GDP increases as per capita income increases.

3/6/3/3-The volume of shares traded to the volume of shares listed increases as per capita income increases.

* Market Concentration hypotheses: -

3/6/4-The market concentration decreases as per capita income increases.

The above sub-hypothesis can be, in turn, divided into two sub sub-hypotheses as follows: -

3/6/4/1-The percentage of the 10 biggest companies’ share in market capitalization decreases as per capita income increases.

3/6/4/2-The percentage of the 10 biggest companies’ share in value traded decreases as per capita income increases.
Concerning the budget deficit: -

3/7-The stock market performance increase as the budget deficit decreases.

This hypothesis will be examined through the following sub-hypotheses: -

* Market activity hypotheses: -

3/7/1-The market activity increases as the budget deficit decreases.

The above sub-hypothesis includes many sub sub-hypotheses as follows: -

3/7/1/1-The value of trade increases as the budget deficit decreases.
3/7/1/2-The volume of trade increases as the budget deficit decreases.
3/7/1/3-The number of transactions increases as the budget deficit decreases.
3/7/1/4-The number of traded companies increases as the budget deficit decreases.
3/7/1/5-The value of new issues (including capital increases) increases as the budget deficit decreases.
3/7/1/6-The value of new issues (including capital increases) as a percentage of GDP increases as the budget deficit decreases.

* Market size hypotheses: -

3/7/2-The market size increases as the budget deficit decreases.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows: -

3/7/2/1-The market capitalization increases as the budget deficit decreases.
3/7/2/2-The market capitalization as a percentage of GDP increases as the budget deficit decreases.
3/7/2/3-The number of listed companies increases as the budget deficit decreases.
3/7/2/4-The volume of shares listed increases as the budget deficit decreases.
3/7/2/5-The number of financial intermediaries increases as the budget deficit decreases.
* Market liquidity hypotheses: -

3/7/3-The market liquidity increases as the budget deficit decreases.

The above sub-hypothesis can be, in turn, divided into sub sub-hypotheses as follows: -

3/7/3/1-The total value traded to market capitalization increases as the budget deficit decreases.

3/7/3/2-The total value traded to GDP increases as the budget deficit decreases.

3/7/3/3-The volume of shares traded to the volume of shares listed increases as the budget deficit decreases.

* Market Concentration hypotheses: -

3/7/4-The market concentration decreases as the budget deficit decreases.

The above sub-hypothesis can be, in turn, divided into two sub sub-hypotheses as follows: -

3/7/4/1-The Percentage of the 10 biggest companies’ share in market capitalization decreases as the budget deficit decreases.

3/7/4/2-The percentage of the 10 biggest companies’ share in value traded decreases as the budget deficit decreases.
6.4 Test for hypotheses:

6.4.1 Test for the structural change using logistic regression:

6.4.1.1 Introduction:
For the first two hypotheses, which aim at determining whether both economic reform programme variables and stock market performance variables witnessed a significant change after 1991 compared with the prior period. Several logistic regressions will be performed using Genstate software for windows 95. In other applications, logistic regression has been applied to: the determination of whether UK companies that use finance leases are more likely to have tax losses and advance corporation tax carried forward (Lasfer and Levis, 1998); an investigation into the success of a tender offer in US take-overs (Raad and Ryan, 1995); and the ability of financial statement analysis to predict abnormal returns (Morton and Shane, 1998).

The logistic regression uses logit as a link function, that is it takes the log of the odds of the success ratio. The fitted regression will show the log of the odds ratio as a linear function of the independent variables.

Each regression takes the following form.

\[
\ln \left( \frac{p}{1-p} \right) = \alpha + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_n x_n \quad \text{Equation (6.4)}
\]

Where:

- \( \ln \) the natural logarithm,
- \( \frac{p}{1-p} \) the odds ratio,
- \( \alpha \) constant,
- \( \beta_1, \beta_2, \ldots \) other regression coefficients, and
It follows that: 

\[ p = \frac{e^{\alpha + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_n x_n}}{1 + e^{\alpha + \beta_1 x_1 + \beta_2 x_2 + \ldots + \beta_n x_n}} \]  

Equation (6.5)

Although this methodology is normally used to predict the success or failure of events, success here will refer to a significant positive change in both economic reform programme and stock market performance variables, while failure will be defined as a non-significant change in these variables. Thus, the intention here is to examine whether the data prior to 1991 can be separated from the data relating to the period from 1991. Clearly, the term success and failure are used purely in the sense of a Bernoulli distribution, which implies binary responses that are categorized as one for a Bernoulli success and zero for a Bernoulli failure. In this case, zero represents the period prior to 1991, and one for the period from 1991. In turn for this purpose, a categorical binary variable will be used, hence, the log of the odds ratio is regressed against a linear function of the continuous variables. The odds ratio is calculating by taking the probability that the data relate to the economic reform programme period, divided by the probability that the data relate to the previous period. The deviance of the logistic regression is approximately chi-square distributed (Open University, 1998). Hence, if the significance probability of the deviance of the logistic regression for the given degrees of freedom is small, then the null hypothesis of no significant change in the data prior to and after the introduction of the economic reform programme is rejected, hence there is strong evidence that there is a structural change in the data, thus differentiating between the environmental conditions of the two periods. Before performing the logistic regressions, it is necessary to consider the raw data. It can be seen from the numerous charts in Appendix A that there were changes
following 1991. However, it could be argued that performing a logistic regression on the raw data might reveal that the post 1991 period is significantly different solely on account of sustained growth. Hence, there needs to be a method to eliminate this growth from the data.

For comparative purposes, the logistic regressions were run on the first differenced data, the relative annual change of the data and on the deflated data, i.e. after adjusting for the sustained growth.

In order to deflate the data, the growth trend up to 1990 was computed, using the following formula:

\[
A(1+g)^L = B
\]  
Equation (6.6)

Where:

\[A = \text{The data value in the beginning of the series},\]

\[g = \text{The compound annual growth factor},\]

\[L = \text{The length in years for the pre-economic reform programme period}, \text{and}\]

\[B = \text{The value of the last data point before the introduction of the economic reform programme.}\]

Hence:

\[(1+g)^L = B/A\]

\[L \log (1+g) = \log (B/A)\]

\[\log (1+g) = \frac{1}{L} \log (B/A)\]

\[1 + g = \exp \left[ \frac{1}{L} \log (B/A) \right]\]

\[\therefore g = \exp \left[ (1/L) \log (B/A) \right] - 1.\]  
Equation (6.7)
Having computed the growth factor, each data value was then deflated. For example, given a growth factor of 8 per cent, a raw data value of 100 in 1997 would be deflated to $100/(1.08)^7 = 27.03$. If the data values after 1991 were then significantly different from the values prior to 1991 then, having deflated the data, it could not be argued that the difference is purely due to the time factor.

It was considered that deflating the data in this way would be appropriate. Alternative methodologies would have included first differencing or determining the annual relative changes. However, the final conclusions were identical (refer to Appendix B where the full results from these approaches are also given).

6.4.1.2 Test for the success of the Egyptian government in implementing its economic reform programme:

The results of testing for this hypothesis using logistic regression analysis can be shown in detail in Appendix B, however, the following table can summarize the findings as follows:

**Table 6.1**
Testing for structural change in environmental conditions in economic reform programme variables using logistic regression

<table>
<thead>
<tr>
<th>Variables</th>
<th>Standardized residual</th>
<th>Regression deviance</th>
<th>Probability of Chi-square of regression deviance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic reform programme</td>
<td>0.00</td>
<td>24.06</td>
<td>0.0011</td>
</tr>
<tr>
<td>Interest rates</td>
<td>0.01</td>
<td>24.06</td>
<td>0.0000</td>
</tr>
<tr>
<td>Real interest rates</td>
<td>0.02</td>
<td>24.06</td>
<td>0.0000</td>
</tr>
<tr>
<td>Inflation rate</td>
<td>2.23</td>
<td>13.56</td>
<td>0.0002</td>
</tr>
<tr>
<td>Exchange rate stability</td>
<td>0.01</td>
<td>24.06</td>
<td>0.0000</td>
</tr>
<tr>
<td>Real GDP growth rate</td>
<td>2.3</td>
<td>0.58</td>
<td>0.446</td>
</tr>
<tr>
<td>Per capita income</td>
<td>1.9</td>
<td>4.59</td>
<td>0.03216</td>
</tr>
<tr>
<td>Budget deficit</td>
<td>0.00</td>
<td>24.06</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

* All figures with bold face refer to a significant change.
As seen from the first entry in the above table, the results of the logistic regression reveal very small standardized residuals for the economic reform programme variables as a whole, hence demonstrating an excellent fit. As mentioned previously, to test whether the changes in the economic reform programme variables are significant, the significance probability of the deviance of the logistic regression, which refers to Chi-square, should be near to zero. In other words, if the probability of the Chi-square of the regression deviance is significantly different from zero, then the null hypothesis of no significant change in the data prior to and after the introduction of the economic reform programme cannot be rejected, meanwhile, the alternative hypothesis of a significant change in the data series will be rejected. With regard to this point, the economic reform programme as a whole indicated that the Chi-square is highly significant, in turn it cannot be accepted that the probability of the Chi-square is significantly different from zero, that is, it does not exceed the ten per cent selected critical value, and the null hypothesis of no significant change in the data prior to and after 1991 will be rejected. Hence there is strong evidence that there is a structural change in the data, thus differentiating between the environmental conditions of the two periods. On the other hand, for each individual variable, the results indicated the same conclusion except for the real GDP growth rate. In fact, most of the economic reform programme variables witnessed a dramatic change after the introduction of this programme compared with the situation prior to 1990/91. The analysis in the previous chapter indicated that interest rates decreased from around 16.2 per cent to only 9.3 per cent, real interest rates increased from negative 6 per cent to positive 5 per cent, the inflation rate decreased from 23.6 per cent to only 4.1 per cent, the exchange rate witnessed very high stability starting from 1991, per capita income increased from US $ 600 to US $ 1460 and the budget deficit decreased from 18.2 per cent to only 0.06 per cent (more details about the time series from 1980/81 to 1997/98 are shown in Appendix A). For the real
GDP growth rate, there is strong evidence that this variable did not witness a significant change after the introduction of the economic reform programme. Clearly, Egypt benefited significantly from its open door policy and from oil prices in terms of the rate of growth within the 1980s. Even with the oil collapse in 1986, the rate of growth was still high, but with the introduction of the economic reform programme in late 1990, the GDP growth rate declined sharply in the first two years because of tight monetary and fiscal policy. Even though, it rebounded quickly, but still with no significant change compared with the period prior to 1991.

As a conclusion, this hypothesis cannot be rejected indicating that the Egyptian government succeeded in implementing its economic reform programme. Besides this, six out of seven sub-hypotheses cannot be rejected indicating that there is a significant change in these variables prior to and after 1991. The only rejected sub-hypothesis is that the real GDP growth rate did not improve significantly in the period after the introduction of the economic reform programme compared with the prior period. It may be worthy in this point to mention again that Egypt needs to increase both the saving and investment ratio in order to accelerate the rate of growth. For example, as mentioned in the previous chapter, the level of investment in Egypt at only 18 per cent of GDP, is below the average level for developing countries and the fast growing Asian countries (26 and 31 per cent of GDP respectively).

6.4.1.3 Test for the change in Egypt's stock market performance after the introduction of the economic reform programme:

For this hypothesis, the technique of logistic regression will be used as well in order to indicate whether stock market performance variables witnessed a significant change after 1991. As the stock market performance contains four areas: market activity, market size,
market liquidity and market concentration, logistic regression will be run for each separate area as follows: -

6.4.1.3.1 Test for the change in market activity after the introduction of the economic reform programme: -

The results of testing for this hypothesis using logistic regression analysis can be shown in detail in Appendix B, However, the following table can summarize the finding results as follows: -

**Table 6.2**

Testing for structural change in environmental conditions in market activity variables using logistic regression

<table>
<thead>
<tr>
<th>Variables</th>
<th>Standardized residual</th>
<th>Regression deviance</th>
<th>Probability of Chi-square of regression deviance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum</td>
<td>Minimum</td>
<td></td>
</tr>
<tr>
<td>Market activity</td>
<td>0.00</td>
<td>0.00</td>
<td>24.06</td>
</tr>
<tr>
<td>Value of trade</td>
<td>1.78</td>
<td>-1.42</td>
<td>3.74</td>
</tr>
<tr>
<td>Volume of trade</td>
<td>2.52</td>
<td>-1.26</td>
<td>7.23</td>
</tr>
<tr>
<td>Number of transactions</td>
<td>1.92</td>
<td>-0.96</td>
<td>9.51</td>
</tr>
<tr>
<td>Number of traded companies</td>
<td>1.72</td>
<td>-1.74</td>
<td>20.54</td>
</tr>
<tr>
<td>Value of new issues (including capital increases)</td>
<td>1.95</td>
<td>-1.17</td>
<td>3.13</td>
</tr>
<tr>
<td>Value of new issues (including capital increases) as a % of GDP</td>
<td>1.93</td>
<td>-1.10</td>
<td>3.99</td>
</tr>
</tbody>
</table>

* All figures with bold face refer to a significant change.

As seen from the first entry in the above table, the results of the logistic regression reveal very small standardized residuals for the market activity area as a whole, hence demonstrating an excellent fit. As mentioned previously, to test whether the changes in market activity variables are significant, the significance probability of the deviance of the logistic regression should be near to zero, in turn the null hypothesis of no significant change in the data prior to and after 1991 will be rejected. With regard to this point, the market activity as a whole indicated that
the Chi-square probability is highly significant, in turn it cannot be accepted that the probability of Chi-square is significantly different from zero, in turn the null hypothesis of no significant change in the data prior to and after 1991 will be rejected. Hence there is strong evidence that there is a structural change in the data, thus differentiating between the environmental conditions of the two periods. On the other hand, for each individual variable, the results indicated the same conclusion for all market activity variables. Generally speaking, market activity witnessed a dramatic change after the introduction of the economic reform programme compared with the situation in 1990/91. The analysis in the previous chapter showed that value of trade increased from L.E. 427.8 million to L.E. 24219.8 million, which means a 5561 per cent rate of increase, volume of trade increased from 22.7 million shares to 372.5 million shares, which represents a 1541 per cent rate of increase, while the number of transactions jumped sharply from only 10305 transactions to 1225351 transactions, which means a 11791 rate of increase, the number of traded companies increased from 218 companies to 416 companies, which reflects a 91 per cent rate of increase, in the meantime, the value of new issues (including capital increases) increased from L.E. 1335 million to L.E. 18289.6 million reflecting a 1270 per cent rate of increase as well, the value of new issues (including capital increases) as a percentage of GDP increased from 1.2 per cent to 7.2 per cent which means a 492 per cent rate of increase (more details about the time series from 1980/81 to 1997/98 are given in Appendix A).

Indeed, the conclusion from the above analysis proves that this hypothesis cannot be rejected indicating that the market activity changed dramatically after 1991. Besides this, all the six sub-hypotheses cannot be rejected indicating that there is a significant change in these individual variables prior to and after the introduction of the economic reform programme.
6.4.1.3.2 Test for the change in market size after the introduction of the economic reform programme:

The results of testing for this hypothesis using logistic regression analysis can be shown in detail in Appendix B, however, the following table can summarize the findings as follows:

**Table 6.3**
Testing for structural change in environmental conditions in market size variables using logistic regression

<table>
<thead>
<tr>
<th>Variables</th>
<th>Standardized residual</th>
<th>Regression deviance</th>
<th>Probability of Chi-square of regression deviance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Maximum</td>
<td>Minimum</td>
<td></td>
</tr>
<tr>
<td>Market size</td>
<td>0.00</td>
<td>0.00</td>
<td>24.06</td>
</tr>
<tr>
<td>Market capitalization</td>
<td>1.85</td>
<td>-1.18</td>
<td>3.28</td>
</tr>
<tr>
<td>Market capitalization as a % of GDP</td>
<td>1.74</td>
<td>-1.50</td>
<td>4.42</td>
</tr>
<tr>
<td>Number of listed companies</td>
<td>2.81</td>
<td>-1.42</td>
<td>1.51</td>
</tr>
<tr>
<td>Volume of shares listed</td>
<td>2.02</td>
<td>-1.29</td>
<td>5.45</td>
</tr>
<tr>
<td>Number of financial intermediaries</td>
<td>2.33</td>
<td>-0.44</td>
<td>17.17</td>
</tr>
</tbody>
</table>

* All figures with bold face refer to a significant change.

As seen from the above table, the results of the logistic regression show very small standardized residuals for the market size area as a whole, hence demonstrating an excellent fit. The table also indicates that for the market size as a whole, the probability of the Chi-square is highly significant, in turn it cannot be accept that the probability of the Chi-square is significantly different from zero and the null hypothesis of no significant change in the data prior to and after 1991 will be rejected. Hence there is strong evidence that there is a structural change in the data, thus differentiating between the environmental conditions of the two periods. Furthermore, for each individual variable, the results indicated the same conclusion for all market size variables with the exception of the number of listed companies. In fact, most of the market size variables witnessed a dramatic change after the introduction of the economic reform programme compared with the situation in 1990/91. The analysis from the
previous chapter showed that market capitalization increased significantly from only L.E. 8845 billion to L.E. 70873 billion reflecting a 701 per cent rate of increase, in the meantime, market capitalization as a percentage of GDP increased also from only 7.8 per cent to 27.2 per cent, which means a 255 per cent rate of increase. On the other hand, the volume of shares listed increased from 394.1 million shares to 1854.2 million shares, which means 370.5 per cent as a rate of increase, and the number of financial intermediaries has increased sharply from only 12 to 213, which means a 1675 per cent rate of increase (more details about the time series from 1980/81 to 1997/98 are given in Appendix A). With respect to the number of listed companies, the results from the logistic regression indicated clearly that the probability of the Chi-square is significantly different from zero, hence there is a strong evidence that this variable did not show a significant change after 1991 compared with the prior period, in turn, the null hypothesis of no significant change in the number of listed companies cannot be rejected. As shown in the previous chapter, the number of listed companies just increased from 627 companies to 650, which means only 3.5 per cent as a rate of increase. In turn, this variable did not follow the same trend of increase as the other variables representing market size.

Indeed, the conclusion from the above analysis proves that the main hypothesis cannot be rejected indicating that the market size changed dramatically after 1991. Besides this, four out of five sub-hypotheses cannot be rejected indicating that there is a significant change in these individual variables after 1991 compared with the prior period, and the only rejected sub-hypothesis is that the number of listed companies did not increase significantly after the introduction of the economic reform programme.
6.4.1.3.3 Test for the change in market liquidity after the introduction of the economic reform programme:

The results of testing for this hypothesis using logistic regression analysis can be shown in detail in Appendix B. However, the following table can summarize the results as follows:

**Table 6.4**
Testing for structural change in environmental conditions in market liquidity variables using logistic regression

<table>
<thead>
<tr>
<th>Variables</th>
<th>Standardized residual</th>
<th>Regression deviance</th>
<th>Probability of Chi-square of deviance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market liquidity</td>
<td>2.27</td>
<td>-1.43</td>
<td>17.43</td>
</tr>
<tr>
<td>Total value traded to market capitalization</td>
<td>1.81</td>
<td>-1.29</td>
<td>3.34</td>
</tr>
<tr>
<td>Total value traded to GDP</td>
<td>0.01</td>
<td>-0.01</td>
<td>24.06</td>
</tr>
<tr>
<td>Volume of shares traded to volume of shares listed</td>
<td>2.18</td>
<td>-1.34</td>
<td>14.93</td>
</tr>
</tbody>
</table>

* All figures with bold face refer to a significant change.

As seen from the first entry in the above table, the results of the logistic regression reveal that the standardized residuals are not excessively large, hence demonstrating a good fit. As well, as mentioned in the previous analysis, to test whether the changes in market liquidity variables are significant, the probability of the Chi-square should not be significantly different from zero. With regard to this point, the market liquidity as a whole (as shown in the first entry in the table) indicated that the probability of the Chi-square is highly significant, in turn cannot be accepted that Chi-square is significantly different from zero and the null hypothesis of no significant change in the data prior to and after 1991 will be rejected. Hence there is strong evidence that there is a structural change in the data, thus differentiating between the environmental conditions of the two periods. On the other hand, for each individual variable, the results indicated the same conclusion for all market liquidity variables without exception. In fact, all market liquidity variables witnessed a dramatic change after the introduction of the
economic reform programme compared with the situation in 1990/91. The analysis from the previous chapter showed that the total value traded to market capitalization increased from 4.8 per cent to 34 per cent, which means a 608 per cent rate of increase, the total value traded to GDP increased sharply from only 0.38 per cent to 9.4 per cent reflecting a 2373 per cent rate of increase, and the volume of shares traded to the volume of shares listed increased from 5.8 per cent to 20 per cent reflecting a 245 per cent as a rate of increase (more details about the time series from 1980/81 to 1997/98 can be shown in Appendix A).

The conclusion from the above analysis proves, clearly, that this hypothesis cannot be rejected, indicating that the market liquidity changed dramatically after 1991. Besides this, all the three sub-hypotheses cannot be rejected indicating that there is a significant change in these individual variables after the introduction of the economic reform programme compared with prior period.

6.4.1.3.4 Test for the change in market concentration after the introduction of the economic reform programme.

The results of testing for this hypothesis using logistic regression analysis can be shown in detail in Appendix B, However, the following table can summarize the finding results as follows: -
Table 6.5
Testing for structural change in environmental conditions in market concentration variables using logistic regression

<table>
<thead>
<tr>
<th>Variables</th>
<th>Standardized residual</th>
<th>Regression deviance</th>
<th>Probability of Chi-square of regression deviance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market concentration</td>
<td>0.01</td>
<td>-0.01</td>
<td>13.67</td>
</tr>
<tr>
<td>% of the 10 biggest companies' share in market capitalization</td>
<td>2.1</td>
<td>-1.41</td>
<td>5.9</td>
</tr>
<tr>
<td>% of the 10 biggest companies' share in value traded</td>
<td>2.45</td>
<td>-0.84</td>
<td>12.79</td>
</tr>
</tbody>
</table>

* All figures with bold face refer to a significant change.

As seen from the above table, the results of the logistic regression reveal small standardized residuals, hence demonstrating an excellent fit. In the meantime, the results of the market concentration as a whole indicated that the probability of the Chi-square is highly significant, in turn, the null hypothesis of no significant change in the data prior to and after 1991 can be rejected, hence there is strong evidence that there is a structural change in the data, thus differentiating between the environmental conditions of the two periods. On the other hand, for each individual variable, the results indicated the same conclusion for both market concentration variables. In fact, both market concentration variables witnessed a dramatic change after the introduction of the economic reform programme compared with the situation in 1990/91. The analysis from the previous chapter showed that the percentage of the 10 biggest companies’ share in market capitalization decreased from 80 per cent to 52 per cent, which means a 35 per cent rate of decrease, as well, the percentage of the 10 biggest companies’ share in value traded decreased by the same percentage, from 48 per cent to 31 per cent (more details about the time series from 1980/81 to 1997/98 are given in Appendix A).

The conclusion from the above analysis proves, clearly, that this hypothesis cannot be rejected indicating that the market concentration changed dramatically after 1991. Besides this, the other two sub-hypotheses cannot be rejected, indicating that there is a significant change in
these individual variables after the introduction of the economic reform programme compared with the prior period.

In the light of the above analysis, since the four main sub-hypothesis supported that there is a strong evidence that there is a structural change in the data of market activity, market size, market liquidity and market concentration and there is a significant change in theses variables after 1991 compared with the prior period, this implies that the stock market performance as a whole witnessed a significant change as well, hence the main hypothesis, which stated that Egypt’s stock market performance increased significantly after the introduction of the economic reform programme cannot be rejected as well.
6.4.2 Test for the relationships between the economic reform programme variables and the stock market performance variables:

6.4.2.1 Introduction:

At that point, it can be noticed from the analyses in the previous chapter and from the above analyses that some sort of relationships between economic reform programme variables and stock market performance are existing. However, these analyses have not been able to reveal anything about the long-run equilibrium relationships between the variables. Indeed, time series analyses enable long-run equilibrium relationships to be identified and examined. In addition, time series analysis, which comprises a number of modern and fairly complex techniques, allows both long-run and short-run time series perspectives to be considered. In fact, within a time series relationship, both long-run and short-run relationships often co-exist. Cointegration analysis may be considered as the only available method, which can be employed to examine both processes within a single relationship expression. While the long-run processes in a particular cointegration would correspond to a state of equilibrium of stock market performance with respect to the factors which influenced it, the short-run processes in a cointegration relationship correspond to a state of disequilibrium of stock market performance with respect to the factors which influenced it. In the light of the above, cointegration analysis will be used to examine the relationships between the economic reform programme variables and stock market performance variables on a bivariate basis. However, while it is preferable to test for the impact of the economic reform programme on the stock market performance within a multivariate model, to examine the interaction between the variables and to determine their relative importance in the determination of the stock market performance, it is not sensible to employ the Johansen procedure (1988,1989) for the multivariate error correction modelling (EC) of the stock market performance, because of the limitation of the time series of the data, which is too short to enable a multivariate modelling
method to be used, in particular, when lag structures are introduced. Alternatively, multiple regression will be used as an indicator of this kind of analysis.

6.4.2.2 Cointegration analysis:

6.4.2.2.1 Introduction:

The implications of cointegration for the theory and practice of econometrics are tremendous and have led to a revolution in the way applied work is carried out. In fact, few economic time series are stationary, since most of the series tends to grow or decline over time (Holden and Thompson 1992), which has always been regarded as a problem in econometric analysis. In the meantime, it is noticed that most economic variables tend to trend together. Unfortunately, most of the traditional statistical tests that are used in inference have been developed for stationary, ergodic stochastic process. The absence of a formal statistical procedure to test whether the existence of similar trends implies a bounded linear relationship in the level of many time series led to induce two different approaches to modelling time series (Banerjee, Dolado, Hendry and Smith 1986).

