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The Impact of Trade Credit Use on Corporate Profitability: The Case of Manufacturing Firms Listed on the Zimbabwe Stock Exchange (2009-2017)

By

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Declaration

I, the undersigned, do hereby declare that this Dissertation is a result of my own original research and that no part of this has been presented for examination in any other university.

Signed_____ Date_____

Noel Gumbo

Reg No. R1611245

Dedication

I would like to dedicate this dissertation to my mother Kudzai Shumba and my father Wilson Gumbo.

Acknowledgements

I would like to thank God Almighty for granting me the opportunity and perseverance to undertake and complete this study. Special thanks to my supervisor Dr. P. G. Kadenge for his mentorship that made this study a success. I appreciate efforts by staff members of the Department of Economics at the University of Zimbabwe who assisted by giving me guidelines.

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Abstract

The purpose of this study was to examine the impact of trade credit as a source of funding among manufacturing firms listed on the Zimbabwe Stock Exchange (ZSE) for the period 2009 to 2017. In doing so, panel data collected from financial statements of fifteen manufacturing firms listed on the ZSE for the period 2009 to 2017 were used. As suggested by the Hausman Specification Test and Breusch-Pagan Lagrangian Multiplier Test, the study adopted the Random Effects Model. The study found that trade credit negatively affects firm profitability. Furthermore, firm size and liquidity were found to have positive impact on firm profitability while leverage was found to be irrelevant as predicted by the Modigliani-Miller Proposition 1. Basing on these findings, the study advises manufacturing firms to reduce the use of trade credit as a financing source by making early payments to their suppliers and opt for the issuance of debt and equity since leverage had no impact on firm profitability. Apart from that, manufacturing firms should strive to increase their size by investing in assets with positive Net Present Value (NPV). Manufacturing firms need to engage in intensive cash management techniques in order to increase and preserve their liquidity levels.

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List of Acronyms

ATCCL	Average Trade Credit to Current Liabilities
COMESA	Common Market for Eastern and Southern Africa
EBIT	Earnings Before Interest and Tax
ECM	Error Components Model
FEM	Fixed Effects Model
GDP	Gross Domestic Product
GMM	Generalised Methods of Moments
IDP	Industrial Development Policy
JSE	Johannesburg Securities Exchange
MM	Modigliani-Miller
NIM	Net Interest Margin
NPV	Net Present Value
NSE	Nigerian Stock Exchange
OLS	Ordinary Least Squares
POT	Perking Order Theory
RBZ	Reserve Bank of Zimbabwe
REM	Random Effects Model
ROA	Return on Assets
ROCE	Return on Capital Employed
ROE	Return on Equity
SADC	Southern Africa Development Community
SI 64	Statutory Instrument 64
SMEs	Small to Medium Enterprises
STERP	Short Term Emergency Recovery Programme
UK	United Kingdom
ZSE	Zimbabwe Stock Exchange

CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.0 Introduction

For firms to operate, they require finance where debt and equity are two major types of finance which constitute firms' capital structure (Bodie *et al*., 2014). Debt finance originates from financial institutions in the form of loans and advances while equity comes from investors who wish to own shares in a company. Apart from these two sources of finance, firms can also obtain short term finance called trade credit from their goods suppliers. Trade credit refers to an arrangement between the buyer and the seller where the seller grants the buyer the right to delay the payment of products as opposed to cash payment (Mian and Smith, 1992). Cook (1999) defined trade credit as credit that is extended by the supplier by allowing the buyer to pay later. According to Cunat (2007), trade credit is known as vendor financing[1]. Trade credit is an essential business element that brings life in many firms in the world. For example, the world's largest retailer Wal-Mart in 2015 used trade credit more frequently than bank financing (Wu and Zhou, 2015).

Unlike institutional finance, trade credit does not require any formal collateral security[2] but it is built upon trust and reputation. A trade credit contract legally binds the agreement between the buyer and the seller where the buyer is allowed to purchase goods and services on account and then pay the supplier at a later date (Yazdanfar and Öhman, 2016). To the buyer, a trade credit agreement (accounts payable) is a financing tool which is recorded as a current liability on the balance sheet of that firm. To the supplier, a trade credit agreement is an investment in accounts receivable that is recorded as an asset.

In countries with malfunctioning financial markets, trade credit is very important (Ojenike and Olusola, 2012). For example, Moodley *et al*. (2017) found out that firms with a higher rate of trade credit grew faster even when financial institutions are weak. Trade credit serves a vital role to the buying firm's financing policy. Granting trade credit is a powerful selling aid that is a fundamental foundation upon which business relationships are laid (Myers and Majluf, 1984). Suppliers can find it necessary to lend to financially constrained customers because of their

[1] Vendor financing is the lending of money by a vendor to a customer who then uses it to buy the vendor's inventory or services. A vendor is a company offering something for sale.

[2] Collateral security is a form of secondary protection required by the lender with the intention to guarantee a borrower's performance on a debt obligation.

comparative advantage in gathering information about their buyers which is costly for financial institutions. According to Burkart and Ellingsen (2004), even if efficient financial intermediaries exist, it is true that goods exchange can be bundled with credit transactions. In many countries, trade credit is a significant element of capital structure (Kasozi, 2017 and Raddatz, 2010).

According to Modigliani and Miller (1958), under perfect market conditions, the firm's financial decision will not affect its value and profitability. Trade credit is not supposed to be an issue in corporate financing at least under the conditions of perfect capital market because it does not affect corporate profitability (Sartoris and Hill, 1982). However, since Modigliani and Miller (1958)'s Proposition 1 considered an Arrow-Debreu world (no taxes, complete markets, absence of bankruptcy[3] and no transaction costs), it is hardly realistic. Lewellen *et al.* (1980) revealed that under imperfect market conditions, decisions on trade credit will affect the value and profitability of a firm. In most non-financial firms, trade credit represents an important source of financing (Achode and Rotich, 2016).

According to Fisman (2001), in economies with underdeveloped financial and capital markets, trade credit acts as a substitute for bank finance, and firms that depend much on supplier finance had positive high growth rates. Thus trade credit helps to provide a safety net for firms that are suffering from idiosyncratic liquidity shocks and hence improve profitability (Cunat, 2007). However, Yazdanfar and Öhman, (2016) pointed out that trade credit is coupled with its costs such as loss of early payment discounts among others which negatively affect firm profitability. According to Rodríguez-Rodríguez (2006), the relevance of trade credit is clear among Small to Medium Enterprises (SMEs) because of their limited access to mainstream sources of finance. However, if a manufacturing firm listed on the Zimbabwe Stock Exchange (ZSE) is using trade credit, trade credit becomes an important source of financing whose impact on firm profitability is worth investigating.

1.1 Background of the Study

The inception of the multi-currency regime in 2009 ushered Zimbabwe into a new economic dispensation and the country registered positive economic growth and the manufacturing sector capacity utilization improved. In order to support the manufacturing sector, the government came up with a number of polices in order to enhance the manufacturing sector profitability.

[3] Bankruptcy is a legal declaration that a debtor is insolvent or unable to pay its debts.

