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Impact of IFRS adoption on stock performance and financial indicators: a comparative study between Germany and the UK

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**THE IMPACT OF IFRS ADOPTION ON STOCK PERFORMANCE AND
FINANCIAL INDICATORS: A COMPARATIVE STUDY BETWEEN GERMANY
AND THE UK**

BY

ASHRAF ELSAYED MOSTAFA ELBAKRY

A thesis submitted to the University of Plymouth
in partial fulfilment for the degree of

**DOCTOR OF PHILOSOPHY
IN ACCOUNTING AND FINANCE**

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Faculty of Social Sciences & Business

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DEDICATION

*To the memory of my father and my mother,
to my wife and my dear children and special dedication to my
supervisors: John Pointon and Sue Farrar*

ABSTRACT

The compulsory adoption of International Financial Reporting Standards (IFRSs) in Europe has been one of the most important developments in the accounting and finance literature in the last couple of years. IFRSs have promised to provide more accurate and transparent financial statements, and hence to be more value-relevant to investors than local GAAP. Because there are broadly two different accounting systems in force in Europe: the accounting system adopted in common-law countries and the accounting system adopted in code-law countries and because the nature and concept of each accounting system is entirely different, researchers believe that the compulsory adoption of IFRSs in Europe will have different impacts on European countries that fall under each category.

The objective of this thesis is to explore the impact of the movement to IFRSs in Europe on share prices, trading volume of shares and financial ratios of listed companies in Germany, as a case study of code-law countries, and the UK, as a case study of common-law countries. Using 8 years of data, which cover the period from 2000 to 2007 and incorporate time periods pre and post IFRSs adoption in Europe, this thesis empirically investigates three main issues. First, it examines whether the adoption of IFRSs has an impact on share prices in the two different environments of accounting systems. Second, the thesis evaluates the impact of IFRSs adoption on financial indicators in the two different environments. Third, the thesis evaluates the impact of the movement towards IFRSs in Europe on the trading volume of shares in the two different environments.

For the first issue, several multiple regression models were employed based on Ohlson and modified Ohlson models. The results from the analysis indicate that the

adoption of IFRSs was value-relevant in both Germany and the UK, with a greater relative impact in the UK.

For the second issue, both univariate and multivariate techniques based on ANOVA tests and different logistic regression models were adopted. Generally speaking, the results from this analysis demonstrate that IFRSs adoption had an impact on some financial indicators and that the impact is higher in Germany than in the UK.

As for the third issue, logistic regression was employed to study the pattern of trading volume of stock before and after IFRSs adoption in both Germany and the UK. The results of this analysis showed a great impact of IFRSs adoption on trading volume of shares in both Germany and the UK, with a significantly higher impact in Germany.

As such, the thesis makes an important contribution to the value-relevance literature pertaining to the impact of the recent movement to IFRSs in Europe on common-law/UK and code-law/Germany environments in terms of stock performance and financial indicators.

A caveat to the finding of this thesis is that the impact of the movement to IFRSs in Europe might need a longer period to be effectively evaluated and that more common-law and code-law countries must be considered to truly reflect the difference in IFRSs impact on both sets of accounting environments.

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When I first thought about studying a PhD while I was working as an assistant lecturer at Cairo University, one of my friends offered me a 'kind' warning: "You know what PhD stands for? - Permanent Head Damage - so have another think". I was laughing because I thought that was a wonderful joke.

Now seven years on, my PhD thesis nearly comes to an end. That joke came back to my mind again and I start to think about what the 'permanent head damage' means to me.

I have to admit that the past seven years have been the most difficult part of my life. In that sense, the joke turns out to be true. However, in the meantime, the PhD study is also the most rewarding and meaningful thing I have ever done. I set up the greatest challenge for myself and success is waiting for me. The true meaning comes not only from the certificate which I have not got yet, but also from the life experiences which I have already obtained. During the past seven years, I have experienced much more than I have in years prior to my PhD study put together. I believe that this is the true reward to my past seven years. I admit that the difficulties I have gone through have, for many times, led me to think about giving in, but I chose not to because I believe the miracle lies in 'hold on to it'. It is because of this thought that I have gone so far in my PhD study. I am glad that I did it.

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AUTHER'S DECLARATION

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

The study was partly self-financed and partly financed by the University Of Plymouth Business School.

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

- Attendance in a number of courses in data analysis, in particular, a course in quantitative research methods and a workshop of data analysis using statgraphics and SPSS.
- Attendance in a course in Datastream via Thomson, London.
- Attendance in a number of conferences and a Doctoral Colloquium, during which research work was presented.

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Signed... *A. elbakry*.....

Date... *21/05/2010*...

Abbreviations

IASC	International Accounting Standards Committee
IASB	International Accounting Standards Board
IOSCO	International Organisation of Securities Commissions
IFAC	International Federation of Accountants
IASs	International Accounting Standards
IFRSs	International Financial Reporting Standards
GAAP	Generally Accepted Accounting Principles
U.S. GAAP	United States Generally Accepted Accounting Principles
UK GAAP	United Kingdom Generally Accepted Accounting Principles
German GAAP	German Generally Accepted Accounting Principles
SEC	Securities & Exchange Commission
EU	European Union
CESR	Commission of European Securities
SSAP	Statement of Standard Accounting Practice (UK)
SFAS	Statement of Financial Accounting Standards
FRS	Financial Reporting Standards
STRGL	Statement of Recognised Gains and Losses
HGB	German Generally Accepted Accounting Principles
MVPS	Market Value Per Share
BVPS	Book Value Per Share
EPS	Earnings Per Share
NYSE	New York Stock Exchange
APB	Accounting Principles Board (U.S.)
FASB	Financial Accounting Standards Board

LSE	London Stock Exchange
FIFO	First In First Out
LIFO	Last In Last Out
CR	Current Ratio
DTER	Debt To Equity Ratio
OP%	Operating Profit Percentage
ROE	Return On Equity
ROIC	Return On Invested Capital
LN	Natural Log

CHAPTER 1 INTRODUCTION

- 1.1 Overview
- 1.2 Importance of the study
- 1.3 Objectives of the study
- 1.4 Research Hypotheses
- 1.5 Data set and collection of data
- 1.6 Models used in the study
- 1.7 Outline of the thesis content

1.1 Overview

Over the last decade, numerous accounting papers have investigated the empirical relationship between stock market values (or changes in values) and particular accounting numbers, for the purpose of assessing, or providing a basis of assessing those numbers' use or proposed use in an accounting standard. This trend of literature is commonly referred to as "value-relevance" literature. From the perspective of information economics, accounting and financial reporting play a vital role in an efficient capital market. Major accounting standard bodies, such as the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB), have adopted this investor-oriented information-usefulness perspective and specifically stated that the primary purpose of accounting is to meet the needs of capital markets (IASB 1994). As a result, the relationship between accounting numbers and stock markets has attracted considerable attention, to the extent that it is probably one of the most popular issues in the accounting and finance literature.

Barth, Beaver and Landsman (2001) suggest that an accounting amount is defined as value relevant if it has a predicted association with equity market values. Since most value relevance studies examine the impact of accounting measures prepared under different sets of accounting standards on share prices using Ohlson or modified Ohlson models, the researcher follows the majority of studies in the literature and adopts both Ohlson and modified Ohlson models on a sample of companies listed in the German market and in the UK market.

In February 2001, The European Union (EU) proposed a regulation that would require all firms listed on EU exchanges to prepare consolidated financial statements in accordance with International Accounting Standards (IASs), currently referred to as International Financial Reporting Standards IFRS(s). This obligation would have to be effective as from 1 January 2005 onwards and would imply that 7000 European listed companies should apply IFRS(s) for their financial reporting as from this date. This application of IFRS(s) is expected to have significant influence on the disclosure and measurement of the components of financial statements (mainly the income statement, the statement of cash flows, and the balance sheet). These changes of disclosure and measurement basis are expected to have influence on the movement of share prices, the volume of shares traded and the companies' financial performance.

It is standard in the accounting literature to distinguish between two models under which accounting standards are developed: the shareholders model originating in countries with a common-law legal system, and the stakeholders' model originating in countries with a code-law legal system. In a pure shareholder- or common-law-model country, companies raise capital (equity and debt) directly from the public, and investors are presumed to rely on public, not private, information. Consequently, common-law systems tend to require a high standard of public disclosure, and accounting rules are determined largely by the disclosure needs of shareholders and prospective shareholders. Accounting standards evolve by becoming commonly accepted in practice and are generally separate from tax laws. In other words, accounting standards arise in an accounting market and are not determined by the government. Conversely, in a pure stakeholder- or code-law-model country, taxation

requirements largely encumber financial reporting rules, and the government, shareholders, debt holders, employees, and managers are all viewed as stakeholders. In code-law countries, transactions are frequently conducted among parties that know each other. There is less reliance on public information and investors typically have access to private information. Code-law systems therefore tend to require a lower standard of public disclosure and thus generate less public information. Consequently, code-law systems do not support large public capital markets. Rather, they tend to rely on intermediaries such as banks. For example, a corporation raises debt and equity capital in relatively large amounts from a bank with which it has a long-term relation. The bank, which serves as an intermediary, in turn raises the capital from the public. The bank has access to private information about the corporation's risks, which need not be publicly disclosed.

While pure common-law countries and pure code-law countries do not exist in reality, the Anglo-American countries (e.g., the United States and the United Kingdom) are typically classified as common-law countries, whereas most continental European countries (e.g., Germany) and Japan are classified as code-law countries. Several researchers report that the objective of financial statements, as defined in the IASB Framework, is achieved in the code-law countries. For instance, Barth, Landsman and Lang (2005) find that firms have higher financial reporting quality after adoption of IFRS than before, and that this result is strongest for code-law countries. Moreover, Daske and Gebhardt (2006) report that disclosure quality, as perceived by experts in their ratings of annual reports of Austrian, German and Swiss firms, has increased significantly under IFRSs. However, prior studies report mixed evidence on whether IFRSs provide more value-relevant accounting information than code-law

country's GAAP (e.g., Bartov, Givoly and Hayn 2002; Hung and Subramanyam 2007).

In brief, the mixed results in this context suggest the following question is still controversial: does accounting information reported under U.K. GAAP or GAAP of other Anglo-Saxon countries better explain share prices and trading volume of shares than accounting information reported under German GAAP or GAAP of other non-Anglo-Saxon countries?

To address this problem, the value relevance of accounting numbers contained in financial statements will be analysed pre and post the implementation of IFRSs for a sample of listed companies in two different European Stock Exchanges.

1.2 Importance of the study

1. This study contributes to the existing literature in two ways: first, the study looks at a comparison between common-law and code-law environments, an area which is not extensively covered in previous studies; and second, it evaluates the impact of IFRSs adoption on companies' performance; an area which is considerably ignored in the literature.
2. The study is timely, as the compulsory adoption of IFRSs in Europe is one of the most important issues, perhaps the most important, in the accounting literature for the time being. As the impact of IFRSs adoption in Europe on share prices in common-law and code law countries is controversial, the study adds to the debate and provides evidence as to whether the nature of the accounting system adopted really matters with regard to the adoption of

IFRSs. Additionally, the analysis of stock performance encapsulates trading volume as well as share prices.

3. Moreover, the study considers the comparative impact of the compulsory adoption of IFRSs in Europe on companies' performance through some selected performance indicators in two different environments, an area which is not covered before in the accounting and finance literature. Based on the results of this study, it may motivate other countries that are not yet obligated to follow IFRSs to switch to IFRSs in preparing their financial reports. This will lead to more convergence of accounting standards throughout the world and will achieve more benefits to investors who are concerned with cross-border listings and for the capital markets worldwide as well.
4. In terms of methodology, the study adopts a multinomial and logistic approach to enable the researcher to make comparisons between four categories: code-law pre-adoption, code law post adoption, common law pre-adoption and common law post adoption. This will provide a means of separating out some of the effects. Particularly, this should enable distinctions to be made as to whether differences in impact are due to the switch to IFRSs or to the code versus common-law environmental factors.

1.3 Objectives of the study

The main objectives of the study are to evaluate the impact of the compulsory adoption of IFRSs in Europe on the share performance, expressed by share price and trading volume of shares, and the financial performance of listed companies, measured by some selected financial indicators, and to explore the difference of

impact, if any, of IFRSs adoption between a common-law environment; using the UK as a case study, and a code-law environment; using Germany as a case study.

1.4 Research Hypotheses

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

1. The adoption of IFRSs has an impact on share prices in both common-law and code-law environments.
2. The impact of the compulsory adoption of IFRSs is higher in a code-law than in a common-law environment.
3. The compulsory adoption of IFRSs has an impact on companies' performance.
4. The adoption of IFRSs has an impact on trading volume of shares

Clearly, these will be discussed in detail later (see chapter 5).

1.5 Data set and collection of data

The data set¹ of this study was obtained from all listed companies in both German and the UK market that were using local GAAP before the compulsory adoption of IFRSs in 2005 and that are switched to IFRSs from that date. If it was unclear from Datastream as to the type of standards previously followed, or if the company followed different standards other than local GAAP, then those companies were excluded. Also the following were initially excluded: banks, equity investment

¹ For more detail about data set, see chapter 5 page 133.

instruments, financial service sector companies and the life and non-life insurance companies. The reason for excluding those companies was that the disclosure and measurement basis for those sectors are entirely different from those of manufacturing and other service sectors. Companies identified as “unclassified” were also excluded. Five years of data before the adoption of IFRSs (until 2004) and three years after adoption of IFRSs (until 2007) were extracted. A pooled sample was then chosen amalgamating data from the two eras. Clearly, given eight years of data, there were 1,112 company-years for the UK and 832 company-years for Germany.

1.6 Models used in the study

To examine the hypotheses shown previously, both univariate and multivariate techniques will be used. With regard to the first and second hypotheses, multiple regressions using Ohlson and modified Ohlson models will be used to evaluate the impact of accounting information chosen as independent variables on share prices in both Germany and the UK data sets. Details of these models are introduced in chapter five.

With regard to the third hypothesis, ANOVA test will be used to examine the statistical characteristics of the performance indicators in order to evaluate whether the main five performance measures chosen in this study, namely return on equity; return on invested capital; debt to equity ratio; current ratio and operating profit margin have significantly changed following the adoption of IFRSs. This will be performed for both Germany and the UK. The researcher will also perform a number of tests to evaluate changes in the standard deviation and the median of the five

chosen performance measures following the adoption of IFRSs. In order to evaluate whether the performance indicators are different between Germany and the UK prior to the adoption of IFRSs, a logistic regression model will be employed. Further logistic regression models will be used to compare UK and German firms post IFRSs adoption. The next stage in the analysis will be to compare the impact of IFRSs on each country separately. In this way, a logistic regression model will be used to differentiate German companies pre and post IFRSs adoption according to a linear combination of performance measures. The same procedure will be repeated for the UK.

The analysis will be extended to accommodate differences between four scenarios namely, UK GAAP, German GAAP, IFRSs in the UK and IFRSs in Germany. To achieve this, a multinomial logistic regression model will be employed.

On the other hand, the data analysis to test for the fourth hypothesis will be based on using ANOVA tests to assess changes in the mean trading volume; Cochran's test, Bartlett's test and Levene's test to investigate changes in the dispersion (standard deviation) profile; and Kruskal-Wallis test to evaluate whether the median trading volume is changed following IFRSs adoption. The skewness and kurtosis of the trading volume will also be assessed in the light of any improvement or deterioration in non-normality.

1.7 Outline of the thesis content

This research can be classified into two parts. First the theoretical part, which contains three chapters, will deal with the literature review concerning the origination

and development of the International Financial Reporting Standards (IFRSs), the main differences between these standards and the local UK GAAP and German GAAP, and the studies related to the value relevance of accounting information both at country level and for international comparisons. The second part will contain two chapters, which will concentrate on the empirical study to test the different research hypotheses and to answer the research questions, followed by conclusions and recommendations.

Chapter One: Is a summary of this research study and introduces the different elements of this thesis in terms of objectives, research questions, summary of research methods, limitations, and contribution and outline of the thesis.

Chapter Two: discusses the evolution of International Accounting Standards, the efforts made by the International Accounting Standards Board (IASB) to converge the accounting standards followed worldwide, the relationship between the IASB and other standard-setters in different countries, the agreement between the IASB and the International Organisation for Securities Commissions (IOSCO) and the main benefits and obstacles of adopting world-wide accounting language for financial reporting for both capital markets, as well as the participants in these markets.

Chapter Three: analyses the main differences between UK GAAP, German GAAP and IFRSs with regard to the presentation and measurement of key items in the financial statements. This chapter consists of two parts. The first part will deal with disclosure and presentation differences, which will lead to different classification and/or recognition of assets, liabilities, equity, revenues and expenses in the financial statements. The second part will deal with measurement differences, which

will lead to differences in group totals of the various categories of assets, liabilities, revenues and expenses in the financial statements.

Chapter Four: deals with the different valuation models used in the accounting and finance literature to link accounting information with the movement in share prices and trading volume of shares. The nature and types of value-relevance studies will also be presented in this chapter, followed by a survey of the comprehensive academic work that dealt with the three key issues raised in this research, namely the impact of accounting standards adopted on share prices; the impact of accounting standards adopted on trading volume and the impact of accounting standards adopted on financial indicators.

Chapter Five: points out the methodology of the research and the statistical analysis techniques that will be used in order to test the impact of the compulsory adoption of IFRSs on stock and company performance. This chapter will deal with the empirical research questions and their conversion into research hypotheses. It also gives an explanation in detail of how the main research hypotheses are subdivided into sub-hypotheses. The statistical techniques shown in this chapter, i.e. the univariate and the multivariate analysis based on multiple regressions and multinomial regression will be used to test the research hypotheses and to evaluate the impact of the shift towards IFRSs adoption on both company and stock performance for Germany and the UK.

Chapter Six: pinpoints the main findings of the empirical study in several stages. The first stage will answer the first and second research questions through a comparison between the value relevance of accounting information and the impact of

accounting numbers on share prices in the pre- and post- IFRSs adoption eras. The second stage will answer the third question through a comparison between the performance indicators of German and UK listed companies pre- and post- IFRSs adoption. The third stage will answer the fourth question through a comparison between the behaviour of trading volume of shares in both Germany and the UK pre- and post- IFRSs adoption.

Chapter Seven: summarises the findings of this thesis. It mainly concentrates upon the findings of the empirical part of this research. Additionally, recommendations will be made regarding the potential direction for further research studies arising from the conclusions derived from this thesis.

CHAPTER 2 HISTORICAL BACKGROUND ON INTERNATIONAL FINANCIAL REPORTING STANDARDS (IFRSs)

- 2.1 Introduction
- 2.2 The Relationship between IASC and IOSCO
- 2.3 Pressure for international harmonisation
- 2.4 Reasons for International Accounting Standards
- 2.5 World-wide acceptance and observance of IASs
- 2.6 The IASC's relationship with standard setting bodies
- 2.7 Advantages of IFRSs for investors
 - 2.7.1 Direct advantages of IFRSs for investors
 - 2.7.2 Indirect advantages of IFRSs for investors
- 2.8 Disadvantages of IFRSs for investors
- 2.9 Summary

2.1 Introduction

Financial statements are prepared and presented for external users by many enterprises around the world. Although such financial statements may appear similar from country to country, there are differences, which have probably been caused by a variety of social, economic, and legal circumstances and by different countries having in mind the needs of different users of financial statements when setting national requirements.

These different circumstances have led to the use of a variety of definitions of the elements of financial statements; that is assets, liabilities, equity, income and expenses. They have also resulted in the use of different criteria for the recognition of items in the financial statements and in a preference for different bases of measurement. The scope of the financial statements and the disclosures made in them has also been affected.

The International Accounting Standards Committee (IASC), which is replaced by the International Accounting Standards Board (IASB) in April 2001, is committed to narrowing these differences by seeking to harmonise regulations, accounting standards and procedures relating to the preparation and presentation of financial statements. It believes that further harmonisation can best be pursued by focusing on financial statements that are prepared for the purpose of providing information that is useful in making economic decisions.

The Board of IASC believes that financial statements prepared for this purpose meet the common needs of most users. This is because nearly all users are making economic decisions.

The users of financial statements include present and potential investors, employees, lenders, suppliers and other trade creditors, customers, governments and their agencies and the public. They use financial statements in order to satisfy some of their different needs for information. While all of the information needs of these users cannot be met by financial statements, there are needs which are common to all users. As investors are providers of risk capital to the enterprise, the provision of financial statements that meet their needs will also meet most of the needs of other users that financial statements can satisfy.

In the last decades, capital markets have become increasingly globalised due to advances in technology and communications which have effectively linked the markets of the world. Due to the growing trend of national governments to deregulate their capital markets, investors are increasingly interested in foreign equities as a means of enhancing investment performance. Globalisation of the world's capital markets has brought to the forefront the increasing need for comparable and reliable financial information to support the varied transactions and operations of these markets.

Diversity in accounting reporting (defined as measurement, presentation, and disclosure) affects capital market participants. Stanko (2000) argues that lack of financial statement comparability influences 1) a company's decision to acquire an overseas operation, 2) an analyst's recommendation or rating when reviewing the

creditworthiness of a foreign entity, 3) an investor's ability to make decisions concerning global investment opportunities, and 4) a domestic organisation's decision to use an overseas supplier.

In an extensive survey of capital market participants, i.e., investors, corporate issuers, investment underwriters, market regulators, and rating agencies, almost one-half of the respondents stated that their capital market decisions were affected by accounting diversity (Choi and Levish 1991). In the absence of comparable accounting principles, analysing foreign financial statements is difficult for investors. For companies seeking to raise capital in foreign markets, complying with foreign disclosure and reporting requirements often becomes a cumbersome and costly process.

The American Accounting Association (AAA) supports development of quality international accounting standards within the context of a sound conceptual framework because such standards would promote both business reporting that is comparable across companies and markets and the efficient allocation of capital in the world economy (Wahlen, Boatsman, Herz, Jennings, Jonas, Palepu, Petroni, Ryan and Schipper 1999)

2.2 The Relationship between IASC and IOSCO

The International Accounting Standards Committee (IASC) was set up in 1973 by 16 professional accountancy bodies in nine countries – Australia, Canada, France, Germany, Japan, Mexico, the Netherlands, the United Kingdom and the United

States of America. It now has member accountancy bodies in about 90 countries and many other countries make use of its work.

The International Accounting Standard Committee (IASC) is a private sector body whose membership includes all the professional accountancy bodies that are members of the International Federation of Accountants (IFAC). IFAC has more than 140 members from over 100 countries. The IASC has the dual objectives of:

- Formulating international accounting standards and promoting their acceptance and observance; and
- Working generally for improvement and harmonisation of accounting standards.

Since 1973, the IASC has extended well beyond its roots in the accountancy profession to involve in its work national standard setting bodies (both private sector and government), companies and other business groups, financial analysts and other users of financial statements, regulators and stock exchanges, development agencies, and governmental and intergovernmental bodies. The evolution has inevitably taken time and has sometimes been controversial.

The International Organisation of Securities Commissions (IOSCO), created in 1983, is an organisation dedicated to ensuring that global capital markets will be able to operate on an efficient basis. It soon acknowledged that different national accounting standards were an impediment to multinational securities offerings and other foreign listings and that the agreement of mutually acceptable standards of accounting and disclosure was a critical goal. IOSCO saw IASs as the basis for these standards and the IASC as the appropriate body to set them. IOSCO is a non-voting observer for

most steering committees. IOSCO is an association of securities regulatory organisations. It has approximately 135 ordinary, associate and affiliate members, including twelve based in the United States. Two key IOSCO committees following this project are the Technical Committee and its Working party No.1 on Multinational Disclosure and Accounting. The Technical Committee is composed of 16 regulatory agencies that regulate some of the world's largest, more developed and internationalised markets. Its objective is to review major regulatory issues related to international securities and futures transactions and to co-ordinate practical responses to these concerns. The Securities Exchange Commission (SEC) is represented by a member of the Commission. As a member of IOSCO, the SEC has been a significant participant in efforts to harmonise regulatory requirements for cross-border offerings and listings. Most recently, IOSCO approved and recommended that its members adopt a set of non-financial statement disclosure standards for the purpose of cross-border offerings and listings. The SEC has amended its foreign private issuer disclosure requirements to implement these IOSCO disclosure standards.

In 1989, IOSCO prepared a report entitled, "International Equity Offers." That report noted that cross-border offerings would be facilitated by the development of internationally accepted accounting standards. Rather than attempt to develop those standards itself, IOSCO focused on the efforts of IASC.

IOSCO did not feel that existing IASs were good enough for its purposes, a view which did not surprise the IASC. Indeed, the IASC had already started its comparability project which was aimed at tackling one of the most obvious weaknesses in existing IASs, the number of free choices of accounting alternatives

which were permitted by some of the standards. In 1993, IOSCO wrote to the IASC detailing the necessary components of a reasonably complete set of standards to create a comprehensive body of principles for enterprises undertaking cross-border securities offerings. IOSCO also urged the IASC to make further improvements to IASs to ensure that they were sufficiently detailed and complete, contained adequate disclosure requirements, and were prepared with a visible commitment to the needs of the users of financial statements. In 1993, the IASC completed a project to improve the comparability and usefulness of financial statements prepared in accordance with its standards. As a result of this improved project, many alternatives were eliminated, although in a few areas, the IASC standard retained multiple approaches, with one designated as a “benchmark” treatment and the other as an “allowed alternative”.

In 1994, IOSCO completed a review of the revised IASC standards and identified a number of issues that would have to be addressed, as well as standards that the IASC would have to improve, before IOSCO could consider recommending IASC standards for use in cross-border listings and offerings.

In July 1995, IOSCO and the IASC came to an important agreement. The IASC agreed to complete a core set of standards by 1999. Once this core set of standards is in place, IOSCO has pledged to consider them for endorsement. If IOSCO does endorse them, it will then recommend to national regulators that they accept IASs for use in cross-border offerings and listings as an alternative to national accounting standards. This agreement gave a real fillip to the international importance of the IASC.

In 1998, the IASC completed the comparability project and, accordingly was looking for the IOSCO's endorsement of IASs. As a result, the IOSCO review of these core standards began in 1999. The prospect of such an endorsement has led to growing support for the IASC by national setters. IASs have been adopted by law in some countries (e.g., Malta) and by accountancy bodies (e.g., Malaysia and Singapore). Prior to the compulsory adoption of IFRSs in Europe, Belgium, France, Germany, and Italy have agreed to permit certain companies to use IASs in their consolidated financial statements instead of existing national requirements. Moreover, a growing number of companies were voluntarily adopting IASs, including multinationals such as Bayer, Fiat, Lafarge, Nestle, and Nokia.

An important event for the IASB was the decision of the IOSCO on May 17, 2000 to endorse IASs. This endorsement implied that the IOSCO advised its members (the Securities Commissions) to accept 30 IASC standards as the reporting basis for companies that are listed at several stock exchanges.

The European Union (EU) proposed a regulation in February 2001 that would require all firms listed on EU exchanges to prepare consolidated financial statements in accordance with IFRSs by 2005 (European Commission Proposal on the Use of IASs in Europe (www.iasbiorg.uk/news 2001)). This obligation would have to be effective as from 1 January 2005 onwards and would imply that 7000 European listed companies should apply IASs for their financial reporting as from this date. The EU has announced that it regards the proper enforcement of accounting standards as a high priority. This requires not only co-operation from the companies which prepare financial statements, but also from their auditors and from securities regulators. The securities regulators in the EU who are members of CESR

(Commission of European Securities Regulators) have decided to set up a special committee that will specifically look into matters of enforcement.

The move towards the adoption of International Accounting Standards is arguably the most important underlying development that took place in international financial markets in the last couple of years. There is nothing more important for the health of capital markets than ensuring that the raw material on which investors base their decisions, i.e. accounting information, is of a good and even quality around the globe.

Perhaps the most important recent event for the IASB is that the Securities Exchange Commission (SEC) has waived reconciliation to US GAAP for foreign private issuers (that is, foreign companies that register in the United States) that prepare financial statements in accordance with IFRSs as issued by the IASB. It has also proposed a road map that could mandate the adoption of IFRSs in the United States beginning in 2014 (Epstein 2009). This event, if taken together with the rapidly growing pace of IFRSs adoption by other influential countries (e.g., Canada, which will officially switch from Canadian GAAP— a set of standards quite similar to US GAAP— to IFRSs by 2011), highlights a potential worldwide embrace of IFRSs over the next few years.

2.3 Pressures for international harmonisation

International pressures for improvement in the comparability of accounting and information disclosure arise from the diverse interests and concerns of a wide range of participant groups and organisations around the world. Since the early 1970s,

when the IASC was established, these pressures have grown at a rapid pace along with the development of stock markets internationally and especially those in emerging economies.

Researchers believe that diversity in international accounting practices between countries represents a great disadvantage to capital providers. Choi and Levich (1991) argue that international accounting diversity leads to four global problems:

- Different languages lead to confusion and misunderstanding. For example, the term stock is automatically associated in a North American context with shares of ownership, whereas it is typically associated with merchandise inventory in Commonwealth countries. The solution for coping with this problem is the development of multilingual capabilities on the part of the analysts and readers of financial statements.
- Different forms of classification of financial information. For example, in the U.S analysts are used to seeing multiple step income statements that break down important expense categories, such as cost of sales. In countries such as Germany, analysts most often impute cost of sales as expenses which tend to be disclosed by type rather than function, i.e., wages are aggregated whether they relate to production or distribution. In this event, statement readers must exert some effort to reclassify accounting formats to the benchmark that is being used as a standard of comparison.
- Different levels of disclosure. Despite the progress that has been made in international reporting, disclosure levels still vary considerably both between and within countries. Interviews with large institutional investors in Frankfurt, London, New York, Tokyo and Zurich reveal the following areas where

international disclosure practices are considered most wanting: segmental information, methods of asset valuation, foreign operations disclosures, frequency and completeness of interim information, description of capital expenditures, hidden reserves and off-balance sheet items.

- Different measurement concepts. A major hurdle facing foreign analysts is the need to analyse company statistics that have been prepared according to an unfamiliar set of accounting measurement rules. For example, Daimler Benz, the German car manufacturer which was the first German company to list its shares in the U.S., had to meet the SEC's requirement of reconciling its accounts to U.S. GAAP. As a result, net income based on U.S. GAAP was a loss of DM 1839 million in 1993, instead of income of DM 615 million based on German GAAP (Warrell 1999). In 1993, while British Airways reported a profit of £178 million to its UK shareholders under UK GAAP, it reported a loss of £75 million to U.S. investors under US GAAP. This reinforces the fact that profits are simply a matter of opinion, and opinions differ around the world. Making valid comparisons between companies in global industries will continue to be fraught with danger until there is a common accounting language adopted worldwide (Stanko 2000). Moreover, if a company reports dramatically different results for its operations for a given year, because it has to publish results according to the rules in different countries, confidence in accounting will suffer.

The final conclusion from the above consequences is that the continuing absence of and subscription to international reporting standards should be a major concern of

policy makers around the world. The benefits of increased transparency from applying international accounting standards are clear and compelling.

2.4 Reasons for International Accounting Standards

Warrell (1999) argued that some international developments that took place everywhere in the world necessitate a well-defined single set of accounting standards that are applicable in all countries. Among these developments are:

- The development of the economic unions in Europe and North America, and looser associations elsewhere in the world, has meant that companies are moving more and more towards becoming European rather than British, French, or German, and North American rather than of Canadian or United States origin.
- The development of the General Agreement on Tariffs and Trade (GAAT) gives impetus to expanding the vision even further to the point where we view companies as world citizens regardless of their nationality.
- The privatisation programmes, which are occurring in Australia, China, Russia, Egypt and elsewhere in the world, frequently require far more capital and expertise than is available locally. So, the demands for capital are increasingly requiring support from abroad.

All of these developments have meant that the number of multinational companies has increased significantly and their ownership and financing have also become far more international. This again ensures the need for International Accounting Standards (Warrell 1999).

2.5 World-wide acceptance and observance of IAS(s)

The impact of the IASC has varied world-wide. A threefold differentiation is possible: less developed countries, European countries and capital market countries. The influence of the IAS is strongest in the less developed countries. Many, such as Malaysia, Nigeria and Singapore, have adopted IAS as a cheaper alternative than developing their own standards. This trend continues, with many of the new proposed Chinese accounting standards being based on IASs. Although based on UK/US principles, IASs are a more practicable alternative for less developed countries than the implicit adoption directly of actual UK/US standards.

In continental Europe, especially in France and Germany, there is ambivalence to IASs. Traditionally, these countries have favoured much regulated, tax-driven, creditor-based accounting practices. This is very much at variance with the UK/US approach contained in the IASs. On the other hand, many representatives on the IASC board come from professional multinational auditing firms. By training and inclination they are likely to favour IASs. Furthermore, IASs are widely seen as preferable to US standards. Many large French and German multinationals are voting with their feet. In 1995, 23 out of 100 leading French industrial companies referred to IASs (Hora, Tondkar and Adhikari 1997).

In some European countries, such as Germany, listed companies were allowed to use IASs instead of domestic standards as a basis of preparing their financial statements.

Capital market countries, such as the US, Canada and the UK, generally have standards which already approximate to IASs. However, until very recently there has been a great reluctance to endorse fully all aspects of the IASs. Before the IOSCO agreement in 1995, the impact of the IASs had been much researched and found to be marginal.

In a survey conducted by Ernst and Young in (2002) of national efforts to promote and achieve convergence with IASs in 59 countries, it was observed that over 90% of the surveyed countries intended to converge with IASs, indicating that the IASB was viewed as the appropriate body to develop a global accounting language.

The majority of the surveyed countries currently have formally stated their intention to converge. Typically, this intention takes the form of a governmental or other regulatory requirement, or a policy announced by the national accounting standard setting body. In many instances, the country initially will require only listed companies to adopt IASs. In other countries, national standard setters have an agenda designed to remove existing differences between IASs and their national GAAP, covering listed and unlisted companies.

2.6 The IASC's Relationship with Standard Setting Bodies

In the early years, the IASC's links with national standard setting bodies were achieved through the professional accountancy bodies, which are the members of the IASC. However, from the early 1980s, the IASC took a number of initiatives to work directly with national standard setting bodies. It established joint working parties

on common problems, such as deferred taxes and pension costs, and carried out a programme of visits to discuss issues of common interest. The late 1980s and the early 1990s saw some important initiatives by the IASC to extend these links further. The IASC also began to play a role in the group now known as G4+1 which is the standard setting bodies in Australia, Canada, the United Kingdom, and the United States plus the IASC. The IASC believes that such groups should lead to the improvement and harmonisation of financial reporting through both recommendations to the IASC and the adoption of common improvements in national standards. The direct involvement of standard setters in the work of the IASC gives IASs a wide acceptance from different countries all over the world (Cairns 1999).

Recently, the progress toward attaining a global financial reporting framework has accelerated, and many significant steps have been taken. The most important step is the formation of International Accounting Standards Board (IASB), a highly professional organisation supported by industry and governments around the world, in March 2001, which replaces the IASC, as part of a comprehensive restructuring of the international accounting standards-setting organisation. The restructuring culminated in April 2001, when IASB assumed the responsibilities of its predecessor body, IASC. It was determined that the IASs issued by the IASC will be effective until superseded and that the international accounting standards will now be known as International Financial Reporting Standards (IFRSs) (Casabona and Shoaf 2002). The restructuring program adopted by the IASC attempts to incorporate the SEC's suggestions, as evidenced in its new Constitution, issued in 2000.

To achieve its goal of convergence, the IASB works closely with national standard setters around the world. The Financial Accounting Standards Board (FASB) is one of the IASB's most important partners. In face of the financial reporting crisis that took place early this decade in the U.S., FASB has realised that it does not have all the answers to all of the accounting issues. There are some areas of U.S. standards that could be improved, where international standards seem to be more principles-based and more easily applied. Therefore the FASB has become a proponent of improved international standards, and a single set of standards to be used internationally and domestically (Sylwia and Irene 2003).

In the Memorandum of Understanding called 'The Norwalk Agreement,' issued at their joint meeting in Norwalk, Connecticut, on September 18, 2002, both the FASB and IASB pledged to use their best efforts to make their existing financial reporting standard fully compatible as soon as possible. The Boards also made a commitment to co-ordinate their future work programs to ensure that once achieved, compatibility is maintained. Based on this Memorandum, on October 29, 2002, the FASB and IASB jointly announced their commitment to achieving real convergence between their respective accounting standards by 2005, when listed EU companies were required to apply IFRSs. The European Commission welcomed this announcement.

The U.S. Securities and Exchange Commission (SEC) has also supported global standards, although it still does not accept IAS financial statements without reconciliation to U.S.GAAP. From the U.S. prospective, the international standards are not yet adequate comprehensive and remain too ambiguous (Tidrick 2002).

The SEC also wanted IASs to be more rigorously interpreted and applied. That involves more uniform auditing procedures, enforcement mechanisms, and regulatory environments around the world. Currently about 50 foreign issuers registered with the SEC use IASs. This number was estimated to increase to 500-600 by 2005 (Reason 2002). Therefore, the recent IASB/FASB convergence agreement was applauded by the SEC. Convergence should lead to a situation when reconciliation between IASs and U.S.GAAP, as currently required by the SEC in foreign filings, will no longer be required. The FASB has reached consensus that a set of high-quality international standards is desirable because their use would improve international comparability; reduce costs to financial statement users, preparers, auditors, and others; and, ultimately, optimise the efficiency of capital markets (Street and Gray 1999).

Another major benefit to the internationalisation of accounting standards would be the ability for many large foreign companies to be listed on the NYSE. This would give the companies access to the largest capital market in the world, which would make it easier to issue equity or raise debt. In addition, the NYSE would have the opportunity to earn more profit as well, because they would have access to an immense number of multinational corporations that were previously out of reach (Osborn 2001).

On September 1999, the Certified General Accountants Association of Canada (CGA-Canada) published a report, *The Case for International Accounting Standards in Canada*, which details the many benefits of adopting the IASs. The report recommends that Canada cease setting its own standards in favour of adopting

IASB standards, which are more reflective of globalisation and the growing trend toward international commercial activity (Richardson and Hutchinson 1999).

2.7 Advantages of IFRSs for investors

In 2002, the European Commission issued a regulation requiring publicly listed firms in the European Union member states to adopt IFRS in 2005, most of which previously applied domestic financial reporting standards. The adoption of IFRS resulted in application of a common set of financial reporting standards not only within Europe, but also between European firms and firms in the many other countries that require or permit application of IFRSs. Thus, it represents one of the largest financial reporting changes in recent years.

