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# WHY DO FIRMS INVEST IN ACCOUNTS RECEIVABLE? AN EMPIRICAL INVESTIGATION OF THE MALAYSIAN MANUFACTURING SECTOR

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# WHY DO FIRMS INVEST IN ACCOUNTS RECEIVABLE? AN EMPIRICAL INVESTIGATION OF THE MALAYSIAN MANUFACTURING SECTOR

## ABSTRACT

This paper investigates the factors that influence the level of investment in accounts receivable in the Malaysian manufacturing sector. We test several theories of the level of investment in accounts receivable, using a cross-section of 262 listed manufacturing firms over a period of five years (2007-2011). Both fixed and random effect approaches are adopted to deal with potential heterogeneity across firms. Our results show that investment in accounts receivable in Malaysia are influenced by firm size, short-term finance, sales growth, and collateral. Profit, liquidity and gross margins have no role in affecting the decision of trade credit granting to customers. Our results are inconsistent with previous studies. Size and short-term finance have a negative, rather than positive, impact. Liquidity and gross margins have no, rather than positive, effect. While profit and sales growth are predicted to feature a U-shaped relationship with investment in accounts receivable, the former is insignificant while the latter is strictly increasing. The only factor found to be consistent with prior studies is collateral. This has important implications for policy makers in Malaysia and may apply to emerging economies.

Key words: accounts receivable level, trade credit, Malaysian manufacturing sector.

## 1. INTRODUCTION

Accounts receivable occur when suppliers of goods and services sell on credit and thus allow their customers to defer payment to a later date. However, this type of credit is granted by firms whose primary business is to sell goods and services *not provide finance* to customers. Sale on credit create a current asset, called accounts receivable, in the balance sheet of suppliers. Thus investment in accounts receivable is the amounts outstanding payable by customers to their suppliers. Given the high volume of sales on credit between businesses, this asset is especially high and considered by many as the riskiest in the firm's balance sheet (Pike and Cheng, 2001; Wilson and Summers, 2002; Paul and Boden, 2008). There are many reasons why firms accept

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delayed payment and invest in this low return asset (see Paul and Boden, 2008 for more detail). Although, selling on credit increases sales and often improves customer loyalty, it nevertheless increases financial costs and exposes firms to significant risks (delayed payment and default). For example, during the 1997 Asian financial crisis, credit squeeze was cited as one of the main causes of the collapse of many Malaysian firms (Thomas, 2002).

Various theories have been put forward to explain factors that influence the granting of credit to customers. The aim of this paper is to test these theories using a cross section of listed Malaysian manufacturing firms. It has been shown that accounts receivable represent a major proportion of Malaysian firms' assets (Paul et al., 2012). Given the risk exposure threatening Malaysian firms, it is ~~curious~~ surprising to find that little research has been conducted as to the factors that influence Malaysian firms' decisions to carry high levels of accounts receivable and incur costs related to investing in this low return, high risk asset by granting credit to their customers.

The Malaysian manufacturing sector, which accounts for approximately 30% of the Malaysian GDP, is an important part of the economy. The sector suffers from late payment problems as shown by Dun and Bradstreet's Survey ((Infocredit D&B, 2005)[1]. It is likely that the high levels of accounts receivable of Malaysian manufacturing firms are due to their being pressured into granting credit to customers in order to survive and compete. Moreover, Thomas (2002) reports that the Malaysian legal process for debt recovery is tedious, time-consuming and costly and Ge and Qiu (2007) find that firms in less developed Asian economies, rely more on borrowing through account receivables compared to firms from more developed economies. Given all these factors, this paper will shed light on the reasons business-to-business lending, through accounts receivable, is widespread in Malaysia and investigate the factors that affect this decision despite

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[1] As reported in the Credence by Infocredit, Issue 2, July to Sept 2005.

the risk involved. To our knowledge, this is the first study to-date that looks at the factors that influence accounts receivable level in the Malaysian manufacturing sector.

The rest of the paper is organised into five sections. In section 2 we explain, by reference to the literature, the factors that incentivise firms to grant loans to their customers through accounts receivable level lending and develop a number of hypotheses. In section 3 we explain the methodology used in the study and this is followed by section 4 which presents the models used for the empirical investigation. In section 5, we discuss the results and finally conclude in section 6.

## 2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

A number of theories have been developed to explain factors that may influence the level of accounts receivable (Petersen and Rajan, 1997; Wilson and Summers, 2002; Pike and Chen, 2002; Paul and Boden, 2008, 2011). Some theories emphasise the role of factors such as company size, access to internal/external financing, operating profit and sales revenue growth, liquidity and collateral (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002; Paul and Boden, 2008). Others have added factors such as industry norms (Wilson, 2008; Paul and Boden, 2011), reputation of firm's auditor (Gul, et al., 2009; Paul et al., 2012) and ownership (Carney and Child, 2012; Martínez et al., 2007). Empirical support for the relevance of the various extant theories in this area can be found in the work of writers such as Petersen and Rajan, (1997), Marotta (2000), Pike and Cheng (2002), Soufani and Poutziouris (2002), Levchuk, (2013), Delannay and Weill (2004), Rodriguez (2006). However, there is very little empirical evidence on the role of the proposed factors in explaining how much firms are prepared to invest in accounts receivable within the emerging and developing economies, especially in Asia (Zainudin, 2008; Love and Zaidi, 2010). Most of the empirical literature has focused particularly on the US and the UK.

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In the next subsections we explain the factors put forward in the literature to explain decisions on the level of accounts receivable; these include: firm size, access to internal/external financing, operating profit, sales revenue growth, price discrimination, liquidity and collateral to secure financing; and based on the literature, seven hypotheses are proposed to examine the determinants of the scale of accounts receivable in the Malaysian manufacturing sector.

### 2.1 Firm Size

It is argued that firm size plays a major role in determining the scale of accounts receivable. Larger firms are perceived to be more creditworthy and to have more capacity to grant credit to their customers (Petersen and Rajan, 1997; Main and Smith, 1982; Pike and Cheng, 2001; Soufani and Poutziouris, 2002). They also have too high a transaction volume to deal with cash sales (Summers and Wilson, 2002; Boden and Paul, 2014). In addition, selling on credit allows firms to accumulate invoices for payment and reduce their transaction costs and thus this incentivises them to invest in accounts receivable (Petersen and Rajan, 1997; Main and Smith, 1982; Pike and Cheng, 2001; Soufani and Poutziouris, 2002). Nevertheless, market power theory suggests that larger firms tend to have stronger bargaining position in the trading relationship with their customers and thus may both be more reluctant to hold considerable amounts of receivables and impose stricter conditions for payments (Delannay and Weill, 2004). However, most empirical evidence shows that firms' characteristics such as size play a positive effect on the level of accounts receivable (Ng et al., 1999; Petersen and Rajan, 1997; Wilson and Summers, 2002; Delannay and Weill, 2004; Paul and Wilson, 2006; Boden and Paul, 2014) hence:

*H1: Larger firms are expected to have higher levels of accounts receivable.*

### 2.2 Access to External Short-Term Finance

The helping hand theory suggests that firms with higher short-term borrowing capability are more likely to use this source of finance to grant business-to-business credit to their customers (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002; Ge and Qiu, 2007). Such firms tend to have high borrowing power, hence better access to funds and thus are expected to be in a position to grant credit to their customers that rely heavily on them to finance their working capital needs (Petersen and Rajan, 1997; Atanasova and Wilson, 2004). Wilson (2008) finds that financial strength plays a big role in the decision of investing in accounts receivable. In addition, Paul and Wilson (2006) and Boden and Paul (2014) report that this situation is often exacerbated by financial crises and distress and/or when banks tighten lending. Thus credit from suppliers is offered to substitute and/or complement other sources of funds to help valuable customers. In times of recession it is found that borrowing, through accounts receivable, becomes a source of finance for the survival and growth of firms of all sizes (Soufani and Poutziouris, 2002). We therefore expect a positive relationship between short-term lines of credit and accounts receivable hence:

> *H2: Firms with greater access to external short-term financing are expected to have*
> *higher accounts receivable.*

### 2.3 Access to Internal Short-Term Finance and Profit

Financial theory posits that profitable firms with sound internal cash-flow generating capability tend to grant credit to their customers and thus carry high receivables (Petersen and Rajan, 1997; Levchuk, 2013; Ge and Qiu, 2007). Delannay and Weill (2004) find that profitability is positively linked with the trade receivables ratio. In the same vein, Ge and Qiu, (2007) show that profitable firms are more inclined to grant credit to their customers given their healthy financial situation.

However, applying the distressed[2] firms' theory, loss-making firms may extend more credit to improve sales and keep themselves afloat (Petersen and Rajan, 1997; Summers and Wilson, 2002), and thus one would expect such firms to grant more credit and hence have higher levels of accounts receivable. In addition, Delannay and Weill (2004) and Soufani and Poutziouris, (2002) find that certain loss-making firms, by default, tend to exhibit high receivables resulting from customers taking advantage of this financial fragility to delay payment. Therefore, we anticipate that both higher profitability and higher distress lead to higher accounts receivable. We thus propose the following hypothesis:

> *H3: Operating profitability has a smile effect on accounts receivable. Specifically, firms with greater access to internal financing (higher operating profitability) hold higher levels of accounts receivable, while firms in greater distress (negative operating profitability) also hold higher levels of accounts receivable.*

Several measures have been used to proxy internal financing that is represented by the cash-flow generated from operating profit. Petersen and Rajan (1997), for instance, use net profit after tax over turnover while Rodriguez (2006) utilises the operating profit to turnover. In this study, we use the latter.

### 2.4 Sales Revenue Growth

Firms with sales growth tend to offer more credit to their customers (Petersen and Rajan, 1997; Wilson, 2008). Changes in firms' turnover, from year to year, indicate an increase/decrease in their operations and this is represented by changes in firms' revenues. Given that most business-to-business transactions are on credit, increases in sales lead to increases in accounts receivable

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[2] A firm is defined as being under distress if it has negative sales growth and negative net income (Petersen and Rajan, 1997).

level. Summers and Wilson (2002) find that small/new firms with potential same growth tend to have larger investments in receivables, relative to their total assets, as they may invest more in accounts receivable to attract new customers. In the same vein, Boden and Paul (2014) find that growing firms make relatively higher investments in their receivables as they tend to grant more credit to encourage repeated business to finance their growth. Nevertheless, those with declining sales may have greater receivables as they use credit granting as a marketing tool to improve their sales (Petersen and Rajan, 1997; Wilson, 2008). Many find a positive relationship between sales growth and accounts receivable in growing firms which decide to implement aggressive commercial strategies to increase sales (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002). In addition, Delannay and Weill (2004) find distressed firms extend more credit to their customers to boost depressed sales, sustain revenues and survive. A non-linear link between growth and receivables is therefore expected. Hence, we propose the following hypothesis:

*H4: The sales growth has a smile effect on the level of accounts receivable, namely, both positive and negative growth in sales lead to higher levels of accounts receivable.*

### 2.5 Collateral to Secure Financing

Levchuk (2013) and Hammes (2003) posit that higher asset-based firms can offer better collateral to obtain external funding that can be used to invest more on accounts receivable by give credit to customers constrained by inadequacy of collateral. They use the net fixed assets to total assets ratio to represents firms' ability to secure bank loans. They find that firms with high ratios have a greater ability to secure short-term borrowing to extend credit to customers. Similarly, Petersen and Rajan (1997) find that when firms have relatively easy access to funds through their collateral, they are in a better position to grant credit to their customers. However, they came

across some firms with low fixed assets (such as trading firms that have the bulk of their assets in current assets) that still extend trade credit in order to compete. Levchuk (2013) uses the ratio of net fixed assets to firms' total assets as a proxy to measure firms' ability to secure financing. We therefore expect collateral to be positively related to trade credit granting, hence:

> *H5: Firms with higher net fixed assets to total assets are more likely to extend more credit and thus to have higher levels of accounts receivable.*

### 2.6 Liquidity

Firms that have better access to sources of finance tend to pass on the benefit to their less liquid customers by granting them credit (Summers and Wilson, 2002; Soufani and Poutziouris, 2002; Delannay and Weill, 2004; Paul et al. 2012). This helping hand theory postulates that cash-rich firms are more willing to finance their customers' inventory to secure repeat business (Paul and Boden, 2008). So firms that have a better liquidity position tend to invest in their less liquid customers by granting them credit. Nevertheless, Marotta (2000) and Rodriguez (2006) argue that firms with a high quick ratio (liquid assets over current liabilities) may have less incentive to promote sales via granting credit due to potential overtrading and, thus, are likely to offer less credit. However, Levchuk (2013) finds that those with financial disadvantages promote sales through investment in low-return financial instruments such as trade credit. The liquidity position of firms is proxied by the quick ratio, net of commercial component (Levchuk, 2013; Marotta, 2000). So a positive relationship is expected between liquidity and accounts receivable, hence:

> *H6: Cash-rich firms have high levels of accounts receivables.*

### 2.7 Price Discrimination

Firms with high gross profit margins have a greater incentive to finance sales of additional units

via generous credit terms and hence are expected to have high receivables (Petersen and Rajan,

1997). They can use different credit terms to price discriminate between their customers (Meltzer,

1960; Schwartz and Whitcomb, 1978; Mian and Smith, 1992; Petersen and Rajan, 1997). For

instance, they may choose not to enforce the agreed terms and thus allow selected customers to

pay after the due date; this is the equivalent of price reduction (Schwartz and Whitcomb, 1978;

Paul and Boden, 2008). Such generous credit terms allow suppliers surreptitiously to violate price

regulation (Emery, 1984). In addition, it is found that those with healthy profit margins can,

effectively, afford to reduce the product price through the generous credit terms and this often

leads to additional sales (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002). Such price

discrimination is frequently used as a strategic tool to maintain customers and, indeed, to attract

more (Boden and Paul, 2014). So any credit period prolonged beyond the agreed period, without

penalty, is equivalent to a price reduction (Schwartz, 1974; Schwartz and Whitcomb, 1978). We

therefore predict a positive relationship between accounts receivable and firms' gross profit

margins. Hence:

> *H7: Firms with higher gross margins are expected to have higher levels accounts*
>
> *receivable.*

## 3. DATA, METHODS AND VARIABLES

We use secondary data to test the hypotheses developed in the preceding section. We use listed

firms on the Main and Second Board of Bursa Malaysia (under the Consumer Products and

Industrial Products sector) which collectively represent the listed manufacturing firms in

Malaysia. The data is obtained from Reuter's official website[3]using balance sheets and profit and

loss accounts for the financial years ending 2007-2011, for all listed manufacturing firms. The

annual reports are obtained from the Bursa Malaysia official website[4]. We follow Petersen and

Rajan's (1997) study and adopt a correlational approach to examine the factors that affect the

level of accounts receivable. A predictive correlational design is used to explore causality and

factors influencing other variables.

We use accounts receivable (AR) as a proxy for trade credit extension. However, because of

potential scale effect problems, we also consider a scaled version of accounts receivables, namely

accounts receivable to totals assets. We increase the scale of this variable in order to match the

scale of the dependent variables (which helps reduce the number of decimal places in the

estimated coefficients, but does not alter the results). Thus, our second dependent variable is

defined as follows:

$$\text{ARTA} = \frac{AR}{Total\ Asset} \times 1000$$

In line with our hypotheses, we use the seven independent variables which have been identified in

previous studies (Petersen and Rajan, 1997; Delannay and Weill, 2004; Soufani and Poutziouris,

2002): company size, access to internal/external financing, operating profit, sales revenue growth,

price discrimination, liquidity and collateral.

Finally, to complete our model specification, we consider several control variables. The first is a

dummy representing the firm's sector. This variable represents either consumer product or

industrial product manufacturers (in accordance with Bursa Malaysia's classification). Prior

studies such as Angappan and Nasruddin (2003) and Nasruddin (2008) included the sector as a

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[3] www.reuters.com/finance
[4] www.bursamalysia.com

control variable. This variable (SECTOR) is used to control for the well-known impact of industry

sectors and payment customs (Petersen and Rajan, 1997; Angappan and Nasruddin, 2003;

Nasruddin, 2008). Consumer products are more fast-moving than industrial products and mainly

for consumption whereas industrial products are mainly for capital goods. As a result, commercial

motives, elasticity of demand, and economies of scale are expected to be different in different

sectors. Following the Bursa Malaysia classification for the manufacturing sector, the variable

SECTOR is set equal to 0 for consumer products and 1 for industrial products. Other sectors are

not included in this study.

The second control variable is the auditor's reputation (*AUDITOR*), which identifies whether the

firm uses one of the Big Four auditing firms in Malaysia. Large firms are expected to have more

resources and technical expertise and may be more likely to use auditors of the highest reputation

(Eng and Mak, 2003; Janssen et al., 2005; Gul et al., 2009). So we use AUDITOR to control for

the possibility that firms audited by one of the Big Four extend different levels of trade compared

to those that use the services of Non-Big Four firms. The variable AUDITOR is set equal to 1 if

the firm is audited by one of the Big Four and zero otherwise.

The third variable captures the possible effect of family ownership concentration (20% or more

family ownership). Malaysia has a high level of family ownership concentration (Claessens, et al.,

2000; Claessens, et al., 2002; Ismail and Sinnadurai, 2012) and has one of the highest per capita

presences of family-owned firms in the world (Claessens et al., 2002; Ismail and Sinnadurai,

2012; Sinnadurai, 2015). Family owned-firms are more likely to enjoy enhanced earnings quality

(Wang, 2006; Ali et al., 2007) and may, therefore, grant more credit to their customers. The

control for family ownership captures ownership concentration as potential determinants of credit

granting in the same way as dividend policy (La Porta et al., 2000; Aivazian et al., 2003; Mitton,

2004). We label this variable OWN and set it equal to 1 if 20% or more of the firm's equity is family owned and zero otherwise.

Finally, the time effect is accounted for by four time dummies (T2007 to T2010), where each dummy-year is set equal to one for that particular year and zero otherwise. These four years are contrasted with the year 2006.

Since the data set consists of observations for 262 firms over five consecutive years, the estimation should be undertaken within a panel analysis framework. One advantage of a panel regression over a simple cross-section regression is that it provides more flexibility when modelling differences in behaviour across different firms. These firm-specific effects are accounted for in a natural way in panel data models. However, one particular difficulty is whether these effects should be treated as fixed or randomly distributed across firms. The fixed effects model assumes that the unobserved firm-specific effects are uncorrelated with the regressors, while in the latter case they may be correlated. Fortunately, the choice between the fixed or random effects model may be tested empirically through the Hausman test which assesses whether the firm-specific factors are correlated with the regressors. Rejection of this hypothesis implies that the firm-specific factors should be treated as fixed (deterministic) rather than random.

Table 1 provides brief definitions of the above independent variables and relates them to the study's hypotheses.