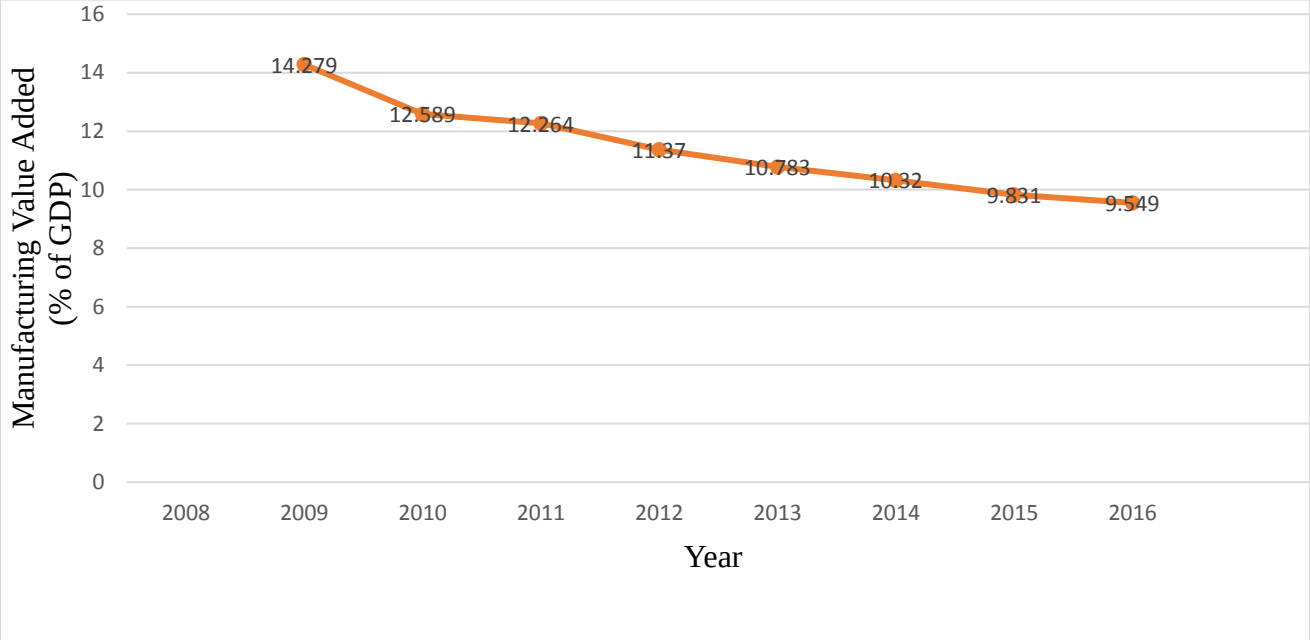
In February 2009 the government launched the Short Term Emergency Recovery Programme (STERP 1). STERP 1 was then followed by a Macro-economic Policy and Budget Framework (STERP II) which was launched on 23 December 2009 to cover a three year period of 2010-2012 (Ministry of Industry and Commerce, 2015). STERP 1 and STERP II's main objectives were to resuscitate the manufacturing industry and increase its capacity utilisation from 5% in 2008 to 80% by 2012. In 2011, the government also came up with an Industrial Development Policy (IDP) to cover the period of 2011-2015 (Ministry of Industry and Commerce, 2015). The objectives of the IDP were: to restore the contribution of the Zimbabwean manufacturing sector to Gross Domestic Product (GDP) from 15% to 30%, to restore the manufacturing sector export contribution from 26% to 50%, to increase capacity utilisation from 43% to 100% and to increase manufacturing sector exports to COMESA and SADC regions.

In 2016, the government instituted Statutory Instrument 64 (SI 64) of 2016 which requires traders to obtain import permits when importing basic commodities. SI 64 was a way of refocusing attention on locally produced goods so as to boost the manufacturing sector capacity utilisation and enhance profitability. In 2017 the government came up with an incentive framework that helps to strengthen backward and forward linkages between the manufacturing sector and other sectors like agriculture (Ministry of Finance and Economic Development, 2017). All these polices were put in place to resuscitate the manufacturing sector and enhance its profitability.

1.1.1 Architecture of the Zimbabwean Manufacturing Sector

The Zimbabwean manufacturing sector is made up of different subsectors which include: Clothing and Textiles, Pharmaceuticals, Wood and Timber, Agri-Business, Fertilizer and Chemical Industry, Leather and Footwear, Metals and Electricals and Food and Beverages among others. The manufacturing sector plays a vital role to Zimbabwe's economic growth and development (Ministry of Industry and Commerce, 2015). The significant contribution of the Zimbabwean manufacturing sector to gross domestic output, employment creation and export earnings cannot be denied although its contribution was declining for the period 2009 to 2016. At its best, the manufacturing sector contributed 41% towards GDP in 1992 (Ministry of Industry and Commerce, 2015). Figure 1.1 illustrates the trend in the manufacturing value added as a percentage of GDP.

Figure 1.1: Trend in the Zimbabwe Manufacturing Value Added[4] (2009-2016)

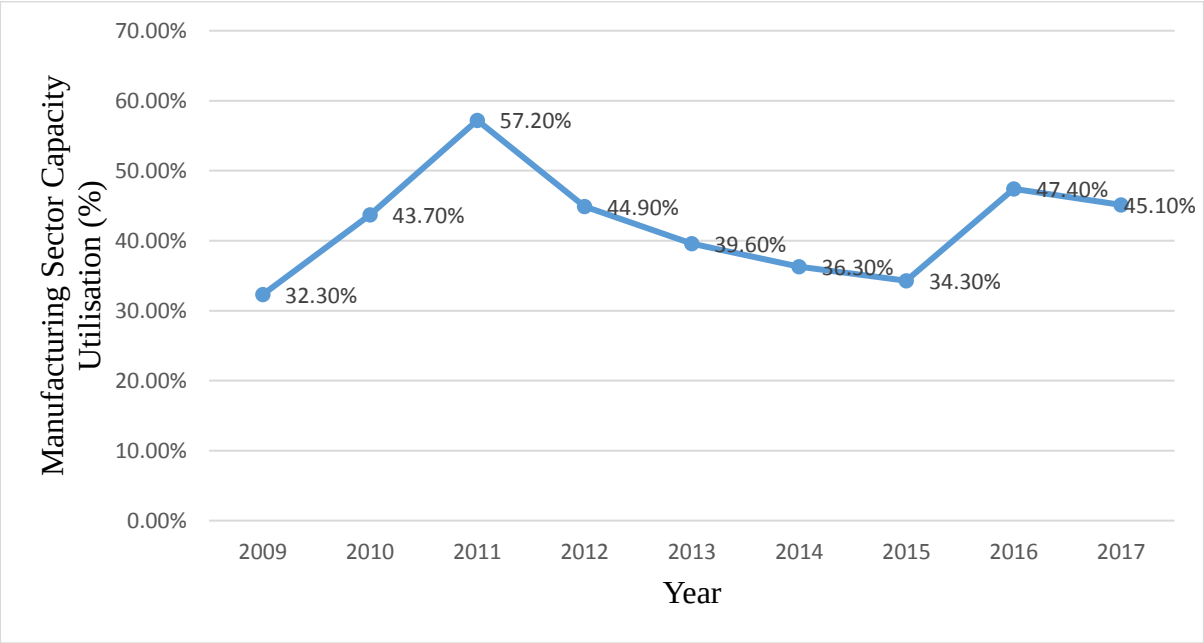


Source: Author's illustration of data from World Bank (2017)

From 2009 to 2016, the manufacturing sector contribution to GDP has been declining as shown on Figure 1.1. The IDP's main objectives were to restore the manufacturing sector contribution to Zimbabwe's GDP to about 30% and to increase capacity utilisation in the manufacturing sector from to 100% by 2015 (Institute of Chartered Accountants of Zimbabwe, 2013). However, the objective was not achieved since the contribution to GDP by the manufacturing sector in 2015 was 9.83% while capacity utilisation fell to 34.3% in 2015. Figure 1.2 below illustrates the manufacturing sector's capacity utilization.