The adoption of IFRSs in Europe was controversial. Proponents believe IFRSs adoption would benefit investors for three primary reasons. First, some proponents believe application of IFRSs would result in higher quality financial reporting information than application of domestic European standards. Improved information quality would lower information asymmetry and information risk. Second, application of a common set of standards would lower costs to investors of comparing performance of firms from different countries. Third, European capital markets would experience increased capital flows from outside of Europe and become more globally competitive, thereby increasing liquidity for European firms. Prior research reveals that these effects are associated with lower costs of capital. Thus, it is predictable that equity investors perceive net benefits associated with adoption of IFRSs in Europe.

Opponents to IFRSs adoption countered that IFRSs do not adequately reflect regional differences in economies, and that a common set of standards might not accommodate the differing political and economic features of member states that caused divergent accounting systems to arise in the first place. Also, prior research indicates it is unclear whether investors benefit simply from adoption of a common set of financial reporting standards, even those of high quality.

According to Sharp (1998) the benefits of international accounting standards include:

- The reduction of investment risks and cost of capital world-wide.
- The lowering of costs arising from multiple reporting.
- The elimination of confusion arising from different measures of financial position and performance across countries.
- The encouragement of international investment.
- The more efficient allocation of savings world-wide.

2.7.1 Direct advantages of IFRSs for investors

Widespread international adoption of IFRSs offers equity investors a variety of potential advantages, these include:

1. IFRSs promise more accurate, comprehensive and timely financial statement information, relative to the national standards they replace for public financial reporting in most of the countries adopting them, Continental Europe included. To the extent that financial statement information is not known from other sources, this should lead to more-informed valuation in the equity markets, and hence lower risk to investors.

2. Small investors are less likely than investment professionals to be able to anticipate financial statement information from other sources. Improving financial reporting quality allows them to compete better with professionals, and hence reduces the risk they would suffer from trading with a better-informed professional instead, known as “adverse selection” (Glosten and Milgrom 1985; Diamond 1991; Leuz and Verrecchia 2000).

3. By eliminating many international differences in accounting standards, and standardizing reporting formats, IFRSs eliminate many of the adjustments analysts historically have made in order to make companies’ financials more comparable internationally. IFRSs adoption therefore could reduce the cost to investors of processing financial information.

4. A bonus is that reducing the cost of processing financial information most likely increases the efficiency with which the stock market incorporates it in prices. Most investors can be expected to gain from increased market efficiency.

5. Reducing international differences in accounting standards assists to some degree in removing barriers to cross-border acquisitions and divestitures, which in theory will reward investors with increased takeover premiums (Bradley, Desai and Kim 1988).

In general, IFRSs offer increased comparability and hence reduced information costs and information risk to investors.

2.7.2 Indirect Advantages of IFRSs for Investors

IFRSs offer several additional, indirect advantages to investors. Because higher information quality should reduce both the risk to all investors from owning shares and the risk to less-informed investors due to adverse selection, in theory it should lead to a reduction in firms' costs of equity capital. This would increase share prices, and would make new investments by firms more attractive, other things equal.

Indirect advantages to investors arise from improving the usefulness of financial statement information in contracting between firms and a variety of parties, notably lenders and managers (Watts 1977; Watts and Zimmerman 1986).

An accounting model that focuses on the primacy of assets/liability recognition and measurement is the cornerstone of "transparent" financial reporting. Therefore, the IASB considers, for example, fair value to be the most relevant measurement basis. This means that a substantial portion of assets and liabilities are stated in the balance sheet at fair value. Such balance sheet items as pension assets and liabilities, derivative financial instruments, certain other financial assets, financial liabilities held for trading, tangible and intangible fixed assets that have been acquired in a business combination, impaired or revalued, share-based payment liabilities, investment properties and biological assets, are measured at fair value, in accordance with IFRSs. However, accounting practice in a code-law country like Germany is generally based on historical cost.

Increased transparency causes managers to act more in the interests of shareholders. In particular, timelier loss recognition in the financial statements increases the incentives of managers to attend to existing loss-making investments

and strategies more quickly, and to undertake fewer new investments with negative Net Present Values (NPVs).

Bushman and Piotroski (2006) report evidence that firms in countries with timelier financial-statement recognition of losses are less likely to undertake negative-NPV investments. The increased transparency and loss recognition timeliness promised by IFRSs therefore could increase the efficiency of contracting between firms and their managers, reduce agency costs between managers and shareholders, and enhance corporate governance.

The potential gain to investors arises from managers acting more in their (i.e., investors') interests. The increased transparency promised by IFRSs also could cause a similar increase in the efficiency of contracting between firms and lenders. In particular, timelier loss recognition in the financial statements triggers debt covenants violations more quickly after firms experience economic losses that decrease the value of outstanding debt (Ball 2001; 2004; Ball and Shivakumar 2005; Ball, Ashok and Sadka 2006). Timelier loss recognition involves timelier revision of the book values of assets and liabilities, as well as earnings and stockholders' equity, causing timelier triggering of covenants based on financial statement variables. In other words, the increased transparency and loss recognition timeliness promised by IFRSs could increase the efficiency of contracting in debt markets, with potential gains to equity investors in terms of reduced cost of debt capital.

It has long been believed by researchers that uniform financial reporting standards will result in a lower cost of capital, which is a desirable objective for companies and investors. More specifically, a lower cost of capital results when investors are willing

to accept lower returns (interest on debt, dividends and capital appreciation on equity) from their investments in corporate securities. Investors are, theoretically willing to accept lower returns when the risk of their investment is reduced. While investment risk is a function of many factors, accounting risk is definitely a relevant concern. Accounting risk refers to the risk in investing that derives from difficulties in understanding the accounting principles being applied by the reporting entity, and the possibility that financial reporting standards may not be uniformly adhered to (Epstein 2009).

2.8 Disadvantages of IFRS adoption to investors

On the other hand, there are some drawbacks for the adoption of IFRS to investors.

1. Substantial international differences in financial reporting practice and financial reporting quality are inevitable and most political and economic influences on financial reporting practice remain local.
2. One concern that arises from widespread IFRSs adoption is that investors will be misled into believing that there is more uniformity in practice than actually is the case and that international differences in reporting quality now will be hidden under the rug of seemingly uniform standards.
3. In addition, uneven implementation curtails the ability of uniform standards to reduce information costs and information risk, described above as an advantage to investors of IFRS. Uneven implementation could increase information processing costs to transnational investors – by burying accounting inconsistencies at a deeper and less transparent level than differences in standards.

2.9 Summary

In the last decades, capital markets have been extensively globalised and investors have shown more interest in foreign equities to enhance their investment portfolios. This has led to more pressure on one common accounting language to be followed by all companies worldwide. The International Accounting Standards Committee (IASC) was formed in 1973 for the purpose of issuing International Accounting Standards. This committee and its successor, the International Accounting Standards Board (IASB), have gained world-wide acceptance in relatively short period of time. Academics and practitioners believe that globalising the accounting standards will achieve many benefits to capital markets' participants. Unsurprisingly, the IASB began to work with national standard-setters in leading countries, i.e. the U.S. and the UK, to harmonise the accounting standards and to achieve convergence in accounting practices. The IASB also gained good faith from the International Organisation of Securities Commissions, to the extent that the latter advised its members to adopt IFRSs as a basis for their financial reporting. The European Union responded to this development by enacting a law that requires all listed companies in the different European Stock Exchanges to mandatorily adopt IFRSs as a basis for preparing their financial statements from 1st January 2005 and onwards. This historical event is expected to have big influence on the way items are presented and measured in the financial statements, compared with domestic accounting standards in the different countries.

The next chapter discusses the main differences between IFRSs, German GAAP and the UK GAAP, in terms of disclosure and measurement of items in the financial

statements. These differences are supposed to have an influence on investors' decisions. As IFRSs promise to provide more transparent and accurate financial information than local GAAP, it is expected that the adoption of IFRSs in Europe will convey more value to investors and will increase the relevance of financial reporting to those investors.

CHAPTER 3 MAJOR DIFFERENCES BETWEEN GERMAN GAAP, UK GAAP AND IFRSs

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3.1 Introduction

It is standard in the accounting literature to distinguish between two models under which accounting standards are developed: the shareholders' model originating in countries with a common-law legal system, and the stakeholders' model originating in countries with a code-law legal system. In a pure shareholder- or common-law-model country, companies raise capital (equity and debt) directly from the public, and investors are presumed to rely on public, not private, information. Consequently, common-law systems tend to require a high standard of public disclosure, and accounting rules are determined largely by the disclosure needs of shareholders and prospective shareholders. The problem of asymmetric information between managers and shareholders is addressed through financial reporting and other means of timely public disclosure. Accounting standards evolve by becoming commonly accepted in practice and are generally separate from tax laws. In other words, accounting standards arise in an accounting market and are not determined by the government.

Conversely, in a pure stakeholder- or code-law-model country, taxation requirements largely encumber financial reporting rules, and the government, shareholders, debt holders, employees, and managers are all viewed as stakeholders. In code-law countries, transactions are frequently conducted among parties that know each other. There is less reliance on public information and investors typically have access to private information. Code-law systems therefore tend to require a lower standard of public disclosure and thus generate less public information. Consequently, code-law systems do not support large public capital markets. Rather,

they tend to rely on intermediaries such as banks. For example, a corporation raises debt and equity capital in relatively large amounts from a bank with which it has a long-term relation. The bank, which serves as an intermediary, in turn raises the capital from the public. The bank has access to private information about the corporation's risks, which need not be publicly disclosed.

While pure common-law countries and pure code-law countries do not exist in reality, the Anglo-American countries (e.g., the United States and the United Kingdom) are typically classified as common-law countries, whereas most continental European countries (e.g., Germany) and Japan are classified as code-law countries.

German GAAP (HGB) is typically characterized as stakeholder-oriented and tax-driven (Harris, Lang and Moller 1994; Ball, Kothari and Robin 2000; Leuz and Wüstemann 2003). It differs substantially from IASs, which is shareholder-oriented and independent of tax reporting considerations. The different roles of the accounting systems have several important implications for the accounting standards. First, German GAAP (HGB) generally encourages a “prudent” approach to asset valuation and liability recognition to facilitate contracting with stakeholders, while IASs promotes “true and fair” presentation of balance sheets to facilitate decisions- making for investors. For example, HGB does not allow capitalization of internally developed intangibles or research & development cost (R&D). On the contrary, IASs allows capitalization if certain criteria are met. Second, HGB permits great flexibility for managers to value assets at their lowest amount possible to minimize tax liability, while IASs constrains such flexibility. For example, HGB allows tax-based accelerated depreciation methods for property, plant and equipment and IAS 16, *Property, Plant and Equipment*, does not. Third, HGB is characterised by

income smoothing through the use of reserves to dampen fluctuations in income and also through delayed and gradual recognition. IASs, on the other hand, are more fair-value oriented and therefore likely to incorporate the effects of economic events in a more timely (and volatile) manner in the financial statements (Coopers & Lybrand 1993; Alexander and Archer 2001).

UK GAAP and IASs have evolved in environments where accounting practices are developed primarily in the private sector, reporting rules are largely unencumbered by taxation requirements, and capital is traditionally raised in public markets. Thus, the primary focus of UK GAAP and IASs is the needs of current and prospective shareholders for relevant and reliable information.

Conversely, German standards were developed in a highly politicized environment serving a number of stakeholders including taxation requirements, which tend to align tax reporting and financial reporting rather than to focus on earnings informativeness. Accelerated depreciation is a good example that demonstrates the focus of German accounting rules on the alignment of financial and tax reporting. German companies purchasing qualifying assets are entitled to write off these assets in an accelerated fashion. The amount of the accelerated depreciation is first charged to the income statement and credited to a balance-sheet item and then is reversed to earnings (as a credit) in future periods. Footnote 9 in the 2000 Volkswagen Group annual report provides an insight into the magnitude associated with this practice. Specifically, the footnote reveals that at the end of year 2000, the balance of accelerated depreciation included in special items with an equity portion was 409 million DM (Bartov, Goldberg and Kim 2005).

Another characteristic of German accounting is the liberal use of provisions. The German Company Law allows companies to create provisions for estimated future losses if they are possible and reasonable, as opposed to IAS 37 *Provisions, Contingent Assets and Contingent Liabilities*, which strictly requires that the loss be probable and measurable. The relatively high discretion allowed by German Law when creating provisions is often used as a smoothing mechanism; that is, in good years provisions may be created, only to be reversed to income in bad years. For example, footnote 10 in the 2000 Volkswagen Group annual financial statements reports "other provisions" in the amount of 4.266 billion DM, and footnote 14 reports that in year 2000 other operating income of 2.8 billion DM resulted from the elimination of provisions (Bartov *et al.* 2005).

Given these differences between earnings produced under German GAAP and earnings produced under U.K. GAAP or IASs, it is expected that earnings prepared under the latter have higher value relevance than earnings determined under the former.

One of the main strengths of common-law systems is that economic losses are quickly included in published financial statements. Timely loss recognition means that managers who become aware of decreases in expected future cash flows from long-term investments will incorporate that information quickly into accounting income as one-time losses. The system encourages managers to take action to improve investments and strategies that are losing money, and thus make the company more efficient.

In a code-law system, the government writes and enforces the accounting code, with violations carrying criminal penalties. Countries that use a code-law system rely more on private than public information. There is no fundamental presumption that transactions must be at arm's length in an open market, and therefore informed by public disclosure.

Code-law accounting gives managers considerable discretion in making various accounting estimates. For example, in good years managers can reduce reported income by overestimating expenses, by underreporting revenues, and even by transferring funds to hidden reserves. These techniques "put income in the bank" for the future. In bad years, they can increase reported income by reverting to normal accounting estimates, "taking income out of the bank."

Additionally, in common-law countries the aim of financial reporting is a fair representation of the financial situation of the company, whereas, in code-law countries financial reporting is focused on compliance with the legal requirements and tax law. This is reflected in many accounting treatments, mainly the accounting treatment of lease contracts. In countries with strong shareholder orientation and emphasis on fairness, like the UK, lease contracts are accounted for on the balance sheet although the company is not the legal owner of the assets. However, in countries where the legal form prevails, like Germany, these assets used by the company are kept off balance sheet as the company is not the legal owner. Basically, this difference can have a major impact on the debt/equity ratio of companies (Alexander, Briton and Jorisson 2009).

Moreover, in code-law countries the regulator attaches importance to uniformity. Compliance with prescribed accounting plans (German) and detailed formats for the balance sheet and the profit and loss account are a result of this drive for uniformity. When regulation is in the hands of the government the layout of the balance sheet, profit and loss account and notes is much more detail. On the other hand, the level of detail in the notes to the balance sheet and profit and loss account is much higher when accounts are prepared in compliance with IFRSs.

In countries where financial reporting has a strong shareholders' orientation, e.g. UK, the practice of preparing and publishing consolidated financial statements emerged much earlier. In typical creditor orientation countries (German), which are usually also, code-law countries, consolidation was introduced by law (Alexander *et al.* 2009).

In summary, code-law accounting provides greater incentives and opportunities to minimize and/or smooth income than common-law accounting. These reporting goals are achieved at the expense of timeliness of conveying value relevant information. While both U.K. GAAP and IASs are set primarily by the private sector and focus on investors' needs, differences exist between these two sets of rules.

The following section discusses the main differences between the three sets of accounting standards and their impact on the disclosure and measurement of items in the financial statements.

3.2 The main differences between IFRSs, UK and German GAAP

Many differences can be identified from the comparisons between IFRSs, UK and German GAAP which demonstrate the main differences in the accounting systems in both common and code-law countries. These differences can be classified into either differences in disclosure of items in the financial statements or differences in the measurement basis for such items.

The following section details these two categories of differences.

3.2.1 Disclosure-based differences

3.2.1.1 Presentation of the cash flow statement

According to German GAAP, the requirement for presenting primary financial statements and accounting policies is not like IFRSs and UK GAAP. A statement of cash flow and a statement of changes in equity are required only by German listed companies (Deloitte and Touche 2004).

Additionally, there are some major differences between a cash flow statement prepared under IFRSs and German GAAP and one prepared under UK GAAP. The cash flows reported under IAS 7, *Cash Flow Statement*, and German GAAP relate to movements in cash and cash equivalents, defined as short-term highly liquid investments that are readily convertible into known amounts of cash and subject to insignificant risk of changes in value (PwC 2005). UK GAAP requires the movement of cash (defined as cash in hand and deposits repayable on demand, less

overdrafts) to be reported in the cash flow statement. Under UK GAAP, there is no concept of 'cash equivalents'. On the other hand, under both IAS 7 and German GAAP, cash equivalents would be included in 'management of liquid resources' (Deloitte and Touche 2004).

In addition, Both IAS 7 and German GAAP require cash flows to be reported under three sections: operating, investing and financing, whereas UK GAAP require cash flows to be reported in far greater detail under nine standard headings (PwC 2005). Moreover under UK GAAP, foreign currency exchange differences on cash balances are not reported on the face of the cash flow statement as they are non-cash items. However, IAS 7 and German GAAP require foreign currency exchange differences on cash and cash equivalents to be reported on the face of the cash flow statement in order to reconcile the opening and closing cash and cash equivalent balances. IFRSs deal with the situation where the reporting entity itself reports in the currency of a hyper-inflationary economy. This is not specifically dealt with in UK GAAP. Instead, the translation of foreign entities is included in consolidated financial statements.

3.2.1.2 Accounting treatment for investment in associates

Unlike IFRSs and UK GAAP, no equivalent term exists for "associate" in German GAAP. Rather, the description "participating interests with significant influence" is used (Deloitte and Touche 2004). Under UK GAAP, an investor that is not required to produce consolidated financial statements because it has no subsidiaries, treats interests in associates as investments and carries them at cost or valuation. UK GAAP require additional disclosures of the relevant equity accounted amounts for

these associate interests. Such disclosures are not required for those associates not included because the investor was exempt from the requirement to prepare consolidated financial statements or would be if the investor had subsidiaries (PwC 2005).

However, IFRSs require summarised aggregated financial information disclosures for all associates. Under German GAAP, inter-company eliminations in respect of an associate may be made in full. Further, the accounting policies of an associate are not consistent with those of the group. In addition, under German GAAP there is a permitting to exclude some subsidiaries from consolidation (Beckman, Barndes and Eierle 2007).

3.2.1.3 Accounting treatment for income taxes

In the accounting literature income taxes are classified in the financial statements into two broad categories, current and deferred tax, the treatment of which is different under the three sets of accounting standards under study. IAS 12, *Income Taxes*, and German GAAP are similar to Financial Reporting Standard (FRS) 16 in respect of current taxes, except that IAS 12 requires current tax to be presented separately on the face of the balance sheet (there is no such requirement in FRS 16). In addition, IAS 12 requires current tax to be charged directly to equity if it relates to items that are also charged or credited directly to equity. FRS 16 requires that all current tax, which are related to the financial year, to be included in the statements of performance (www.incisivemedia.com/pdf/ifrs_press200705release.pdf).

In relation to deferred tax, IAS 12 states that deferred taxes are to be recognised on the basis of taxable temporary difference (subject to certain exceptions). Temporary

differences include all timing differences and many permanent differences. Under FRS 19, deferred tax is recognised on the basis of timing differences (subject to certain exceptions) (Horton and Serafeim 2007). In addition, under IAS 12, deferred tax on revaluation gains is always recognised, while under FRS 19, deferred tax on revaluation gains is only recognised (i) if there is an obligatory agreement to sell the re-valued asset and the gain expected to arise on sale has been recognised; or (ii) where an asset is continuously re-valued to fair value with changes in fair value being recognised in the profit and loss account. Further, IAS 12 prohibits the discounting of deferred tax, while FRS 19 permits, but does not require, discounting of deferred tax (PwC 2005).

On the other hand, German GAAP state that a deferred tax is provided in respect of timing differences, which are focused on the income statement. Deferred tax cannot be recognised directly in equity (Beckman *et al.* 2007). Moreover, unlike IFRSs, deferred tax can be measured either on a discounted or on an undiscounted basis in the German GAAP (Deloitte and Touche 2004). Finally, the general classification rules for current / non-current assets apply to deferred tax assets; therefore a portion of a deferred tax asset may be classified as current in the German GAAP. Unlike IFRSs, German GAAP classifies deferred tax liabilities as a separate class of provisions within liabilities, for which the current / non-current distinction is not applicable (KPMG 2003).

3.2.1.4 Accounting treatment for leases

Although all the three sets of standards agree on the classification of leases into finance leases or operating leases, and although the definition of a finance lease is

the same in all standards, they are different with regard to whether a lease is to be classified as finance or operating lease. IAS 17, *Leases*, does not provide a quantitative test of whether a lease is a finance lease (the '90% test') (PwC 2005). Instead it provides additional guidance on when a lease should be classified as a finance lease. According to IAS 17, *Leases*, finance leases should be capitalised if all rewards and risks of ownership are transferred to the lessee, and depreciation should be recorded in a fashion similar to that recorded for other long-lived assets (Beckman *et al.* 2007). IAS 17 requires that a lease of land and buildings should be split at inception of the lease into a separate lease of land and a lease of buildings. Unless title is expected to pass to the lessee at the end of the lease term, leases of land should normally be treated as operating leases (PwC 2005). The buildings element would be classified as an operating or finance lease as appropriate. This means that leases of buildings are more likely to be classified as finance leases under IAS 17 than under Statement of Standard Accounting Practices (SSAP) 21 where the land and buildings are considered together (Deloitte and Touche 2004).

Income recognition by lessors for finance leases is different under the standards, which can give rise to materially different income recognition profiles, particularly where the tax effects of a lease are significant (PwC 2005). Accordingly, it appears that some leases which have historically been classified as operating leases under UK GAAP will now be classified as finance leases under IAS 17 (Horton and Serafeim 2007). Regarding German GAAP, the classification of leases generally is driven by tax guidelines. In many cases, lease contracts are classified as operating leases, but would be finance leases under IFRSs (KPMG, 2003). Further, gains on sale and leaseback transactions often are recognised in the period of sale.

Accordingly, in German practice, the accounting treatment is aligned to tax regulations which, as compared to IFRSs, are more ruled –based (Beckman *et al.* 2007).

3.2.1.5 Accounting treatment for segment reporting

In relation to segmental reporting, the scope of IAS 14, *Segment Reporting*, and SSAP 25 differs. IAS 14 applies to entities whose equity or debt securities are publicly traded or in the process of being so. SSAP 25 applies to public companies, banking and insurance companies and groups, and certain other large entities. The disclosure requirements of IAS 14 are more extensive than in SSAP 25 (PwC 2005). IAS 14 provides that one basis of segmentation is primary and the other is secondary. Extensive disclosure is required for primary segments, with considerably less information required to be disclosed for secondary segments. This differs from SSAP 25 which does not make such a distinction (Deloitte and Touche 2004). IAS 14 is based on management's approach to organise the business. This management-based approach differs from the risk/returns approach of SSAP 25, although in practice the results may be similar (PwC 2005). According to German GAAP, the segmentation is based wholly on the internal reporting structure (KPMG 2003).

3.2.1.6 Accounting treatment for non-current assets held for sale and discontinued operations

IFRS 5, *Non-current Assets Held for Sale and Discontinued Operations*, sets out requirements for the classification, measurement and presentation of non-current

assets held for sale. There is no equivalent UK or German standard (PwC 2005). IFRS 5 introduces the concept of a 'disposal group'. Assets classified as held for sale and the assets in a disposal group that is classified as held for sale are presented separately from other assets in the balance sheet. The liabilities of a disposal group classified as held for sale should be presented separately from other liabilities (PwC 2005). Under IFRS 5, subsidiaries acquired exclusively with a view to resale that meet the conditions to be classified as held for sale are consolidated, but their results are presented within the single line item for discontinued operations. They are presented in the balance sheet as two separate items (that is, assets, including goodwill, and liabilities) measured at fair value less costs to sell (PwC 2005). Under UK GAAP, these subsidiaries are exempt from consolidation and are included in the balance sheet as a single asset at fair value based on net proceeds.

3.2.2 Measurement-based differences

3.2.2.1 Accounting treatment for investment in subsidiaries

A choice of policy for translating the results of a subsidiary in a hyperinflationary economy – either adjusting the local currency financial statements to reflect current price levels prior to translation or using a relatively stable currency as the measurement currency of the foreign operation is permitted under UK GAAP. However, under IAS 29, *Financial Reporting in Hyperinflationary Economies*, the results of an entity whose functional currency is the currency of a hyper-inflationary economy must be restated under prior to translation into a different presentation currency. IAS 29 requires such an entity's results to be restated in terms of the measuring unit current at the balance sheet date. In addition, unrealised gains

resulting from the translation of foreign currency transactions are permitted (PwC 2005). According to German GAAP, there are no legal requirements for translating the financial statements of foreign subsidiaries for consolidation purposes. Moreover, there are no legal requirements for hyperinflation accounting. Further, foreign currency for both current and non-current monetary items carried out at fair value following the write-down, is not translated if this would lead to the recognition of unrealised gains (KPMG 2003).

In terms of consolidated and separate financial statements, the scope of IFRSs and UK GAAP is similar, except that IFRSs include guidance on the treatment of investments in subsidiaries in the parent's separate financial statements, whereas UK GAAP do not (PwC 2005). On the other hand, unlike IFRSs, consolidation under German GAAP is focused primarily on the concept of a group and then on actual control; however, this should not lead to differences from IFRSs in practice. Moreover, a subsidiary may be excluded in many circumstances (KPMG 2003): first, if there are severe long-term restrictions which substantially hinder the exercise of the control of the parent, second, if held exclusively for resale, regardless of the expected date of sale, third, if the information necessary for consolidation cannot be obtained without disproportionate expense or undue delay, and finally, if its operations are so different from those of the rest of the group that consolidation would impair fair presentation. Contrary to IFRSs, minority interests are presented as part of the equity. This will affect the total amount of equity and accordingly will affect all financial ratios that are based on the equity figure, e.g. return on equity and debt to equity ratios.

3.2.2.2 Accounting treatment for intangibles

Regarding the intangible assets, both IFRSs and UK GAAP identify an intangible asset as a non-monetary asset without physical substance. Under IAS 38, *Intangible Assets*, an asset is identifiable when it is separable (that is, capable of being sold separate from the entity) or arises from contractual or other legal rights, while under UK GAAP, the assets have to be capable of being disposed of separately from the business. UK GAAP require an internally generated intangible to have a readily ascertainable market value before it can be recognised (Deloitte and Touche 2004; PWC 2005). However, under German GAAP, the acquirer's intangible assets are recognised only if they meet the general requirements for recognition and the acquirer's contingent liabilities are not recognised, and goodwill is either amortised over its useful life or 40 years starting the year after acquisition (Beckman *et al.* 2007), or is charged directly to equity or to the profit and loss account. On the other hand, IFRS 3, *Business Combination*, does not allow the amortisation of goodwill. Instead, goodwill must be tested for impairment on an annual basis. Similar to German GAAP, UK GAAP require that goodwill is to be amortised over its useful life, but with a maximum period of 20 years not 40 years as with German GAAP (Horton and Serafeim 2007).

On the other hand, the major differences between German GAAP and IFRSs in asset capitalisation and write-off policies arise due to the recognition of development costs under IFRSs (Beckman *et al.* 2007). Under IAS 38, *Intangible Assets*, research costs must be written off as incurred, whereas development costs should be capitalised where particular criteria are met. Conversely, under UK GAAP an entity may choose to capitalise development costs. According to German GAAP, internally

generated intangible assets, including development costs, cannot be capitalised. The amortisation period of intangible assets may exceed 20 years if justified under IFRSs, while under German GAAP amortisation is tax driven and not necessarily based on the useful life of the assets (KPMG 2003).

3.2.2.3 Accounting treatment for foreign exchange rate

IAS 21, *The Effects of Changes in Foreign Exchange rates*, requires the income and expense items of foreign entities, with a different functional currency to the group's presentation currency, to be translated at the transaction rate and suggests that the average rate may be a good approximation of that rate (PwC 2005). IAS 21 does not permit the choice, allowed under UK GAAP (SSAP 20), of using the closing rate for the profit and loss account when applying the closing rate/net investment method of translation (PwC 2005). Unlike IFRSs, the financial statements of "direct foreign activities" under German GAAP are translated as if they were assets, liabilities, income and expenses of the reporting entity itself, and resulting translation differences are recognised in profit or loss. Under IAS 21, net exchange differences classified as equity must be separately tracked and the cumulative amounts disclosed (KPMG 2003). On disposal of a foreign entity, the appropriate amount of cumulative translation differences relating to the entity is included in the gain or loss on sale in the income statement. SSAP 20 does not allow such 'recycling' of exchange gains and losses (Deloitte and Touche 2004). However, German GAAP state that when an investment in a foreign operation is disposed of, the transfer of the cumulative exchange differences to profit or loss is recommended but not mandated; instead, the differences may remain in equity (KPMG 2003). In addition, although translation of foreign currency financial statements under German GAAP

does not require a specific method (Ordelheide 2001), the realisation principle prohibits the recognition of unrealised gains (Beckman *et al.* 2007).

3.2.2.4 Accounting treatment for fixed assets transactions

IAS 16, *Property, Plant and Equipment*, capitalises subsequent expenditure on an asset using the same criteria as the initial spend, that is, when it is probable that the future economic benefits associated with the item will flow to the entity and the cost of the item can be measured reliably. If part of an asset is replaced, then the part it replaces is derecognised, regardless of whether it has been depreciated separately or not (PwC 2005). UK GAAP, on the other hand, require capitalisation of subsequent expenditure only when the expenditure improves the condition of the asset beyond its previously assessed standard of performance, which generally would have been reflected in the asset's depreciation (Deloitte and Touche 2004). Under German GAAP, dismantling, removal and restoration costs cannot be capitalised (KPMG 2003). Moreover, revaluation of fixed assets is not permitted under German GAAP and fixed assets must be disclosed and measured according to their historical cost, net of related accumulated depreciation. Depreciation is based on the useful life of an asset under IFRSs, whereas, under German GAAP, depreciation is tax driven and not necessarily based on the useful life of the asset (Ballwieser 2001). To the extent that tax-driven depreciation exceeds the depreciation calculated for commercial purposes, the amount can be recorded in a special reserve to improve transparency (Beckman *et al.* 2007).

The compensation for loss or impairment is recognised in the income statement, but only when its receipt is virtually certain in IFRSs, while under German GAAP,

compensation received for a lost asset is deducted from the carrying amount of the replacement cost (Deloitte and Touche 2004).

IAS 16 states that if fixed assets are acquired in exchange for a non-monetary asset, the cost of the acquired asset is measured at fair value unless (a) the exchange transaction lacks commercial substance or (b) the fair value of neither the asset received nor the asset given up is reliably measurable (PwC 2005). A transaction has commercial substance if the future cash flows are expected to change significantly as a result of the transaction. Fair value is taken as the fair value of the asset given up, unless the fair value of the asset received is more reliably measurable. This will be a new requirement for UK companies upon the adoption of IFRSs, as UK GAAP do not contain equivalent rules.

Where a company adopts a policy of valuations, there is a key difference in principle between IFRSs and UK GAAP with this regard. IFRSs require revaluations to be at fair value. It states that fair value is usually 'market value', which is generally taken to mean open market value (PwC 2005). UK GAAP use the 'value to the business' model and require revaluations to 'current value', which is defined as being the lower of replacement cost and recoverable amount (Deloitte and Touche 2004). In addition, IFRSs require residual values to be based on prices current at the balance sheet date, whereas under UK GAAP residual values are based on prices prevailing at the date of acquisition (or revaluation) of an asset and do not take account of price changes (PwC 2005).

3.2.2.5 Accounting treatment for investment property

There are significant differences between both IFRSs and German GAAP from one side and UK GAAP from the other side in terms of the measurement of investment property. IAS 40, *Investment Property*, states that an entity can choose, for all investment property, between the fair value model and depreciated historical cost (PwC 2005). This differs from the treatment required by UK GAAP, which requires investment property to be carried at open market value and does not permit such property to be carried at depreciated historical cost (Deloitte and Touche 2004). Further, when the fair value model is applied under IFRSs, the carrying amount is not depreciated. Gains or losses arising from changes in the asset's fair value are recognised in the income statement. Basically, this differs from UK GAAP where a revaluation gain or loss is recognised, unless it is a permanent deficit (or a reversal) that should be recognised in the profit and loss account (PwC 2005). Finally, when there is a change in use of the investment property, IFRSs provide detailed guidance for subsequent classification. Investment property to be developed for sale is reclassified as inventory and investment property to be owner-occupied is reclassified as property, plant and equipment. There is no guidance in UK GAAP on this issue although properties would be similarly reclassified, but there are some differences in the accounting for transfer values (PwC 2005). German GAAP allows choosing between the book value method and the share capital method when applying the equity method and requires eliminating income from inter-company transactions only if the information necessary to do this is available (KPMG 2003). Furthermore, under German GAAP the equity method is not to be applied if the

investment is of minor relevance for presenting a true and fair value (Beckman *et al.* 2007).

3.2.2.6 Accounting treatment for financial instruments

IAS 39, *Financial Instruments: Recognition and Measurement*, covers the recognition, measurement and de-recognition of financial instruments, in addition to rules on hedge accounting. In the UK, FRS 4 covers the recognition, measurement and presentation of shares and certain financial liabilities that are capital instruments. However, there is currently no UK standard that comprehensively addresses accounting for financial instruments (Horton and Serafeim 2007). The definition of a financial instrument under IFRSs is the same as the UK GAAP definition. The scope is wide and includes cash, debt and equity investments, loans, trade receivables and payables, certain provisions and derivatives. The exclusions from scope are similar to those in UK GAAP. However, there is no short-term debtors and creditors exemption (PwC 2005).

Unlike IAS 39, German GAAP require that financial assets are to be classified in accordance with the prescriptive formats for the balance sheet, including “financial fixed assets”, “receivables”, “securities” and “cash at banks and in hand” (KPMG 2003). According to IAS 39, all derivatives are recognised in the balance sheet and measured at fair value, and loans and receivables and held-to-maturity financial assets are measured at amortised cost. All other financial assets are measured at fair value (with limited exceptions) (PwC 2005). Moreover, under German GAAP, there are no legal accounting rules for derivatives, which often are off-balance sheet. Further, derivatives, when they are recognised, can be measured either at cost or at

fair value. In addition, most financial assets are measured at cost, although some may be measured at fair value (KPMG 2003).

Under IAS 39, changes in the fair value of available-for-sale assets are recognised directly in equity. However, under German GAAP, when financial assets are recognised at fair value, changes in fair value (except for derivatives) can be recognised either in profit or loss or directly in equity (KPMG 2003).

On the other hand, German GAAP generally require that financial liabilities are to be stated at redemption amount initially. In addition, fair value accounting for financial instruments is not allowed and long-term investments are not written down unless impairment is considered permanent (Deloitte and Touche 2004).

3.2.2.7 Accounting treatment for inventories

Both IFRSs and UK GAAP are similar. However, German GAAP is different to some extent. Under IFRSs and UK GAAP, inventories generally are measured at the lower of cost and net realisable value (PwC 2005). However, under German GAAP, inventories also may be measured at current value, which generally is the lower of replacement value and net realisable value, with increases in value being recognised directly in equity in a revaluation reserve (KPMG 2003). Like IFRSs and UK GAAP, German GAAP states that cost includes all direct expenditure to get inventory ready for sale, although there is less guidance in this area. However, unlike IFRSs and UK GAAP, it is not mandatory to include attributable overheads and other indirect costs in the cost of inventories (PwC 2005). For example, Schwarz Pharma AG includes in inventory only direct materials and labour cost as permitted under German GAAP (Schwarz Pharma AG 1998).

Under IFRSs and UK GAAP, the amount to be recognised as an expense (cost of goods sold) must be determined using the specific identification, FIFO (first-in, first-out) or weighted average method. The use of the LIFO (last-in, first-out) method is prohibited. On the other hand, under German GAAP, the LIFO method is permitted as an alternative to the specific identification, FIFO and weighted average methods (Nobes and Parker 2004).

3.2.2.8 Accounting treatment for impairment of tangible and intangible assets

In relation to the impairment of property, plant and equipment, goodwill and intangible assets, IFRSs require an annual impairment test to be taken for goodwill and intangible assets that either are not yet available for use or that have an indefinite useful life. This impairment test may be performed at any time during an annual reporting period, provided it is performed at the same time each year (PwC 2005). Unlike IFRSs, German GAAP states that a compulsory impairment exists only if the carrying amount of a fixed asset permanently exceeds its current value (KPMG 2003). Although the basic approach in IAS 36 is the same as that in FRS 11—impairment is measured by comparing the carrying value of fixed assets and goodwill with the recoverable amount (the higher of fair value less costs to sell, or net selling price, and the value in use, there are some differences between both IFRSs and UK GAAP arising from the UK view of intangible assets as being of a similar nature to goodwill, whereas under IFRSs, intangible assets are treated as similar to tangible fixed assets (PwC 2005).

Under both IFRSs and UK GAAP, impairment losses are to be allocated first to goodwill and then to intangible assets and other tangible fixed assets. Moreover, under IFRSs, reversals of impairment of goodwill are prohibited. Reversals of impairments on other intangible assets are permitted where there are indicators that the impairment no longer exists or is reduced. UK GAAP permits reversals of impairments of goodwill and intangible assets in restricted circumstances (PwC 2005). Regarding German GAAP, repurchase prices, costs, estimated selling prices or discounted cash flows can be the basis of measuring the impairment losses. Further, impairment losses are measured on an item-by-item basis, instead of using cash generating units (Deloitte and Touche 2004).

3.2.2.9 Accounting treatment for employee benefits

FRS 17 and IAS 19, *Employee Benefits*, are similar in their rules regarding measurement and disclosure of retirement benefits such as the adoption of “balance sheet” approach whereby any surplus or deficit in a pension plan should be shown on the employer’s balance sheet (Horton and Serafeim 2007). However, there are significant differences in the recognition of actuarial gains and losses and the presentation of items in the financial statements (Horton and Serafeim 2007). All of the items recognised in the profit and loss account under FRS 17 are treated in a similar way under IAS 19. However, actuarial gains and losses that are recognised immediately in the Statement of Recognised Gains and Losses (STRGL) under FRS 17 are instead recognised in the profit and loss account under IAS 19, usually over a period representing the expected average remaining working lives of employees participating in the scheme (PwC 2005). Any deferred actuarial gains and losses are carried on the balance sheet as part of the net pension asset or liability. Additionally,

whereas FRS 17 requires that pension assets and liabilities are shown net of any related deferred tax, this presentation is not permissible under IAS 12, *Income Taxes*. In addition, IAS 19 goes further than FRS 17 to consider accounting for and disclosure of other employee benefits such as wages and salaries, bonuses, equity compensation and termination benefits (Deloitte and Touche 2004; PWC 2005).