The first approach indicates that some econometricians have traditionally disregarded the stationarity issue and run static models in data levels. This approach has been criticized by time series analysts as being inconsistent with most data and giving rise to spurious inferences. The idea behind this criticism is that if no bounded combination of the levels exists, then the error term in the regression must be non-stationary under the null hypothesis, so that distributional result do not apply (see Yule 1926, Granger and Newbold 1974 and Granger 1981). As well, Pindyck and Rubinfeld (1998) warned that regressing one random walk against another can lead to spurious results in the conventional significance tests and will tend to indicate a relationship between the variables when in fact none exist, in turn, this is one
reason why it is important to test for random walks before running any regression. Besides these, Phillips (1986) stated that cointegration analysis is extremely important in modern economic analysis, as the statistical properties of regression analyses using non-stationary time series are spurious. He added that regression models of data characterized by a stochastic or deterministic trend are not robust, the reason behind that, for example, given a relative high goodness of fit statistic may be due to the trends inherent in the models’ variables (Tucker 1995).

On the other hand, in the light of the above discussion of spurious inference, another approach (the Box-Jenkins approach 1970) advocated differencing and prewhitening the time series prior to estimating the models. With respect to this approach, it could be used to describe only relationships between changes in variables, while it disregards the potentially important long-run relationship between the levels of the time series to which the hypotheses of economic theory are usually taken to apply (Banerjee, Dolado, Hendry and Smith 1986). They added referring to the error correction mechanism (ECM) that:

"ECM models provide a way of combining the advantage of these two approaches. In this type of model the dynamics both of short-run (changes) and long-run (levels) adjustment process are modelled simultaneously".

(Banerjee, Dolado, Hendry and Smith (1986), P. 255).

As mentioned above, most economic data series contain trends, in turn these series have to be detrended before any sensible regression analysis can be employed, otherwise, regression analysis does not make any sense for data which is subject to a trend. Most economic researchers accustomed to use first differencing as a method of removing the trend. Given, for example, a time series with a stochastic trend as follows:

\[ y_t = y_{t-1} + \epsilon_t \]  

Equation (6.8)
Where: $\varepsilon_t$ is an independent standard normal random variable, that is a series of identically distributed random variables with zero mean and variance equal to unity, which is a stationary disturbance. This trend can be removed, as mentioned above, by first differencing as follows:

$$\Delta y_t = y_t - y_{t-1} = \varepsilon_t$$

Equation (6.9)

Where $\Delta y_t$ is expected to be stationary

Charemza and Deadman (1992) argued that:

"It is not necessary for a series to be a random walk for its differencing to achieve stationary. The variables $\varepsilon_t$ can be correlated with each other, that is they may not constitute a white noise process)".

(Charemza and Deadman (1992), P. 128).

They considered a process with the following type:

$$y_t = y_{t-1} + \varepsilon_t$$

with: $\varepsilon_t = \rho \varepsilon_{t-1} + \xi_t$

Where $\xi_t$ is a white noise variable. First differencing of $y_t$ gives a stationary series, providing that $|\rho| < 1$.

However, it is not in all the cases that all time series data become stationary after being differenced once, as sometimes it is necessary to difference a series more than once to achieve stationarity. In this framework, the concept of an integrated order will be convenient to use.

Following Engle and Granger (1987), Charemza and Deadman (1992) defined such a series as follows:

"A nonstationary series which can be transformed to a stationary series by differencing $d$ times is said to be integrated of order $d$".

(Charemza and Deadman (1992), P. 128).
They stated that a series $y_t$ integrated of order $d$ is conventionally denoted as: $y_t \sim I(d)$. Thus, $y_t$ may be stationary with level data, then denoted as $y_t \sim I(0)$, and if this series needs differencing once to achieve stationarity, it will be denoted as $y_t \sim I(1)$. Similarly, for example, if a variable is first differenced twice to achieve stationarity (second differenced) it is said to be integrated of order two and denoted as $y_t \sim I(2)$, the first differences of the first differences of $y_t$ achieve stationarity, that is:

$$
\Delta\Delta y_t = \Delta(y_t - y_{t-1}) = (y_t - y_{t-1}) - (y_{t-1} - y_{t-2}) = y_t - 2y_{t-1} + y_{t-2}
$$

Equation (6.10)

As well Banerjee, Dolado, Galbraith and Hendry (1992) defined integrated time series data as follows:

"A series is said to be integrated if it accumulates past effects; such as a series is non-stationary because its future path depends upon all such past influences, and is not tied to some mean to which it must eventually return".  
(Banerjee Dolado, Galbraith and Hendry (1992), PP. 136-137).

In the light of the above discussion, it is clear that the data should be stationary before employing any regression or modelling for the given data. However, the differencing of the variables may cause elimination of any long-run process within a relationship between the variables, through using cointegration analysis both long-run and short-run processes within a time series relationship may be modelled concurrently. In turn, the first step in running the cointegration analysis is to determine the order of integration of the economic reform programme variables as well as the stock market performance variables, to enable modelling them in a bivariate relationship as they must have the same order of integration.

As a conclusion to modelling the various relationships between the economic reform programme and the stock market performance using cointegration analysis, Augmented
Dickey-Fuller (ADF) unit root tests will be performed to determine the order of integration of the variables. Initially, the unit root tests were based upon the raw data, the data being first differenced, second differenced and so on until achieving the stationarity for the economic reform programme variables. The process was repeated using the natural logarithm for each stock market variable, the log transformations being selected to help linearize the data. The next step was to determine whether variables, that were integrated of the same order, exhibited a cointegrating relationship. For this purpose ordinary least squares (OLS) regressions will be run and the ADF unit root tests conducted on the residuals. The rule was that where the residuals have a zero order of integration, the variables are then cointegrated. Then, further OLS regressions will be performed taking the saved residuals lagged for one year and the differenced variables in modelling the variables within an error correction (EC) model form.

6.4.2.2.2 Order of integration of the economic reform programme variables and the stock market performance variables:

As mentioned above, it is essential to identify the order of integration for each variable before any sensible regression analysis can be run. The Dickey and Fuller approach (1979) can be considered as an appropriate and simple method of testing the order of integration. Following Charemza and Deadman (1992) the DF method is analogous to a Student-\(t\) test of the autoregressive coefficient in the following equation:

\[
y_t = p \cdot y_{t-1} + \epsilon_t \tag{6.11}
\]

In the above Equation (6.11), if the error is a white noise process, it means that the equation represents a random walk given that \(p = 1\) and as such this process reveals that \(Y_t\) is nonstationary. In contrast, if \(|p| < 1\), then \(Y_t\) will be stationary or integrated of order zero. The ordinary least squares can be use to estimate equation (6.11) and to test the hypothesis that
\( p = 1 \) by a Student-\( t \) test. Charemza and Deadman (1992) pointed out that the ordinary least squares estimate of \( p \) may be substantially biased in an autoregressive equation, in addition little is known about the distribution of the Student-\( t \) statistic, where the variable \( y_t \) is non-stationary.

To avoid the bias mentioned above, the DF method would be used as an alternative to testing the order of integration of \( y_t \) in the equation (6.11). More specifically, the DF test is a test of the hypothesis that \( p = 1 \) in the above equation (6.11), the so-called unit root test. This test is based on the estimation of an equivalent regression in the above equation, expressed in a differenced form as follows:

\[
\Delta y_t = \delta \cdot y_{t-1} + \epsilon_t
\]

Equation (6.12)

Charemza and Deadman (1992) indicated that this equation can be re-written in another form as follows:

\[
y_t = (1 + \delta) \cdot y_{t-1} + \epsilon_t.
\]

They noticed that the Equation (6.12) is the same as the equation (6.11), with \( p = (1 + \delta) \).

If \( \delta \) in equation (6.12) is negative, it means that \( p \) in equation (6.11) becomes smaller than one. The null hypothesis in the DF test is that \( \delta = 0 \) which implies that the variable is nonstationary. Alternatively, if \( \delta < 0 \) which means negative sign, it implies that \( p < 1 \) and that \( y_t \) is integrated of order zero.

However, if the null hypothesis cannot be rejected, which means that \( y_t \) is not stationary, that is the variable might be integrated of order higher than zero, consequently, it would be necessary to tested whether the order of integration is one. If \( y_t \sim I(1) \) then \( \Delta y_t \sim I(0) \),
which means that the null hypothesis is not rejected in the first DF test and the variable must be differenced and retested, as in the following equation:

$$\Delta \Delta \Delta y_t = \delta \cdot \Delta y_{t-1} + \varepsilon_t$$

Equation (6.13)

Again, the null hypothesis in the DF test is that $\delta = 0$ which implies that the variable is nonstationary. Alternatively, if $\delta < 0$ which means negative sign, it implies that $p < 1$ and that $y_t$ is integrated of order one.

However, if the null hypothesis cannot be rejected, which means that $y_t$ is not stationary, that is the variable might be integrated of order higher than one, consequently, it should be tested whether $y_t \sim I(2)$ by running the DF regression using $\Delta \Delta \Delta y_t$ as a left-hand side variable and $\Delta \Delta y_{t-1}$ as the right-hand side as follows:

$$\Delta \Delta \Delta y_t = \delta \cdot \Delta y_{t-1} + \varepsilon_t$$

Equation (6.14)

This process can be continued until stationarity is achieved to the variable or to be sure that the variable cannot be stationary at all. However Charemza and Deadman (1992) argued that it is unusual in practice for economic series to be integrated of order higher than two.

However, the DF test may not be perfect because it does not take into account the possibility of autocorrelation in the error process $\varepsilon_t$. If it is the case, then the ordinary least squares estimates of equation (6.11) are not efficient. The Augmented Dickey- Fuller (ADF) test (1981) will simply solve this problem by using lagged left-hand side variables as additional explanatory variables to approximate the autocorrelation. The ADF equivalent of equation (6.11) is as follows:

$$\Delta y_t = \delta \cdot y_{t-1} + \sum_{i=1}^{K} \delta_i \cdot \Delta y_{t-i} + \varepsilon_t$$

Equation (6.15)
Where $k$ represents the number of lags for $\Delta y_{t-i}$, which should be relatively small in order to save the degrees of freedom, but large enough to allow for the existence of autocorrelation in $\epsilon_t$.

With regard to the research data, ADF unit root tests have been run to determine the order of integration for both economic reform programme and stock market performance variables using Personal Computer Generalized Instrumental Variables Estimators (PCGIVE) Version 8.0 (1994). The following table shows the results of ADF unit root tests for the order of integration of all the variables (full details about the results can be shown in Appendix C).
Table 6.6
ADF unit root test results for order of integration of economic reform programme and stock market variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Levels form</th>
<th>First differenced</th>
<th>Second differenced</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>rd</td>
<td>ln</td>
<td>rd</td>
</tr>
<tr>
<td>$y_1$</td>
<td>Lag 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_2$</td>
<td>Lag 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_3$</td>
<td>Lag 0,2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_4$</td>
<td>Lag 1,2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_5$</td>
<td>Lag 1,2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_6$</td>
<td>Lag 0,1,2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_7$</td>
<td>Lag 0,1,2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_8$</td>
<td>Lag 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_9$</td>
<td>Lag 0,1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_{10}$</td>
<td>Lag 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_{11}$</td>
<td>Lag 0,1,2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_{12}$</td>
<td>Lag 0,1,2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_{13}$</td>
<td>Lag 0,1,2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_{14}$</td>
<td>Lag 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_{15}$</td>
<td>Lag 0,1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_{16}$</td>
<td>Lag 0,1,2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$x_1$</td>
<td>Lag 0,1,2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$x_2$</td>
<td>Lag 0,1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$x_3$</td>
<td>Lag 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$x_4$</td>
<td>Lag 0,2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$x_5$</td>
<td>Lag 0,1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$x_6$</td>
<td>Lag 0,1,2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$x_7$</td>
<td>Lag 0,1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: rd=raw data, ln=natural logarithm, Lag 0,1,2 refers to the number of lags where the variables have a stationarity form. $y_1$ = value of trade, $y_2$ = volume of trade, $y_3$ = number of transactions, $y_4$ = number of traded companies, $y_5$ = value of new issues (including capital increases), $y_6$ = value of new issues (including capital increases) as a percentage of GDP, $y_7$ = market capitalization, $y_8$ = market capitalization as a percentage of GDP, $y_9$ = number of listed companies, $y_{10}$ = volume of shares listed, $y_{11}$ = number of financial intermediaries, $y_{12}$ = total value traded to market capitalization, $y_{13}$ = total value traded to GDP, $y_{14}$ = volume of shares traded to volume of shares listed, $y_{15}$ = percentage of the 10 biggest companies' share in market capitalization, $y_{16}$ = percentage of the 10 biggest companies' share in value traded, $x_1$ = interest rates, $x_2$ = real interest rates, $x_3$ = inflation rate, $x_4$ = exchange rate stability, $x_5$ = real GDP growth rate, $x_6$ = per capita income, $x_7$ = budget deficit.
As seen from the above table, for the data levels form the null hypothesis that \( \delta = 0 \) in equation (6.13) can be rejected for only exchange rate stability, market capitalization as a percentage of GDP, number of listed companies and value of shares traded to GDP, implying that \( \delta < 0 \) which means a negative sign, in turn \( p < 1 \) and that the above mentioned variables had to be integrated of order zero. Meanwhile, the null hypothesis for the rest of the variables cannot be rejected, that is the alternative hypothesis is rejected, in turn these variables had to be integrated of order higher than zero, thus, they need to be first differenced to test for order of integration. Concerning the variables which are first differenced, the null hypothesis is rejected for most variables except for per capita income, value of new issues (including capital increases) as a percentage of GDP, market capitalization, number of financial intermediaries and percentage of the 10 biggest companies' share in value traded. In fact, this means that these variables had to be integrated of order higher than one. Consequently, it is necessary to retest again for the order of integration with second differences. In this case, the results indicated that the null hypothesis can be rejected, that is these variables are integrated of order two. Although most economic reform programme variables and stock market performance variables as well showed an integration of order one, with respect to other variables which were integrated of a different order, these other variables cannot be used to test for cointegration as the variables in cointegration analysis should be integrated of the same order. As will be shown later, variables which are integrated of order zero should be excluded from the cointegration analysis as they are not integrated with the same order as most of the other variables. However, for the variables which showed integration of order higher than one, they were replaced by new variables measuring the relative change instead and then ADF unit root tests for these variable can be run again to determine their order of integration. Where these were of integration of order one, they were
retained in the cointegration modelling process. The results of this test can be shown in the following table: -

Table 6.7
ADF unit root test results for economic reform programme and stock market variables using relative change

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Levels form</td>
</tr>
<tr>
<td></td>
<td>rd</td>
</tr>
<tr>
<td>$y_6$</td>
<td></td>
</tr>
<tr>
<td>$y_7$</td>
<td></td>
</tr>
<tr>
<td>$y_{11}$</td>
<td></td>
</tr>
<tr>
<td>$y_{16}$</td>
<td></td>
</tr>
<tr>
<td>$x_6$</td>
<td></td>
</tr>
</tbody>
</table>

As seen from the above table, the null hypothesis for the data levels form can be rejected for two variables; market capitalization and percentage of the 10 biggest companies' share in value traded, implying that these variables are to be integrated of order zero with relative change data levels. On the other hand, for the rest of the variables, the null hypothesis cannot be rejected, in turn, these variables had to be integrated of higher order than zero, thus, they need to be first differenced to test for the order of integration. The test indicated that for all the variables which were first differenced for the relative change, the null hypothesis is rejected, in turn, per capita income, value of new issues (including capital increases) as a percentage of GDP and the number of financial intermediaries had to be integrated of order one by using the relative change. However, all variables, which indicated integration of order zero whether in the first test or in the second, will be excluded from the cointegration analysis. Strictly speaking, these variables are: exchange rate stability, market capitalization, market capitalization as a percentage of GDP, number of listed companies, total value traded to GDP and percentage of the 10 biggest companies' share in value traded.
Since the order of integration has been determined, the next step is to determine whether variables, that were integrated of the same order, exhibited a cointegrating relationship. The next section will deal with this matter in detail.

6.4.2.2.3 The determination of a cointegration relationship between the economic reform programme variables and the stock market performance variables through error correction models: -

6.4.2.2.3.1 Introduction: -

The previous section identified the order of integration of the variables, hence, those variables which showed the same order of integration can be used for a cointegration relationship. However, the same order of integration for the variables can be considered as a pre-requisite to run a cointegration relationship, there is another essential condition, which is also necessary to determine the cointegration relationship between the variables. Straightforwardly speaking, a cointegration relationship between variables only exists if those variables are integrated of the same order, in addition, the residual from a static long-run regression is integrated of order zero, that is, the residual must be stationary. In this section, both the long-run and short-run relationships between the variables will be identified in the same model, that is, error correction modelling (EC), but before this method can be applied, a cointegration relationship should be determined firstly.

6.4.2.2.3.2 Concept of cointegration: -

A cointegration between two variables means that both variables have to move together over the long-run and they cannot move “too far” away from each other. In contrast, a lack of integration implies that such variables have no long-run link and cannot “drift together“
through time, in principle, they can wander arbitrarily far away from each other (Dickey, Jansen and Thornton 1991).

Formal definition of cointegration of two variables, where this research is focusing on, has been introduced by Engle and Granger (1987) as follows:

"Time series $X_t$ and $Y_t$ are said to be cointegrated of order $d, b$ where $d \geq b \geq 0$, written as: $X_t, Y_t \sim CI(d, b)$ if:

1. both series are integrated of order $d$,
2. there exists a linear combination of these variables, say $\alpha_1 X_t + \alpha_2 Y_t$, which is integrated of order $d - b$. The vector $[\alpha_1, \alpha_2]$ is called a cointegration vector".

(Charemza and Deadman (1992), P. 144)

The most interesting case in empirical econometrics is where $d = b$, which implies that the variables are integrated of the same order, in turn, the series become stationary by being transformed with the use of a cointegrating vector. The cointegrating coefficient can be, then, identified with parameters in the long-run relationship between the variables.

With regard again to the data of this research, the order of integration, shown in the previous section, indicated that most of the independent and dependent variables are integrated of order one. In turn, the long-run relationship between these variables will be given as follows:

$$y_t = \alpha + \beta_1 x_t + \nu_t$$

Equation (6.16)

Where:

$y_t$ : the dependent variable, in this case, any of the stock market performance variables which are integrated of order one,

$x_t$ : the independent variable, in this case, any of the economic reform programme variables which are integrated of order one, more precisely, all economic reform programme variables except exchange rate stability, and
\( V_t \): the estimated residual from the equation, which refers to the deviation from any dependent variable (stock market performance) from its long-run path. In fact, \( V_t \) in this case reflects the error correction aspects of the equation or the ECM.

Once again, it should be mentioned that the residual from the long-run regression must be integrated of order zero in order to fulfil the cointegration conditions. With regard to this condition, it may be considered why variables with a different order of integration cannot be examined for the occurrence of cointegration. On this point, Charemza and Deadman (1992) stated various possibilities of integration and cointegration based on equation (6.15) as follows:

1) \( Y_t \sim I(1) \) and \( X_t \sim I(0) \), then \( V_t \sim I(1) \), implying that the variables \( Y_t, X_t \) cannot be cointegrated.

2) \( Y_t \sim I(0) \) and \( X_t \sim I(1) \), then \( V_t \sim I(1) \), implying that the variables \( Y_t, X_t \) cannot be cointegrated.

3) \( Y_t \sim I(0) \) and \( X_t \sim I(0) \), then \( V_t \sim I(0) \), hence, the inquiry about cointegration between the variables \( Y_t, X_t \) does not really make any sense.

4) Consider lastly that \( Y_t \sim I(1) \) and \( X_t \sim I(1) \), it may be that \( V_t \sim I(0) \) in case if \([\beta, -1] \) is a cointegrated vector, then, the variables \( Y_t, X_t \) are said to be cointegrated.

Consequently, in this research, the variables which indicated integration of order one will be considered to test for a cointegration relationship, and if the error from this long-run regression indicated integration of order zero, then models incorporating an error correction mechanism (ECM) will be run and examined. In the light of the above, the hypotheses which contain variables with a different order of integration will not be tested as they imply that there is no...
long-run relationship between these variables and they cannot move together as each one of these variables is stationary of a different order. Strictly speaking, the null hypothesis of no long-run relationship between the variables indicated above cannot be rejected.

With reference to the other hypotheses which contain variables of the same order of integration, the residual from the long-run relationship will be saved and then tested for the order of integration using the ADF unit root test as follows:

$$\Delta \hat{\nu}_t = \delta_1 \hat{\nu}_{t-1} + \sum_{i=1}^{K} \delta_i \Delta \hat{\nu}_{t-i} + \xi_t$$  \hspace{1cm} \text{Equation (6.17)}

Where:

- $\Delta \hat{\nu}_t$ = the ECM, which equals the residual from the long-run equation, given in equation (6.15), and
- $\delta$ = the ADF static.

The null hypothesis from the equation (6.16) is that the ECM is not integrated of order zero, that is, it is not stationary. If it is the case, then there is no long-run relationship between the variables as they are not cointegrated. In contrast, if the null hypothesis is rejected, this may imply that these variables are cointegrated, hence the variables can be modelled in the form of an EC model.

At this stage, it seems that, since the residual from the long-run equation was integrated of order zero, that is, stationary, this means that the variables are cointegrated. However, authors such as Banerjee, Dolado, Hendry and Smith (1986) stated that the cointegrating regression estimator in cointegration testing may exhibit very large biases, in turn this test can have low power to reject non-cointegration, in other words, they concluded that the results from the long-run equation and the test for the residual may indicate that the variables are cointegrated,
meanwhile they are not in fact. Hence, the variables should be examined again by using an EC model, and where the ECM is significant, it definitely proves that the variables are cointegrated. Besides this, Engle and Granger (1987) pointed out that any cointegrated series has an error correction representation. Indeed, the converse is true, that is cointegration is a necessary condition for an error correction model to hold (Engle and Granger 1991).

6.4.2.3.3 Modelling cointegrated data series through error correction models: -

As mentioned in the previous sections, testing for a cointegration relationship needs both variables to have the same order of integration, and the residual from the long-run regression should also be integrated of order zero. As the first step has been determined previously, now it is necessary to consider cointegration analysis.

The EC model can be used to examine both the long-run and short-run dynamic relationship between two variables simultaneously, which is the case of the variables in this research. It is important to mention the fact that the variables which are cointegrated imply that there is some adjustment process which prevents the errors in the long-run relationship becoming larger and larger (Charemza and Deadman 1992). In the meantime Charemza and Deadman again stated why cointegration analysis should be examined within ECM, that is:

"Such models currently represent the most common approach to situations where is wishes to incorporate both the economic theory relating to long run relationship between variables, and short run disequilibrium behavior."

(Charemza and Deadman (1992), P. 154-155).

One of the most simplest and common used procedures, which requires using ordinary least squares (OLS) is defined as the Granger Representation Theorem, which states that the cointegrated variables must have an error correction representation. The error correction represents the extent of the disequilibrium between levels of the variables in the previous
period. However, ECM states that changes in the dependent variable depend not only on changes in the independent variables but also on the extent of disequilibrium between the levels of both dependent and independent variables (Dolado, Jenkison and Sosvilla-Rivero 1990). EC models have many useful properties; the most important use is in providing a possible approach to dealing with non-stationary series and spurious correlation. However, it is important to identify the basic EC model and to know why the disequilibrium error is important to the mechanics of the model.

Thomas (1997) showed this process through two variables. Where the long-run or equilibrium relationship between variable $Y$ and variable $X$ can be expressed as follows:

\[ Y_t = KX_t^{\lambda_1} \]  

Equation (6.18)

Where: $K$ and $\lambda_1$ are constants.

The following algebraic explanation will closely follow Thoma (1997), by taking the natural logarithms (ln) of the variables and using $y$ instead of ln $Y$ and $x$ instead of ln $X$, equation (6.18) can be rewritten as equation (6.19)

\[ y_t = \lambda_0 + \lambda_1 x_t \]  

Equation (6.19)

Where: $\lambda_0 = \ln (K)$.

Since most economic series are rarely to be found in equilibrium, then the value of the variable $Y$ will be different from its equilibrium value and the extent of any disequilibrium, which is known as a disequilibrium error, can be given as follows:

\[ y_t - \lambda_0 - \lambda_1 x_t \]  

Equation (6.20)

According to the above, the disequilibrium error will take a zero value if, and only if $Y$ and $X$ are in equilibrium. Once again, since it is not always the case, that is $Y$ and $X$ to be in
equilibrium, a short-run or disequilibrium relationship seems to be interesting to observe by an applied econometrician. Thus, by lagging variables $Y$ and $X$, that is the past values of $Y$ and $X$, the disequilibrium relationship can be shown in the following equation:

$$y_t = \omega_0 + \omega_1 x_t + \omega_2 x_{t-1} + \psi y_{t-1} + \epsilon_t \quad 0 < \psi < 1 \quad \text{Equation (6.21)}$$

In fact, there still a problem, that is, the parameters in the equation (6.21) look to be not accurate, since the variables $Y$ and $X$ are expressed in levels, which may imply a spurious regression. However, by subtracting $y_{t-1}$ from the both sides, it gives the following equation:

$$y_t - y_{t-1} = \omega_0 + \omega_1 x_t + \omega_2 x_{t-1} - (1 - \psi) y_{t-1} + \epsilon_t \quad \text{Equation (6.22)}$$

Again, adding and subtracting $x_{t-1}$ from the right-hand side of the equation (6.22) then yields:

$$y_t - y_{t-1} = \omega_0 + \omega_1 x_t - \omega_1 x_{t-1} + \omega_1 x_{t-1} + \omega_2 x_{t-1} - (1 - \psi) y_{t-1} + \epsilon_t$$

The above equation can be considered again in the following form:

$$\Delta y_t = \omega_0 + \omega_1 \Delta x_t + (\omega_1 + \omega_2) x_{t-1} - \phi y_{t-1} + \epsilon_t \quad \text{Equation (6.23)}$$

Where: $\phi = 1 - \psi$.