[4] Manufacturing value added is the percentage contribution of the manufacturing sector to GDP.

Figure 1.2: Trend in the Zimbabwe Manufacturing Sector Capacity Utilisation (2009-2017)



Source: Author's illustration of data from Confederation of Zimbabwe Industries (2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017)

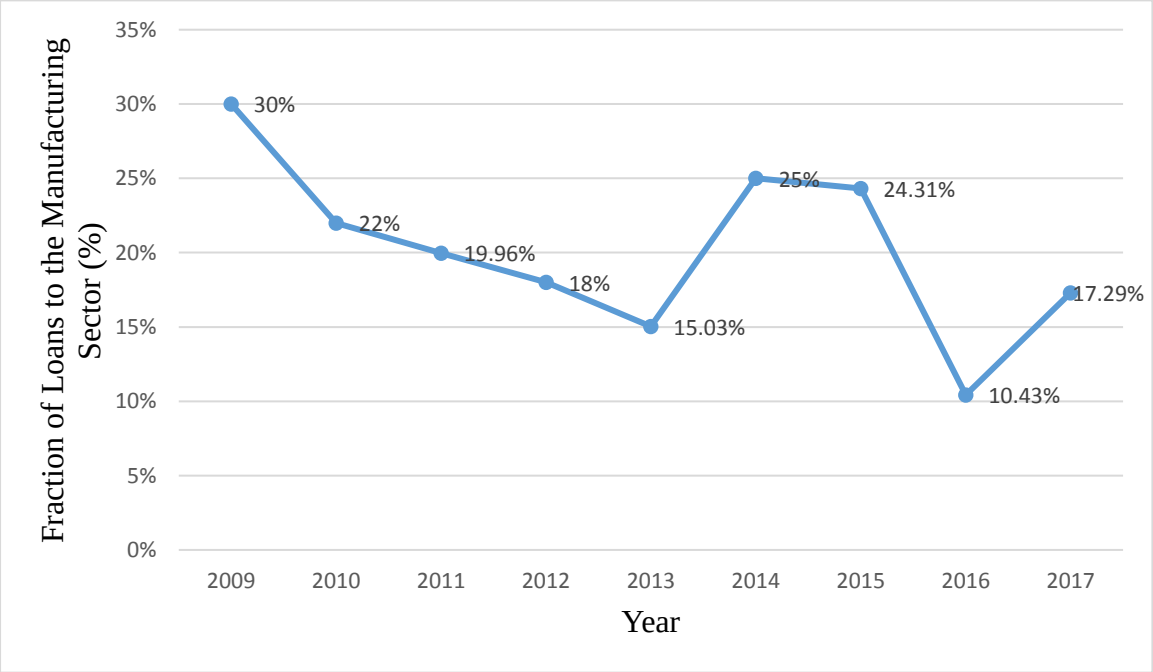
Figure 1.2 shows that from 2009 to 2011, the manufacturing sector capacity utilisation trended upwards reaching a peak of 57.2% in 2011. Thereafter, from 2011 to 2015, there was a decline in capacity utilisation. However, the period of 2015 to 2016 recoded a sharp increase from 34.3% to 47.4% and then declined to 45.1% in 2017. Among the challenges that were responsible for the manufacturing sector slowdown, was lack of working capital (Confederation of Zimbabwe Industries, 2015). Lack of working capital was a result of decreased bank credit supply to the manufacturing sector in Zimbabwe (Kwenda and Matanda, 2015).

Credit Access by Manufacturing Firms in Zimbabwe

Since the Reserve Bank of Zimbabwe (RBZ) lost the ability to print money by adopting the multi-currency system in 2009, it lost the ability to contribute to liquidity creation in the economy (Ministry of Industry and Commerce, 2015). The RBZ was left defenceless since it could not fulfil its role as the lender of last resort. For the manufacturing sector, the multi-currency system aroused the need for recapitalisation, but recapitalisation was hampered by liquidity challenges in the economy. The financial sector in Zimbabwe failed to ease liquidity challenges through its intermediary role and that was worsened by its inability to attract savings (World Bank, 2016).

The absence of adequate short term financial instruments which firms require to finance working capital needs worsened liquidity challenges. The Zimbabwean manufacturing sector struggled to cope with increasing capital costs World Bank (2016). Lack of adequate, timely and affordable lines of credit bedevilled the operations of Zimbabwean manufacturing firms. The fraction of banking sector loans to the manufacturing sector was facing a decline for the period 2009 to 2017. Figure 1.3 illustrates the trend in the fraction of banking sector loans and advances to the manufacturing sector for the period 2009 to 2017.

Figure 1.3: Distribution of Loans to the Manufacturing Sector (2009-2017)



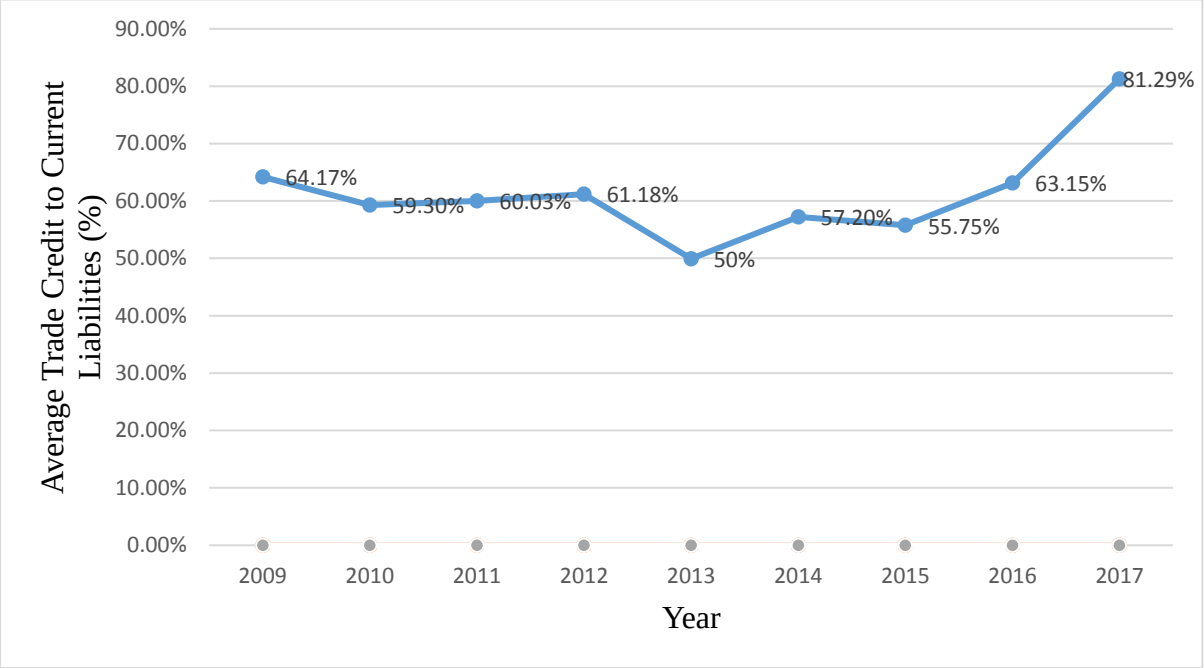
Source: Author's illustration of data from Reserve Bank of Zimbabwe (2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018)

Figure 1.3 shows that the percentage of loans to the manufacturing sector was declining since 2009 up to 2013. From 2013 to 2015 the fraction of loans to the manufacturing sector recovered from 15.03% to 25% and then declined sharply followed by a recovery in 2017. However, the overall trend is a decline. Since bank credit availability to manufacturing firms was limited, trade credit became a relatively more important source of short term finance for manufacturing firms in Zimbabwe (Kwenda and Matanda, 2015). This confirms Bougheas *et al*. (2009) and Rodríguez-Rodríguez (2006)'s argument that the reduction of bank loans will lead to an increase in trade credit use.

