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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 countries, 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.

1. INTRODUCTION

Accounts receivable (AR) occur when suppliers of goods and services¹ 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

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.

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

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

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

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

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

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

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 distressed⁵ 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

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

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 website⁶ 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:

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

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

⁶ www.reuters.com/finance

⁷ www.bursamalaysia.com

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

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 α_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

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

(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 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 (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 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.

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

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

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.

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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