By reparameterizing the equation (6.23), it can give the following equation:

$$\Delta y_t = \omega_0 + \omega_1 \Delta x_t - \phi (y_{t-1} - \lambda_1 x_{t-1}) + \epsilon_t \quad \text{Equation (6.24)}$$

Where a new parameter $\lambda_1$ can be defined as: $(\omega_1 + \omega_2) / \phi$. A further reparameterization of equation (6.24) yields a more useful representation, termed ECM.

$$\Delta y_t = \omega_1 \Delta x_t - \phi (y_{t-1} - \lambda_0 - \lambda_1 x_{t-1}) + \epsilon_t \quad \text{Equation (6.25)}$$

Where:

$$\lambda_0 = \omega_0 / \phi$$
\((Y_{t-1} - \hat{\lambda}_0 - \hat{\lambda}_1 x_{t-1})\) = the disequilibrium error from the period \(t - 1\)

Indeed, equation (6.25) is the same as equation (6.21), with rearranging the original disequilibrium relationship and defining two new parameters, that are, \(\lambda_0\) and \(\lambda_1\). The equation (6.25), which represented the ECM points out that the changes in the dependent variable \(Y\) depends on the change in the independent \(X\) variable and the extent of the disequilibrium error from the previous period, which is compensated for in current period, depends on the size of the parameter \(\varphi\). In fact, only part of any disequilibrium error is made up for in the period \(t\) since the parameter \(\varphi\) lies between zero and unity.

In the light of the above, both long-run and short-run relationships between the variables can be shown simultaneously. The parameter \(\lambda_1\) in the static long-run equilibrium relationship equation (6.18) refers to long-run elasticity of \(Y\) with respect to \(X\), while \(\alpha_1\) which appears in the short-run disequilibrium relationship in equation (6.25) refers to short-run elasticity, and obviously, reflects the immediate response of \(Y\) to any change in \(X\).

As the ECM has been illustrated, the point now is how to estimate this model? Engle and Granger (1987) suggested two stages to model the data in the EC model form, which is called the Engle and Granger two-stage procedure. The first stage is to model the time series data by regressing each one upon the other in the long-run static relationship equation, in this research, stock market performance variables as dependent and the economic reform programme as an independent variable in each bivariate relationship. Then if the residual from the long-run static regression is found stationary in the ADF test, then as the Granger Representation Theorem pointed out the variables must have an error correction representation. The second stage of Engle-Granger can be applied by lagging the residual from the cointegration regression and as well lagging appropriate lags on the differenced variables. The lagged
residual, in fact, can be described as the equilibrium errors in the long-run regression. The general model for ECM, then is based on the lagged residual and a first differenced Auto-regressive Distributed lag (ADL) model as shown in the following equation:

\[ \Delta y_t = \pi_0 + \pi_1 \Delta y_{t-1} + \pi_2 \Delta x_t + \pi_3 \Delta x_{t-1} + \pi_4 ECM_{t-1} + \epsilon_t \]  

Equation (6.26)

Where:

\( \Delta y_t, \Delta y_{t-1} = \) the first differenced dependent variable, lagged zero and one year respectively,

\( \Delta x_t, \Delta x_{t-1} = \) the first differenced independent variable, lagged zero and one year respectively,

\( ECM_{t-1} = \) the disequilibrium error from the static long-run equation, that is, the error correction mechanism, and

\( \epsilon_t = \) the disturbance.

However, Thomas (1993) stated that the precise lags on the differenced terms in disequilibrium relationship, that is, in ECM form, are not specified by the theorem. In fact, this implies that changes in the independent and dependent variable are not necessarily lagged only one period, in turn it is permissible that the differenced variables may be lagged more than once according to the nature of the data series. In the light of this, as the data series of this research (as given in Appendix A) indicate that the dependent variables react slowly to changes in the independent variables, to lag the differenced variables up to three years would be reasonable, with respect to the number of degrees of freedom. Hence, the EC model will take the following form:

\[ \Delta y_t = \pi_0 + \pi_1 \Delta y_{t-1} + \pi_2 \Delta y_{t-2} + \pi_3 \Delta y_{t-3} + \pi_4 \Delta x_t + \pi_5 \Delta x_{t-1} + \pi_6 \Delta x_{t-2} + \pi_7 \Delta x_{t-3} + \pi_8 ECM_{t-1} + \epsilon_t \]  

Equation (6.27)
As seen from equation (6.27) in the right-hand side, it contains the first differenced dependent variable lagged one, two, and three years plus the first differenced independent variable, lagged zero, one, two and three years, that is, this bivariate model is estimated in its full general form. In fact, the above equation (6.27) is the initial equation to be used in a general-to-specific modelling approach, which starts with a very general model with many parameters and may be a complicated model that contains a series of simpler models, which should represent alternative economic hypotheses that need to be considered. However, a simplification search is carried out in order to make the model more simple. The simplification search, or a so-called testing-down procedure, will be carried out in a systematic and sequential matter involving the gradual elimination of apparently unimportant lagged variables. To reduce the general model, a two-tailed t-test with a ten per cent level of significance will be used to eliminate non-significant variables until no further reductions or simplifications are feasible. Strictly, general-to-specific models will be reduced using the criteria shown above, up to the point where the right-hand side of the EC model contains at least one differenced independent variable and the lagged ECM, which represents the basic form of the EC model. For each bivariate relationship, once the final models from EC models have been specified, various diagnostic tests should be run in order to test for the power of the models. More precisely, the diagnostic tests are: Autocorrelation, Autoregressive Conditional Heteroscedasticity (ARCH), Normality and Model mis-specification (RESET).

Autocorrelation of the residual can be done through the auxiliary regression of the residuals on the original variables and lagged residuals. The null hypothesis is no autocorrelation, that is, the errors are white noise. Under this test, the null hypothesis would be rejected if the test statistic is too high. In fact, this test is also valid for models with lagged dependent variables.
AtutoRegressive Conditional Heteroscedasticity (ARCH) test (Engle 1982) tends to check whether the residuals have an ARCH structure, that is, the ARCH model considers the variance of the current error term to be a function of, or to be conditional on, the variance of previous time periods' error terms. The test can be done through regressing the squared residuals on constant lagged squared residuals. The null hypothesis is no ARCH, which would be rejected if the test statistic is too high.

Normality tests will be performed on the residuals. The test for normality is that the distribution of the residuals approach that of the normal distribution as the sample size increases (Jarque and Bera 1980). The null hypothesis is that the distribution of the residuals is not normal, which would be rejected if the test statistic is too high.

Model mis-specification, which in this case refers to Ramsey Regression Specification Error Test RESET (Ramsey 1969), is a general test that determines the likelihood of an omitted variable or some other specification error by measuring whether the fit of a given model can be significantly improved by additional terms. These additional terms act as proxies for any possible omitted variables or incorrect functional forms. Even though the Ramsey RESET test cannot specify the details of the error, in case errors exist in the equation, it is still useful to determine whether there any variable has been omitted from the model. The null-hypothesis is no functional form mis-specification, which would be rejected if the test statistic is too high.

6.4.2.3.4 Results from modelling cointegrated data series through error correction models:

6.4.2.3.4.1 Modelling the impact of interest rates upon the stock market performance through error correction models:

As seen in chapter four, the literature reviews indicated that interest rates have a significant effect on stock returns and prices. The relationship is inverse, in that as interest rates go up,
stock prices go down and vice-versa (see for example, Peavy 1992, Baye and Jansen 1995, and Solomon 1997). However, no attention has been made for the impact of interest rates on other aspects of stock market performance, in turn this section will concentrate on examining this relationship. The results of this relationship can be shown in two sections: the first section will concentrate on the relationship between interest rates and market activity. The other section will deal with the relationship between interest rates and market size, market liquidity and market concentration, and as these categories contain few variables compared with market activity, in turn, they will be discussed in one section.

6.4.2.3.4.1.1 Modelling the impact of interest rates upon market activity through error correction models: -

The ADF unit root tests indicated that interest rates and all market activity variables have the same order of integration, that is, these variables are integrated of order one. As this the case, a static long-run regression has been performed using ordinary least squares (OLS). The outputs of this analysis are given in the following table: -
Table 6.8
Static long-run models for the impact of interest rates upon market activity variables

<table>
<thead>
<tr>
<th>Description</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Prob.</th>
<th>F- Prob.</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y_{1,t}$</td>
<td>Constant</td>
<td>14.848</td>
<td>1.6335</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>(Expl. variable)</td>
<td>-58.544</td>
<td>10.081</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>$y_{2,t}$</td>
<td>Constant</td>
<td>9.4556</td>
<td>1.0264</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>(Expl. variable)</td>
<td>-43.747</td>
<td>6.334</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>$y_{3,t}$</td>
<td>Constant</td>
<td>19.798</td>
<td>1.3048</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>(Expl. variable)</td>
<td>-65.614</td>
<td>8.0522</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>$y_{4,t}$</td>
<td>Constant</td>
<td>7.6232</td>
<td>0.76530</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>(Expl. variable)</td>
<td>-16.591</td>
<td>4.7228</td>
<td>0.0029</td>
<td>0.0029</td>
</tr>
<tr>
<td>$y_{5,t}$</td>
<td>Constant</td>
<td>14.170</td>
<td>1.2475</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>(Expl. variable)</td>
<td>-47.008</td>
<td>7.6988</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>$% y_{6,t}$</td>
<td>Constant</td>
<td>0.0718</td>
<td>0.04295</td>
<td>0.1154</td>
<td>0.1154</td>
</tr>
<tr>
<td></td>
<td>(Expl. variable)</td>
<td>-0.6298</td>
<td>0.26616</td>
<td>0.0318</td>
<td>0.0318</td>
</tr>
</tbody>
</table>

Notes: Expl = Explanatory or independent variable. Figures with bold face refer to the significant effect.

$y_1$ = value of trade, $y_2$ = volume of trade, $y_3$ = number of transactions, $y_4$ = number of traded companies, $y_5$ = value of new issues and (including capital increases), $y_6$ = value of new issues (including capital increases) as a percentage of GDP.

As mentioned previously, the residual from each bivariate equation should be tested for stationarity in order to determine whether the variables in the equation are cointegrated. For this purpose, ADF unit root tests have been performed lagging the residual up to two years, which seem to be suitable to remove any autocorrelation in the residual. The results from ADF unit root tests indicated clearly that the residuals from the above six static long-run equations are integrated of order zero, suggesting that the variables in each bivariate relationship are cointegrated, that is, there is a long-run relationship between these variables. However, since ADF unit root tests have a low power, EC models can support or refute the cointegration relationship between the variables explaining both long-run and short-run relationship simultaneously. With regard again to the data series of this research, they indicated that there is a slow response of most stock market performance variables to the introduction of the economic reform programme, in turn both dependent and independent variables will be lagged up to three years in the EC models. Clearly, this may give more information about the best
model, which can represent the best relationship between the variables. So, the chosen model has been decided, taking into consideration the probability of the F statistic, the number of insignificant variables in the equation, mainly, ECM and the independent variable, the $R^2$ and also the degrees of freedom. The following table shows the final model of each lag, however, more details about general-to-specific modelling procedures are given in Appendix D.
Table 6.9
The specific EC models for the impact of interest rates upon market activity variables

<table>
<thead>
<tr>
<th>D.V.</th>
<th>Length of Lags</th>
<th>RHSV</th>
<th>RHSV</th>
<th>RHSV</th>
<th>RHSV</th>
<th>RHSV</th>
<th>RHSV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lag0</td>
<td>Lag1</td>
<td>Lag2</td>
<td>Lag3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$R^2$ (F.P.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta y_{1,t}$</td>
<td></td>
<td>N. S.</td>
<td>0.16 (0.32)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.17 (0.29)</td>
<td>Cons***</td>
<td>$\Delta x_{1,t-2}$</td>
<td>ECM-1***</td>
<td>0.42 (0.04)</td>
</tr>
<tr>
<td>$\Delta y_{2,t}$</td>
<td></td>
<td>Cons* $\Delta x_{1,t}$</td>
<td>0.23 (0.18)</td>
<td>Cons* $\Delta x_{1,t-1}$</td>
<td>0.31 (0.09)</td>
<td>Cons* $\Delta x_{1,t}$</td>
<td>ECM-1**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.31 (0.11)</td>
<td>Cons* $\Delta x_{1,t}$</td>
<td>ECM-1**</td>
<td>0.31 (0.11)</td>
<td>Cons* $\Delta y_{3,t-2}$</td>
</tr>
<tr>
<td>$\Delta y_{3,t}$</td>
<td></td>
<td>Cons* $\Delta x_{1,t}$</td>
<td>0.29 (0.13)</td>
<td>Cons* $\Delta x_{2,t-1}$</td>
<td>0.31 (0.11)</td>
<td>Cons* $\Delta x_{2,t-1}$</td>
<td>ECM-1**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.54 (0.006)</td>
<td>Cons*** $\Delta y_{4,t}$</td>
<td>0.91 (0.00)</td>
<td>N. S.</td>
<td>0.77 (0.001)</td>
</tr>
<tr>
<td>$\Delta y_{4,t}$</td>
<td></td>
<td>Cons*** $\Delta x_{1,t}$</td>
<td>0.13 (0.42)</td>
<td>Cons* $\Delta y_{5,t-1}$</td>
<td>0.76 (0.001)</td>
<td>Cons* $\Delta y_{5,t-1}$</td>
<td>0.82 (0.001)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.08 (0.78)</td>
<td>Cons* $\Delta y_{5,t}$</td>
<td>ECM-1**</td>
<td>0.82 (0.001)</td>
<td></td>
</tr>
<tr>
<td>$\Delta y_{5,t}$</td>
<td></td>
<td>N. S.</td>
<td>0.01 (0.93)</td>
<td>N. S.</td>
<td>0.40 (0.23)</td>
<td>N. S.</td>
<td>0.68 (0.02)</td>
</tr>
<tr>
<td>$% \Delta y_{6,t}$</td>
<td></td>
<td>N. S.</td>
<td>0.08 (0.78)</td>
<td>N. S.</td>
<td>0.40 (0.23)</td>
<td>N. S.</td>
<td>0.68 (0.02)</td>
</tr>
</tbody>
</table>

Notes: * denotes 1% level of significance, ** denotes 5% level of significance, *** denotes 1% level of significance, D. V. = Dependent Variables, RHSV = Right hand-side variables, (F.P) = F test probability, N. S. = None of the essential variables in the right hand-side equation (main independent variable and the ECM) is significant at any level. Bold print indicates the best model.

$y_1$ = value of trade, $y_2$ = volume of trade, $y_3$ = number of transactions, $y_4$ = number of traded companies, $y_5$ = value of new issues (including capital increases), $y_6$ = value of new issues (including capital increases) as a percentage of GDP, $x_1$ = interest rates.

The EC models will explain both the long-run and short-run relationship simultaneously as the ECM coefficients are expected to capture the adjustments of differenced dependent and independent variables towards long-run equilibrium, whereas the coefficients on differenced...
dependent and independent variables are expected to capture the short-run dynamics of the model. As seen from Table 6.9 interest rate models, with market activity as the dependent variable, contains significant ECMs except for the value of new issues (included capital increase) as a percentage of GDP. Even though, the results from the static long-run regression given in Table 6.8 indicated that there is a long-run relationship between interest rates and the value of new issues (including capital increases) as a percentage of GDP. As the residuals were integrated of order zero within the ADF unit root tests, the results from EC models refuted this previous suggestion because the ECM was insignificant. In addition, the results from EC models did not suggest even a short-run relationship between interest rates and this variable, in turn the hypothesis, which stated that the value of new issues (including capital increases) as a percentage of GDP increases as the interest rates decrease, cannot be accepted implying that the null-hypothesis of no relationship between interest rates and this variables cannot be rejected. On the other hand, ECMs were significant for the rest of the variables; at the five per cent level for the value of trade, the volume of trade and the value of new issues (including capital increases), and at the one per cent level for the number of transactions and the number of traded companies. As well, the diagnostic tests given in Appendix D for the EC models showed that the assumptions behind these models are supported by examinations of the Autocorrelation of the residual, AutoRegressive Conditional Heteroscedasticity (ARCH), Normality and Model mis-specification (RESET) tests.

The interest rates model which includes the value of trade contains a significant ECM with lag two for the differenced independent variable. With regard to the sign of the coefficient of the independent variable from the static long-run equation given in Table 6.8, it is found to be negative suggesting that there is a negative long-run relationship between the variables.
However, the EC model failed to find a short-run relationship between interest rates and the value of trade, as the coefficient from this equation was not significant. Even though, since the ECM indicated a significant effect, the hypothesis, which stated that the value of trade increases as interest rates decrease, cannot be rejected, implying a negative long-run relationship between the variables.

With regard to the volume of trade, the EC model showed a significant ECM with lagged interest rates differenced for one year, that is, confirming the cointegration relationship found in the static long-run equation given in Table 6.8. Even though, the model did not support any short-run relationship between the variables, the existence of a long-run relationship cannot be rejected as the ECM indicated a significant effect. Since the interest rates showed a negative coefficient in the long-run static regression, the hypothesis, which stated that the volume of trade increases as the interest rates decrease, cannot be rejected, that is, there is a negative long-run relationship between the variables.

The interest rates model incorporating the number of transactions, contains a significant ECM with lag two and three for both the differenced independent variable and the differenced dependent variable. With regard to the sign of the coefficient of the independent variable from the static long-run equation given in Table 6.8, it is found to be negative, suggesting that there is a negative long-run relationship between the variables. However, the results of the EC model indicated a short-run relationship between interest rates and the value of trade, as the coefficients of the differenced independent variable lagged for two and three years, were significant at the five per cent and the ten per cent level respectively. On the other hand, the coefficients of the differenced dependent variable lagged two and three years were significant
at one per cent level, implying that the number of transactions seems to be affected by its previous performance. As this is the case, it can be concluded that the hypothesis, which stated that the number of transactions increases as interest rates decrease, cannot be rejected, implying a negative long-run and short-run relationship between the variables.

Concerning the relationship between interest rates and the number of traded companies, the EC model indicated a significant ECM with lag zero and two for the differenced independent variable and with lag one for the differenced dependent variables. However, the model indicated that the differenced dependent variable lagged for one year was significant, which means that the number of traded companies may be affected in the short-run by its performance in the previous year. In the meantime, the lagged differenced interest rates indicated significant affect at the ten per cent level, that is, there is a short-run relationship with the number of traded companies. In the meantime, the coefficient from the static long-run equation showed a negative sign, that is, a negative relationship between the variables. In this case, the hypothesis, which stated that number of traded companies increases as interest rates decrease, cannot be rejected, indicating a negative long-run and short-run relationship between the variables.

Lastly, the interest rates model which include the value of new issues (including capital increases) indicated a significant ECM with a lag up to two years for both the differenced dependent and independent variable. However, the model indicated that the differenced dependent variable lagged for one and two years were significant at the one per cent and the ten per cent level, respectively, which means that the value of new issues (including capital increases) may be affected in the short-run by its performance in the previous years. In the meantime, the lagged interest rates differenced for two years indicated an insignificant effect,
hence, there is no short-run relationship between the variables. In addition, the coefficient from the static long-run equation indicated a negative sign, which means that the relationship between the variables is negative. In turn, the hypothesis, which stated that value of new issues (including capital increases) increases as interest rates decrease, cannot be rejected, indicating a negative long-run relationship between the variables.

As a conclusion, it seems that interest rates have a significant impact on the market activity as five of the six variables indicated a significant negative long-run relationship. However, the results from EC models indicated that there is no short-run relationship between interest rates and market activity variables except for the number of transactions. In fact, it is not a surprising result that interest rates failed to show a short-run impact upon market activity variables, as most of investors may need some time to recognize that the economic reform situation will be stable in Egypt. Generally speaking, the results revealed an expected behaviour for the market activity response to the decrease in interest rates and it is found consistent with the literature review which stated that there is a negative relationship between interest rates and stock returns and prices. More clearly, when interest rates increase, stock prices decrease and this in turn, depress the stock market as investors prefer to invest in banks, for example. In the case of Egypt, interest rates decreased sharply two years after the introduction of the economic reform programme resulting in changes in the behaviour of investors to alter their way of investment from banks to stock markets, hence, this affected the activity of the market positively as the value of trade, the volume of trade, the number of transactions and the number of traded companies benefited from this. In the meantime, it may be suggested that new firms have been established as the cost of capital became lower with the decrease in interest rates, and so they could find the required finance through the stock market.
As well, many other companies found it easier than before to increase their capital through the stock market, as the market became active and many investors have been attracted because of changes in the economic environment in Egypt, in turn the stock market had the ability to provide the required finance to firms, hence the value of new issues (including capital increases) witnessed a positive response.

The results of the EC models reflected different values for $R^2$ of each model: it was very high for the relationship between interest rates and the number of transactions, the number of traded companies and the value of new issues (including capital increases) as $R^2$ was 0.91, 0.91 and 0.82 respectively, reflecting excellent models. On the other hand, it was 0.42 and 0.31 for the relationship between interest rates and the value of trade and the volume of trade, respectively.

In fact, with respect to the value of $R^2$, it does not affect the long-run relationship between the variables, but it does indeed determine the strength of this relationship. Thereby, the hypothesis, which stated that the market activity increases as the interest rates decrease, cannot be rejected, implying a negative relationship between the variables.

6.4.2.3.4.1.2 Modelling the impact of interest rates upon market size, market liquidity and market concentration through error correction models:

The results from ADF unit root tests indicated that not all market size, market liquidity and market concentration variables are integrated of order one as interest rates. However, the variables which showed a different order of integration, that is, not integrated of order one, cannot be cointegrated with interest rates, more precisely, these variables were: market capitalization, market capitalization as a percentage of GDP and the number of listed companies as a surrogate for market size. In fact, these variables seem to be independent from, not only interest rates, but also other economic reform programme variables except for
exchange rate stability as it represents the only economic reform programme variable which is integrated of order zero. Since these variables have a different order of integration compared with interest rates, they cannot be cointegrated, in turn, the hypotheses which stated that market capitalization, market capitalization as a percentage of GDP and the number of listed companies increase as interest rates decrease cannot be accepted, and the null hypothesis of no relationship between these variables cannot be rejected. As mentioned previously, the number of listed companies did not follow the same trend of increase as other stock market performance variables, in turn, this may explain why this variable was not affected by interest rates or other economic reform programme variables. Concerning market capitalization and market capitalization as a percentage of GDP, these variables may be affected by changes in other variables, for example, shares prices and the volume of shares listed which indicated significant increase after 1991. In turn, it is argued that an indirect relationship might be found between economic reform programme variables and both market capitalization and market capitalization as a percentage of GDP, as economic reform programme variables may affect both shares prices and the volume of shares listed, which in turn, determine market capitalization. Besides these, the privatization programme, as mentioned in chapter five, assisted in increasing the market value of the stocks and the number of listed companies as well.

With regard to market liquidity, the total value traded to GDP cannot be cointegrated with interest rates or any other economic reform programme variables except for exchange rate stability, as this variable is integrated of a different order. In a case like this, the hypothesis, which stated that the total value traded to GDP increases as interest rates decrease, cannot be accepted and the null hypothesis of no relationship between the variables cannot be rejected. In
fact, the same results hold for one of the market concentration variables, that is, the percentage of the 10 biggest companies’ share in value traded, which cannot be cointegrated with interest rates as it is integrated of a different order. Concerning the rest of the variables, which were shown to be integrated of the same order as interest rates, that is, these variables are integrated of order one, static long-run regressions have been performed, using ordinary least squares (OLS). The outputs of this analysis are given in following table, which summarizes the results of this test.

Table 6.10
Static long-run models for the impact of interest rates upon market size, market liquidity and market concentration variables

<table>
<thead>
<tr>
<th>Description</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Prob.</th>
<th>F- Prob.</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\gamma_{10,t}$</td>
<td>Constant (Expl. Variable)</td>
<td>9.2045</td>
<td>0.751</td>
<td>0.0000</td>
<td>0.0002</td>
</tr>
<tr>
<td>$% \gamma_{11,t}$</td>
<td>Constant (Expl. Variable)</td>
<td>0.34511</td>
<td>0.10398</td>
<td>0.0047</td>
<td>0.0112</td>
</tr>
<tr>
<td>$\gamma_{12,t}$</td>
<td>Constant (Expl. Variable)</td>
<td>0.34254</td>
<td>0.7218</td>
<td>0.6415</td>
<td>0.0003</td>
</tr>
<tr>
<td>$\gamma_{14,t}$</td>
<td>Constant (Expl. Variable)</td>
<td>0.2531</td>
<td>0.4575</td>
<td>0.5877</td>
<td>0.0000</td>
</tr>
<tr>
<td>$\gamma_{15,t}$</td>
<td>Constant (Expl. Variable)</td>
<td>-1.1140</td>
<td>0.10017</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

$\gamma_{10} = \text{volume of shares listed, } \gamma_{11} = \text{number of financial intermediaries, } \gamma_{12} = \text{total value traded to market capitalization, } \gamma_{14} = \text{volume of shares traded to volume of shares listed, } \gamma_{15} = \text{percentage of the 10 biggest companies’ share in market capitalization.}$

The results from ADF unit root tests indicated clearly that the residuals from the above five static long-run equations are integrated of order zero, suggesting that the variables in each bivariate relationship are cointegrated, that is, there is a long-run relationship between these variables. However, EC models can represent the cointegration relationship between the variables explaining both long-run and short-run relationships simultaneously. The following table shows the final model of each lag, however, more details about general-to-specific modelling procedures are given in Appendix D.
Table 6.11
The specific EC models for the impact of interest rates upon market size, market
liquidity and market concentration variables

<table>
<thead>
<tr>
<th>D.V</th>
<th>Length of Lags</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lag0</td>
<td>Lag1</td>
<td>Lag2</td>
<td>Lag3</td>
<td>Lag0</td>
<td>Lag1</td>
</tr>
<tr>
<td>RHSV</td>
<td>( R^2 ) (F.P)</td>
<td>RHSV</td>
<td>( R^2 ) (F.P)</td>
<td>RHSV</td>
<td>( R^2 ) (F.P)</td>
<td>RHSV</td>
</tr>
<tr>
<td>( \Delta y_{10,t} )</td>
<td>Cons***</td>
<td>( \Delta x_{1,t} )</td>
<td>ECM-1*</td>
<td>0.22</td>
<td>Cons***</td>
<td>( \Delta x_{1,t} )</td>
</tr>
<tr>
<td>% ( \Delta y_{11,t} )</td>
<td>Cons</td>
<td>%( \Delta y_{11,t-1} )</td>
<td>( \Delta x_{1,t-2} )</td>
<td>ECM-1***</td>
<td>0.47</td>
<td>Cons</td>
</tr>
<tr>
<td>( \Delta y_{12,t} )</td>
<td>N. S.</td>
<td>Cons</td>
<td>( \Delta y_{12,t-1} )</td>
<td>( \Delta x_{1,t-1} )</td>
<td>ECM-1*</td>
<td>0.10</td>
</tr>
<tr>
<td>( \Delta y_{14,t} )</td>
<td>N. S.</td>
<td>N. S.</td>
<td>N. S.</td>
<td>N. S.</td>
<td>0.075</td>
<td>N. S.</td>
</tr>
<tr>
<td>( \Delta y_{15,t} )</td>
<td>N. S.</td>
<td>N. S.</td>
<td>N. S.</td>
<td>N. S.</td>
<td>0.031</td>
<td>N. S.</td>
</tr>
</tbody>
</table>

\( y_{10} \) = volume of shares listed, \( y_{11} \) = number of financial intermediaries, \( y_{12} \) = total value traded to market capitalization, \( y_{14} \) = volume of shares traded to volume of shares listed, \( y_{15} \) = percentage of the 10 biggest companies' share in market capitalization, \( x_{1} \) = interest rates.