Trade Credit Use in the Zimbabwean Manufacturing Sector

According to Kwenda and Matanda (2015), trade credit became a significant source of finance in the Zimbabwean manufacturing sector since 2009. Figure 1.4 shows the trend of Average Trade Credit to Current Liabilities (ATCCL) in the Manufacturing Sector for the period 2009 to 2017. ATCCL indicates the proportion of trade credit to a firm's short-term funding.

Figure 1.4: Average Trade Credit to Current Liabilities Trend in the Manufacturing Sector (2009-2017)



Source: Author's illustration of data from firms' financial statements (2009-2017)

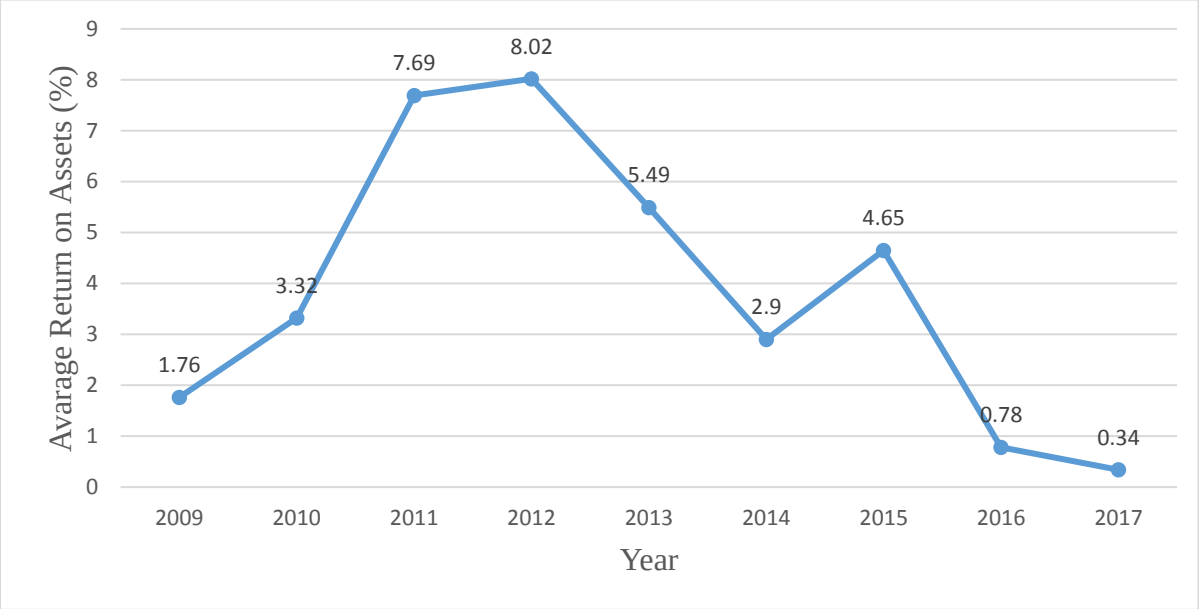
Figure 1.4 shows that from 2009 to 2013 ATCCL was falling reaching a lowest point of 50% in 2013. From 2013 to 2017 the trend was on the rise, reaching a maximum of 81.29% in 2017. A sharp increase of ATCCL was experienced in 2015 the same year that the fraction of banking sector loans and advances to the manufacturing sector declined sharply while the manufacturing sector capacity utilisation was recovering.

Manufacturing Sector Performance

Although it remains positive, the manufacturing sector profitability as proxied by the Return on Assets[5] (ROA) was fluctuating following a downward trend. From 2009 to 2012, profitability increased and then declined sharply from 2012 to 2014 followed by a slight recovery from 2014 to 2015 and thereafter in worsened until 2017 as shown on Figure 1.5.

[5] Return on Assets is a profitability ratio calculated by dividing Earnings Before Interest and Tax (EBIT) by total assets.

Figure 1.5: Trend in the Manufacturing Sector Average Return on Assets (2009- 2017)



Source: Author's illustration of data from manufacturing firms' financial statements (2009-2017)

The comparison between the trend of ATCCL and average manufacturing sector profitability raises some questions as to whether trade credit and profitability are related. However, there is no empirical evidence using Zimbabwean data since the multi-currency system in 2009 that tested the impact of using trade credit as a source of finance on manufacturing firms' profitability, thus creating room for this study.

1.2 Statement of the Problem

The Zimbabwean manufacturing sector has been poorly performing for the period 2009 to 2017. The manufacturing sector's poor performance is surprising given the level of support through policies that were put forward by the government to boost the manufacturing sector. Among the policies were STERP 1, STERP II, the IDP and the SI 64. All these policies through their targets were necessary to improve profitability in the manufacturing sector. However, despite the efforts by the government, none of the stated targets were achieved and profitability continued to decrease. The manufacturing industry continued to face some viability challenges and some firms ceased their operations due to recurrent losses (Confederation of Zimbabwe Industries, 2017). It is alarming that the decline in manufacturing firms' performance was coupled with their increasing use of trade credit.

In Zimbabwe, it is evident that trade credit became a significant source of short term finance in the manufacturing sector. For example, the manufacturing sector ATCCL for 2017 was

81.29%. It is important that when firms raise funds to finance their operations, they should consider the effects of their choice of financing to the overall performance of the company. Trade credit is associated with literature ambiguity with regards to its impact on firm profitability. The debate in literature regarding the relationship between trade credit and firm profitability is inconclusive. Apart from that, a closer look at the empirical evidence shows that the relationship between trade credit and firm profitability is positive in developing countries while negative in developed countries. However, this relationship cannot be imposed on Zimbabwe by virtue of it being a developing country because Zimbabwe is operating in a multi-currency system which makes it unique and calls for an independent investigation. Although trade credit is an important source of short term financing among Zimbabwean manufacturing firms, its impact on firm profitability in a multi-currency system using Zimbabwean data needs to be investigated, hence this research.

1.3 Research Objectives

The main objective of this study was to investigate the impact of trade credit as a source of finance on the profitability of manufacturing firms listed on the ZSE for the period 2009 to 2017.

The study focused on the following specific objectives:

1. To determine the impact of trade credit use on manufacturing firms' profitability in Zimbabwe for the period 2009 to 2017.
2. To determine other firm specific variables that affect manufacturing firms' profitability in Zimbabwe for the period 2009 to 2017.

1.4 Research Questions

In relation to the stated objectives, the following questions were asked:

1. What is the impact of trade credit use on manufacturing firms' profitability in Zimbabwe for the period 2009 to 2017?
2. What are other firm specific variables that affect manufacturing firms' profitability in Zimbabwe for the period 2009 to 2017?