Table 1: List of Independent and Control Variables

| Hypothesis | Explanatory Variables | Definition |
|---|---|---|
| H1 | Company's size (LOGSIZE) | Log (Book Value of Assets) |
| H2 | Short-term line of credit (STCREDIT) | Financial Institutions Debts in Current Liabilities/Turnover |
| H3 | Profit and internal cash (OPEPROFIT) | Operating Profit Before Tax (OP) /Revenue(REV) |
| H4 | Sales growth (SGROWTH) | Percentage Sales Growth |
| H5 | Collateral to secure financing (COLLATERAL) | Net Fixed Assets /Total Assets |
| H6 | Liquidity (LIQUID) | Quick Ratio, i.e. the ratio of current assets (excluding |

| | | inventories) over current liabilities |
|---|---|---|
| H7 | Gross Margin (GMARGIN) | Gross Profit Margin/Revenue |
| | Industry Sector (SECTOR) | Industrial Products = '1', zero otherwise. |
| | Auditors (AUDITOR) | Big Four audit firms = '1', zero otherwise. |
| | Ownership (OWN) | Family members own 20% or more of shareholdings of company = '1', zero otherwise. |

## 4. ANALYSIS

Our data consists of 262 firms over a period of five years (2007-2011). Although a pooled time series and cross section regression is possible, the potential heterogeneity across firms may bias the results. Both fixed effect and random effect approaches are therefore adopted.

The following simple functional equation is proposed:

$$TC_{it} = \alpha_i + \beta_1 LOGSIZE_{it} + \beta_2 STCREDIT_{it} + \beta_3 OPEPROFIT_{it} + \beta_4 SGROWTH_{it}$$
$$+ \beta_5 COLLATERAL_{it} + \beta_6 LIQUID_{it} + \beta_7 GMARGIN_{it} + \beta_8 SEC_{it} + \beta_9 AUDITOR_{it}$$
$$+ \beta_{10} OWN_{it} + \beta_{11} T2007_{it} + \beta_{12} T2008_{it} + \beta_{13} T2009_{it} + \beta_{14} T2010_{it}$$

where TCit takes one of the two trade credit proxies defined earlier, for firm i in year t, and $\alpha i$ is a firm specific effect which is assumed either fixed or random depending on the panel data model adopted.

Out of the 262 publicly listed firms under study, 66% specialise in industrial products (the remainder specialising in consumer products). Over half the sample (51.14%) employs one of the Big Four auditing firms in Malaysia.

Table 2 provides summary statistics for all dependent and independent variables used in the analysis. The statistics are summarised across all firm-year observations. A typical Malaysian firm has an average accounts receivable of just over 66 million Rm. The large standard deviation of nearly 114 million Rm is indicative of large dispersion of trade credit extension in our sample. The most credit offered is more than

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1.25 billion RM. This extreme figure indicates the potential scale problem stemming from the heterogeneity in firm size across the sample. Once we scale accounts receivable by total assets, the figures look more reasonable with an average of 16.33% and a maximum of 63.19%.

Additional calculations reveal that the industrial products firms have longer days outstanding (81.64 days) compared to consumer product manufacturers (65.29 days). This is confirmed by the figures on ARTA (16.92% for the industry against 15.18% for the non-industry). However, in absolute terms, the AR of the two sectors are of similar scale (RM 67.84 million against RM 62.73 million) although the industry sector is marginally higher. These results are in line with Angappan and Nasruddin (2003), who find that industrial product manufacturers have higher trade credit levels compared with consumer product manufacturers.

The remaining independent variables also show large variability and extreme cases. The short-term credit also reflects a substantial diversity within our sample. The average availability of debt (current liabilities) relative to turnover is 0.249%. Given a standard deviation of 0.464, which would roughly mean that 95% of firms have credit availability of less than 1.2%, this indicates that the majority of firms have little access to external funding. Nevertheless, there are a few firms that have much healthier access to credit (the maximum being 5.856%).

The operating profit is negative on average. This is not surprising since our sample coincides with the global meltdown of the credit crunch. The growth in sales is about 11% on average, but includes extremes on both sides. While some firms' growth declined by nearly 94%, that of others exploded by more than 2,254%. The collateral also shows a substantial diversity in our sample. Although the average is around 3% (with more than 90% of the firms having less than 9% collateral) there are some outliers with 46.349%. The liquidity is very similar. Finally, the gross margin shows a positive average profitability of nearly 18%, but a substantial number of firms witnessed losses (the standard deviation suggesting that about 95% of firms had gross margins between roughly -10% and 46%).

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Pearson's pairwise correlation matrix is shown in Table 3. As can be seen, the largest correlation is between gross margin and operating profit. Although significant at the 1% level, the correlation is well below the usual recommended threshold of 0.8 (Gujarati, 2006). The lowest correlation is -0.358 between short-term credit and operating profit. Overall, the pairwise correlations between the independent variables do not suggest that multicollinearity is an issue.

Table 2 Summary Statistics of the Main Dependent and Independent Variables

| Series | Mean | Std. Error | Minimum | Maximum |
|---|---|---|---|---|
| AR (million Rm) | 66.107 | 113.996 | 0.000 | 1254.185 |
| ARTA (%) | 16.329 | 9.831 | 0.000 | 63.189 |
| LOGSIZE (log Million Rm) | 5.483 | 1.177 | 3.131 | 10.171 |
| STCREDIT (%) | 0.249 | 0.464 | 0.000 | 5.856 |
| OPEPROFIT (million Rm) | -0.376 | 41.465 | -873.564 | 270.306 |
| SGROWTH (%) | 11.058 | 84.887 | -93.987 | 2254.707 |
| COLLATERAL (%) | 3.057 | 3.241 | 0.000 | 41.989 |
| LIQUID (%) | 2.635 | 2.987 | 0.105 | 46.349 |
| GMARGIN (%) | 17.912 | 13.977 | -71.227 | 86.280 |

Table 3. Pairwise Correlations of the Main Independent Variables

| | LOGSIZE | STCREDIT | OPEPROFIT | SGROWTH | COLLATERAL | LIQUID |
|---|---|---|---|---|---|---|
| CREDIT | -0.037 | | | | | |
| OPERPROFIT | 0.143** | -0.358** | | | | |
| SGROWTH | 0.049 | -0.070* | 0.091** | | | |
| COLLATERAL | 0.080** | -0.174** | 0.104** | 0.068* | | |
| LIQUID | -0.087** | -0.240** | 0.100** | -0.034 | -0.023 | |
| GMARGIN | 0.113** | -0.168** | 0.378** | 0.060 | -0.008 | 0.103** |

** significant at the 1% level. * significant at the 5% level.

## 5. DISCUSSION

Table 4 presents the results for the random and fixed effect models for the two dependent variables. In both cases the Hausman specification test are highly significant and suggest that the fixed effect models are more appropriate. The coefficients for the sector (SEC) and ownership (OWN) dummies are not estimated under the fixed specification since the fixed effect model wipes out time invariant variables (including the intercept). We will therefore rely on the random effect estimates of these dummy variables

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while for the remaining coefficients we use the fixed effect estimates.

The two fixed effect models explain a significant portion of the variability of the trade credit measures. The R-squares are 86.9% and 84.6% for AR and ARTA respectively, whereas both F-statistics are highly significant, suggesting that the overall fit is statistically significant. Although the fit is very good in both cases, the relative (ARTA) and absolute (AR) measures of trade credit do not coincide. The level of trade credit (AR) is explained almost exclusively by size. In the AR model, the coefficient associated with LOGSIZE is highly significant and positive, suggesting that larger firms grant more trade credit. This result could have two explanations. One obvious, but less likely, explanation is that only size matters for trade credit. If we were to accept this explanation, then only the first hypothesis can be confirmed. However, a more reasonable explanation is that these results are likely to be due to the scale effect. In other words, the results are driven by the fact that some firms are larger than others. Since larger firms have relatively larger sales, accounts receivable are naturally greater for larger firms. This effect could be so important that the other explanations such as collateral or liquidity are dwarfed and rendered statistically insignificant. This suggests that AR is not an appropriate measure for trade credit since the scale effect dominates and obscures other variables. The only other significant variable for the AR model is sales growth.

The model for the relative measure, ARTA, shows a more reasonable outcome, albeit with a marginally lower coefficient of determination. Given the lower R-squares, it is clear that size does not dominate the other variables. More importantly, size has a negative effect on trade credit (larger firms extend less trade credit relative to their size). The coefficient of log-size is -14.36, and suggests that an increase from the average firm size of 244 million Rm (5.48 log-million Rm) to 665 million RM (6.46 log-million RM) reduces the trade credit by slightly more than 14%.

Short-term credit is highly significant and suggests that a 1 percentage point increase in short-term external finance leads to a decrease in trade credit of around 13%.

Sales growth is modelled with a quadratic term in order to capture non-linearity. Our two sub-hypotheses H4a and H4b state that both increasing growth and decreasing growth lead to higher trade credit (smile pattern). This can be captured by the linear (SGROWTH) and quadratic (SGROWTH2) terms. The smile pattern would be indicated by a negative linear coefficient and a positive quadratic coefficient. The results suggest the opposite of the smile pattern, since the linear term is positive (=0.211) and significant while the quadratic coefficient is negative (=-0.0001) and significant. This means that a decrease in sales always decreases trade credit. At the same time, increasing sales always leads to increases trade credit, albeit at a decreasing rate.

Collateral is highly significant and has a positive coefficient, suggesting that a one percentage point increase in collateral increases trade credit by 3.56%.

The remaining variables, namely operating profit (H3) and liquidity (H6), and gross margin (H7) are insignificant.

The control variables have a mixed effect. The sector, auditor and ownership dummies are insignificant (as suggested by the random effect model). The second group of the control variables are the time dummies related to the crisis period. The 2007 dummy is insignificant, meaning that there was no difference in trade credit between 2006 and 2007. This is expected as the year 2007 was the beginning the latest credit crunch whereas ARTA is a stock variable that cumulates over one or more years. However, the crisis was clearly felt a year later, starting from 2008. Indeed, the dummies for 2008, 2009 and 2010 are all highly significant and negative. Thus, the crisis reduced the average relative trade credit, probably as a result of financial difficulties, and the increased default risk faced by suppliers.

Table 4. Fixed and Random Effect Panel Data Estimation Results

|  | Fixed Effect | | | | Random Effect | | | |
|  | AR | | ARTA | | AR | | ARTA | |
|  | coeff | p-val | coeff | p-val | Coeff | p-val | coeff | p-val |
| Intercept |  |  |  |  | -252.802 | 0.000 | 274.935 | 0.000 |
|  |  |  |  |  |  |  |  |  |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| LOGSIZE | 29.782 | 0.000 | -14.360 | 0.028 | 59.228 | 0.000 | -21.214 | 0.000 |
| STCREDIT | -0.935 | 0.832 | -13.124 | 0.001 | -4.133 | 0.328 | -13.885 | 0.000 |
| OPEPROFIT | -0.014 | 0.833 | 0.112 | 0.078 | -0.049 | 0.466 | 0.113 | 0.069 |
| OPEPROFIT2 | -0.0001 | 0.853 | 0.0001 | 0.234 | 0.000 | 0.493 | 0.000 | 0.263 |
| SGROWTH | 0.105 | 0.013 | 0.211 | 0.000 | 0.089 | 0.031 | 0.204 | 0.000 |
| SGROWTH2 | -0.0001 | 0.029 | -0.0001 | 0.000 | 0.000 | 0.048 | 0.000 | 0.000 |
| COLLATERAL | 0.073 | 0.945 | 3.562 | 0.000 | 0.561 | 0.534 | 5.168 | 0.000 |
| LIQUID | 0.382 | 0.613 | -0.860 | 0.220 | 0.362 | 0.608 | -1.538 | 0.021 |
| GMARGIN | -0.172 | 0.468 | -0.298 | 0.175 | -0.390 | 0.065 | -0.271 | 0.183 |
| SEC | | | | | -1.307 | 0.903 | 19.570 | 0.113 |
| AUDITOR | | | | | 8.465 | 0.403 | 4.694 | 0.680 |
| OWN | | | | | 2.708 | 0.790 | -9.963 | 0.393 |
| T2007 | -2.254 | 0.584 | 0.971 | 0.800 | -4.534 | 0.264 | 0.261 | 0.945 |
| T2008 | -2.136 | 0.612 | -10.289 | 0.009 | -5.712 | 0.164 | -11.271 | 0.003 |
| T2009 | -7.105 | 0.097 | -19.565 | 0.000 | -11.178 | 0.007 | -20.068 | 0.000 |
| T2010 | -3.261 | 0.439 | -22.331 | 0.000 | -7.543 | 0.065 | -22.809 | 0.000 |
| R2 | 0.869 | | 0.846 | | | | | |
| Regression F | 24.965 | | 20.686 | | | | | |
| p-val (F) | 0.000 | | 0.000 | | | | | |
| Log Likelihood | | | | | -7204.54 | | -7159.16 | |
| Hausman Test | | | | | 31.609 | | 35.187 | |
| p-val | | | | | 0.001 | | 0.000 | |

Notes: The dependent variable is the accounts receivables over total revenue reported by the firms extracted from www.reuters.com/finance/stocks.
The coefficients are estimated using ordinary least squares (OLS) and the reported t-statistics are White-   adjusted values to control for heteroscedasticity.
***, **, * Significant at 1%, 5% and 10% level.

## 5. DISCUSSION

Our results are summarised on Table 5. One important result   in this paper relates to the involvement of size in both the definition of and impact on trade credit. If we defined trade credit in level terms as accounts receivable, then size is not only positively related to trade credit, but also virtually the only variable that matters. We argue that this scale effect should be controlled for, since large firms naturally grant more trade credit on average. Controlling for the scale effect through the use of accounts receivable to total assets (ARTA) reveals interesting insights.

First, contrary to expectation, our results show that larger Malaysian manufacturing firms grant less trade credit. Nevertheless, this result is in line with Soufani and Poutziouris (2002) and Delannay and Weill (2004) who argue that under market power theory, larger firms have a better bargaining position in the

trading relationship and, as such, may not need to use trade credit to sell their goods/services. In fact, given their bargaining power, larger firm are capable of imposing stricter conditions for payments and thus may capitalise on their position to reduce the costs associated with holding considerable amounts of receivables. In addition, Smith (1987) and Paul and Boden (2008) argue that larger firms tend to have a good reputation, and tend to grant less trade credit to their customers who do not need extended time to inspect the quality of the products. However, as we reported in the literature review section, the majority of existing empirical work has shown a positive relationship between size and trade credit. Although the result could be partly sensitive to methodological issues (we would have confirmed a positive relationship under an accounts receivable definition), it could also be specific to Malaysia. Malaysian manufacturing firms may be more efficient at collecting debt, or may simply have more market power compared with their counterparts in the industrialised economies. Overall, we find insufficient evidence in our sample of firms to confirm our first hypothesis.

Second, the results show that firms in our sample that have access to short-term finance are less likely to grant trade credit. This suggests that the helping-hand theory does not hold as far as the Malaysian manufacturing firms are concerned: firm that have better access to short-term finance in Malaysia do not use trade credit to pass on the benefit to their customers by granting them trade credit. Our second hypothesis is therefore rejected.

Operating profit is found to play no significant role in determining trade credit. While our third hypothesis predicted a smile effect (a negative linear coefficient and a positive quadratic coefficient), the result show that the two coefficients are not significantly different from zero at the 5% level of significance. Thus, we conclude that whether a firm is more or less profitable has no consequence on trade credit granting; the third hypothesis is therefore rejected.

Our fourth hypothesis, suggesting the change in sales has a smile effect, is also rejected. Our results show that when sales increase, the level of trade credit granted increases with them. On the other hand, when

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sales decrease, trade credit decreases with them but at an increasing rate. This is clearly contrary to prior findings which argue that when the level of sales decreases, firms use trade credit to increase their sales (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002; Delannay, 2004; Wilson, 2008).

Collateral is positively correlated with the level of accounts receivable in Malaysian manufacturing firms. It seems to play a significant role in the decision of accounts receivable level, implying that those with higher tangibility can collateralise their assets to obtain external financing to fund their working capital, inter alia, passing on the benefit to their customers by extending them credit though accounts receivable. This finding is consistent with Levchuk (2013), Petersen and Rajan (1997) and Boden and Paul (2014). Our fifth hypothesis is, therefore, the only one we could confirm for Malaysian manufacturing firms.

Finally, we found no evidence to support the remaining hypotheses, Liquidity (H6) and gross margin (H7) both being statistically insignificant.

## 7. CONCLUSION

Investment in accounts receivable, in the Malaysian manufacturing sector, is impacted by many of the factors implied by either theory or empirical evidence. However, our main finding in this paper is that the Malaysian manufacturing sector is rather different. First, while liquidity and gross margin have been found to have a positive and significant effect on accounts receivable helping-hand theory in prior studies, our results show that these two factors play no role in influencing the level of accounts receivable in the Malaysian manufacturing sector. Second, operating profit was expected to have a U-shape effect based on prior findings. This too is not supported by our results, which suggest that operating profit has no role in determining the scale of accounts receivable. Third, while size, short-term credit and sales growth have been found to be significant, they are nevertheless inconsistent with the expected direction of relationship. Both size and short-term credit were expected to play a positive role, but were found to have a negative effect instead. Note, however, that size does have a positive effect on accounts receivable, which is an

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absolute measure of trade credit. However, we argue that accounts receivable are naturally linked to firm size and should be descaled in order to provide a more relevant measure of trade credit. The only variable that is consistent with prior studies is collateral. This factor was found to have a positive effect as expected. That collateral is positively associated with trade credit is the only hypothesis confirmed by this study.

Our results have two principal implications. First, policy makers should not take a holistic view of the trade credit market. Given that policy makers aim to improve liquidity and trade they should design policies that are not only country specific but also sector specific. As is clear from our results, what holds for other countries or sectors may not necessarily be true for the Malaysian manufacturing sector. For example, if size is positively linked to trade credit, then government policy (via some incentive scheme, for example) should target smaller firms because they offer less trade credit. On the other hand, in the Malaysian manufacturing sector, the policy should be directed towards larger firms. Second, trade credit research is highly sensitive to the definition of trade credit. Results, therefore, depend primarily on the proxy the researcher uses for trade credit. We find clear evidence that the use of accounts receivable is likely to distort findings and affect the validity of empirical results.