German GAAP states that valuations for defined benefit plans should be done annually and must be based on conditions at the balance sheet date (KPMG 2003). Consideration of future developments such as future salaries is not permitted. The interest rate used for discounting by most enterprises is six per cent due to tax rules. Further, actuarial gains and losses are recognised immediately as expenses or income and not amortised over the expected average remaining working lives of employees participating in the scheme (Beckman *et al.* 2007).

3.2.2.10 Accounting treatment for share-based payments to employees

Generally, the accounting for employee share schemes under IFRS 2, *Share-based Payment*, differs significantly from the current treatment in the UK, which deals only with employee share schemes (Horton and Serafeim 2007).

IFRS 2 requires that for equity-settled transactions with employees (for example, share option awards), the fair value of the employee services received should be measured by reference to the fair value of the equity instrument (for example, the share option) at the grant date (PwC 2005). On the other hand, UK GAAP require that the charge to the profit and loss account should, as a minimum, be based on the

difference between the fair value of the shares at the date of grant and the exercise price (Deloitte and Touche 2004). Under IFRSs, the charge is spread over the 'vesting period', which differs to the requirement in UK GAAP to spread the charge over the 'performance period'. No distinction is drawn in IFRSs between vesting periods during which employees have to satisfy specific performance conditions and vesting periods during which there are no particular requirements other than to remain in the entity's employment (PwC 2005). Hence, a vesting period in the context of IFRSs is different from a performance period referred to in UK GAAP. German GAAP states that when shares are issued to employees, the acquisition cost less payment from employees is to be recognised in the income statement.

Table 3.1 summarises the above differences between IFRSs, UK GAAP and German GAAP.

Table 3.1 IFRSs, UK GAAP and German GAAP – Summary of Main Differences

Topic	IFRSs	UK GAAP	German GAAP
Goodwill	Capitalized and impaired	Generally amortized	Can be deducted immediately against equity, otherwise is amortized
Foreign currency monetary balances	Closing rate	Adjusting the local currency financial statements to reflect current price levels, or using a	Worse of transaction rate and closing rate

		relatively stable currency	
Finance leases	The majority is capitalised;	Capitalised or expensed based on the nature of lease agreement	Generally not capitalized
Trading and available-for-sale marketable securities	Fair value	At cost or lower of cost and market	Lower of cost and market
Provisions	Only when obligation exists; discounted	Discounted	Can be made when no obligation exists; not discounted
Employee benefit provisions	Take account of expected salaries; use market discount rate	Less consideration for expected salaries, use market discount rate.	Consideration of future developments, such as future salaries, is not permitted. Follow tax rules in relation to the interest rate used for discounting (currently 6%).

	Actuarial gains and losses are recognised in the profit and loss account and amortised over the expected average remaining working lives of employees participating in the scheme.	Actuarial gains and losses are recognised immediately in the Statement of Recognised Gains and Losses.	Actuarial gains and losses are recognised immediately in the profit and loss account and not amortised.
Deferred tax	Temporary differences; no discounting	Timing differences; can be discounted	Timing differences; some deferred tax assets not recognised
Inventories	LIFO not allowed	LIFO not allowed	LIFO common
Fixed assets	Can be held extensively at fair value	Measurement is mainly based on historical cost, although fair value measurement is possible in some	Lower of cost or market value, due to conservatism

		cases	
Policy changes and correction of errors	Prior year adjustment	Prior year adjustment	Through income
Investment properties	Cost or market value	Market value	Cost
Proposed dividends	Not accrued	Accrued	Not accrued
Focus of cash flow statement	Cash and cash equivalents	Cash	Cash and cash equivalents
Development costs	Capitalised	Capitalised	Written off

Source: (Nobes and Parker 2004)

3.3 Summary

In this chapter the major differences between IFRSs, UK GAAP and German GAAP are highlighted and classified into disclosure and measurement differences. The main disclosure differences are found to be in the areas of presentation of the cash flow statement; investment in associates; income taxes, leases; segment reporting and the accounting treatment for non-current assets held for sale and discontinued operations.

On the other hand, the main measurement differences are found to be in the areas of investment in subsidiaries; intangibles; foreign exchange transactions; fixed assets transactions; investment property; financial instruments; inventories; impairment of tangible and intangible assets; employee benefits and share-based payments to employees.

As a result of the two categories of differences introduced in this chapter, it is expected that the financial statements prepared under the three sets of accounting standards will be significantly different in terms of both disclosure and measurement of the different items of assets, liabilities and expenses. This, in turn, will lead to differences in the impact of those items on stock performance (measured by share price and trading volume of shares) and on financial indicators of companies adopting those different sets of accounting standards (measured by the financial ratios that are based on the different categories of assets and liabilities and operating profit).

The reason for obtaining such meaningful impact on stock performance and financial indicators is that the adoption of IFRSs requires the reclassification of assets and liabilities in the balance sheet. As a result of this reclassification, there will be one of two possibilities:

- (1) Certain assets and liabilities, which cannot qualify as assets and liabilities according to IFRSs are to be removed from the IFRS-based financial statements. For example, research costs do not qualify as assets under IFRSs. The research costs that had been capitalised previously were entered in the accounts as expenditure when they arose. Likewise, the interest and exchange rate differences, which should not be regarded as part of the cost of an asset under IFRSs, must be removed from that asset's cost. This will affect the book value of the asset recorded in the balance sheet, as well as the amount of depreciation reported in the profit and loss account with regard to this asset under IFRSs

(2) Certain assets and/or liabilities which had not been entered into accounts under local GAAP are to be considered as assets and/or liabilities in IFRS-based balance sheets. For example, deferred tax assets and deferred tax liabilities are more widely defined and recognised under IFRSs than under local GAAP. The adoption of IFRSs requires the inclusion of those assets and/or liabilities in the balance sheet.

The above two points imply that both the recognition and measurement of assets, liabilities and expenses will differ under IFRSs from those under German GAAP or UK GAAP. This implies that the adoption of IFRSs should have an impact on stock performance and financial indicators that mainly measure liquidity, leverage and profitability ratios. This in turn will constitute the basis for building up the hypotheses of this study, which will be discussed later in chapter five.

The following chapter will review the accounting literature that examines the relationship between accounting numbers contained in the financial statements and stock performance (measured by share price and trading volume of shares), as well as the previous studies that investigated the impact of switching from one set of GAAP to another on the financial performance of companies.

CHAPTER 4 LITERATURE REVIEW

- 4.1 Introduction
- 4.2 The value-relevance studies
 - 4.2.1 Relative association studies
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- 4.3 Valuation models
 - 4.3.1 The balance sheet model
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- 4.4 Price and return models
- 4.5 Literature review on the use of modified Ohlson model for international comparisons
- 4.6 Literature review on the impact of IFRSs adoption on financial indicators
- 4.7 Summary

4.1 Introduction

In February 2001, the European Union (EU) proposed a regulation that would require all firms listed on EU exchanges to prepare consolidated financial statements in accordance with International Accounting Standards, currently referred to as International Financial Reporting Standards IFRSs. This obligation would have to be effective as from 1 January 2005 onwards and would imply that 7,000 European listed companies should apply IFRSs to their financial reporting as from this date. This application of IFRSs is expected to have a significant influence on the disclosure and measurement of the components of financial statements (mainly the income statement, the statement of cash flows, and the balance sheet). These changes of disclosure and measurement basis are expected to have an influence on the movement of share prices and trading volumes of stocks, which is collectively referred to as stock performance, and on the different financial indicators for the companies registered on the different European stock exchanges.

Over the last decade, numerous accounting papers have investigated the empirical relationship between stock market values (or changes in values) and particular accounting numbers, for the purpose of assessing, or providing a basis of assessing those numbers' use or proposed use in an accounting standard. This trend of literature is commonly referred to as "value-relevance" literature. From the perspective of information economics, accounting and financial reporting play a vital role in an efficient capital market. Major accounting standard bodies, such as the Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB), have adopted this investor-oriented information-usefulness

perspective and specifically stated that the primary purpose of accounting is to meet the needs of capital markets (FASB 1987; IASC 1994). Consequently, the relationship between accounting numbers and stock markets has attracted considerable attention, to the point that it is probably one of the most popular issues in the accounting literature.

Barth, Beaver and Landsman (2001) suggest that an accounting amount is defined as value relevant if it has a predicted association with equity market values. Value relevance is not the same as usefulness. An accounting item might have an association with market value but not be useful because it is not timely. In particular, then, value relevance research does not take into account the timeliness of accounting data.

The first studies that documented a relationship between accounting numbers and stock performance, measured by share prices and trading volume of shares, were the studies of Ball and Brown (1968) and Beaver (1968). Beaver (1968) showed that the stock market reacts with increased trading volume and increased price variability in the week of the earnings announcement. Ball and Brown (1968) explained that over the 12 months prior to the earnings announcement, earnings increases (decreases) are associated (on average) with positive (negative) abnormal returns and the unexpected component of earnings tends to have the same sign as unexpected price changes. The relation between new information in earnings and the market reaction to this information, as in Beaver (1968), has been an area of emphasis in most recent research works. Others focus on the work of Ball and Brown (1968), which examines the association between new information and unexpected or abnormal components of returns. The study of Ball and Brown (1968),

which examined the association between unexpected or abnormal returns and unexpected earnings, provided evidence of the role of accounting as a summary of the unexpected events that have affected the firm over the 12-month period prior to the earnings announcement. In contrast, Beaver (1968) whose study focused on the market response at the date of the announcement of the accounting data, examined the role of accounting data in providing information to the market about events that may affect investor's perceptions of the firm.

Since the pioneering work of Ball and Brown (1968) and Beaver (1968) on the relationship between stock returns and accounting information contained in financial statements, the literature has grown rapidly with over 1,000 published papers in leading academic accounting and finance journals in the past four decades (Kothari 2001). Initially, accounting researchers produced numerous studies documenting the association between the accounting earnings and stock returns. More recently, studies about the value-relevance of accounting information have been expanded to include both balance sheet measures of assets and liabilities and income statement measures of earnings.

Beaver (2002) suggests that value-relevance research examines the association between a security price-based dependent variable and a set of accounting variables. An accounting number is termed value relevant if it is significantly related to the dependent variable. This suggests that the value relevance is a statistical concept. Barth *et al.* (2001) argue that if an accounting measurement is value relevant then it must possess, to some extent or another, the accounting qualities of relevance and reliability, qualities of information though relevant to accounting

standard setters. As a consequence, value relevance research provides insights into questions of interest to standard setters.

Barth *et al.* (2001) add, however, that accounting information does not have to be new to be relevant or useful, and an important role of accountants is to summarise or aggregate information that might be available from other sources. They do not see that it must be a unique source of information to be value relevant.

As the adoption of IFRSs became obligatory in Europe from 1st January 2005 onwards, an ambiguous area for investors will be the effect of IFRSs on their ability to forecast earnings. One school of thought is that better accounting standards make reported earnings less noisy and more accurate, hence more 'value relevant'. Other things being equal (for example, ignoring enforcement and implementation issues for the moment) this would make earnings easier to forecast and would improve average analyst forecast accuracy (Ashbaugh and Pincus 2001; Hope 2003).

The other school of thought reaches precisely the opposite conclusion. This reasoning is along the lines that managers in low-quality reporting regimes are able to "smooth" reported earnings to meet a variety of objectives, such as reducing the volatility of their own compensation, reducing the volatility of payouts to other stakeholders (notably, employee bonuses and dividends), reducing corporate taxes, and avoiding recognition of losses (Ball, Kothari and Robin 2000; Ball, Robin and Wu 2003).

In contrast, earnings in high-quality regimes are more informative, more volatile, and more difficult to predict. This argument is bolstered in the case of IFRSs by their emphasis on "fair value accounting". Fair value accounting rules aim to incorporate

more-timely information about economic gains and losses on securities, derivatives and other transactions into the financial statements, and to incorporate more-timely information about contemporary economic losses ("impairment") on long term tangible and intangible assets. IFRSs promise to make earnings more informative and therefore more volatile and more difficult to forecast.

Jermakowicz and Gornik-Tomaszewski (2006), report that European firms believe that the adoption of IFRSs should improve financial transparency and comparability of financial statements between firms. However, they do not provide evidence of the perceived improvement of financial reporting after adoption of IFRSs which could be attained by using a specific accounting practices or rules/standards.

The remainder of this chapter is organised as follows. Section two introduces an overview of the different types of value relevance studies in the accounting and finance literature. Section 3 discussed the different valuation models used in the literature to study the relationship between accounting numbers and stock prices or returns. Section four draws a comparison between price and return models as two alternatives for value relevance studies. A review on the use of the modified Ohlson model for international comparisons is introduced in section five. Section six offers an overview of the studies introduced in the literature on the impact of IFRS adoption on financial indicators. Section seven provides a summary of the literature studies in the impact of IFRS adoption on stock performance and financial indicators.

4.2 The value-relevance studies

According to Chambers (1974) the behaviour of the market prices of ordinary shares is regarded as a way of testing empirically the propriety of accounting rules. If this did in fact provide such a test, the correlation of share price behaviour with the rules used may resolve much of the debate about different treatments of the same kinds of asset, equity, revenue, and expense.

Ali and Hwang (2000), Joos (1997), Ball *et al.*(2000), Harris *et al.* (1994), and Arnold (1998) all examined the role of accounting information in capital markets.

From various regression analyses, Ali and Hwang (2000) used the coefficient R^2 to measure the changes in the value relevance of accounting information as it relates to cash flows, earnings and book values of shareholders' equity. Using the variations in the institutional characteristics of France, Germany and the UK, Joos (1997) predicted and found that the value relevance of earnings will be higher than that of book value in the UK (because of the importance of shareholders as a source of finance), and vice versa in Germany and France, because of the less reliance on shareholders as a source of finance.

Holthausen and Watts (2001) classified the value-relevance studies into three categories:

4.2.1 Relative association studies

These studies compare the association between stock market values (or changes in values) and alternative bottom-line measures for long windows (i.e., fiscal quarters or

even years). Dhaliwal *et al.* (1999), for example, examined in their study whether the association of an earnings number, calculated under a proposed standard, is more highly associated with stock market values than earnings calculated under existing GAAP. These studies usually test for differences in the R^2 of regressions. The accounting number with the greater R^2 is described as being more value-relevant.

4.2.2 Measurement (incremental) studies

These studies investigate whether an accounting number of particular interest is helpful in explaining value or returns, given other specified variables. That accounting number is typically deemed to be value relevant if its estimated regression coefficient is significantly different from zero. Venkatachalam (1996), for example, examined the incremental association of the fair value of risk management derivatives in a regression of equity market value on a variety of on-and off-balance sheet items.

It is of particular importance to distinguish between relative and incremental value relevance. Biddle, Seow and Siegel (1995) pointed out the importance of distinguishing between relative and incremental value relevance. Incremental value relevance implies that one accounting measure provides value relevance beyond that provided by another, while relative value relevance implies that one accounting measure provides greater value relevance than another. They specified some research contexts in which each value relevance measure was appropriate. Incremental value relevance is useful for studying the necessity of disclosure and components of financial statements and relative value relevance is useful in choosing between two competing sets of accounting information.

The famous stream of return-based literature is the studies on the incremental information content. These studies focus on whether accounting items add to the explanation of share price or returns given the presence of other financial statement components. The first of these types of studies were Rayburn (1986), Bowen, Burgstahler and Daley (1987) and Wilson (1987). These studies found that both earnings and cash flows together provide incremental information to each other in an association with stock returns. This was important because it was previously thought that cash flows did not provide any information content beyond that of accounting earnings, Ball and Brown (1968); Beaver and Dukes (1972). Additional studies that examined the incremental information content of accrual based earnings and cash flows were Bernard and Stober (1989) and Livnat and Zarowin (1990).

Rayburn (1986) was one of the first incremental information content studies in market research who wanted to determine whether the accrual process added information when valuing stocks. She therefore estimated three earnings components: operating cash flow, current accruals, and noncurrent accruals. Rayburn (1986) argued in her study that previous research operationalised operating cash flows inappropriately by using total cash flows that included financing and investing cash flows. Using Compustat data for firms from 1962 to 1982, she constructed an operating cash flow measure by adjusting net income before extraordinary items for depreciation, the change in working capital and change in deferred taxes. Employing cross sectional regression method, Rayburn (1986) assessed whether the accrual process created a difference in information content via current or noncurrent accruals. She concluded that operating cash flow and current

accruals have incremental information content beyond each other. While total accruals also have incremental information, noncurrent accruals do not.

Bowen *et al.* (1987) compiled their sample from data collected for the years 1971 to 1981 from firms' funds statements that were required beginning in 1971. Their study was to determine whether two different cash flow measures possess incremental information given either earnings or working capital from operations. Similar to Wilson (1987), the evidence supported that cash flow variables, especially operating cash flows, and earnings have incremental information beyond each other across firms over time, but working capital does not contain information beyond earnings. In contrast to the positive cash flow-earning relationship with returns that these described studies provided, Bernard Bernard and Stober (1989) refuted the results of Wilson's 1987 study. They used similar stock return association tests as Wilson (1987) but expanded the data to include all firms and increased Wilson's two year sample period to the years 1977 to 1984. Bernard and Stober (1989) provided evidence that the incremental information content of cash flows and the accrual components of accounting earnings that Wilson (1987) found were not generalisable over other time periods or economic conditions.

Livnat and Zarowin (1990) suggested an additional interpretation of Bernard and Stober (1989) results: while the disaggregating of net income into cash flow and accrual components failed to provide incremental information, it says nothing about the components in cash flows. Livnat and Zarowin (1990) added to the evidence in the incremental information content literature with their examination of the individual cash flow components of the newly required cash flow statement and the components' association with stock returns. They separated each of the operating,

financing, and investing components using the definitions by the newly required SFAS No. 95 in their sample of firms from 1973 to 1986. Livnat and Zarowin (1990) corroborated Bernard and Stober (1989) results in that separating net income into only operating cash flows and accruals did not significantly improve the association of those items with stock returns. Additionally, they found that the individual components of operating and financing cash flows were associated with stock returns but investing cash flows were not. Thus, the results indicate that operating and financing cash flows provide incremental information to the user but the components of investing cash flows do not.

It is worth mentioning that this research gives emphasis to both relative value relevance studies, as it aims at comparing the value relevance of accounting information prepared under two different sets of accounting standards, and incremental value relevance studies, as it aims at highlighting which accounting variable is more value relevant than others in relation to stock performance.

4.2.3 Marginal information content studies

These studies investigate whether a particular accounting number adds to the information set available to investors. They use event studies, where returns are measured over a short interval (i.e., a few days) around the announcement date, to determine if the release of an accounting number is associated with value changes. Price reactions are considered evidence of value relevance. Amir and Lev (1993), for example, tested the marginal information content of the Form 20-F reconciliation of foreign and US GAAP earnings numbers for foreign firms, by regressing five-day

abnormal announcement returns on the difference and the changes in the difference between foreign and US GAAP earnings.

All of these value-relevance studies employ a valuation model that specifically fits the study. The input-to-equity valuation theory approach requires a valuation model to specify the firm attributes that affect value and their relation to value. Specification of a link between the accounting numbers and firm attributes is also required. It is important that the valuation model be appropriate for valuing the attributes of the firms investigated in the study.

4.3 Valuation models

Most value relevance studies adopt a valuation model to investigate the relationship between accounting values and share prices. Researchers usually choose between three different valuation models, namely the balance sheet model, the earnings (return) model and the Ohlson (price) model. The following section provides a discussion on the core of each of these three models:

4.3.1 The balance sheet model

This model is based on a notion that the market value of equity is equal to the market value of assets minus the market value of liabilities. The link between the accounting numbers and the attributes valued is that book values of accounting assets and liabilities convey information about the market values of these assets and liabilities. The balance sheet model takes the following form:

$$\text{MVE} = \text{MVA} + \text{MVL} + \text{MVC}$$

where MVE is the market value of equity, MVA the market value of separable assets other than the component whose incremental association is being assessed, MVL the market value of separable liabilities other than the component whose incremental association is being assessed, and MVC the market values of the balance sheet component whose incremental association is being tested.

4.3.2 The earnings model (return model)

Under this model, returns are regressed on a scaled earnings variable. This model describes the relationship between stock returns and accounting earnings. The earnings model takes the following form:

$$\text{RET}_{Jt} = a_0 + a_1 E_{Jt}/P_{Jt-1} + a_2 (E_{Jt} - E_{Jt-1})/P_{Jt-1} + e_{Jt}$$

where:

RET_{Jt} : annual return (including cash dividends) of firm J between the current announcement month and last year's annual report announcement-month;

E_{Jt} : annual earnings per share;

$(E_{Jt} - E_{Jt-1})$: change in annual earnings per share;

P_{Jt-1} : stock price at the beginning of the last year's annual report announcement-month;

e_{Jt} : residual error

Easton *et al.* (1991) popularise the above-mentioned specific version of the annual return model including both earnings levels and earnings changes (Harris *et al.* 1994; Haw, Qi and Wu 1998).

Nichols and Wahlen (2004) provided evidence that annual earnings changes contain more value-relevant information than changes in cash flows from operations. His study also provided evidence that has two important implications. First, the results suggest earnings numbers communicate new information to capital markets that has important consequences for future earnings forecasts, expectations of future dividends, and current market values. Second, the stock price consequences of new earnings information provide substantial incentives for market participants to trade on that information quickly—stock prices appear to incorporate the new information by day +1. The strong reaction to unexpected earnings provides additional insight into why capital market participants place so much emphasis on earnings.

Research seeking to explain market reactions to earnings has traditionally focused on factors such as the absolute value of unexpected earnings which are not revealed until the time of the disclosure (e.g., Beaver 1968; Beaver, Clarke and Wright 1979; Morse 1981). However, factors that affect the availability of pre-disclosure information (e.g., firm size) may be assessed before earnings are announced (and hence before unexpected earnings are known).

Identification of a systematic relationship between an *ex ante* observable variable, such as firm size, and the magnitude and duration of the trading volume associated

with accounting disclosures may enable policymakers to anticipate how the market reaction will differ across various firm's accounting disclosures (Bamber 1987).

Capital market consequences associated with accounting earnings could be explained using the three theoretical links between earnings and share prices developed by Beaver (1968). These "three links" are: 1) current period earnings provide information to predict future periods' earnings, which 2) provide information to develop expectations about dividends in future periods, which 3) provide information to determine share value, which represents the present value of expected future dividends.

The theory linking the firm's earnings numbers to changes in the firm's market value (i.e., stock returns) depends on three assumptions about the information contained in earnings and share prices (Nichols and Wahlen, (2004). First, the theory assumes that earnings (or more broadly, financial reporting) provides new information to equity shareholders about current and expected future profitability. Second, the theory assumes that current and expected future profitability provides shareholders with information about the firm's current and expected future dividends. Third, the theory assumes share price equals the present value of expected future dividends to the shareholder.

These links imply that new accounting earnings information that generates a change in investors' expectations for future dividends should correspond with a change in the market value of the firm. To test these theories with empirical data, researchers examine the associations between accounting earnings numbers and share prices (encompassing links 1-3), as well as the associations implied by each of the three

links. Figure 1 depicts these three theoretical links. Link 1 in the three-links framework assumes that a current period earnings number provides two important elements of information useful for developing dividends expectations: (1) information about current period wealth creation and (2) information about future earnings. First, firms measure earnings using accrual accounting principles, which measure the effects of transactions and events on shareholders' equity (apart from capital transactions with shareholders). Therefore, the current period earnings number summarizes important information about the wealth created by the firm for equity shareholders during the period. Second, current period earnings and related financial statement data provide useful information to predict future earnings.

For instance, firms' income statements commonly distinguish between operating income, which captures the results of the firm's ongoing operations that will likely recur in the future, and special items (e.g., nonrecurring gains or losses, extraordinary items, discontinued operations), which are not part of ongoing operations and therefore are less likely to affect the firm's performance in future periods. In fact, firms depend on financial reporting to convey credible information about their ability to generate future wealth for equity shareholders and other stakeholders. The Conceptual Framework of the Financial Accounting Standards Board, FASB (1987), states that an important objective of financial accounting is to provide information useful for assessing the amounts, timing, and uncertainty of future dividends and cash flows.

Link 2 in the three-links framework assumes that current and future earnings represent wealth created by the firm that will ultimately be distributed to equity shareholders through dividends. Thus, current earnings and forecasts of future

earnings are indicative of future dividend-paying ability, which shareholders can use to develop expectations of dividends in the future.

Link 3, which assumes that share prices reflect the present value of all expected future dividends, represents the classical approach to equity valuation, which views share value as the present value of the future dividends the shareholder expects to receive over the remaining life of the firm.

Current period earnings numbers (and related financial reports) provide shareholders with vital information to aid in developing expectations for future earnings, which also aid in developing expectations of future dividends and ultimately form the basis for share value.

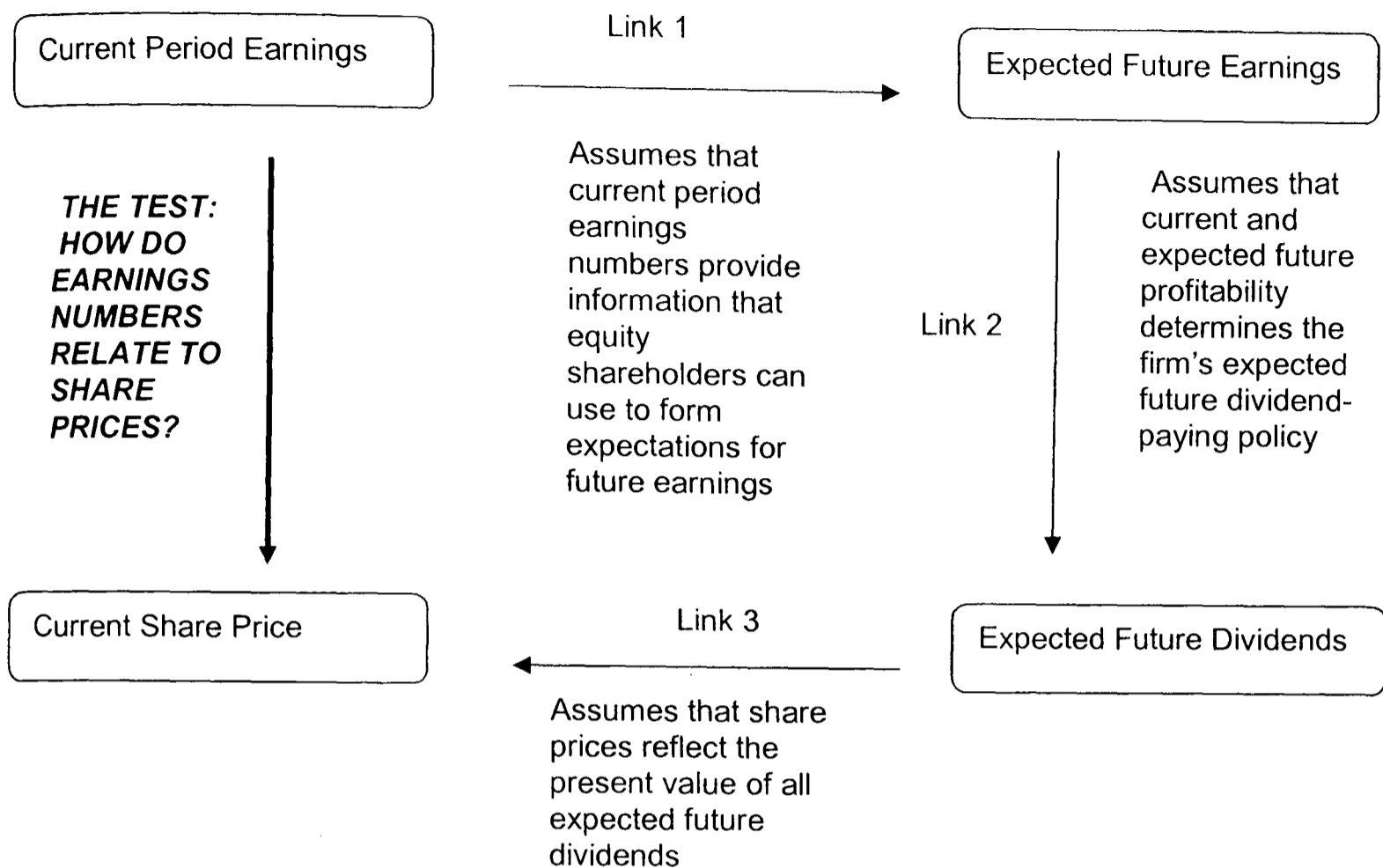
These three links from current earnings to future earnings to future dividends to share value provide an intuitive framework for understanding the relation between earnings and share value (Nichols and Wahlen 2004).

Furthermore, these links also implicitly underlie why investors commonly use earnings-based valuation ratios, such as price-earnings ratios. In addition, these links further emphasize the great importance of accounting information and the reason why so many capital market participants focus so much attention on them. It also explains the extent of financial press interest in covering daily announcements of accounting information.

Figure 4.1 depicts the three link framework and provides a useful tool for analyzing the valuation implications of earnings information. This framework shows that the present value of expected future dividends is determined by current and expected

future earnings. Share prices generally react to the earnings announcement when the earnings being announced are unexpectedly different from the market expectations. In general terms, if the disclosed earnings beat the expectations of the market participants, share prices will increase and, on the other hand, if earnings fall short of expectations, share prices fall. Several factors determine the magnitude of the rise or fall due to earnings disclosure, but a prominent factor is the persistence of the unexpected earnings. The announcement of an unexpected change in earnings that is not likely to persist will cause share prices to change by the amount of the one-time earnings change. Alternatively, the announcement of an unexpected change in earnings that will likely persist in the future will cause an up or down movement in share prices by a larger amount due to the link between current and future earnings-persistence. Therefore, when there is an announcement of unexpected earnings or earnings that differ from expectations, a set of steps are provided by the three-links framework that one can follow to analyze the implications of an unexpected change in earnings for future earnings (persistence), future dividends, and share value.

Figure 4.1 The Three Links Relating Earnings to Stock Returns



Source: (Nichols and Wahlen 2004)

These links imply that new accounting earnings information that triggers a change in investors' expectations for future dividends should correspond with a change in the market value of the firm. To test these theories with empirical data, researchers examine the associations between accounting earnings numbers and share prices (encompassing links 1-3), as well as the associations implied by each of the three links.

4.3.3 The price model (Ohlson model)

Under this model, stock prices are regressed on balance sheet and income statement measures. The model takes the following form:

$$MV_{Jt} = a_0 + a_1 BV_{Jt} + a_2 E_{Jt} + e_{Jt}$$

where:

MV_{Jt} : market value per share of firm J at the end of year t;

BV_{Jt} : book value of equity per share of firm J at year t;

E_{Jt} : reported earnings per share of firm j during year t, and

e_{Jt} : error term, i.e. other value-relevant information that cannot be captured by earnings and book value figures.

The three-links framework for the relation between earnings and share value is consistent with Ohlson (1995) and Feltham and Ohlson (1995), which use the classical dividends-based valuation model to derive equivalent formal models of the links between earnings and share value. These papers demonstrate that equity share value depends on book value of equity and forecasts of future "residual income," which is earnings less a charge for the use of capital, as long as accounting for expected future earnings follows the clean surplus relation. Clean surplus accounting assumes that all changes in book value of equity, except for transactions with owners such as dividends and capital contributions, flow through earnings. U.S. GAAP and International Financial Reporting Standards follow clean surplus accounting for most transactions and events. Many researchers believe that the

persistence of current period residual income is an important determinant of current market values².

The growth in capital markets have put companies under pressure to submit financial statements that are intended to help investors evaluate the present and future financial status of the reporting entity, Venkateswar (1997), Joos (1997) and Kaplan and Roll (1972). Studies conducted by Amir, Harris and Elizabeth (1993), Gore and Stott (1998) and Abuzar and Khalid (2001) all have evidenced that managers and investors, alike, have a tendency to find indicative measures of their company's performance. In all countries around the world, the professional accounting bodies and stock exchange authorities require companies to disclose summary performance measures, such as accounting earnings and book values. Accounting researchers such as Beaver and Dukes (1972), Rayburn (1986), Wilson (1986, 1987), and Bowen *et al.* (1987), have long had an interest in the informativeness of these measures. These studies have concentrated on discovering which of the accounting measures has a higher association with share prices. The concern of investors, which accounting bodies intend to address, is to provide information that is relevant and that enable them to evaluate company's performance, hence their impact on share prices.

Bao, Ben-Hsien and Chow (1999) examined the relative value relevance in equity valuation of two sets of accounting information of listed Chinese companies on the

² For additional discussions of valuation based on residual income, see Bernard (1995) and Lee (1999).

Chinese Stock Exchanges, one prepared under IASs and the other applied the China's accounting regulations (domestic GAAPs). They selected a sample that consisted of firms that issued the so-called B shares to non-domestic investors covering a five years' period from 1992-1996. Using the Ohlson model, the study showed that book values and earnings prepared under IASs account for 23.6% in the variations in share prices. On the other hand, financial information prepared under domestic GAAPs account for 21.1% of share price variations. Yearly regression analysis produced results that suggested that the explanatory power of book value and earnings increase over time.

Barth *et al.* (2001) discovered that 75-80 percent of the variation in market value of equity is due to the book value of assets and liabilities, and the net book value.

Bernard (1995) empirically tested various valuation functions which used earnings and book value as determinants and found that, on average, book value explained 55% of the cross-sectional variances in stock prices.

Collins *et al.* (1997) investigated the value relevance common to both earnings and book values over forty years from 1953 to 1993 for American firms. They found that when book values are added as an additional independent variable along with earnings, the value relevance holds steady with slight increases overtime. They further examined the incremental explanatory power of earnings and book values and found that there is a decrease in the ability of earnings to explain the movement in share prices. On the contrary, their investigation also revealed an increase in the ability of book values to explain changes in share prices over the same period. However, the explanatory power common to both earnings and book values is in fact higher. The findings show for the first ten years (1953-1962), using a multiple

regression model and regressing earnings and book values on share prices, that the average adjusted R^2 was 0.50, which rose to 0.69 for the other ten-year period from 1984-1993. They further discovered that reported losses, an increase in the incidence of one-time items and a decrease in firm size in the sample were the main reasons for the fall in the explanatory power of earnings. Brown, Lo and Lys (1999), however, argued that a scale factor common to price per share, EPS and book value per share brings about a spurious increase in value-relevance over time.

An examination of the usefulness of financial information to investors by Lev and Zarowin (1999) revealed a systematic decline in the association between market values and major financial accounting variables. They used the association between capital market values (share prices and returns) and major financial accounting variables (earnings, cash flows and earnings) to measure the usefulness of financial information over twenty years from 1977 to 1996. The results of Lev and Zarowin were contrary to Collins *et al.* (1997). The results showed that over the twenty years' period, the association between share prices and earnings and book values, as measured by the R^2 , fell from 0.90 in latter part of 1970 to 0.80 in 1980 and finally to 0.50 in the 1990s. In general, their results showed a decline in the association between share prices and earnings and book values over the period under study.

As far as the relevance of accounting information is concerned, contrary to the claim of Chen and Dodd (2001), there is a large and growing body of evidence that shows that accounting information is becoming progressively less relevant. A study by Lev and Zarowin (1999) sought to establish whether financial reporting conveyed useful information to investors. They also examined three foundation pieces of published financial information — earnings, cash flow, and book value for the thousands of

companies in Compustat's data base – and correlated this information with changes in the companies' share prices. They concluded that the association between key financial statement variables and both stock returns and share prices have been declining in importance over the past 20 years. The relationship between the independent variables and the dependant variable (share price) suggest that variables not yet part of the reported accounting information have a powerful impact on share prices and returns (Paulo 2002).

Despite the widespread of the use of Ohlson model in value relevance studies, the model was criticized by several researchers in the accounting and finance literature. For example, Hand et al (1998) pointed out that Ohlson model rests on assumptions that may either characterize reality with reasonable accuracy, or be sufficiently misspecified so as to yield misleading theoretical and/or empirical inferences. Gietzmann and Ostaszewski (2003) argue that the model does not give rise to any structural implications for the application of accounting rules. That is, it may be hard to argue that the model presents a justification for accrual accounting when there is little evidence of the need for accrual adjustments.

However, the model remains predominant between accounting researchers in conducting value-relevance studies. This research follows the majority of the value relevance accounting literature and utilises Ohlson model in determining the relationship between IFRS-based accounting information versus local-GAAP-based accounting information and share prices.

4.4 Price and return models

Value-relevance studies investigate the empirical relation between stock market values (or changes in values) and various accounting numbers for the purpose of assessing those numbers' usefulness in equity valuation. Two types of valuation models are commonly used to investigate the relation, namely the price model and the return model. The price model examines the relation between stock price, book value and earnings, and the return model examines the relation between stock returns, earnings and earnings changes. Although the theoretical foundations of both models are derived from the same source, which is the Ohlson (1995) linear information model, the results obtained using both models are sometimes inconsistent. For example, Harris *et al.* (1994) compare the value-relevance of accounting data for U.S. and German firms matched on industry and firm size. They report that the R^2 obtained for German firms using the return model is comparable to that for U.S. firms. However, the R^2 obtained for German firms using the price model is less than half that for U.S. firms.

Price models, however, have two advantages over return models. First, if stock markets anticipate components of accounting earnings and incorporate the anticipation in the beginning stock price, that is, prices leading earnings, return models will bias earnings coefficients towards zero. In contrast, price models yield unbiased earnings coefficients because stock prices reflect the cumulative effect of earnings information (Kothari and Zimmerman 1995). In other words, accounting information can be value relevant if it is related to stock prices even though it does not provide new information to affect stock returns. Second, return models only allow

assessing value relevance of accounting earnings, whereas price models based on Ohlson (1995) show how a firm's market value is related to both book values of equity and accounting earnings. Because these two components of accounting information play different roles in security pricing, the use of the Ohlson model expands the scope of value relevance research (Chen, Chen and Su 2001).

Many researchers have used price regressions to test empirically the value relevance of balance sheet items, including various types of assets. Examples are: the valuation of deferred tax assets (Amir, Kirschenheiter and Willard 1997; Amir, Kirschenheiter and Willard 2001), oil and gas properties (Boone 2002), brand assets (Barth, Clement, Foster and Kasznik 1998; Kallapur and Kwan 2004) and pension assets and liabilities (Barth and Clinch 1998; Easton 1998).

Price models are important tools in the study of the value relevance of accounting information. Value relevance studies are evaluated either across time, to help understand the change in an accounting system (see, for example, Collins *et al.* 1997; Chang 1998; Francis and Schipper 1999; Aboody, Hughes and Liu 2002; Gu and Chen 2004), or internationally, to compare different accounting systems (Alford, Jones, Leftwich and Zmijewski 1993; Hung 2001).