With regard to market size variables, the interest rates models with these variables as dependent variables contain significant ECMs for both the volume of shares listed and the number of financial intermediaries at the ten per cent and the one per cent levels, respectively, supporting the cointegration relationship found in the static-long run equation given in Table 6.10. As well, the diagnostic tests given in Appendix D for the EC models showed that the assumptions behind these models are supported by examinations of the Autocorrelation of the residual, AutoRegressive Conditional Heteroscedasticity (ARCH), Normality and Model mis-specification (RESET) tests. Both models contain significant ECM without a lag for the
differenced independent variable, suggesting a long-run relationship between interest rates and both the volume of shares listed and the number of financial intermediaries, but the models did not support any short-run relationship as differenced interest rates in both models were insignificant. The coefficient of the independent variable in the static long-run equation given in Table 6.10 indicated a negative sign, which implies a negative relationship between the variables. As it is the case, the hypothesis which stated that the volume of shares listed and the number of financial intermediaries increase as interest rates decrease, cannot be rejected, suggesting an inverse long-run relationship between the variables. It can be noticed that $R^2$ was just 0.22 for the interest rates model that include the volume of shares listed, which seems to be small reflecting a weak relationship between the variables in the equation, whereas it was 0.47 for the relationship between interest rates and the number of financial intermediaries, which seems to be a reasonable model, even so, still there is a long-run relationship between the variables but the strength of this relationship, depends upon the value of $R^2$.

The conclusion of the impact of interest rates on market size as a whole is not clear enough, as three out of five variables, which represent market size, were integrated of other orders, hence were not cointegrated with interest rates. By contrast, the other two variables were shown to be cointegrated with interest rates, in turn, the hypothesis which stated that market size increases as interest rates decrease, cannot be accepted or rejected totally, but it can stated that in terms of the volume of shares listed and the number of financial intermediaries, this hypothesis cannot be rejected. On the other hand, in terms of market capitalization, market capitalization as a percentage of GDP and the number of listed companies, the null hypothesis of no relationship between interest rates and market size cannot be rejected. From the above analysis, it is noticed that, in general, interest rates may affect market size: for example, when
interest rates decrease, as mentioned previously, this may encourage the firms to increase their capital and others to establish new firms, hence, this will lead to an increase in the number of shares in the stock market. In addition, since the decrease in interest rates will encourage investors to change their behaviour and invest in stocks, this may encourage others to establish brokerage firms, mutual funds, and portfolio management in order to face the exceeded demand from investors.

Concerning market liquidity, the interest rates model, which incorporated the ratio of the volume of shares traded to the volume of shares listed, did not show any significant relationship as neither ECM nor the independent variable was significant, which means that the results from the EC model did not support the previous results given in the static long-run regression, which indicated that these variables are cointegrated. Since this is the case, there is no long-run or short-run relationship between interest rates and the ratio of volume of shares traded to volume of shares listed. On the other hand, the interest rates model, which included the total value traded to market capitalization, contains a significant ECM at the one per cent level with a lag of one for the differenced independent variable and a lag of one and two for the differenced dependent variable. The value of $R^2$ of the model can be considered reasonable (0.61) reflecting a strong relationship, as well the diagnostic tests supported the assumptions behind this model (Appendix D). With regard to the sign of the coefficient of the independent variable from the static long-run equation given in Table 6.10, it is found to be negative, suggesting that there is a negative long-run relationship between the variables. However, the EC model also indicated that the differenced total value traded to market capitalization lagged for one year is significant at the one per cent level, which means that the total value traded to market capitalization may be affected in the short-run by its performance.
in the previous year. In the meantime, the lagged differenced interest rates were insignificant, suggesting that there is no short-run relationship between the variables. In this case, it can be concluded that the hypothesis, which stated that the total value traded to market capitalization increases as the interest rates decrease, cannot be rejected, implying a negative long-run relationship between the variables.

However, two out of three variables that represent market liquidity were not cointegrated with interest rates, in turn, the hypothesis, which stated that market liquidity increases as interest rates decrease, cannot be accepted or rejected totally. But it can be stated that there is a long-run relationship between interest rates and market liquidity, in terms of total value traded to market capitalization, where as the other variables may be affected by other economic reform programme variables or any unstated variables as well.

Finally, the order of integration for market concentration variables indicated that the percentage of the 10 biggest companies' share in value traded cannot be cointegrated with interest rates as they have different orders of integration, in turn, the hypothesis, which stated that the percentage of the 10 biggest companies' share in value traded decreases as interest rates decrease, cannot be accepted. On the other hand, the interest rates model which included the percentage of the 10 biggest companies' share in market capitalization contains a significant ECM at the five per cent level with a lag of zero and one for the differenced independent variable and lags of one and three for the differenced dependent variable. In the meantime, the value of $R^2$ of the interest rates model which incorporates the percentage of the 10 biggest companies' share in market capitalization was 0.55 reflecting a good model. As well the results from the diagnostic tests supported the assumptions behind this model (the
results can be shown in Appendix D). With regard to the sign of the coefficient of the independent variable from the static long-run equation given in Table 6.10, it is found to be positive suggesting that there is a positive long-run relationship between the variables. However, the EC model also indicated that the differenced interest rates, lagged for one year, seem to affect the percentage of the 10 biggest companies' share in market capitalization in the short-run at the ten per cent level. In this case, it can be concluded that the hypothesis, which stated that the percentage of the 10 biggest companies' shares in market capitalization decreases as the interest rates decrease, cannot be rejected, implying a positive long-run and short-run relationship between the variables.

In the above case, since the results indicated that interest rates have an impact on one of the market concentration variables, the hypothesis, which stated that the market concentration decreases as interest rates decrease, cannot be accepted or rejected totally, but it can be stated that interest rates have a negative relationship with market concentration in terms of the percentage of the 10 biggest companies’ share in market capitalization.

As a final conclusion, the interest rate models have indicated that interest rates have a long-run relationship with all areas of stock market performance in terms of market activity, market size, market liquidity and market concentration. In fact, this relationship was negative and, mainly, in the long-run for all stock market performance variables except for market concentration, as the relationship was positive and was both in the long-run and short-run. Indeed, from the above analysis, it can be concluded that the hypothesis, which stated that the stock market performance increases as the interest rates decrease cannot be rejected, even though, interest rates did not affect all stock market performance variables, but at least, affected all areas of the stock market performance with differenced variables.
6.4.2.3.4.2 Modelling the impact of real interest rates upon the stock market performance through error correction models:

The literature review given in chapter four indicated that there is a negative relationship between real interest rates and stock prices (Spiro 1990). With respect to the point of view which may argue that people may prefer to invest in banks rather than stock markets when real interest rates go up, hence, higher real interest rates may affect stock markets negatively; it should also be mentioned that real interest rates depend on the changes in both interest rates and the inflation rate as seen in Equation (6.2). Since this is the case, the impact of real rates of interest on stock markets will depend, mainly, upon its sign from the movements in interest rates and inflation rate. For example, if interest rates decreased more than the decrease in the inflation rate, this will generate a decrease in real interest rates as well, and in this case, the relationship between real interest rates and stock prices will be expected to be negative. On the other hand, if the decrease in interest rates was lower than the decrease in the inflation rate, this will generate an increase in real interest rates, and since the decrease in both interest rates and the inflation rate affects the stock market positively, the relationship between real interest rates and stock markets in this case is expected to be positive. As the latter case represents the same situation in Egypt, it can be argued that the relationship between real interest rates and the stock market performance is expected to be positive, in turn this section will concentrate on examining this relationship. The results of this relationship can be shown in two sections: the first section will concentrate on the relationship between real interest rates and market activity and the other section will deal with the relationship between real interest rates and market size, market liquidity and market concentration.
6.4.2.2.3.4.2.1 Modelling the impact of real interest rates upon market activity through error correction models:

The ADF unit root tests indicated that real interest rates and all market activity variables have the same order of integration, that is, these variables are integrated of order one. In turn, static long-run regressions have been performed using ordinary least squares (OLS) to test for a cointegration relationship between the variables. The outputs of this analysis are given in the following table, which summarizes the results of this test.

**Table 6.12**

<table>
<thead>
<tr>
<th>Description</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Prob.</th>
<th>F-Prob.</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y_{1,t}$</td>
<td>7.0113</td>
<td>0.3381</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.7666</td>
</tr>
<tr>
<td></td>
<td>27.581</td>
<td>3.0.46</td>
<td>0.0000</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>$y_{2,t}$</td>
<td>3.5906</td>
<td>0.20375</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.8324</td>
</tr>
<tr>
<td></td>
<td>20.439</td>
<td>2.2925</td>
<td>0.0000</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>$y_{3,t}$</td>
<td>10.860</td>
<td>0.36202</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.7469</td>
</tr>
<tr>
<td></td>
<td>27.992</td>
<td>4.0734</td>
<td>0.0000</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>$y_{4,t}$</td>
<td>5.4692</td>
<td>0.14368</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.663</td>
</tr>
<tr>
<td></td>
<td>9.0726</td>
<td>1.6166</td>
<td>0.0000</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>$y_{5,t}$</td>
<td>7.9374</td>
<td>0.19670</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.8736</td>
</tr>
<tr>
<td></td>
<td>23.275</td>
<td>2.2133</td>
<td>0.0000</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>% $y_{6,t}$</td>
<td>0.010201</td>
<td>0.0092470</td>
<td>0.2874</td>
<td>0.0000</td>
<td>0.428</td>
</tr>
<tr>
<td></td>
<td>0.35879</td>
<td>0.10707</td>
<td>0.0044</td>
<td>0.0044</td>
<td></td>
</tr>
</tbody>
</table>

The results from ADF unit root tests upon the residuals from each bivariate static long-run equation are given in Table 6.12 and indicate clearly that the residuals from the above six static long-run equations are integrated of order zero, suggesting that the variables in each bivariate relationship are cointegrated, that is, there is a long-run relationship between these variables. The next step is to run the EC models which can support or refute the cointegration relationship between the variables explaining both the long-run and short-run relationship simultaneously (see Appendix D for further details).
Table 6.13
The specific EC models for the impact of real interest rates upon market activity variables

<table>
<thead>
<tr>
<th>D.V</th>
<th>Length of Lags</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RHSV (F.P)</td>
<td>$R^2$ (F.P)</td>
<td>RHSV (F.P)</td>
<td>$R^2$ (F.P)</td>
<td>RHSV (F.P)</td>
</tr>
<tr>
<td>$\Delta y_{1,t}$</td>
<td>N.S.</td>
<td>0.28 (0.25)</td>
<td>N.S.</td>
<td>0.28 (0.25)</td>
<td>N.S.</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta y_{2,t}$</td>
<td>N.S.</td>
<td>0.02</td>
<td>N.S.</td>
<td>0.16</td>
<td>N.S.</td>
</tr>
<tr>
<td></td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta y_{3,t}$</td>
<td>Cons*</td>
<td>0.36 (0.054)</td>
<td>Cons*</td>
<td>0.36 (0.054)</td>
<td>Cons</td>
</tr>
<tr>
<td></td>
<td>$\Delta x_{2,t}$</td>
<td></td>
<td>$\Delta x_{2,t}$</td>
<td></td>
<td>$\Delta x_{2,t}$</td>
</tr>
<tr>
<td></td>
<td>ECM-1**</td>
<td></td>
<td>ECM-1**</td>
<td></td>
<td>ECM-1**</td>
</tr>
<tr>
<td>$\Delta y_{4,t}$</td>
<td>Cons***</td>
<td>0.42 (0.03)</td>
<td>Cons***</td>
<td>0.66 (0.004)</td>
<td>Cons*</td>
</tr>
<tr>
<td></td>
<td>$\Delta x_{2,t}$</td>
<td></td>
<td>$\Delta x_{2,t}$</td>
<td></td>
<td>$\Delta x_{2,t}$</td>
</tr>
<tr>
<td></td>
<td>ECM-1***</td>
<td></td>
<td>ECM-1***</td>
<td></td>
<td>ECM-1***</td>
</tr>
<tr>
<td>$\Delta y_{5,t}$</td>
<td>N.S.</td>
<td>0.18 (0.28)</td>
<td>N.S.</td>
<td>0.32 (0.18)</td>
<td>Cons</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% $\Delta y_{6,t}$</td>
<td>Cons**</td>
<td>0.38 (0.06)</td>
<td>Cons***</td>
<td>0.71 (0.003)</td>
<td>Cons*</td>
</tr>
<tr>
<td></td>
<td>$\Delta x_{2,t}$</td>
<td></td>
<td>$\Delta x_{2,t}$</td>
<td></td>
<td>$\Delta x_{2,t}$</td>
</tr>
<tr>
<td></td>
<td>ECM-1***</td>
<td></td>
<td>ECM-1***</td>
<td></td>
<td>ECM-1***</td>
</tr>
</tbody>
</table>

$x_2 =$ real interest rates.

As seen from the above table, the real interest rates models which take market activity as a dependent variable contain significant ECMs without exception, which seem to be consistent with the previous results from the static long-run regressions and the ADF unit root tests for the residuals. The ECMs were significant at the one per cent level for the value of trade, the number of transactions, the number of traded companies and the value of new issues (including capital increases). While the ECM was significant at five per cent level for volume of trade and at ten per cent level for value of new issues (including capital increases) as a
percentage of GDP. In addition, the diagnostic tests given in Appendix D for the EC models showed that the assumptions behind these models support the chosen models.

The real interest rate models, which include both the value of trade and the volume of trade contain significant ECMs with a lag of three for the differenced independent variable and a lag of one for the differenced dependent variable. With regard to the sign of the coefficients of the independent variable from the static long-run equation given in Table 6.12, it is found positive, suggesting that there is a positive long-run relationship between the variables. In the meantime, both differenced real interest rates with a lag of three and the differenced value of trade and the volume of trade with a lag of one were significant at the five percent level, suggesting that the value of trade and the volume of trade may be affected in the short run by changes in real interest rates and their previous values as well. Since the ECMs indicated a significant effect as well as the differenced independent variable, the hypothesis, which stated that the value of trade and the volume of trade increases as real interest rates increase, cannot be rejected, implying a positive long-run and short-run relationships between the variables.

With regard to the real interest rate model, which incorporate the number of transactions, the results showed that this model contains a significant ECM with lagged differenced real interest rates for three years, that is, confirming the cointegration relationship found in the static long-run equation given in Table 6.12. In addition, the coefficient of the differenced real interest rates lagged for three years is significant at the ten per cent level, suggesting a short-run relationship between the variables. Since the real interest rates showed a positive coefficient in the long-run static regression, the hypothesis, which stated that the number of transactions
increases as the real interest rates increase, cannot be rejected, that is, there is a positive long-run and short-run relationship between the variables.

Concerning the relationship between real interest rates and the number of traded companies, the EC model indicated a significant ECM with a lag of one for the differenced dependent variable and without lag for the differenced independent variable. However, the model indicted that the dependent variable lagged for one year was significant at the five per cent level, which means that the number of traded companies may be affected in the short-run by its performance in the previous year. In the meantime, the coefficient of the differenced interest rates indicated an insignificant affect, that is, there is no short-run relationship with the number of traded companies. In the meantime, the coefficient from the static long-run equation showed a positive sign, that is, a positive relationship between the variables. In this case, the hypothesis, which stated that the number of traded companies increases as the real interest rates increase, cannot be rejected, indicating a positive long-run relationship between the variables.

The real interest rate model which include the value of new issues (including capital increases) indicated a significant ECM with a lag of two for the differenced dependent variable and a lag of two and three for the differenced independent variable. However, the model indicated that the differenced dependent variable lagged for two years was significant at the five per cent level, which means that the value of new issues (including capital increases) may be affected in the short-run by its performance in the previous years. In the meantime, the coefficients of the differenced interest rates lagged for two and three years were significant at the five percent level, implying a short-run relationship between the variables. In addition, the coefficient from the static long-run equation indicated a positive sign, which means that the relationship
between the variables is positive. In turn, the hypothesis, which stated that value of new issues (including capital increases) increases as real interest rates increase, cannot be rejected, indicating a positive long-run and short-run relationship between the variables.

Lastly, the real interest rate model, which includes the value of new issues (including capital increases) as a percentage of GDP, indicated that the coefficient of the ECM is significant with a lag of one for the differenced dependent variable and a lag of three for the differenced independent variable. The model indicated that the coefficients of both the differenced dependent variable lagged for one year and the differenced independent variable lagged for three years are significant at the five per cent level, which means that value of new issues (including capital increases) as a percentage of GDP may be affected in the short-run by its performance in the previous year and also there is a short-run relationship with the independent variable. In addition, the coefficient from the static long-run equation indicated a positive sign, which means that the relationship between the variables is positive. In turn, the hypothesis, which stated that value of new issues (including capital increases) as a percentage of GDP increases as real interest rates increase, cannot be rejected, indicating a positive long-run and short-run relationship between the variables.

As a conclusion, it is clear enough that real interest rates have a significant impact on the market activity as all the six variables indicated a significant positive long-run relationship. As well, real interest rates seem to have a significant short-run relationship with all market activity variables except for the number of traded companies. However, the results revealed an expected behaviour for the market activity response to the increase in real interest rates as mentioned in the analysis given above, and the results seem to be inconsistent with the literature review, which argued an inverse relationship between real interest rates and stock
prices. In fact, as mentioned previously, the sign of the impact of real interest rates upon stock markets, depends mainly on the changes in both interest rates and the inflation rate. As in case of Egypt, the decrease in the inflation rate was higher than the decrease in interest rates, resulting in an increase in real interest rates. The reason behind the positive relationship between real interest rates and market activity variables is that investors may changed their type of investment from real estates, for example, to investment in the stock market as the latter seems to be more attractive to them. In the meantime, as real interest rates became positive, this may have encouraged people to save in banks and other financial institutions, hence, these financial institution have the opportunity to invest in the stock markets as they have the ability to encourage people to save with them. As a conclusion, all market activity variables benefited significantly from changes in the real interest rates. In all cases, the overall fit of the real interest rate models, including market activity variables, was good with $R^2$ ranging from 0.54 to 0.82, reflecting good models. Hence, the hypothesis, which stated that the market activity increases as the real interest rates increase, cannot be rejected, implying a positive relationship between the variables.

6.4.2.2.3.4.2.2 Modelling the impact of real interest rates upon market size, market liquidity and market concentration through error correction models: -

The results from ADF unit root tests indicated that some market size, market liquidity and market concentration variables are integrated of different orders from real interest rates. In turn, these variables, which were mentioned in the previous section, cannot be cointegrated with real interest rates. Hence, the hypotheses, which stated that market capitalization, market capitalization as a percentage of GDP, the number of listed companies and the total value traded to GDP increases as the real interest rates increase, cannot be accepted. Besides these, the hypothesis which stated that the percentage of the 10 biggest companies’ share in value
traded decreases as the real interest rates increase, cannot be accepted as well, implying that these variables are not cointegrated, in turn, there is no long-run relationship between these variables. Concerning the rest of the variables where shown to be integrated of the same order as real interest rates, that is, these variables are integrated of order one, static long-run regressions have been performed using ordinary least squares (OLS). The outputs of this analysis are given in the following table, which summarizes the results of this test.

Table 6.14
Static long-run models for the impact of real interest rates upon market size, market liquidity and market concentration variables

<table>
<thead>
<tr>
<th>Description</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Prob.</th>
<th>F-Prob.</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>y₁₀ₜ</td>
<td>6.3119</td>
<td>0.15687</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.688</td>
</tr>
<tr>
<td></td>
<td>10.499</td>
<td>1.7651</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% y₁₁ₜ</td>
<td>0.092844</td>
<td>0.024976</td>
<td>0.0021</td>
<td>0.0093</td>
<td>0.0093</td>
</tr>
<tr>
<td></td>
<td>0.86254</td>
<td>0.28920</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>y₁₂ₜ</td>
<td>-2.4103</td>
<td>0.17959</td>
<td>0.0000</td>
<td>0.0005</td>
<td>0.543</td>
</tr>
<tr>
<td></td>
<td>8.8153</td>
<td>2.0207</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>y₁₄ₜ</td>
<td>-2.7184</td>
<td>0.10185</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>9.9684</td>
<td>1.1460</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>y₁₅ₜ</td>
<td>-0.35985</td>
<td>0.025659</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.817</td>
</tr>
<tr>
<td></td>
<td>-2.4373</td>
<td>0.28871</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results from ADF unit root tests indicated clearly that the residuals from the above five static long-run equations are integrated of order zero, suggesting that the variables in each bivariate relationship are cointegrated, that is, there is a long-run relationship between these variables. However, EC models can represent the cointegration relationship between the variables explaining both long-run and short-run relationships simultaneously. The following table shows the final model of each lag. However, more details about general-to-specific procedures are given in Appendix D.
Table 6.15
The specific EC models for the impact of real interest rates upon market size, market liquidity and market concentration variables

<table>
<thead>
<tr>
<th>D.V</th>
<th>Length of Lags</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lag0</td>
<td>Lag1</td>
<td>Lag2</td>
<td>Lag3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RHSV</td>
<td>$R^2$ (F.P.)</td>
<td>RHSV</td>
<td>$R^2$ (F.P.)</td>
<td>RHSV</td>
<td>$R^2$ (F.P.)</td>
</tr>
<tr>
<td>$\Delta y_{10,t}$</td>
<td>N. S.</td>
<td>0.18 (0.27)</td>
<td>N. S.</td>
<td>0.21 (0.22)</td>
<td>Cons*</td>
<td>$\Delta y_{10,t-1}$</td>
</tr>
<tr>
<td>$% \Delta y_{11,t}$</td>
<td>Cons</td>
<td>0.52 (0.01)</td>
<td>Cons*</td>
<td>0.62 (0.01)</td>
<td>Cons*</td>
<td>$% \Delta y_{11,t-1}$</td>
</tr>
<tr>
<td>$\Delta y_{12,t}$</td>
<td>N. S.</td>
<td>0.14 (0.37)</td>
<td>Cons*</td>
<td>0.40 (0.097)</td>
<td>Cons*</td>
<td>$\Delta y_{12,t-1}$</td>
</tr>
<tr>
<td>$\Delta y_{14,t}$</td>
<td>N. S.</td>
<td>0.10 (0.51)</td>
<td>Cons*</td>
<td>0.59 (0.01)</td>
<td>Cons*</td>
<td>$\Delta y_{14,t-1}$</td>
</tr>
<tr>
<td>$\Delta y_{15,t}$</td>
<td>N. S.</td>
<td>0.14 (0.37)</td>
<td>N. S.</td>
<td>0.15 (0.57)</td>
<td>N. S.</td>
<td>0.28 (0.46)</td>
</tr>
</tbody>
</table>

$x_2 =$ real interest rates.

With regard to market size variables, the real interest rate models with these variables as dependent variables contain significant ECMs for both the volume of shares listed and the number of financial intermediaries at the five per cent level, respectively, supporting the cointegration relationship found in the static-long run equation given in Table 6.14. As well, the diagnostic tests given in Appendix D for the EC models showed that the assumptions behind the models supported the power of these models.
For the real interest rate model, which includes the volume of shares listed, the ECM was significant with a lag of one and two years for the differenced dependent variable and a lag of two years only for the differenced independent variable, suggesting a long-run relationship between real interest rates and the volume of shares listed. However, the model did not support any short-run relationship, as a differenced real interest rates was insignificant. The coefficient of the independent variable in the static long-run equation given in Table 6.14 indicated a positive sign, which implies a positive relationship between the variables. As this is the case, the hypothesis, which stated that volume of shares listed increases as the real interest rates increase, cannot be rejected, suggesting a positive long-run relationship between the variables.

The real interest rate model, which includes the number of financial intermediaries, contains a significant ECM with a lag of up to three for the differenced dependent variable and a lag of two and three for the differenced independent variable suggesting a long-run relationship between real interest rates and the number of financial intermediaries. In the meantime, the coefficients of the differenced dependent variable were significant at the five per cent level with a lag of one, two and three, suggesting that the number of financial intermediaries may be affected by its previous values in the short-run. In addition, the coefficient of the differenced independent variable lagged for three years was significant at the ten per cent level implying a short-run relationship between the variables. Since the coefficient of the independent variable in the static long-run equation given in Table 6.14 indicated a positive sign, this means that there is a positive relationship between the variables. Hence, the hypothesis, which stated that the number of financial intermediaries increases as the real interest rates increase, cannot be rejected, suggesting a positive long-run and short-run relationship between the variables.
It can be noticed that $R^2$ was just 0.37 for the relationship between real interest rates and the volume of shares listed, which seems to be small compared with 0.82 for the real interest rates model of the number of financial intermediaries, even though, still there is a long-run relationship between the variables, but the strength of the relationship between the variables in the equations depends upon the value of $R^2$.