**Table 5: Summary Results of Factors Influencing Accounts Receivable in the Malaysian Manufacturing Sector**

| No. | Hypothesis | t-statistics ('+'= positive, '-' = negative) | Expected Results | Results Obtained | Comments |
|---|---|---|---|---|---|
| H1 | **Company's Size (SIZE)** Larger firms will grant more trade credit to their customers if the financing and helping hand theories hold true and under market power theory, the opposite is true if larger firms grant less trade credit. | – | + | Significant*** | Large firms will grant less trade credit (Market power theory supported) |
| H2 | **Short-term Line of Credit (STCREDIT)** Firms with greater access to external short-term financing will grant more trade credit, if financing and helping hand theories hold true. | + | + | Not Significant | Financing and helping hand theories not supported |
| H3a | **Profit and Internal Cash (OPEPROFIT)** Firms with greater access to internal financing (higher operating profitability) will extend more trade credit, if the financing and helping hand theory hold true. | + | + | Not Significant | Financing and helping hand theories not supported |
| H3b | Contrary to the financing and helping hand theories, firms in distress (negative operating profitability) will also extend more trade credit to survive. | – | – | Not Significant | Not supported |
| H4a | **Sales Growth (GROWTH)** Firms that have positive sales growth will extend more credit, if the commercial motive holds true. | – | + | Not Significant | Not supported |
| H4b | Contrary to the commercial motive, distressed/loss-making firms offer more trade credit despite negative sales growth for business survival. | – | – | Not Significant | Not supported |
| H5 | **Collateral to secure financing (COLLATERAL)** Firms with higher collateral (net fixed assets to total assets) have better ability to secure external borrowings to extend trade credit (financing and helping hand theory) and the opposite is true under the market power theory. | – | + | Significant*** | Market power theory supported. Financing and helping hand theories not supported. |
| H6 | **Liquidity (LIQUID)** Firms with high liquidity have less incentive to promote sales via trade credit if the market power theory holds true and under the financial and helping hand theories. the opposite is true if firms with higher liquidity extend more trade credit. | – | – | Significant** | Market power theory supported. Financing and helping hand theories not supported |
| H7 | **Incentive to Price Discriminate - Gross Margin (GROSS)** Firms with higher gross margin extend more credit, if the price discrimination theory holds true. | + | + | Significant*/** (Model 1* and Model 2**) | Price discrimination theory supported. |

Note: Unless specified, the results are for all the two models, Model 1 – the basic model, Model 2 – the extended model of significance ***, **, * at 1%, 5%, 10%, respectively.

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# WHY DO FIRMS INVEST IN ACCOUNTS RECEIVABLE? AN EMPIRICAL INVESTIGATION OF THE MALAYSIAN MANUFACTURING SECTOR

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## ABSTRACT

The purpose of this paper is to investigate the factors that influence Malaysian manufacturing sector investment in accounts receivable, an asset seen by many as one of the riskiest in any company's balance sheet. We test several theories, related to accounts receivable, using a cross-section of 262 listed manufacturing firms over a period of five years (2007-2011). Both fixed and random effect approaches are adopted to deal with potential heterogeneity across firms. Our results show that the absolute level of accounts receivable is almost exclusively explained by size. However, the ratio of accounts receivable to assets is influenced by firm size, short-term finance, sales growth, and collateral. Profit, liquidity and gross margin have no role in affecting the decision to grant trade credit to customers. Our results are mostly inconsistent with previous studies. Size and short-term finance have a negative, rather than positive, impact. Liquidity and gross margin have no, rather than a positive, effect. Profit and sales growth are expected to exhibit a U-shaped relationship with investment in accounts receivable. We found that the former is insignificant while the latter is strictly increasing. The only factor found to be consistent with prior studies, in developed counties, is collateral. Our findings may have important implications for policy makers in Malaysia and other emerging economies.

## 1. INTRODUCTION

Accounts receivable (AR) occur when suppliers of goods and services[1] sell on credit and thus allow their customers to defer payment to a later date. This type of credit is granted by firms whose primary business is to sell goods, rather than to provide finance to customers. Sale on credit creates AR, a current asset in the balance sheet of suppliers. Thus, AR are the amounts outstanding payable by customers to their suppliers. Given the high volume of sales on credit between businesses, AR are especially high and are considered by many as the riskiest asset in a firm's balance sheet (Pike and Cheng, 2001; Wilson and Summers, 2002; Boden and Paul, 2014).

There has been sustained interest in managing the level of AR from both academics and practitioners, each emphasising the permanent character of this short-term but continuously renewed investment and its strategic potential due to the existence of financial, tax-based, operating, transaction and pricing motives (Asselbergh, 1999). Increasingly, the focus has shifted to the efficiency of AR management and its relationship with profitability, in both developing and developed countries (see, for example, the studies of Michalski (2012)[2] in Poland; Raheman, and Nasr (2007) in Pakistan; Gill, Biger, and Mathur (2010) in the USA; and Singh, Kumar, and Colombage (2017) in India). However, whilst there is ample evidence as to why companies in developed countries continue to invest in AR, it is not clear whether firms within the developing world have a similar experience.

This brings us to the important question of why firms in Malaysia invest in this risky asset. Previous research from developed economies has evidenced a variety of reasons as to why firms accept delayed payment and invest in this low-return, high-risk asset (Paul and Boden, 2008). Specifically, although selling on credit increases sales and often improves customer loyalty, it nevertheless increases financial costs and exposes firms to significant risks associated with delayed payment and default. The increased risk involved with trade credit may be particularly relevant to Malaysia. Indeed, during the

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[1] Henceforth, we shall use goods to mean goods and or services.
[2] G Michalski - 2012 Efficiency of accounts receivable management in Polish institutions-papers.ssrn.com

1997 Asian financial crisis, a credit squeeze was cited as one of the main causes of the collapse of many Malaysian firms (Thomas, 2002). Clearly, there is a lot at stake, and the risk exposure related to AR in Malaysian firms may well exceed the levels experienced in the developed world. Thus, given the risk exposure threatening Malaysian firms, it is surprising to find that little research has been conducted as to the factors that influence their decision of such firms to carry high levels of AR and so incur costs related to investing in this low-return/high-risk asset.

A substantial body of theoretical and empirical work has been dedicated to developed economies, especially the US and the UK. These studies suggested a multitude of potential factors that influence AR. However, very little research has been carried out on Malaysia. Our aim is to fill this gap in the literature by extending our knowledge of AR in one emerging economy and potentially drawing lessons for other such economies and developing countries. Specifically, our aim is to test on a cross section of Malaysian manufacturing firms, the various theories developed within industrialised economies. This will shed light on the various reasons that Malaysian businesses invest in AR and assess the relevance of various factors affecting the decision to grant trade credit. To our knowledge, this is the first study that looks at the factors that influence AR levels in the Malaysian manufacturing sector.

Furthermore, the Malaysian manufacturing sector accounts for approximately 30% of Malaysian GDP. However, the sector suffers from late payment problems (Infocredit D&B, 2005).[3] High levels of AR are often imposed on companies that are pressured into granting credit to customers in order to survive and compete (Paul *et al*., 2012). Moreover, the Malaysian legal process for debt recovery is tedious, time-consuming and costly (Thomas, 2002). Ge and Qiu (2007) find that firms in less developed Asian economies rely more on business-to-business borrowing compared to firms from more developed economies.

Whilst banks and financial companies are bracing themselves to deal with the implementation of IFRS 9, effective from 1st January 2018, we expect the attention of non-financial companies to be directed towards managing their AR. Receivables management is an important tool for the elimination of credit losses and constitutes an essential part of the financial management of each company. Thus, understanding the

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[3] As reported in the Credence by Infocredit, Issue 2, July to Sept 2005.

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determinants of credit extension is critical. Our paper contributes to the existing literature on trade receivables management from an emerging economy perspective. It serves to bring focus to a topic that is almost ignored in most emerging economies but which will gain prominence with the implementation of IFRS 9.

The rest of the paper is organised into five sections. In section 2, we explain, by reference to the literature, the factors that incentivise firms to grant loans to their customers through AR and develop a number of hypotheses. In section 3, we explain the methodology used in the study and this is followed by a presentation of the models used for the empirical investigation in section 4. Section 5 discusses the results, and then sets out the conclusions.

## 2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Trade credit is a practice as old as trade itself. At its heart lies the precept that customers will honour their commitment to make payment at the agreed time. Sellers agree to a time lapse between the delivery of goods and the payment for them. These deliveries are recorded as AR. However, although AR may help boost sales, payment delays or even defaults may and do occur. As such, AR also creates potential costs that can exceed the benefits gained by selling on credit. This two-sided contingency makes investing in AR a complex decision for businesses and an interesting phenomenon to academics.

However, despite potential losses, evidence from markets around the world shows that most business-to-business transactions are undertaken on credit, often resulting in high levels of AR (Summers and Wilson, 2002; Kling et al., 2014). Trade credit is very important; it is greater in volume than the flows of short-term bank borrowing in nearly all developing and industrialised countries (Guido 2003; Blasio, 2003). In the UK, for instance, AR stand at around 37% of total business assets (Paul and Wilson, 2006, 2007). In both the UK and the USA, trade credit exceeds the primary money supply by a factor of about 1.5. Trade credit is considered one of the most important forms of finance, exceeding the short-term business lending of the entire banking system (Lee and Stowe, 1993; Ng et al., 1999; Wilson and Summers, 2002; Aaronson et al., 2004; Boden and Paul, 2014). Kling et al. (2014) examine the link between trade and short term bank credit and provide evidence that they are complementary, a finding that was also supported by

both Bias and Gollier (1997) and Burkart and Ellingsen (2004). Trade credit is therefore an important source of trade liquidity, as well as a useful source of money supply.

At the micro level, trade credit is seen by firms as an essential marketing tool that helps their competitiveness and growth (Ferrando and Mulier, 2013). Ai-guo (2006) finds that firms invest in AR to reinforce their market position, making them more competitive, increasing their sales and reducing their inventories. Kling et al. (2014) find that UK firms have had to invest in AR to maintain sales and remain competitive.

Trade credit is also an essential part of working capital; the level of AR has a direct impact on other elements of firms' working capital, such as cash flow and inventory holding. Michalski (2012) reports that any change in the level of AR affects the level of working capital. It is often argued that cash volatility, for instance, affects the AR level and that firms with limited access to external funds invest less in AR (Summers and Wilson, 2002). In the same vein, firms with higher cash-flow volatility tend to hold higher levels of cash and hence to invest less in AR by reducing the level of credit granted to their customers (Molina and Preve, 2009; Bates, Kahle and Stulz, 2009). Choi and Kim (2003) find that firms tend to increase their AR level when the level of their inventories rises.

Others argue that investing in AR is a way of channelling funds from cash rich firms to their financially constrained customers (Ge and Qiu, 2007; Garcia-Appendini and Montoriol-Garriga, 2013; Levchuk, 2013) with the aim of enhancing long-term relationships. Others still report a positive relationship between the level of AR and the increase in shareholder wealth (Hill, et al., 2013). Nevertheless, too high a level of AR can be associated with lower profitability (Padachi, 2006) as sellers are effectively financing their customers' inventory for an agreed period into the future, and granting credit entails substantial costs as well as risks. If AR can increase both the cost of credit and the risk of default, it begs the question as to why companies invest in this asset at all.

Rationally, the risks of investing in AR should be outweighed by the benefits discussed above (Paul and Boden, 2008; Ferrando and Mulier, 2013). Some have argued that the benefits result from a reduction in transaction costs: selling on credit allows firms to accumulate invoices for payment and reduce their transaction costs and this may incentivise them to invest more in AR (Main and Smith, 1982; Petersen and Rajan, 1997; Pike and Cheng, 2001; Soufani and Poutziouris, 2002). Others have emphasised the benefits gained from building customer relationship to help repeat business and thus gain

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competitive advantage (Jacob, 1994; Wilson and Summers, 2002; Fisman and Raturi, 2004; Cuñat, 2007; Burkart et al., 2011). Other still looked at the helping hand theory where, through trade credit, funds are channelling from cash-rich firms to those with limited borrowing power in the supply chain (Petersen and Rajan, 1997; Pike and Cheng, 2001; Atansova and Wilson, 2003). This process facilitates financial efficiency across supply chains between suppliers and customers (Hoffman and Kotzab, 2010). It is also argued that the benefits come from better communication between buyers and sellers (Jain, 2001; Wilson, 2008; Boden and Paul 2014). Investment in AR leads to mitigating the asymmetry of information for both parties. Buyers have time to inspect the quality of the goods before payment, and sellers to collect important information about the buyers' financial health through risk assessment before granting credit. Therefore, in the process of granting credit, buyers and sellers gain vital information about each other. The warranty of product quality reduces the risk of late payment and default, whereas the information collected in the process can be used effectively to assess the creditworthiness of customers before further credit is granted. This can speed up the return on AR.

A number of theories have been developed to explain the factors influencing the level of AR (Petersen and Rajan, 1997; Wilson and Summers, 2002; Pike and Chen, 2002; Paul and Boden, 2008, 2011; Boden and Paul, 2014). Some theories emphasise the role of factors such as company size, access to internal/external financing, operating profit and sales revenue growth, liquidity and collateral (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002; Paul and Boden, 2008). Others have added factors such as industry norms (Wilson, 2008; Paul and Boden, 2011), the reputation of the firm's auditor (Gul, et al., 2009; Paul et al., 2012) and ownership (Martínez et al., 2007; Carney and Child, 2012). Empirical support for the relevance of the various extant theories in this area can be found in the work of, for example, Petersen and Rajan, (1997), Marotta (2000), Pike and Cheng (2002), Soufani and Poutziouris (2002), Levchuk, (2013), Delannay and Weill (2004), Rodriguez (2006). However, there is very little empirical evidence on the role of the proposed factors in explaining how much firms are prepared to invest in AR within emerging and developing economies, especially in Asia (Zainudin, 2008; Love and Zaidi, 2010). Most of the empirical literature has focused particularly on the US and the UK.

In the next subsections, we describe the factors put forward in the literature to explain decisions on the level of AR and these include: firm size, access to internal/external financing, operating profit, sales revenue growth, price discrimination, liquidity and

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collateral to secure financing. Based on the literature, seven hypotheses are proposed to examine the determinants of the scale of AR in the Malaysian manufacturing sector.

## 2.1. Firm Size

It is argued that firm size plays a major role in determining the scale of AR. Larger firms are perceived to be more creditworthy and to have a higher capacity for greater investment in AR by granting more credit to their customers (Petersen and Rajan, 1997; Main and Smith, 1982; Pike and Cheng, 2001; Soufani and Poutziouris, 2002). They also have too high a transaction volume to deal with cash sales and may already hold high AR levels (Summers and Wilson, 2002; Boden and Paul, 2014). Nevertheless, market power theory suggests that larger firms tend to have a stronger bargaining position in the trading relationship with their customers and, thus, may not need to hold considerable amounts of AR. Consequently, they impose stricter conditions for payments (Delannay and Weill, 2004). However, most empirical evidence shows that characteristics such as firm size *do* play a positive effect on the level of AR (Ng *et al*., 1999; Petersen and Rajan, 1997; Wilson and Summers, 2002; Delannay and Weill, 2004; Paul and Wilson, 2006; Boden and Paul, 2014). Hence:

*H1: Larger firms tend to invest more in AR.*

## 2.2. Access to External Short-Term Finance

Financial strength plays a major role in the decision to invest in AR (Wilson, 2008) Thus firms with borrowing capability are more likely to invest in AR by granting more credit to their customers (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002; Ge and Qiu, 2007). Such firms tend to have high borrowing power, and are thus expected to invest more in AR, so helping those customers which rely heavily on them to finance their working capital needs (Petersen and Rajan, 1997; Atanasova and Wilson, 2004). Thus, credit from suppliers is offered to complement, and/or substitute for, other sources of funds to help valuable customers. Furthermore, lack of finance is often exacerbated by financial crises and, when banks tighten lending, so trade borrowing becomes a source of finance for the survival and growth of firms of all sizes (Soufani and Poutziouris, 2002). We therefore expect a positive relationship between short-term lines of credit and AR:

*H2: Firms with greater access to external short-term financing are expected to invest more in AR.*

## 2.3 Access to Internal Short-Term Finance and Profit

Financial theory posits that profitable firms with sound internal cash-flow generating capability tend to grant credit to their customers and thus carry high AR levels (Petersen and Rajan, 1997; Ge and Qiu, 2007; Levchuk, 2013). Delannay and Weill (2004) find that profitability is positively linked with the AR ratio. In the same vein, Ge and Qiu, (2007) show that, given their healthy financial situation, profitable firms are more inclined to grant credit to their customers. However, applying the distressed[4] firms' theory, loss-making firms may extend more credit to improve sales and keep themselves afloat (Petersen and Rajan, 1997; Summers and Wilson, 2002). Thus, one would expect such firms to grant more credit and hence have higher levels of AR. In addition, Delannay and Weill (2004) and Soufani and Poutziouris, (2002) find that certain loss-making firms, by default, tend to exhibit high AR resulting from customers taking advantage of this financial fragility to delay payment. Therefore, we anticipate that both higher profitability and higher distress lead to higher AR. We thus propose the following hypothesis:

> *H3: Operating profitability has a smile effect on AR. Specifically, firms with greater access to internal financing (higher operating profitability) invest in higher levels of AR, while firms in greater distress (negative operating profitability) also invest in higher levels of AR.*

Several measures have been used to proxy internal financing represented by the cash flow generated from operating profit. Petersen and Rajan (1997), for instance, use net profit after tax over turnover while Rodriguez (2006) utilises the operating profit to turnover. In this study, we use the latter.

### 2.4. Sales Revenue Growth

Given that most transactions are on credit, increases in sales lead to increases in the AR level. Thus, firms with sales growth may offer more credit to their customers and hence invest more in AR (Petersen and Rajan, 1997; Wilson, 2008). It is argued that small/new firms with potential for growth tend to have larger investments in AR, relative to their total assets, as they are inclined to grant more credit to encourage repeated business to finance further growth (Summers and Wilson, 2002; Boden and Paul, 2014). Nevertheless, those with declining sales may have greater AR as they use trade credit as a marketing tool to improve their sales (Petersen and Rajan, 1997; Wilson, 2008). Many find a positive relationship between sales growth and AR in expanding firms, which

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[4] A firm is defined as being under distress if it has negative sales growth and negative net income (Petersen and Rajan, 1997).

decide to implement aggressive commercial strategies to increase sales (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002). In addition, distressed firms extend more credit to boost depressed sales in a bid to survive (Delannay and Weill, 2004). A non-linear link between growth and AR is therefore expected. Hence, we propose the following hypothesis:

*H4: Sales growth has a smile effect on the level of AR, namely, both small (negative) and big growth in sales lead to higher levels of AR.*

### 2.5. Collateral to Secure Financing

Levchuk (2013) and Hammes (2003) posit that higher asset based firms can offer better collateral to obtain external funding that can then be used to invest in more AR by granting credit to customers constrained by inadequacy of collateral. They use the net fixed assets to total assets ratio to represents firms' ability to secure bank loans and find that firms with high ratios have a greater ability to secure short-term borrowing to invest in AR. Similarly, Petersen and Rajan (1997) find that when firms have relatively easy access to funds through their collateral, they tend to have high levels of AR. However, they came across some firms with low fixed assets (such as trading firms, the bulk of whose assets are current assets) that still grant trade credit in order to compete. Levchuk (2013) uses firms' net fixed assets to total assets ratio as a proxy to measure their ability to secure financing. We therefore expect collateral to be positively related to the level of AR, hence:

*H5: Firms with higher net fixed assets to total assets are more likely to grant credit and thus to invest in higher levels of AR.*

### 2.6. Liquidity

Firms with healthy liquidity tend to hold high AR levels (Summers and Wilson, 2002; Soufani and Poutziouris, 2002; Delannay and Weill, 2004; and Paul et al. 2012). They are more willing to finance their customers' inventory to secure repeat business (Paul and Boden, 2008). Thus those with greater liquidity tend to invest in their less liquid customers by granting them credit. Nevertheless, Marotta (2000) and Rodriguez (2006) argue that firms with a high quick ratio (liquid assets over current liabilities) may have less incentive to promote sales through granting credit due to potential overtrading and, thus, are likely to offer less credit. However, Levchuk (2013) finds that those with financial disadvantages promote sales through investment in low-return financial instruments such as AR. The liquidity position of firms is proxied by the quick ratio, net

of commercial components (Levchuk, 2013; Marotta, 2000) and so a positive relationship is expected between liquidity and the level of AR, hence:

*H6: Cash-rich firms invest in higher levels of AR.*

### 2.7. Price Discrimination

Firms with high gross profit margins have a greater incentive to finance sales of additional units via generous credit terms and hence are expected to have a high level of AR (Petersen and Rajan, 1997). They can use different credit terms to price discriminate between their customers (Meltzer, 1960; Schwartz and Whitcomb, 1978; Mian and Smith, 1992; Petersen and Rajan, 1997). For instance, they may choose not to enforce the agreed terms and thus allow selected customers to pay after the due date; this is the equivalent of a price reduction (Schwartz, 1974; Schwartz and Whitcomb, 1978; Paul and Boden, 2008). Such generous credit terms allow suppliers surreptitiously to violate price regulation (Emery, 1984). In addition, those with healthy profit margins can, effectively, afford to reduce the product price through the generous credit terms and this often leads to additional sales (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002). We therefore predict a positive relationship between the level of AR and firms' gross profit margins, hence:

*H7: Firms with higher gross margins are expected to have higher levels AR.*

## 3. DATA, METHOD AND VARIABLES

Secondary data is used to test the hypotheses developed in the preceding section. We use the firms listed on the Main and Second Board of Bursa Malaysia (under the Consumer Products and Industrial Products sector), collectively representing all listed manufacturing firms in Malaysia. The data is obtained from Reuter's official website[5] using balance sheets and profit and loss accounts for the financial years ending 2007 to 2011 (inclusive). This data is then complemented by annual reports, obtained from the Bursa Malaysia official website.[6] We follow Petersen and Rajan's (1997) study and adopt a correlational approach to examine the factors that affect the level of AR. A predictive correlational design is used to explore causality and factors influencing other variables.