A better assessment of the value relevance of accounting information is given by the price model that associates share prices with accounting numbers such as earnings and book value of equity. Many studies which apply the price model, obtain evidence for the value relevance of accounting information. For example, Francis and Schipper (1999) reported declining value relevance based on a return model, but a rising coefficient (R^2) result based on a price model.

From the researcher's point of view, this model has some limitations:

First: it does not take into consideration the effect of information contained in the cash flow statement on stock performance. Instead, the model focuses on information contained only in the income statement and in the balance sheet. Accrual-based accounting earnings have been criticised in general as lacking value-relevance because of the historical emphasis.

Early studies on the relative association of accounting information with share prices differ in opinions on which accounting information or measures have closer correlation on share prices. Fama (1965), Beaver (1970), Beaver and Dukes (1972), Board, Day and Walker (1989), Brown and Kennelly (1972), and Ball (1972), all demonstrated that the association between stock returns and earnings was significantly higher than that between stock returns and operating cash flows. However, Beaver, Griffin and Landsman (1982) found that both earnings and operating cash flows explained stock returns. Nevertheless, a study by Board *et al.*, (1989) showed that share prices are influenced more by earnings than cash flows.

In a study conducted by Cheng *et al.* (1997) actual cash flows from operations disclosures, which became mandatory by FASB since 1988 and afterwards, were found to have incremental stock price effects beyond both earnings and estimated cash flows from operations.

Dechow (1994) tested the relation between the information content of operating cash flows and earnings. The study defined operating cash flows as operating income less depreciation, interest, taxes, and change in non-cash working capital. The study found that cash flows are less strongly associated with share prices than accounting

earnings, while earnings are more associated to share prices. A more intensive study was conducted by Biddle *et al.* (1995), with a sample of 40 industries, in which the association between earnings and cash flows was extensively tested and their findings corroborated earlier studies. Consistent with Dechow (1994), Biddle found that earnings has the greatest information content, and that the information content declines as the income measures move further away from accrual accounting earnings toward cash flows.

Arnold (1998) provided U.K evidence on the correlation between accounting income and different measures of cash flow. The study reported a significant association between net income and working capital flow, but not a significant association with other measures of cash flows. However, a correlation of cash flows with capital markets similar to the one reported by Bowen *et al.* (1987) was not found. Wild (1992) investigated the relationship between returns and accounting information, using book values as the accounting measure. His findings indicate that book value is significantly positively related to cumulative abnormal returns measured over a period from the release of analysts' forecast of book value through the announcement date of earnings. In looking at the value relevance of book value within industries, Wild concluded that book value is informative for share prices.

Bowen, Burgstahler and Daley (1986) found significant relations between accounting earnings and fund-based cash flow measures. This correlation could be considered as a support for those who argue for the relevance of accounting-based measures. But, the correlation found between earnings and alternative cash flow measures was low. The relation to capital markets was addressed by Bowen *et al.* (1987), where a significant association between share price and cash flow information was reported.

However, the study was not conclusive on the issue of whether cash flow information signals incremental messages beyond earnings.

Second: it does not take into consideration the alternative ways of expressing certain accounting numbers. For example, the model includes EPS as an independent variable without taking into account the different ways accountants normally use to express this figure in the income statement. EPS has different concepts: the basic EPS, and the diluted EPS. Several studies indicated that these two different measures have different effect on stock performance. Balsam and Lipka (1998) studied the impact of different reported earnings per share (EPS) measures (i.e. basic/primary EPS, and fully diluted EPS) on stock prices, for a sample of 3,646 firms from the Standard and Poor's Compustat database of corporate annual report data for the years 1975 through 1993. They found that each of the reported EPS measures is significantly associated with share prices, with fully diluted EPS having the strongest effect. They also found that each of the EPS measures has incremental explanatory power relative to the other two components.

Third: the model discusses the relationship between stock prices and accounting variables. It ignores the potential relationship between trading volume of stocks and accounting variables.

Although both price and trading volume reflect the same underlying economic factors, each may capture somewhat different aspects of investor's reactions. Trading volume reflects investor's behaviour or activity by summing all market trades, whereas security prices reflect an aggregation or averaging of investor's beliefs. The summation process establishing trading volume preserves differences

between investors' interpretations of accounting disclosures that are suppressed in the averaging process that determines prices.

Let us assume, for example, that investors interpret an announcement differently, trading volume may then be high, as those who interpret the information favourably buy from those who interpret it unfavourably. However, the equilibrium price reflects an averaging of investors' beliefs, so the price may not change significantly if investors' belief-revisions are largely counterbalancing. Accordingly, trading volume may be relatively more sensitive to individual differences in interpreting earnings information. It is not uncommon, therefore, that previous empirical research has documented differences between price and trading volume reactions to earnings announcements. Morse (1981) reported that the trading volume reaction to earnings announcements persists longer than the price reactions. Bamber (1987) found that trading volume around annual earnings announcements was much more closely associated with unexpected earnings using a random-walk earnings expectation model than using analysts' forecasts.

In empirical studies that utilize earnings-returns methodology, firm size (measured as a log of total assets) is a significant explanatory variable, indicating the market weights reconciled earnings of smaller firms more heavily than larger firms (Meek 1991). Results of trading volume studies indicate that an inverse relationship exists between trading volume and firm size (Bamber 1986). These results suggest that relatively smaller firms, being followed by fewer analysts, have fewer information sources—causing a stronger reaction since the impact of the announcement has not been diluted by other sources (Hora, Tondkar and McEwen 2004).

Elbakry, El-Masry and Pointon (2006) examined empirically, using a regression model based on a modified Ohlson equity-valuation framework, whether domestic investors in the Egyptian stock market perceive accounting information to be value-relevant. Five-year pooled data were gathered to test the impact of accounting numbers on trading volume of shares in the Egyptian stock market. By employing the trading volume model, they found a significant impact of share book value, leverage, return on investment, size (measured by the log of market capitalisation) and price to earnings ratio on trading volume. While a positive association between trading volume and leverage and size is found, trading volume is significantly negatively associated with share book value, return on investment and price to earnings ratio.

Frost and Pownall (1998), Frost and Kinney (1996), Hall, Hamao and Harris (1994), Jensen and Litzenberger (1970), and Kaplan and Roll (1972) concentrated their empirical studies on the correlation among some measures of performance on one hand, Return on Equity (ROE), Cash Flow (CF) and Earnings Per Share (EPS) and their association with stock market prices on the other hand, in highly developed economies, which have relatively effective and efficient markets. For example, Dickinson and Muragu (1994), Forsgardh and Herten (1975), Frost and Pownall (1998) all documented that an efficient market is important for a valid relation between the variables in the capital markets.

Omran and Pointon (2004) conducted a study on the relationship between accounting numbers and share prices for a sample of 94 listed companies in the Egyptian Stock Exchange. They found that, for 1999, retained earnings are more significant than dividends in determining prices of shares that are actively traded in

the Egyptian stock market. However, for non-actively traded shares, they found that the accounting book value is the most important determinant of share prices.

As a result of these limitations, the researcher will use a modified Ohlson model in the study, to include several factors that are not taken into consideration in Ohlson model and to include the effect of items included in the cash flow statement on stock performance, whether in terms of stock price or trading volume of stocks.

4.5 Literature review on the use of modified Ohlson model for international comparisons

The explanation for changes in share prices has been a popular area of interest to financial economists. It has gradually been found by empirical researchers that there is a relationship between accounting information and share prices in capital markets. There is ample empirical evidence which suggests that the accounting variables convey information regarding future capital market activities in the developed economies.

In accounting and finance research, studies on the impact of accounting information on capital markets have primarily focused on well organised and developed security markets in Australia, United States, the United Kingdom, France, Germany and Japan. Examples are Hall *et al.* (1994) for Japan; Harris *et al.* (1994) for Germany; Dumontier and Labelle(1998) for France and Barth and Clinch (1996) for Australia. Other studies by Ball and Brown (1968), Brown (1970), Firth (1981), and Forsgardh and Herten (1975), have established that accounting variables convey information to the stock markets in the aforementioned countries.

As the compulsory adoption of IFRSs in Europe resulted in application of a common set of financial reporting standards within Europe, it represented one of the largest financial reporting changes in recent years. A question then arises whether equity investors perceive net benefits associated with the adoption of IFRSs in Europe.

Armstrong *et al.* (2007) examined the European stock market reaction to sixteen key events associated with the adoption of IFRSs in Europe. They found significant positive market reactions to events that increase the likelihood of IFRSs adoption, which indicates that European equity investors perceive net benefits to adoption of IFRSs. To assess whether this positive reaction to IFRSs adoption reflects benefits from convergence of accounting standards or from improved information quality, they grouped firms by the quality of their pre-adoption information environments. They found a significant positive reaction to IFRSs adoption for firms with higher quality pre-adoption information environments. Because the informational benefits to IFRSs adoption should be minimal for these firms, they interpreted this result as indicating the market perceives net benefits associated with convergence of accounting standards. They also found a significantly more positive market reaction to IFRSs adoption for firms with lower quality pre-adoption information environments.

The international accounting literature has mixed findings regarding which set of accounting standards provide information that is more value relevant to investors. In a comparison between U.S. GAAP and IAS, the FASB (1999) found 250 key differences in four categories: recognition, measurement, permissible alternatives, and lack of guidance or requirements. The FASB concludes that IASs is of lower quality than U.S. GAAP (see, The Wall Street Journal 1999). The European Union (EU), which currently requires companies listed on European stock exchanges to

adopt IASs, disagrees. For example, an EU spokesman was quoted in the Wall Street Journal (2002) as saying "We believe IASs is superior to GAAP. We believe it offers investors the best view of the situation of a company in which an investor might want to invest".

Accounting researchers and company managers have yet another view. They argue that from an investor's point of view, there is essentially no difference between the two sets of standards. For example, a survey by KPMG (2000) shows that CFOs of large European companies view IASs as offering similar quality to U.S. GAAP, but is less expensive to implement because of the level of complexity and detail contained in U.S. GAAP. Harris (1995) computes earnings for eight companies under both U.S. GAAP and IAS and concludes that they are essentially similar.

Ball *et al.*(2000) show that the extent of political influence on accounting and the legal origin (common-law or code-law) of the country affects the need for published financial information. In code-law countries, capital provided by the state, banks or families tends to be more important than in common-law countries, where companies are mainly financed by a large number of private investors. Consequently information asymmetry between capital providers and a firm is likely to be resolved in code-law countries by institutional features other than transparent financial reports (Ball *et al.* 2000). In other words, timely and frequent accounting information is provided privately to the capital providers, i.e. governments, banks and families (Nobes 1983; 1998).

Prior studies show also that the institutional background of a country has several effects on the financial reporting standard setting. A study conducted by Ding, Hope,

Jeanjean and Tolowy (2006) reported that domestic accounting standards differ from IFRSs more in code-law countries than in common-law countries, due to differences in institutional background between the two types of countries.

Ball *et al.*(2000) applied an extensive institutional detail to examine seven countries, some of which are under common law and others are under code law. They used regressions of earnings per share deflated by price per share on annual return per share deflated by price to capture the extent to which the annual earnings number reflects the same information the market impounded in share price during the fiscal year. The authors interpreted this measure as an indicator of timeliness of accounting earnings: their hypotheses about differences in timeliness stem from group-specific differences in the uses of accounting earnings. In common law countries where “shareholder-focused” economies apply, earnings are used by shareholders to determine share value and to remunerate managers. On the contrary, in code law countries, where “stakeholder-focused” economies apply, accounting earnings may be applicable in determining payments of dividends to shareholders, payouts of taxes to government, employees’ and managers’ wages and bonuses. In consistency with their hypothesis, Ball *et al.*(2000) reported that earnings timeliness in common law countries is greater than that in code law countries. Their study also revealed that in all seven countries, earnings are timelier than operating cash flows, and that differences in timeliness vary by country, ranging from over twice as timely for German firms to almost five times as timely for U.S firms. They also suggested that in common law countries, accounting earnings are more conservative than in code law countries. This may be due to the arm’s length

relation between contracting parties exacerbates the asymmetric information problem.

Harris *et al.* (1994) used reported accounting variables and tested the long-window association test statistics for 18-month stock returns regressed on annual earnings levels and changes and valuation models of share prices regressed on book values and accounting earnings. They found that for firms in Germany, the correlation between returns and earnings is similar to that of U.S firms. In consistency with the conservative accounting policies practised in Germany, German firms have higher earnings multiples. Results presented by Easton, Edey and Harris (1993) and Barth and Clinch (1996) indicate value-relevance for Australian shares with regard to some kinds of Australian revaluation data for tangible and intangible assets.

Moreover, Hope, Jin and Kang (2005) find that code-law countries are more likely to adopt IFRSs to improve investor protection, to make their capital markets more accessible for foreign investors, and to improve the comparativeness and comprehensiveness of their financial information. D'Arcy (2001) also finds that the adoption of IFRSs in European countries changes their accounting systems towards a more capital market orientated system. In addition, Barth, Landsman and Lang (2005) find that adoption of IFRSs by firms leads to improved accounting quality, i.e. less earnings management, more timely loss recognition and more value-relevant accounting information. By supporting this view, Daske and Gebhardt (2006) report that disclosure quality has increased significantly under IFRSs in the three European countries, i.e. Austria, Germany and Switzerland. In general, previous studies suggest that the firms in the code-law countries report more useful financial statement information after the adoption of IFRSs than before.

Earlier studies report that IFRSs change domestic accounting systems of the country towards a more capital market orientated system, i.e. to improve investor protection and to improve the comparativeness and comprehensiveness of their financial information (e.g., d'Arcy 2001; Hope *et al.* 2005). The majority of countries adopting IFRSs are classified as code-law countries (e.g., La Porta, Lopez-de-Silanes, Shleifer and Vishny 1998). In code-law countries a main source of corporate finance has not been the share capital provided by a large number of private investors (e.g., La Porta *et al.* 1998). Therefore, the need to publish financial statement information to fill the information needs of private investors has been low in these countries (e.g., Ball *et al.* 2000). Thus, in code-law countries, there is low demand for high quality public financial reporting and disclosure. Thus, information asymmetry is more likely resolved by 'insider' communication with stakeholder representatives (e.g., Ball *et al.* 2003). By contrast, the IASB (International Accounting Standard Board) Framework defines that the objective of a financial statement is to provide useful information for investors. According to the IASB Framework, useful information is relevant, reliable, understandable, and comparable.

Relevance and reliability are two primary characteristics of financial statement information. While the IASB emphasizes the reporting of financial performance, thereby enabling the prediction of future cash flows, credit-based countries like code-law countries have traditionally been more concerned with the protection of creditors and therefore with the prudent calculation of distributable profit (e.g., Nobes 1998). Consequently, prior studies find that the level of difference between domestic accounting standards and IFRSs is higher in code-law countries than in common-law countries (e.g., Ding *et al.* 2006).

Several researchers report that the objective of financial statements, as defined in the IASB Framework, is achieved in the code-law countries. For instance, Barth *et al.* (2005) find that firms have higher financial reporting quality after adoption of IFRS than before, and that this result is strongest for code-law countries. Moreover, Daske and Gebhardt (2006) report that disclosure quality, as perceived by experts in their ratings of annual reports of Austrian, German and Swiss firms, has increased significantly under IFRSs. However, prior studies report mixed evidence on whether IFRSs provide more value-relevant accounting information than code-law country's GAAP (e.g., Bartov *et al.* 2005; Hung and Subramanyam 2007).

In general, value-relevance studies are criticized because they ignore the information needs of individual investors and employ stock prices that are affected by many other factors, not just accounting information reported under standards (e.g., Sloan 1999; Holthausen and Watts 2001). In addition, prior studies show that the compliance with IFRSs may be limited during the time that European companies voluntarily adopted the standards (e.g., Taylor and Jones 1999). Therefore, they are criticized, e.g. by Barth *et al.* (2005), for not being able to find all the important differences between domestic GAAP and IFRSs. This in turn reduces comparability and transparency of financial statements, which may also explain the mixed results of these studies.

Lantto (2005) investigated whether IFRSs improves the usefulness of accounting information in a code-law country that has a strong system of legal enforcement and high quality domestic accounting standards. The empirical analyses of the study based on three surveys, run by financial analysts, managers and auditors, support the hypothesis that new information provided by IFRSs is relevant. Even though the

results show that managers and auditors deem information prepared under many IFRS/IAS reliable, the results show that they are, overall, neutral towards the reliability of information prepared by using judgment following the adoption of IFRSs. Even though the results indicate that IFRSs improves the relevance of accounting information in Finland, they highlight the concern about the reliability of those items that are prepared by using judgment based on IFRSs.

German firms are the most frequently used in comparison studies of IASs. Unlike IAS's focus on shareholders, German GAAP has traditionally focused on stakeholders and uses the prudent approach in financial reporting. Germany also has a strong legal system in terms of rule of law and efficiency of the judicial system to ensure compliance with the chosen accounting standards (Hung and Subramanyam 2007). The large differences between the two accounting standards (i.e. German GAAP and IASs) and the high compliance levels likely increase the power of empirical tests using German samples (Soderstrom and Sun 2007).

Gassen and Sellhorn (2006) conclude from their study that the voluntary adoption of IFRSs for German firms is influenced by size, international exposure, and dispersion of ownership. They found that the earnings of IFRSs firms are of higher quality than earnings under German GAAP. They also found that IFRSs adopters experience lower levels of information asymmetry on the German equity market relative to their German counterparts and that the level of share price volatility is significantly higher for IFRSs firms.

Bartov, Goldberg and Kim (2005) compared the value relevance of earnings produced under three accounting regimes, German GAAP, U.S. GAAP, and IASs, by

considering the association of stock returns and reported earnings as a measure of quality of accounting standards. They investigated the slope coefficient of the returns/earnings regression within a sample of German companies traded on German stock exchanges. They found that the value relevance of U.S. GAAP- and IAS-based earnings was higher than that of German GAAP based earnings. The result holds only for profit observations, suggesting that the reporting regime does not have an influence on the quality of earnings in the case of loss firms. However, they did not find a significant difference in value relevance between U.S. GAAP and IASs after controlling for self-selection (sample bias). These findings are obtained from both cross-sectional regressions, in which they compare firms under different accounting regimes keeping the time period fixed, and from time-series regressions, in which they perform a before-and-after comparison using a set of firms that have switched from German accounting rules to either U.S. GAAP or IASs.

Alford, Jones, Leftwich and Zmijewski (1993) find that the association between earnings and stock returns is stronger in countries where capital is traditionally raised in capital markets and there are weaker links for financial and tax reporting (i.e. Anglo-Saxon countries). They used pooled regressions to estimate the relation between annual earnings and 15-month returns for each of their sample countries separately. According to their measure of information content (a comparison of the regressions' R^2), annual earnings from the United Kingdom and the United States are more informative than earnings from Germany.

The value relevance of accounting information for German and American companies was compared by Harris *et al.* (1994). They did consider the information of these companies on industry bases and the size of the firms over the period 1982-1991.

They found no differences in the overall value relevance between the German and the American companies. In the case of German firms, higher coefficient applied to book values and earnings. To examine the individual explanatory power of earnings and book values, they applied a simple regression approach and discovered that the explanatory power of earnings in America is about the same as in Germany, but the explanatory power of book value in the US is higher than that of Germany.

Joos and Lang (1994) also investigate the financial statement effects of differences in accounting measurement practices in France, Germany, and the United Kingdom. They investigated the relation between share prices and earnings and book values over a period of 9 years from 1982 to 1990. Their results showed that the association between the share prices and earnings and book values are not the same in all countries but rather varies from country to country. In Germany, the explanatory power ranges between 20% and 38%, while in the UK it ranges from 14% to 42% and in France it ranges from 48% to 78%. Unlike the findings of Alford *et al.* (1993), they found no evidence that measurement practices in the United Kingdom resulted in accounting numbers with a higher association with stock price than in Germany. These results, however, were consistent with the findings of Harris *et al.* (1994).

Jermakowicz, Prather and Wulf (2007) examined the book value of earnings and equity and market values of Dax-30 German companies during the period 1995-2004. Using 265 observations, they found a significant relationship between the book value of earnings and the market value of equity. Their study investigated whether adopting IFRSs or US GAAP or cross-listing on the NYSE improves or worsens the association between book values of earnings and stock prices. The results confirmed

that that adopting IFRSs or US GAAP or cross-listing on the NYSE significantly increased the value relevance of earnings relative to market prices.

King and Langli (1998) also studied the association between accounting data and share prices in the United Kingdom, Germany and Norway to check for any systematic differences in the value relevance of accounting data across these countries. Any possible variations in the incremental and relative value relevance of earnings and book values across these countries were also examined. The results of the study showed a significant relation between earnings and book values on one hand and share prices on another in all these countries. The coefficient R^2 was 40% in Germany, 60% and 70% in Norway and the UK respectively. Whilst accounting numbers in the UK has the highest relation with share price, those in Germany has the lowest. The conclusion was that there are differences from country to country in the association between earnings and book values from one hand, and share prices from the other hand, though the explanatory power of book values is more than earnings in Germany and Norway, but less in the UK.

Black and White (2003) examined the value relevance of earnings and book values in relation to share prices in three different countries, namely, Germany, Japan and the U.S. Their results provided evidence that book value of equity is more value-relevant than earnings in Germany and Japan (both are code-law countries), and earnings are more value-relevant than book value in the U.S. (a common-law country). They attributed this result to the fact that capital providers in code-law countries are more concerned with balance sheet measures, such as liquidity, and that accounting characteristics, such as conservatism and tax conformity, may lead

to greater value relevance of the balance sheet compared to the income statement in those countries.

Ball, Kothari *et al.* (2000) compare timeliness of earnings reported by firms in common-law countries and code-law countries. They find that common-law earnings exhibit greater timeliness than code-law earnings, but this greater timeliness is driven entirely by greater sensitivity of accounting income to negative returns (income conservatism).

Platikanova and Nobes (2006) examined whether the compulsory introduction of IFRSs in Europe was an event which introduces value-relevant information into financial markets. They argued that certain factors might reduce the impact of IFRSs introduction. Lengthy trading experience in the European domestic reporting environments may have provided investors with tools to cope with apparently inadequate accounting information. This would reduce any added value relevance of financial reporting under IFRSs. Nevertheless, the introduction of IFRSs may be a value-relevant, not least because the opening reconciliations from domestic GAAP to IFRSs may help investors, by adjusting their prior basis for comparison and revising their estimates, and by distinguishing profitable investments not recognisable before IFRSs introduction. Using a sample of 3,907 public firms from 13 EU countries for three consecutive years, 2003-2005, they found that the introduction of IFRSs in Europe has slightly decreased the information asymmetry and accordingly is considered a value-relevant event in Europe.

Ioannis, Andre and Evans (2008) examined the value relevance of accounting fundamentals after the mandatory transition to IFRSs in Greece. They found no

significant change in the value relevance of book value of equity and earnings between the 2004 pre IFRSs and 2005 post IFRSs periods and conclude that the accounting framework is not in itself sufficient for changing market participants' perception about value relevance of accounting information. However, market participants viewed the extra information provided by reconciliations between Greek GAAP and IFRSs for 2004 figures as incrementally value relevant. Specifically, this applied to adjustments resulting from standards curtailing previous creative accounting practices and was mainly driven by firms with lower reporting quality.

In summary, the mixed findings in this international accounting literature suggest the following question is still open: does accounting information reported under common-law GAAP environments better explain stock prices and trading volumes of stocks than accounting information reported under code-law GAAP environments?

One of the purposes of this research is to find an answer to the above question by comparing the value relevance of accounting information reported by German companies using IFRSs or German GAAP with the value relevance of accounting information reported by UK companies using IFRSs or UK GAAP.

The approach of comparing firms reporting under different accounting regimes but traded on the same stock exchange has been used by two recent studies: Leuz and Verrecchia (2000) and Leuz (2003). Leuz and Verrecchia (2000) test the theory that a commitment by a firm to increased levels of disclosure lowers the information asymmetry component of the firm's cost of capital. They analyze a sample of German firms that switch from German GAAP to IASs or U.S. GAAP. They show that this international reporting strategy is associated with statistically significant lower

bid-ask spreads and higher share turnover. These constructs are proxies for information asymmetry and market liquidity. They conclude that their evidence is consistent with the idea that firms reap economically significant benefits from committing to increased levels of disclosure required by IASs and U.S. GAAP. Their results showed higher earnings quality of U.S. GAAP, and IASs over German GAAP.

Leuz (2003) investigated whether German firms using U.S. GAAP exhibit differences in several proxies for information asymmetry from German firms using IASs. As the study focuses on firms trading in Germany's new market, institutional factors such as listing requirements, market microstructure and standards enforcement are held constant. The study reveals that the choice between IASs and U.S. GAAP as a basis for financial reporting for firms trading in Germany's new market appears to have no influence on the value relevance of accounting information....."these findings do not support widespread claims that U.S. GAAP produce financial statements of higher informational quality than IASs" Leuz (2003). However, these findings are consistent with the findings of (Bartov *et al.* 2005), who reported no significant differences in value relevance between U.S. GAAP and IASs after controlling for self-selection.

Hung and Subramanyam (2007) compared the financial statement effects of using IASs to those using German GAAP for a sample of German companies that elected to adopt IASs, by examining these companies' restatements of prior years accounting numbers in the adoption year. They found that the adjustments between the two reporting systems are value relevant for book value of equity, but not for earnings. However, they did not find any difference in value relevance of book value of equity and earnings under IASs and German GAAP. They also found that total assets and book value of equity are significantly higher under IASs and that there is

a higher variability in book value of equity and earnings under IASs. Finally, they found that IASs adopters exhibit larger loss provisions. (Bartov *et al.* 2005) also examined and compared the value relevance of earnings based US GAAP, IASs and German GAAP. They, on the other hand, found that IASs earnings are more value relevant than those based on German GAAP.

Lin and Paananen (2007) examined the characteristics of accounting numbers using a sample of German companies reporting under IASs 2000-2002, and IFRSs 2003-2004 and 2005-2006. They investigated the change in accounting quality during these time periods as IASB revises and issues new standards. Contrary to expectations, they found a significant decrease in association between earnings, and equity book value and the share price, which indicates a decrease in value relevance of both earnings and book value of equity in the IFRSs periods in general.

Tse (1986) provided evidence that the set of annual financial statements would be expected to be most relevant for explaining security prices at about the report publication date. At this time the information is fairly current and is publicly available. Prior to this point, the information may not be fully reflected in prices; after publication, the information would become obsolete with the arrival of new information and should gradually lose relevance for the explanation of security prices.

Ota (2001) reviewed some of the theory and evidence associated with value relevance studies in accounting. In general, most value relevance studies in the accounting literature use either the price model or the return model. Although their theoretical foundations are the same, the results obtained using these two models

are sometimes inconsistent. For example, Harris *et al.* (1994) compared the value relevance of accounting data for U.S. and German firms matched on industry and firm size. They report that the R^2 obtained for German firms using the return model is comparable to that for U.S. firms. However, the R^2 obtained for German firms using the price model is less than half that for U.S. firms.

Francais and Schipper (1996) examined the changes in the value relevance of accounting numbers using both the price and the return models for the period 1952-1994 and found an increase in the value relevance for the price model and a decline in the value relevance in the return model. They concluded that the decline for the return model could be due to increases in the volatility of market returns during the sample period.

Ely and Waymire (1999) examined the changes in the value relevance of accounting numbers over the tenure of different accounting standard-setting bodies. Their evidence indicated a decline in the value relevance from the Accounting Principles Board (APB) era (1960-1973) to the Financial Accounting Standard Board (FASB) era (1974-1993) when the return model is used. However, when the price model is used, their results reveal an increase in the value relevance from the APB era to the FASB era.

Lev and Zarowin (1999) also investigated changes in the value relevance of accounting data for the period 1977-1996 using both the price model and the return model and found a decline in the value relevance over the period for both models.

Schiebel (2006) examined the value relevance of IFRSs and German GAAP on companies listed on the Frankfurt Stock Exchange and publishing exclusively either

IFRSs or German GAAP consolidated financial reports over the period 2000-2004. The study concluded that German GAAP is significantly more value relevant statistically than IFRSs.

Putting all these findings together, accounting information are significant explanatory variables which contain incremental information in understanding the behaviour of stock performance. This research seeks to confirm or otherwise the incremental information content of accounting numbers in both common and code law environments and to explore the impact of the introduction of IFRSs in Europe on the value relevance of accounting information in the two aforementioned accounting environments.

4.6 Literature review on the impact of IFRSs adoption on financial indicators

There is a considerable lack of sufficient studies on the impact of IFRSs adoption on financial indicators. To the extent of the researcher's knowledge, only three studies addressed this issue during the last decade.

Hung and Subramanyam (2007) investigated the effects of adopting IAS on some key financial measures, namely return on equity; asset turnover; leverage; book-to-market ratios and earnings-to-price ratios for a sample of 80 German firms that adopted IASs for the first time during 1998-2002. They found that total assets and book value of equity are significantly larger under IASs than under German GAAP, and that cross-sectional variation in book value and net income are significantly higher under IASs than under German GAAP. They documented that the adoption of

IASs significantly decreased return on equity, return on assets and asset turnover because of the relatively larger book value of equity and total assets under IASs. They found no significant differences in leverage between German GAAP and IASs, because both liabilities and book values of equity tend to increase under IASs. They also found that book-to-market ratios tend to increase while earnings-to-price ratios tend to decrease under IAS. To sum it up, they found that adopting IAS resulted in economically significant changes to many key accounting measures and financial ratios (Hung and Subramanyam 2007).

Agca and Aktas (2007) investigated whether adopting IFRSs in Turkey has an impact on some key financial ratios for Turkish listed firms on the Istanbul Stock Exchange. They examined twelve financial indicators, namely, current ratio, acid-test ratio, cash ratio, inventory turnover, receivables turnover, total liability ratio, long-term liability ratio, profit margin, return on assets, return on equity and equity factor. They found that only the change in the ratios of cash ratio and asset turnover are statistically significant. They attributed this poor response of financial indicators to the adoption of IFRSs to limiting the study for only one year, namely 2004, the year of first-time adoption where there was clearly a lack of training on preparing IFRS-based financial statements and mistakes were made in applications.

Beuren, Hein and Klann (2008) analysed the impact of differences between IFRSs and US GAAP on the economic-financial indicators of 37 English companies that negotiate American Depositary Receipts on the NYSE. The financial indicators taken into consideration in this study were debt (measured by total liabilities divided by liquid assets), financial dependence (measured by total liabilities divided by total assets), general liquidity (measured by current assets + long term realisable assets

divided by current liabilities + long term maturing liabilities), current liquidity (measured by current assets divided by current liabilities), return on assets and return on liquid assets. These financial indicators were calculated based on the financial statements of the year 2005, which are sent to the London Stock Exchange (LSE), based on IFRSs, and the New York Stock Exchange (NYSE), based on US GAAP. The results show percentage differences in the economic-financial indicators of the 37 English companies, calculated based on the financial statements sent to LSE and the NYSE that suggest divergences between the IFRSs and the US GAAP. However, their correlation and regression analyses indicate no significant differences between values of the indicators calculated based on the two different sets of accounting standards. It was, thus, concluded that the economic-financial indicators are not affected in a significant way by the divergences in the accounting standards considered.

These three studies, however, cover only one year of adopting IFRSs, and thus do not allow for the change from domestic accounting standards to IFRSs to be settled and fully reflected in the financial statements.

On the other hand, none of the three studies highlighted the difference in the magnitude of the impact of IFRSs adoption on financial indicators between common-law and code-law environments.

This research is an attempt to fill in this gap in the accounting and finance literature by providing an evidence of whether the accounting environment, i.e. common or code-law directs the impact of IFRSs adoption on financial indicators.

4.7 Summary

Studies conducted by Amir *et al.* (1993), Gore and Scott (1998) and Abuzar and Khalid (2001) all have evidenced that managers and investors alike, have a tendency to find indicative measures of their company's performance. To this end, countries around the world, the professional accounting bodies and stock exchange authorities require companies to disclose summary performance measures, such as Return on Equity, Cash Flow and Earnings per Share. The informativeness of these measures has long been an area of interest for accounting researchers.

According to Fama (1965), Beaver (1970), Beaver and Dukes (1972), Board, Day and Walker (1989), Brown and Kennelly (1972), Ball (1972), Beaver *et al.* (1982), Bernard and Stober (1989), Livnat and Zarowin (1990), Dechow (1994), the association between share price and accounting information can be used to infer market participants' perceptions of the properties of accounting information including their relevance and reliability. Other earlier studies including Beaver and Dukes (1972), Rayburn (1986), Wilson (1986, 1987), and Bowen *et al.* (1987) also showed that an association need not mean that investors actually use the information in making their investment and trading decisions; it may simply reflect some common information with other accounting measures that are used by investors.

Lev (1989), Easton and Harris (1991), Ali and Zarowin (1992), Harris *et al.* (1994), Ohlson (1995), Ali and Hwang (2000), Joos (1997), and other researchers also examined the role of accounting information in capital markets. Notwithstanding the importance of accounting information they also suggest that accounting information is of limited relevance even to residual risk bearers.

Most of these empirical studies reviewed, including Frost and Pownall (1998), Frost and Kinney (1996), Hall *et al.*(1994), Jensen and Litzanberger (1970), Kaplan and Roll (1972), Harris *et al.* (1994), Dumontier and Labelle (1998), Easton *et al.* (1993), Barth and Clinch (1996), Ball and Brown (1968), Brown (1970), Firth (1981), and Forsgardh and Herten (1975), all concentrated on the highly developed economies with effective and efficient markets such as Australia, United States and the United Kingdom. Other early literature and empirical studies by Dickinson and Muragu (1994), Forsgardh and Herten (1975), and Frost and Pownall (1998) supported the basic hypothesis that the existence of an efficient market is important for a valid relation between the variables and can affect the results of studies between the dependent and independent variables. They investigated the correlation among accounting measures of performance on one hand, and their association with stock market prices on the other.

In sum, majority of previous researchers who studied the association between accounting data and capital market values (share prices and returns) focused mainly on:

- Examining the value relevance of earnings and book values in equity valuation,
- Comparing the incremental explanatory power of earnings with that of book values,
- Comparing the explanatory power of earnings and book values across countries, and
- Comparing the value relevance of earnings and book values generated based on different sets of accounting standards in the same country.

Accounting research has largely targeted on whether accounting standards add value for investors or other stakeholders. Most of the studies like Kothari (2001) examined the relation between accounting information and share prices. The most significant conclusion from these previous studies is that the financial reports that are being published under regulation provide new and relevant information to investors. Furthermore, the previous researches (Collins and Kothari 1989; Easton and Zmijewski 1989; Alford *et al.* 1993) showed that the informational content of required accounting diversifies systematically depending on firm and country characteristics.

From another perspective, several other literature has created widespread impression that financial statements providing accounting information have lost their value relevance because of a shift from a traditional intensive economy into a high-technology, service-oriented economy. These studies provide evidence for a decline in the level of relevance of earnings and other financial statement items. Using different approaches, studies by Ramesh and Thiagarajan (1995); Chiang and Venkatesh (1988); Lev and Zarowin (1999); Francis and Schipper (1999) and Brown *et al.* (1999) all found that in developed economies like the UK, the value-relevance of accounting information was in the decline. They argue that the relations between share prices, earnings and book values have deteriorated over time. These studies examined the association between a combination of earnings and book values from one side and share prices or returns from the other. These researchers mentioned above all view the R^2 or coefficient on the explanatory variables in these regressions as a reflection of value-relevance. Collins *et al.* (1997), Francis and Schipper (1999), and Ely and Waymire (1999) also examined the relation between returns, earnings and book values. They found that while the relation between returns and earnings

has deteriorated, this has been offset by an increase in the value-relevance of book values.

While the existing literature focuses on the importance of earnings and book values are two explanatory variables for changes in share prices, it ignores the potential importance of other accounting information in explaining changes in stock prices. Moreover, the existing literature pays no attention to study the impact of the compulsory adoption of IFRSs on the value relevance of accounting measures and, potentially, on trading volume of shares. On the other hand, a very little attention is devoted in the accounting literature to study the impact of the compulsory adoption of IFRSs on financial indicators.

In light of the above, this research attempts to examine the association between share prices and a set of accounting variables in two different accounting environments in Europe, namely common-law and code-law environments pre and post IFRS adoption in Europe, as well as the impact of IFRS adoption on financial indicators in both common law and code law environments. The research is expected to shed some light on the impact of IFRS adoption on both company and stock performances in Europe and to highlight the magnitude of this important shift towards the international convergence of accounting standards.

CHAPTER 5 RESEARCH METHODOLOGY

- 5.1 Introduction
- 5.2 Approaches of research methodology
- 5.3 Objectives of the study
- 5.4 Research questions
- 5.5 Research hypothesis
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- 5.7 The identification and specification of key variables
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5.1 INTRODUCTION

The word "research" has a Latin origin meaning to know. It is a systematic and repeated process that identifies and defines the problems, within certain limits. It uses well-designed methods to collect data and analyse results.

The word "Methodology" refers to the theoretical analysis of the methods appropriate to a field of study or to the body of methods and principles particular to a branch of knowledge. Methodology includes the following concepts that relate to a particular discipline or field of inquiry: (i) a collection of theories, concepts or ideas; (ii) comparative study of different approaches; and (iii) critique of the individual methods (Creswell 2003).

The term "research methodology", in general, refers to the strategy that will be followed in order to achieve the objectives of the study.

As seen from Chapter Four, most value relevance studies benefit from the usage of modified Ohlson model to explain the relationship between accounting numbers and share prices. However, most of these studies focus on accounting information contained in the income statement and the balance sheet, ignoring the importance of information contained in the cash flow statement. Also most of the studies focus on the book value per share and the earnings per share as independent variables and their impact on share prices, ignoring the potential impact of other accounting information contained in the income statement and the balance sheet. Moreover, there was no attempt to compare the impact of the movement towards IFRSs on share prices between common and code-law environments. In addition, very little

attention is devoted in the literature to examine the potential impact of IFRSs adoption on companies' performance. This research is an attempt to fill in these gaps in the literature by studying the impact of more variables other than earnings per share and book value per share on share performance in the two different accounting environments and by studying the impact of IFRS adoption on some key performance ratios; namely the operating profit margin; the return of equity; the return on invested capital; the leverage and the current ratio.

The remainder of this chapter is organised as follows. The major approaches of research methodology are described in the section two. Section three articulates the objectives of the study. Section Four develops the main hypotheses for this study. Analysis of the research and the statistical analysis techniques that will be used in order to evaluate the impact of IFRSs adoption on share prices and companies' performance are described in the Fifth section. Sections Six and Seven explain the variables of the study and their measures. Section Eight focuses on the data-set and the resources of data; including: the nature of research data, sources of data, and the sample of the study. The summary of the chapter is set out in Section Nine.