As in the case like mentioned in the relationship between nominal interest rates and market size, the impact of real interest rates on market size as a whole is not clear enough, as three out of five variables which represent market size were integrated of other orders, hence were not cointegrated with interest rates. By contrast, the other two variables were shown to be cointegrated with real interest rates, in turn, the hypothesis, which stated that market size increases as real interest rates increase, cannot be accepted or rejected totally, but it can stated that, in terms of market capitalization, market capitalization as a percentage of GDP and the number of listed companies, the null hypothesis of no relationship between real interest rates and market size cannot be rejected. On the other hand, in terms of the volume of shares listed and the number of financial intermediaries, this hypothesis of a relationship between these variables and real interest rates cannot be rejected, hence, in general, real interest rates seem to affect market size.

Concerning market liquidity, the real interest rate models contain significant ECMs at the one per cent level. The real interest rate model of the relationship with the total value traded to market capitalization confirmed the cointegration relationship between the variables, as the ECM was significant with a lag of one for the differenced dependent variable and a lag of three for the differenced independent variable. However, the coefficient of the differenced dependent variable lagged for one year was significant at the one per cent level, supposing that
the total value traded to market capitalization can be affected by its previous value in the short-run. In the meantime, the coefficients of the differenced real interest rates lagged for three years were significant as well at the one per cent level, hence there is a short-run relationship between the variables. As the coefficient of the independent variable from the static long-run equation has a positive sign, then there is a positive relationship between the variables. In turn, the hypothesis, which stated that the total value traded to market capitalization increases as the real interest rates increase, cannot be rejected, indicating a long-run and short-run relationship between the variables.

The real interest rate model of the volume of shares traded to the volume of shares listed showed a significant ECM with a lag of one for the differenced dependent variable and lag one and three for the differenced independent variable. However, the coefficient of the differenced dependent variable lagged for one year was significant at the one per cent level supporting that the volume of shares traded to the volume of shares listed can be affected by its previous value in the short-run. In the meantime, the coefficients of the differenced real interest rates lagged one and three years were significant as well at the five per cent level, hence there is a short-run relationship between the variables. With regard to the sign of the coefficient of the independent variable from the static long-run equation given in Table 6.14, it is found to be positive, suggesting a positive relationship between the variables. In turn, it can be concluded that the hypothesis, which stated that the volume of shares traded to the volume of shares listed increases as the real interest rates increase, cannot be rejected, indicating a positive long-run and short-run relationship between the variables.

It is noticeable that the value of $R^2$ was 0.72 and 0.84 per cent for the real interest rate models of the relationship with the total value traded to market capitalization and the volume of shares
traded to the volume of shares listed, respectively, reflecting a good fit for both. Since two out of three variables, which represent market liquidity, were cointegrated with real interest rates, the hypothesis, which stated that the market liquidity increases as real interest rates increase, tends to be accepted indicating a positive long-run relationship between the variables.

Finally, as shown previously, the order of integration for the market concentration variables indicated that the percentage of the 10 biggest companies’ share in value traded cannot be cointegrated with real interest rates, as it has a different order of integration, in turn, the hypothesis which stated that the percentage of the 10 biggest companies’ share in value traded decreases as real interest rates increase, cannot be accepted. On the other hand, the real interest rate model with the percentage of the 10 biggest companies’ share in market capitalization contains a significant ECM at the ten per cent level with a lag of one and three for the differenced dependent variable and a lag of two for the differenced independent variable with a reasonable value of $R^2$ (0.48). In the meantime, the results from the diagnostic test supported the assumptions behind this model (the results can be shown in Appendix D). However, the EC model also indicated that the differenced dependent variable lagged for three years was significant at the ten per cent level suggesting that the percentage of the 10 biggest companies’ share in market capitalization seems to be affected by its previous value in the short-run, while the differenced real interest rate lagged for two year was insignificant, implying that there is no short-run relationship between the variables. With regard to the sign of the coefficient of the independent variable from the static long-run equation given in Table 6.14 it is found to be negative, suggesting that there is a negative long-run relationship between the variables. In this case, it can be concluded that the hypothesis, which stated that the percentage of the 10 biggest
companies' share in market capitalization decreases as the real interest rates increase, cannot be rejected, implying a negative long-run relationship between the variables.

In the above case, since the results indicated that real interest rates have an impact on one of the market concentration variables, the hypothesis, which stated that the market concentration decreases as real interest rates increase, cannot be accepted or rejected totally, but it can be stated that real interest rates have a negative relationship with market concentration in terms of the percentage of the 10 biggest companies' share in market capitalization.

As a final conclusion, real interest rates models of the relationship with stock market performance variables indicated clearly that real interest rates have a long-run relationship with all areas of stock market performance in terms of market activity, market size, market liquidity and market concentration. In fact, this relationship was positive and in the long-run and short-run as well for most of the stock market performance's areas except for market concentration as the relationship was negative and in the long-run only, as well as for the volume of shares listed as the relationship was in the long run only. Indeed, from the above analysis it can be concluded that the hypothesis, which stated that the stock market performance increases as the real interest rates increase, cannot be rejected, as real interest rates affected not only the majority of the stock market performance variables, but also all areas of the stock market performance as well.

6.4.2.2.3.4.3 Modelling the impact of the inflation rate upon the stock market performance through error correction models:

As indicated in chapter four, most empirical studies stated that there is a negative relationship between the inflation rate and stock prices and returns (see Lintner 1975, Body 1976, Jaffe and Mandelker 1976, Nelson 1976, Fama and Schwert 1977, and Fama 1981). They argued that
any increase in the inflation rate might reduce the expected real returns to investors from holding stocks, in turn, depressing stock prices. In addition, since the relationship between real activity and common stock returns is positive, and there is a negative relationship between the inflation rate and real activity, thereby the relationship between the inflation rate and stock returns should be expected to be negative. However, the empirical studies just examined the potential relationship between the inflation rate and both stock returns and prices, without mentioning the kind of relationship between the inflation rate and other aspects of stock market performance. In the light of the above, this section will deal with the impact of the inflation rate on the stock market performance. The results of this relationship can be shown in two sections: the first section will concentrate on the relationship between the inflation rate and market activity and the other section will deal with the relationship between the inflation rate and market size, market liquidity and market concentration.

6.4.2.3.4.3.1 Modelling the impact of the inflation rate upon market activity through error correction models: -

The ADF unit root tests indicated that the inflation rate and all market activity variables have the same order of integration, that is, these variables are integrated of order one. In turn, static long-run regressions have been performed using ordinary least squares (OLS) to test for cointegration relationships between the variables. The outputs of this analysis are given in the following table, which summarizes the results of this test.
Table 6.16
Static long-run models for the impact of the inflation rate upon market activity variables

<table>
<thead>
<tr>
<th>Description</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Prob.</th>
<th>F- Prob.</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y_{1,t}$</td>
<td>Constant</td>
<td>9.8830</td>
<td>0.74919</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>Expl. Variable</td>
<td>-23.747</td>
<td>3.7568</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>$y_{2,t}$</td>
<td>Constant</td>
<td>5.7633</td>
<td>0.44887</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>Expl. Variable</td>
<td>-17.842</td>
<td>2.2508</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>$y_{3,t}$</td>
<td>Constant</td>
<td>13.968</td>
<td>0.70823</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>Expl. Variable</td>
<td>-25.161</td>
<td>3.5514</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>$y_{4,t}$</td>
<td>Constant</td>
<td>6.3300</td>
<td>0.33344</td>
<td>0.0000</td>
<td>0.0004</td>
</tr>
<tr>
<td></td>
<td>Expl. Variable</td>
<td>-7.3525</td>
<td>1.6720</td>
<td>0.0004</td>
<td>0.0000</td>
</tr>
<tr>
<td>$y_{5,t}$</td>
<td>Constant</td>
<td>10.395</td>
<td>0.45794</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>Expl. Variable</td>
<td>-20.228</td>
<td>2.2963</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>$y_{6,t}$</td>
<td>Constant</td>
<td>-0.028540</td>
<td>0.018550</td>
<td>0.1447</td>
<td>0.0045</td>
</tr>
<tr>
<td></td>
<td>Expl. Variable</td>
<td>-0.31348</td>
<td>0.094065</td>
<td>0.0045</td>
<td>0.0045</td>
</tr>
</tbody>
</table>

The results from ADF unit root tests upon the residuals from each bivariate static long-run equation given in Table 6.16 indicate clearly that the residuals from the above six static long-run equations are integrated of order zero, suggesting that the variables in each bivariate relationship are cointegrated, that is, there is a long-run relationship between these variables. The EC models have been performed to explain both long-run and short-run relationships simultaneously (see Appendix D for further details).
### Table 6.17
The specific EC models for the impact of the inflation rate upon market activity variables

<table>
<thead>
<tr>
<th>D.V</th>
<th>Length of Lags</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lag0</td>
<td>Lag1</td>
</tr>
<tr>
<td></td>
<td>RHSV</td>
<td>$R^2$ (F.P)</td>
</tr>
<tr>
<td>$\Delta y_{1,t}$</td>
<td>N.S.</td>
<td>0.19 (0.25)</td>
</tr>
<tr>
<td>$\Delta y_{2,t}$</td>
<td>N.S.</td>
<td>0.02 (0.89)</td>
</tr>
<tr>
<td>$\Delta y_{3,t}$</td>
<td>Cons* $\Delta x_{3,t}$ ECM-1*</td>
<td>0.23 (0.18)</td>
</tr>
<tr>
<td>$\Delta y_{4,t}$</td>
<td>Cons*** $\Delta x_{3,t}$ ECM-1**</td>
<td>0.49 (0.012)</td>
</tr>
<tr>
<td>$\Delta y_{5,t}$</td>
<td>N.S.</td>
<td>0.18 (0.27)</td>
</tr>
<tr>
<td>$% \Delta y_{6,t}$</td>
<td>Cons* $\Delta x_{3,t}$ ECM-1*</td>
<td>0.30 (0.12)</td>
</tr>
</tbody>
</table>

$x_3 = \text{inflation rate}$

As seen from the above table, the inflation rate models of market activity as a dependent variable contains significant ECMs without exception, which seem to be consistent with the previous results of the tests for cointegration. The ECMs were significant at the one per cent
level for the first four variables: the value of trade, the volume of trade, the number of transactions and the number of traded companies. The ECMs were significant at the five per cent and ten per cent level for the value of new issues (including capital increases) and the value of new issues (including capital increases) as a percentage of GDP respectively. In addition, the diagnostic tests given in Appendix D for the EC models showed that the assumptions behind these models support the chosen models.

The inflation rate models of the relationship with the value of trade contains a significant ECM without a lag for the differenced independent variable and a lag of one and three for the differenced dependent variable. With regard to the sign of the coefficients of the independent variable from the static long-run equation given in Table 6.16, it is found to be negative, suggesting that there is a negative long-run relationship between the variables. In the meantime, the differenced inflation rate without a lag was significant at the ten per cent level, suggesting a short-run relationship between the variables. In addition, the differenced value of trade with a lag of one and three was significant at the five per cent and the ten per cent level, respectively, implying that the value of trade may be affected in the short run by its previous performance. Since the ECM indicated a significant effect as well as the differenced independent variable, the hypothesis, which stated that the value of trade increases as inflation rate decreases, cannot be rejected, implying a negative long-run and short-run relationship between the variables.

With regard to the inflation rate model of the relationship with the volume of trade, the results showed that this model contains a significant ECM with a lagged differenced inflation rate of one and three years and a lagged differenced dependent variable of one year, that is confirming
the cointegration relationship found in previous analysis. The lagged differenced dependent variable for one year was significant at the ten per cent level, suggesting that the value of trade may be affected in the short-run by its performance in the previous year. In addition, the coefficient of the differenced inflation rate lagged for three years was significant at the ten per cent level suggesting a short-run relationship between the variables. Since the inflation rate showed a negative coefficient in the long-run static regression, the hypothesis, which stated that the volume of trade increases as the inflation rate decreases, cannot be rejected, that is, there is a negative long-run and short-run relationship between the variables.

Concerning the inflation rate model of the relationship with the number of transactions, the results showed that this model contains a significant ECM with a lagged differenced inflation rate of one and three years, and a lagged differenced dependent variable of two and three years. The coefficient of the differenced dependent variable lagged for two years was significant at the ten per cent level suggesting that there is a short-run relationship between the number of transactions and the performance in the previous years. In the meantime, the coefficients of the differenced inflation rate with a lag of one and three years were significant at the ten and five per cent level, respectively, suggesting a short-run relationship between the variables. Since the inflation rate showed a negative coefficient in the long-run static regression, the hypothesis, which stated that the number of transactions increases as the inflation rate decreases, cannot be rejected, implying a negative long-run and short-run relationship between the variables.

The inflation rate model of the relationship with the number of traded companies contains a significant ECM with a lag one for differenced dependent variable and a lag of zero for the
differenced independent variable. However, the model indicated that the dependent variable lagged for one year was significant at the one per cent level, which means that the number of traded companies may be affected in the short-run by its performance in the previous year. In the meantime, the coefficient of the differenced inflation rate without a lag indicated an insignificant affect, that is, there is no short-run relationship with the number of traded companies. Since the coefficient from the static long-run equation showed a negative sign, that is means a negative relationship between the variables. In this case, the hypothesis, which stated that the number of traded companies increases as the inflation rate decreases, cannot be rejected, indicating a negative long-run relationship between the variables.

The inflation rate model, which incorporate the value of new issues (including capital increases) indicated a significant ECM with a lag of two and three for the differenced dependent variable and without a lag for the differenced independent variable. However, the model indicated that the differenced dependent variable lagged for two and three years was significant at the ten per cent and five per cent level, respectively, which means that the value of new issues (including capital increases) may be affected in the short-run by its performance in the previous years. In the meantime, the coefficient of the differenced inflation rate without a lag was significant at the ten per cent level, implying a short-run relationship between the variables. In addition, the coefficient from the static long-run equation indicated a negative sign, which means that the relationship between the variables is negative. In turn, the hypothesis, which stated that value of new issues (including capital increases) increases as inflation rate decreases, cannot be rejected, indicating a negative long-run and short-run relationship between the variables.
Lastly, the inflation rate model of the relationship with the value of new issues (including capital increases) as a percentage of GDP, indicated that the coefficient of the ECM is significant without a lag for the differenced independent variable. The model indicted that the coefficient of the differenced independent variable was insignificant, which means that there is no short-run relationship between the variables. In addition, the coefficient from the static long-run equation indicated a negative sign, which means that the relationship between the variables is negative. In turn, the hypothesis, which stated that value of new issues (including capital increases) as a percentage of GDP increases as inflation rate decreases, cannot be rejected, indicating a negative long-run relationship between the variables.

As a conclusion, it is clear enough that the inflation rate has a significant impact on the market activity as all the six variables indicated a significant negative long-run relationship. As well, the inflation rate seems to have a significant short-run relationship with all market activity variables except for the number of traded companies and the value of new issues (including capital increases) as a percentage of GDP. However, the results revealed an expected behaviour for the market activity response to the decrease in the inflation rate as mentioned in the analysis given above, and the results seem to be consistent with the literature review, which stated that there is an inverse relationship between the inflation rate and both stock returns and prices. In fact, the news about the level of inflation can depress or encourage the stock markets. In the case of Egypt, the inflation rate decreased sharply after the introduction of the economic reform programme due to tight fiscal and monetary policy. The decrease in the inflation rate may give a good sign to investors to invest in the stock market, as it means that there will be an expansion in the business sector, in turn, the returns of companies will increase. In the meantime, with a decrease in the inflation rate, it is expected that interest rates will decrease as well, and this will encourage investors to establish new firms and to find the
required finance with less cost. Besides this, many other investors may leave the investment in the real estates as they will be less profitable and may prefer to invest in the stock market, taking into account the fact that the savings in banks will be less attractive as the interest rates are expected to go down as mentioned previously. As a conclusion, all market activity variables benefited significantly from the changes in the inflation rate. In all cases, except for the inflation rate models of the relationship with the value of new issues (including capital increases) as a percentage of GDP, the overall fit of the inflation rate models of market activity was good with $R^2$ ranging from 0.57 to 0.82. Concerning the inflation rate models of the value of new issues (including capital increases) as a percentage of GDP, $R^2$ was 0.30, reflecting a slightly weak model. Even though, $R^2$ just reflects the strength of the relationship between the variables in the equation, but does not affect the existence of a cointegration between the variables. Therefore, the hypothesis, which stated that the market activity increases as inflation rate decreases, cannot be rejected.

6.4.2.3.4.3.2 Modelling the impact of the inflation rate upon market size, market liquidity and market concentration through error correction models:

The results from the ADF unit root tests indicated that some market size, market liquidity and market concentration variables are integrated of different orders from that of inflation rate. In turn, these variables cannot be cointegrated with the inflation rate. Hence, the hypotheses, which stated that market capitalization, market capitalization as a percentage of GDP, number of listed companies, and the total value traded to GDP increases as inflation rate decreases, cannot be accepted. Besides these, the hypothesis, which stated that the percentage of the 10 biggest companies’ share in value traded decreases as the inflation rate decreases, cannot be accepted as well, implying that these variables are not cointegrated. In turn, there is no long-
run relationship between these variables. Concerning the rest of the variables, which were shown to be integrated of the same order as the inflation rate, that is, these variables are integrated of order one, static long-run regressions were performed using ordinary least squares (OLS). The outputs of this analysis are given in the following table, which summarizes the results of this test.

Table 6.18
Static long-run models for the impact of the inflation rates upon market size, market liquidity and market concentration variables

<table>
<thead>
<tr>
<th>Description</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Prob.</th>
<th>F- Prob.</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y_{10,t}$</td>
<td>7.3967</td>
<td>0.34001</td>
<td>0.0000</td>
<td>0.0001</td>
<td>0.635</td>
</tr>
<tr>
<td></td>
<td>-8.9939</td>
<td>1.7050</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% $y_{11,t}$</td>
<td>0.18139</td>
<td>0.051046</td>
<td>0.0029</td>
<td>0.0131</td>
<td>0.345</td>
</tr>
<tr>
<td></td>
<td>-0.72812</td>
<td>0.25886</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_{12,t}$</td>
<td>-1.4716</td>
<td>0.36802</td>
<td>0.0010</td>
<td>0.0007</td>
<td>0.52</td>
</tr>
<tr>
<td></td>
<td>-7.7040</td>
<td>1.8454</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_{14,t}$</td>
<td>-1.6273</td>
<td>0.20597</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.822</td>
</tr>
<tr>
<td></td>
<td>-8.8736</td>
<td>1.0328</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_{15,t}$</td>
<td>-0.62870</td>
<td>0.050661</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.822</td>
</tr>
<tr>
<td></td>
<td>2.1810</td>
<td>8.585</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The residuals from the above five static long-run equations were integrated of order zero, suggesting that the variables in each bivariate relationship are cointegrated, that is, there is a long-run relationship between these variables. However, EC models can represent the cointegration relationship between the variables explaining both a long-run and short-run relationship simultaneously. The following table shows the final model of each lag. However, more details about general-to-specific procedures are given in Appendix D.
### Table 6.19

The specific EC models for the impact of inflation rate upon market size, market liquidity and market concentration variables

<table>
<thead>
<tr>
<th>D.V</th>
<th>Length of Lags</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lag0</td>
<td>Lag1</td>
<td>Lag2</td>
<td>Lag3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>RHSV</td>
<td>$R^2$</td>
<td>RHSV</td>
<td>$R^2$</td>
<td>RHSV</td>
</tr>
<tr>
<td></td>
<td>(F.P.)</td>
<td></td>
<td>(F.P.)</td>
<td></td>
<td>(F.P.)</td>
</tr>
<tr>
<td>$\Delta y_{10,t}$</td>
<td>N. S.</td>
<td>0.18</td>
<td>N. S.</td>
<td>0.20</td>
<td>0.33</td>
</tr>
<tr>
<td></td>
<td>(0.28)</td>
<td></td>
<td>(0.44)</td>
<td></td>
<td>(0.36)</td>
</tr>
<tr>
<td>$% \Delta y_{11,t}$</td>
<td>Cons</td>
<td>0.46</td>
<td>Cons</td>
<td>0.57</td>
<td>0.57</td>
</tr>
<tr>
<td></td>
<td>$\Delta x_{3,t}$</td>
<td>(0.025)</td>
<td>$\Delta x_{3,t}$</td>
<td>(0.02)</td>
<td>$\Delta x_{3,t}$</td>
</tr>
<tr>
<td></td>
<td>ECM-1***</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta y_{12,t}$</td>
<td>N. S.</td>
<td>0.11</td>
<td>N. S.</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>(0.49)</td>
<td></td>
<td>(0.31)</td>
<td></td>
<td>(0.31)</td>
</tr>
<tr>
<td>$\Delta y_{14,t}$</td>
<td>N. S.</td>
<td>0.09</td>
<td>Cons</td>
<td>0.57</td>
<td>0.57</td>
</tr>
<tr>
<td></td>
<td>$\Delta y_{14,t}$</td>
<td>(0.53)</td>
<td>$\Delta x_{3,t}$</td>
<td>(0.04)</td>
<td>$\Delta x_{3,t}$</td>
</tr>
<tr>
<td></td>
<td>ECM-1*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta y_{15,t}$</td>
<td>N. S.</td>
<td>0.10</td>
<td>N. S.</td>
<td>0.10</td>
<td>0.25</td>
</tr>
<tr>
<td></td>
<td>(0.51)</td>
<td></td>
<td>(0.51)</td>
<td></td>
<td>(0.53)</td>
</tr>
</tbody>
</table>

$x_3 = \text{inflation rate}$

The inflation rate models, using market size variables as dependent variables, contain significant ECMs at the ten per cent and one per cent level for both the volume of shares listed and the number of financial intermediaries, respectively. As well, the diagnostic tests given in Appendix D for the EC models showed that the assumptions behind the models supported the power of these models.
For the inflation rate model of the relationship with the volume of shares listed, the ECM was significant with a lag of one and two for the differenced dependent variable and without a lag for the differenced independent variable, suggesting a long-run relationship between the inflation rate and the volume of shares listed. However, the model did not support any short-run relationship, as the differenced inflation rate was insignificant as well as the differenced dependent variable. The coefficient of the independent variable in the static long-run equation given in Table 6.18 indicated a negative sign, which implies a negative relationship between the variables. As this is the case, the hypothesis, which stated that the volume of shares listed increases as the inflation rate decreases, cannot be rejected, suggesting a negative long-run relationship between the variables.

The inflation rate model for the number of financial intermediaries, contains a significant ECM without a lag for the differenced independent variable, suggesting a long-run relationship between the inflation rate and the number of financial intermediaries. However, the model did not support any short-run relationship, as the differenced inflation rate was insignificant. In the meantime, the coefficient of the independent variable in the static long-run equation given in Table 6.18 indicated a negative sign, so this means that there is a negative relationship between the variables. Hence, the hypothesis, which stated that the number of financial intermediaries increases as the inflation rate decreases, cannot be rejected, suggesting a negative long-run relationship between the variables.

It can be noticed that $R^2$ was just 0.33 and 0.46 for the inflation rate models using the volume of shares listed and the number of financial intermediaries respectively, which may reflect quite reasonable models. With respect to the value of $R^2$, although still there is a long-run
relationship between the variables, the strength of the relationship between the variables in the equations, depends upon the value of $R^2$.

As in the case mentioned in the relationship between interest rates and market size, the impact of the inflation rate on market size as a whole is not clear enough. In turn, the hypothesis, which stated that market size increases as the inflation rate decreases, cannot be accepted or rejected totally, but it can be stated that, in terms of the volume of shares listed and the number of financial intermediaries, this hypothesis of a relationship between these variables and the inflation rate cannot be rejected. Hence, in general, the inflation rate seem to affect market size.

Concerning market liquidity, the inflation rate models contain significant ECMs at the one per cent level. The inflation rate model of the relationship with the total value traded to market capitalization confirmed a cointegration relationship between the variables as the ECM was significant with a lag of one for the differenced dependent variable and a lag of three for the differenced independent variable. However, the coefficient of the differenced dependent variable lagged for one year was significant at the five per cent level supposing that the total value traded to market capitalization can be affected by its previous performance in the short-run. In the meantime, the coefficients of the differenced inflation rate lagged for three years were significant as well at the five per cent level, hence there is a short-run relationship between the variables. As the coefficient of the independent variable from the static long-run equation has a negative sign, then there is a negative relationship between the variables. In turn, the hypothesis, which stated that the total value traded to market capitalization increases
as the inflation rate decreases, cannot be rejected, indicating a long-run and short-run relationship between the variables.

The inflation rate model of the volume of shares traded to the volume of shares listed showed a significant ECM with a lag of one for the differenced dependent variable and a lag of one and three for the differenced independent variable. However, the coefficient of the differenced dependent variable lagged one year was significant at the one per cent level, suggesting that the volume of shares traded to the volume of shares listed can be affected by previous performance in the short-run. In the meantime, the coefficients of the differenced inflation rate lagged for one and three years were significant as well at the five per cent level. Hence there is a short-run relationship between the variables. With regard to the sign of the coefficient of the independent variable from the static long-run equation given in Table 6.18, it is found to be negative, suggesting a negative relationship between the variables. In turn, it can be concluded that the hypothesis, which stated that the volume of shares traded to the volume of shares listed increases as the inflation rate decreases, cannot be rejected, indicating a long-run and short-run relationship between the variables.

It is noticeable that the value of $R^2$ was 0.60 and 0.83 per cent for the inflation rate models of the total value traded to market capitalization and the volume of shares traded to the volume of shares listed, respectively, reflecting a good fit for both models. Since two out of three variables which represent market liquidity were cointegrated with the inflation rate, the hypothesis, which stated that the market liquidity increases as the inflation rate decreases, cannot be rejected, indicating a negative long-run relationship between the variables.
Finally, as shown previously, the order of integration for the market concentration variables indicated that the percentage of the 10 biggest companies' share in value traded cannot be cointegrated with the inflation rate, as it has a different order of integration. In turn, the hypothesis, which stated that the percentage of the 10 biggest companies' share in value traded decreases as the inflation rate decreases, cannot be accepted. On the other hand, the inflation rate model using the percentage of the 10 biggest companies' share in market capitalization contains a significant ECM at the ten per cent level with a lag of one, two and three for the differenced dependent variable and a lag of one for the differenced independent variable with a reasonable value of $R^2(0.54)$. In the meantime, the results from the diagnostic test supported the assumptions behind this model (the results can be shown in Appendix D). However, the EC model also indicated that the differenced dependent variable lagged for three years was significant at the ten per cent level, suggesting that the percentage of the 10 biggest companies' share in market capitalization seems to be affected by its previous performance in the short-run, while the differenced inflation rate lagged for two years was insignificant, implying that there is no short-run relationship between the variables. With regard to the sign of the coefficient of the independent variable from the static long-run equation given in Table 6.18, it is found to be positive, suggesting that there is a positive long-run relationship between the variables. In this case, it can be concluded that the hypothesis, which stated that the percentage of the 10 biggest companies' shares in market capitalization decreases as the inflation rate decreases, cannot be rejected, implying a positive long-run relationship between the variables.