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[5] www.reuters.com/finance

[6] www.bursamalysia.com

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We use AR as a proxy for the granting of trade credit. However, because of potential scale effect problems, we also consider a scaled version of AR, namely AR to totals assets (AR/TA). We increase the scale of this variable in order to match the scale of the dependent variables (which helps reduce the number of decimal places in the estimated coefficients, but does not alter the results). Thus, our second dependent variable is defined as follows:

$$\text{ARTA} = \frac{AR}{Total\ Asset} \times 1000$$

In line with our hypotheses, we use seven independent variables, which have been identified in previous studies (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002; Delannay and Weill, 2004): company size, access to internal/external financing, operating profit, sales revenue growth, price discrimination, liquidity and collateral.

Finally, to complete our model specification, we consider several control variables. The first is a dummy representing the firm's sector. This variable represents either consumer product or industrial product manufacturers (in accordance with Bursa Malaysia's classification). Prior studies such as Angappan and Nasruddin (2003) and Nasruddin (2008) included the sector as a control variable. *SECTOR* is used to control for the well-known impact of industry sectors and payment customs (Petersen and Rajan, 1997; Angappan and Nasruddin, 2003; Nasruddin, 2008). Consumer products are more fast-moving than industrial products and mainly for consumption whereas industrial products are mainly for capital goods. As a result, commercial motives, elasticity of demand, and economies of scale are expected to be different in different sectors. Following the Bursa Malaysia classification for the manufacturing sector, the variable *SECTOR* is set equal to zero for consumer products and 1 for industrial products. Other sectors are not included in this study.

The second control variable is the auditor's reputation (*AUDITOR*), which identifies whether the firm uses one of the Big Four auditing firms in Malaysia. Large firms are expected to have more resources and technical expertise and may be more likely to use auditors of the highest reputation (Eng and Mak, 2003; Janssen et al., 2005; Gul et al., 2009). So we use *AUDITOR* to control for the possibility that firms audited by one of the Big Four extend different levels of trade compared to those that use the services of Non-

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Big Four firms. The variable *AUDITOR* is a dummy, which is set equal to one if the firm is audited by one of the Big Four and zero otherwise.

The third variable captures the possible effect of family ownership concentration (20% or more family ownership). Malaysia has a high level of family ownership concentration (Claessens, *et al*., 2000; Ismail and Sinnadurai, 2012) and per capita has one of the highest presences of family-owned firms in the world (Claessens et al., 2000; Ismail and Sinnadurai, 2012; Sinnadurai, 2015). Family owned-firms are more likely to enjoy enhanced earnings quality (Wang, 2006; Ali et al., 2007) and may, therefore, obtain high levels of AR by granting more credit to their customers. The control for family ownership captures ownership concentration as a potential determinant of credit granting in the same way as dividend policy (La Porta et al., 2000; Aivazian et al., 2003; Mitton, 2004). We label this dummy variable *OWN,* and we set it equal to one if 20% or more of the firm's equity is family owned and zero otherwise.

Finally, the time effect is accounted for by four time dummies (*T2007* to *T2010*), where each dummy-year is set equal to one for that particular year and zero otherwise. These four years are contrasted with the year 2006.

Since the data set consists of observations for 262 firms over five consecutive years, the estimation should be undertaken within a panel analysis framework. One advantage of a panel regression over a simple cross-section regression is that it provides more flexibility when modelling differences in behaviour across different firms. These firm-specific effects are accounted for in a natural way in panel data models. However, one particular difficulty is whether these effects should be treated as fixed or randomly distributed across firms. The fixed effects model assumes that the unobserved firm-specific effects are uncorrelated with the regressors, while in the latter case they may be correlated. Fortunately, the choice between the fixed or random effects model may be tested empirically through the Hausman test which assesses whether the firm-specific factors are correlated with the regressors. Rejection of this hypothesis implies that the firm-specific factors should be treated as fixed (deterministic) rather than random. Table 1 provides brief definitions of the above independent variables and relates them to the study's hypotheses.

Table 1: List of Independent and Control Variables

| Hypothesis | Explanatory Variables | Definition |
|---|---|---|
| H1 | Company's size (LOGSIZE) | Log (Book Value of Assets) |

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| H2 | Short-term line of credit (STCREDIT) | Financial Institutions Debts in Current Liabilities/Turnover |
| H3 | Profit and internal cash (OPEPROFIT) | Operating Profit Before Tax (OP) /Revenue(REV) |
| H4 | Sales growth (SGROWTH) | Percentage Sales Growth |
| H5 | Collateral to secure financing (COLLATERAL) | Net Fixed Assets /Total Assets |
| H6 | Liquidity (LIQUID) | Quick Ratio, i.e. the ratio of current assets (excluding inventories) over current liabilities |
| H7 | Gross Margin (GMARGIN) | Gross Profit Margin/Revenue |
| Control | Industry Sector (SECTOR) | Industrial Products = '1', Consumer = zero |
| | Auditors (AUDITOR) | Big Four audit firms = '1', zero otherwise. |
| | Ownership (OWN) | Family members own 20% or more of shareholdings of company = '1', zero otherwise. |

## 4. RESULTS

Our data consists of 262 firms over a period of five years (2007-2011). Although a pooled time series and cross section regression is possible, the potential heterogeneity across firms may bias the results. Both fixed effect and random effect approaches are therefore adopted. The following linear equation is proposed:

$$TC_{it} = \alpha_i + \beta_1 LOGSIZE_{it} + \beta_2 STCREDIT_{it} + \beta_3 OPEPROFIT_{it} + \beta_4 OPEPROFIT_{it}^2 \\ + \beta_5 SGROWTH_{it} + \beta_6 SGROWTH_{it}^2 + \beta_7 COLLATERAL_{it} \\ + \beta_8 LIQUID_{it} + + \beta_9 GMARGIN_{it} + \beta_{10} SEC_{it} + \beta_{11} AUDITOR_{it} \\ + \beta_{12} OWN_{it} + \beta_{13} T2007_{it} + \beta_{14} T2008_{it} + \beta_{15} T2009_{it} + \beta_{16} T2010_{it}$$

where $TC_{it}$ takes one of the two AR proxies defined earlier, for firm i in year t, and $\alpha_i$ is a firm specific effect which is assumed either fixed or random depending on the panel data model adopted.

Of the 262 publicly listed firms under study, 66% are in industrial products while the remainder specialise in consumer products. Over half the sample (51.14%) employs one of the Big Four auditing firms in Malaysia.

Table 2 provides summary statistics for all dependent and independent variables used in the analysis. The statistics are summarised across all firm-year observations. A typical Malaysian firm has an average AR of just over 66 million RM. The large standard deviation of nearly 114 million RM is indicative of large dispersion of credit granting in our sample. The most credit offered is just over 1.25 billion RM. This extreme figure indicates the potential scale problem stemming from the heterogeneity in firm size across

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the sample. Once we scale AR by total assets, the figures look more reasonable with an average of 16.33% and a maximum of 63.19%.

Additional calculations reveal that the firms making industrial products have longer days outstanding (81.64 days) compared to consumer product manufacturers (65.29 days). This is confirmed by the figures on ARTA (16.92% for the industry against 15.18% for the non-industry). However, in absolute terms, the AR of the two sectors are of similar scale (67.84 million RM against 62.73 million RM) though the industry sector is marginally higher. These results are in line with Angappan and Nasruddin (2003), who find that industrial product manufacturers have higher levels of AR compared with consumer product manufacturers.

The remaining independent variables also show large variability and extreme cases. The short-term credit also reflects a substantial diversity within our sample. The average availability of debt (current liabilities) relative to turnover is 0.249%. Given a standard deviation of 0.464, which would mean that approximately 95% of firms have credit availability of less than 1.2%, this indicates that the majority of firms have little access to external funding. Nevertheless, there are a few firms that have much healthier access to credit (the maximum being 5.856%).

The operating profit is negative on average. This is not surprising since our sample coincides with the global meltdown of the credit crunch. The growth in sales is about 11% on average, but includes extremes on both sides. While some firms' growth declined by nearly 94%, that of others exploded by more than 2,254%. The collateral also shows a substantial diversity in our sample. Although the average is around 3% (with more than 90% of the firms having less than 9% collateral) there are some outliers with 46.349%. The liquidity is very similar. Finally, the gross margin shows a positive average profitability of nearly 18%, but a substantial number of firms witnessed losses (the standard deviation suggesting that about 95% of firms had gross margins between roughly -10% and 46%).

Pearson's pairwise correlation matrix is shown in Table 3. As can be seen, the largest correlation is between gross margin and operating profit. Although significant at the 1% level, the correlation is well below the usual recommended threshold of 0.8 (Gujarati, 2006). The lowest correlation is -0.358 between short-term credit and operating profit.

Overall, the pairwise correlations between the independent variables do not suggest that multicollinearity is an issue.

Table 2 Summary Statistics of the Main Dependent and Independent Variables

| Series | Mean | Std. Error | Minimum | Maximum |
|---|---|---|---|---|
| AR (million RM) | 66.107 | 113.996 | 0.000 | 1254.185 |
| ARTA (%) | 16.329 | 9.831 | 0.000 | 63.189 |
| LOGSIZE (log Million RM) | 5.483 | 1.177 | 3.131 | 10.171 |
| STCREDIT (%) | 0.249 | 0.464 | 0.000 | 5.856 |
| OPEPROFIT (million RM) | -0.376 | 41.465 | -873.564 | 270.306 |
| SGROWTH (%) | 11.058 | 84.887 | -93.987 | 2254.707 |
| COLLATERAL (%) | 3.057 | 3.241 | 0.000 | 41.989 |
| LIQUID (%) | 2.635 | 2.987 | 0.105 | 46.349 |
| GMARGIN (%) | 17.912 | 13.977 | -71.227 | 86.280 |

Table 3. Pairwise Correlations of the Main Independent Variables

| | LOGSIZE | STCREDIT | OPEPROFIT | SGROWTH | COLLATERAL | LIQUID |
|---|---|---|---|---|---|---|
| CREDIT | -0.037 | | | | | |
| OPERPROFIT | 0.143** | -0.358** | | | | |
| SGROWTH | 0.049 | -0.070* | 0.091** | | | |
| COLLATERAL | 0.080** | -0.174** | 0.104** | 0.068* | | |
| LIQUID | -0.087** | -0.240** | 0.100** | -0.034 | -0.023 | |
| GMARGIN | 0.113** | -0.168** | 0.378** | 0.060 | -0.008 | 0.103** |

** significant at the 1% level. * significant at the 5% level.

Table 4 presents the results for the random and fixed effect models for the two dependent variables. In both cases the Hausman specification test is highly significant and suggests that the fixed effect models are more appropriate. The coefficients for the sector (*SEC*) and ownership (*OWN*) dummies are not estimated under the fixed specification since the fixed effect model wipes out time invariant variables (including the intercept). We will therefore rely on the random effect estimates of these dummy variables, while for the remaining coefficients we will use the fixed effect estimates.

The two fixed effect models explain a significant portion of the variability of the trade credit measures. The R-squares are 86.9% and 84.6% for AR and ARTA respectively, whereas both F-statistics are highly significant, suggesting that the overall fit is statistically significant. However, the relative (ARTA) and absolute (AR) measures of trade credit do not coincide. The level of AR is explained almost exclusively by size. In the AR model, the coefficient associated with LOGSIZE is highly significant and positive, suggesting that larger firms grant more trade credit, and hence have high levels of AR. This result could have two explanations. One obvious, but less likely, explanation

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is that only size matters for credit granting. If we were to accept this explanation, then only the first hypothesis can be confirmed. However, a more rational explanation is that these results are likely to be due to the scale effect. In other words, the results are driven by the fact that some firms are larger than others. Since larger firms have relatively larger sales, AR are naturally greater for larger firms. This effect could be so important that the other explanations such as collateral or liquidity are dwarfed and rendered statistically insignificant. This suggests that AR is not an appropriate measure for trade credit since the scale effect dominates and obscures other variables. The only other significant variable for the AR model is sales growth.

The model for the relative measure, ARTA, shows a more realistic outcome, albeit with a marginally lower coefficient of determination. It is clear that size does not dominate the other variables. More importantly, size (H1) has a negative effect on credit granting (larger firms extend less credit relative to their size). The coefficient of log-size is -14.36, and suggests that an increase from the average firm size of 244 million RM (5.48 log-million RM) to 665 million RM (6.46 log-million RM) reduces the granting of credit by slightly more than 14%. This is contrary to the prediction of our first hypothesis.

Short-term credit (H2) is highly significant and suggests that a one percentage point increase in short-term external finance leads to a decrease in the level of AR of around 13%. Sales growth (H4) is modelled with a quadratic term in order to capture non-linearity. Our fourth hypothesis states that both small (or negative) growth and big growth lead to higher levels of AR (smile pattern). This can be captured by the linear (SGROWTH) and quadratic ($SGROWTH^2$) terms. The smile pattern would be indicated by a negative linear coefficient and a positive quadratic coefficient. The results suggest the opposite of the smile pattern since the linear term is positive (=0.211) and significant while the quadratic coefficient is negative (=-0.0001) and significant. This means that a decrease in sales always decreases the level of AR. At the same time, increasing sales always leads to increases in AR levels, albeit at a decreasing rate.

Collateral (H5) is highly significant and has a positive coefficient, suggesting that a one percentage point increase in collateral increases AR by 3.56%.

The remaining variables, namely operating profit (H3) and liquidity (H6), and gross margin (H7) are insignificant.

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The control variables have a mixed effect. The sector, auditor and ownership dummies are insignificant (as suggested by the random effect model). The second group of control variables are the time dummies related to the crisis period. The 2007 dummy is insignificant, meaning that there was no difference in the level of AR between 2006 and 2007. This is expected as the year 2007 was the beginning the credit crunch whereas ARTA is a stock variable that cumulates over one or more years. However, the crisis was more clearly felt a year later, starting from 2008. Indeed, the dummies for 2008, 2009 and 2010 are all highly significant and negative. Thus, the crisis reduced the average relative credit granted, probably as a result of financial difficulties, and the increased default risk faced by suppliers.

Table 4. Fixed and Random Effect Panel Data Estimation Results

| | Fixed Effect | | | | Random Effect | | | |
|---|---|---|---|---|---|---|---|---|
| | AR | | ARTA | | AR | | ARTA | |
| | coeff | p-val | coeff | p-val | Coeff | p-val | Coeff | p-val |
| Intercept | | | | | -252.802 | 0.000 | 274.935 | 0.000 |
| | | | | | | | | |
| LOGSIZE | 29.782 | 0.000 | -14.360 | 0.028 | 59.228 | 0.000 | -21.214 | 0.000 |
| STCREDIT | -0.935 | 0.832 | -13.124 | 0.001 | -4.133 | 0.328 | -13.885 | 0.000 |
| OPEPROFIT | -0.014 | 0.833 | 0.112 | 0.078 | -0.049 | 0.466 | 0.113 | 0.069 |
| OPEPROFIT$^2$ | -0.0001 | 0.853 | 0.0001 | 0.234 | 0.000 | 0.493 | 0.000 | 0.263 |
| SGROWTH | 0.105 | 0.013 | 0.211 | 0.000 | 0.089 | 0.031 | 0.204 | 0.000 |
| SGROWTH$^2$ | -0.0001 | 0.029 | -0.0001 | 0.000 | 0.000 | 0.048 | 0.000 | 0.000 |
| COLLATERAL | 0.073 | 0.945 | 3.562 | 0.000 | 0.561 | 0.534 | 5.168 | 0.000 |
| LIQUID | 0.382 | 0.613 | -0.860 | 0.220 | 0.362 | 0.608 | -1.538 | 0.021 |
| GMARGIN | -0.172 | 0.468 | -0.298 | 0.175 | -0.390 | 0.065 | -0.271 | 0.183 |
| SEC | | | | | -1.307 | 0.903 | 19.570 | 0.113 |
| AUDITOR | | | | | 8.465 | 0.403 | 4.694 | 0.680 |
| OWN | | | | | 2.708 | 0.790 | -9.963 | 0.393 |
| T2007 | -2.254 | 0.584 | 0.971 | 0.800 | -4.534 | 0.264 | 0.261 | 0.945 |
| T2008 | -2.136 | 0.612 | -10.289 | 0.009 | -5.712 | 0.164 | -11.271 | 0.003 |
| T2009 | -7.105 | 0.097 | -19.565 | 0.000 | -11.178 | 0.007 | -20.068 | 0.000 |
| T2010 | -3.261 | 0.439 | -22.331 | 0.000 | -7.543 | 0.065 | -22.809 | 0.000 |
| $R^2$ | | 0.869 | | 0.846 | | | | |
| Regression F | | 24.965 | | 20.686 | | | | |
| p-val (F) | | 0.000 | | 0.000 | | | | |
| Log Likelihood | | | | | | -7204.54 | | -7159.16 |
| Hausman Test | | | | | | 31.609 | | 35.187 |
| p-val | | | | | | 0.001 | | 0.000 |

Notes: The dependent variable is the accounts receivable over total revenue reported by the firms extracted from www.reuters.com/finance/stocks.
The coefficients are estimated using ordinary least squares (OLS) and the reported t-statistics are White- adjusted values to control for heteroscedasticity.
***, **, * Significant at 1%, 5% and 10% level.