5.2 APPROACHES OF RESEARCH METHODOLOGY

Overall, there are two major approaches of research methodology: positivistic and phenomenological (Saunders, Lewis and Thornhill 2003). The positivistic approach follows an objective, scientific methodology and is associated with quantitative analysis. By contrast, the phenomenological paradigm follows a qualitative approach and relies on the more subjective interpretation of the researcher. The term "quantitative research" is often used in the social sciences, which may include: the

generation of models, theories and hypotheses; the development of instruments and methods for measurement; experimental control and manipulation of variables; collection of empirical data; modelling and analysis of data; and evaluation of results. Accounting and finance fall within the realm of the social sciences. In turn, social sciences often emulate the natural sciences and the above scientific approach.

Quantitative research is appropriate for measuring both attitudes and behaviour. It is specifically designed to produce accurate and reliable measurements that permit statistical analysis, through advanced statistical techniques such as correlation, regression, cluster analysis or factor analysis, which depend on the data gained from populations that are large enough to permit such analysis (Hancick 1998). Quantitative research is widely used in both natural sciences and social sciences, from physics and biology to sociology and journalism. It is also used as a way to examine different aspects of education.

Quantitative research can be used to predict whether or not a proposed model would act in a certain way based on an observable characteristic³. The following is a list of the main advantages of the quantitative approach:

1. the ability to translate data effectively into easily quantifiable charts and graphs (easily comparable data);
2. it allows the researcher to measure and control variables; and
3. the results are projectable to the population.

³ For more details about quantitative and qualitative research, please see:
http://linguistics.byu.edu/faculty/henrichsenl/researchmethods/RM_1_01.html

On the other hand, there are some disadvantages of the quantitative approach, which are:

1. the quantitative approach is weak in understanding social processes;
2. it needs a large number of samples; and
3. it is not flexible; often direction cannot be changed once data collection has started.

On the other hand, "qualitative research" is one of the two major approaches of research methodology in social sciences. It uses qualitative data which are collected from many sources, such as interviews, documents, and participant observation data, to understand and explain social phenomena. Qualitative research reveals areas of consensus, either positive or negative, in the patterns of response. It also determines which ideas generate a strong emotional response. Thus, it is especially useful in situations which involve the ongoing development and refinement of new ideas. Qualitative research requires a lower level of skill in both statistics and experimental design (El- Kahlout 2001).

However, the researcher must have the experience and conceptual framework that allow for accurate and meaningful observation and analysis of the internal operations of systems. There are four key advantages of the qualitative methodology, which are:

1. it facilitates understanding of how and why;
2. it enables the researcher to be responsive to the change which occurs during the research process;
3. it is good for understanding social process; and
4. it allows interaction between group members.

The disadvantages of the qualitative methodology are as follows:

1. the data collection process can be time consuming;
2. the data analysis process is difficult;
3. it is generally perceived as less readable by non-researchers; and
4. it is unreliable as predictors of the population (El- Kahlout 2001). It can expand our list of possibilities, but they cannot be used to identify the best of the possibilities.

Table 5-1 summarises the general characteristics of the qualitative and quantitative methodology.

Table 5.1 General characteristics of the qualitative and quantitative methodology

Characteristic	Quantitative Methodology	Qualitative Methodology
Approach	Deductive	Inductive.
Research Focus	Isolates variables, uses large samples, is often anonymous to participants, and uses test and formal instruments.	Examines full context, interacts with participants, and collects data face to face from participants.
Purpose	Theory testing, prediction, and establishing facts.	Describing multiple realities, developing deep understanding, capturing everyday life.
Data Analysis	Mainly statistical, quantitative.	Mainly interpretive, and descriptive.
Research Plan	Is developed before the study is initiated, structured, formal proposal.	Begins with an initial idea that evolves as the researcher learns more about participants and setting, flexible.

Source: El- Kahlout (2001).

It is worth mentioning, in this context, that this research employs a quantitative approach to investigate the impact of IFRSs adoption on share performance and company performance in common-law and code-law environments. There are two reasons for the choice of a quantitative approach. Firstly, quantitative data are available, and so this approach is practicable. Secondly, a quantitative approach is more objective and allows research hypotheses to be tested.

5.3 Objectives of the study

The main objectives of the study are

- to evaluate the impact of the compulsory adoption of IFRSs in Europe on the share price and the trading volume of shares of listed companies, and to explore the difference of impact, if any, of IFRSs adoption between common-law environments; using the UK as a case study, and code-law environments; using Germany as a case study.
- To evaluate the impact of the compulsory switch to IFRSs in Europe on the financial indicators of listed companies, and to explore the difference of impact, if any, of IFRS adoption between common-law environments, using the UK as a case study, and code-law environments, using Germany as a case study.

5.4 Research questions

Most value relevance studies examine the impact of accounting measures prepared under different sets of accounting standards on share prices without directly testing the impact of the different sets of accounting standards on the performance of

companies. In this study, the researcher tests the performance changes of German and UK listed companies following the adoption of IFRSs.

To evaluate the impact of the compulsory adoption of IFRSs on share prices and companies' performance, the research attempts to answer the following four questions

Question No.1

Does information, based on IFRSs increase or decrease the value-relevance of accounting numbers to investors in relation to stock prices and is the impact different for the two common-law and code-law environments? More specifically, does the new disclosure and measurement basis make a difference to investors when compared with the disclosure and measurement basis of old reporting systems, which are based on different sets of local GAAP, and what potential information, if any, might also influence the share price?

Question No.2

Does the adoption of IFRSs in Europe enhance the reported performance of companies listed in different European stock exchanges?

Question No.3

Does the impact of adopting IFRSs on financial indicators differ between the two common-law and code-law environments?

Question N0.4

Does the adoption of IFRSs have an impact on trading volume of shares and is the impact different for these two common-law and code-law environments?

It could be argued that the adoption of IFRSs should enhance the transparency of financial statements thus leading to an enhancement in the trading volume of shares. Moreover, since the impact of IFRSs adoption is likely to be different between common-law and code-law environments, it is expected that the impact of IFRSs adoption on trading volume is also likely to be different.

In the next section, the main hypotheses to answer these questions are addressed.

5.5 Research hypotheses

Cohen, Manion and Morrison (2000) noted the formulation of hypotheses and testing them is one approach used in historical researches, such as this research. They also noted the role of generating hypotheses as one method that can be applied in both quantitative and qualitative studies which involve recording and analyzing accounts of events and social episodes. Kerlinger and Lee (2000) suggested two criteria for acceptable hypotheses:

1. Hypotheses should be statements of possible relationships between variables, and
2. These statements should imply how they are to be tested.

A number of propositions were put forward at the end of Chapters Three and Four. These will now be formally expressed as hypotheses. So, as one of the main reasons of the compulsory adoption of IFRSs in Europe is to help investors better

evaluate their investments and to provide them with more valuable information for this purpose, the research investigates the following hypotheses:

Hypothesis No.1 (H₁)

The adoption of IFRS has an impact on share prices in both common-law and code-law environments.

To test this hypothesis, the following sub-hypotheses will be examined:

H_{1/1}: the compulsory adoption of IFRSs increases the value relevance of accounting information in a code-law environment.

H_{1/2}: the compulsory adoption of IFRSs increases the value relevance of accounting information in a common-law environment.

Hypothesis No.2 (H₂)

The impact of the compulsory adoption of IFRSs is higher in a code-law than in a common-law environment.

IFRSs are already heavily influenced by the shareholder-oriented Anglo-Saxon accounting model typical in common-law countries.

Hypothesis No.3 (H₃)

The compulsory adoption of IFRSs has an impact on companies' performance.

The adoption of IFRSs means that great changes will take place in the disclosure requirements in both the balance sheet and the income statement and in the

measurement basis of assets, liabilities, revenue, expenses and equity components compared with local GAAP in the UK and Germany. This will, in turn, have a great impact on the values assigned to those items in the financial statements after the adoption of IFRSs, which will affect the liquidity, profitability and performance measures of the companies under study. This leads to hypothesis no. 3 as above.

To test this hypothesis, the following sub-hypotheses will be examined:

H_{3/1} the adoption of IFRSs will have an impact on companies' current ratios.

H_{3/2} the adoption of IFRSs will have an impact on companies' debt to equity ratios.

H_{3/3} the adoption of IFRSs will have an impact on companies' operating profit ratios.

H_{3/4} the adoption of IFRSs will have an impact on companies' returns on equity.

H_{3/5} the adoption of IFRSs will have an impact on companies' returns on capital employed.

Hypothesis No.4 (H₄)

The adoption of IFRSs has an impact on trading volume of shares

To test this hypothesis, the following sub-hypotheses will be examined:

H_{4/1} the adoption of IFRSs has an impact on the trading volume of shares in Germany.

H_{4/2} the adoption of IFRSs has an impact on the trading volume of shares in the UK.

H_{4/3} the adoption of IFRSs has a stronger impact on the trading volume of shares in Germany than in the UK.

5.6 Data collection and sample size

The accounting and stock market data were collected from Datastream. The original population for the study was all companies listed on the UK and German stock markets, as identified by Datastream. The total number of companies in the UK was 1,979 from different sectors and 3,378 in Germany.

Then an elimination process was undertaken based on several criteria. The following were initially excluded: banks, equity investment instruments, financial service sector companies and the life and non-life insurance companies. The reason for excluding those companies was that the disclosure and measurement basis for these sectors are entirely different from those of manufacturing and other service sectors. Companies identified as unclassified were also excluded. Five years of data before the adoption of IFRSs (until 2004) and three years after adoption of IFRSs (until 2007) were extracted, but the criterion for choosing adoption was based on companies that switched from local GAAP to IFRSs in 2005. If it was unclear from Datastream as to the type of standards previously followed, or if the company followed different standards other than local GAAP, then those companies were excluded. For example, since April 1998, exchange-listed corporations in Germany were allowed to prepare consolidated financial statements in accordance with IASs, U.S. GAAP, or German GAAP. Many German companies voluntarily decided to switch to US GAAP or even to IFRSs before 2005. Those companies did not serve the purpose of the study, and hence they were excluded. Based on these criteria, the

number of companies in the study was reduced to 139 for the UK, and 104 for Germany. A pooled sample was then chosen amalgamating data from the two eras. Clearly, given eight years of data, there were 1,112 company-years for the UK and 832 company-years for Germany. Some data-entries were missing, leaving final sample sizes as indicated by the following table:

Table 5.2 Final sample size

		UK	Germany
Ohlson model	Pre	630	471
	post	<u>414</u>	<u>298</u>
Total sample		<u>1,044</u>	<u>769</u>
Modified Ohlson model	Pre	626	321
	Post	<u>410</u>	<u>246</u>
Total sample		<u>1,036</u>	<u>567</u>

5.7 The identification and specification of key variables

Since there are three phases to the research, it is pertinent to introduce the key variables under each model separately. The identification of most of the variables is obtained from Datastream and Osiris databases. However, for some other variables there was no predetermined measure readily available for which further discussion will be given below.

5.7.1 The specifications of the key variables for the share price models

Under the Ohlson model, the key variables are share price, book value per share and earnings per share. The definition of each is indicated below:

Share price (Datastream code: P)

The price per share is given by the ex-dividend market price per share as at 30th of June in the year following the accounting year-end.

Book value per share: (Datastream code WC05476)

Represents the book value (proportioned common equity divided by outstanding shares) at the company's accounting year-end. Participating preference shares are included.

Earnings per share: (Datastream code: WC05201)

Represents the earnings for the 12 months ended as at the end of the accounting year.

Earnings per share are "estimated using net income after tax and after (non-participating) preferred dividends divided by year-end shares or latest shares available".

Under the modified Ohlson model, additional variables are introduced, the identification of which are:

Leverage:

Represents total long-term debt divided by market value of equity at the end of the accounting year.

Dividend payout: (Datastream code: WC09504)

Dividend per share divided by earnings per share (it was expressed in Datastream as a percentage, but in this research in proportionate form as a decimal).

Log size:

Represents the natural logarithm of the total assets at the end of the accounting year.

Accruals:

Earnings per share minus cash flow per share as measured at the end of the accounting year.

Orthogonalised accruals:

Represent the residuals arising after regressing accruals against earnings per share, book value per share and dividend payout. This procedure is only to be adopted in case of high multicolleniariry (see chapter 6 for details).

5.7.2 The specifications of the key variables for performance measures:

For the purpose of this study, the researcher has hypothesised an impact of IFRS adoption on five performance indicators, namely return on equity; return on invested capital; debt to equity ratio; current ratio and operating profit percentage. The following section provides a definition for each of these performance indicators as stated in Datastream.

Return on equity: (Datastream code: WC08301)

Represented by (net income before preferred dividends – preferred dividends requirement) divided by last year's common equity. This is expressed in proportionate form as a decimal rather than as a percentage.

Return on invested capital: (Datastream code WC08376)

Represents (net income before preferred dividends + ((interest expense on debt – interest capitalised) * (1 – tax rate))) / average of last year's and current year's (total capital + last year's short term debt & current portion of long term debt). This is expressed in proportionate form as a decimal rather than as a percentage.

Debt to equity: (Datastream code: WC08226)

Represents long-term debt divided by common equity in proportionate form.

Current ratio: (Datastream code WC08106)

Is measured by dividing current assets by current liabilities at the accounting year end.

Operating profit percentage: (Datastream code: WC08316)

Operating profit expressed as a proportion of sales (it was originally expressed as a percentage in Datastream, but converted to its proportionate form).

5.7.3 The specification of trading volume as a key variable

Average trading volume of shares is represented by the average number of shares traded daily for the respective year. This variable is obtained from Osiris database. However, due to restrictions in data availability, data were collected for this variable on a monthly basis from 2002 until 2007.

5.8 The specification of the models

5.8.1 Ohlson model

The Ohlson model has been discussed already in details in chapter three and is specified as:

$$P_t = \alpha + \beta_1 BVPS_t + \beta_2 EPS_t + \varepsilon_t$$

P_t : price per share at the end of year t ,

$BVPS_t$: book value per share at the end of year t ,

EPS_t : earnings per share at the end of year t .

ε_t : error term, i.e. other value-relevant information that cannot be captured by earnings and book value figures.

5.8.2 Modified Ohlson Model

Similarly, the Modified Ohlson Model has already been discussed in detail in chapter 3, and whose specification is:

$$P_t = a + b_1 BVPS_t + b_2 EPS_t + b_3 LEV_t + b_4 LOG SIZE_t + b_5 ACCRUALS_t + e_t$$

P_t , $BVPS_t$, and EPS_t : as previously defined.

Although the main intention of the previous models is to compare the two different eras of pre and post IFRS adoption for the German and the UK data sets, some brief comments will be made on the quality of different models for the same era in each country.

5.8.3 The impact of IFRSs on performance measures

ANOVA test will be used to examine the statistical characteristics of the performance indicators in order to evaluate whether the main five performance measures chosen in this study, namely return on equity; return on invested capital; debt to equity ratio; current ratio and operating profit margin have significantly changed following the adoption of IFRSs. This will be performed for both Germany and the UK. The researcher will also perform a number of tests to evaluate changes in the standard

deviation and the median of the five chosen performance measures following the adoption of IFRSs.

In order to evaluate whether the performance indicators are different between Germany and the UK prior to the adoption of IFRSs, a logistic regression model will be employed. The reason for this choice of method is that it is a classification technique used solely for a binary dependent variable, and is thus well suited to this problem. Incidentally, there are no restrictions on the normality of the residuals. The previous models that have been specified should enable it to be made clear whether IFRS adoption influences share prices. The purpose of the logistic regression model in this context is to validate these results by attempting to demonstrate that the profile of the accounting performance values are different following IFRS adoption. The researcher is not suggesting that these independent variables impact upon IFRS as might be the case in a multiple regression model or even in a logistic regression model whereby the independent right-hand side variables impact upon the dependent variable. Instead of implying causation in this way, the objective is quite simple: to test whether there is statistical evidence to show that the accounts, proxied by the linear combination of independent variables, are different. In the theoretical framework introduced in this thesis it is suggested that IFRS impacts upon the performance values, as such a modeller would normally therefore treat IFRS adoption as the independent variable not the dependant variable. Nevertheless, if the set of accounts can be classified according to IFRS adoption, then the logistic regression serves its purpose by attempting to demonstrate that the accounts are different. In this way the logistic regression is being used in a confirmatory way strengthening our confidence in the results from the earlier models.

However, the logistic regression model does not show the extent to which IFRS impacts upon the individual accounting performance variables. Instead the logistic regression model will show whether there is a statistically significant difference between the two sets of results.

In a logistic regression, the right-hand side of the equation represents a linear combination of the performance measures and is similar to that typically found in a multiple regression model. However, the left-hand side variable is much different and represents the natural logarithm of the odds ratio. Unlike a multiple regression model, the likelihood ratio tests for the estimates of the coefficients follow a chi-square distribution. Where the probability values of the chi-square statistics are less than 0.05 then the coefficients of the respective performance variables are significantly different from zero. The identification of such variables will enable the researcher to provide a profile of combinations of performance measures whose values help to differentiate German companies from UK companies. Additionally, positive signs for the coefficient estimates will indicate greater values of these measures in the UK rather than Germany. This model will take the following form:

$$\ln [p/(1-p)] = \delta_0 + \delta_1\text{CR} + \delta_2\text{DTER} + \delta_3\text{OP}\% + \delta_4\text{ROE} + \delta_5\text{ROIC} + u$$

where

ln: natural log

p: probability that the company is based in the UK

1-p: probability that the company is based on Germany

u : residual of the model for which $E(u) = 0$, and u is not necessarily normally distributed (as would be the case for a residual using a multiple regression).

It follows that the probability that the company is based in the UK is

$$p = e^z / (1 + e^z),$$

where $z = \delta_0 + \delta_1\text{CR} + \delta_2\text{DTER} + \delta_3\text{OP}\% + \delta_4\text{ROE} + \delta_5\text{ROIC}$.

By using this likelihood, in maximum likelihood estimation, the values of δ_0 , δ_1 , δ_2 , δ_3 , δ_4 , and δ_5 are derived iteratively to arrive at the best classification results given the data.

Further logistic regression models will be used to compare UK and German firms post IFRSs adoption. The next stage in the analysis will be to compare the impact of IFRSs on each country separately. In this way, a logistic regression model will be used to differentiate German companies pre and post IFRSs adoption according to a linear combination of performance measures. The same procedure will be repeated for the UK.

The analysis needs to be extended to accommodate differences between four scenarios namely, UK GAAP, German GAAP, IFRSs in the UK and IFRSs in Germany. To achieve this, a reference point must be chosen. For both countries, the pre-adoption era is chosen as a reference point, i.e. UK GAAP is chosen as a reference point for the UK and German GAAP is chosen as a reference point for Germany.

It follows that UK GAAP will be compared with German GAAP and IFRSs, whether in the UK or in Germany using the first reference point. On the other hand, German GAAP will be compared with UK GAAP and IFRSs, whether in Germany or in the UK.

To achieve this, the study needs to employ a model that uses categorical data as the dependant variable, for which there will be four categories, namely UK GAAP, German GAAP, IFRSs in the UK and IFRSs in Germany. No ordering of categories is implied and hence there is no need for an ordinal-based model. Instead, the appropriate model would be a multinomial logistic regression, which can simultaneously deal with, for example, the four scenarios identified.

The multinomial approach seeks to find a linear combination of independent variables whose coefficients are chosen in such a way so as to distinguish between the different categories using one of them as a reference point. If there were only two categories in total, it would operate in the same way as a logistic regression.

A Chi-square statistic is used for the likelihood ratio test for the overall model, while Wald statistics are used to assess the significance of the individual variables for the different combinations when comparing the reference category with the other categories in turn.

Since there are four categories in one reference point in turn, there will be three logit equations using the UK GAAP as a reference point and similarly three logit equations with German GAAP as a reference point. The logit equations will take the following form:

$$\text{Ln} [\text{Prob} (i/j \text{ and } i \neq j) / \text{Prob} (j)] = \alpha_{ji} + \beta_{1ji}X_1 + \beta_{2ji}X_2 + \beta_{3ji}X_3 + \beta_{4ji}X_4 + \beta_{5ji}X_5$$

where:

$j = 1$ or 2 as the reference-category ($1 = \text{UK GAAP}$ and $2 = \text{German GAAP}$)

$i = 1, 2, 3, 4$ as a comparator-category ($1 = \text{UK GAAP}$, $2 = \text{German GAAP}$, $3 = \text{IFRSs}$ in the UK and $4 = \text{IFRSs}$ in Germany)

5.8.4 The impact of IFRSs on trading volume

For trading volume analysis, data is collected from Orais database for the same set of companies. Due to restrictions on data availability in this database, data are collected only for three years prior to the adoption of IFRSs and three years following the adoption of IFRSs, i.e. the years 2002 to 2007.

The impact of IFRSs on trading volume will also be investigated using: ANOVA tests to assess changes in the mean trading volume; Cochran's test, Bartlett's test and Levene's test to investigate changes in the dispersion (standard deviation) profile; and Kruskal-Wallis test to evaluate whether the median trading volume is changed following IFRSs adoption.

The skewness and kurtosis of the trading volume will also be assessed in the light of any improvement or deterioration in non-normality.

5.9 Summary

This chapter analysed the methodology used in this research. It pinpointed different approaches to research methodology and the approach used in this research in particular. It highlighted the main research objectives, the main research questions to achieve those objectives and the main research hypotheses to answer the research questions. It then analysed the sampling process. Each step was thoroughly explained in order for the reader to have a comprehensive understanding of the data collection process. Finally, It introduced the different models used in the study and the specifications of the key variables used in the study.

CHAPTER 6 RESULTS

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6.1 Introduction

In the previous chapter, a discussion of the research methodology was addressed. This aimed at proposing the most important variables that might explain variations in share prices pre and post IFRSs adoption, and exploring the impact of IFRSs adoption on key measures of German and UK listed companies' performance. Moreover, the need for an investigation of the impact of IFRSs adoption on the trading volume of shares of the companies under current study was highlighted, and indeed will be undertaken and discussed here.

In this chapter, an analysis of the Ohlson model, the modified Ohlson model, and the performance of companies, as well as an ANOVA test of trading volume are now introduced for both Germany and the UK in the two eras of pre and post adoption of IFRSs. Firstly, the main two variables that constitute the Ohlson model, namely earnings per share (EPS) and book value per share (BVPS) are investigated in relation to their impact on share prices.

Secondly, more variables, namely firm size, leverage, accruals and dividend payout, are added to constitute a modified Ohlson model. Correlations between independent variables were considered for both German and UK data-sets. On the one hand, prior to the adoption of IFRSs, due to high correlation in the German data-set between the accruals and three other independent variables, namely EPS, BVPS and dividend payout, an orthogonalisation test has been used by replacing actual values by residual values of the accruals, details of which are provided later in this chapter. Also, a multicollinearity problem is observed in the German data-set following the adoption of IFRSs between accruals and BVPS. After the

orthogonalisation, in both German data-sets, the multicollinearity problem between all independent variables had been eliminated, with no correlations with absolute values greater than 0.05. On the other hand, for the UK data-set, prior to the IFRSs adoption, the multicollinearity problem was observed between accruals and EPS. After the Orthogonalisation procedure in the UK data-set, the multicollinearity problem between accruals and EPS had been eliminated, with no correlations with absolute values greater than 0.05. It should be emphasised that following the IFRSs adoption in the UK, there was no multicollinearity problem between different predictor variables.

Thirdly, to measure the impact of the IFRSs adoption on companies performance in the major areas of liquidity and profitability, different performance measurements were selected from the review of the literature, namely current ratio; debt to equity ratio; operating profit percentage; return on equity and return on invested capital. Logistic regression is employed using the previously mentioned variables, in addition to a dummy variable, to reflect the two different eras of the IFRSs adoption, as a dependent variable. Furthermore, an ANOVA test was employed to explore whether statistically significant differences exist between the two different eras of the adoption of IFRSs for performance measures. Finally, an ANOVA test is conducted to investigate whether IFRSs adoption has improved the trading volume of shares of the chosen companies in both Germany and the UK.

In order to run different models and analysis, STATGRAPHICS Plus 5.1 and SPSS 16.00 were used in this research. The details of different results can be summarized as follows.

6.2 Ohlson Model

6.2.1 Ohlson model in German data-set

The main variables used in building Ohlson model are earning per share and book value per share, with the dependent variable being share price. Table 6.1 sets out the results arising from the multiple regression analysis to test the Ohlson model, using data pre- and post-IFRSs in Germany.

Table 6.1: Statistical results of Ohlson Model for the German data-set

Variables and measures	Pre IFRS				Post IFRS			
	Estimate	t stat.	<i>P</i> -value	ANOVA* <i>P</i> -value	Estimate	t stat.	<i>P</i> -value	ANOVA <i>P</i> -value
Constant	6.9696	4.1766	0.000		4.4917	1.6948	0.091	
EPS	1.4154	9.1326	0.000		6.8885	7.7986	0.000	
BVPS	1.1721	19.387	0.000		1.0871	10.442	0.000	
Model				0.000				0.000
R ²	62.5317%				71.0963%			
R ² Adj	62.3719%				70.901%			
Akaike info criterion	9.807892				10.25357			
Schwarz criterion	9.834313				10.29070			

* For this table and subsequent tables ANOVA: analysis of variance.

The analysis of variance *P*-value indicates that the overall model based on German GAAP is significant at the 99% confidence level. Both EPS and BVPS are individually significant at the same confidence level. The BVPS is even more informative than EPS as indicated by its very high t statistic (19.38%). The model

provides an explanation of 62.37% of the variation in share prices, as indicated by the adjusted R^2 .

Following the adoption of IFRSs in Germany, the overall Ohlson model is very significant with an ANOVA P -value less than 0.01 and thus significant at the 99% level of confidence. Once again EPS and BVPS are individually significant at the 99% confidence level (and BVPS is still more informative than EPS with its higher t statistic). The adjusted R^2 is 70.90% revealing a higher level of explanatory power following the adoption of IFRSs. This is consistent with hypothesis $H_{1/1}$: compulsory adoption of IFRSs increases the value relevance of accounting information in code-law environments.

The Akaike Information Criterion (AIC) provides a way of comparing models and from this the recommendation is to choose the model with the lowest AIC value⁴. It follows that the Germany pre-Ohlson model is a better model than the Germany post-Ohlson model, despite the fact that the R^2 is lower.

6.2.2 Ohlson Model in the UK data-set

To build the Ohlson model, the same variables, employed in German data-sets, are used in the UK data-sets. The statistical results are summarised in Table 6.2. Under UK GAAP, the overall Ohlson model is significant at the 99% confidence level, as indicated by the ANOVA P -value being less than 0.01. EPS is significant at the 99% confidence level and BVPS, with its higher t statistic, is even more significant at the

⁴ <http://www.mathworks.com/access/helpdesk/help/toolbox/ident/ref/aic.html>, accessed 27th January 2010.

same confidence level. This model explains 42.42% of the variation in share prices under UK GAAP, as indicated by the R^2 of the Ohlson model.

Following IFRSs adoption in the UK, the Ohlson model is very significant overall with an ANOVA P -value less than 0.01, i.e. significant at the 99% level. EPS and BVPS are individually significant at the same confidence level with equal importance (as indicated by the similar t statistic between 9.0 and 9.5). The adjusted R^2 is 61.05% revealing a model which can explain 61.05% of the variations in UK share prices following the adoption of IFRSs.

It is evident that IFRSs adoption has improved the explanatory power of the Ohlson model by 19.00% points in absolute terms from 42.42% to 61.05%, an enhancement of 44% in relative terms. This is consistent with hypothesis $H_{1/2}$: the compulsory adoption of IFRSs increases the value relevance of accounting information in common-law environments.

Table 6.2: Statistical results of Ohlson Model for the UK data-set

Variables and measures	Pre IFRS				Post IFRS			
	Estimate	t stat.	P - value	ANOVA P -value	Estimate	t stat.	P - value	ANOVA P -value
Constant	1.3897	7.8196	0.000		1.7896	7.5032	0.000	
EPS	2.3635	8.9358	0.000		4.1775	9.4534	0.000	
BVPS	1.1537	15.642	0.000		0.9693	9.0381	0.000	
Model				0.000				0.000
R^2	42.5996				61.238%			
R^2 Adj	42.4168				61.0499%			
Akaike info criterion	14.54806				14.79996			
Schwarz criterion	14.56920				14.82908			

The results of the Ohlson model for both Germany and the UK prior to the adoption of IFRSs indicate that both models are similar in terms of the significance of EPS and BVPS. However, under German GAAP the model has a higher explanatory power, increasing the adjusted R^2 by around 20% when compared with UK GAAP.

On the other hand, although the adoption of IFRSs has improved the value relevance of accounting information in both the UK and Germany and although the improvement has been greater in the UK, indicated by a shift from 42.42% to 61.05% in the UK compared with a smaller shift from 62.37% to 70.90% in Germany, nevertheless the Ohlson model for Germany after IFRSs adoption exhibits greater value relevance than that for the UK. It follows that the second hypothesis⁵ is rejected. This result agrees with the findings of (Schiebel 2006), which indicated that German GAAP is significantly more value relevant statistically than IFRSs. However, this result is an unexpected outcome considering the opposite findings in the majority of previous empirical studies and the descriptive theories of German GAAP and IFRSs.

The Akaike Information Criterion (AIC) is quite similar for the UK data set pre and post IFRS adoption; although it is slightly lower prior to IFRS adoption.

⁵ This states that “The impact of the compulsory adoption of IFRSs is higher in code-law than in common-law environments”.

6.3 Modified Ohlson Model

The following section reveals the statistical results that arise from the adoption of the modified Ohlson model for both German and UK data sets.

6.3.1 German data-set

To develop the modified Ohlson model, four more variables have been included, namely leverage, dividend pay-out, firm size and accruals. Table 6.3 summarises the statistical results of an orthogonalised modified Ohlson Model for the German data-set.

The modified Ohlson model under German GAAP reveals that it is overall significant at the 99% level of confidence, as indicated by the ANOVA *P*-value which is less than 0.01. EPS and BVPS are significant as before under the original Ohlson model. However, under the modified Ohlson model additional variables are included. The leverage ratio is not significant at the 95% confidence level, although the negative regression coefficient estimate bears the correct sign. The dividend payout ratio is significant at the 99% level of confidence and is correctly positively related to share price.

The overall result is consistent with hypothesis $H_{1/1}$: compulsory adoption of IFRSs increases the value relevance of accounting information in code-law countries.

increases the value relevance of accounting information in code-law countries.

Table 6.3: Statistical results of orthogonalised modified Ohlson model in German data-sets

Variables and measures	Pre IFRS				Post IFRS			
	Estimate	T stat.	P-value	ANOVA P-value	Estimate	T stat.	P-value	ANOVA P-value
Constant	24.759	2.0076	0.046		-22.854	-2.0126	0.045	
EPS	1.5027	11.430	0.000		8.8553	14.987	0.000	
BVPS	1.1381	20.770	0.000		0.83262	12.494	0.000	
LEVE	-10.310	-1.205	0.229		-15.357	-2.0285	0.043	
DIVI PAYOUT	1.34278	11.416	0.000		2.3268	9.7945	0.000	
LOG SIZE	-1.1518	-1.205	0.229		2.5705	2.8268	0.005	
ACCRUALS	1.05771	5.7286	0.000		-1.2965	-3.9309	0.000	
Model				0.000				0.000
R ²	79.2347%				88.5936%			
R ² Adj	78.8391%				88.3084%			
Akaike info criterion	9.473791				9.229884			
Schwarz criterion	9.555847				9.329341			

There is no significant size effect under German GAAP contributing to the determination of share prices at the 95% level of confidence. By contrast the accruals effect is significant at the 99% confidence level, indicating an important contribution as an explanatory variable relevant to share prices under German GAAP.

Overall, the model explains 78.84% of the variation in share prices as indicated by the adjusted R². However, the presence of multicollinearity was detected revealing high correlation between the accruals variable and three other independent variables namely EPS, BVPS and dividend payout (see Appendix 1). Consequently, as a

further stage, in the analysis the accruals variable was replaced by the residuals arising from an orthogonalisation process.

The first stage of the orthogonalisation procedure was to regress accruals against EPS, BVPS and dividend payout. The second stage was to compute the residuals arising from the first stage, save them, labelling them as orthogonalised accruals, and then replacing the original accruals by the orthogonalised accruals in a modified Ohlson model. In this way, the orthogonalised accruals do not cause any multicolleniarity problem with the dividend payout ratio, which would previously being the case (see Appendix 2).

An alternative to orthogonalisation would have been to omit one of the two offending variables. The advantage of not doing this is that both variables might be significant, which indeed is the case in several models. It needs to be mentioned that the key variables in the basic Ohlson model, namely EPS and BVPS were retained regardless of any multicolleniarity problem, since they are integral to the theoretical model.

After orthogonalisation, the adjusted R^2 of 78.84% remained the same and similarly the significance probabilities of the independent variables remain the same. Furthermore, the multicolleniarity problem between all independent variables had been eliminated, with no correlations with absolute values greater than 0.5. It is worth mentioning that even after orthogonalisation the accruals variable plays a significant role in the value relevance model.

Following the adoption of IFRSs, the explanatory power of the model is increased to 88.31% as indicated by the adjusted R^2 after considering the orthogonalisation

process discussed above (see Appendices 3 and 4). EPS, BVPS, DIVI Payout, Log size and Accruals are all significant at the 99% level, while Leverage is significant at the 95% level of confidence.

The Schwartz criterion, also known as the Bayesian Information Criterion (BIC), is a yardstick for comparing the quality of information from different models which employ the same values for the dependent variable. It takes account of the number of parameters, inter alia the sample size and the residual sum of squares (Schwartz 1978). The model with the smallest BIC figure has the best information quality.

The German pre-modified Ohlson model has a lower Schwartz criterion than the Germany pre-Ohlson model, despite the fact that it utilised several more variables. Hence, the pre-modified model for Germany is a better model in terms of the quality of information.

On the other hand, the German post-modified Ohlson model has a lower Schwartz criterion than that of the German post-Ohlson model, despite the fact that it has more variables. It is therefore better in terms of information quality.

The AIC is lower after IFRS adoption in Germany than before, which provides a superior model in terms of the quality of information provided.

6.3.2 The UK data-set

The same set of variables previously used with the German data-sets, are employed with the UK data-sets with the statistical results being highlighted in Table 6.4.

Table 6.4: Statistical results of orthogonalised modified Ohlson Model in UK data-set

Variables and measures	Pre IFRS				Post IFRS			
	Estimate	t stat.	P-value	ANOVA P-value	Estimate	t stat.	P- value	ANOVA P-value
Constant	1.1193	1.5863	0.113		0.9753	1.0616	0.289	0.000
EPS	2.4558	11.596	0.000		4.1636	13.795	0.000	
BVPS	1.0667	16.531	0.000		0.9647	12.682	0.000	
LEVE	-0.8958	-1.8256	0.068		0.6485	1.1583	0.247	
DIVI	0.0298	0.4181	0.676		0.3427	2.6088	0.009	
PAYOUT								
LOG SIZE	0.07124	1.1933	0.233		0.0288	0.3715	0.710	
ACCRUALS	-6.3314	-18.79	0.000		-5.341	-21.583	0.000	
Model				0.000				0.000
R ²	64.3651%				82.5929%			
R ² Adj	64.0202%				82.3344%			
Akaike info criterion	14.08834				14.02385			
Schwarz criterion	14.13792				14.09229			

A similar multicolleniarity problem was observed in the UK data set pre and post IFRS adoption (see Appendices 5 and 7) and was dealt with in the same way as with German data set; a procedure which resulted in no multicolleniarity problems between the variables after orthogonalisation (see Appendices 6 and 8).

The UK pre-modified Ohlson model has a lower Schwarz criterion than the UK pre-Ohlson model, despite the fact that it utilised several more variables. Hence, the pre-modified model for the UK is a better model in terms of the quality of information.

On the other hand, the UK post-modified Ohlson model has a lower Schwartz criterion than that of the UK post-Ohlson model, despite the fact that it has more variables. It is therefore better in terms of information quality.

The AIC is lower after IFRS adoption in the UK than before, which provides a superior model in terms of the quality of information provided.

In terms of explaining share prices, the models for Germany are better than those for the UK which holds both pre IFRSs and post IFRSs. However, in terms of the change in the explanatory power R^2 , the effects are more pronounced in the UK than in Germany. A possible reason for this is that in Germany even before IFRSs the models were already very good. But in terms of impact, IFRSs has had a bigger impact in the UK than in Germany. In both Germany and the UK the introduction of IFRSs has improved the information value associated with accounting information. The value added, however, is stronger in the UK, which is not consistent with the second hypothesis⁶. This result is not consistent with the literature and calls for more investigation in different common-law and code-law countries other than the UK and Germany.

6.4 Analysis of performance measures

This section will address the second research question: "Does the adoption of IFRSs in Europe enhance the reported performance of companies listed in different

⁶ This states that "The impact of the compulsory adoption of IFRSs is higher in code-law than in common-law countries".

European stock exchanges?” Five different measures of performance are selected in the main areas of profitability and liquidity, namely return on equity; return on invested capital; debt to equity; current ratio and operating profit percentage.

An ANOVA test is taken for each of the above-mentioned five performance measures to investigate whether statistically significant differences are observed following the adoption of IFRSs. Furthermore, logistic regression analysis has been used in building performance models to explore whether the adoption of IFRSs has improved the companies’ performance, other things being equal. A summary of the findings in both Germany and the UK, as examples of common and code law countries, respectively, is detailed below.

6.4.1 Analysis of performance measures in Germany

Table 6.5 summarised the ANOVA test statistics for the main five variables used to measure companies’ performance. It can be observed that there was an improvement in the mean ROE following IFRSs adoption, which was significant at the 90% level of confidence (see the ANOVA test in Table 6.5). There was also a reduction in the standard deviation of ROE, which was significant at the 95% level of confidence (see Cochran’s test in Table 6.5).

The significant difference in standard deviations violates an assumption behind ANOVA and so Kruskal-Wallis test is adopted instead, and reveals a significant difference in the median ROE following IFRSs adoption.