In the above case, since the results indicated that the inflation rate can have an impact on one of the market concentration variables, the hypothesis, which stated that the market concentration decreases as the inflation rate decreases cannot be accepted or rejected totally,
but it can be stated that inflation rate has a positive relationship with market concentration in terms of the percentage of the 10 biggest companies' share in market capitalization.

From all the analysis shown above, it can be concluded that the inflation rate, clearly, has an impact upon all areas of stock market performance in terms of market activity, market size, market liquidity and market concentration. In fact, this relationship was negative and in the long-run and short-run as well for all market activity and market liquidity variables, except for the number of traded companies and the value of new issues (including capital increases) as a percentage of GDP as the relationship was in the long-run only. Besides that the total value traded to GDP did not indicate any kind of relationship with the inflation rate as it has a different order of integration. In the meantime, the results from the inflation rate models that use market size or market concentration variables, which have the same order of integration as the inflation rate, indicated a relationship in the long-run only, and it was negative for market size variables and positive for market concentration. Indeed, the results can support the hypothesis, which stated that the stock market performance increases as the inflation rate decreases, in turn, this hypothesis cannot be rejected as the inflation rate affected, not only the majority of the stock market performance variables, but all areas of the stock market performance as well.

6.4.2.3.4.4 Modelling the impact of the exchange rate stability upon the stock market performance through cointegration analysis: -

The relationship between the movement in the exchange rate and stock market performance has been paid little attention in previous empirical studies. However, most of empirical studies failed to find a significant relationship between the exchange rate and stock prices (see, Jorion 1991, Amihud 1993 and Bondnar and Gentry 1993). Recent studies that have stated this
relationship have indicated that the effect of the exchange rate on the stock market depends upon whether the country is export-dominant or import-dominant (1993). Meanwhile, both Abdalla and Murinde (1997) indicated that exchange rate "Granger-cause" stock prices in Korea, Pakistan and India. As stated in chapter four, fluctuation in exchange rates may change the attractiveness of the domestic stock market compared with other markets, in turn, the more fluctuation in the exchange rates the less attractive the market. In the light of this framework, this section will deal with the impact of exchange rate stability on stock market performance. The results of this relationship can be shown in the next section.

The ADF unit root tests indicated that exchange rate stability is integrated of order zero, where as most other stock market performance variables are integrated of order one. Hence, the exchange rate stability as an independent variable cannot be cointegrated with these variables as they cannot move together in the long-run. In turn, all the hypotheses which stated that the value of trade, the volume of trade, the number of transactions, the number of traded companies, the value of new issues (including capital increases), the value of new issues (including capital increases) as a percentage of GDP, the volume of shares listed, the number of financial intermediaries, the total value traded to market capitalization, the volume of shares traded to the volume of shares listed, increase as the exchange rate stability increases cannot be accepted. Besides this, the hypothesis which stated that the percentage of the 10 biggest companies' share in market capitalization decreases as the exchange rate stability increases cannot be accepted either. As this is the case, it is clear that exchange rate stability does not affect any market activity variables. Consequently, the hypothesis, which stated that the market activity increases as exchange rate stability increases cannot be accepted either. In fact, it may be concluded that local investors, who represent the majority of investors in the Egyptian stock...
market, did not pay attention to the exchange rate variable. Hence, the market activity variables tend to be affected by other economic reform programme variables.

Concerning the other aspects of stock market performance, some variables are to be integrated of order zero, hence, these variables are to be cointegrated with exchange rate stability, in turn, the residual from the static long-run relationship should be integrated of order zero as well (Charemza and Deadman 1992). The results of the static long-run relationship can be shown in the following table.

**Table 6.20**
Static long-run models for the impact of the exchange rate stability upon some stock market performance variables

<table>
<thead>
<tr>
<th>Description</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Prob.</th>
<th>F- Prob.</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$% y_{7,t}$</td>
<td>Constant Expl. Variable</td>
<td>-3.3942</td>
<td>0.18854</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14.754</td>
<td>2.1540</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>$y_{8,t}$</td>
<td>Constant Expl. Variable</td>
<td>-2.0032</td>
<td>0.12224</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9.9936</td>
<td>1.3966</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>$y_{9,t}$</td>
<td>Constant Expl. Variable</td>
<td>0.0344</td>
<td>0.012226</td>
<td>0.0133</td>
<td>0.754</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.04776</td>
<td>0.14955</td>
<td>0.754</td>
<td>0.754</td>
</tr>
<tr>
<td>$y_{13,t}$</td>
<td>Constant Expl. Variable</td>
<td>-4.0055</td>
<td>0.31036</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22.804</td>
<td>3.5458</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>$% y_{16,t}$</td>
<td>Constant Expl. Variable</td>
<td>-0.012278</td>
<td>0.16062</td>
<td>0.94</td>
<td>0.0458</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-4.2685</td>
<td>1.9598</td>
<td>0.0458</td>
<td>0.0458</td>
</tr>
</tbody>
</table>

$y_7 = $ market capitalization, $y_8 = $ market capitalization as a percentage of GDP, $y_9 = $ number of listed companies, $y_{13} = $ total value traded to GDP, $y_{16} = $ percentage of the 10 biggest companies' share in value traded.

As seen from the above table, some market size variables, which indicated the same order of integration as the exchange rate stability seem to be affected by the exchange rate stability in the long-run. However, $R^2$ was high for the first two variables, ranging between 0.74 to 0.76, and the coefficients of the exchange rate stability was positive and significant in both models, suggesting that there a positive long-run relationship between the variables. In turn, the hypotheses, which stated that the market capitalization and the market capitalization as a percentage of GDP increase as the exchange rate stability increases, cannot be rejected. On the
other hand, the results indicated that the coefficient of the exchange rate stability model of the number of listed companies is highly insignificant and the value of $R^2$ is too low. Hence, it cannot be argued that there is a long-run relationship between the variables. In fact, it is not a surprising result, as the previous analysis indicated that the number of listed companies did not witness a significant change after the introduction of the economic reform programme. Therefore, the hypothesis, which stated that the number of listed companies increases as the exchange rate stability increases, cannot be accepted.

As a conclusion, since the exchange rate stability affects two out of five variables which represent market size, it can be argued that the hypothesis, which stated that the market size increases as the exchange rate stability increases, cannot be rejected in terms of market capitalization and market capitalization as a percentage of GDP. The explanation of this relationship is that the stability of the exchange rate in Egypt after the introduction of the economic reform programme may encourage foreign investors to invest in the stock market, as well as attracting foreign firms and multinational companies, which are characterized by heavy capital, to work in Egypt and to be registered in the stock market.

With regard to the relationship between exchange rate stability and market liquidity, only one variable has the same order of integration as exchange rate stability, that is, total value traded to GDP. The result of the exchange rate stability with this variable, as given in Table 6.20 indicated that there is a long-run relationship between the variables, as the coefficient of the exchange rate stability was significant and $R^2$ was high as well (0.72). Since the coefficient from the static long-run regression showed a positive sign, the hypothesis, which stated that the total value traded to GDP increases as the exchange rate stability increases cannot be
rejected implying a positive long-run relationship between the variables. In the light of this, it may be argued that the hypothesis which stated that the market liquidity increases as exchange rate stability increases cannot be rejected as the results indicated that exchange rate stability has a positive impact upon one of the market liquidity variables, that is, the total value traded to GDP.

Lastly, the exchange rate stability model, which included market concentration in terms of the percentage of the 10 biggest companies’ share in value traded, indicated a significant coefficient for the exchange rate stability at the five per cent level. Even though, $R^2$ was slightly small, but this does not affect the fact that there is a long-run relationship between the variables. The sign of the coefficient given in the static long-run regression in Table 6.20 indicated a negative sign, that is, there is a negative long-run relationship between the variables. In turn, the hypothesis, which stated that the percentage of the 10 biggest companies’ share in value traded decreases as the exchange rate stability increases, cannot be rejected, implying a negative long-run relationship between the variables. As a conclusion the hypothesis which stated that the market concentration decreases as exchange rate stability increases cannot be rejected as the results indicated that exchange rate stability has a negative impact upon one of the two market concentration variables.

As a final conclusion, the exchange rate seems to affect the stock market performance except for market activity variables. In fact, as the exchange rate became more stable in Egypt, this attracted many investors and financial institutions to invest in Egypt, as the exchange rate risk became at its minimum level compared with before. Therefore, it is found from the analysis that exchange rate stability was positively significant for some market size and market
liquidity variables. On the other hand, it was significantly negative in relation to market concentration, in terms of the percentage of the 10 biggest companies' share in value traded. Indeed, from the above analysis it can be concluded that the hypothesis, which stated that the stock market performance increases as the exchange rate stability increases, cannot be rejected, as the exchange rate stability affected the majority of the stock market performance areas.

6.4.2.3.4.5 Modelling the impact of the real GDP growth rate upon the stock market performance through cointegration analysis:

The literature review given in chapter four indicated that there is a positive relationship between real economic activities such as the rate of growth and stock returns (see, Fama 1981, Koreisha and Partch 1985, Kwok 1992 and Lee 1992). As well, Jones (1994) stated that stock prices, in general, tend to decline as a recession is likely or underway, conversely, if a strong economic expansion is underway, stock prices will be heavily affected and tend to increase. In the light of the above, the relationship between real GDP growth rate and other stock market performance variables is expected to be positive. In the light of this framework, this section will deal with the impact of the real GDP growth rate on the stock market performance.

The ADF unit root tests indicated that all market activity variables have the same order of integration as the real GDP growth rate, where as some other variables which represent market size, market liquidity and market concentration cannot be cointegrated with the real GDP growth rate as they are integrated of a different order. In turn, the hypotheses which stated that the market capitalization, the market capitalization as a percentage of GDP, the number of listed companies and the total value traded to GDP increases as real GDP growth rate increases cannot be accepted as these variables cannot move together in the long-run. Besides this, the hypothesis, which stated that the percentage of the 10 biggest companies' shares in value traded decreases as real GDP growth rate increases, cannot be accepted as well.
With regard to other stock market performance variables which have the same order of integration as the real GDP growth rate, that is, these variables are integrated of order one, static long-run regression have been performed using ordinary least squares (OLS). The outputs of this analysis are given in the following table, which summarizes the results of this test.

Table 6.21
Static long-run models for the impact of real GDP growth rate upon stock market performance variables

<table>
<thead>
<tr>
<th>Description</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Prob.</th>
<th>F- Prob.</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y_{1,t}$</td>
<td>5.0069</td>
<td>1.8220</td>
<td>0.0143</td>
<td>0.7614</td>
<td>0.7614</td>
</tr>
<tr>
<td>$y_{2,t}$</td>
<td>2.5006</td>
<td>1.2996</td>
<td>0.0732</td>
<td>0.9989</td>
<td>0.9989</td>
</tr>
<tr>
<td>$y_{3,t}$</td>
<td>8.3648</td>
<td>1.8603</td>
<td>0.0004</td>
<td>0.5783</td>
<td>0.5783</td>
</tr>
<tr>
<td>$y_{4,t}$</td>
<td>4.8731</td>
<td>0.22685</td>
<td>0.0000</td>
<td>0.9989</td>
<td>0.9989</td>
</tr>
<tr>
<td>$y_{5,t}$</td>
<td>6.7443</td>
<td>1.4446</td>
<td>0.0003</td>
<td>0.9735</td>
<td>0.9735</td>
</tr>
<tr>
<td>% $y_{6,t}$</td>
<td>0.069947</td>
<td>0.030104</td>
<td>0.0346</td>
<td>0.1613</td>
<td>0.1613</td>
</tr>
<tr>
<td>$y_{10,t}$</td>
<td>5.6494</td>
<td>0.73384</td>
<td>0.0000</td>
<td>0.8840</td>
<td>0.8840</td>
</tr>
<tr>
<td>% $y_{11,t}$</td>
<td>0.0211</td>
<td>0.082650</td>
<td>0.8021</td>
<td>0.7131</td>
<td>0.7131</td>
</tr>
<tr>
<td>$y_{12,t}$</td>
<td>-3.6837</td>
<td>0.66091</td>
<td>0.0000</td>
<td>0.2194</td>
<td>0.2194</td>
</tr>
<tr>
<td>$y_{14,t}$</td>
<td>-2.8737</td>
<td>0.63594</td>
<td>0.0001</td>
<td>0.8677</td>
<td>0.8677</td>
</tr>
<tr>
<td>$y_{15,t}$</td>
<td>-0.16687</td>
<td>0.15558</td>
<td>0.2994</td>
<td>0.6752</td>
<td>0.6752</td>
</tr>
</tbody>
</table>

The results from ADF unit root tests upon the residuals from each bivariate static long-run equation given in Table 6.21 indicate clearly that the residuals from the above static long-run equations are not integrated of order zero, suggesting that the variables in each bivariate relationship cannot be cointegrated. In fact, it is not a surprising result, as the coefficients of
the real GDP growth rate in the static long-run equations were insignificant. In addition, the value of $R^2$ in all the above equations given in Table 6.21 indicated clearly that they are so low ranging between 0.12 and 0.00. Indeed, the real GDP growth rate was the only economic reform programme variable, which indicated an insignificant change prior to and after the introduction of the programme. As a conclusion, it can be argued that all the hypotheses, which stated that there is a relationship between the real GDP growth rate and the stock market performance, cannot be accepted. Even though, this result seems to be inconsistent with the literature review, but it is reflects the fact that this variable needs more attention from the Egyptian government in order to raises the standard of life for the society.

6.4.2.2.3.4.6 Modelling the impact of per capita income upon the stock market performance through error correction models: -

The literature review did not advocate attention to the impact of per capita income on stock market performance, however, it is argued that higher per capita income may affect the stock market performance positively. In turn, this section will concentrate on examining this relationship. The results of this relationship can be shown in two sections: the first section will concentrate on the relationship between per capita income and market activity and the other section will deal with the relationship between per capita income and market size, market liquidity and market concentration.

6.4.2.2.3.4.6.1 Modelling the impact of per capita income upon market activity through error correction models: -

The ADF unit root tests indicated that per capita income and all market activity variables have the same order of integration, that is, these variables are integrated of order one. In turn, static long-run regressions have been performed using ordinary least squares (OLS) to test for a
The results from ADF unit root tests upon the residuals from each bivariate static long-run equation given in Table 6.22 indicate clearly that the residuals from the above six static long-run equations are integrated of order zero, except for the last two variables. In fact, the coefficients of per capita income for both the value of new issues (including capital increases) and the value of new issues (including capital increases) as a percentage of GDP were insignificant, as given in the static long-run regressions shown in Table 6.22. In addition, the value of \( R^2 \) in both models was so low, in turn, it is not a surprising result to find the residual from each bivariate relationship is not integrated of order zero. As this is the case, these variables cannot move together with per capita income in the long-run, hence, the hypotheses, which stated that the value of new issues (including capital increases) and the value of new issues (including capital increases) as a percentage of GDP increase as the per capita income increases, cannot be accepted. On the other hand the first four variables seem to be cointegrated with per capita income as the residuals from the static long-run regression are
shown to be integrated of order zero, that is, there is a long-run relationship between these variables. The next step is to run the EC models which can support or refute the cointegration relationship between the variables explaining both long-run and short-run relationships simultaneously (see Appendix D for further details).

**Table 6.23**
The specific EC models for the impact of per capita income upon market activity variables

<table>
<thead>
<tr>
<th>D.V</th>
<th>Lag0</th>
<th>Lag1</th>
<th>Lag2</th>
<th>Lag3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RHSV</td>
<td>$R^2$</td>
<td>RHSV</td>
<td>$R^2$</td>
</tr>
<tr>
<td></td>
<td>(F.P)</td>
<td></td>
<td>(F.P)</td>
<td></td>
</tr>
<tr>
<td>$\Delta y_{1,t}$</td>
<td>N. S.</td>
<td>0.15</td>
<td>N. S.</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.38)</td>
<td></td>
<td>(0.38)</td>
</tr>
<tr>
<td>$\Delta y_{2,t}$</td>
<td>Cons***</td>
<td>0.28</td>
<td>Cons***</td>
<td>0.63</td>
</tr>
<tr>
<td></td>
<td>$\Delta y_{2,t-1}$</td>
<td></td>
<td>$\Delta y_{2,t-2}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\Delta y_{2,t-1}$</td>
<td></td>
<td>$\Delta y_{2,t-2}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>$\Delta x_{6,t-2}$</td>
<td></td>
<td>$\Delta x_{6,t-3}$</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ECM-1*</td>
<td></td>
<td>ECM-1*</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta y_{3,t}$</td>
<td>N. S.</td>
<td>0.03</td>
<td>N. S.</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>(0.85)</td>
<td></td>
<td>(0.61)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta y_{4,t}$</td>
<td>N. S.</td>
<td>0.03</td>
<td>N. S.</td>
<td>0.21</td>
</tr>
<tr>
<td></td>
<td>(0.84)</td>
<td></td>
<td>(0.65)</td>
<td></td>
</tr>
</tbody>
</table>

$X_6 = \text{per capita income}$

As seen from the above table, the per capita income models, which model the relationship with market activity as a dependent variable, contain significant ECMs excluding the number of traded companies. In fact, these results seem to be consistent with the previous results from the static long-run regressions and the ADF unit root tests for the residuals, with respect to the number of traded companies, as the EC model did not support the previous finding of an existing cointegration between the variables. In turn, the hypothesis, which stated that the
number of traded companies increases as per capita income increases, cannot be accepted, as no cointegration relationship has been found between the variables. For the rest of the variables, the ECMs were significant at the one per cent level for the volume of trade only and at the ten per cent level for the value of trade and the number of transactions. In addition, the diagnostic tests given in Appendix D for the EC models showed that the assumptions behind these models support the chosen models.

The per capita income model, which is based on the value of trade contains significant ECMs with a lag of two and three for the differenced independent variable. It is also worthwhile to mention that the differenced per capita income, lagged for two years, was significant at the ten per cent level, implying a short-run relationship between the variables. With regard to the sign of the coefficients of the independent variable from the static long-run equation given in Table 6.22, it is found to be positive, suggesting that there is a positive long-run relationship between the variables. Since the ECM indicated a significant effect as well as the differenced independent variable, the hypothesis, which stated that the value of trade increases as per capita income increases, cannot be rejected, implying a positive long-run and short-run relationship between the variables.

With regard to per capita income model based on the volume of trade, the results showed that this model contains a significant ECM without a lag and with a lag of one year for the differenced per capita income, while the differenced dependent variable in this model has been lagged for one year. In addition, the coefficients of the differenced per capita income without a lag and lagged for one year were significant at the ten per cent level, suggesting a short-run relationship between the variables. As well, the differenced dependent variable with a lag of one was significant at the five per cent level, suggesting that the volume of trade may be

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affected by its previous performance in the short-run. Since the coefficient of per capita income showed a positive sign in the long-run static regression, the hypothesis, which stated that the volume of trade increases as per capita income increases, cannot be rejected, that is, there is a positive long-run and short-run relationship between the variables.

Concerning per capita income model based on the number of transactions, the results showed that this model contain a significant ECM with a lagged differenced per capita income for up to three years, and for a lag of one and three for the differenced dependent variable. In fact, the coefficients of the differenced per capita income without a lag and a lagged for one and three years were significant at the five per cent, the ten per cent and the five per cent level, respectively, suggesting a short-run relationship between the variables. In the meantime, the number of transactions seems to be affected by previous performance as the differenced dependent variable lagged for one and three years were significant at the five per cent level. With regard to the coefficient of per capita income in the static long-run regression given in Table 6.22, it shown to have a positive coefficient, in turn, the hypothesis, which stated that the number of transactions increases as the per capita income increase, cannot be rejected, implying a positive long-run and short-run relationship between the variables.

It can be concluded that per capita income has a significant impact on market activity as three out of the six variables, which represent this area are shown to be cointegrated with per capita income, indicating a significant positive long-run and short-run relationship as well. However, the results revealed an expected behaviour for the market activity response to the increase in per capita income as mentioned in the analysis given previously. As per capita income increased in Egypt after the introduction of the economic reform programme, society has more
money to save and invest, in turn, one channel to invest is the stock market, hence, this may affect market activity as the more money people have, the greater the ability to invest, and the more injection of money in the stock market. As a conclusion, the market activity seems to have benefited significantly from the changes in the per capita income. In turn, the hypothesis, which stated that the market activity increases as per capita income increases, cannot be rejected, at least, with regard to the per capita income models based on the value of trade, the volume of trade and the number of transactions, as the overall fit of the per capita income models with these variables was good, with $R^2$ ranging from 0.52 to 0.81, reflecting good models.

6.4.2.3.4.6.2 Modelling the impact of per capita income upon market size, market liquidity and market concentration through error correction models:

The results from ADF unit root tests indicated that some market size, market liquidity and market concentration variables are integrated of different orders than per capita income. In turn, these variables, which are mentioned in the previous section, cannot be cointegrated with per capita income. Hence, the hypotheses, which stated that the market capitalization, the market capitalization as a percentage of GDP, the number of listed companies and the total value traded to GDP increase as per capita income increases, cannot be accepted. Besides these, the hypothesis, which stated that the percentage of the 10 biggest companies' share in value traded decreases as per capita income increases, cannot be accepted as well, implying that these variables are not cointegrated, in turn, there is no long-run relationship between these variables. Concerning the rest of variables which are shown to be integrated of the same order as per capita income, that is, these variables are integrated of order one, static long-run regressions have been performed using ordinary least squares (OLS). The outputs of this analysis are given in the following table, which summarizes the results of this test.
Table 6.24
Static long-run models for the impact of per capita income upon market size, market liquidity and market concentration variables

<table>
<thead>
<tr>
<th>Description</th>
<th>Coefficient (Expl. Variable)</th>
<th>Std. Error</th>
<th>t-Prob.</th>
<th>F- Prob.</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y_{10,t}$</td>
<td>Constant: 5.5086, 3.8694</td>
<td>0.25762, 1.9608</td>
<td>0.0000, 0.0672</td>
<td>0.0672, 0.206</td>
<td></td>
</tr>
<tr>
<td>$y_{11,t}$</td>
<td>Percentage: 0.035912, 0.16529</td>
<td>0.034567, 0.26310</td>
<td>0.3153, 0.5393</td>
<td>0.5393, 0.025</td>
<td></td>
</tr>
<tr>
<td>$y_{12,t}$</td>
<td>Constant: -3.2233, 4.4589</td>
<td>0.25465, 1.9382</td>
<td>0.0000, 0.0362</td>
<td>0.0362, 0.26</td>
<td></td>
</tr>
<tr>
<td>$y_{14,t}$</td>
<td>Constant: -3.5989, 4.2276</td>
<td>0.23801, 1.8116</td>
<td>0.0000, 0.0339</td>
<td>0.0339, 0.266</td>
<td></td>
</tr>
<tr>
<td>$y_{15,t}$</td>
<td>Constant: -0.14088, -1.1502</td>
<td>0.053697, 0.40870</td>
<td>0.0192, 0.0131</td>
<td>0.0131, 0.346</td>
<td></td>
</tr>
</tbody>
</table>

The results from ADF unit root tests indicated that the residuals from the above five static long-run equations are integrated of order zero except for the number of financial intermediaries. In turn, these results suggest that the variables in each bivariate relationship are cointegrated, that is, there is a long-run relationship between these variables. However, the results also indicated that the number of financial intermediaries cannot be cointegrated with per capita income, as the residual from this bivariate static long-run equation was not integrated of order zero. Hence, the hypothesis, which stated that the number of financial intermediaries increases as per capita income increases, cannot be accepted. For the variables, which seem to be cointegrated with per capita income, EC models will be run to support or refute this relationship between the variables, explaining both long-run and short-run relationships simultaneously. The following table shows the final model of each lag. However, more details about general-to-specific modelling procedures are given in Appendix D.
Table 6.25
The specific EC models for the impact of per capita income upon market size, market liquidity and market concentration variables

<table>
<thead>
<tr>
<th>D.V</th>
<th>Lag0</th>
<th>Lag1</th>
<th>Lag2</th>
<th>Lag3</th>
<th>RHSV</th>
<th>( R^2 )</th>
<th>( R^2 )</th>
<th>( R^2 )</th>
<th>( R^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \Delta y_{10,t} )</td>
<td>N. S.</td>
<td>0.05</td>
<td>0.05</td>
<td>0.12</td>
<td>N. S.</td>
<td>0.05</td>
<td>0.05</td>
<td>0.12</td>
<td>0.52</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.75)</td>
<td>(0.75)</td>
<td>(0.98)</td>
<td></td>
<td>(0.75)</td>
<td>(0.75)</td>
<td>(0.98)</td>
<td>(0.17)</td>
</tr>
<tr>
<td>( \Delta y_{12,t} )</td>
<td>N. S.</td>
<td>0.22</td>
<td>Cons</td>
<td>Cons</td>
<td>N. S.</td>
<td>0.39</td>
<td>Cons</td>
<td>Cons</td>
<td>0.55</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.22)</td>
<td>( \Delta y_{12,t-1} )</td>
<td>( \Delta x_{6,t} )</td>
<td></td>
<td>(0.13)</td>
<td>( \Delta x_{6,t} )</td>
<td>( \Delta x_{6,t-2} )</td>
<td>(0.09)</td>
</tr>
<tr>
<td>( \Delta y_{14,t} )</td>
<td>N. S.</td>
<td>0.03</td>
<td>Cons</td>
<td>Cons</td>
<td>N. S.</td>
<td>0.46</td>
<td>Cons</td>
<td>Cons</td>
<td>0.70</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.85)</td>
<td>( \Delta y_{14,t-1} )</td>
<td>( \Delta x_{6,t-1} )</td>
<td></td>
<td>(0.07)</td>
<td>( \Delta x_{6,t} )</td>
<td>( \Delta x_{6,t-1} )</td>
<td>(0.05)</td>
</tr>
<tr>
<td>( \Delta y_{15,t} )</td>
<td>N. S.</td>
<td>0.24</td>
<td>N. S.</td>
<td>N. S.</td>
<td>0.26</td>
<td>Cons</td>
<td>Cons</td>
<td>Cons</td>
<td>0.58</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.19)</td>
<td></td>
<td></td>
<td>(0.50)</td>
<td>( \Delta x_{6,t} )</td>
<td>( \Delta x_{6,t-2} )</td>
<td>( \Delta x_{6,t-3} )</td>
<td>(0.94)</td>
</tr>
</tbody>
</table>

\( \chi_6 = \) per capita income

As seen from the above table, the per capita income model based on the volume of shares listed as a dependent variable contains an insignificant ECM, that is, the cointegration relationship found in the previous analysis cannot be accepted, in turn, there is no long-run relationship between the variables. However, the model indicated that the differenced per capita income lagged for three years was significant at the five per cent level, suggesting a short-run relationship between the variables. Even though, since the ECM was insignificant, the hypothesis, which stated that the volume of shares listed increases as per capita income increases, cannot be accepted as both variables cannot move together in the long-run.