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## 5. DISCUSSION

One important result in this paper relates to the involvement of size both in the definition of, and the impact on, the level of AR. If we define trade credit as the level of AR, then size is not only positively related to the level of AR, but also virtually the only variable that matters. We argue that this scale effect should be controlled for, since large firms naturally grant more credit on average. Controlling for the scale effect through the use of ARTA reveals interesting insights. First, contrary to expectations, our results show that larger Malaysian manufacturing firms grant less trade credit relative to their size. Nevertheless, this result is in line with Soufani and Poutziouris (2002) and Delannay and Weill (2004) who argue that under market power theory, larger firms have a better bargaining position in the trading relationship and, as such, may not need grant credit to sell their goods. In fact, given their bargaining power, larger firm are capable of imposing stricter conditions for payments and thus may capitalise on their position to reduce the costs associated with holding considerable amounts of AR. In addition, Smith (1987) and Paul and Boden (2008) argue that larger firms tend to have a good reputation and hence tend to grant less credit to their customers who do not need extended time to inspect the quality of the products. However, as we reported in the literature review section, the majority of existing empirical work has shown a positive relationship between size and credit granting. Although the result could be partly sensitive to methodological issues (we would have confirmed a positive relationship under an AR definition), it could also be specific to Malaysia. Malaysian manufacturing firms may be more efficient at collecting debt, or may simply have more market power compared with their counterparts in the industrialised economies. Overall, we find insufficient evidence in our sample of firms to confirm our first hypothesis.

Second, the results show that firms in our sample that have access to short-term finance are less likely to grant credit. This suggests that the helping-hand theory does not hold as far as the Malaysian manufacturing firms are concerned: firms that have better access to short-term finance do not use trade credit to pass on the benefit to their customers. Our second hypothesis is therefore rejected. Operating profit is found to play no significant role in determining the level of AR. While our third hypothesis predicted a smile effect (a negative linear coefficient and a positive quadratic coefficient), the result shows that the two coefficients are not significantly different from zero at the 5% level of significance. Thus, we conclude that whether a firm is more or less profitable has no

consequence on trade credit granting; the third hypothesis is therefore rejected. Our fourth hypothesis, suggesting that the change in sales has a smile effect, is also rejected. Our results show that when sales increase, the level of AR increases with them. On the other hand, when sales decrease, AR decreases with them but at an increasing rate. This is clearly contrary to prior findings which argue that when the level of sales decreases, firms use trade credit to increase their sales (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002; Delannay, 2004; Wilson, 2008).

Collateral is positively correlated with the level of AR in Malaysian manufacturing firms. It seems to play a significant role in decisions over the AR level, implying that those with higher tangibility can collateralise their assets to obtain external financing to fund their working capital, inter alia, passing on the benefit to their customers by extending them credit through AR. This finding is consistent with Levchuk (2013), Petersen and Rajan (1997) and Boden and Paul (2014). Our fifth hypothesis is, therefore, the only one we could confirm for Malaysian manufacturing firms. Finally, we found no evidence to support the remaining hypotheses, Liquidity (H6) and gross margin (H7) both being statistically insignificant.

## 6. CONCLUSION

Investment in AR in the Malaysian manufacturing sector is impacted by many of the factors implied by either theory or empirical evidence. However, our main finding in this paper is that the Malaysian manufacturing sector is rather different. First, while in prior studies liquidity and gross margin have been found to have a positive and significant effect on the level of AR, our results show that these two factors play no role in influencing such level in the Malaysian manufacturing sector. Second, operating profit was expected to have a U-shaped effect based on prior findings. This, too, is not supported by our results, which suggests that operating profit has no role in determining the scale of AR. Third, while size, short-term credit and sales growth have been found to be significant, they are nevertheless inconsistent with the expected direction of their relationship with trade credit. Both size and short-term credit were expected to play a positive role, but were found to have a negative effect instead. Note, however, that size does have a positive effect on the level of AR, which is an absolute measure of trade credit. However, we argue that AR are naturally linked to firm size and should be descaled in order to provide a more relevant measure of trade credit. The only variable

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that is consistent with prior studies is collateral. This factor was found to have a positive effect as expected. The positive association of collateral with the level of AR is the only hypothesis confirmed by this study.

Our results have several principal implications for policy makers. First, we show that policy makers should not take a holistic view of the trade credit market. Given that policy makers aim to improve liquidity and trade they should design policies that are not only country specific but also sector specific. As is clear from our results, what holds for other countries or sectors may not necessarily be true for the Malaysian manufacturing sector. For example, if elsewhere size is positively linked to the level of investment in accounts receivable, then government policy (via incentive schemes, for example) should target smaller firms because they offer less trade credit. On the other hand, in the Malaysian manufacturing sector, the policy should be directed towards larger firms.

Second, under the new Expected Credit Loss (ECL) provisioning rule of International Financial Reporting Standard 9 (IFRS 9), companies must provide for expected credit losses from the time a credit is granted (Cohen and Edwards, 2017). This rule has important implications to Malaysian firms in the light of our findings. In particular, we found that smaller firms and those firms with lower short-term credit facilities tended to offer more trade credit. Thus, because of their reduced size and financial capabilities, these firms are particularly vulnerable to credit shocks, and should make provision for potential credit losses rather than wait for "trigger events" signalling imminent losses.

It is disturbing to note that large firms may depend on their bargaining power to the detriment of the small and medium sector growth. The Malaysian authorities may consider initiatives adopted in the UK and Europe, for example, to protect this important asset that many describe as the riskiest in a firm's balance sheet due to the risk related to late payment and possible default that increases the costs of granting credit. In the UK, for instance, many Codes and Charters have been introduced to protect companies' investments in AR (especially those of SMEs). These measures include the statutory provision of late payment interest legislation, (charging 8% above the bank rate), the change to Company Act that emphasises the need for disclosure of payment trends, the Prompt Payment code administered by the Chartered Institute for Credit Management on behalf of the Department for Business, Innovation and Skills (such self-regulatory devices attempting to alter the behaviour of larger customers by eliciting public commitments to ethical and fair behaviour). Other measures include self-regulation, such

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as Voluntary Codes of Conduct, and business support in the form of enhanced training for SMEs. The UK late payment legislation was subsequently adopted by the EU (European Union Directive 2000/35/EC.

Third, trade credit research is highly sensitive to the definition of trade credit. Results, therefore, depend primarily on the proxy the researcher uses for the level of credit granted. We find clear evidence that the use of AR is likely to distort findings and affect the validity of empirical results.

The absence or negligible impact of the helping hand theory further raises concerns about the political economy of the country. It appears that there is a disconnect between large and small businesses. Organisations such as the SME Corporation need to harness the potential of big businesses to play the "big brother" role to enhance the ecosystem for the SME sector.

Lastly, the low inclination of firms to use trade credit to boost declining sales may need to be investigated. Perhaps the enforcement of IAS 39 (or MFRS 139 in Malaysia since 2010) will deter firms from using this technique. Future research may examine whether adoption of IAS 39 has had an effect.

Our quantitative approach has obvious limitations. First, we used a simple linear model, which may be a crude approximation to the true AR data generating process. In particular, as AR and ARTA are strictly positive, a Panel Tobit model might be preferred since it truncates the data at zero. Second, our model tested AR and ARTA in levels rather than differences. One way to extend our study is to investigate the dynamics in trade credit, which can be measured using the yearly change in AR and ARTA.

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# Responses to Reviewers

**We thank the reviewer for his/her valuable comments, suggestions and insights. We believe we have addressed all issues raised, and have no doubt that our paper has improved significantly as a result.**

**Deadline: 21-Aug-2017**

**Recommendation**: Major Revision

A) **Comments:** Address the above comments to make a significant contribution to the existing literature.

**We hope we have revised the paper to the referee's satisfaction. We have reviewed and updated all sections to better highlight our contribution. Corresponding references have been incorporated in both the text and the reference list.**

B) **Additional Questions**

**The responses to each comment made and on each section are presented below.**

| **1) Originality** | Does the paper contain new and significant information adequate to justify publication? <br><br> a) The topic is not novel, what would have been novel perhaps could have been, the justification for the study, literature gap that the study intended to fill and the methodology employed. <br><br> b) The main study purpose is not clear |
| --- | --- |

a) **We thank the referee for this comment, and agree that we could have highlighted our contribution more explicitly. We have added the following paragraph explaining that most studies in this area focus on developed countries.**

"There has been sustained interest in managing the level of AR from both academics and practitioners, each emphasising the permanent character of this short-term but continuously renewed investment and its strategic potential due to the existence of financial, tax-based,

operating, transaction and pricing motives (Asselbergh, 1999). Increasingly, the focus has shifted to the efficiency of AR management and its relationship with profitability, in both developing and developed countries (see, for example, the studies of Michalski (2012)[1] in Poland; Raheman, and Nasr (2007) in Pakistan; Gill, Biger, and Mathur (2010) in the USA; and Singh, Kumar, and Colombage (2017) in India). However, whilst there is ample evidence as to why companies in developed countries continue to invest in AR, it is not clear whether firms within the developing world have a similar experience.

**We have also added two paragraphs (below) to emphasize the relative scarcity of earlier studies on Malaysia:**

"Clearly, there is a lot at stake, and the risk exposure related to AR in Malaysian firms may well exceed the levels experienced in the developed world. Thus, given the risk exposure threatening Malaysian firms, it is surprising to find that little research has been conducted as to the factors that influence their decision of such firms to carry high levels of AR and so incur costs related to investing in this low-return/high-risk asset.

A substantial body of theoretical and empirical work has been dedicated to developed economies, especially the US and the UK. These studies suggested a multitude of potential factors that influence AR. However, very little research has been carried out on Malaysia. Our aim is to fill this gap in the literature by extending our knowledge of AR in one emerging economy and potentially drawing lessons for other such economies and developing countries. Specifically, our aim is to test on a cross section of Malaysian manufacturing firms, the various theories developed within industrialised economies. This will shed light on the various reasons that Malaysian businesses invest in AR and assess the relevance of various factors affecting the decision to grant trade credit. To our knowledge, this is the first study that looks at the factors that influence AR levels in the Malaysian manufacturing sector."

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[1] G Michalski - 2012 Efficiency of accounts receivable management in Polish institutions- papers.ssrn.com

**b)   A section has been added to clarify this.**

**We thank the referee for bringing this point to our attention. In order to explain better why studying the factors influencing trade credit in Malaysia is important, we have modified certain existing paragraphs. In addition, we suggest the following new paragraphs:**

"This brings us to the important question of why firms in Malaysia invest in this risky asset. Previous research from developed economies has evidenced a variety of reasons as to why firms accept delayed payment and invest in this low-return, high-risk asset (Paul and Boden, 2008)."

"Specifically, although selling on credit increases sales and often improves customer loyalty, it nevertheless increases financial costs and exposes firms to significant risks associated with delayed payment and default. The increased risk involved with trade credit may be particularly relevant to Malaysia. Indeed, during the 1997 Asian financial crisis, a credit squeeze was cited as one of the main causes of the collapse of many Malaysian firms (Thomas, 2002)."

| **2) Relationship to Literature** | Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources?  Is any significant work ignored? |
|---|---|
| | a)   This section was done in a rush I would say. |
| | b)   The hypotheses have been mechanically developed. |
| | c)   The literature does not adequately demonstrate the interplay between the study variable. For instance, H1 reads "Larger firms are expected to have higher levels of accounts receiveables" But the literature write up does not demonstrate exactly how this happens. Same applies to all other hypotheses. |
| | d)   H4: The sales growth has a smile effect on the level of accounts receivable, namely, both positive and negative growth in sales lead to higher levels of accounts receivable. ... and many others stated as such...the question is how can both positive and negative effects lead to higher levels of accounts receivables??? When followed to the results and discussion sections, this is not clearly demonstrated. I suggest a revisit of all study hypotheses. |
| | e)   The theories and authors of the suggested theories does not come out well. And besides, there is need to mention the limitations of those theories. |

a) **We thank the referee for this comment, which we think is a fair one. We deliberately integrated the literature review with the development of our hypotheses as most of what has been covered regarding the choice of variables included in our modelling explains what has been written in the area. However, we have now added four pages to update the first part of the literature review and we believe we have improved this section to meet with the referee's fair request.**

**As well as the paragraphs below, we also made a number of changes in the explanation of variables to avoid duplication.**

"Trade credit is a practice as old as trade itself. At its heart lies the precept that customers will honour their commitment to make payment at the agreed time. Sellers agree to a time lapse between the delivery of goods and the payment for them. These deliveries are recorded as AR. However, although AR may help boost sales, payment delays or even defaults may and do occur. As such, AR also creates potential costs that can exceed the benefits gained by selling on credit. This two-sided contingency makes investing in AR a complex decision for businesses and an interesting phenomenon to academics.

However, despite potential losses, evidence from markets around the world shows that most business-to-business transactions are undertaken on credit, often resulting in high levels of AR (Summers and Wilson, 2002; Kling et al., 2014). Trade credit is very important; it is greater in volume than the flows of short-term bank borrowing in nearly all developing and industrialised countries (Guido 2003; Blasio, 2003). In the UK, for instance, AR stand at around 37% of total business assets (Paul and Wilson, 2006, 2007). In both the UK and the USA, trade credit exceeds the primary money supply by a factor of about 1.5. Trade credit is considered one of the most important forms of finance, exceeding the short-term business lending of the entire banking system (Lee and Stowe, 1993; Ng et al., 1999; Wilson and Summers, 2002; Aaronson et al., 2004; Boden and Paul, 2014). Kling et al. (2014) examine the link between trade and short term bank credit and provide evidence that they are complementary, a finding that was also supported by both Bias and Gollier (1997) and Burkart and Ellingsen (2004). Trade credit is therefore an important source of trade liquidity, as well as a useful source of money supply.

At the micro level, trade credit is seen by firms as an essential marketing tool that helps their competitiveness and growth (Ferrando and Mulier, 2013). Ai-guo (2006) finds that firms invest in AR to reinforce their market position, making them more competitive, increasing their sales and reducing their inventories. Kling et al. (2014) find that UK firms have had to invest in AR to maintain sales and remain competitive.

Trade credit is also an essential part of working capital; the level of AR has a direct impact on other elements of firms' working capital, such as cash flow and inventory holding. Michalski (2012) reports that any change in the level of AR affects the level of working capital. It is often argued that cash volatility, for instance, affects the AR level and that firms with limited access to external funds invest less in AR (Summers and Wilson, 2002). In the same vein, firms with higher cash-flow volatility tend to hold higher levels of cash and hence to invest less in AR by reducing the level of credit granted to their customers (Molina and Preve, 2009; Bates, Kahle and Stulz, 2009). Choi and Kim (2003) find that firms tend to increase their AR level when the level of their inventories rises.

Others argue that investing in AR is a way of channelling funds from cash rich firms to their financially constrained customers (Ge and Qiu, 2007; Garcia-Appendini and Montoriol-Garriga, 2013; Levchuk, 2013) with the aim of enhancing long-term relationships. Others still report a positive relationship between the level of AR and the increase in shareholder wealth (Hill, et al., 2013). Nevertheless, too high a level of AR can be associated with lower profitability (Padachi, 2006) as sellers are effectively financing their customers' inventory for an agreed period into the future, and granting credit entails substantial costs as well as risks. If AR can increase both the cost of credit and the risk of default, it begs the question as to why companies invest in this asset at all.

Rationally, the risks of investing in AR should be outweighed by the benefits discussed above (Paul and Boden, 2008; Ferrando and Mulier, 2013). Some have argued that the benefits result from a reduction in transaction costs: selling on credit allows firms to accumulate invoices for payment and reduce their transaction costs and this may incentivise them to invest more in AR (Main and Smith, 1982; Petersen and Rajan, 1997; Pike and Cheng, 2001; Soufani and Poutziouris, 2002). Others have emphasised the benefits gained from building customer

relationship to help repeat business and thus gain competitive advantage (Jacob, 1994; Wilson and Summers, 2002; Fisman and Raturi, 2004; Cuñat, 2007; Burkart et al., 2011). Other still looked at the helping hand theory where, through trade credit, funds are channelling from cash-rich firms to those with limited borrowing power in the supply chain (Petersen and Rajan, 1997; Pike and Cheng, 2001; Atansova and Wilson, 2003). This process facilitates financial efficiency across supply chains between suppliers and customers (Hoffman and Kotzab, 2010). It is also argued that the benefits come from better communication between buyers and sellers (Jain, 2001; Wilson, 2008; Boden and Paul 2014). Investment in AR leads to mitigating the asymmetry of information for both parties. Buyers have time to inspect the quality of the goods before payment, and sellers to collect important information about the buyers' financial health through risk assessment before granting credit. Therefore, in the process of granting credit, buyers and sellers gain vital information about each other. The warranty of product quality reduces the risk of late payment and default, whereas the information collected in the process can be used effectively to assess the creditworthiness of customers before further credit is granted. This can speed up the return on AR.

A number of theories have been developed to explain the factors influencing the level of AR (Petersen and Rajan, 1997; Wilson and Summers, 2002; Pike and Chen, 2002; Paul and Boden, 2008, 2011; Boden and Paul, 2014). Some theories emphasise the role of factors such as company size, access to internal/external financing, operating profit and sales revenue growth, liquidity and collateral (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002; Paul and Boden, 2008). Others have added factors such as industry norms (Wilson, 2008; Paul and Boden, 2011), the reputation of the firm's auditor (Gul, et al., 2009; Paul et al., 2012) and ownership (Martínez et al., 2007; Carney and Child, 2012). Empirical support for the relevance of the various extant theories in this area can be found in the work of, for example, Petersen and Rajan, (1997), Marotta (2000), Pike and Cheng (2002), Soufani and Poutziouris (2002), Levchuk, (2013), Delannay and Weill (2004), Rodriguez (2006). However, there is very little empirical evidence on the role of the proposed factors in explaining how much firms are prepared to invest in AR within emerging and developing economies, especially in Asia (Zainudin, 2008; Love and Zaidi, 2010). Most of the empirical literature has focused particularly on the US and the UK.