Table 6.5: Statistical results of ANOVA analysis in German data-set

	ROE	ROIC	DTEQ	CR	OP%
Mean					
Pre (0)	-6.627	5.602	50.535	4.756	-8.721
Post (1)	10.475	8.715	163.376	1.685	-5.835
Standard deviation					
Pre (0)	157.442	41.354	2332.331	39.955	150.490
Post (1)	35.532	16.795	1318.814	1.340	123.623
ANOVA					
F-Ratio	3.42	1.58	0.61	1.66	0.08
P-Value	0.065	0.209	0.436	0.198	0.776
Cochran's Test <i>P</i> -Value	<0.05	<0.05	<0.05	<0.05	<0.05
Bartlett's Test <i>P</i> -Value	<0.05	<0.05	<0.05	<0.05	<0.05
Levene's Test <i>P</i> -Value	0.047	0.039	0.128	0.209	0.908
Kruskal-Wallis test					
P-Value	0.000	0.000	0.387	0.000	0.000

Table 6.5 also reveals that the ANOVA F-ratio for the other four variables, namely ROIC; DTEQ; CR; OP% is not statistically significant. This concludes that the adoption of IFRSs makes no difference with regard to these four variables. There was also a reduction in the standard deviation of all these variables, which was significant at the 95% level of confidence (see Cochran's test in Table 6.5). The significant difference in standard deviations violates an assumption behind ANOVA and so Kruskal-Wallis test is adopted instead, and reveals significant difference in the median for all these four variables except debt to equity ratio following IFRSs adoption.

6.4.1.1 Analysis of return on equity in Germany

From the results revealed in Table 6.6, it can be summarized that the ANOVA analysis decomposes the variance of ROE⁷ into two components: a between-group component and a within-group component. The F-ratio, which in this case equals 3.41609, is a ratio of the between-group estimate to the within-group estimate. Since the *P*-value of the F-test is greater than or equal to 0.10, there is a statistically significant difference between the mean ROE from one level of DUMMY PRE AND POST to another at the 90.0% confidence level.

Table 6.6: Statistical analysis for ROE in Germany

	ROE		
	Pre (0)	Post (1)	Overall
Count	472	299	771
Average (Mean)	-6.62676	10.475	0.0054345
Standard deviation	157.442	35.532	125.382
ANOVA F-Ratio	-	-	3.42*
Fisher's least significant difference test: Pre (0) – Post (1)	-	-	-17.1017
Cochran's C Test:	-	-	0.95154***
Bartlett's Test:	-	-	2.00414***
Levene's Test:	-	-	3.93526**
Kruskal-Wallis Median Test			
Statistic:			
Average Rank	357.524	430.952	-
Test Statistic	-	-	19.8967***

*, ** and *** denotes a statistically significant difference at 10, 5 and 1 per cent level, respectively.

⁷ And the variance of all subsequent variables.

This table applies a multiple comparison procedure to determine which means are significantly different from which others. It also shows the estimated difference between each pair of means. There are no statistically significant differences between any pre and post IFRSs adoption means at the 95.0% confidence level. The method currently being used to discriminate among the means is Fisher's least significant difference (LSD) procedure. With this method, there is a 5.0% risk of calling each pair of means significantly different when the actual difference equals 0.

For the variance analysis, as revealed by Cochran's C, Bartlett's and Levene's tests, the three statistics displayed in Table 6.6 test the null hypothesis that the standard deviations of ROE⁸ within each of the 2 levels of DUMMY PRE AND POST is the same. Of particular interest are the three *P*-values. Since the smallest of the *P*-values is less than 0.05, there is a statistically significant difference amongst the standard deviations at the 95.0% confidence level. This violates one of the important assumptions underlying the analysis of variance and will invalidate most of the standard statistical tests. Since the standard deviations differ by more than a factor 3 to 1 and the sample sizes are not equal, the *P*-values and significance levels of the tests may be off significantly.

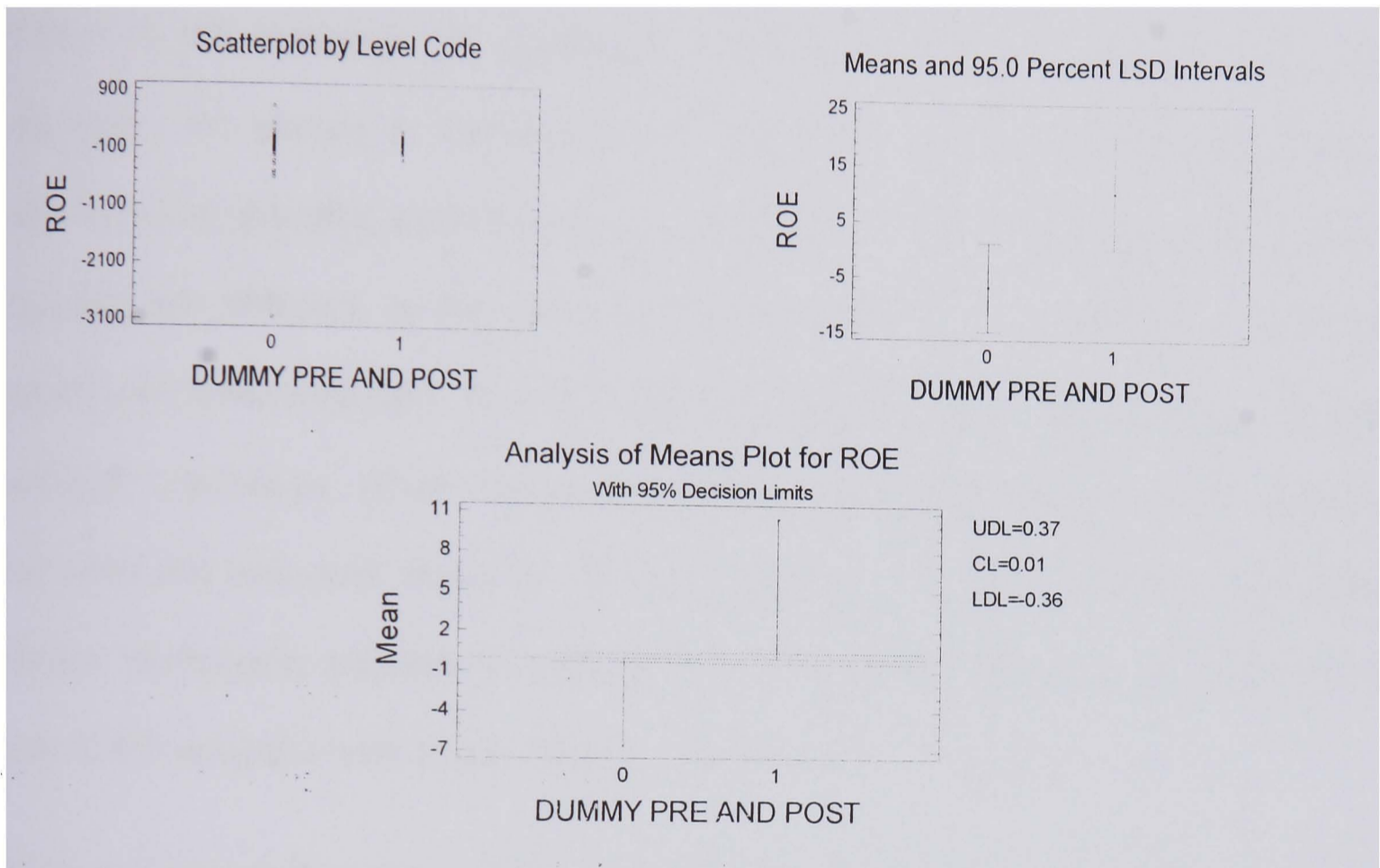
The Kruskal-Wallis test tests the null hypothesis that the medians of ROE⁹ within each of the 2 levels of DUMMY PRE AND POST are the same. The data from all the levels is first combined and ranked from smallest to largest. The average rank is then computed for the data at each level. Since the *P*-value is less than 0.05, there is a

⁸ And the same hypothesis for all subsequent variables.

⁹ And for all subsequent variables.

statistically significant difference amongst the medians at the 95.0% confidence level.

Figure 6.1: Scatter plot by level code, means and 95.0 percent LSD intervals and analysis of means plot for ROE



Notes:

Notation: ROE = return on equity; for this figure and subsequent figures 0 = Pre adoption, 1 = Post adoption.

Scatter-plot: observations shown.

Means and 95 Percent LSD Intervals: asterisks represent means, whiskers represent LSD intervals.

Analysis of Means Plot with 95% Decision Limits: CL = Central Limit (overall mean), UDL = Upper Decision Limit, LDL = Lower Decision Limit.

Differences between pre and post the adoption of IFRSs can also be observed in the graphical analysis in Figure 6.1. The Scatter-plot by Level Code illustrates a greater spread for category 0. Although the Means are different, the 95 Percent LSD Intervals for categories 0 and 1 slightly overlap. The Analysis of Means Plot With a

95% Decision Limit reveals that category 0 is close to the LDL and category 1 is close to the UDL.

6.4.1.2 Analysis of return on invested capital in Germany

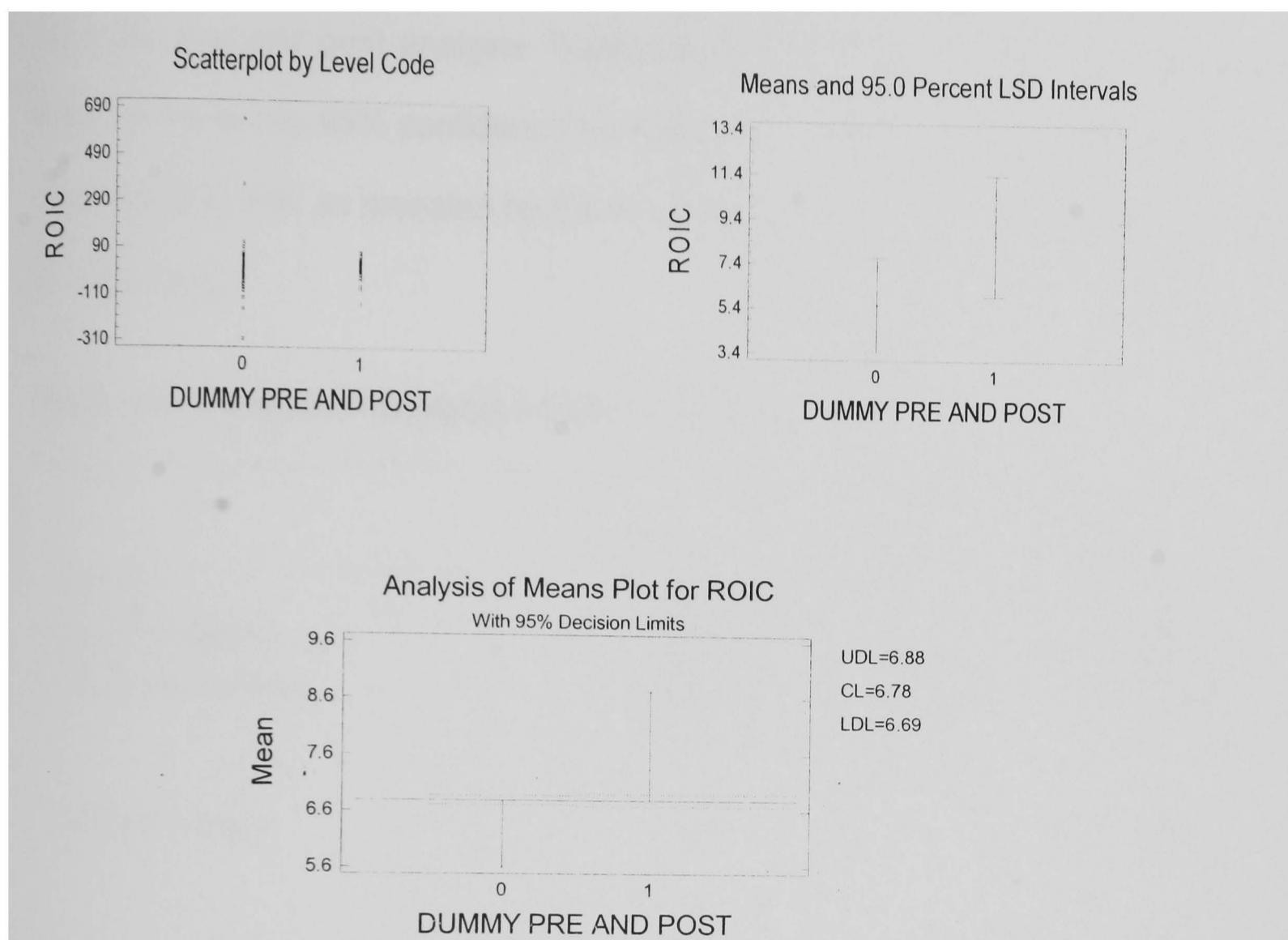
There is no evidence of significant differences between pre and post IFRSs adoption. As shown in Table 6.7, the ANOVA F-Ratio was 1.58. This was not significant at the 95% confidence level. Besides, both pre and post analysis are not significantly different at the 95% confidence level as revealed by Fisher's least significant difference test. The Cochran's C, Bartlett's and Levene's tests revealed unequal variances (there were statistically significant differences in variances between pre and post analysis). Moreover, the Kruskal-Wallis Median Test Statistic shows statistically significant differences at the 99% confidence level for pre and post IFRS adoption with a test Statistic of 21.46 (see Table 6.7).

Table 6.7: Statistical analysis for ROIC in Germany

	ROIC		
	Pre (0)	Post (1)	Overall
Count	501	307	808
Average (Mean)	5.6022	8.71459	6.78475
Standard deviation	41.3536	16.7949	34.1877
ANOVA F-Ratio	-	-	1.58
Fisher's least significant difference test: Pre (0) – Post (1)	-	-	-3.1124
Cochran's C Test:	-	-	0.85841***
Bartlett's Test:	-	-	1.35377***
Levene's Test:	-	-	4.23561**
Kruskal-Wallis Median Test Statistic:			
Average Rank	374.723	453.094	-
Test Statistic	-	-	21.4639***

** and ***denotes a statistically significant difference at 5 and 1 per cent level, respectively.

Figure 6.2: Scatter plot by level code, means and 95.0 percent LSD intervals and analysis of means plot for ROIC



Notes:

Notation: ROIC = return on invested capital.

The Scatter-plot by Level Code illustrates a narrower spread for category 1. Although the Means are different, the 95 Percent LSD Intervals for categories 0 and 1 do overlap. The Analysis of Means Plot With a 95% Decision Limit shows that category 0 is close to the LDL and category 1 is close to the UDL.

6.4.1.3 Analysis of debt to equity ratio in Germany

As summarised in Table 6.8, the ANOVA F-Ratio was 0.610. This was not significant at the 95% confidence level; and both pre and post IFRSs adoption analysis are not significantly different at the 95% confidence level as revealed by Fisher's least

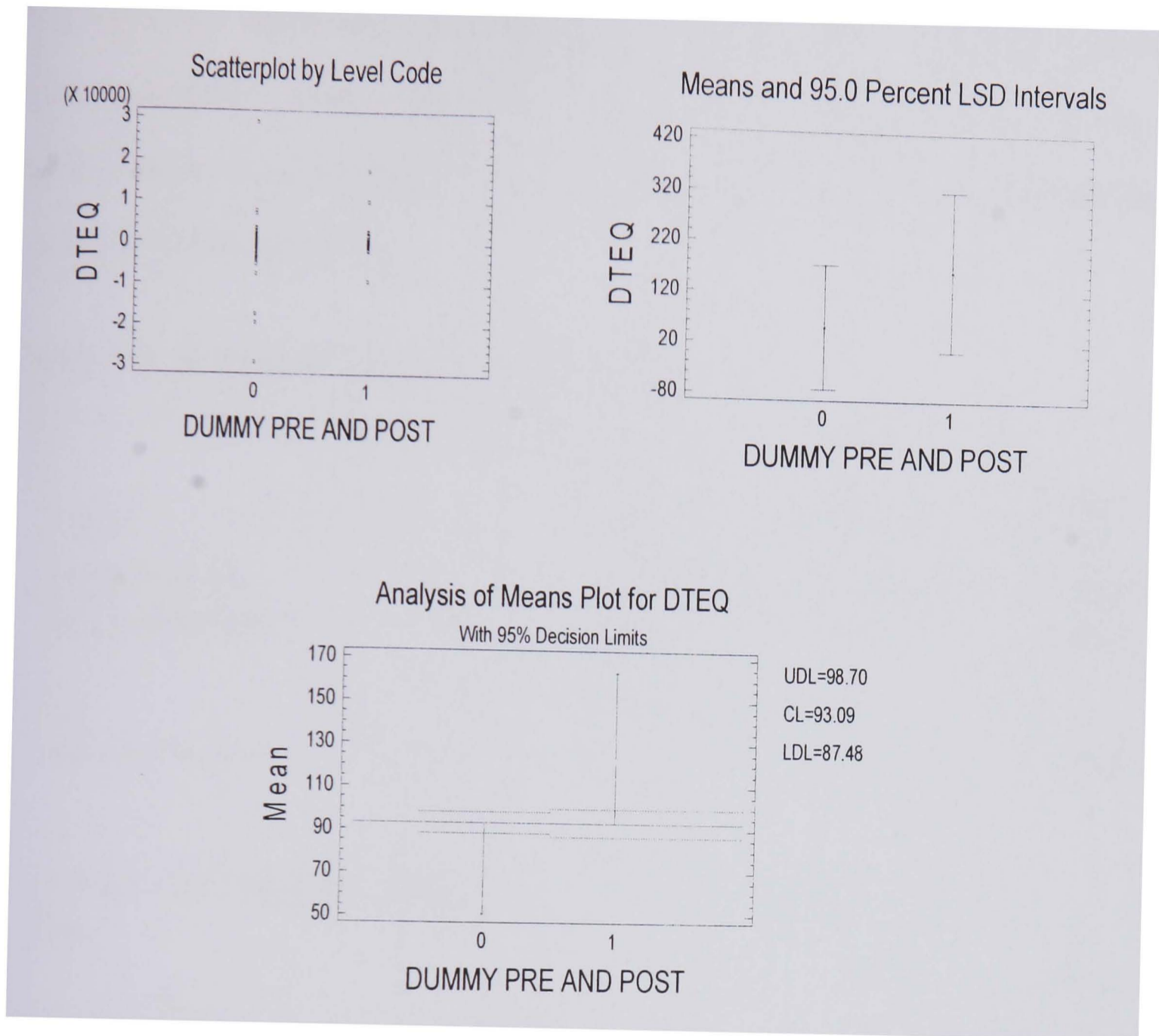
significant difference test. By contrast, the Cochran's C, Bartlett's and Levene's tests revealed unequal variances showed statistically significant differences in variances between pre and post analysis. Furthermore, there were no statistically significant differences at the 95% confidence level for pre and post IFRSs adoption with a test Statistic of 0.748, as revealed by the Kruskal-Wallis Median Test Statistic (as shown in Table 6.8).

Table 6.8: Statistical analysis for DTEQ in Germany

	DTEQ		
	Pre (0)	Post (1)	Overall
Count	512	310	822
Average (Mean)	50.535	163.376	93.0907
Standard deviation	2332.33	1318.81	2010.82
ANOVA F-Ratio	-	-	0.610
Fisher's least significant difference test:			
Pre (0) – Post (1)	-	-	-112.841
	-	-	0.75773***
Cochran's C Test:			
Bartlett's Test:	-	-	1.14283***
Levene's Test:	-	-	2.31476
Kruskal-Wallis Median Test Statistic:			
Average Rank	417.07	402.30	-
Test Statistic	-	-	0.747625

***denotes a statistically significant difference at 1 per cent level.

Figure 6.3: Scatter plot by level code, means and 95.0 percent LSD intervals and analysis of means plot for DTEQ



Notes:

Notation: DTEQ = debt to equity.

As shown in figure 6.3, a greater spread for category 0 is observed in the Scatterplot by Level Code. Nevertheless, the Means are different; the 95 Percent LSD Intervals for categories 0 and 1 do overlap. Category 0 is close to the LDL and category 1 is close to the UDL as shown by the Analysis of Means Plot with a 95% Decision Limit.

6.4.1.4 Analysis of current ratio in Germany

The ANOVA F-Ratio was 1.34, as shown in Table 6.9. This was not significant at the 95% confidence level. Also, there were no significantly different at the 95% confidence level as revealed by Fisher's least significant difference test, between pre and post IFRSs adoption.

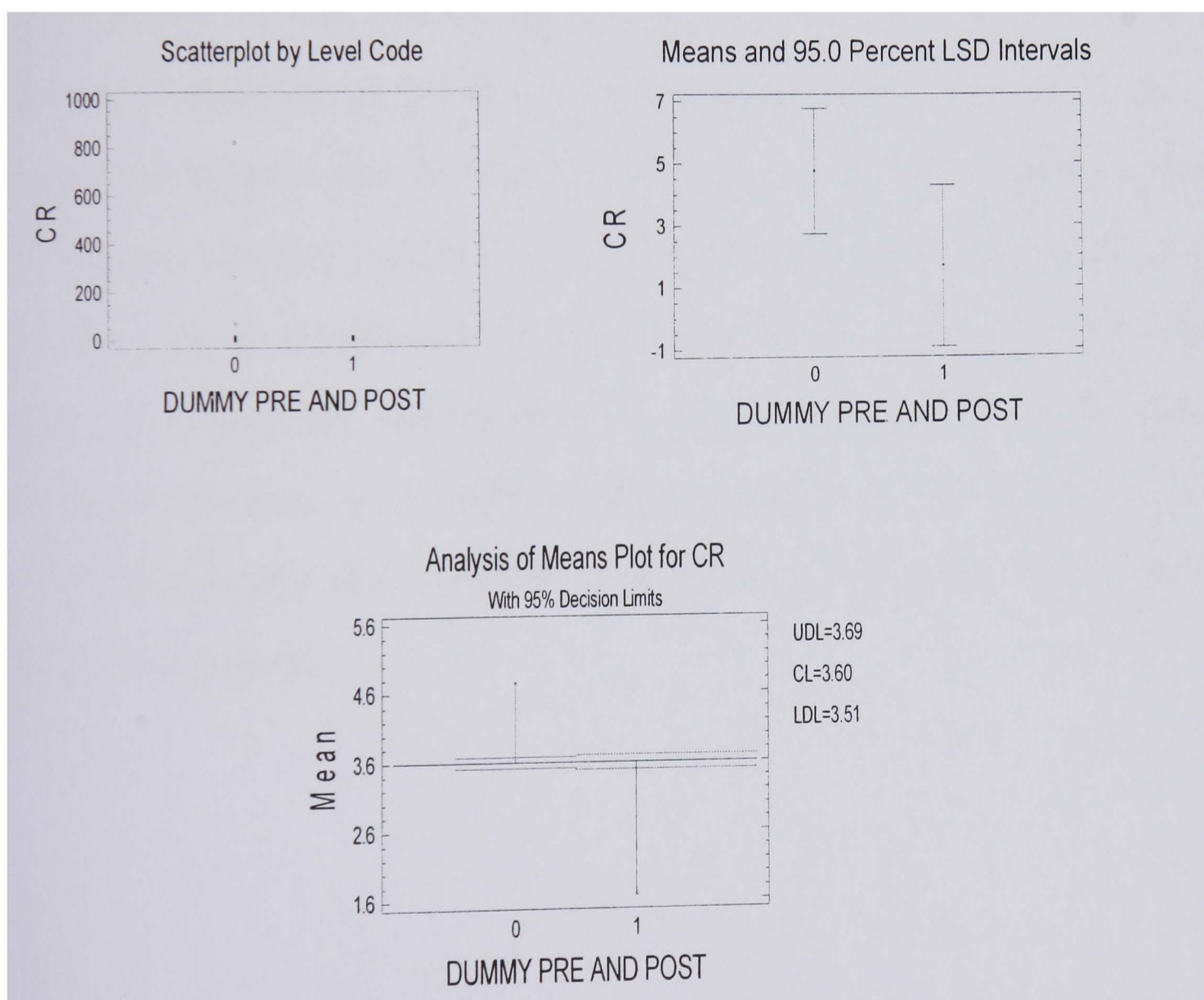
Table 6.9: Statistical analysis for CR in Germany

	CR		Overall
	Pre (0)	Post (1)	
Count	465	281	746
Average (Mean)	4.75576	1.68548	3.59926
Standard deviation	39.9547	1.33989	39.9547
ANOVA F-Ratio	-	-	1.33989
Fisher's least significant difference test:	-	-	3.07028
Pre (0) – Post (1)			
Cochran's C Test:	-	-	0.99888***
Bartlett's Test:	-	-	8.03670***
Levene's Test:	-	-	1.58166
Kruskal-Wallis Median Test Statistic:			
Average Rank	395.744	336.69	-
Test Statistic	-	-	13.1537***

***denotes a statistically significant difference at 1 per cent level.

Dissimilarity, there were statistically significant differences in variances between pre and post analysis as revealed by the Cochran's C and Bartlett's tests. Whilst, there were no statistically significant differences between them based on Levene's test. In addition, there were statistically significant differences at the 99% confidence level for the medians of the pre and post IFRSs adoption with a test Statistic of 13.15, as revealed by the Kruskal-Wallis Median Test Statistic (see Table 6.9).

Figure 6.4: Scatter plot by level code, means and 95.0 percent LSD intervals and analysis of means plot for CR



Notes:

Notation: CR = current ratio.

Figure 6.4 shows almost no spread for category 1 compared with a great spread for category 0, as observed by the Scatter-plot by Level Code. Nevertheless, the Means are different; the 95 Percent LSD Intervals for categories 0 and 1 do overlap. Category 0 is close to the UDL and category 1 is close to the LDL as shown by the Analysis of Means Plot with a 95% Decision Limit.

6.4.1.5 Analysis of operating profit ratio in Germany

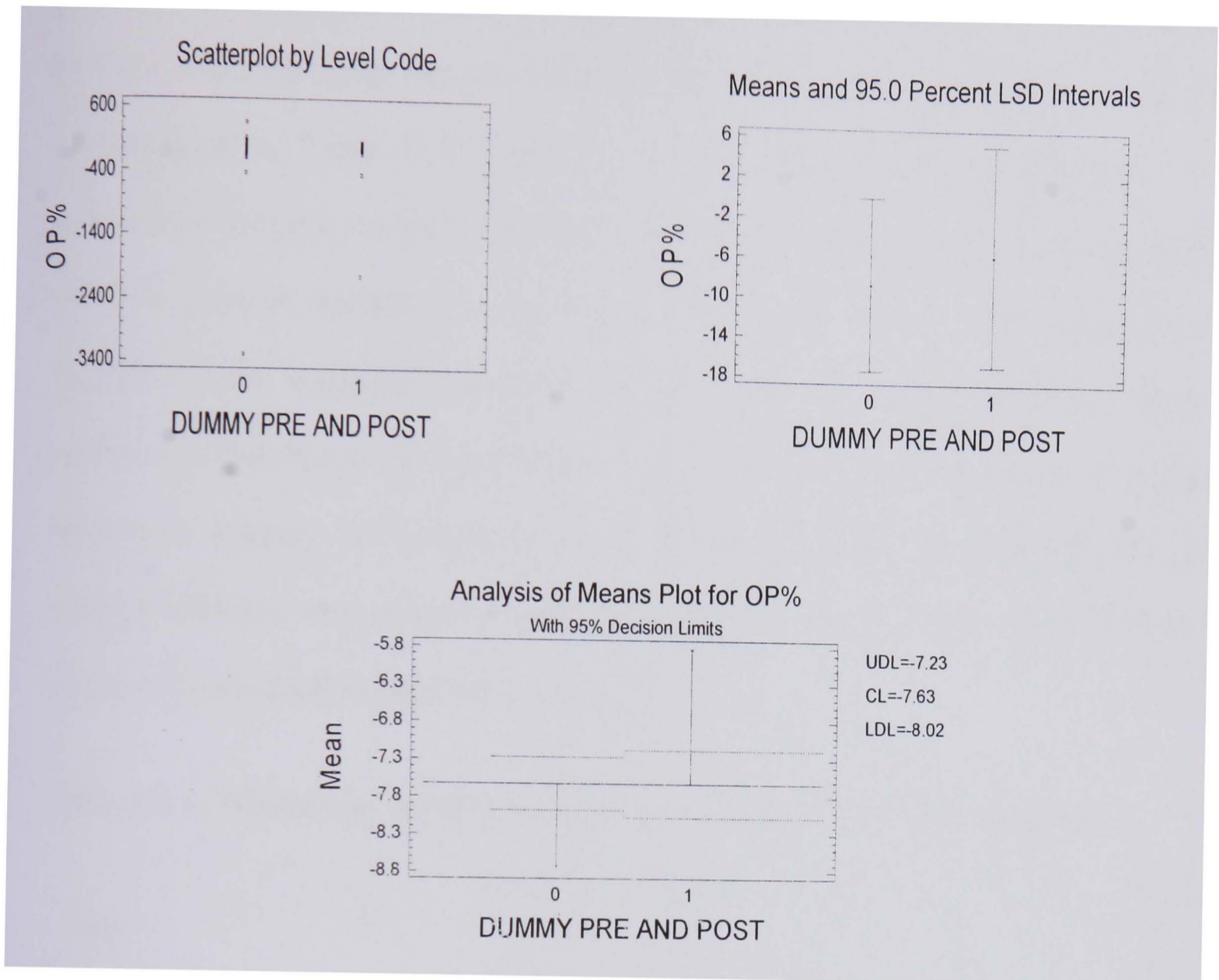
Finally, the ANOVA F-Ratio was 0.080 for OP%, as shown in Table 6.10, which was not significant at the 95% confidence level. Also, there were no statistically significant differences at the 95% confidence level as revealed by Fisher's least significant difference test. By contrast, there were statistically significant differences in variances between pre and post analysis as revealed by the Cochran's C and Bartlett's tests. But, there were no statistically significant differences between them based on Levene's test. Additionally, as shown in Table 6.10, there were statistically significant differences at the 99% confidence level for the medians of the pre and post IFRSs adoption with a test Statistic of 36.38, as revealed by the Kruskal-Wallis Median Test Statistic.

Table 6.10: Statistical analysis for OP% in Germany

	OP%		
	Pre (0)	Post (1)	Overall
Count	510	311	821
Average (Mean)	-8.72067	-5.8345	-7.62737
Standard deviation	150.489	123.623	140.845
ANOVA F-Ratio	-	-	0.080
Fisher's least significant difference test:			
Pre (0) – Post (1)	-	-	-2.88617
Cochran's C Test:	-	-	0.59708***
Bartlett's Test:	-	-	1.01768***
Levene's Test:	-	-	0.01335
Kruskal-Wallis Median Test Statistic:			
Average Rank	372.017	474.928	-
Test Statistic	-	-	36.3813***

***denotes a statistically significant difference at 1per cent level.

Figure 6.5: Scatter plot by level code, means and 95.0 percent LSD intervals and analysis of means plot for OP%



Notes:

Notation: OP% = operating profit ratio.

Differences between pre and post the adoption of IFRS can also be observed in the graphical analysis in Figure 6.5. The Scatter-plot by Level Code illustrates a greater spread for category 0. Although the Means are different, the 95 Percent LSD Intervals for categories 0 and 1 do overlap. The Analysis of Means Plot With a 95% Decision Limit reveals that category 0 is close to the LDL and category 1 is close to the UDL.

6.4.2 Analysis of performance measures in the UK

For the sake of comparability, the same five performance measures previously used with the German data set are used for the UK data set, the results of which are summarised in Table 6.11 below. It can be observed that there was a clear improvement in the mean ROE following IFRSs adoption, although not significant at the 90% level of confidence (see the ANOVA test in Table 6.11). There was also a reduction in the standard deviation of ROE, which was significant at the 95% level of confidence (see Cochran's test in Table 6.11). The significant difference in standard deviations violates an assumption behind ANOVA and so Kruskal-Wallis test is adopted instead, and reveals a significant difference in the median ROE at the 95% confidence level following IFRSs adoption.

Table 6.11: Statistical results of ANOVA analysis in the UK data-set

	ROE	ROIC	DTEQ	CR	OP%
Mean					
Pre	2.163	3.476	84.468	2.253	-115.674
Post	12.062	9.437	56.282	2.184	-757.631
Standard deviation					
Pre	134.245	50.473	1057.740	3.486	1232.19
Post	120.930	35.006	292.401	3.484	12893.80
ANOVA					
F-Ratio	1.43	4.42	0.28	0.09	1.60
P-Value	0.232	0.036	0.595	0.759	0.2054
Cochran's Test P-Value	0.019	<0.05	<0.05	0.989	<0.05
Bartlett's Test P-Value	0.022	<0.05	<0.05	0.989	<0.05
Levene's Test P-Value	0.498	0.418	0.012	0.706	0.201
Kruskal-Wallis test					
P-Value	<0.05	<0.05	0.656	0.731	0.000

Table 6.11 also reveals that the ANOVA F-ratio for DTEQ; CR; OP% is not statistically significant, but it is statistically significant for ROIC. This concludes that the adoption of IFRSs makes no difference with regard to these three variables, but it does make difference for the ROIC. There was also a reduction in the standard deviation of all these variables, which was significant at the 95% level of confidence, except for the CR (see Cochran's test in Table 6.11). The significant difference in standard deviations violates an assumption behind ANOVA and so Kruskal-Wallis test is adopted instead, and reveals significant difference in the median for all two variables, namely ROIC and OP% and not significant for the other two variables, namely DTEQ and CR, following IFRSs adoption.

6.4.2.1 Analysis of return on equity in the UK

The ANOVA table decomposes the variance of ROE into two components: a between-group component and a within-group component. The F-ratio, which in this case equals 1.42619, is a ratio of the between-group estimate to the within-group estimate. Since the *P*-value of the F-test is greater than or equal to 0.05, there is not a statistically significant difference between the mean ROE from one level of DUMMY PRE AND POST to another at the 95.0% confidence level.

This table applies a multiple comparison procedure to determine which means are significantly different from which others. The Fisher's least significant difference test shows the estimated difference between each pair of means. There are no statistically significant differences between pre and post IFRSs adoption of means at the 95.0% confidence level.

The three statistics, namely Cochran's C Test, Bartlett's Test and Levene's Test displayed in Table 6.12 test the null hypothesis that the standard deviations of ROE within each of the two levels of DUMMY PRE AND POST are the same. Of particular interest are the three *P*-values. Since the smallest of the *P*-values is less than 0.05, there is a statistically significant difference amongst the standard deviations at the 95.0% confidence level. This violates one of the important assumptions underlying the analysis of variance.

Therefore, the Kruskal-Wallis test tests the null hypothesis that the medians of ROE within each of the two levels of DUMMY PRE AND POST are the same. The data from all the levels is first combined and ranked from smallest to largest. The average rank is then computed for the data at each level. Since the *P*-value is less than 0.05, there is a statistically significant difference amongst the medians at the 95.0% confidence level.

Table 6.12: Statistical analysis for ROE in the UK

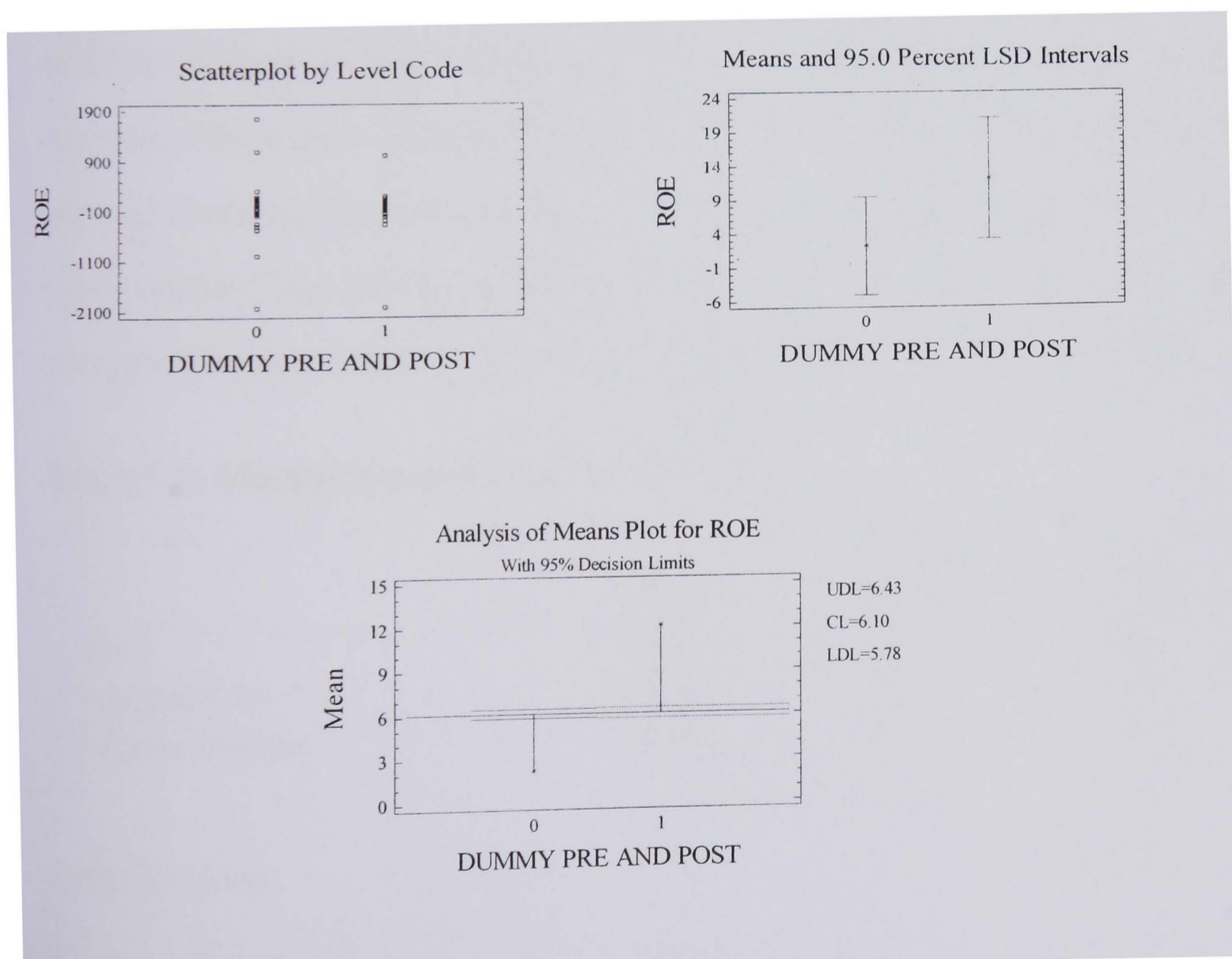
	ROE		
	Pre (0)	Post (1)	Overall
Count	614	404	1018
Average (Mean)	2.18327	12.0621	6.10376
Standard deviation	134.245	120.93	129.155
ANOVA F-Ratio	-	-	1.430
Fisher's least significant difference test(1): Pre (0) – Post (1)	-	-	-9.87886
Cochran's C Test:	-	-	0.55204**
Bartlett's Test:	-	-	1.00515**
Levene's Test:	-	-	0.45883
Kruskal-Wallis Median Test Statistic:			
Average Rank	454.963	592.385	-
Test Statistic	-	-	53.2318***

** and ***denotes a statistically significant difference at 5 and 1 per cent level, respectively.

(1)The method currently being used to discriminate among the means is Fisher's least significant difference (LSD) procedure. With this method, there is a 5.0% risk of calling each pair of means significantly different when the actual difference equals 0.