From the previous analysis, it is noticed that all market size variables cannot be cointegrated with per capita income as an independent variable, in turn, the hypothesis which stated that the
market size increases as per capita income increases cannot be accepted, hence, there is no relationship between these variables.

Concerning market liquidity, the per capita income models based on the variables representing this area, indicated a significant ECM based only up on the total value traded to market capitalization, at the ten per cent level, without a lag for the differenced independent variable and a lag of one for the differenced dependent variable. Additionally, well the results from the diagnostic test given in Appendix D support the assumptions behind this model. Besides this, the coefficients of both differenced independent and dependent variables were insignificant implying no short-run relationship between the variables. The sign of per capita income's coefficient given in the static-long run regression was positive, hence, the hypothesis which stated that the total value traded to market capitalization increases as per capita income increases cannot be rejected, that is, the long-run relationship between the variables indicated by the value of $R^2$, seems to be small, although positive.

On the other hand, the per capita income model based on the volume of shares traded to the volume of shares listed contains an insignificant ECM, which means that there is no long-run relationship between the variables, as they are not cointegrated. In the meantime, the coefficients of the differenced independent variable without lags and with lag two and the differenced dependent variable lagged for one year were significant at the ten per cent level for the independent variable and at the five per cent level for the dependent variable, suggesting that the volume of shares traded to the volume of shares listed may be affected in the short-run by per capita income, as well as its previous performance. Even though there is a short-run relationship between per capita income and the volume of shares traded to the volume of
shares listed, the two variables cannot move together in the long-run as they are not cointegrated, but the hypothesis, which stated that the volume of shares traded to the volume of shares listed increases as per capita income increases, cannot be accepted.

As a conclusion, the hypothesis which stated that the market liquidity increases as per capita income increases tends to be rejected as the previous analysis has clearly indicated, since per capita income is cointegrated with only one out of three variables, which represent market liquidity, at the ten per cent level. Hence, it seems that the overall relationship between per capita income as an independent variable and market liquidity as a dependent variable is not significant.

Finally, as mentioned previously, the order of integration for market concentration variables indicated that the percentage of the 10 biggest companies' share in value traded cannot be cointegrated with per capita income as it has a different order of integration. In turn, the hypothesis, which stated that the percentage of the 10 biggest companies' share in value traded decreases as per capita income increases, cannot be accepted. On the other hand, the per capita income model based on the percentage of the 10 biggest companies' share in market capitalization contains a significant ECM at the ten per cent level with a lag of three for the differenced independent variable and a lag of two for the differenced dependent variable, with a reasonable value of $R^2$ (0.58). In the meantime, the results from the diagnostic test support the assumptions behind this model (the results can be shown in Appendix D). However, the EC model has also indicated that the differenced independent variable lagged for three years was significant at the five per cent level, suggesting a short-run relationship between the variables. With regard to the sign of the coefficient of the independent variable from the static
long-run equation given in Table 6.24, it is found to be negative, suggesting that there is a negative long-run relationship between the variables. In this case, it can be concluded that the hypothesis, which stated that the percentage of the 10 biggest companies’ share in market capitalization decreases as per capita income increases, cannot be rejected, implying a negative long-run and short-run relationship between the variables.

In the above case, since the results indicated that per capita income has an impact on one of the market concentration variables, the hypothesis which stated that the market concentration decreases as per capita income increases cannot be accepted or rejected totally, but it can be stated that per capita income has a negative relationship with market concentration variables in terms of the percentage of the 10 biggest companies’ share in market capitalization.

As a final conclusion, per capita income models using stock market performance variables indicated, clearly, that per capita income does not have any long-run relationship with market size and nearly with market liquidity. On the other hand, per capita income tends to have an impact upon market activity and market concentration. In turn, the hypothesis, which stated that stock market performance increases as per capita income increases cannot be accepted or rejected totally, instead it can be concluded that per capita income, indeed, affects some aspects of stock market performance, in particular, market activity and market concentration.

6.4.2.2.3.4.7 Modelling the impact of the budget deficit upon the stock market performance through error correction models:

The empirical studies, which dealt with the relationship between the budget deficit and the stock market performance, seem to be rare. As seen in chapter four, the budget deficit may affect stock prices and returns directly or indirectly through its effect upon both the inflation rate and interest rates. The conclusion from these studies is that the budget deficit affects stock
returns and prices negatively, as well as depressing the stock market performance as a whole (see, Darrat 1988, 1990 and 1994, Caporate and Thorbecke 1993, and Rippe 1997). In the light of this framework, the relationship between the budget deficit and stock market performance is expected to be negative. In turn this section will concentrate upon examining this relationship. The results of this relationship can be shown in two sections: the first section will concentrate on the relationship between the budget deficit and market activity and the other section will deal with the relationship between the budget deficit and market size, market liquidity and market concentration.

6.4.2.2.3.4.7.1 Modelling the impact of the budget deficit upon market activity through error correction models: -

The ADF unit root tests indicated that the budget deficit and all market activity variables have the same order of integration, that is, these variables are integrated of order one. In turn, static long-run regressions have been performed using ordinary least squares (OLS) to test for a cointegration relationship between the variables. The outputs of this analysis are given in the following table, which summarizes the results of this test.

<table>
<thead>
<tr>
<th>Table 6.26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static long-run models for the impact of the budget deficit upon market activity variables</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Description</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Prob.</th>
<th>F- Prob.</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y_{1,t}$</td>
<td>Constant Expl. Variable</td>
<td>7.9002</td>
<td>0.62051</td>
<td>0.0000</td>
<td>0.0002</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-14.980</td>
<td>3.1945</td>
<td>0.0002</td>
<td>0.0002</td>
</tr>
<tr>
<td>$y_{2,t}$</td>
<td>Constant Expl. Variable</td>
<td>4.2403</td>
<td>0.41806</td>
<td>0.0000</td>
<td>0.0001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-11.043</td>
<td>2.1522</td>
<td>0.0000</td>
<td>0.0001</td>
</tr>
<tr>
<td>$y_{3,t}$</td>
<td>Constant Expl. Variable</td>
<td>11.798</td>
<td>0.63629</td>
<td>0.0000</td>
<td>0.0002</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-15.432</td>
<td>3.2757</td>
<td>0.0000</td>
<td>0.0002</td>
</tr>
<tr>
<td>$y_{4,t}$</td>
<td>Constant Expl. Variable</td>
<td>5.7099</td>
<td>0.25393</td>
<td>0.0000</td>
<td>0.0029</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-4.5990</td>
<td>1.3073</td>
<td>0.0000</td>
<td>0.0029</td>
</tr>
<tr>
<td>$y_{5,t}$</td>
<td>Constant Expl. Variable</td>
<td>8.5973</td>
<td>0.47736</td>
<td>0.0000</td>
<td>0.0002</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-12.068</td>
<td>2.4575</td>
<td>0.0000</td>
<td>0.0002</td>
</tr>
<tr>
<td>$% y_{6,t}$</td>
<td>Constant Expl. Variable</td>
<td>0.0036</td>
<td>0.014728</td>
<td>0.8101</td>
<td>0.0571</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-0.15845</td>
<td>0.076934</td>
<td>0.0571</td>
<td>0.0571</td>
</tr>
</tbody>
</table>
The results from the ADF unit root tests upon the residuals from each bivariate static long-run equation given in Table 6.26 indicate that, except for the value of trade, the residuals from the above static long-run equations are integrated of order zero, suggesting that the variables in each bivariate relationship are cointegrated, that is, there is a long-run relationship between these variables and the budget deficit. In the meantime, the hypothesis, which stated that the value of trade increases as the budget deficit decreases, cannot be accepted. The next step is to run the EC models which can support or refute the cointegration relationship between the variables explaining both long-run and short-run relationships simultaneously (see Appendix D for further details).

### Table 6.27
The specific EC models for the impact of the budget deficit upon market activity variables

<table>
<thead>
<tr>
<th>D.V</th>
<th>Length of Lags</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lag0 RHSV</td>
<td>R² (F.P.)</td>
<td>Lag1 RHSV</td>
<td>R² (F.P.)</td>
<td>Lag2 RHSV</td>
<td>R² (F.P.)</td>
<td>Lag3 RHSV</td>
</tr>
<tr>
<td>∆y₂,t</td>
<td>N.S.</td>
<td>0.13 (0.41)</td>
<td>N.S.</td>
<td>0.13 (0.41)</td>
<td>N.S.</td>
<td>0.13 (0.41)</td>
<td>N.S.</td>
</tr>
<tr>
<td>∆y₃,t</td>
<td>Cons* ∆x₇,t ∆x₃₄₋₂ ∆x₇,t ∆x₃₄₋₁ ECM-1*</td>
<td>0.26 (0.14)</td>
<td>Cons* ∆y₃₄₋₁ ECM-1*</td>
<td>0.30 (0.22)</td>
<td>Cons* ∆y₃₄₋₂ ∆x₇,t ∆x₃₄₋₁ ECM-1**</td>
<td>0.35 (0.17)</td>
<td>Cons* ∆y₃₄₋₂ ∆x₇,t ∆x₃₄₋₁ ECM-1***</td>
</tr>
<tr>
<td>∆y₄,t</td>
<td>Cons*** ∆x₇,t ∆x₃₄₋₁ ECM-1***</td>
<td>0.46 (0.02)</td>
<td>Cons*** ∆y₃₄₋₁ ECM-1***</td>
<td>0.81 (0.000)</td>
<td>Cons*** ∆y₃₄₋₁ ∆x₇,t ∆x₃₄₋₁ ECM-1**</td>
<td>0.77 (0.003)</td>
<td>Cons*** ∆y₃₄₋₁ ∆x₇,t ∆x₃₄₋₁ ECM-1***</td>
</tr>
<tr>
<td>∆y₅,t</td>
<td>N.S.</td>
<td>0.11 (0.48)</td>
<td>N.S.</td>
<td>0.17 (0.50)</td>
<td>Cons*** ∆y₅₄₋₁ ECM-1***</td>
<td>0.50 (0.85)</td>
<td>N.S.</td>
</tr>
<tr>
<td>%∆y₆,t</td>
<td>N.S.</td>
<td>0.17 (0.32)</td>
<td>Cons** %∆y₆₋₁ ECM-1</td>
<td>0.77 (0.000)</td>
<td>Cons** %∆y₆₋₁ ∆x₇,t ECM-1**</td>
<td>0.86 (0.01)</td>
<td>Cons** %∆y₆₋₁ ∆x₇,t ECM-1***</td>
</tr>
</tbody>
</table>

x₇ = budget deficit
As seen from the above table, the budget deficit models using market activity as a dependent variable contain significant ECMs except for the volume of trade, which seem to be consistent with the previous results from the static long-run regressions and the ADF unit root tests for the residuals. The only exception was the budget deficit model based on the volume of trade, as the results refuted the previous findings, in turn the hypothesis, which stated that the volume of trade increases as the budget deficit decreases, cannot be accepted. For the rest of the variables, the ECMs were significant at the one per cent level for the budget deficit models based on the number of traded companies and the value of new issues (including capital increases) as a percentage of GDP, while the ECMs were significant at the five per cent level for the budget deficit models, which include the number of transactions and the value of new issues (including capital increases). In addition, the diagnostic tests given in Appendix D for the EC models showed that the assumptions behind these models support the chosen models.

The budget deficit model based on the number of transactions contains a significant ECM with a lag of one for the differenced independent variable and a lag of two for the differenced dependent variable, supporting the cointegration relationship between the variables. In the meantime, the coefficients of both the differenced independent and dependent variable were insignificant implying no short-run relationship found in the model. With regard to the sign of the coefficients of the independent variable from the static long-run equation given in Table 6.26, it is found to be negative, suggesting that there is a negative relationship between the variables. In turn, the hypothesis, which stated that the number of transactions increases as the budget deficit decreases, cannot be rejected, implying a negative long-run relationship between the variables.
Concerning the relationship between the budget deficit and the number of traded companies, the EC model indicated a significant ECM without a lag for the differenced dependent variable and with a lag of one for the differenced dependent variable. However, the model indicted that the differenced independent variable was significant at the ten per cent level, supporting the existence of a short-run relationship between the variables, while the differenced dependent variable lagged for one year was significant at the one per cent level, which means that the number of traded companies may be affected in the short-run by its performance in the previous year. In the meantime, the coefficient of the budget deficit given in the static long-run equation showed a negative sign, that is, a negative relationship between the variables. In this case, the hypothesis, which stated that number of traded companies increases as the budget deficit decreases, cannot be rejected, indicating a negative long-run and short-run relationship between the variables.

With regard to the budget deficit model based on the value of new issues (including capital increases), the model indicated a significant ECM with a lag of one for the differenced independent variable and a lag of two for the differenced dependent variable. In addition, the model indicated that the differenced dependent variable lagged for two years was significant at the one per cent level, which means that the value of new issues (including capital increases) may be affected in the short-run by its performance in the previous years. In the meantime, the coefficient for the lagged differenced budget deficit was insignificant, that is, there was no short-run relationship between the variables. However, the coefficient for the budget deficit as an independent variable indicated a negative sign in the static long-run equation given in Table 6.26, which means that the relationship between the variables is negative. In turn, the hypothesis, which stated that the value of new issues (including capital increases) increases as
the budget deficit decreases, cannot be rejected, indicating a negative long-run and short-run relationship between the variables.

The budget deficit model based upon the value of new issues (including capital increases) as a percentage of GDP indicated that the coefficient of the ECM is significant with a lag of three for the differenced independent variable and a lag of one for the differenced dependent variable. The model indicated that the coefficients of both the differenced independent variable lagged for three years and the differenced dependent variable lagged for one year are significant at the ten per cent and the one per cent level, respectively. In fact, this means that there is a short-run relationship between the variables, as well as implying that the value of new issues (including capital increases) as a percentage of GDP may be affected in the short-run by its performance in the previous year. In addition, the coefficient from the static long-run equation indicated a negative sign, which means that the relationship between the variables is negative. In turn, the hypothesis, which stated that the value of new issues (including capital increases) as a percentage of GDP increases as the budget deficit decreases, cannot be rejected, indicating a negative long-run and short-run relationship between the variables.

From the above analysis, it can be concluded that even though the budget deficit did not affect all market activity variables, but it affected most of them as the results have indicated clearly that the budget deficit and four out of the six variables are cointegrated. As seen in the previous analysis, both the value of trade and the volume of trade seem to be not cointegrated with the budget deficit. One possible reason behind this is that local investors have a majority dealing in the stock market, and they may not take the budget deficit in their consideration when they invest in the stock market. On the other hand, other financial institutions have the
ability to analyze and consider many economic indicators such as the budget deficit. In turn, this may also be another reason, for example, for cointegration between budget deficit and both the value of new issues (including capital increases) and the value of new issues (including capital increases) as a percentage of GDP, as they can provide the preferred finance for firms, compared with individual investors. As a conclusion, it seems that market activity variables benefited significantly from the changes in the budget deficit. In all cases, the overall fit of the budget deficit models with the market activity variables was good except for the budget deficit model based on the number of transactions. The $R^2$ ranging from 0.50 to 0.84, for budget deficit models of the relationship with the last three variables reflect good models. As this the case, the hypothesis, which stated that the market activity increases as the budget deficit decreases, cannot be rejected, implying a long-run relationship between the variables.

6.4.2.3.4.7.2 Modelling the impact of the budget deficit upon market size, market liquidity and market concentration through error correction models:

The results from the ADF unit root tests indicated that some market size, market liquidity and market concentration variables are integrated of different orders from the budget deficit. In turn, these variables, which are mentioned in the previous section, cannot be cointegrated with the budget deficit. Hence, the hypotheses, which stated that the market capitalization, the market capitalization as a percentage of GDP, the number of listed companies and the total value traded to GDP increase as budget deficit decreases, cannot be accepted. Besides these, the hypothesis which stated that the percentage of the 10 biggest companies' share in value traded decreases as the budget deficit decreases, cannot be accepted as well, implying that these variables are not cointegrated, in turn, there is no long-run relationship between these variables. Concerning the rest of the variables, which showed to be integrated of the same order as the budget deficit, that is, these variables are integrated of order one, static long-run
regression have been performed using ordinary least squares (OLS). The outputs of this analysis are given in the following table, which summarizes the results of this test.

Table 6.28
Static long-run models for the impact of the budget deficit upon market size, market liquidity and market concentration variables

<table>
<thead>
<tr>
<th>Description</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Prob.</th>
<th>F- Prob.</th>
<th>$R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$y_{10,t}$</td>
<td>6.5880</td>
<td>0.28475</td>
<td>0.0000</td>
<td>0.0023</td>
<td>0.45</td>
</tr>
<tr>
<td>Constant (Exp. Variable)</td>
<td>-5.3061</td>
<td>1.4660</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$% y_{11,t}$</td>
<td>0.013053</td>
<td>0.034334</td>
<td>0.0017</td>
<td>0.0105</td>
<td>0.36</td>
</tr>
<tr>
<td>Constant (Exp. Variable)</td>
<td>-0.52403</td>
<td>0.17936</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_{12,t}$</td>
<td>-2.0979</td>
<td>0.27129</td>
<td>0.0000</td>
<td>0.0026</td>
<td>0.44</td>
</tr>
<tr>
<td>Constant (Exp. Variable)</td>
<td>-4.9674</td>
<td>1.3966</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_{14,t}$</td>
<td>-2.3445</td>
<td>0.18163</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.70</td>
</tr>
<tr>
<td>Constant (Exp. Variable)</td>
<td>-5.7482</td>
<td>0.93506</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$y_{15,t}$</td>
<td>-0.44362</td>
<td>0.048580</td>
<td>0.0000</td>
<td>0.0001</td>
<td>0.65</td>
</tr>
<tr>
<td>Constant (Exp. Variable)</td>
<td>1.3569</td>
<td>0.25010</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results from the ADF unit root tests indicated clearly that the residuals from the above five static long-run equations are integrated of order zero, except for the relationship between budget deficit and the percentage of the 10 biggest companies’ share in market capitalization. In turn, the hypothesis which stated that the percentage of the 10 biggest companies’ share in market capitalization decreases as the budget deficit decreases cannot be accepted as both variables are not cointegrated. In the light of the above, the hypothesis which stated that the market concentration decreases as the budget deficit decreases cannot be accepted as the previous results have indicated clearly that the budget deficit is not cointegrated with any of the market concentration variables. Turning again to those variables, which are shown to be cointegrated with the budget deficit, EC models will be performed in order to explain both long-run and short-run relationships between the cointegrated variables simultaneously. The following table shows the final model for each lag. However, more details about general-to-specific modelling procedures are given in Appendix D.
Table 6.29
The specific EC models for the impact of the budget deficit upon market size, market liquidity and market concentration variables

<table>
<thead>
<tr>
<th>D.V</th>
<th>Length of Lags</th>
<th>R² (F.P)</th>
<th>R² (F.P)</th>
<th>R² (F.P)</th>
<th>R² (F.P)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lag0</td>
<td>Lag1</td>
<td>Lag2</td>
<td>Lag3</td>
<td></td>
</tr>
<tr>
<td>Δy₁₀,t</td>
<td>N.S.</td>
<td>0.18 (0.28)</td>
<td>N.S.</td>
<td>0.20 (0.23)</td>
<td>Cons*** Δx₁₀,t-2 ECM-1*</td>
</tr>
<tr>
<td>%Δy₁₁,t</td>
<td>Cons Δx₁₁,t ECM-1**</td>
<td>0.52 (0.01)</td>
<td>Cons %Δy₁₁,t-1 Δx₁₁,t-1 ECM-1***</td>
<td>0.64 (0.01)</td>
<td>Cons %Δy₁₁,t-1 Δx₁₁,t-2 ECM-1***</td>
</tr>
<tr>
<td>Δy₁₂,t</td>
<td>N.S.</td>
<td>0.07 (0.61)</td>
<td>N.S.</td>
<td>0.22 (0.37)</td>
<td>Cons** Δy₁₂,t-2 ECM-1**</td>
</tr>
<tr>
<td>Δy₁₄,t</td>
<td>N.S.</td>
<td>0.10 (0.50)</td>
<td>N.S.</td>
<td>0.39 (0.10)</td>
<td>N.S.</td>
</tr>
</tbody>
</table>

x₇ = budget deficit

Concerning market size variables, the budget deficit models based on these variables as dependent variables contain significant ECMs for both the volume of shares listed and the number of financial intermediaries at the ten per cent and the one per cent level, respectively, supporting the cointegration relationship found in the previous analysis. As well, the diagnostic tests given in Appendix D for the EC models showed that the assumptions behind the models support the power of these models.

For the budget deficit model based on the volume of shares listed, the ECM was significant with a lag of two for the differenced independent variable, suggesting a long-run relationship between budget deficit and the volume of shares listed. However, the model did not support any short-run relationship as the differenced independent variable was insignificant. The coefficient of the independent variable in the static long-run equation given in Table 6.28...
indicated a negative sign, which implies a negative relationship between the variables. As this is the case, the hypothesis, which stated that the volume of shares listed increases as the budget deficit decreases, cannot be rejected, suggesting a negative long-run relationship between the variables.

The budget deficit model based on the number of financial intermediaries contains a significant ECM with a lag of one for both the differenced independent variable and the differenced dependent variable, suggesting a long-run relationship between the budget deficit and the number of financial intermediaries. In the meantime, the coefficients of the differenced dependent variable were significant at the ten per cent level with a lag of one, suggesting that the number of financial intermediaries may be affected by its previous values in the short-run. In addition, the coefficient of the differenced independent variable lagged for one year was insignificant, implying no short-run relationship between the variables. Since the coefficient of the independent variable in the static long-run equation given in Table 6.28 indicated a negative sign, this means that there is a negative relationship between the variables. Hence, the hypothesis, which stated that the number of financial intermediaries increases as the budget deficit decreases, cannot be rejected, suggesting a negative long-run relationship between the variables.

It can be noticed that $R^2$ was just 0.24 for the relationship between the budget deficit and the volume of shares listed, which seems to be small compared with 0.64 for the budget deficit model based on the number of financial intermediaries. However, there is still a long-run relationship between the variables but the strength of the relationship between the variables in the equations depends upon the value of $R^2$. 

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As a conclusion, the impact of the budget deficit on market size as a whole is not clear enough, as three out of the five variables which represent market size were integrated of other orders, hence were not cointegrated with the budget deficit. Since the other two variables were shown to be cointegrated with the budget deficit, in turn, the hypothesis, which stated that the market size increases as the budget deficit decreases cannot be accepted or rejected totally. But it can be stated that, in terms of the market capitalization, the market capitalization as a percentage of GDP and the number of listed companies, the null hypothesis of no overall relationship between the budget deficit and the market size cannot be accepted. On the other hand, in terms of the volume of shares listed and the number of financial intermediaries, the hypothesis of a relationship between these variables and the budget deficit cannot be rejected. Hence, in general, the budget deficit seems to affect the market size.

Concerning the variables representing market liquidity, budget deficit models indicated a significant ECM with only the total value traded to market capitalization at the five per cent level with a lag of two for the differenced independent variable and lag of one for the differenced dependent variable. As well as, the results from the diagnostic tests given in Appendix D support the assumptions behind this model. In addition, the coefficient of the differenced dependent variable was significant at the five per cent level, implying that the total value traded to market capitalization seems to be affected by its previous performance in the short-run. On the other hand, the model did not support any short-run relationship between the budget deficit and the total value traded to market capitalization, as the coefficient of the differenced independent variable was insignificant. The sign of the budget deficit's coefficient given in the static-long run regression was negative. Hence, the hypothesis, which stated that the total value traded to market capitalization increases as budget deficit decreases, cannot be
rejected, that is, there is a negative long-run relationship between the variables with a reasonable value of $R^2$.

On the other hand, the budget deficit model based on the volume of shares traded to the volume of shares listed contains an insignificant ECM, which means that there is no long-run relationship between the variables as they are not cointegrated; that is, this model refuted the previous finding about the existence of a cointegration relationship between the variables. In turn, the hypothesis, which stated that the volume of shares traded to the volume of shares listed increases as budget deficit decreases, cannot be accepted.

As a conclusion, the hypothesis which stated that the market liquidity increases as the budget deficit decreases tends to be rejected as the previous analysis has indicated clearly that the budget deficit is cointegrated with only one out of three variables representing market liquidity, hence, it seems that the relationship between the budget deficit as an independent variable and market liquidity as a dependent variable is insignificant.