1.5 Justification of the Study

The study is relevant to manufacturing firms in Zimbabwe because its findings may help them to make their decisions regarding the use of trade credit as a financing tool. Manufacturing sector profitability is important for economic revival through its contribution to GDP,

employment creation and export promotion. Increasing manufacturing sector value addition requires profitable manufacturing firms. Since many manufacturing firms were facing credit constraint, trade credit became the next attractive source of short term finance but its impact on firm profitability during the period 2009 to 2017 was not yet investigated. Thus, this study provides advice to financial managers of manufacturing firms on whether to continue financing with trade credit or not.

In literature, there has been a debate regarding the impact of trade credit usage on corporate profitability and therefore there is no consensus. Although trade credit plays an important role on firm financing, its impact on firm profitability is ambiguous and only further research can shed more light. Apart from that, studies on other countries cannot be generalised on Zimbabwe because Zimbabwe is currently operating in a multi-currency system and that makes it unique. According to the researcher's knowledge, no research on the relationship between trade credit use and firm profitability was carried out in Zimbabwe covering the multi-currency period. Hence, this study contributes to the body of literature in a unique way.

1.6 Organisation of the rest of the Study

The remainder of the study is organised as follows: Chapter Two gives theoretical and empirical literature review while Chapter Three provides a detailed outline of methods and procedures used in this study. Chapter Four presents estimation and interpretation of results. Lastly, Chapter Five concludes and summarizes the study findings as well as giving some policy recommendations, highlighting some limitations and providing suggestions for further study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews both theoretical and empirical literature relating to the impact of trade credit use on corporate profitability. Although the major purpose of this study was to investigate the impact of trade credit use on corporate profitability, this chapter also reviews some theories of firm performance and capital structure in order to locate firm specific variables that affect corporate profitability. Theoretical literature that relate to trade credit arises from the Financing Theory, Liquidity Theory, Transaction Cost Theory, Product Quality Verification Theory and the Financial Distress Theory. Empirical literature review illuminates an understanding about the impact of trade credit use on corporate profitability. The reviewed literature helps to identify appropriate variables and to construct an appropriate model.

2.1 Theoretical Literature Review

2.1.1 Theories of Firm Performance

Hansen and Wernerfelt (1989) decomposed the interfirm profit variance into organisational and economic factors. Organisational factors regard sociological, psychological and physical interactions between managers and employees as determinants of firm performance while economic factors focus on external market forces as components that affect firm performance (Hansen and Wernerfelt, 1989).

Economic Model of Firm Performance

The Economic Model of firm performance emanates from industrial economics where it is the basis theoretical literature on the impact of market structure on both firm performance and strategy. Although there are many determinants of firm profitability, major determinants according to Hansen and Wernerfelt (1989) are industrial characteristics, position of a firm in relation to its competitors and the quality and quantity of resources at the firm's disposal. Bain (1956) identified industrial variables that contribute to the above-average firm profitability which are growth, concentration, advertising intensity and capital intensity. Apart from industrial variables, market share is among the important and widely used variables that relate a firm to its competitors (Buzzell and Gale, 1987). According to Shepherd (1972) market share is viewed as the basis for market power and it is a proxy for the firm's competitive advantage. Hansen and Wernerfelt (1989) acknowledged firm size as the most important firm-specific variable that negatively affects firm profitability because it is considered to be the source of x-

inefficiencies or organisational costs. Firm size may as well be used to proxy diversification which is mostly found to be affecting firm performance negatively (Wernerfelt and Montgomery, 1988).

Organisational Model of Firm Performance

The Organisational Model of firm performance recognises managers' influence on employees' behaviour which eventually affect firm performance (Hansen and Wernerfelt, 1989). The model acknowledges that managers can influence other employees' performance through designing and controlling of both informal and formal structures, employee rewarding, planning, goal setting and determining the needed employee skills and qualifications. This means that the management can influence outcomes of an organization by creating an organizational climate that is made up of sociological, psychological and physical interactions. Researches following the organisational model of firm performance focused on the effect of group dynamics, motivation, job enrichment, organizational structure, goal setting, leadership, planning and decision making among others on corporate performance (Hansen and Wernerfelt, 1989). However, the stated variables are subjective and they are also difficult to capture.

2.1.2 Trade Credit Theories

A number of theoretical approaches were developed to explain the concept trade credit use by corporations and its impact on firm profitability, these include the Financing Theory, Transaction Cost Theory, Liquidity Theory, Product Quality Verification Theory and the Financial Distress Theory.

The Financing Theory

The Financing Theory by Emery (1984) is the major view on trade credit and it states that trade credit is the type of financing that is made available by the seller to the buyer. Trade credit may either be in form of a formal agreement that is similar to that of a bank loan or an informal agreement where invoices provide evidence of goods exchanged. Emery (1984) points out two reasons why suppliers are superior to financial institutions in providing credit to their buyers. The first reason is that since suppliers are in close contact with their buyers, they are in a better position both to evaluate the credit worthiness and monitor their customers regularly. Such opportunities are not easily available to financial institutions. The second reason is that suppliers can liquidate assets of defaulting buyers quickly and more effectively than financial institutions. In cases where the supplied goods are durables, suppliers through their network

can repossess and sell the goods quickly. Ng *et al*. (1999) observed that goods are viewed as valuable collateral to suppliers than to financial institutions and hence sellers can offer better terms of credit than those offered by financial institutions.

According to Wilner (2000), trade credit exists due to inefficiencies in financial markets. Moreover, even if financial institutions are efficient, firms do not have equal access to credit because of their perceived risks that arises due to information asymmetry. Financial institutions do not accept risk that is above their risk tolerance[6] level, hence some firms will resort to trade credit because of denied access to institutional finance. Firms that have higher probability of default tend to prefer trade credit to bank loan and as a result, interest rates on trade credit exceeds market rates. In this case, trade credit becomes a costlier form of financing that negatively affects firm profitability.

The Financing Theory concludes that firms that have greater access to mainstream finance would become second level intermediaries to firms with limited access (Emery, 1984). This means that there is a diffusion of institutional finance through credit worth firms to firms whose risks are beyond the acceptable standards that they cannot be granted institutional credit. Therefore, credit worth firms assume this risk by granting trade credit because of their ability to reduce information asymmetry through daily association with their clients (Petersen and Rajan, 1997). By this, trade credit is a last resort source of finance that is expected to positively affect profitability of credit constrained firms. However, the financing theory failed to explain why large firms that have superior access to mainstream finance are also found using trade credit.

The Transaction Cost Theory

The Transaction Cost Theory was pioneered by Schwartz (1974) and modified by Ferris (1981), it states that trading partners use trade credit to economize costs of exchange through collective payments. Trade credit helps to reduce transaction costs and the opportunity cost of holding cash or converting liquid assets to cash (Schwartz, 1974). The Transaction Cost Theory points that when transactions are frequent, both the seller and the buyer can agree on periodical payment schedules so as to reduce transaction costs (Ferris, 1981). The purpose of trade credit under the Transaction Cost Theory is on reducing transaction costs both to the buyer and the seller. Trade credit is beneficial as long as the savings that arise due to reduced transaction costs are greater than the costs incurred when holding receivables and payables by the seller

[6] Risk tolerance is the level of risk or degree of uncertainty that is acceptable to organisations.

and buyer respectively (Petersen and Rajan, 1997). The reduction of transaction costs enhances profitability.