In the next subsections, we describe the factors put forward in the literature to explain decisions on the level of AR and these include: firm size, access to internal/external financing, operating profit, sales revenue growth, price discrimination, liquidity and collateral to secure financing. Based on the literature, seven hypotheses are proposed to examine the determinants of the scale of AR in the Malaysian manufacturing sector."

b) **We have followed current practice within accounting and management literature by relating existing theoretical and empirical work to our proposed hypotheses. Whenever there are conflicting results (theoretical or empirical), we have adopted the position of the majority of papers on that particular hypothesis. Moreover, when we were developing the hypotheses, we kept in mind the need to keep the length of the paper to manageable proportions. As it stands, the paper is already more than 8,000 words and we will probably be asked to reduce the word count. Given that we had seven hypotheses, we were forced to be 'economical' for otherwise the paper would simply be too long. Nevertheless, although we believe that for each hypothesis we have used the most important papers in the field, we would be happy to extend our discussion of the hypotheses if requested.**

c) **We have set out how we came up with each of the hypotheses. Taking H1 as an example, we explain that "Larger firms are perceived to be more creditworthy and to have more capacity to invest more in AR by granting more credit to their customers…. Large firms also have too high a transaction volume to deal with cash sales … selling on credit allows firms to accumulate invoices for payment and reduce their transaction costs and thus this incentivises them to invest more in AR…" Nevertheless, we do appreciate the referee's concerns that the explanations as to how these factors function fundamentally are not obvious. In fact, they cannot as unlike other scientific fields, where researchers can use laboratories or test behaviour on individuals, there is no data on firms' behaviour. All we observe is the annual (bottom line) accounts. This is why it is virtually impossible to gauge the behaviour of the firm.**

d) **The smile effect (and hump effect) are very well known patterns in social and biomedical sciences. For example, taking too few vitamins (or too many) may increase the probability of disease (the lowest probability of disease somewhere in between). As we have explained in the text, when sales are plentiful the firm invests more in AR as it can afford to take a higher level of risk. However, when sales are very low the firm becomes 'desperate' as**

**inventories pile up (thereby incurring costs associated with holding high levels of inventories, including obsolescence), and cash is tied up in unsold inventories. Thus to encourage sales and revenues, the firm may be forced to take on more risk by granting further trade credit (probably to less creditworthy customers). Therefore, trade credit, in such instances, is used as a marketing tool to counter the sales decline and such marketing is one of the motives most cited in the literature for granting trade credit (the others including financing, and building relationships, Wilson et all., Pike et al., Paul et al., etc. as per our references).**

e) **We are very sorry but we are not sure we understand the referee's comment on this point. However, we hope that the new insertion under literature deals with the concern raised. We were also constrained by the size of our paper, regarding the number of other papers we could review in developing our hypotheses. Nevertheless, we did cover the most important and widely-cited papers on the subject and most of the authors we referred to are leaders in this field. Furthermore, we specifically tried to select papers that are directly relevant to the reasons companies invest in accounts receivable.**

| 3) Methodology | Is the paper's argument built on an appropriate base of theory, concepts, or other ideas? Has the research or equivalent intellectual work on which the paper is based been well designed? Are the methods employed appropriate?<br><br>a) The study makes use of secondary data, and uses the fixed and random effects for data analysis. Nonetheless, there is need to provide concrete justification for not using pooled time series.<br><br>b) There is need to highlight the limitations of the quantitative approach that was employed for the benefit of researchers and practitioners. (though this information should appear at the end of the write up of the paper/ last section). |
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a) **It is well known that pooled time-series cross-section regressions do not account for unobserved heterogeneity in firms (fixed effect). Ignoring these firm effects produces biased estimates and invalidates inference. Indeed, we have found that the Chi-square test is highly significant, thus rejecting the redundancy of the fixed effects.**

b) **We thank the referee for this insightful comment. We have added the following paragraph at the end of the paper highlighting the limitations of our quantitative approach:**

"Our quantitative approach has obvious limitations. First, we used a simple linear model, which may be a crude approximation to the true AR data generating process. In particular, as AR and ARTA are strictly positive, a Panel Tobit model might be preferred since it truncates the data at zero. Second, our model tested AR and ARTA in levels rather than differences. One way to extend our study is to investigate the dynamics in trade credit, which can be measured using the yearly change in AR and ARTA."

| **4) Results** | Are results presented clearly and analysed appropriately?  Do the conclusions adequately tie together the other elements of the paper? <br><br> The results: <br>   a) have not been presented according to the hypotheses set to be tested. As such, it is difficult to say whether all the hypotheses were tested. Interpretation of the results and discussion have to be further refined to clearly demonstrate the interplay between the study variables. <br><br>   b) Seem to be contrary to the existing theories and empirical studies, but not proper justification of debate has been fronted for this. Consider collecting some primary data to explain the controversies in the results. <br><br>   **c)** Looking at the topic, the story does not come out clearly in the results and discussion section. This has to be aligned. |
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a) **We are grateful for this remark. We agree that we did not mention each hypothesis specifically nor the relationship of each to the estimated model. We have now corrected this problem and ensured that each coefficient is explicitly related to its hypothesis. The confusion may have arisen because we did not treat the hypotheses in their numerical order. The reason is simply that previously we opted to highlight the significant coefficients first (H1, H2, H4, H5), and then mention the three insignificant coefficients related to H3, H6 and H7.**

b) **In Malaysia, there is a lack of information on trade credit. At the beginning of this study, we tried to collect data from companies through questionnaires but had a very low response rate, those firms that did reply hardly answering the questions, and claiming that the information we sought was of a sensitive nature. Therefore, the few responses received were incomplete and not timely.  In fact, companies themselves claimed that the lack of information made it difficult for them to assess the creditworthiness of their customers.  They reported that what was available was deemed sensitive, confidential and**

**incomplete. We also approached a few companies for interviews but none was willing to take part. They were concerned that the information would reflect negatively on them as most carry high levels of AR and suffer from late payment. As such, the use of primary data on AR in Malaysia would not be appropriate due to the perceived sensitivity of the information. We judge this is one of the reasons that not many studies of trade credit are conducted in Malaysia generally. Furthermore, even in developed countries most research is based on secondary data (very few being based on questionnaires, while some are of a qualitative nature).**

c) **We have now reviewed the entire paper in the light of the comments made, which we greatly appreciate, and have made the changes accordingly.**

| **5)** **Implications** | Implication for research, practice and/or society:  Does the paper identify clearly any implications for research, practice and/or society?  Does the paper bridge the gap between theory and practice? How can the research be used in practice (economic and commercial impact), in teaching, to influence public policy, in research (contributing to the body of knowledge)?  What is the impact upon society (influencing public attitudes, affecting quality of life)?  Are these implications consistent with the findings and conclusions of the paper?  a) This is evidently lacking. |
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a) **We thank the referee for this comment. We agree that a summary of the paper's implications was previously lacking and we have added several paragraphs at the end of the paper to rectify this problem, as follows:**

"Our results have several principal implications for policy makers. First, we show that policy makers should not take a holistic view of the trade credit market. Given that policy makers aim to improve liquidity and trade they should design policies that are not only country specific but also sector specific. As is clear from our results, what holds for other countries or sectors may not necessarily be true for the Malaysian manufacturing sector. For example, if elsewhere size is positively linked to the level of investment in accounts receivable, then government policy (via incentive schemes, for example) should target smaller firms because they offer less trade credit. On the other hand, in the Malaysian manufacturing sector, the policy should be directed towards larger firms.

Second, under the new Expected Credit Loss (ECL) provisioning rule of International Financial Reporting Standard 9 (IFRS 9), companies must provide for expected credit losses from the time a credit is granted (Cohen and Edwards, 2017). This rule has important implications to Malaysian firms in the light of our findings. In particular, we found that smaller firms and those firms with lower short-term credit facilities tended to offer more trade credit. Thus, because of their reduced size and financial capabilities, these firms are particularly vulnerable to credit shocks, and should make provision for potential credit losses rather than wait for "trigger events" signalling imminent losses.

It is disturbing to note that large firms may depend on their bargaining power to the detriment of the small and medium sector growth. The Malaysian authorities may consider initiatives adopted in the UK and Europe, for example, to protect this important asset that many describe as the riskiest in a firm's balance sheet due to the risk related to late payment and possible default that increases the costs of granting credit. In the UK, for instance, many Codes and Charters have been introduced to protect companies' investments in AR (especially those of SMEs). These measures include the statutory provision of late payment interest legislation, (charging 8% above the bank rate), the change to Company Act that emphasises the need for disclosure of payment trends, the Prompt Payment code administered by the Chartered Institute for Credit Management on behalf of the Department for Business, Innovation and Skills (such self-regulatory devices attempting to alter the behaviour of larger customers by eliciting public commitments to ethical and fair behaviour). Other measures include self-regulation, such as Voluntary Codes of Conduct, and business support in the form of enhanced training for SMEs. The UK late payment legislation was subsequently adopted by the EU (European Union Directive 2000/35/EC.

Third, trade credit research is highly sensitive to the definition of trade credit. Results, therefore, depend primarily on the proxy the researcher uses for the level of credit granted. We find clear evidence that the use of AR is likely to distort findings and affect the validity of empirical results.

The absence or negligible impact of the helping hand theory further raises concerns about the political economy of the country. It appears that there is a disconnect between large and small

businesses. Organisations such as the SME Corporation need to harness the potential of big businesses to play the "big brother" role to enhance the ecosystem for the SME sector.

Lastly, the low inclination of firms to use trade credit to boost declining sales may need to be investigated. Perhaps the enforcement of IAS 39 (or MFRS 139 in Malaysia since 2010) will deter firms from using this technique. Future research may examine whether adoption of IAS 39 has had an effect."

| E(6) | 6. **Quality of Communication**: Does the paper clearly express its case, measured against the technical language of the field and the expected knowledge of the journal's readership? Has attention been paid to the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.: <br><br> Right from the introduction section, there is need to maintain a coherent and chronological flow of thoughts. |
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**We have re-written the paper and made significant improvement, which, we hope will make the paper more readable and more interesting to readers. We also re-written the conclusion to reflect the changes made. Many thanks indeed.**

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# WHY DO FIRMS INVEST IN ACCOUNTS RECEIVABLE? AN EMPIRICAL INVESTIGATION OF THE MALAYSIAN MANUFACTURING SECTOR

## Abstract

The purpose of this paper is to investigate the factors that influence Malaysian manufacturing sector investment in accounts receivable, an asset seen by many as one of the riskiest in any company's balance sheet. We test several theories, related to accounts receivable, using a cross-section of 262 listed manufacturing firms over a period of five years (2007-2011). Both fixed and random effect approaches are considered to deal with potential heterogeneity across firms. Our results show that the absolute level of accounts receivable is almost exclusively explained by size. However, the ratio of accounts receivable to assets is influenced by firm size, short-term finance, sales growth, and collateral. Profit, liquidity and gross margin have no role in affecting the decision to grant trade credit to customers. Some of our results are mostly inconsistent with previous studies. Size and short-term finance have a negative, rather than a positive, impact. Liquidity and gross margin have no, rather than a positive, effect. Profit and sales growth are expected to exhibit a U-shaped relationship with investment in accounts receivable. We found, however, that the former is insignificant while the latter is strictly increasing. The only factor found to be consistent with prior studies, in developed counties, is collateral. Our findings have important implications for policy makers in Malaysia and other emerging economies, especially in the light of the forthcoming International Financial Reporting Standard 9.

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## 1. INTRODUCTION

Accounts receivable (AR) occur when suppliers of goods and services[1] sell on credit and thus allow their customers to defer payment to a later date. This type of credit is granted by firms whose primary business is to sell goods, rather than to provide finance to customers. Sale on credit creates AR, a current asset in the balance sheet of suppliers. Thus AR are the amounts outstanding payable by customers to their suppliers. Given the high volume of sales on credit between businesses, AR are especially high and are considered by many as the riskiest asset in a firm's balance sheet (Pike and Cheng, 2001; Wilson and Summers, 2002; Boden and Paul, 2014).

There has been sustained interest in managing the level of AR from both academics and practitioners, each emphasising the permanent character of this short-term but continuously renewed investment and its strategic potential due to the existence of financial, tax-based, operating, transactional and pricing motives (Asselbergh, 1999; Paul and Boden, 2008). Increasingly, the focus has shifted to the efficiency of AR management and its relationship with profitability, in both developing and developed countries (see, for example, the studies of Michalski (2012) in Poland; Raheman, and Nasr (2007) in Pakistan; Gill, Biger, and Mathur (2010) in the USA; Singh, Kumar, and Colombage (2017) in India). However, whilst there is ample evidence as to why companies in developed countries continue to invest in AR, it is not clear whether firms within the developing world have a similar experience.[2] Orobia, Padachi and Munene (2016) observe that the most frequently performed routines relate to safeguarding cash and inventory, and to credit risk assessment. Payment management routines are the least performed. This suggests that firms in emerging countries may face difficulties in managing their extended credit.

This brings us to the important question of why firms in Malaysia invest in this risky asset. Previous research from developed economies has evidenced a variety of reasons as to why firms accept delayed payment and invest in this low-return, high-risk asset (Paul and Boden, 2008). Specifically, although selling on credit increases sales and

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[1] Henceforth, we shall use goods to mean goods and/or services.

[2] A Google Scholar search for articles and patents with Accounts Receivable in the title since 2010 returned a total of 287 articles and patents. Although we used the title and abstract only to identify the country of interest, the vast majority of articles and patents were related to the US and Europe. China followed as the third most studied country, albeit mostly in local Chinese journals. Of the 287 items, seven were related to East- European, five to African, and four to Middle- and Far-Eastern countries.

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often improves customer loyalty, it nevertheless increases financial costs and exposes firms to significant risks associated with delayed payment and default. The increased risk involved with trade credit may be particularly relevant to Malaysia. Indeed, during the 1997 Asian financial crisis, a credit squeeze was cited as one of the main causes of the collapse of many Malaysian firms (Thomas, 2002). Clearly, there is a lot at stake, and the risk exposure related to AR in Malaysian firms may well exceed the levels experienced in the developed world. Thus, given the risk exposure threatening Malaysian firms, it is surprising to find that little research has been conducted as to the factors that influence the decisions of such firms to carry high levels of AR and so incur costs related to investing in this low-return/high-risk asset.

The introduction of the International Financial Reporting Standard (IFRS) 9,[3] which will become effective in 2018, has drawn some attention to trade receivables (accounts receivable). KPMG (2016) predict that bad debt provisions are likely to increase and become more volatile. Indeed, the challenges of IFRS 9 may go beyond accounting and require changes to systems and processes. This study seeks to illuminate the intricacies of accounts receivable that may be a major concern for Malaysian non-financial corporates. Companies will probably need to review their processes of trade credit provision.

The literature on IFRS adoption suggests that financing decisions are heterogeneous among companies from different regions and countries (Al-Yaseen and Al-Khadash, 2011; dos Santos, Fávero and Distadio, 2016; Sayed, 2017) and that they impact their emerging capital markets (Mhedhbi, et al., 2016; Uzma, 2016). Moreover, emerging countries may face issues with compliance with financial instruments standards (Tahat, Mardini and Power, 2017).

A substantial body of theoretical and empirical work has been dedicated to the developed economies, especially the US and the UK. These studies have suggested a multitude of potential factors that influence AR. However, very little research has been carried out on Malaysia. Our aim is to fill this gap in the literature by extending our knowledge of AR in an emerging economy and potentially drawing lessons for other such economies and developing countries. Specifically, our aim is to test, using a cross section of Malaysian manufacturing firms, the various theories developed within

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[3] Referred to in Malaysia as Malaysian Financial Reporting Standard (MFRS) 9.

industrialised economies. This will shed light on the different reasons that Malaysian businesses invest in AR and will assess the relevance of various factors affecting the decision to grant trade credit. To our knowledge, this is the first study that looks at the factors that influence AR levels in the Malaysian manufacturing sector.

The Malaysian manufacturing sector is a major player in the Malaysian economy as it accounts for approximately 30% of Malaysian GDP. However, the sector suffers from late payment problems (Infocredit D&B, 2005).[4] High levels of AR are often imposed on companies that are pressured into granting credit to customers in order to survive and compete (Paul *et al*., 2012). Moreover, the Malaysian legal process for debt recovery is tedious, time-consuming and costly (Thomas, 2002).

Whilst banks and financial companies are bracing themselves to deal with the implementation of IFRS 9, effective from 1 January 2018, we expect the attention of non-financial companies to be directed towards managing their AR. Receivables management is an important tool for the elimination of credit losses and constitutes an essential part of the financial management of each company. Thus, understanding the determinants of credit extension is critical. Our paper contributes to the existing literature on trade receivables management from an emerging economy perspective. It serves to bring focus to a topic that is almost ignored in most emerging economies but which will gain prominence with the implementation of IFRS 9.

Indeed, most of the prior empirical results from those developed economies considered do not seem to hold for the Malaysian industrial sector. For example, in previous studies size and short-term finance have been found to impact accounts receivable positively. We find a negative relationship. The U-shaped relationship between sales growth and accounts receivable is rejected for our sample of Malaysian firms. Collateral is the only factor in which our study and previous studies in the developed economies agree. Accordingly, the implications for policy makers in Malaysia, and possibly other emerging economies, may be quite different from those that apply in countries like the US and the UK.

The rest of the paper is organised into five sections. In section 2, we explain, by reference to the literature, the factors that incentivise firms to grant loans to their customers through AR and develop a number of hypotheses. In section 3, we explain

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[4] As reported in the Credence by Infocredit, Issue 2, July to Sept 2005.

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the methodology employed in the study and this is followed by a presentation of the models used for the empirical investigation in section 4. Section 5 discusses the results, and the final section sets out the conclusions.

## 2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Trade credit is a practice as old as trade itself. At its heart lies the precept that customers will honour their commitment to make payment at the agreed time. Sellers agree to a time lapse between the delivery of goods and the payment for them. These deliveries are recorded as AR. However, although AR may help boost sales, payment delays and even defaults may and do occur. As such, AR also creates potential costs that can exceed the benefits gained from selling on credit. This two-sided contingency makes investing in AR a complex decision for businesses and an interesting phenomenon to academics.

However, despite potential losses, evidence from markets around the world shows that most business-to-business transactions are undertaken on credit, often resulting in high levels of AR (Summers and Wilson, 2002; Kling et al., 2014). Trade credit is very important; it is greater in volume than the flows of short-term bank borrowing in nearly all developing and industrialised countries (Guido 2003; Blasio, 2003). In the UK, for instance, AR stand at around 37% of total business assets (Paul and Wilson, 2006, 2007). In both the UK and the USA, trade credit exceeds the primary money supply by a factor of about 1.5. It is one of the most important forms of finance, exceeding the short-term business lending of the entire banking system (Lee and Stowe, 1993; Ng et al., 1999; Wilson and Summers, 2002; Aaronson et al., 2004; Boden and Paul, 2014). Kling et al. (2014) examine the link between trade and short-term bank credit and provide evidence that they are complementary, a finding that was also supported by both Bias and Gollier (1997) and Burkart and Ellingsen (2004). Trade credit is therefore an important source of trade liquidity, as well as a useful source of money supply.

At the micro level, trade credit is seen by firms as an essential marketing tool that helps their competitiveness and growth (Ferrando and Mulier, 2013). Ai-guo (2006) finds that firms invest in AR to reinforce their market position, making them more competitive, increasing their sales and reducing their inventories. Barrot (2016) goes further and provides evidence that any reduction in investment in AR leads to an increase in the corporate default probability while Kling et al. (2014) find that UK firms have had to

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invest in AR to maintain sales and remain competitive. In the same vein, it has been shown that when trade credit is restricted, trade between buyers and sellers decreases (Breza and Liberman, 2017).

Trade credit is also an essential part of working capital. The level of AR has a direct impact on other elements of firms' working capital, such as cash flow and inventory holding. Michalski (2012) reports that any change in the level of AR affects the level of working capital. It is often argued that cash volatility, for instance, affects the AR level and that firms with limited access to external funds invest less in AR (Summers and Wilson, 2002). In the same vein, firms with higher cash-flow volatility tend to hold higher levels of cash and hence to invest less in AR by reducing the level of credit granted to their customers (Molina and Preve, 2009; Bates, Kahle and Stulz, 2009). Choi and Kim (2003) find that firms tend to increase their AR level when the level of their inventories rises.