From the above analysis, it can be noticed that the budget deficit models of the relationship with stock market performance variables are not significant in all cases. For instance, the results indicated clearly that the budget deficit does not have any long-run relationship with both market concentration and nearly with market liquidity, as it was cointegrated with only one out of three variables representing market liquidity. On the other hand, the budget deficit tends to have an impact upon market activity and market size. In turn, the hypothesis which stated that the stock market performance increases as the budget deficit decreases cannot be accepted or rejected totally, instead it can be concluded that the budget deficit, indeed, affects some aspects of stock market performance, in particular, market activity and market size.
After all the above analysis, which has concentrated upon the bivariate relationships between the economic reform programme, the point now is to determine whether the hypothesis which stated that there is a significant relationship between the economic reform programme variables and the overall stock market performance variables can be rejected or not. In order to state this relationship, the following table summarizes all the above results found in the cointegration analysis and EC models.
Table 6.30
Table summarizing the relationship between the economic reform programme variables and the stock market performance variables:

<table>
<thead>
<tr>
<th>Description</th>
<th>$x_1$</th>
<th>$x_2$</th>
<th>$x_3$</th>
<th>$x_4$</th>
<th>$x_5$</th>
<th>$x_6$</th>
<th>$x_7$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L-R</td>
<td>S-R</td>
<td>L-R</td>
<td>S-R</td>
<td>L-R</td>
<td>S-R</td>
<td>L-R</td>
</tr>
<tr>
<td>$y_1$</td>
<td>**</td>
<td>-</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>*</td>
<td>-</td>
</tr>
<tr>
<td>$y_2$</td>
<td>**</td>
<td>-</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>*</td>
<td>-</td>
</tr>
<tr>
<td>$y_3$</td>
<td>**</td>
<td>*</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>*</td>
<td>-</td>
</tr>
<tr>
<td>$y_4$</td>
<td>**</td>
<td>-</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>*</td>
<td>-</td>
</tr>
<tr>
<td>$y_5$</td>
<td>**</td>
<td>*</td>
<td>**</td>
<td>**</td>
<td>**</td>
<td>*</td>
<td>-</td>
</tr>
<tr>
<td>$y_6$</td>
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<tr>
<td>$y_7$</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
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<td></td>
<td>n.a.</td>
</tr>
<tr>
<td>$y_8$</td>
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<td>-</td>
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<td></td>
<td></td>
<td></td>
<td>n.a.</td>
</tr>
<tr>
<td>$y_9$</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>n.a.</td>
</tr>
<tr>
<td>$y_{10}$</td>
<td>*</td>
<td>-</td>
<td>*</td>
<td>-</td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>$y_{11}$</td>
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<td>**</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>$y_{12}$</td>
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<tr>
<td>$y_{13}$</td>
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<td>-</td>
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<td>n.a.</td>
</tr>
<tr>
<td>$y_{14}$</td>
<td></td>
<td>-</td>
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<td></td>
<td></td>
<td>n.a.</td>
</tr>
<tr>
<td>$y_{15}$</td>
<td>**</td>
<td>*</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>$y_{16}$</td>
<td></td>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>n.a.</td>
</tr>
</tbody>
</table>

Notes: L.R refers to long-run relationship, S-R refers to short-run relationship, *** denotes 1% level of significance, ** denotes 5% level of significance, * denotes 10% level of significance, - denotes an insignificant relationship, n.a. denotes not applicable.

As seen from the above table, it is clear that the economic reform programme has a significant relationship with the stock market performance. In fact, it can be noticed that the economic reform programme variables affect all the main categories of the stock market performance, whether in the long-run or short-run or in both of them. The only exception variable, which did
not show any affect upon any of the stock market performance variables, was the real GDP growth rate. On the other hand, the number of listed companies can be considered as the only stock market performance variable, which did not indicate being affected by any of the economic reform programme variables. Indeed, it is not a surprising result, and it seems to be consistent with the previous analysis shown in chapter five, and with the results from the logistic regression, which stated that both the real GDP growth rate and the number of listed companies were the only variables, which did not witness a significant change after the introduction of the economic reform programme in 1991. In the meantime, it can be argued that the market activity variables have benefited from the introduction of the economic reform programme compared with other stock market performance variables, while the market size variables seem to be the least affected variables, as most variables of this category were not shown to be cointegrated with most economic reform programme variables. In fact, as mentioned previously, the market size seems to be affected by other variables such as the privatization programme, and other stock market variables, such as share prices and volume of shares listed, which seem to be affected significantly after the introduction of the economic reform programme. Meanwhile, the activity of the market led to greater increases in the prices of the shares listed, and more capital increases in the registered companies, hence, all these led to an increase in the market size.

On the other hand, real interest rates and the inflation rate followed by nominal interest rates seem to be the most important economic reform programme variables, which have an impact upon the stock market performance. The real GDP growth rate has no relationship with stock market performance followed by exchange rate stability.
As a conclusion, the hypothesis, which stated that there is a significant relationship between the economic reform programme variables and the stock market performance variables cannot be rejected, as most economic reform programme variables seem to affect most stock market performance variables positively. In fact, the behaviour of this relationship seems to be consistent with the Laveine's study (1996), who stated that there is an impact of economic reform, in terms of liberalization on the performance of a stock market, precisely, market size, market liquidity and market volatility. Besides this, the results as well tend to be consistent with the theory of finance, which indicates that investors before deciding on investing in a stock market of a given country, looking firstly to the fundamental issues of the economy of the country. In other words, they try to analyze the macro-economic indicators before moving to analyze the sectors and then the companies themselves. As can be seen, Egypt did really well in improving its macroeconomic indicators and this has attracted both local and foreign investors to Egypt's stock market. Hence, the stock market performance witnessed a dramatic change after the introduction of this programme.

6.4.2.3 Modelling the impact of the economic reform programme variables upon stock market performance variables within multivariate analysis (multiple and step wise regression):

The above analysis indicated the bivariate relationships between the economic reform programme variables and the stock market performance variables. However, as mentioned previously, it is ideally preferable to state this relationship within multivariate models in order to study the interaction between the economic reform programme variables and to determine their relative importance and the implications of this in the determination of the stock market performance variables. On the other hand, Johansen's Maximum Likelihood procedures can be considered the most important technique to employ in multivariate error correction modelling,
as it enables the number of cointegrating vectors to be established and estimated. However, it is not sensible to employ Johansen's Maximum Likelihood procedures for the multivariate error correction modelling of the stock market performance because of the limitation of the time series of the data, which is too short to enable a multivariate modelling method to be used, especially, when lag structures are introduced. Alternatively, multiple regression will be used as an indicator of this kind of analysis.

The method here is based upon two steps, the first step is to run a multiple regression for each stock market performance variable as a response variable upon all economic reform programme variables as explanatory variables, when expressed in stationary form. The output of the previous step will show the results of fitting a multiple regression model, which describes the relationship between one dependent variable and all independent variables. The next step then is to run a step wise regression, that is, to look to the p-value in the ANOVA table. If for a given independent variable it is greater or equal to ten per cent level, it means that there is not a statistically significant relationship between the variables at the 90 per cent or higher confidence level, hence, this variable should be removed from the model. The general model will be simplified by eliminating the insignificant variables, starting with the variable that has a higher p-value and so on. Given the data series has a small number of observations, it cannot be advisable to introduce any lag for the dependent or independent variables as the degrees of freedom will be affected significantly, thereby, the goodness of fit of the models may be affected negatively as well. It is worthwhile mentioning again that most stock market performance variables showed a tendency to react slowly to changes in the independent variables, in turn, the results from this analysis should be treated with caution. The following table summarizes the final model of the multivariate relationship. However, full details about this analysis is given in Appendix E.
Table 6.31
Table summarizing the results of the final models of the multivariate relationship between the economic reform programme variables and the stock market performance variables:

<table>
<thead>
<tr>
<th>Description</th>
<th>$x_1$</th>
<th>$x_2$</th>
<th>$x_3$</th>
<th>$x_4$</th>
<th>$x_5$</th>
<th>$x_6$</th>
<th>$x_7$</th>
</tr>
</thead>
<tbody>
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<td>***</td>
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</tr>
<tr>
<td>$y_5$</td>
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</tr>
<tr>
<td>$y_7$</td>
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<td>$y_8$</td>
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<td>-</td>
</tr>
<tr>
<td>$y_{11}$</td>
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<tr>
<td>$y_{12}$</td>
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</tr>
<tr>
<td>$y_{14}$</td>
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Notes: *** denotes 1% level of significance, ** denotes 5% level of significance, * denotes 10% level of significance.

As seen from the above table, in most cases the results from the stepwise regression indicated that there is no relationship between the economic reform programme variables and the stock market performance variables. It can be noticed from this analysis that there is some consistency between the results shown in the above Table 6.31 with the results shown in Table 6.20 as in both cases the exchange rate stability was significant with market capitalization, market capitalization as a percentage of GDP, the total value traded to GDP and the percentage of the 10 biggest companies' share in value trade. Indeed, they are not surprising results as the
other economic reform programme variables were not integrated of the same order as these variables. In turn, the results from the multiple and stepwise regression took the same form as in the bivariate relationships between exchange rate stability and these variables. Besides this, the only significant explanatory variables in this analysis were real interest rates followed by the inflation rate and finally nominal interest rates and these significant relationships were, mainly, with market activity variables. It is worthwhile mentioning that this seems to be consistent with some previous findings, which have indicated that the above mentioned explanatory variables tend to have a more important affect upon stock market performance. Additionally, market activity variables seem to be the most affected variables compared with other stock market performance variables. Nevertheless, the whole multivariate analysis seems to be far from the previous findings, as most of the relationships tend to be insignificant.

One possibility of this inconsistency in the results may be due to the lag structure, as the stock market variables, in general, showed a slow response to the introduction of the economic reform programme: lagged independent variables were required to show the underlying relationship between the variables. Strictly speaking, it was possible to lag the variables in a bivariate relationship, but within a multivariate context, it is not advisable, as the degrees of freedom will be so short, hence, the model as a whole will not make any sense.

In the light of the above, it can be concluded that many of the multivariate models, in general, were insignificant, but an important caveat is that this may hide significant multivariate relationships between lagged variables. Given an emerging market, it is inevitable that the sample size is not ideal; in turn, in the future if the data series became longer, it would be possible to examine this relationship further in a multivariate form.
6.5 The chapter summary:

This chapter dealt with the empirical part of this research, starting with the data set, research hypotheses and the methods, which were used to examine and determine whether the hypotheses can be rejected or not. As mentioned previously, the data series covered 18 years from 1980/1981 to 1997/1998, which incorporates time periods prior to and after the introduction of the economic reform programme. The aims of this chapter were firstly, to examine whether the economic situation, in terms of the economic reform programme variables, and the stock market performance witnessed significant changes after 1991, in another words, an examination has been made of the environmental conditions from 1991 in both series for the economic reform programme and the stock market performance, and secondly to examine the relationships between the independent economic reform programme variables and the hypothesized dependent stock market performance variables in the context of bivariate and multivariate analysis.

For the first aim, several logistic regressions were performed in order to examine whether the data prior to 1991 can be separated from the data relating to the period from 1991. For this purpose, a categorical binary variable was used, although this methodology is normally used to predict the success or failure of events. In this example, success of an event referred to a significant positive change in both economic reform programme and stock market performance variables, while failure was defined as a non-significant change in these variables. In the binary responses, zero represented the period prior to 1991 and one was used for the period from 1991. The results indicated clearly that all economic reform programme variables witnessed a dramatic change after 1991 except for the real GDP growth rate. In the meantime, all stock market performance variables witnessed a similar change after the
introduction of the economic reform programme in 1991, except for the number of listed companies. The strong evidence from this analysis is that there is a structural change in the data, thus differentiating between the environmental conditions of the two periods, hence, the both hypotheses, which stated that the Egyptian government succeeded in implementing its economic reform programme and Egypt's stock market performance increased significantly after the introduction of the economic reform programme cannot be rejected.

To examine the impact the relationships between the economic reform programme variables and the stock market performance variables, two kinds of analysis were used: bivariate analysis and multivariate analysis. For the first kind, that is, bivariate analysis, cointegration analysis was employed in examining whether the variables were cointegrated. To achieve this purpose, the ADF unit root tests were performed to determine the order of integration of the variables. Initially, the tests for the order of integration were based upon the raw data for the economic reform programme variables and for the natural logarithm for each stock market performance variables. The results from the ADF unit root tests indicated that most of the economic reform programme variables and the stock market performance variables were integrated of order one. In fact, the only economic reform programme variable, which indicated an integration of order zero was the exchange rate stability, in addition to per capita income, which was shown to be integrated of order two. With regard to the stock market performance variables, three of them were shown to have an integration of order zero, and another four variables were integrated of order two. The variables that were integrated or order two were replaced by new variables measuring the relative change instead. Where these were of integration of order one, they were retained in the modelling process. The next step was to determine whether variables, that were integrated of the same order, exhibited a cointegrating
relationship. For this purpose Ordinary Least Squares (OLS) regressions were run and unit root tests conducted on the residuals. The rule was that where the residuals had a zero order of integration, the variables were cointegrated. Since the ADF unit root tests have a low power, to support or refute the cointegration results, EC models were performed to explain both long-run and short-run relationships between the variables.

The results from the above analysis indicated that most of the economic reform programme variables tend to affect the stock market performance variables. In fact, there were only two exceptions, one related to an aspect of the economic reform programme and the other to a particular feature of the stock market performance. Concerning the first one, the real GDP growth rate did not show any cointegration relationship with any of the stock market performance variables, that is, this variable cannot affect the dependent variables. On the other hand, the number of listed companies was the only stock market performance variable, which seemed to have any relationship with any of the economic reform programme variables. The conclusion from this analysis is that the economic reform programme has affected the stock market performance, hence, the hypothesis which stated that there is a significant relationship between the economic reform programme variables and the stock market performance variables cannot be rejected. Besides this, the results indicated that both real interest rates and the inflation rate, followed by nominal interest rates have the greatest impact on stock market performance, in addition, the market activity variables seem to be the most affected variables compared with other dependent variables.

The another approach in analysis the relationship between the economic reform programme and the stock market performance was to use multivariate models in order to study the
interaction between the explanatory variables and to determine their relative importance and the implications of this in the determination of the response variables. Even though Johansen’s Maximum Likelihood procedures can be considered the most important technique to employ in the multivariate error correction modelling, it was not sensible to use this technique as the data series was too short to enable a multivariate modelling method to be used, especially, if lag structures were introduced. In turn, multiple regression had been used as an alternative.

The method here was based upon two steps, the first step was performed by running multiple regressions for each response variable upon all explanatory variables, when each was expressed in stationary form. The next step was to run a stepwise regression by removing the insignificant explanatory variables from the model. Given the data series had a small number of observations, no lags were introduced in this analysis.

The results from the multivariate analysis indicated that the models did not reflect a significant relationship between the independent and the dependent variables in most of the cases. In fact, given no lag structure because of its affect upon the degrees of freedom, these results should be taken with caution and an important caveat is that this may hide significant multivariate relationship between lagged variables.
Chapter Seven
Conclusion
7.1 Summary and concluding remarks: -

In this research, 18 yearly observations have been used to examine the relationship between the economic reform programme and the stock market performance with special emphasis on Egypt. Many issues related to economic reform and stock markets have been discussed, an extensive literature review has been undertaken to highlight the conceptual framework of these variables as well as many empirical studies have been mentioned regarding the previous work in this field. In addition, statistical and econometric techniques, which have been performed to evaluate the Egyptian experiment through both economic reform and stock market series, although more attention has been paid to examining the impact of the economic reform programme variables on the stock market performance variables.

In chapter two, an overview of economic reform was conducted in order to understand the concept and the importance of this phenomenon, as it is a quite recent issue within the last two decades. It was argued that the main target of any economic reform programme should be to accelerate the rate of growth and to raise the standard of living in a given society. However, the method, which should be followed to implement such programmes was not determined, as there is not an optimal way. Mainly, there are two methods: shock therapy and gradualism, and a comparison between the costs and benefits of a direct, sudden and large-scale change versus those of on ongoing and piecemeal change, was the main factor in choosing between the two of them. The experiments from other countries indicated, clearly, that the circumstance of each individual country should be take into account before starting to implement such a programme. In the case of Egypt, with respect to the International Monetary Fund and The World Bank’s advice, Egypt chose the gradualism method and to go step by step in implementing its programme in order to minimize for society any side affects. From the experiments of many
regions, which have implemented an economic reform programme, it can be concluded that the South and Eastern Asia region was the most successful one compared with other regions. Higher national savings, investment and exports played a key role in this success.

Chapter three highlighted different classifications to define stock markets, indicating their importance in mobilizing savings and the allocation of resources. As well, note was made of their significant role in attracting both local and foreign investments, which may assist in accelerating the rate of growth. One important aspect in this chapter was to determine the criteria that should be used to measure the performance of any stock market. However four main aspects were identified in measuring the Egyptian stock market performance: market activity, market size, market liquidity and market concentration. Of course, each one of these aspects contains several variables, which can give an overview of the whole performance of a given market. Furthermore, the term emerging markets received a great respect, as Egypt can be considered one of these markets. In this context, it should be mentioned that little attention has been paid to this term, but the conclusion from the literature review indicated clearly that it is difficult to find universally shared features for emerging markets. Nevertheless, it can be stated that the term emerging markets refers, mainly, to those markets in developing countries, which tend to be less in size, activity, age, investors’ confidence and in their organization compared with more sophisticated markets, but in the meantime, they are high in growth and more volatile. In addition, these emerging markets may differ between themselves, as for instance, it can be noticed that there is gap between the degree of development in Asian emerging markets and those emerging markets in Sub-Saharan Africa. Finally, it is worthwhile mentioning that most empirical studies, which have dealt with emerging markets, have concentrated mainly upon examining the benefits from investing in these markets and whether
they can provide potential investors the opportunity for portfolio diversification, but it is rare to find empirical studies that focus on discussing other aspects related to those markets such as regulation and organization of emerging markets, or deal with other issues, for instance, market size, activity of the market, liquidity of the market as well as other qualitative issues.

In chapter four, many empirical studies were highlighted in the investigation into the relationship between the economic reform programme variables and the stock market performance variables. It was noticed that all these studies mainly concentrated upon the effect of various economic variables on the stock market in terms of stock returns and prices. Within this framework, it was found that there was an inverse relationship between interest rates, the inflation rate and the budget deficit and the stock returns and prices. For the first two variables, that is, nominal interest rates and inflation rates, the relationship was obvious and there was strong evidence that those two variables always depress the stock markets when they are increasing. However, for the budget deficit, its impact on stock returns and prices was not at the same level as the first two variables, but at least, the budget deficit may cause an increase in interest rates, which in turn may affect the stock market negatively. With regard to the exchange rate, it was found that its effect on stock returns and prices may differ from one economy to another depending on whether the particular this economy is imported-oriented or exported-oriented. However, for the purpose of this research, it can be concluded that the fluctuations in exchange rate may make a domestic stock market less attractive compared with other markets, hence this can cause a bad effect upon the stock market as a whole. In contrast, these empirical studies indicated clearly that both the rate of growth and privatization programmes have positive effects on stock market performance. However, the absence of any empirical studies to examine the impact of per capita income on a stock market does not mean
this relationship should be automatically rejected. In turn it was suggested that per capita income may have a positive relationship with stock market performance. It may be worthwhile mentioning that most of the empirical studies just concentrated upon investigating which variables affected stock returns and prices, but other stock market performance variables, such as market activity, market size, market liquidity and market concentration, did not receive a reasonable attention. Indeed, one of these rare studies indicated that an economic reform programme, in term of liberalization, may affect stock market performance through increasing market size and market liquidity as well as market volatility.

Chapter five and six examined the Egyptian experiment concerning the economic reform programme and the implication of that on the Egyptian economy as well as upon the performance of Egypt's stock market. While chapter five concentrated on the history of the Egyptian economy and the stock market as well, chapter six dealt with an investigation into to what extent Egypt benefited from this programme and the relationship between the economic reform programme and the stock market performance through employing statistical and econometric techniques.

With regard to chapter five, it can be concluded that Egypt starting from the mid 1980s facing a crisis in managing its economy as all the economic indicators pointed out that Egypt needed a revolution to overcome its problems. In turn in late 1990 Egypt adopted a programme of economic reform with the full support from the International Monetary Fund and the World Bank, as well as many other creditor countries. Egypt chose the gradualism method to implement this programme in order to minimize for its society any side effects, covering the whole economic spectrum. To date, an impressive work has been achieved: a significant
decrease in the inflation rate, the budget deficit, the total external debt, and a high level of stability in exchange rates with full confidence in the local currency. In addition, interest rates became attractive for both savers and investors, real interest rates became positive and a significant increase in per capita income has been achieved as well. Meanwhile, Egypt still needs to increase its economic growth to overcome a high rate of unemployment and to raise the standard of living in its society. In this context, it is worthwhile mentioning that Egypt should work towards increasing its exports with decrease the level of imports, besides these, both its domestic saving and the level of investment as a percentage of GDP need to increase as Egypt can be classified as being at the bottom level of developing countries in these fields.

On the other hand, Egypt’s stock market resurrected itself again under the economic reform programme umbrella, as it had been suffering after the nationalization period, which started from 1957. Many impressive developments to this market have been achieved due to economic freedom in Egypt after 1991: the market became well organized using electronic machines for trading, there were greater disclosures in financial reports, which should be published quarterly, more domestic and foreign investors whether, individuals or/and financial institutions, and unlimited support to the stock market from the government. As a result, the privatization programme also witnessed a high level of success as the market assisted in implementing this programme, which in turn affect of the stock market performance significantly, therefore, for all the reasons indicated above, Egypt’s stock market became one of the most promising emerging markets.

Chapter six, empirically examined the hypotheses behind this research, which were stated in terms of a significant change in both the Egyptian economy and Egypt’s stock market, as well
as suggesting significant relationships between these variables. It was found that the overall results supported these hypotheses. Logistic regression was used to test for a structural break in both the economic reform programme and stock market performance series. All economic reform programme variables witnessed a significant improvement after the introduction of this programme except for the real GDP growth rate, which may have been due to tight monetary and fiscal policy at the beginning of this programme. Again, Egypt needs to raise saving and investment ratios to accelerate the rate of growth. Generally speaking, the results supported the hypothesis, which stated that the Egyptian government succeeded in implementing its economic reform programme.

As well, the logistic regressions were employed in testing for a significant improvement in Egypt’s stock market performance. The overall results indicated clearly that all stock market performance areas: market activity, market size, market liquidity and market concentration, witnessed a significant change after the introduction of the economic reform programme. In the meantime, the results supported the same findings for each individual variable except for the number of listed companies, as this variable did not show the same change as other variables did. The overall conclusion is that the results supported the hypothesis that Egypt’s stock market performance improved significantly after the introduction of the economic reform programme.

The most important part in this chapter was the modelling of the impact of the economic reform programme variables on the stock market performance variables by using cointegration analysis through EC models. The overall results indicated that most economic reform programme variables had an impact upon stock market performance variables except for two
variables: the real GDP growth rate, which did not show any impact upon any of the stock market performance variables, and the number of listed companies was the only stock market performance variable, which was not affected by any of the economic reform programme variables. In the meantime, the results showed that real interest rates and the inflation rate, followed by nominal interest rates had the greatest impact upon the stock market performance variables. On the other hand, the market activity tended to be the most benefited area compared with other response variables. As a final conclusion to this analysis, the results supported the hypothesis that there is a significant relationship between the economic reform programme variables and the stock market performance variables. It is worthwhile mentioning here that this result tends to be consistent with the expected behaviour of the stock market after liberalization or with introducing of such programmes, as indicated in the literature review. Besides these, the impact of each individual economic reform programme variable upon stock market performance tends to follow the same direction found in the literature review, except for real interest rates and the real GDP growth rate.

As an extension to the above analysis, multivariate models were performed to study the interaction between the economic reform programme variables and to determine their relative importance to the stock market performance. The overall results did not support the previous findings in the bivariate models. One reason behind this is that these multivariate models did not use any lag structure as the time series was so short to allow for this kind of analysis. However, these results should be treated with caution and an important caveat is that this may hide significant multivariate relationships between lagged variables.
7.2 Directions for further research studies: -

Although this research undertaken can be considered a comprehensive study of the Egyptian experiment concerning its economic reform programme and the implication of that on the Egyptian economy and the stock market there as well, many other research studies can be undertaken following the results and the theoretical framework stated in this research.

One extension to this research would be to compare the Egyptian experiment with other countries, which experienced the same situation and to state the differences between these various experiments and the outcome of each one. Such a study may help to determine the strengths and weaknesses of each experiment and may lead to a better way of implementing such programmes. Another suggestion is to study other variables not examined in this research, as the research cannot cover all economic reform programme or stock market variables. Examples include examining the impact of tax and investment incentives on the rate of growth in Egypt, or the impact of that upon the stock market. Also, foreign direct investment (FDI) can be stated as an important variable and would need to be examined to show its effect on the Egyptian economy. Besides these, one of the economic reform programme variables, which may need more attention, is the privatization programme. In turn, the evaluation of this programme and its effect on improving the productivity and profitability of privatized companies may be considered as a useful branch of research in this context.

Instead of treating all stock market performance variables as being dependent, further research could examine the interactions between these variables. In this context, for instance, one possibility is to examine the impact of market activity on market size, market liquidity or market concentration. Furthermore, regarding previous work by Levine (1996), market
liquidity could be taken as an independent variable and an examination could be made of its impact on, for example, the real GDP growth rate or on the stock market index in Egypt.

Another potential extension to this research would be to conduct a study of qualitative criteria to measure the development in Egypt's stock market by looking at institutional development, the degree of openness to foreign portfolios, financial disclosures and the extent of the usage of derivative instruments. Another aspect for study would be to test various forms of the efficient market theory in the Middle East region, including Egypt.

At the micro level, criteria, such as profitability ratios, liquidity ratios, efficiency ratios and dividend ratios may be used to evaluate the performance of individual companies and stock market sectors and the influence of the introduction of the economic reform programme.

From the literature review, it was noticed that most empirical studies, which dealt with emerging stock markets, concentrated on those markets in East Asia and Latin America, and little attention was paid to the Middle East region. Therefore, one possibility is to use the same method employed in this research and test for the existence of cointegrated relationship among the emerging stock markets in the Middle East region indicating whether it is useful for portfolio diversification. As well, as the data set increases in size through time, Johansen's Maximum Likelihood procedure can be used for multivariate error correction modelling to enable cointegration vectors to be incorporated. Besides these, the same techniques can be used to examine cointegrated relationships between sophisticated or developed markets and the emerging markets, or between emerging markets themselves in many regions in the world, which may add a valuable contribution to global portfolio diversification.
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