The Liquidity Theory

The Liquidity Theory was put forward by Emery (1984) and it suggests that firms who are credit rationed tend to rely more on trade credit than firms with easy access to the mainstream sources of finance. The main point is that financially constrained firms look up for trade credit offers in order to supplement for the reduction in credit offers from banks. Those firms with good liquidity standing and superior access to formal capital and money markets can offer finance to credit rationed firms via trade credit. Nielsen and Lüthje (2002) tried to obtain an empirical evidence that may support this assumption using small firms to proxy credit rationed firms while large firms represented those with superior access to bank loans. Nielsen and Lüthje (2002) found that in times of monetary contraction, credit rationed firms react by accepting more trade credit as a financing tool.

Nielsen and Lüthje (2002) accepted the view that firms that are financially unconstrained unlikely demand trade credit and yet they are more likely to offer it. This shows that there is a negative relationship between trade credit use and the buyers' access to other finance sources. Petersen and Rajan (1997) accepted this view and concluded that trade credit and institutional finance are substitutes. Bougheas *et al*. (2009) and Rodríguez-Rodríguez (2006) also confirmed that the decrease in bank loans leads to an increase in trade credit use.

In review of the liquidity theory, it makes sense to believe that only credit constrained firms are likely to demand trade credit while financially unconstrained firms provide liquidity to financially constrained firms hence the name "Liquidity Theory". It is evident in countries where institutional credit is expensive that firms substitute it with trade credit as a convenient and cheaper source of financing. However, the liquidity theory is easy to criticize since it does not explain why firms who are not credit constrained use trade credit. For example, Wal-Mart the largest retailer in the world used trade credit more frequently in 2015 than institutional financing (Wu and Zhou, 2015).

The Product Quality Verification Theory

The Product Quality Verification Theory by Smith (1987) is grounded on the information asymmetry assumption. Due to information asymmetry, buyers do not know the quality of products they buy and as a result they need time to inspect before the payment is made (Smith, 1987). Therefore trade credit allows the buyer to verify the quality of products prior to payment

(Ng *et al*., 1999). Trade credit offers a great protection against defect products because if the product is a defect, the buyer will return them without costs that are attached to refunding procedures. If the buyer pays cash and the products turn out to be defects, the buyer loses money and faces production disruptions. Smith (1987) also highlighted that although sellers offer money-back guarantees, the enforcement of such guarantees takes time and the buyer faces production disturbances.

According to Lee and Stowe (1993), sellers may offer attractive early payment discounts as a way of persuading buyers to take risks posed by shorter inspection period so that product deficiencies may be revealed after the payment is made. Lack of proper verification will welcome poor quality raw materials which will in turn negatively affect the quality and sales of the final products, thus compromising profitability. This means that under the Product Quality Verification Theory, trade credit enhances firm profitability. However, the Product Quality Verification Theory does not apply to some perishables because it is impossible for the buyer to assess the quality of perishables for a long time period.

The Financial Distress Theory

The Financial Distress Theory was put forward by Petersen and Rajan (1997) and is built on the concept of "buyer opportunism[7]". The theory states that when the supplier is experiencing financial distress, it becomes desperate for customers to an extent that it cannot threaten to stop supplies even if late payments of goods are being made. The buyer will eventually utilize this opportunity by delaying payment. The opportunistic behaviour is rampart when the buyer is the main customer that the financially distressed supplier cannot afford to disappoint. Wilner (2000) detected that the majority of financially distressed suppliers cannot levy penalty for late payments. Thus, the buyer can take advantage of the seller's desperation to negotiate for favourable credit terms thereby bringing an opportunity to acquire cheap supplier provided finance that will in turn enhance profitability.

Following the sentiments posed by trade credit theories, there is a debate concerning the impact of trade credit use on firm profitability. Ng *et al*. (1999) posited that firms that take long to settle their supplies face high opportunity cost arising from losing early payment discounts. As a result, the decision to request for or accept a credit period will lead to increased cost to the firm which then diminishes profitability. On the other hand, firms can also enhance their profitability by bunching the payments of supplies, that is to say, trade credit will result in the

[7] Buyer opportunism is the buyer's behaviour that is self-interest seeking with guile.

reduction of transaction costs of paying bills as expounded by the Transaction Cost Theory and hence increasing firm profits. The availability of cash flow that is generated by means of delaying payments may lead to increased investments that may in turn generate more profits. The Financial Distress Theory advocated that the use of trade credit helps firms to overcome financial constraints without costs by taking advantage of the desperate seller so as to smooth production and hence lead to increased profitability.

2.1.3 Capital Structure Theories

Capital structure theories focus on the relationship between leverage and firm value and profitability. Theories of capital structure include the Modigliani-Miller Theorem and the Pecking Order Theory.

Modigliani-Miller (MM) Theorem

The origin of capital structure theories is due to Modigliani and Miller (1958) who established that under perfect market conditions capital structure is irrelevant. The irrelevance of capital structure means that the choice between equity and debt does not affect firm value. This proposition only holds under an Arrow-Debreu world where capital markets are perfect, there are no taxes (both personal and corporate taxes) and no financial distress[8]. These assumptions build the MM Proposition 1 which states that the value of a levered firm is always equal to the value of an unlevered firm. MM Proposition 1 can be algebraically illustrated as:

$V_U = V_L$ but $V_L = S_L + D_L$

where V_U is an unlevered firm's market value, V_L is a levered firm's market value, S_L is the market value of a firm's common shares and D_L is the market value of firm's debt. The argument of the MM Proposition 1 is that the firm value can only be enhanced through investing in projects with positive Net Present Value (NPV) and not by altering its financing decisions.

However, since the MM Proposition 1's assumptions are far from reality, MM proposition 1 was heavily criticised. As a response to critics, Modigliani and Miller (1963) revised their assumptions by acknowledging the existence of corporate taxes only while insolvency costs and personal taxes assumptions remained the same, hence MM Proposition II. In the presence of corporate taxes, debt is favourable because it provides a corporate tax shield[9] since debt is

[8] Financial distress is a condition when promises to creditors of a company are broken or honoured with difficulty.

[9] A tax shield is an allowable deduction from taxable income that results in a reduction of taxes owed.

tax deductible. The tax shield made available by debt financing leads to increased firm value and thus proposing the optimal capital structure consisting of 100% debt. This tells that in the presence of corporate taxes, capital structure is relevant and it positively affects firm value.

Despite the idea of 100% debt, in reality it is rare for firms to have an all debt capital structure. This is due to bankruptcy costs that are associated with debt. Suppliers of debt are more confident in lending to firms when equity constitutes a significant part of capital structure due to reduced chances of becoming bankruptcy. The presence of bankruptcy costs when debt is involved led to the development of the MM Proposition III where insolvency costs and corporate taxes were incorporated but not personal taxes. The continued revision of the Modigliani and Miller (1958)'s assumptions led to the unfolding of imperfect capital market beliefs (Ross *et al*., 2013). Under an imperfect capital market, the choice of financing affects firm profitability. This means that apart from debt and equity, trade credit also affects firm profitability.

The Pecking Order Theory (POT)

The Pecking Order Theory (POT) was developed by Myers and Majluf (1984) upon the assumptions of signalling and information asymmetry between internal and external stakeholders. The POT explains why firms finance their operations the way they do and how any choice of financing sends a signal to investors. The theory assumes that the financial manager observes the following hierarchy of funding options: self-financing, issuance of short term or non-risky debt, issuance of risky debt (mostly long term debt) and issuance of equity as a last resort (Myers and Majluf, 1984). Managers should only issue equity when shares are overpriced, otherwise debt is always preferred to equity, non-risky debt is preferred to risk debt and internal finance (retained earnings) is preferred to any kind of debt. However, investors know that they are not well informed and they regard the issuance of equity as bad news where managers are taking advantage of overvalued shares. As a result, financial managers should issue instruments that best convey good news about the firm.