Others argue that investing in AR is a way of channelling funds from cash rich firms to their financially constrained customers (Ge and Qiu, 2007; Garcia-Appendini and Montoriol-Garriga, 2013; Levchuk, 2013; Boden and Paul, 2014) with the aim of enhancing long-term relationships. Others still report a positive relationship between the level of AR and the increase in shareholder wealth (Hill, et al., 2013). Nevertheless, too high a level of AR can be associated with lower profitability (Padachi, 2006) as sellers are effectively financing their customers' inventory for an agreed period into the future, and granting credit entails substantial costs as well as risks. If AR can increase both the cost of credit and the risk of default, it begs the question as to why companies invest in this asset at all.

Rationally, the risks of investing in AR should be outweighed by the benefits discussed above (Paul and Boden, 2008; Ferrando and Mulier, 2013). Some have argued that the benefits result from a reduction in transaction costs: selling on credit allows firms to accumulate invoices for payment and reduce their transaction costs and this may incentivise them to invest more in AR (Main and Smith, 1982; Petersen and Rajan, 1997; Pike and Cheng, 2001; Soufani and Poutziouris, 2002). Others have emphasised the benefits gained from building customer relationships to help repeat business and thus gain competitive advantage (Jacob, 1994; Wilson and Summers, 2002; Fisman and Raturi, 2004; Cuñat, 2007; Burkart et al., 2011). Other still looked at the helping hand theory where, through trade credit, funds are channelling from cash-rich firms to those

with limited borrowing power in the supply chain (Petersen and Rajan, 1997; Pike and Cheng, 2001; Atanasova and Wilson, 2003). In Europe, for instance, when SMEs are unable to obtain finance from banks, they rely heavily on trade credit from their suppliers (Casey and O'Toole, 2014; Carbo-Valverde et al., 2016).

This process facilitates financial efficiency across supply chains between suppliers and customers (Hoffman and Kotzab, 2010). It is also argued that the benefits come from better communication between buyers and sellers (Jain, 2001; Wilson, 2008; Boden and Paul 2014). Investment in AR leads to mitigating the asymmetry of information for both parties. Buyers have time to inspect the quality of the goods before payment, and sellers to collect important information about the buyers' financial health through risk assessment before granting credit. Therefore, in the process of requesting/granting credit, buyers and sellers gain vital information about each other. The warranty of product quality reduces the risk of late payment and default, whereas the information collected in the process can be used effectively to assess the creditworthiness of customers before further credit is granted. This can speed up the return on AR which in turn informs the systems and processes that need to be in place to facilitate the implementation of the expected credit loss model under MFRS 9.

A number of theories have been developed to explain the level of AR (Petersen and Rajan, 1997; Wilson and Summers, 2002; Pike and Chen, 2002; Paul and Boden, 2008, 2011; Boden and Paul, 2014). Some theories emphasise the role of factors such as company size, access to internal/external financing, operating profit and sales revenue growth, liquidity and collateral (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002; Paul and Boden, 2008). Others have added factors such as industry norms (Wilson, 2008; Paul and Boden, 2011), the reputation of the firm's auditor (Gul, et al., 2009; Paul et al., 2012) and ownership (Martínez et al., 2007; Carney and Child, 2012). Empirical support for the relevance of the various extant theories in this area can be found in the work of, for example, Petersen and Rajan, (1997), Marotta (2000), Pike and Cheng (2002), Soufani and Poutziouris (2002), Levchuk, (2013), Delannay and Weill (2004), Rodriguez (2006). However, there is very little empirical evidence on the role of the proposed factors in explaining how much firms are prepared to invest in AR within emerging and developing economies, especially in Asia (Zainudin, 2008; Love and Zaidi, 2010). Most of the empirical literature has focused particularly on the US and the UK, even though firms in less developed Asian economies have been found to

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be more reliant on finance from trade credit than is the case with firms from more developed economies (Ge and Qiu, 2007).

In the next subsections, we describe the factors put forward in the literature to explain decisions on the level of AR. These include: firm size, access to internal/external financing, operating profit, sales revenue growth, price discrimination, liquidity and collateral to secure financing. Based on the literature, seven hypotheses are proposed here to examine the determinants of the scale of AR in the Malaysian manufacturing sector.

### 2.1. Firm Size

It is argued that firm size plays a major role in determining the scale of AR. Larger firms are perceived to be more creditworthy and to have a higher capacity for greater investment in AR by granting more credit to their customers (Petersen and Rajan, 1997; Main and Smith, 1982; Pike and Cheng, 2001; Soufani and Poutziouris, 2002). They also have too high a transaction volume to deal with cash sales (Summers and Wilson, 2002; Boden and Paul, 2014). Nevertheless, market power theory suggests that larger firms tend to have a stronger bargaining position in the trading relationship with their customers and, thus, may not need to hold considerable amounts of AR. Consequently, they impose stricter conditions for payments (Delannay and Weill, 2004). However, most empirical evidence shows that characteristics such as firm size *do* play a positive effect on the level of AR (Ng *et al*., 1999; Petersen and Rajan, 1997; Wilson and Summers, 2002; Delannay and Weill, 2004; Paul and Wilson, 2006; Boden and Paul, 2014). Hence:

*H1: Larger firms tend to invest more in AR.*

### 2.2. Access to External Short-Term Finance

Financial strength plays a major role in the decision to invest in AR (Wilson, 2008). Thus, firms with high borrowing capability are more likely to invest in AR by granting more credit to their customers (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002; Ge and Qiu, 2007). Such firms tend to help those customers which are heavily reliant on them to finance their working capital needs (Petersen and Rajan, 1997; Atanasova and Wilson, 2004). Thus, credit from suppliers is offered to complement, and/or substitute for, other sources of funds to support valuable customers financially. Furthermore, a lack of finance is often exacerbated by financial crises and, when banks

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tighten lending, trade borrowing becomes a source of finance for the survival and growth of firms of all sizes (Soufani and Poutziouris, 2002). We therefore expect a positive relationship between short-term lines of credit and AR:

> *H2: Firms with greater access to external short-term financing are expected to invest more in AR.*

### 2.3 Access to Internal Short-Term Finance and Profit

Financial theory posits that profitable firms with sound internal cash-flow generating capability tend to grant credit to their customers and thus to carry high AR levels (Petersen and Rajan, 1997; Ge and Qiu, 2007; Levchuk, 2013). Delannay and Weill (2004) find that profitability is positively linked with the AR ratio. In the same vein, Ge and Qiu, (2007) show that, given their healthy financial situation, profitable firms are more inclined to grant credit to their customers. However, applying the distressed[5] firms' theory, loss-making firms may extend more credit to improve sales and keep themselves afloat (Petersen and Rajan, 1997; Summers and Wilson, 2002).  Thus, one would expect such firms to grant more credit and hence have higher levels of AR. In addition, Delannay and Weill (2004) and Soufani and Poutziouris, (2002) find that certain loss-making firms, by default, tend to exhibit high AR resulting from customers taking advantage of this financial fragility to delay payment. Therefore, we anticipate that both higher profitability and higher distress lead to higher AR. We thus propose the following hypothesis:

> *H3: Operating profitability has a smile effect on AR.  Specifically, firms with greater access to internal financing (higher operating profitability) invest in higher levels of AR, while firms in greater distress (negative operating profitability) also invest in higher levels of AR.*

Several measures have been used to proxy internal financing represented by the cash flow generated from operating profit. Petersen and Rajan (1997), for instance, use net profit after tax over turnover while Rodriguez (2006) utilises the operating profit to turnover. In this study, we use the latter.

### 2.4. Sales Revenue Growth

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[5] A firm is defined as being under distress if it has negative sales growth and negative net income (Petersen and Rajan, 1997).

Given that most transactions are on credit, increases in sales lead to increases in the AR level. Thus, firms with sales growth may offer more credit to their customers and hence invest more in AR (Petersen and Rajan, 1997; Wilson, 2008). It is argued that small/new firms with potential for growth tend to have larger investments in AR, relative to their total assets, as they are inclined to grant more credit to encourage repeated business to finance further growth (Summers and Wilson, 2002; Boden and Paul, 2014). Nevertheless, those with declining sales may have greater AR as they use trade credit as a marketing tool to improve their sales (Petersen and Rajan, 1997; Wilson, 2008). Many find a positive relationship between sales growth and AR in expanding firms, which decide to implement aggressive commercial strategies to increase sales (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002). In addition, distressed firms extend more credit to boost depressed sales in a bid to survive (Delannay and Weill, 2004). A non-linear link between growth and AR is therefore expected. Hence, we propose the following hypothesis:

> H4: Sales growth has a smile effect on the level of AR, namely, both small (negative) and big growth in sales lead to higher levels of AR.

### 2.5. Collateral to Secure Financing

Hammes (2003) and Levchuk (2013) posit that higher value asset based firms can offer better collateral to obtain external funding that can then be used to invest in more AR by granting credit to customers constrained by inadequacy of collateral. They use the net fixed assets to total assets ratio to represents firms' ability to secure bank loans and find that firms with high ratios have a greater ability to secure short-term borrowing to invest in AR. Their results are in line with research that finds that when firms have relatively easy access to funds through their collateral, they tend to have high levels of AR (Petersen and Rajan, 1997). Levchuk (2013) uses firms' net fixed assets to total assets ratio as a proxy to measure their ability to secure financing. We therefore expect collateral to be positively related to the level of AR, hence:

> H5: Firms with higher net fixed assets to total assets are more likely to grant credit and thus to invest in higher levels of AR.

### 2.6. Liquidity

Firms with healthy liquidity tend to invest more in AR (Summers and Wilson, 2002; Soufani and Poutziouris, 2002; Delannay and Weill, 2004; and Paul et al. 2012). They

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are more willing to finance their customers' inventory to secure repeat business (Paul and Boden, 2008; Paul, 2010). Thus, those with greater liquidity tend to invest in their less liquid customers by granting them credit. Nevertheless, Marotta (2000) and Rodriguez (2006) argue that firms with a high quick ratio (liquid assets over current liabilities) may have less incentive to promote sales through granting credit due to potential overtrading and, thus, are likely to offer less credit. However, Levchuk (2013) finds that those with financial disadvantages promote sales through investment in low-return financial instruments such as AR. The liquidity position of firms is proxied by the quick ratio, net of commercial components (Levchuk, 2013; Marotta, 2000) and so a positive relationship is expected between liquidity and the level of AR, hence:

*H6: Cash-rich firms invest in higher levels of AR.*

### 2.7. Price Discrimination

Firms with high gross profit margins have a greater incentive to finance sales of additional units via generous credit terms and hence are expected to have a high level of AR (Petersen and Rajan, 1997). They can use different credit terms to price discriminate between their customers (Meltzer, 1960; Schwartz and Whitcomb, 1978; Mian and Smith, 1992; Petersen and Rajan, 1997). For instance, they may choose not to enforce the agreed terms and thus allow selected customers to pay after the due date; this is the equivalent of a price reduction (Schwartz, 1974; Schwartz and Whitcomb, 1978; Paul and Boden, 2008). Such generous credit terms allow suppliers surreptitiously to violate price regulation (Emery, 1984). In addition, those with healthy profit margins can, effectively, afford to reduce the product price through generous credit terms and this often leads to additional sales (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002). We therefore predict a positive relationship between the level of AR and firms' gross profit margins, hence:

*H7: Firms with higher gross margins are expected to have higher levels AR.*

### 3. DATA, METHOD AND VARIABLES

Secondary data is used to test the hypotheses developed in the preceding section. We use the firms listed on the Main and Second Board of Bursa Malaysia (under the Consumer Products and Industrial Products sector), collectively representing all listed

manufacturing firms in Malaysia. The data is obtained from Reuter's official website[6] using balance sheets and profit and loss accounts for the financial years ending 2007 to 2011 (inclusive). This data is then complemented by annual reports, obtained from the Bursa Malaysia official website.[7] We follow Petersen and Rajan's (1997) study and adopt a correlational approach to examine the factors that affect the level of AR. A predictive correlational design is used to explore causality and factors influencing other variables.

We use AR as a proxy for the granting of trade credit. However, because of potential scale effect problems, we also consider a scaled version of AR, namely AR to totals assets (AR/TA). We increase the scale of this variable in order to match the scale of the dependent variables (which helps reduce the number of decimal places in the estimated coefficients, but does not alter the results). Thus, our second dependent variable is defined as follows:

$$\text{ARTA} = \frac{AR}{Total\ Asset} \times 1000$$

In line with our hypotheses, we use seven independent variables, which have been identified in previous studies (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002; Delannay and Weill, 2004): company size, access to internal/external financing, operating profit, sales revenue growth, price discrimination, liquidity and collateral.

Finally, to complete our model specification, we consider several control variables. The first is a dummy representing the firm's sector. This variable represents either consumer product or industrial product manufacturers (in accordance with Bursa Malaysia's classification). Prior studies, such as those of Angappan and Nasruddin (2003) and Nasruddin (2008), included the sector as a control variable. *SECTOR* is used to control for the well-known impact of industry sectors and payment customs (Petersen and Rajan, 1997; Angappan and Nasruddin, 2003; Nasruddin, 2008). Consumer products are more fast-moving than industrial products and mainly for consumption whereas industrial products are mainly for capital goods. As a result, commercial motives, elasticity of demand, and economies of scale are expected to be different in different sectors. Following the Bursa Malaysia classification for the manufacturing sector, the

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[6] www.reuters.com/finance
[7] www.bursamalysia.com

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variable *SECTOR* is set equal to zero for consumer products and one for industrial products. Other sectors are not included in this study.

The second control variable is the auditor's reputation (*AUDITOR*), which identifies whether the firm uses one of the Big Four auditing firms in Malaysia. Large firms are expected to have better resources and technical expertise and may be more likely to use auditors of the highest reputation (Eng and Mak, 2003; Janssen et al., 2005; Gul et al., 2009). Therefore, we use *AUDITOR* to control for the possibility that firms audited by one of the Big Four extend different levels of trade compared to those that use the services of firms other than the Big Four. The variable *AUDITOR* is a dummy, which is set equal to one if the firm is audited by one of the Big Four and zero otherwise.

The third variable captures the possible effect of a high family ownership concentration (set at 20% or more family ownership). Malaysia has a high level of family ownership concentration (Claessens, *et al.*, 2000; Ismail and Sinnadurai, 2012) and per capita has one of the highest presences of family-owned firms in the world (Claessens et al., 2000; Ismail and Sinnadurai, 2012; Sinnadurai, 2015). Family owned-firms are more likely to enjoy enhanced earnings quality (Wang, 2006; Ali et al., 2007) and may, therefore, obtain high levels of AR by granting more credit to their customers. The control for family ownership captures ownership concentration as a potential determinant of credit granting in the same way as dividend policy (La Porta et al., 2000; Aivazian et al., 2003; Mitton, 2004). We label this dummy variable *OWN,* and we set it equal to one if 20% or more of the firm's equity is family owned and zero otherwise.

Finally, the time effect is accounted for by four time dummies (*T2007* to *T2010*), where each dummy-year is set equal to one for that particular year and zero otherwise. These four years are contrasted with the year 2006.

Since the data set consists of observations for 262 firms over five consecutive years, the evaluation should be undertaken within a panel analysis framework. The reason for this is that our data involves two dimensions and panel regression has a greater capacity to model the complex behaviour of firms compared with a simple cross-section or time series regression. Indeed, panel data regression provides a more accurate inference of estimated parameters, and exploits the additional degrees of freedom and sample variability better than the single cross-section or time series models (Hsiao et al., 1995). Another advantage of a panel regression over a simple cross-section regression is that it

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provides greater flexibility when modelling differences in behaviour across different firms. These firm-specific effects are accounted for in a natural way in panel data models. However, one particular difficulty is whether these effects should be treated as fixed or randomly distributed across firms. The fixed effects model assumes that the unobserved firm-specific effects are uncorrelated with the regressors, while in the latter case they may be correlated. Fortunately, the choice between the fixed or random effects model may be tested empirically through the Hausman (1978) test, which assesses whether the firm-specific factors are correlated with the regressors. Rejection of this hypothesis implies that the firm-specific factors should be treated as fixed (deterministic) rather than random. Table 1 provides brief definitions of the above independent variables and relates them to the study's hypotheses.

## 4. RESULTS

Our data consists of 262 firms over a period of five years (2007-2011). Although a pooled time series and cross section regression is possible, the potential heterogeneity across firms may bias the results. Both fixed effect and random effect approaches are therefore adopted. The following linear equation is proposed:

$$TC_{it} = \alpha_i + \beta_1 LOGSIZE_{it} + \beta_2 STCREDIT_{it} + \beta_3 OPEPROFIT_{it} + \beta_4 OPEPROFIT_{it}^2$$
$$+ \beta_5 SGROWTH_{it} + \beta_6 SGROWTH_{it}^2 + \beta_7 COLLATERAL_{it} + \beta_8 LIQUID_{it}$$
$$+ \beta_9 GMARGIN_{it} + \beta_{10} SEC_{it} + \beta_{11} AUDITOR_{it} + \beta_{12} OWN_{it} + \beta_{13} T2007_{it}$$
$$+ \beta_{14} T2008_{it} + \beta_{15} T2009_{it} + \beta_{16} T2010_{it}$$

where $TC_{it}$ takes one of the two AR proxies defined earlier, for firm i in year t, and $\alpha_i$ is a firm specific effect, which is assumed either fixed or random depending on the panel data model adopted.

Table 1. List of Independent and Control Variables

| Hypothesis | Explanatory Variables | Definition |
|---|---|---|
| H1 | Company's size (LOGSIZE) | Log (Book Value of Assets) |
| H2 | Short-term line of credit (STCREDIT) | Financial Institutions Debts in Current Liabilities/Turnover |
| H3 | Profit and internal cash (OPEPROFIT) | Operating Profit Before Tax (OP) /Revenue(REV) |
| H4 | Sales growth (SGROWTH) | Percentage Sales Growth |
| H5 | Collateral to secure financing (COLLATERAL) | Net Fixed Assets /Total Assets |
| H6 | Liquidity (LIQUID) | Quick Ratio, i.e. the ratio of current assets (excluding inventories) over current liabilities |
| H7 | Gross Margin (GMARGIN) | Gross Profit Margin/Revenue |
| Control | Industry Sector (SECTOR) | Industrial Products = '1', Consumer = zero |
| | Auditors (AUDITOR) | Big Four audit firms = '1', zero otherwise. |
| | Ownership (OWN) | Family members own 20% or more of |

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| | | shareholdings of company = '1', zero otherwise. |

Of the 262 publicly listed firms under study, 66% are in industrial products while the remainder specialise in consumer products. Over half the sample (51.14%) employs one of the Big Four auditing firms in Malaysia.

Table 2 provides summary statistics for all dependent and independent variables used in the analysis. The statistics are summarised across all firm-year observations. A typical Malaysian firm has an average AR of just over 66 million RM. The large standard deviation of nearly 114 million RM is indicative of large dispersion of credit granting in our sample. The most credit offered is just over 1.25 billion RM. This extreme figure indicates the scale of the potential problem stemming from the heterogeneity in firm size across the sample. Once we scale AR by total assets, the figures look more reasonable with an average of 16.33% and a maximum of 63.19%.