For the UK there was also an improvement in the mean ROE following IFRSs adoption, although this was not significant at the chosen levels (95% and 99%) of confidence. There was also a reduction in the standard deviation of ROE which was significant at the 95% level of confidence, again violating an ANOVA assumption of equal variances. However, the Kruskal-Wallis test reveals a significant difference in medians at the 99% level of confidence.

Figure 6.6: Scatter plot by level code, means and 95.0 percent LSD intervals and analysis of means plot for ROE



Notes:

Notation: ROE = return on equity.

Differences between pre and post the adoption of IFRSs can also be observed in the graphical analysis in Figure 6.6. The Scatter-plot by Level Code illustrates a greater spread for category 0. The Means are not different, and the 95 Percent LSD Intervals for categories 0 and 1 overlap. The Analysis of Means Plot With a 95% Decision Limit reveals that category 0 is close to the LDL and category 1 is close to the UDL.

6.4.2.2 Analysis of return on invested capital in the UK

There is evidence of significant differences between pre IFRSs and post IFRSs adoption. As it shown in Table 6.13, the ANOVA F-Ratio was 4.42. This was significant at the 95% confidence level. Besides, both pre and post analysis are significantly different at the 95% confidence level as revealed by Fisher's least significant difference test. The Cochran's C / Bartlett's tests revealed unequal variances (there were statistically significant differences in variances between pre and post analysis). This was not the case for Levene's Test. Moreover, the Kruskal-Wallis Median Test Statistic shows statistically significant differences at the 99% confidence level for pre and post IFRSs adoption with a test Statistic of 51.1263.

Table 6.13: Statistical analysis for ROIC in the UK

	ROIC		
	Pre (0)	Post (1)	Overall
Count	651	414	1065
Average (Mean)	3.47627	9.43729	5.79351
Standard deviation	50.4728	35.0058	45.1705
ANOVA F-Ratio	-	-	4.42**

Fisher's least significant difference test:

Pre (0) – Post (1) - - -5.96103**

Cochran's C Test: - - 0.67521***

Bartlett's Test: - - 1.06093***

Levene's Test: - - 0.65469

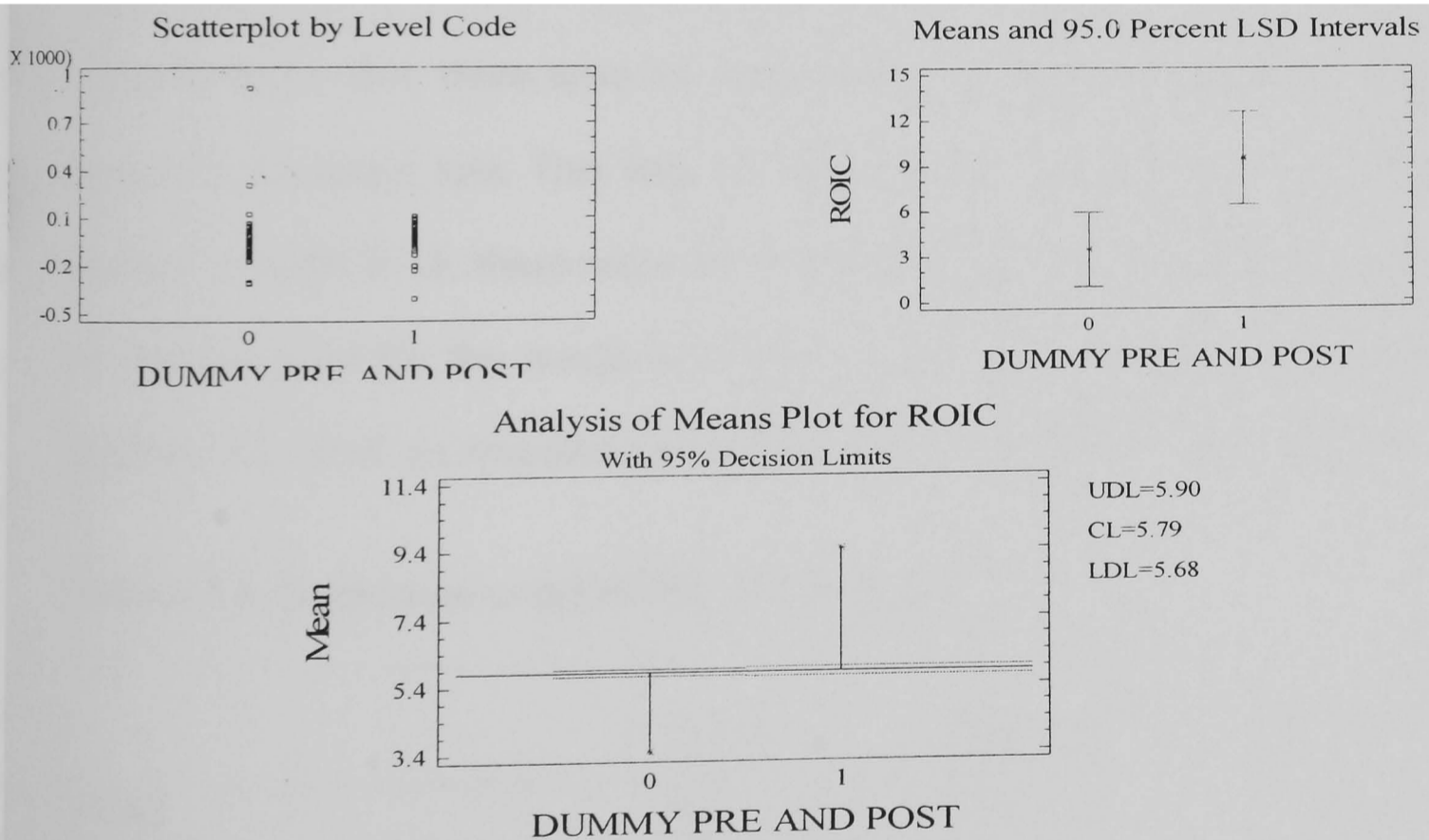
Kruskal-Wallis Median Test Statistic:

Average Rank 479.257 617.508

Test Statistic - - 51.1263***

** and ***denotes a statistically significant difference at 5 and 1 per cent level, respectively.

Figure 6.7: Scatter plot by level code, means and 95.0 percent LSD intervals and analysis of means plot for ROIC



Notes:

Notation: ROIC = return on invested capital.

Figure 6.7 shows little spread for category 1 compared with a great spread for category 0, as observed by the Scatter-plot by Level Code. Nevertheless, the Means are different; the 95 Percent LSD Intervals for categories 0 and 1 do not overlap. Category 0 is close to the LDL and category 1 is close to the UDL as shown by the Analysis of Means Plot with a 95% Decision Limit.

6.4.2.3 Analysis of debt to equity in the UK

The ANOVA F-Ratio was 0.28 for DTEQ, as shown in Table 6.14, which was not significant at the 95% confidence level. Also, there were no statistically significant differences at the 95% confidence level as revealed by Fisher's least significant difference test. By contrast, there were statistically significant differences in variances between pre and post analysis as revealed by the Cochran's C and Bartlett's tests. But, there were no statistically significant differences between them based on Levene's test. This was not the case for Levene's Test. Additionally, as shown in Table 6.14; there were no statistically significant differences at the 99% confidence level for the medians of the pre and post IFRSs adoption with a test Statistic of 0.1918, as revealed by the Kruskal-Wallis Median Test Statistic.

Table 6.14: Statistical analysis for DTEQ in the UK

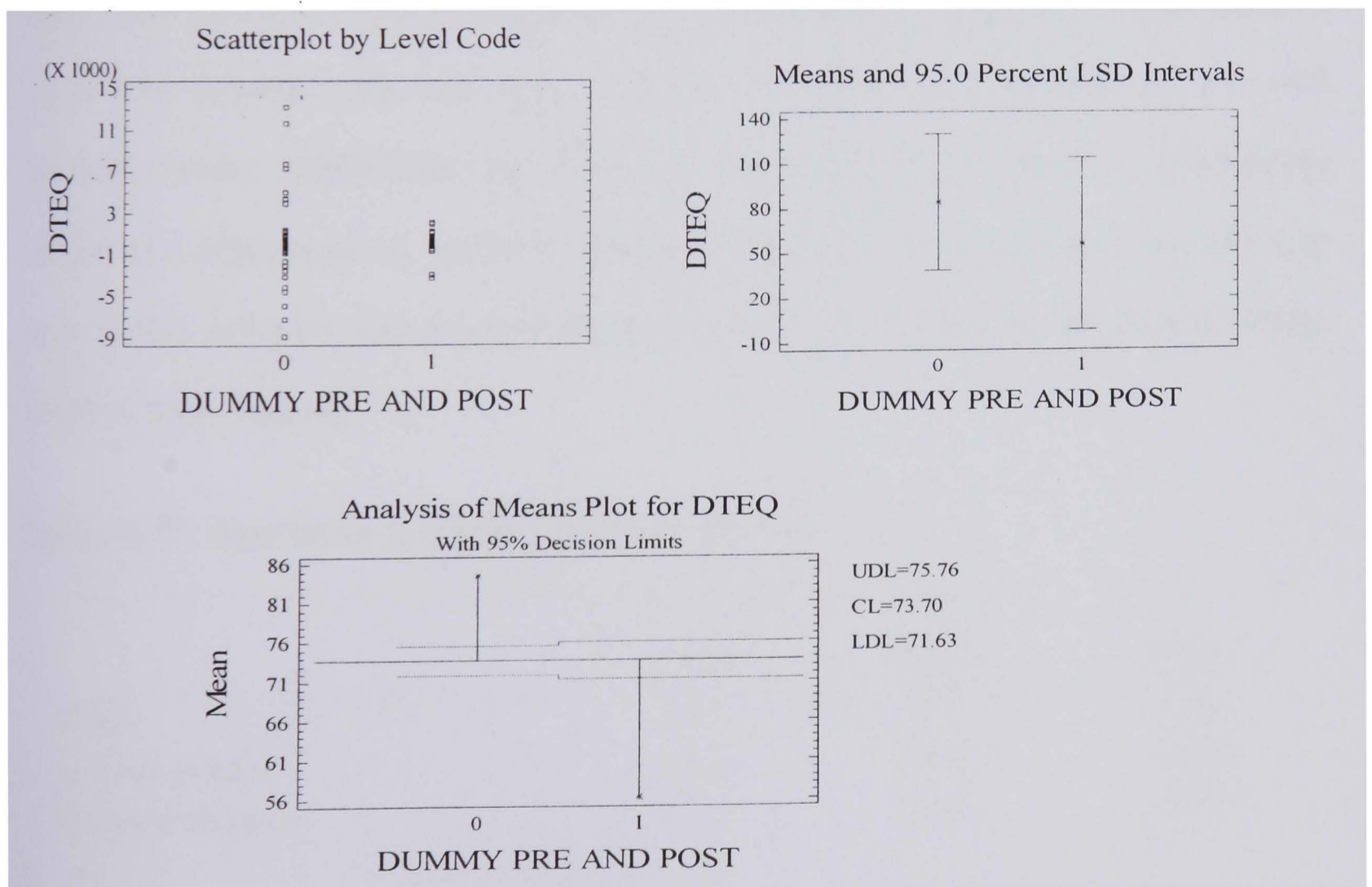
	DTEQ		
	Pre (0)	Post (1)	Overall
Count	674	417	1091
Average (Mean)	84.4682	56.2822	73.695
Standard deviation	1057.74	292.401	850.651
ANOVA F-Ratio	-	-	0.28

Fisher's least significant difference test:

Pre (0) – Post (1)	-	-	28.186
Cochran's C Test:	-	-	0.92901***
Bartlett's Test:	-	-	1.72843***
Levene's Test:	-	-	13.0857
Kruskal-Wallis Median Test Statistic:			
Average Rank	549.334	540.612	-
Test Statistic	-	-	0.197819

***denotes a statistically significant difference at 1 per cent level.

Figure 6.8: Scatter plot by level code, means and 95.0 percent LSD intervals and analysis of means plot for DTEQ



Notes:

Notation: DTEQ = debt to equity.

Differences between pre and post the adoption of IFRSs can also be observed in the graphical analysis in Figure 6.8. The Scatter-plot by Level Code illustrates a greater spread for category 0. Although the Means are not different, the 95 Percent LSD Intervals for categories 0 and 1 do overlap. The Analysis of Means Plot With a 95% Decision Limit reveals that category 0 is close to the UDL and category 1 is close to the LDL.

6.4.2.4 Analysis of current ratio in the UK

Furthermore, the ANOVA F-Ratio was 0.090 for CR, as shown in Table 6.15, which was not significant at the 95% confidence level. Also, there were no statistically significant differences at the 95% confidence level as revealed by Fisher's least significant difference test. Also, there were no statistically significant differences in variances between pre and post analysis as revealed by the Cochran's C and Bartlett's tests. Additionally, as shown in Table 6.15, there were no statistically significant differences at the 95% confidence level for the medians of the pre and post IFRSs adoption with a test Statistic of 0.1182, as revealed by the Kruskal-Wallis Median Test Statistic.

Table 6.15: Statistical analysis for CR in the UK

	CR		
	Pre (0)	Post (1)	Overall
Count	634	393	1027
Average (Mean)	2.25301	2.1843	2.22672
Standard deviation	3.48604	3.48386	3.48367
ANOVA F-Ratio	-	-	0.090

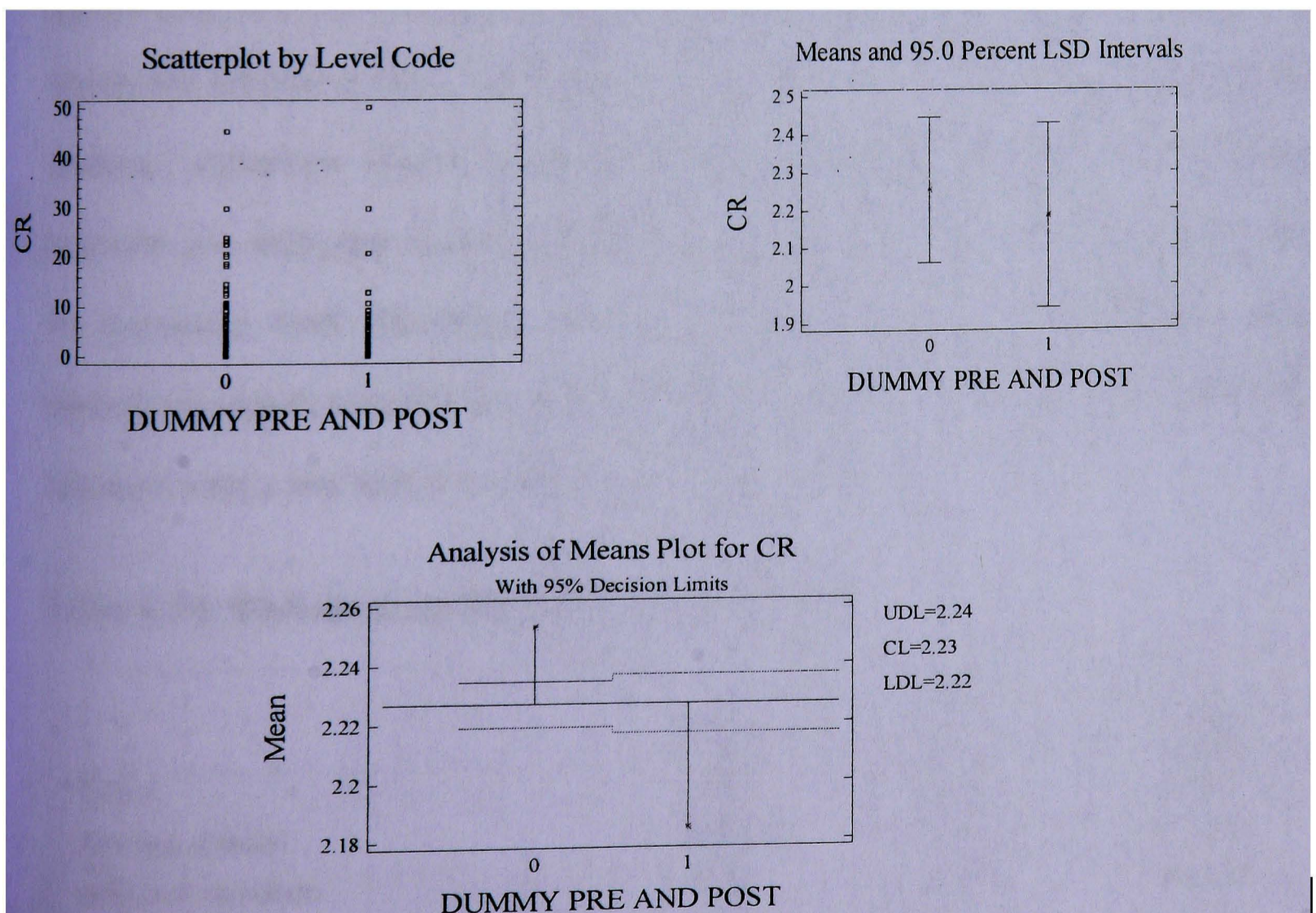
Fisher's least significant difference test:

Pre (0) – Post (1)	-	-	0.0687124
Cochran's C Test:	-	-	0.5003
Bartlett's Test:	-	-	1.0000
Levene's Test:	-	-	0.1425

Kruskal-Wallis Median Test Statistic:

Average Rank	511.494	518.042	-
Test Statistic	-	-	0.118221

Figure 6.9: Scatter plot by level code, means and 95.0 percent LSD intervals and analysis of means plot for CR



Notes:

Notation: CR = current ratio.

Results can be supported by the graphical analysis in Figure 6.9, for the differences between pre and post the adoption of IFRSs. The Scatter-plot by Level Code illustrates almost a similar spread for category 0 and 1. The Means are not different, and the 95 Percent LSD Intervals for categories 0 and 1 do overlap. The Analysis of Means Plot With a 95% Decision Limit reveals that category 0 is close to the UDL and category 1 is close to the LDL.

6.4.2.5 Analysis of operating profit percentage in the UK

There is no evidence of significant differences between pre and post IFRSs adoption. As shown in Table 6.16, the ANOVA F-Ratio was 1.60. This was not significant at the 95% confidence level. Besides, both pre and post analysis are not significantly different at the 95% confidence level as revealed by Fisher's least significant difference test. The Cochran's C, Bartlett's and Levene's tests revealed unequal variances (there were statistically significant differences in variances between pre and post analysis at the 99% confidence level). This was not the case for Levene's Test. Moreover, the Kruskal-Wallis Median Test Statistic shows statistically significant differences at the 99% confidence level for pre and post IFRSs adoption with a test Statistic of 16.11 (see Table 6.16).

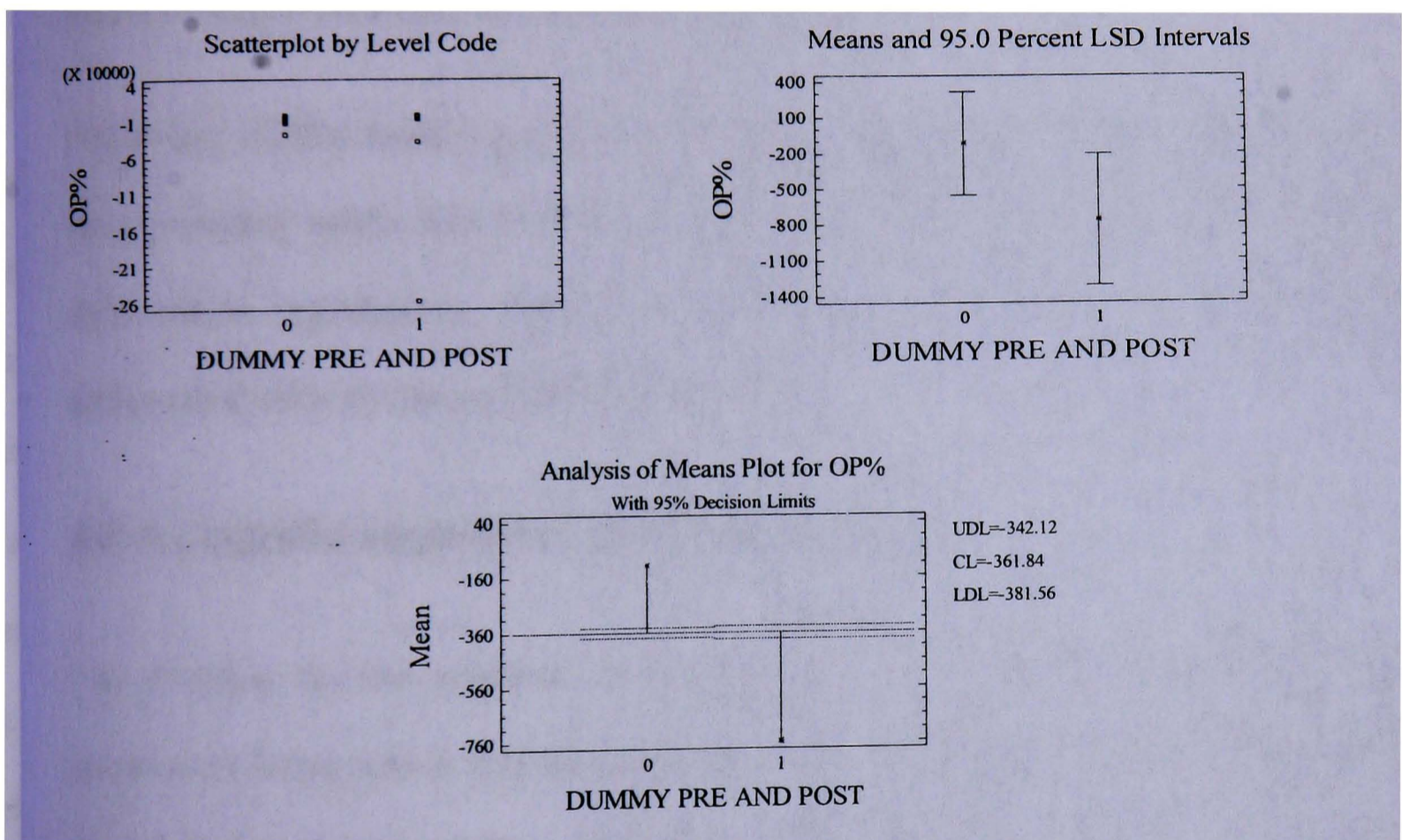
Table 6.16: Statistical analysis for OP% in the UK

	OP%		
	Pre (0)	Post (1)	Overall
Count	656	408	1064
Average (Mean)	-115.674	-757.631	-361.838
Standard deviation	1232.49	12893.8	8042.83
ANOVA F-Ratio	-	-	1.600
Fisher's least significant difference test: Pre (0) – Post (1)	-	-	641.957

Cochran's C Test:	-	-	0.99095***
Bartlett's Test:	-	-	7.03893***
Levene's Test:	-	-	1.63385
Kruskal-Wallis Median Test Statistic:			
Average Rank	502.684	580.439	-
Test Statistic	-	-	16.105***

***denotes a statistically significant difference at 1 per cent level.

Figure 6.10: Scatter plot by level code, means and 95.0 percent LSD intervals and analysis of means plot for OP%



Notes:

Notation: OP% = operating profit percentage.

Differences in the OP% can be also observed from the graphical analysis in Figure 6.10. The Scatter-plot by Level Code illustrates a much narrower spread for category 0. Although the Means are different, the 95 Percent LSD Intervals for categories 0 and 1 are overlap. The Analysis of Means Plot With a 95% Decision Limit shows that category 0 is close to the UDL and category 1 is close to the LDL.

6.4.3 Comparing the results (Germany versus UK)

From the preceding analysis, it can be seen that the profitability for Germany in terms of mean ROE significantly improved following IFRSs adoption.

Correspondingly, the profitability for the UK in terms of mean ROIC has significantly improved following IFRSs adoption. In each case the standard deviation of these profitability measures significantly decreased. Also the medians of these profitability measures (pre-post) were each significantly different.

Following IFRSs there were no significant changes in the mean debt ratios, the mean current ratios and the mean OP%. However, the standard deviations of the debt ratios significantly reduced for the UK and Germany (for other significant differences refer to the earlier discussions)

6.4.4 Logistic regression analysis results

The *P*-value for the analysis of deviance of the model is significant at the 99% confidence level, which indicates that there are some significant differences between the financial characteristics of German and UK firms before the introduction of IFRSs, as revealed in Table 6.17. The *P*-values for the likelihood ratio tests, however, show insignificant differences in profitability, namely ROE and ROIC. There is a weak significant difference in the debt to equity ratios between the two countries, i.e. the *P*-value is significant only at the 90% confidence level. The *P*-value for both the current ratio and the OP% are significant at the 99% level of confidence.

Table 6.17: Logistic regression (Pre adoption) (Germany = 0, UK = 1)

Parameter	Estimate	Likelihood Ratio Tests		AOD*
		Chi Square	<i>P</i> -Value	<i>P</i> -Value
Constant	0.463	—	—	—
CR	-0.083	12.525	0.0004	—
DTEQ	-0.000	3.158	0.0756	—
OP%	-0.001	12.280	0.0005	—
ROE	0.000	1.800	0.1797	—
ROIC	-0.001	0.052	0.8195	—
Model	—	—	—	0.0000

*For this table and subsequent tables AOD = analysis of deviance

The signs of the estimates for the coefficients of the parameters and their respective *P*-values indicate that during the period of pre-IFRSs adoption UK companies are more likely to be characterised by the following significant features: a lower current ratio and a lower operating profit %.

As to post IFRSs adoption (see Table 6.18), the *P*-value for the analysis of deviance of the model is again significant at the 99% confidence level, which indicates that there are some significant differences between the financial characteristics of German and UK firms after the introduction of IFRSs, as shown in Table 6.18. The *P*-values for the likelihood ratio tests, however, show insignificant differences for the current ratio, ROE and OP%. There is a very strong significant difference in the debt to equity ratios between the two countries, i.e. the *P*-value is significant at the 99% confidence level; the *P*-value for ROIC is strongly significant at the 95% level of confidence.

Table 6.18: Logistic regression (post adoption) (Germany = 0, UK = 1)

Parameter	Estimate	Likelihood Ratio Tests		AOD
		Chi Square	P-Value	P-Value
Constant	0.134	—	—	—
CR	0.086	-1.358	1.0000	—
DTEQ	-0.000	8.572	0.0034	—
OP%	-0.000	1.006	0.3158	—
ROE	-0.001	0.436	0.5092	—
ROIC	0.008	5.420	0.0199	—
Model	—	—	—	0.0070

The signs of the estimates for the coefficients of the parameters indicate that during the period of post-IFRSs adoption UK companies are more likely to be characterised by the following features:

A higher current ratio (although not significant), a lower debt to equity ratio, a lower operating profit % (although not significant), a lower return on equity (although not significant) and a higher ROIC.

The question which now presents itself is whether the application of IFRSs has resulted in a shift in the values of the performance measures. For this purpose a logistic regression is performed, as set out in Table 6.19. The *P*-value (0.0000) of the models' Analysis of Deviance indicates that overall the model is very significant. The likelihood ratio tests reveal that CR is significant at the 99 per cent confidence level, and the estimate for the coefficient shows that it is negative. Thus, there has been a significant decrease in the CR following IFRSs adoption in Germany. Conversely, the ROIC is positively significant at the 99 per cent level of confidence. This indicates that the adoption of IFRSs has resulted in a dramatic upward shift in ROIC. The other variables in the model are not significant at the selected confidence levels. This

indicates that IFRSs adoption has had an insignificant impact upon DTEQ, OP% and ROE.

Table 6.19: Logistic regression comparing Pre (0) and Post (1) IFRSs for Germany data-set

Parameter	Estimate	Likelihood Ratio Tests		AOD
		Chi Square	P-Value	P-Value
Constant	-0.1402	—	—	—
CR	-0.2445	12.525	0.0000	—
DTEQ	-0.0000	0.0028	0.9577	—
OP%	-0.0006	0.1509	0.6976	—
ROE	0.0011	0.4154	0.5192	—
ROIC	0.0223	7.3539	0.0067	—
Model	—	—	—	0.0000

Following the same approach, but for the UK data-set, the *P*-value (0.0000) of the models' Analysis of Deviance indicates that overall the model is very significant. The likelihood ratio tests reveal that ROIC is significant at the 99 per cent confidence level, and the estimate for the coefficient shows that it is positive. Thus, there has been a significant increase in the ROIC following IFRSs adoption in the UK. Conversely, the OP% is negatively significant at the 99 per cent level of confidence. This indicates that the adoption of IFRSs has resulted in a dramatic downward shift in OP%. The other variables in the model are not significant at the selected confidence levels. This indicates that IFRSs adoption has had an insignificant impact upon CR, DTEQ, and ROE.

Table 6.20: Logistic regression comparing Pre (0) and Post (1) IFRSs for the UK data-set

Parameter	Estimate	Likelihood Ratio Tests		AOD
		Chi Square	P-Value	P-Value
Constant	-0.5247	-	—	—
CR	0.0038	0.0170	0.8960	—
DTEQ	-0.0003	2.1027	0.1470	—
OP%	-0.0000	6.6844	0.0097	—
ROE	-0.0008	1.4131	0.2345	—
ROIC	0.0163	22.772	0.0000	—
Model	—	—	—	0.0000

It has thus been observed that ROIC significantly improved as a result of the adoption of IFRSs in both Germany and the UK, and even more so in the UK. Some other variables were affected differently. For example, in Germany the CR significantly decreased, whilst in the UK the OP% significantly decreased.

6.4.5 Multinomial logistic regression results

The following section summarises the results of adopting the multinomial logistic regression model to the two data sets for the two different eras of pre and post-IFRSs adoption, taking German GAAP as a reference category at one time and UK GAAP as a reference category at another time.

6.4.5.1 German GAAP as a reference category

Using multinomial logistic regression with Germany as a reference category (see Table 6.21), it can be seen that German GAAP is significantly different from UK GAAP with respect to DTEQ (at the 90% confidence level), the CR (at the 99% confidence level) and the OP% (at the 95% confidence level).

Table 6.21: Multinomial logistic regression taking German GAAP as a reference category

Categories		Regression coefficient	St. Error	Wald	Degrees of freedom	Significance
Variables				Chi-square		
IFRS for Germany	intercept	-.252	.127	3.949	1	.047
	ROE	.000	.001	.176	1	.675
	ROIC	.013	.005	7.126	1	.008
	DTEQ	.000	.000	.001	1	.971
	CR	-.148	.049	9.002	1	.003
	OP%	.000	.001	.267	1	.605
UK GAAP	intercept	.471	.094	25.104	1	.000
	ROE	.001	.001	1.538	1	.215
	ROIC	.000	.003	.010	1	.921
	DTEQ	.000	.000	3.163	1	.075
	CR	-.085	.030	8.018	1	.005
	OP%	-.001	.000	6.554	1	.010
IFRS for UK	intercept	-.096	.112	.746	1	.388
	ROE	.000	.001	.012	1	.911
	ROIC	.020	.004	22.258	1	.000
	DTEQ	.000	.000	4.179	1	.041
	CR	-.085	.035	5.926	1	.015
	OP%	-.001	.000	6.930	1	.008
Final model: likelihood ratio test		—	—	89.658 (Chi-square)	15	.000

Compared with German GAAP, the UK GAAP exhibits greater DTEQ ratio, a lower CR and a lower OP%. Following IFRSs adoption in Germany, compared with German GAAP, there is evidence of a higher ROIC (significant at the 99% confidence level) and a lower CR (significant at the 99% confidence level).

These effects are not confined to Germany because under IFRS for the UK, ROIC is significantly higher at the 99% confidence level and the CR is significantly lower at the 95% confidence level compared with German GAAP.

Also under IFRSs for the UK, there is a higher DTEQ ratio significant at the 95% confidence level and a lower OP% significant at the 99% confidence level. However, these two features (DTEQ and OP%) were also found under UK GAAP (compared with German GAAP) and so they represent key factors distinguishing the UK from Germany irrespective of the influence of the change in accounting standards followed.

6.4.5.2 UK GAAP as a reference category

Comparisons between UK GAAP and German GAAP have already been made, so it is not surprising that DTEQ, CR and OP% distinguish German GAAP from the UK GAAP, with higher values of these items in Germany than in the UK (see Table 6.22).

Regarding IFRSs in the UK, there is a significant increase in ROIC at the 99% confidence level. The same holds for IFRSs in Germany compared with the UK as a reference point. So clearly this increase relates to IFRSs adoption. By contrast, although the DTEQ is higher in Germany under IFRSs compared with UK GAAP as

a reference point, the same feature was also existent under German GAAP compared with UK GAAP. It follows that the differential DTEQ is not related to IFRSs adoption and that it is arguably related to the stronger reliance on the stock market in the UK and less reliance on the banking (credit) system in Germany. So, it would be expected that the DTEQ ratio is higher in Germany than in the UK.

Using the UK GAAP as a reference point, the results reveal that the significant difference in the CR and OP% under German GAAP disappears under IFRSs. The CR and OP% are not distinguishing features between UK GAAP and IFRSs, whether in the UK or Germany. It follows that the CR and OP% arise from the features of German GAAP.

Table 6.22: Multinomial logistic regression taking UK GAAP as a reference category

Categories		Regression coefficient	St. Error	Wald	Degrees of freedom	Significance
Variables				Chi-square		
IFRS for Germany	intercept	-.723	.123	34.745	1	.000
	ROE	.000	.001	.257	1	.612
	ROIC	.013	.005	7.126	1	.005
	DTEQ	.000	.000	3.038	1	.081
	CR	-.063	.049	1.661	1	.198
	OP%	.001	.001	.786	1	.375
IFRS in UK	intercept	-.567	.104	29.873	1	.000
	ROE	-.001	.001	1.327	1	.249

	ROIC	.020	.004	25.246	1	.000
	DTEQ	.000	.000	.377	1	.539
	CR	.000	.032	.000	1	.998
	OP%	.000	.000	.374	1	.541
German	intercept	-.471	.094	25.104	1	.000
GAAP	ROE	-.001	.001	1.538	1	.215
	ROIC	.000	.003	.010	1	.921
	DTEQ	.000	.000	3.163	1	.075
	CR	.085	.030	8.018	1	.005
	OP%	.001	.000	6.554	1	.010
Final model: likelihood ratio test		—	—	89.658 (Chi-square)	15	.000

Whether the reference point is the UK GAAP or the German GAAP, it is clear that ROIC under IFRSs is significantly higher which implies that IFRSs adoption has greatly influenced ROIC in both countries.

6.4.6 Trading volume results

6.4.6.1 Trading volume (LN): Germany

As shown in Table 6.23, a comparison was made between the trading volume before and after IFRSs adoption. The LN trading volume increased from a mean of 9.607 to 10.237 after adoption, although there was little change in the standard deviation from 2.713 to 2.844.

Table 6.23: Statistical analysis for the trading volume in Germany

	Pre (0)	Post (1)	Overall
Count	291	303	594
Average (mean)	9.607	10.237	9.929
Standard deviation	2.713	2.844	2.796
Standard Skewness	4.353	1.870	4.324
Standard Kurtosis	8.066	3.743	7.424
ANOVA F-Ratio	—	—	7.61
ANOVA P-Value	—	—	0.006
Fisher's least significant difference (LSD) test:			
Pre - Post	—	—	-0.630**
Cochran's C test			
Statistic	—	—	0.524
P-value	—	—	0.415
Bartlett's test			
Statistic	—	—	1.001
P-value	—	—	0.415
Levene's test			
Statistic	—	—	1.811
P-value	—	—	0.179
Kruskal-Wallis median			
Test statistic			10.283
Average rank	274.459	319.629	—
P-value	—	—	0.001

** denotes a statistically significant difference at 5 per cent level.

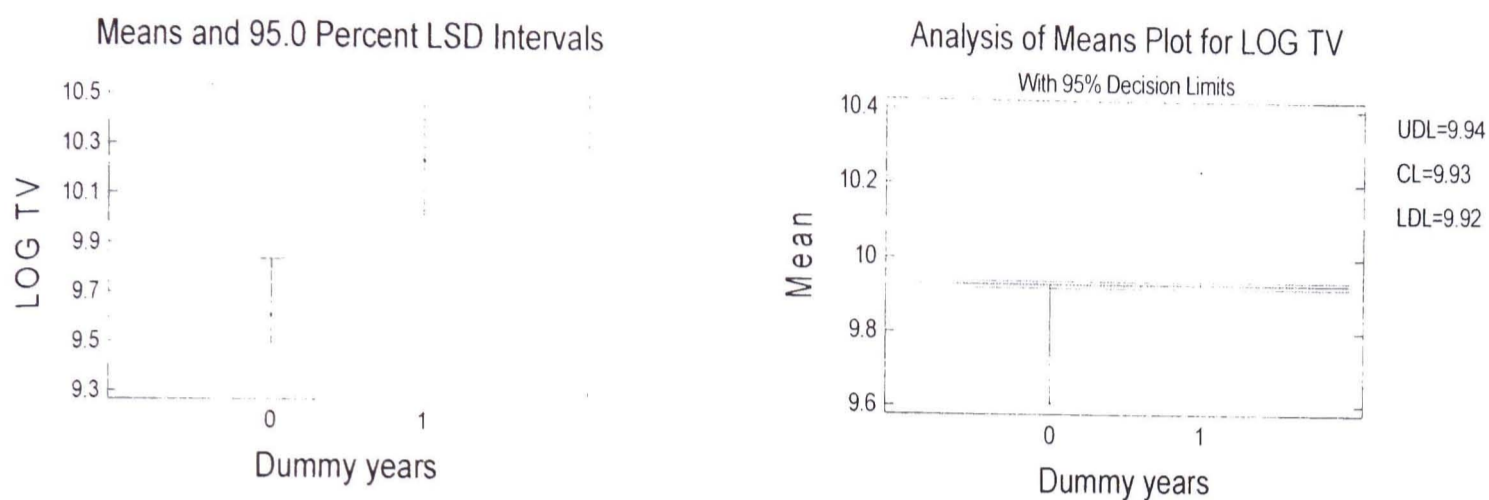
There was some improvement in non-normality in that there was a reduction in both the standardised skewness and the standardised kurtosis. The F- ratio of the ANOVA test was highly significant with a *P*-value of 0.006, indicating that there was a significant shift in mean trading volume following IFRSs adoption in Germany. In addition, there are statistically significant differences between the mean trading volume pre and post the adoption of IFRSs, at the 99% confidence level.