The belief is that profitable firms rely on internal financing. When internal finance is not enough, then non-risky debt is the next alternative thus following a "pecking-order" of funding options. The issuance of debt sends a signal about the board's confidence in an investment's profitability and also that the current share price is undervalued while the issuance of equity signal lack of confidence and the board's feeling that the current share price is overvalued (Ross *et al*., 2013). Equity issuance leads to a fall in stock price. Although the POT did not

acknowledge the presence of trade credit as a financing option, firms can add trade credit to their order of financing options.

2.2 Empirical Literature Review

In response to the objectives of this study, this section articulates empirical research on trade credit as a source of finance and its relationship to corporate profitability as well as empirical research on firm specific determinants of corporate profitability. Since the advent of trade credit theories, there were some massive empirical responses regarding the relationship between trade credit and corporate profitability by different researchers in the world. Yazdanfar and Öhman (2016) empirically investigated the impact of the use of trade credit as a financing tool on 15 897 Swedish Small to Medium Enterprises (SMEs) using panel data covering the period of 2009 to 2012. The fixed effects model results reviewed that trade credit use negatively affects firm profitability. This means that SMEs with low levels of accounts payable are likely to become more profitable than those that heavily rely on trade credit as a source of finance. Yazdanfar and Öhman (2016) estimated the following model:

$$ROA_{it} = \alpha_t + \beta_1 Accountspayable_{it} + \beta_2 Liq_{it} + \beta_3 Size_{it} + \beta_4 Age_{it} + \beta_5 Indus_{it} + \mu_{it}$$

where ROA represents the Return on Assets, $Accountspayable$ was the proxy for trade credit, Liq represents the level of liquidity, $Size$ represents firm size, Age represents firm age, $Indus$ represents industry the firm is operating in and μ was the white noise error term. Trade credit was defined as the ratio of accounts payable to total assets. The study also revealed that firm size and liquidity level have positive impact on firm profitability while firm age had a negative impact. Although Yazdanfar and Öhman (2016) used firm size, firm age, liquidity and industry as control variables, the model can be modified by including leverage ratio and sales growth which may have influence on firm performance.

In Nigeria, Ikechukwu and Nwakaego (2015) studied the impact of accounts payable ratio on the financial performance of six Nigerian Stock Exchange (NSE) listed manufacturing firms that were operating in the food and beverages industry for the period of 2000 to 2011. A multiple regression tool was applied on panel data sourced from companies' annual reports. A set of multiple regressions was made up of linear, semi-log, double log and exponential regression model respectively as follows:

$$Profitability_{it} = \beta_0 + \beta_1 AP_{it} + \beta_2 DR_{it} + \beta_3 SG_{it} + \mu_{it}$$

$$Profitability_{it} = log\beta_0 + log\beta_1 AP_{it} log + \beta_2 DR_{it} + \beta_3 SG_{it} + \mu_{it}$$

$$Profitability_{it} = log\beta_0 log + \beta_1 AP_{it} + \beta_2 DR_{it} + \beta_3 SG_{it} + \mu_{it}$$

$$logProfitability_{it} = \beta_0 + \beta_1 AP_{it} + \beta_2 DR_{it} + \beta_3 SG_{it} + \mu_{it}$$

where AP represents accounts payable ratio, DR represents debt ratio and SG represents sales growth. The study revealed that accounts payable had a negative impact on Return on Assets (ROA). The results were based on the best fit model among the four functional models and this was the strength of the model. The study also revealed that debt ratio positively affects profitability thus contradicting Modigliani and Miller, (1958)'s capital structure irrelevance theory. The study recommends that for manufacturing firms to be profitable, they should reduce the amount of trade payables by paying their suppliers early. Using the same methodology and time period, Nwakaego and Ikechukwu (2016) found a positive relationship between accounts payable and profitability of industrial manufacturing firms listed on the NSE. This contradiction of results by the same authors during the same time period in the same country justifies the ambiguity of the relationship between trade credit and firm profitability.

However, these studies on Nigeria can be criticised on the basis of their definition of accounts payable ratio, they defined the ratio as $\frac{Accounts\ payable}{Cost\ of\ sales}$ which may not be correct because many researchers justified the use of $\frac{Accounts\ payable}{Total\ liabilities}$ (Achode and Rotich, 2016) or $\frac{Accounts\ payable}{Total\ assets}$ (Yazdanfar and Öhman, 2016) to be the true proxies for trade credit. Likewise, Nwakaego and Ikechukwu (2016) did not justify such a deviation from an orthodox way of calculating trade credit ratio.

Deloof (2003) investigated the relationship between working capital management and corporate profitability for the sample of 1009 large firms in Belgium using panel data for the period of 1992 to 1996. Using correlation and regression analysis, a negative relationship between accounts payable (trade credit) and firm profitability was found. This means that firms that are financed through trade credit are likely to be less profitable. Using the same methodology, Lazaridis and Tryfonidis (2006) studied the relationship between working capital management and firm profitability using panel data of 150 firms listed on the Athens Stock Exchange during the period 2001 to 2004. The study focused on the impact of accounts payable on firm profitability and the results showed that a negative relationship exists between firm profitability and trade credit.

In Malaysia, Wasiuzzaman (2015) studied the relationship between working capital and manufacturing firm profitability using panel data of 160 manufacturing companies for the period 2005 to 2010. The relationship was analysed using the following equations:

$$Prof_{it} = \beta_0 + \beta_1 Growth_{it} + \beta_2 Size_{it} + \beta_3 Lev_{it} + \beta_4 GDP_t + \beta_5 Inv_{it} + \varepsilon_{it}$$

$$Prof_{it} = \beta_0 + \beta_1 Growth_{it} + \beta_2 Size_{it} + \beta_3 Lev_{it} + \beta_4 GDP_t + \beta_5 Rec_{it} + \varepsilon_{it}$$

$$Prof_{it} = \beta_0 + \beta_1 Growth_{it} + \beta_2 Size_{it} + \beta_3 Lev_{it} + \beta_4 GDP_t + \beta_5 Pay_{it} + \varepsilon_{it}$$

$$Prof_{it} = \beta_0 + \beta_1 Growth_{it} + \beta_2 Size_{it} + \beta_3 Lev_{it} + \beta_4 GDP_t + \beta_5 NWC_{it} + \varepsilon_{it}$$

where $Prof$ represents firm profitability, Lev represents firm leverage, GDP represents Gross Domestic Product, Inv represents amount of inventory, Rec represents the level of accounts receivable, Pay represents accounts payable and NWC represents net working capital. Using pooled Ordinary Least Squares (OLS) regression model, the results indicated that working capital and its components (inventory, accounts receivable and accounts payable) have negative relationships with firm profitability. In this case, trade credit negatively affects firm profitability. Another negative result was found by Gill *et al*. (2010) for a sample of 88 manufacturing firms listed on the New York Stock Exchange for the period 2005 to 2007 using OLS regression and correlation analysis. In contrary, using the Generalised Method of Moments (GMM) on an eleven year (1993-2003) panel data, Bougheas *et al*. (2009) found a positive relationship between accounts payable and profitability of 56432 UK manufacturing firms.