Additional calculations reveal that the firms making industrial products have longer days outstanding (81.64 days) compared to consumer product manufacturers (65.29 days). This is confirmed by the figures on ARTA (16.92% for the industry against 15.18% for the non-industry). However, in absolute terms, the AR of the two sectors are of similar scale (67.84 million RM against 62.73 million RM) though the industry sector is marginally higher. These results are in line with those of Angappan and Nasruddin (2003), who find that industrial product manufacturers have higher levels of AR compared with consumer product manufacturers.

The remaining independent variables also show large variability and extreme cases. The short-term credit also reflects a substantial diversity within our sample. The average availability of debt (current liabilities) relative to turnover is 0.249%. Given a standard deviation of 0.464, which would mean that approximately 95% of firms have credit availability of less than 1.2%, this indicates that the majority of firms have little access to external funding. Nevertheless, there are a few firms that have much healthier access to credit (the maximum being 5.856%).

The operating profit is negative on average. This is not surprising since our sample coincides with the global meltdown of the credit crunch. The growth in sales is about 11% on average, but includes extremes on both sides. While some firms' growth declined by nearly 94%, that of others exploded by more than 2,254%. The collateral also shows a substantial diversity in our sample. Although the average is around 3%

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(with more than 90% of the firms having less than 9% collateral) there are some outliers with 46.349%. The liquidity is very similar. Finally, the gross margin shows a positive average profitability of nearly 18%, but a substantial number of firms witnessed losses (the standard deviation suggesting that about 95% of firms had gross margins between roughly -10% and 46%).

Pearson's pairwise correlation matrix is shown in Table 3. As can be seen, the largest correlation is between gross margin and operating profit. Although significant at the 1% level, the correlation is well below the usual recommended threshold of 0.8 (Gujarati, 2006). The lowest correlation is -0.358 between short-term credit and operating profit. Overall, the pairwise correlations between the independent variables do not suggest that multicollinearity is an issue.

Table 2. Summary Statistics of the Main Dependent and Independent Variables

| Series | Mean | Std. Error | Minimum | Maximum |
|---|---|---|---|---|
| AR (million RM) | 66.107 | 113.996 | 0.000 | 1254.185 |
| ARTA (%) | 16.329 | 9.831 | 0.000 | 63.189 |
| LOGSIZE (log Million RM) | 5.483 | 1.177 | 3.131 | 10.171 |
| STCREDIT (%) | 0.249 | 0.464 | 0.000 | 5.856 |
| OPEPROFIT (million RM) | -0.376 | 41.465 | -873.564 | 270.306 |
| SGROWTH (%) | 11.058 | 84.887 | -93.987 | 2254.707 |
| COLLATERAL (%) | 3.057 | 3.241 | 0.000 | 41.989 |
| LIQUID (%) | 2.635 | 2.987 | 0.105 | 46.349 |
| GMARGIN (%) | 17.912 | 13.977 | -71.227 | 86.280 |

Table 3. Pairwise Correlations of the Main Independent Variables

| | LOGSIZE | STCREDIT | OPEPROFIT | SGROWTH | COLLATERAL | LIQUID |
|---|---|---|---|---|---|---|
| CREDIT | -0.037 | | | | | |
| OPERPROFIT | 0.143** | -0.358** | | | | |
| SGROWTH | 0.049 | -0.070* | 0.091** | | | |
| COLLATERAL | 0.080** | -0.174** | 0.104** | 0.068* | | |
| LIQUID | -0.087** | -0.240** | 0.100** | -0.034 | -0.023 | |
| GMARGIN | 0.113** | -0.168** | 0.378** | 0.060 | -0.008 | 0.103** |

** significant at the 1% level. * significant at the 5% level.

Table 4 presents the results for the random and fixed effect models for the two dependent variables. In both cases, the Hausman specification test is highly significant and suggests that the fixed effect models are more appropriate. The coefficients for the sector (*SEC*) and ownership (*OWN*) dummies are not estimated under the fixed specification since the fixed effect model wipes out time invariant variables (including the intercept). We will therefore rely on the random effect estimates of these dummy variables, while for the remaining coefficients we will use the fixed effect estimates.

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The two fixed effect models explain a significant portion of the variability of the trade credit measures. The R-squares are 86.9% and 84.6% for AR and ARTA respectively, whereas both F-statistics are highly significant, suggesting that the overall fit is statistically significant. However, the relative (ARTA) and absolute (AR) measures of trade credit do not coincide. The level of AR is explained almost exclusively by size. In the AR model, the coefficient associated with LOGSIZE is highly significant and positive, suggesting that larger firms grant more trade credit, and hence have high levels of AR. This result could have two explanations. One obvious, but less likely, explanation is that only size matters for credit granting. If we were to accept this explanation, then only the first hypothesis can be confirmed. However, a more rational explanation is that these results are likely to be due to the scale effect. In other words, the results are driven by the fact that some firms are larger than others. Since larger firms have relatively larger sales, AR are naturally greater for larger firms. This effect could be so important that the other explanations such as collateral or liquidity are dwarfed and rendered statistically insignificant. This suggests that AR is not an appropriate measure for trade credit since the scale effect dominates and obscures other variables. The only other significant variable for the AR model is sales growth.

The model for the relative measure, ARTA, shows a more realistic outcome, albeit with a marginally lower coefficient of determination. It is clear that size does not dominate the other variables. More importantly, size (H1) has a negative effect on credit granting (larger firms extend less credit relative to their size). The coefficient of log-size is -14.36, and suggests that an increase from the average firm size of 244 million RM (5.48 log-million RM) to 665 million RM (6.46 log-million RM) reduces the granting of credit by slightly more than 14%. This is contrary to the prediction of our first hypothesis.

Short-term credit (H2) is highly significant and suggests that a one percentage point increase in short-term external finance leads to a decrease in the level of AR of around 13%. Sales growth (H4) is modelled with a quadratic term in order to capture non-linearity. Our fourth hypothesis states that both small (or negative) growth and big growth lead to higher levels of AR (smile pattern). This can be captured by the linear (SGROWTH) and quadratic ($SGROWTH^2$) terms. The smile pattern would be indicated by a negative linear coefficient and a positive quadratic coefficient. The results suggest the opposite of the smile pattern since the linear term is positive (=0.211) and

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significant while the quadratic coefficient is negative (=-0.0001) and significant. This means that a decrease in sales always decreases the level of AR. At the same time, increasing sales always leads to increases in AR levels, albeit at a decreasing rate.

Collateral (H5) is highly significant and has a positive coefficient, suggesting that a one percentage point increase in collateral increases AR by 3.56%.

The remaining variables, namely operating profit (H3) and liquidity (H6), and gross margin (H7) are insignificant.

The control variables have a mixed effect. The sector, auditor and ownership dummies are insignificant (as suggested by the random effect model). The second group of control variables are the time dummies related to the crisis period. The 2007 dummy is insignificant, meaning that there was no difference in the level of AR between 2006 and 2007. This is expected as the year 2007 was the beginning the credit crunch whereas ARTA is a stock variable that cumulates over one or more years. However, the crisis was more clearly felt a year later, starting from 2008. Indeed, the dummies for 2008, 2009 and 2010 are all highly significant and negative. Thus, the crisis reduced the average relative credit granted, probably as a result of financial difficulties, and the increased default risk faced by suppliers.

Table 4. Fixed and Random Effect Panel Data Estimation Results

| | Fixed Effect | | | | Random Effect | | | |
|---|---|---|---|---|---|---|---|---|
| | AR | | ARTA | | AR | | ARTA | |
| | coeff | p-val | coeff | p-val | Coeff | p-val | coeff | p-val |
| Intercept | | | | | -252.802 | 0.000 | 274.935 | 0.000 |
| | | | | | | | | |
| LOGSIZE | 29.782 | 0.000 | -14.360 | 0.028 | 59.228 | 0.000 | -21.214 | 0.000 |
| STCREDIT | -0.935 | 0.832 | -13.124 | 0.001 | -4.133 | 0.328 | -13.885 | 0.000 |
| OPEPROFIT | -0.014 | 0.833 | 0.112 | 0.078 | -0.049 | 0.466 | 0.113 | 0.069 |
| OPEPROFIT$^2$ | -0.0001 | 0.853 | 0.0001 | 0.234 | 0.000 | 0.493 | 0.000 | 0.263 |
| SGROWTH | 0.105 | 0.013 | 0.211 | 0.000 | 0.089 | 0.031 | 0.204 | 0.000 |
| SGROWTH$^2$ | -0.0001 | 0.029 | -0.0001 | 0.000 | 0.000 | 0.048 | 0.000 | 0.000 |
| COLLATERAL | 0.073 | 0.945 | 3.562 | 0.000 | 0.561 | 0.534 | 5.168 | 0.000 |
| LIQUID | 0.382 | 0.613 | -0.860 | 0.220 | 0.362 | 0.608 | -1.538 | 0.021 |
| GMARGIN | -0.172 | 0.468 | -0.298 | 0.175 | -0.390 | 0.065 | -0.271 | 0.183 |
| SEC | | | | | -1.307 | 0.903 | 19.570 | 0.113 |
| AUDITOR | | | | | 8.465 | 0.403 | 4.694 | 0.680 |
| OWN | | | | | 2.708 | 0.790 | -9.963 | 0.393 |
| T2007 | -2.254 | 0.584 | 0.971 | 0.800 | -4.534 | 0.264 | 0.261 | 0.945 |
| T2008 | -2.136 | 0.612 | -10.289 | 0.009 | -5.712 | 0.164 | -11.271 | 0.003 |
| T2009 | -7.105 | 0.097 | -19.565 | 0.000 | -11.178 | 0.007 | -20.068 | 0.000 |
| T2010 | -3.261 | 0.439 | -22.331 | 0.000 | -7.543 | 0.065 | -22.809 | 0.000 |
| $R^2$ | | 0.869 | | 0.846 | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Regression F | 24.965 | 20.686 | | | | |
| p-val (F) | 0.000 | 0.000 | | | | |
| Log Likelihood | | | | | -7204.54 | -7159.16 |
| Hausman Test | | | | | 31.609 | 35.187 |
| p-val | | | | | 0.001 | 0.000 |

Notes: The dependent variable is the accounts receivable over total revenue reported by the firms extracted from www.reuters.com/finance/stocks.
The coefficients are estimated using ordinary least squares (OLS) and the reported t-statistics are White- adjusted values to control for heteroscedasticity.
***, **, * Significant at 1%, 5% and 10% level.

## 5. DISCUSSION

One important result in this paper relates to the involvement of size both in the definition of, and the impact on, the level of AR. If we define trade credit as the level of AR, then size is not only positively related to the level of AR, but also virtually the only variable that matters. We argue that this scale effect should be controlled for, since large firms naturally grant more credit on average. Controlling for the scale effect through the use of ARTA reveals interesting insights. First, contrary to expectations, our results show that larger Malaysian manufacturing firms grant less trade credit relative to their size. Nevertheless, this result is in line with Soufani and Poutziouris (2002) and Delannay and Weill (2004) who argue that under market power theory, larger firms have a better bargaining position in the trading relationship and, as such, may not need to grant credit to sell their goods. In fact, given their greater bargaining power, larger firms are capable of imposing stricter conditions for payments and thus may capitalise on their position to reduce the costs associated with holding considerable amounts of AR. In addition, Smith (1987) and Paul and Boden (2008) argue that larger firms tend to have a good reputation and hence to grant less credit to their customers who do not need extended time to inspect the quality of the products. However, as we reported in the literature review section, the majority of existing empirical work has shown a positive relationship between size and credit granting. Although the result could partly be sensitive to methodological issues (we would have confirmed a positive relationship under an AR definition), it could also be specific to Malaysia. Malaysian manufacturing firms may be more efficient at collecting debt, or may simply have more market power compared with their counterparts in the industrialised economies. Overall, we find insufficient evidence in our sample of firms to confirm our first hypothesis.

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Second, the results show that firms in our sample that have access to short-term finance are less likely to grant credit. This suggests that the helping-hand theory does not hold as far as the Malaysian manufacturing firms are concerned: firms that have better access to short-term finance do not use trade credit to pass on the benefit to their customers. Our second hypothesis is therefore rejected. Operating profit is found to play no significant role in determining the level of AR. While our third hypothesis predicted a smile effect (a negative linear coefficient and a positive quadratic coefficient), the results show that the two coefficients are not significantly different from zero at the 5% level of significance. Thus, we conclude that whether a firm is more or less profitable has no consequence on trade credit granting; the third hypothesis is therefore rejected. Our fourth hypothesis, suggesting that the change in sales has a smile effect, is also rejected. Our results show that when sales increase, the level of AR increases with them. On the other hand, when sales decrease, AR decreases with them but at an increasing rate. This is clearly contrary to prior findings, which argue that when the level of sales decreases, firms use trade credit to increase their sales (Petersen and Rajan, 1997; Soufani and Poutziouris, 2002; Delannay, 2004; Wilson, 2008).

Collateral is positively correlated with the level of AR in Malaysian manufacturing firms. It seems to play a significant role in decisions over the AR level, implying that those with higher tangibility can collateralise their assets to obtain external financing to fund their working capital, inter alia, passing on the benefit to their customers by extending them credit through AR. This finding is consistent with Levchuk (2013), Petersen and Rajan (1997) and Boden and Paul (2014). Our fifth hypothesis is, therefore, the only one we could confirm for Malaysian manufacturing firms. Finally, we found no evidence to support the remaining hypotheses, Liquidity (H6) and gross margin (H7) both being statistically insignificant.

### 6. CONCLUSION

Investment in AR is normally impacted by many of the factors implied by either theory or empirical evidence. However, our main finding in this paper is that the Malaysian manufacturing sector is rather different. First, while in prior studies liquidity and gross margin have been found to have a positive and significant effect on the level of AR, our results show that these two factors play no role in influencing such level in the

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Malaysian manufacturing sector. Second, operating profit was expected to have a U-shaped effect based on prior findings. This, too, is not supported by our results, which suggests that operating profit has no role in determining the scale of AR. Third, while size, short-term credit and sales growth have been found to be significant, they are nevertheless inconsistent with the expected direction of their relationship with trade credit. Both size and short-term credit were expected to play a positive role, but were found to have a negative effect instead. Note, however, that size does have a positive effect on the level of AR, which is an absolute measure of trade credit. However, we argue that AR are naturally linked to firm size and should be descaled in order to provide a more relevant measure of trade credit. The only variable consistent with prior studies is collateral. This factor was found to have a positive effect, as expected. The positive association of collateral with the level of AR is the only hypothesis confirmed by this study.

Our results have several principal implications for policy makers. First, we show that policy makers should not take a holistic view of the trade credit market. Given that policy makers aim to improve liquidity and trade, they should design policies that are not only country specific but also sector specific. As is clear from our results, what holds for other countries or sectors may not necessarily be true for the Malaysian manufacturing sector. For example, if elsewhere size is positively linked to the level of investment in accounts receivable, then government policy (via incentive schemes, for example) should target smaller firms because they offer less trade credit. On the other hand, in the Malaysian manufacturing sector, the policy should be directed towards larger firms.

Second, under the new Expected Credit Loss (ECL) provisioning rule of IFRS 9, companies must provide for expected credit losses from the time credit is granted (Cohen and Edwards, 2017). This rule has important implications for Malaysian firms in the light of our findings. In particular, we found that smaller firms and those with lower short-term credit facilities tended to offer more trade credit. Thus, because of their reduced size and financial capabilities, these firms are particularly vulnerable to credit shocks, and should make provision for potential credit losses rather than wait for "trigger events" signalling imminent losses.

It is disturbing to note that large firms may depend on their bargaining power to the detriment of the small and medium sector growth. The Malaysian authorities may

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consider initiatives adopted in the UK and Europe, for example, to protect this important asset that many describe as the riskiest in a firm's balance sheet due to the risk related to late payment and possible default that increases the costs of granting credit. In the UK, for instance, many Codes and Charters have been introduced to protect companies' investments in AR (especially those of SMEs). These measures include the statutory provision of late payment interest legislation, (charging 8% above the bank rate), the change to the Companies Act that requires disclosure of payment trends, the Prompt Payment code administered by the Chartered Institute for Credit Management on behalf of the Department for Business, Energy and Industrial Strategy (such self-regulatory devices attempting to alter the behaviour of larger customers by eliciting public commitments to ethical and fair behaviour). Other measures include self-regulation, such as Voluntary Codes of Conduct, and business support in the form of enhanced training for SMEs. The UK late payment legislation was subsequently adopted by the EU (European Union Directive 2000/35/EC).

Third, trade credit research is highly sensitive to the definition of trade credit. Results, therefore, depend primarily on the proxy the researcher uses for the level of credit granted. We find clear evidence that the use of certain definitions of AR is likely to distort findings and affect the validity of empirical results. One methodological implication of our study is the importance of using relative rather than absolute measures of trade credit. These latter give disproportionate importance to size and this can obscure the impact of the other factors that normally affect trade credit and thus AR levels.

The absence or negligible impact of the helping hand theory further raises concerns about the political economy of the country. It appears that there is a disconnect between large and small businesses. Organisations such as SMEs need to harness the potential of big businesses to play a benign role in enhancing the ecosystem for the SME sector in the same way as in other parts of the world where the helping hand is more widespread, as explained earlier. Lastly, the low inclination of firms to use trade credit to boost declining sales may need to be investigated. Perhaps the enforcement of IAS 39 (or MFRS 139 in Malaysia since 2010) will deter firms from using this technique. Future research may examine whether adoption of IFRS9 (or MFRS 9) has had an effect and how the new model for expected credit losses will impact investment in AR.

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On the theoretical side, given that most of our hypotheses have been rejected, some of the existing theories on trade credit need to be revised, at least as regards the developing world. The behaviour of the firm and its management towards AR is clearly not universal. For example, some (Muslim) Malaysian managers may hold certain beliefs towards usury and as a result, may not tolerate the explicit or implicit interest embedded in investment in AR. In the developed world, larger firms and firms with access to financing tend to grant more trade credit. Malaysian firms are not aligned with this behaviour. Indeed, the negative relationship between firm size and trade credit suggests that market power theory is more relevant in Malaysia. On the other hand, the transaction cost argument and the helping hand theory play a less prominent role in Malaysia.

Our quantitative approach has obvious limitations. First, we used a simple linear model, which may be a crude approximation to the true AR data generating process. In particular, as AR and ARTA are strictly positive, a Panel Tobit model might be preferred since it truncates the data at zero. Second, our model tested AR and ARTA in levels rather than differences. One way to extend our study is to investigate the dynamics in trade credit, which can be measured using the yearly change in AR and ARTA. Third, the scope of our findings could be enriched and broadened via a qualitative approach using interview data. Although secondary quantitative data allows for formal statistical testing, qualitative data has advantages where there may be potential issues, behaviours, or technical information not identified in the literature but which may be identified during interviews. Certain behaviours, experiences, and understandings of firms' managers cannot be captured by secondary financial data. Finally, AR is a stock variable and therefore not a true reflection of trade credit, which is a flow variable. Thus, some of this missing information can be obtained, albeit partially and imperfectly, from the manager's direct observation of the flow of trade credit during the year.

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