There was no significant shift in the standard deviation of the LN (trading volume) on account of IFRSs adoption, as indicated by the insignificant *P*-values of the respective statistics for Cochran's, Bartlett's and Levene's tests.

The Kruskal-Wallis median test revealed a significant difference in the mean LN (trading volume) following IFRSs adoption, at the 99% confidence level with a test statistic of 10.283. Overall, it can therefore be concluded that there was a significant increase in trading volume following IFRSs adoption (see Table 6.23).

This implies that, other things being equal, IFRSs adoption has increased investors' confidence in the view that the accounts are more value relevant to their investments than before IFRSs adoption. This result confirms hypothesis number $H_{4/1}$: "The adoption of IFRSs has an impact on trading volume of shares in Germany".

Figure 6.11: Scatter plot by level code and analysis of means plot for trading volume in Germany



Notes:

Notation: TV = trading volume; 0 = Pre, 1 = Post.

Differences in trading volume between pre and post IFRSs adoption in Germany can also be observed in the graphical analysis in Figure 6.11. The Means are different; the 95 Percent LSD (least significant difference) Intervals for categories 0 and 1 do not overlap. The Analysis of Means Plot with a 95% Decision Limit reveals that category 0 is close to the LDL and category 1 is close to the UDL. It can be concluded that this graphical analysis supports the previous statistical analysis shown in Table 6.23.

6.4.6.2 Trading volume (LN): UK

A comparison was made between the trading volume before and after IFRSs adoption, as shown in Table 6.24. The LN trading volume slightly increased from a mean of 16.179 to 16.788 after adoption, although there was a change in the standard deviation from 1.892 to 2.006.

Table 6.24: Statistical analysis for the trading volume in the UK

	Pre	Post	Overall
Count	388	412	800
Average (mean)	16.179	16.788	16.493
Standard deviation	1.891	2.006	1.973
Standard Skewness	-2.108	-3.856	-3.877
Standard Kurtosis	-0.395	-1.661	-1.943
ANOVA F-Ratio	—	—	19.42
ANOVA P-Value	—	—	0.000
Fisher's least significant difference (LSD) test:			
Pre - Post	—	—	-0.608**
Cochran's C test			
Statistic	—	—	0.530
P-value	—	—	0.237
Bartlett's test			
Statistic	—	—	1.002
P-value	—	—	0.238
Levene's test			
Statistic	—	—	2.074
P-value	—	—	0.150
Kruskal-Wallis median			
Test statistic			22.03
Average rank	360.982	437.716	—
P-value	—	—	0.000

** denotes a statistically significant difference at 5 per cent level.

There was some deterioration in improvement from non-normality in that there was an increase in both the standardised skewness and the standardised kurtosis. The F-ratio of the ANOVA test was highly significant with a *P*-value of 0.000, indicating that there was a significant shift in mean trading volume following IFRSs adoption in the UK. Thus, there is a statistically significant difference between the mean trading volume pre and post the adoption of IFRSs, at the 99% confidence level.

There was no significant shift in the standard deviation of the LN (trading volume) on account of IFRSs adoption, as indicated by the insignificant *P*-values of the respective statistics for Cochran's, Bartlett's and Levene's tests.

The Kruskal-Wallis median test revealed a significant difference in the median LN (trading volume) following IFRSs adoption at the 99% confidence level with a test statistic of 22.03. Overall, it can therefore be concluded that there was a significant increase in trading volume following IFRSs adoption in the UK (see Table 6.24).

This implies that, other things being equal, IFRSs adoption has increased investors' confidence consistent with the view that the accounts are more value relevant to their investments than before IFRSs adoption. This result confirms hypothesis number $H_{4/2}$: "The adoption of IFRSs has an impact on trading volume of shares in the UK".

Figure 6.12: Scatter plot by level code and analysis of means plot for trading volume in the UK

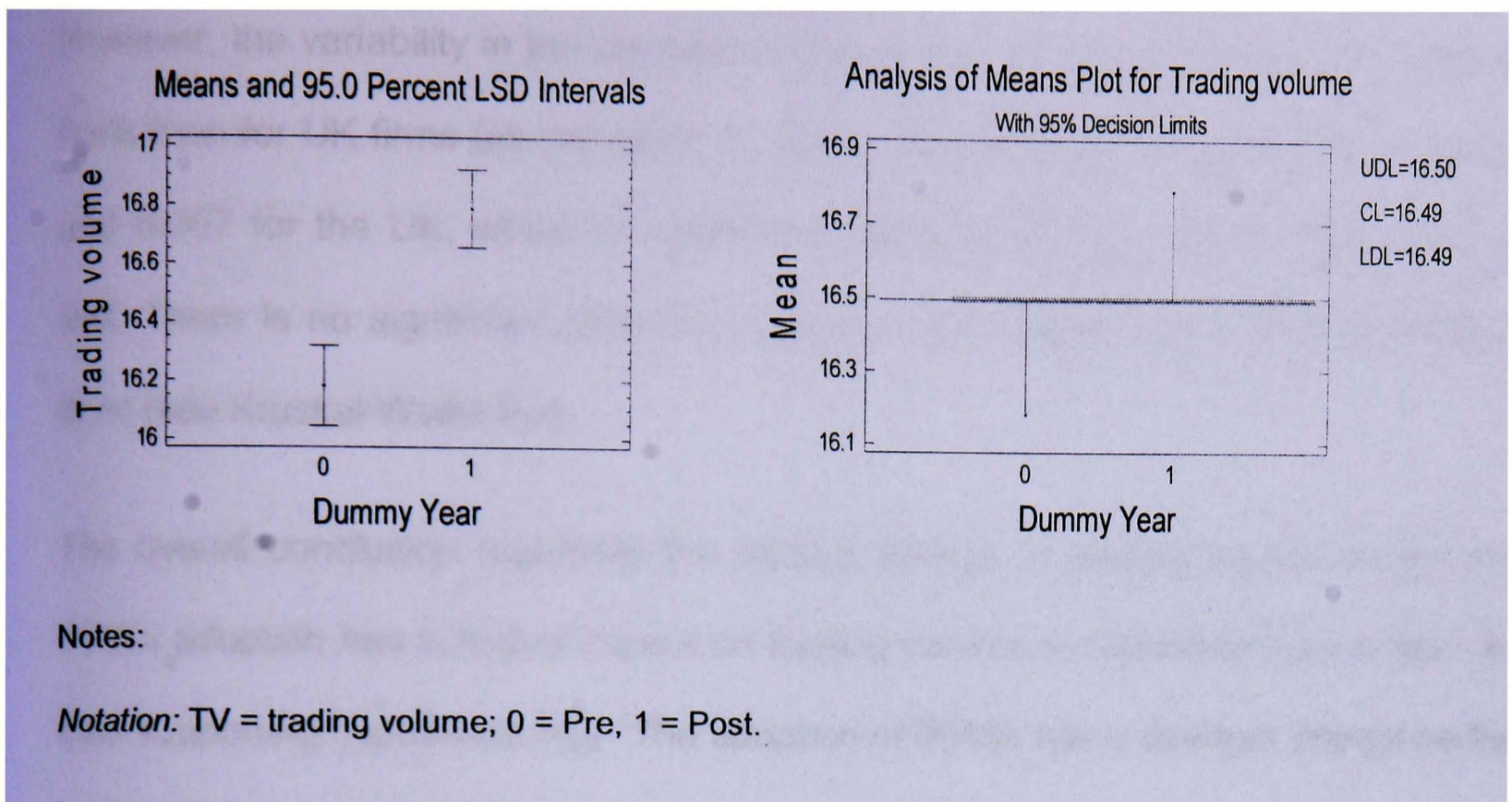


Figure 6.12 shows a graphical analysis of differences in trading volume between pre and post IFRSs adoption in the UK. The mean trading volumes are clearly different; and the 95 per cent LSD Intervals for categories 0 and 1 do not overlap. The Analysis of Means Plot with a 95% Decision Limit reveals that category 0 is close to the LDL and category 1 is close to the UDL. This graphical analysis supports the previous statistical analysis shown in Table 6.24.

6.4.6.3 Comparing trading volume results between Germany and the UK

Table 6.25 reveals that the percentage mean change in trading volume is greater in Germany than in the UK (more than double) and this is significant at the 99%

confidence level using the ANOVA test, and significant at the 95% confidence level using Fisher's (LSD) test.

However, the variability in the change in trading volume is much greater for German firms than for UK firms (as indicated by a standard deviation of 26.202 for Germany and 6.007 for the UK, which is significantly different as indicated by the Levene's test. There is no significant difference between the median at the 90% confidence level (see Kruskal-Wallis test).

The overall conclusion regarding the relative change in trading volume is that the IFRSs adoption has a higher impact on trading volume in Germany than in the UK, thus supporting hypothesis $H_{4/3}$: "The adoption of IFRSs has a stronger impact on the trading volume of shares in Germany than in the UK".

Table 6.25: Statistical analysis for the relative change in trading volume in Germany and the UK

	Germany	UK	Overall
Count	291	388	679
% change (mean)	8.736	4.014	6.038
Standard deviation	26.202	6.007	17.881
Standard Skewness	18.331	9.665	—
Standard Kurtosis	43.610	22.811	—
ANOVA F-Ratio	—	—	11.78
ANOVA P-Value	—	—	0.001
Fisher's least significant difference (LSD) test:	—	—	0.047**

Levene's test			
Statistic	—	—	135.828
<i>P</i> -value	—	—	0.000
Kruskal-Wallis median			
Test statistic	—	—	0.228
Average rank	344.148	336.889	—
<i>P</i> -value	—	—	0.633

** denotes a statistically significant difference at 5 per cent level.

CHAPTER 7 SUMMARY AND CONCLUSIONS

- 7.1 Introduction
- 7.2 Summary of research objectives, questions, hypotheses and methods
 - 7.2.1 Research objectives
 - 7.2.2 Research questions and hypotheses
 - 7.2.3 Research methods
- 7.3 Research contribution
- 7.4 Main findings
- 7.5 Research limitations, implications and suggestions for future research

7.1 Introduction

In this chapter, the findings and conclusions contained in the preceding chapters are summarised. The main aim of this chapter is to bring together and accentuate the primary conclusions related to the objectives of the research. Accordingly, in section 7.2 a summary of the objectives of the research, the research questions to address these objectives, the research hypothesis to answer these questions and the research methods followed in this thesis are provided. Section 7.3 presents research contribution. In section 7.4 the main findings reached based upon the empirical work are provided. Section 7.5 presents the research limitations and implications, as well as some suggestions for future research.

7.2 Summary of research objectives, questions and hypothesis

7.2.1 Research objectives

The main objectives related to the research questions were stated in chapter 1.

These objectives are as follows:

- to evaluate the impact of the compulsory adoption of IFRSs in Europe on the share price and the trading volume of shares of listed companies, and to explore the difference of impact, if any, of IFRSs adoption between common-law countries; using the UK as a case study, and code-law countries; using Germany as a case study.
- To evaluate the impact of the compulsory switch to IFRSs in Europe on the financial indicators of listed companies, and to explore the difference of

impact, if any, of IFRSs adoption between common-law countries, using the UK as a case study, and code-law countries, using Germany as a case study.

7.2.2 Research questions and hypothesis

The main research questions of this research are:

Question No.1

Does information, based on IFRSs increase or decrease the value-relevance of accounting numbers to investors in relation to stock prices and is the impact different for the two common-law and code-law environments

Question No.2

Does the adoption of IFRSs in Europe enhance the reported performance of companies listed in different European stock exchanges?

Question No.3

Does the impact of adopting IFRSs on financial indicators differ between the UK, a common-law country, and Germany, a code-law country?

Question No.4

Does the adoption of IFRSs have an impact on trading volume of shares and is the impact different for these two common-law and code-law environments?

To address the above question, the following hypotheses were tested:

1. The adoption of IFRSs has an impact on share prices in both common-law and code-law environments.
2. The impact of the compulsory adoption of IFRSs is higher in a code-law than in a common-law environment.

3. The compulsory adoption of IFRSs has an impact on companies' performance.
4. The adoption of IFRSs has an impact on trading volume of shares

7.2.3 Research methods

The research used both univariate and multivariate analysis to test the hypothesis.

A multiple regression model was used based on Ohlson model and modified Ohlson model to study the impact of IFRSs adoption on share prices in both Germany and the UK.

ANOVA test was used to examine the statistical characteristics of the performance indicators in order to evaluate whether the main five performance measures chosen in this study, namely return on equity; return on invested capital; debt to equity ratio; current ratio and operating profit margin have significantly changed following the adoption of IFRSs. This was performed for both Germany and the UK. The researcher also performed a number of tests to evaluate changes in the standard deviation and the median of the five chosen performance measures following the adoption of IFRSs.

In order to evaluate whether the performance indicators are different between Germany and the UK prior to the adoption of IFRSs, a logistic regression model was employed. Further logistic regression models were used to compare UK and German firms post IFRSs adoption. The next stage in the analysis was to compare the impact of IFRSs on each country separately. In this way, a logistic regression model was used to differentiate German companies pre and post IFRSs adoption according to a

linear combination of performance measures. The same procedure was repeated for the UK.

The analysis needed to be extended to accommodate differences between four scenarios namely, UK GAAP, German GAAP, IFRSs in the UK and IFRSs in Germany. To achieve this, a reference point was chosen. For both countries, the pre-adoption era is chosen as a reference point, i.e. UK GAAP was chosen as a reference point for the UK and German GAAP was chosen as a reference point for Germany. To achieve this, the study employed the multinomial logistic regression model that uses categorical data as the dependant variable, for which there will be four categories, namely UK GAAP, German GAAP, IFRSs in the UK and IFRSs in Germany.

The multinomial approach seeks to find a linear combination of independent variables whose coefficients are chosen in such a way so as to distinguish between the different categories using one of them as a reference point.

The impact of IFRSs on trading volume was also investigated using a variety of statistical methods focusing on the mean trading volume, dispersion (standard deviation) profile, skewness and kurtosis.

7.3 Research contribution

It is purported that this thesis makes an original contribution to the literature on the impact of IFRS on stock performance and financial indicators in four respects:

1. Within an Ohlson and modified Ohlson framework, a comparison is made between common-law and code-law environments and such comparisons are not extensively covered in previous studies. As such, the study adds to the value relevance debate and provides evidence as to whether the nature of the accounting system employed really matters to share price determination with regard to the adoption of IFRS.
2. An evaluation is made of the impact of IFRS adoption on trading volume, an aspect which is usually neglected in value relevance research pertaining to stock performance.
3. An analysis is performed of the impact of IFRS adoption on companies' performance as measured by selected financial indicators; an area which again is not yet extensively covered in the literature.
4. In terms of the methodological approach to this line of research, the study adopts multinomial and logistic analyses to enable the researcher to make comparisons between four categories: code-law pre-adoption, code law post adoption, common law pre-adoption and common law post adoption. This has provided a means of separating out some of the effects. Particularly, this has enabled distinctions to be made as to whether differences in impact are due to the switch to IFRS or to the code versus common law environmental factor.

7.4 Main findings

The results of this study are really significant. This is the first study that actually tries to measure the effectiveness of IFRSs in Europe following their compulsory adoption, comparing the value relevance of national GAAPs with that of IFRSs in two

different accounting environments, using newly published annual financial reporting data from post-adoption periods.

IFRSs promised to increase the transparency of financial statements and its usefulness to investors and, according to the research results, they indeed increased the value relevance of accounting information in both common and code-law environments. This supports the first hypothesis and gives an answer to the first research question. However, the relative impact of IFRS adoption on share prices was higher in the UK than in Germany, a result that rejects the second research hypothesis.

Also this is the first study to compare the impact of IFRS adoption on financial indicators between common and code-law environments. The results indicate that IFRS adoption has a significant influence on some financial indicators in both Germany and the UK and that the impact is different between the two countries. This gives an answer to the second and third research questions and supports the third research hypothesis.

Finally, the study goes further to investigate the impact of IFRS adoption on the trading volume of shares. The overall results of trading volume analysis indicate that the adoption of IFRSs has a significant positive influence on the number of shares traded in both Germany and the UK, a result that supports the fourth hypothesis and provides answers to the fourth research question.

Hereunder are the detailed findings of this research.

To address the first research question, a multiple regression model was used in two stages. The first stage was achieved by employing the Ohlson model in both Germany and the UK data sets. The main variables used in building Ohlson model were earnings per share and book value per share, with the dependent variable being share price.

Under German GAAP, both EPS and BVPS were individually very significant, although at the BVPS was even more informative than EPS. The model provided a good explanation of the variation in share prices.

Following the adoption of IFRSs in Germany, the overall Ohlson model was also very significant in explaining share price. Once again EPS and BVPS were individually significant explanatory variables in share price determination (and BVPS was still more informative than EPS). It follows that there is support for hypothesis $H_{1/1}$: compulsory adoption of IFRS increases the value relevance of accounting information in a code-law environment.

Under UK GAAP, the overall Ohlson model is highly significant. EPS is individually very significant and BVPS is even more significant. This model explains 42% of the variation in share prices under UK GAAP, as indicated by the R^2 of the Ohlson model.

Following IFRSs adoption in the UK, the Ohlson model is very significant overall. EPS and BVPS are individually significant with equal importance. The model explains 61.05% of the variations in UK share prices following the adoption of IFRSs.

It is evident that IFRSs adoption has improved the explanatory power of the Ohlson model by 19% points in absolute terms from 42% to 61%, an enhancement of 44% in relative terms. This is consistent with hypothesis $H_{1/2}$: the compulsory adoption of IFRSs increases the value relevance of accounting information in a common-law environment.

The results of the Ohlson model for both Germany and the UK prior to the adoption of IFRSs indicate that both models are similar in terms of the significance of EPS and BVPS. However, under German GAAP the model has a higher explanatory power, increasing the adjusted R^2 by around 20% when compared with UK GAAP.

On the other hand, although the adoption of IFRSs has improved the value relevance of accounting information in both the UK and Germany and although the improvement has been greater in the UK, indicated by a shift from 42% to 61% compared with a smaller shift from 62% to 71% in Germany, nevertheless the Ohlson model for Germany after IFRSs adoption exhibits greater value relevance than that for the UK. It follows that hypothesis H_2 is rejected. This result agrees with the findings of (Schiebel 2006), which indicated that German GAAP is significantly more value relevant statistically than IFRS. However, this result is an unexpected outcome considering the opposite findings in the majority of previous empirical studies and the descriptive theories of German GAAP and IFRSs.

The second stage was achieved by employing the modified Ohlson model to both German and UK data sets. To develop the modified Ohlson model, four more variables have been included, namely leverage, dividend pay-out, firm size and accruals.

The modified Ohlson model under German GAAP reveals that it is overall very significant. EPS and BVPS are very significant as before under the original Ohlson model. However, under the modified Ohlson model additional variables are included. The leverage ratio is not significant at the prescribed levels, although the negative regression coefficient estimate bears the correct sign. The dividend payout ratio is very significant and is correctly positively related to share price.

The overall result is consistent with hypothesis $H_{1/1}$: compulsory adoption of IFRSs increases the value relevance of accounting information in a code-law environment.

There is no sufficiently significant size effect under German GAAP contributing to the determination of share prices. By contrast the accruals effect is very significant, indicating an important contribution as an explanatory variable relevant to share prices under German GAAP.

Overall, the model explains 79% of the variation in share prices as indicated by the adjusted R^2 . However, the presence of multicollinearity was detected revealing high correlation between the accruals variable and three other independent variables namely EPS, BVPS and dividend payout. Consequently, as a further stage, in the analysis the accruals variable was replaced by the residuals arising from an orthogonalisation process.

After orthogonalisation, the adjusted R^2 of 79% remained the same and similarly the significance probabilities of the independent variables remained the same. Furthermore, the multicollinearity problem between all independent variables had been sufficiently eliminated. It is worth mentioning that even after orthogonalisation the accruals variable plays a significant role in the value relevance model.

Following the adoption of IFRSs, the explanatory power of the model is increased to 88% as indicated by the adjusted R^2 after considering the orthogonalisation process discussed above. EPS, BVPS, DIVI Payout, Log size, leverage and Accruals are all significant.

In terms of explaining share prices, the models for Germany are better than those for the UK which holds both pre IFRS and post IFRSs. However, in terms of the change in the explanatory power R^2 , the effects are more pronounced in the UK than in Germany. A possible reason for this is that in Germany even before IFRSs the models were already very good. But in terms of impact, IFRSs has had a bigger impact in the UK than in Germany. In both Germany and the UK the introduction of IFRSs has improved the information value associated with accounting information. The value added, however, is stronger in the UK, which is not consistent with the second hypothesis¹⁰. This result is not consistent with the literature and calls for more investigation in different common-law and code-law countries other than the UK and Germany.

To address the second research question, five different measures of performance were selected in the main areas of profitability and liquidity, namely return on equity; return on invested capital; debt to equity; current ratio and operating profit percentage.

¹⁰ This states that “The impact of the compulsory adoption of IFRS is higher in a code-law than in a common-law environment”.

The ANOVA test statistics for the main five variables used to measure companies' performance in Germany revealed that there was an improvement in the mean ROE following IFRSs adoption. There was also a reduction in the standard deviation of ROE. The significant difference in standard deviations violated an assumption behind ANOVA and so Kruskal-Wallis test was adopted instead, and revealed a significant difference in the median ROE following IFRSs adoption. The ANOVA F-ratio for the other four variables, namely ROIC; DTEQ; CR; OP% was not statistically significant at the prescribed level. This concludes that the adoption of IFRSs makes no difference with regard to these four variables. There was also a reduction in the standard deviation of all these variables. The significant difference in standard deviations violated an assumption behind ANOVA and so Kruskal-Wallis test was adopted instead, and revealed significant difference in the median for all these four variables, except debt to equity ratio following IFRSs adoption.

For the sake of comparability, the same five performance measures previously used with the German data set were used for the UK data set, the results of which indicated that there was some improvement in the mean ROE following IFRSs adoption. There was also a reduction in the standard deviation of ROE. The significant difference in standard deviations violated an assumption behind ANOVA and so Kruskal-Wallis test was adopted instead, and revealed a significant difference in the median ROE at the 95% confidence level following IFRSs adoption. The ANOVA F-ratio for DTEQ; CR; OP% were not statistically significant, but it was statistically significant for ROIC. This concludes that the adoption of IFRSs makes no difference with regard to these three variables, but it does make difference for the ROIC. There was also a reduction in the standard deviation of all these variables,

except for the CR. The significant difference in standard deviations violated an assumption behind ANOVA and so Kruskal-Wallis test was adopted instead, and revealed significant differences in the median for these two variables, namely ROIC and OP%, but no significant difference for the other two variables, namely DTEQ and CR, following IFRSs adoption.

From the preceding analysis, it can be seen that the profitability for Germany in terms of mean ROE significantly improved following IFRSs adoption.

Correspondingly, the profitability for the UK in terms of mean ROIC has significantly improved following IFRSs adoption. In each case the standard deviation of these profitability measures substantially decreased. Also the medians of these profitability measures (pre-post) were each very different.

Following IFRSs there were no major changes in the mean debt ratios, the mean current ratios and the mean OP%. However, the standard deviations of the debt ratios significantly reduced for the UK and Germany.

Logistic regression was performed in both Germany and UK data sets to explore whether the adoption of IFRSs has resulted in a shift in the values of the financial indicators. For Germany, the Analysis of Deviance indicated that the overall model was very significant. The likelihood ratio tests revealed that CR was very significant and negative. Thus, there has been a significant decrease in the CR following IFRS adoption in Germany. Conversely, the ROIC is positively very significant. This indicates that the adoption of IFRSs has resulted in a dramatic upward shift in ROIC. The other variables in the model were not significant at the selected confidence

levels. This indicates that IFRSs adoption has had an insignificant impact upon DTEQ, OP% and ROE.

Following the same approach, but for the UK data-set, the Analysis of Deviance indicated that overall the model was very significant. The likelihood ratio tests revealed that ROIC was very significant, and positive. Thus, there has been a significant increase in the ROIC following IFRSs adoption in the UK. Conversely, the OP% was negatively very significant. This indicates that the adoption of IFRSs has resulted in a dramatic downward shift in OP%. The other variables in the model were not significant at the selected confidence levels. This indicates that IFRSs adoption has had an insignificant impact upon CR, DTEQ, and ROE.

It has thus been observed that ROIC substantially improved as a result of the adoption of IFRSs in both Germany and the UK, and even more so in the UK. Some other variables were affected differently. For example, in Germany the CR dramatically decreased, whilst in the UK the OP% substantially decreased.

Using multinomial logistic regression with Germany as a reference category it could be seen that German GAAP is significantly different from UK GAAP with respect to DTEQ (at the 90% confidence level), the CR (at the 99% confidence level) and the OP% (at the 95% confidence level).

Compared with German GAAP, the UK GAAP exhibits greater DTEQ ratio, a lower CR and a lower OP%. Following IFRSs adoption in Germany, compared with German GAAP, there is very strong evidence of a higher ROIC and a lower CR.

These effects are not confined to Germany because under IFRSs for the UK, ROIC is very significantly higher and the CR is significantly lower compared with German GAAP.

Also under IFRSs for the UK, there is a much higher DTEQ ratio and a much lower OP%. However, these two features (DTEQ and OP%) were also found under UK GAAP (compared with German GAAP) and so they represent key factors distinguishing the UK from Germany irrespective of the influence of the change in accounting standards followed.

Regarding IFRSs in the UK, there is a substantial increase in ROIC. The same holds for IFRSs in Germany compared with the UK as a reference point. So clearly this increase relates to IFRSs adoption. By contrast, although the DTEQ is higher in Germany under IFRSs compared with UK GAAP as a reference point, the same feature was also existent under German GAAP compared with UK GAAP. It follows that the differential DTEQ is not related to IFRSs adoption and that it is arguably related to the stronger reliance on the stock market in the UK and weaker reliance on the banking (credit) system in Germany. So, it would be expected that the DTEQ ratio is higher in Germany than in the UK.

Using the UK GAAP as a reference point, the results reveal that the major differences in the CR and OP% under German GAAP disappears under IFRSs. The CR and OP% are not distinguishing features between UK GAAP and IFRSs, whether in the UK or Germany. It follows that the CR and OP% arise from the features of German GAAP.

Whether the reference point is the UK GAAP or the German GAAP, it is clear that

ROIC under IFRSs is dramatically higher which implies that IFRSs adoption has greatly influenced ROIC in both countries.

To address the fourth research question, a comparison was made between the trading volume before and after IFRSs adoption for both Germany and the UK. The LN trading volume for Germany increased after adoption, although there was little change in the standard deviation. There was some improvement in non-normality in that there was a reduction in both the standardised skewness and the standardised kurtosis. The ANOVA test revealed a major shift in mean trading volume following IFRSs adoption in Germany. In addition, there were very significant differences between the mean trading volume pre and post the adoption of IFRSs. There was no significant shift in the standard deviation of the LN (trading volume) on account of IFRSs adoption. The Kruskal-Wallis median test revealed a very significant difference in the mean LN (trading volume) following IFRSs adoption. Overall, it can therefore be concluded that there was a significant increase in trading volume following IFRSs adoption.

This implies that, other things being equal, IFRSs adoption has increased investors' confidence in the view that the accounts are more value relevant to their investments than before IFRSs adoption. This result confirms hypothesis number $H_{4/1}$: "The adoption of IFRSs has an impact on trading volume of shares in Germany".

Similarly, a comparison was made between the trading volume before and after IFRSs adoption in the UK. The mean LN trading volume and standard deviation slightly increased.

As to non-normality, there was some increase in both the standardised skewness and the standardised kurtosis. The ANOVA test indicated a very significant shift in mean trading volume following IFRSs adoption in the UK. Thus, there is a very significant difference between the mean trading volume pre and post the adoption of IFRSs. However, there was no significant shift in the standard deviation of the LN (trading volume) on account of IFRSs adoption.

The Kruskal-Wallis median test revealed a substantial difference in the median LN (trading volume) following IFRSs adoption. Overall, it can therefore be concluded that there was a significant increase in trading volume following IFRSs adoption in the UK.

This implies that, other things being equal, IFRSs adoption has increased investors' confidence consistent with the view that the accounts are more value relevant to their investments than before IFRSs adoption. This result confirms hypothesis number $H_{4/2}$: "The adoption of IFRSs has an impact on trading volume of shares in the UK".

The percentage mean change in trading volume is much greater in Germany than in the UK (more than double). However, the variability in the change in trading volume is much greater for German firms than for UK firms. There is little difference between the medians.

The overall conclusion regarding the relative change in trading volume is that the IFRSs adoption has a higher impact on trading volume in Germany than in the UK, thus supporting hypothesis $H_{4/3}$: "The adoption of IFRSs has a stronger impact on the trading volume of shares in Germany than in the UK".

7.5 Research limitations, implications and suggestions for future research

Since this research focuses primarily on the accounting variables, it therefore does not examine the potential impact of the political and economic factors on share performance. These are broad and major areas of study and could be examined in future researches. On the other hand, sources of finance; existing legal system; the link between accounting and taxation and cultural differences between common-law and code-law environments may have an impact on share prices as well as companies' financial performance and may constitute significant variables that affect share prices in the two eras of pre and post IFRSs adoption. The impact of those factors on share prices is beyond the interest of this research and calls for further investigation in future researches.

Secondly, the research focuses on Germany as a case study for code-law environment and the UK, as a case study for common-law environments. The results of this research must be interpreted with caution and not generalised to all common and code law countries. Further researches must examine more common and code law countries in the EU, in order to better understand the significance of the impact of IFRS adoption on company and stock performance in these two different accounting environments.

This research has several implications. First, it helps the investment community to better understand the role of financial reporting in leading investment decisions in capital markets. Second, it motivates the standard-setting bodies in those countries where the adoption of IFRSs is not compulsory to consider passing laws and

regulations that mandate the adoption of IFRSs, which will lead to more convergence of accounting standards all over the world and more benefits to all participants in capital markets. Third, it enhances financial statement analysis by companies in assessing potential mergers and takeovers, and in evaluating their own performance against competitors.

The author believes that this research study provides wide scope for further researches to explore the value relevance of accounting information further in Europe, after the compulsory adoption of IFRSs. The following are some suggestions for future research:

- i. This research could be extended to cover more years (backwards and forwards). This helps to identify a clear trend on how the adoption of IFRSs in Europe changes the value relevance of accounting information over time.
- ii. Moreover, more common law and code-law countries must be considered in order to gain better insight on the comparative impact of IFRSs on share and company performance in the two different sets of accounting systems.
- iii. Additionally, researchers could look closely on how scale effects (market capitalisation) affect the value relevance of accounting information and make more comparisons across small, medium, and large capitalisation groups.
- iv. Another good area for future research is to observe whether IFRS adoption affected sectors within each country or across countries differently.
- v. Future researches could also further consider qualitative factors in order to juxtapose the research findings to preparers' and users' views on the impact of IFRSs on the value relevance of accounting information, not only in Europe but worldwide.

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Appendices

Appendix (1): Correlation matrix for coefficient estimates for the German data set under modified Ohlson model pre IFRS adoption

	Constant	EPS	BVPS	LEVE	DIVI payout	Log Size	Accruals
Constant	1.0000	0.0194	-0.0109	-0.3444	-0.0176	-0.8903	-0.0066
EPS	0.0194	1.0000	-0.7463	-0.1517	-0.4996	0.0497	-0.8124
BVPS	-0.0109	-0.7463	1.0000	0.2481	0.4133	-0.1502	0.6856
LEVE	-0.3444	-0.1517	0.2481	1.0000	0.1360	-0.0969	0.1513
DIVI payout	-0.0176	-0.4996	0.4133	0.1360	1.0000	-0.0589	0.6452
Log Size	-0.8903	-0.0497	-0.1502	-0.0969	-0.0589	1.0000	-0.0656
Accruals	-0.0066	-0.8124	0.6856	0.1513	0.6452	-0.0656	1.0000

Appendix (2): Correlation matrix for coefficient estimates for the German data set under modified Ohlson model pre IFRS adoption (after orthogonalisation)

	Constant	EPS	BVPS	LEVE	DIVI payout	Log Size	Orthog Accruals
Constant	1.0000	0.0240	-0.0089	-0.3441	-0.0175	-0.8904	0.0046
EPS	0.0240	1.0000	-0.4458	-0.0504	0.0552	-0.0056	0.0071
BVPS	-0.0089	-0.4458	1.0000	0.2038	-0.0520	-0.1470	-0.0374
LEVE	-0.3441	-0.0504	0.2038	1.0000	0.0516	-0.0969	-0.1513
DIVI payout	-0.0175	0.0552	-0.0520	0.0516	1.0000	-0.0224	-0.0087
Log Size	-0.8904	-0.0056	-0.1470	-0.0969	-0.0224	1.0000	0.0656
Accruals	0.0046	0.0071	-0.0374	-0.1513	-0.0087	0.0656	1.0000

Appendix (3): Correlation matrix for coefficient estimates for the German data set under modified Ohlson model post IFRS adoption

	Constant	EPS	BVPS	LEVE	DIVI payout	Log Size	Accruals
Constant	1.0000	-0.0866	0.0704	-0.2501	-0.0282	-0.9073	-0.0288
EPS	-0.0866	1.0000	-0.6022	-0.0860	0.0980	0.0938	0.0747
BVPS	0.0704	-0.6022	1.0000	0.2593	-0.1657	-0.1871	0.5514
LEVE	-0.2501	-0.0860	0.2593	1.0000	0.0084	-0.1487	0.2301
DIVI payout	-0.0282	0.0980	-0.1657	0.0084	1.0000	-0.0034	-0.1546
Log Size	-0.9073	0.0938	-0.1871	-0.1487	-0.0034	1.0000	-0.0470
Accruals	-0.0288	0.0747	0.5514	0.2301	-0.1546	-0.0470	1.0000

Appendix (4): Correlation matrix for coefficient estimates for the German data set under modified Ohlson model post IFRS adoption (after orthogonalisation)

	Constant	EPS	BVPS	LEVE	DIVI payout	Log Size	Orthog Accruals
Constant	1.0000	-0.0834	0.1014	-0.2539	-0.0335	-0.9060	-0.0460
EPS	-0.0834	1.0000	-0.7735	-0.1095	0.1109	0.0988	-0.0263
BVPS	0.1014	-0.7735	1.0000	0.1680	-0.0971	-0.1949	0.0409
LEVE	-0.2539	-0.1095	0.1680	1.0000	0.0470	-0.1487	0.2301
DIVI payout	-0.0335	0.1109	-0.0971	0.0470	1.0000	-0.0113	0.0109
Log Size	-0.9060	0.0988	-0.1949	-0.1487	-0.0113	1.0000	-0.0470
Accruals	-0.0460	-0.0263	0.0409	0.2301	0.0109	-0.0470	1.0000

Appendix (5): Correlation matrix for coefficient estimates for the UK data set under modified Ohlson model pre IFRS adoption

	Constant	EPS	BVPS	LEVE	DIVI payout	Log Size	Accruals
Constant	1.0000	0.2097	0.0863	-0.0353	0.0579	-0.9092	-0.1662
EPS	0.2097	1.0000	-0.4942	-0.1219	-0.0495	-0.1752	-0.7101
BVPS	0.0863	-0.4942	1.0000	0.3416	0.0078	-0.2837	0.4840
LEVE	-0.0353	-0.1219	0.3416	1.0000	-0.0509	-0.3342	0.2102
DIVI payout	0.0579	-0.0495	0.0078	-0.0509	1.0000	-0.0635	0.0271
Log Size	-0.9092	-0.1752	-0.2837	-0.3342	-0.0635	1.0000	0.1228
Accruals	-0.1662	-0.7101	0.4840	0.2102	0.0271	0.1228	1.0000

Appendix (6): Correlation matrix for coefficient estimates for the UK data set under modified Ohlson model pre IFRS adoption (after orthogonalisation)

	Constant	EPS	BVPS	LEVE	DIVI payout	Log Size	Orthog Accruals
Constant	1.0000	0.1395	0.1833	-0.0460	0.0676	-0.9065	-0.2172
EPS	0.1395	1.0000	-0.2452	0.0285	-0.0417	-0.1310	-0.0495
BVPS	0.1833	-0.2452	1.0000	0.2792	-0.0067	-0.3889	0.0247
LEVE	-0.0460	0.0285	0.2792	1.0000	-0.0623	-0.3342	0.2102
DIVI payout	0.0676	-0.0417	-0.0067	-0.0623	1.0000	-0.0702	-0.0268
Log Size	-0.9065	-0.1310	-0.3889	-0.3342	-0.0702	1.0000	0.1228
Accruals	-0.2172	-0.0495	0.0247	0.2102	-0.0268	0.1228	1.0000

Appendix (7): Correlation matrix for coefficient estimates for the UK data set under modified Ohlson model post IFRS adoption

	Constant	EPS	BVPS	LEVE	DIVI payout	Log Size	Accruals
Constant	1.0000	0.1763	0.1206	0.0484	0.0737	-0.9287	-0.1328
EPS	0.1763	1.0000	-0.6707	-0.0180	-0.0439	-0.1736	-0.3948
BVPS	0.1206	-0.6707	1.0000	0.2240	0.0568	-0.2429	0.1640
LEVE	0.0484	-0.0180	0.2240	1.0000	-0.0219	-0.3724	0.0283
DIVI payout	0.0737	-0.0439	0.0568	-0.0219	1.0000	-0.1023	0.0676
Log Size	-0.9287	-0.1736	-0.2429	-0.3724	-0.1023	1.0000	0.1494
Accruals	-0.1328	-0.3948	0.1640	0.0283	0.0676	0.1494	1.0000

Appendix (8): Correlation matrix for coefficient estimates for the UK data set under modified Ohlson model post IFRS adoption (after orthogonalisation)

	Constant	EPS	BVPS	LEVE	DIVI payout	Log Size	Orthog Accruals
Constant	1.0000	0.1396	0.1472	0.0471	0.0862	-0.9290	-0.1687
EPS	0.1396	1.0000	-0.6673	-0.0084	-0.0180	-0.1297	-0.0334
BVPS	0.1472	-0.6673	1.0000	0.2217	0.0469	-0.2743	-0.0221
LEVE	0.0471	-0.0084	0.2217	1.0000	-0.0245	-0.3724	0.0283
DIVI payout	0.0862	-0.0180	0.0469	-0.0245	1.0000	-0.1160	-0.0224
Log Size	-0.9290	-0.1297	-0.2743	-0.3724	-0.1160	1.0000	0.1494
Accruals	-0.1687	-0.0334	-0.0221	0.0283	-0.0224	0.1494	1.0000