In South Africa, Kasozi (2017) carried out a study on the impact of working capital management on corporate profitability using an unbalanced panel comprising of 69 manufacturing companies listed on the Johannesburg Securities Exchange (JSE) for the period 2007 to 2016. A multivariate regression consisting of pooled Ordinary Least Squares (OLS), Fixed Effects Model (FEM) and Random Effects Model (REM) was used and the results revealed that both the average payment period and the average collection period as the main components of working capital have negative impact on firm profitability. This means that manufacturing firms that pay creditors on time and those that manage their trade receivables efficiently tend to be more profitable than those that do not. In short, the results show that accounts payable and accounts receivable have a negative relationship with firm profitability in the manufacturing sector.

Louw *et al*. (2016) empirically analysed the relationship between working capital management and firm profitability for a sample of 18 retail companies listed on the JSE for the period 2004 to 2012. With the use of a multiple regression analysis where profitability was proxied by Return on Assets (ROA), Gross Profit Margin (GPM), Economic Value Added (EVA) and Return on Equity (ROE), the study found out that Cash Conversion Cycle (CCC) was negatively related to profitability. This means that by decreasing the CCC, the company may increase its profitability level. Louw *et al*. (2016) emphasised that reducing the firm's CCC means reducing accounts receivable and inventory levels while increasing accounts payable. This tells that trade credit (accounts payable) positively affects firm profitability. However, Louw *et al*. (2016) revealed that increasing accounts payable only increases the GPM while insignificant for other profitability measures. This signifies the importance of using proper profitability proxies.

In addition, Moodley *et al*. (2017) empirically investigated the relationship between accounts payable management and Return on Investment (ROI) for a sample of 160 non-financial corporations listed on the JSE for the period 1986 to 2014. Using Buy-and-Hold portfolio methodology, the results revealed that a positive relationship exists between trade payables and ROI. Moodley *et al*. (2017) highlighted that short term finance through accounts payable is more beneficial to investors in the manufacturing sector by increasing firm value. Manufacturing firms were advised to keep good relations with their suppliers so that they can easily access trade credit.

In Kenya, Kapkiyai and Mugo (2015) examined the impact of trade credit use on 50 Kenyan SMEs profitability. With the use of Multiple Regression Model and Pearson Correlation, the findings indicated that trade credit had a positive impact on ROA. Thus, trade credit use enhances profitability of SMEs. Consistently, by means of a Multiple Regression Analysis, Achode and Rotich (2016) found a positive relationship between accounts payable and profitability of 16 manufacturing firms listed on the Nairobi Securities Exchange for the period 2009 to 2013. The study recommended that financial managers of manufacturing firms should establish strong long-term relationships with their suppliers so that they will access trade credit more easily because trade credit use enhances profitability. Another positive relationship was found by Makori and Jagongo (2013) for construction and manufacturing firms listed on the Nairobi Securities Exchange for the period 2003 to 2012 using Pearson's Correlation and OLS regression. These three studies defined trade credit as accounts payable to total liabilities ratio

and their findings were consistent with the sentiments of the Transaction Cost Theory and the Product Quality Verification Theory.

In Zimbabwe**,** Kwenda (2014) investigated factors that influence trade credit use using data for 48 non-financial corporations listed on the ZSE for the period of 2009 to 2012. Using the Multiple Regression Analysis, the results indicated that a negative relationship exists between trade credit and both long-term and short-term debt. This means that trade credit and bank credit are substitutes. The study recommends that it is more important for managers to maintain healthy relationships with their suppliers so as to have access to cost-free finance, trade credit. Kwenda and Matanda (2015) focused on working capital management in a liquidity constrained economy, the case of ZSE listed firms for the period of 2009 to 2014. Using Descriptive Statistics and Trend Analysis techniques, the study found that trade credit was the dominant financing short-term instrument and played an important role in financing working capital investments.

However the weakness of Kwenda (2014)'s study is that it labbelled trade credit a cost free finance and advised firms to make use of trade credit without proper investigation on the impact of trade credit use on firm profitability. Despite its benefits, trade credit has some implicit costs that may jeopadize firm profitability, so the relationship between trade credit and firm profitability in Zimbabwe needs to be established.

Isik and Tasgin (2017) studied the determinants of profitability for the sample of 120 Turkish manufacturing firms for the period of 2005 to 2012. Using a Dynamic Panel Data Model, the results showed that firm size, net working capital and economic growth positively affected firm profitability while research and development costs and financial risk negatively affected firm profitability. Using a twelve year period (2000-2011), Lazăr (2016) investigated firm specific determinants of 50 Romanian listed companies. The results of the Fixed Effects Model showed that leverage, tangibility, labour intensity and size have negative impact on profitability while value added and sales growth have positive impact. ROA was used to proxy profitability. One weakness of Isik and Tasgin (2017) and Lazăr (2016)'s studies is that their datasets were five years old, so their results were already outdated by the time their researches were conducted.

Olawale *et al*. (2017) investigated the effect of firm size on 12 non-financial firms in Nigeria for the period 2005 to 2013. The results from the Fixed Effects Model revealed that firm size had a negative relationship with firm profitability. For control variables, leverage and sales growth have positive relationship with firm profitability. However Olawale *et al*. (2017) used

number of employees to determine firm size and this may not be a true reflection of firm size given that some firms are capital intensive while others are labour intensive. So technological advancement which leads to production automation renders invalid the use of number of employees in measuring firm size.

In Sri Lanka, Sivathaasan *et al.* (2013) found that capital structure and non-debt tax shield positively affected profitability of 11 manufacturing firms listed on the Colombo Stock Exchange for the period 2008 to 2012. Sivathaasan *et al.* (2013)'s study used a Multiple Regression Analysis where ROA and ROE were independent variables for each equation. Sales growth rate, firm size and working capital were found to have no impact on firm profitability. In Zimbabwe, Jabangwe and Kadenge (2015) studied the relationship between capital levels and bank performance using semi-annual panel data for 14 banks for the period 2009 to 2013. ROA was used as a proxy for bank performance. Using a one step GMM estimation technique, it was established that there was no relationship between capital levels and bank performance. In addition, Jabangwe and Kadenge (2015)'s study also found that bank size positively affects profitability. The coefficients for market concentration, management efficiency, inflation and industrial performance were insignificant.

2.3 Summary and Conclusion

Emanating from both theoretical and empirical literature, it can be said that the relationship between trade credit and firm profitability is ambiguous. This means that there is no stylized paradigm concerning the relationship between trade credit and firm profitability. However, taking a closer look at reviewed empirical studies, many studies on developed countries found a negative relationship between trade credit and corporate profitability. On the other hand, studies on developing nations found a positive relationship except studies by Ikechukwu and Nwakaego (2015) on Nigeria and Kasozi (2017) on South Africa which found contrary results.

Although the relationships are not unanimous, we can conclude that trade credit negatively affects firm profitability in developed countries while the relationship is positive in developing countries. Nevertheless, this cannot be generalised on Zimbabwe by virtue of it being a developing country because Zimbabwe is operating in a multi-currency system which makes it unique and this calls for an independent investigation. Studies on Zimbabwe did not find the relationship between trade credit and firm profitability but they concentrated on the determinants of trade credit use. From the empirical review on the determinants of firm performance, it can be highlighted that firm size, age, liquidity, leverage and sales growth are

important firm specific determinants of firm performance. The next section provides the research methodology of the study.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

In response to the objectives of this study, and applying ideas extracted from the reviewed literature, this section describes methods which were used in testing the hypothesis. This chapter outlines the research design, study population; sampling procedure and sample, data sources, model specification, definition and justification of variables and the estimation procedure.

3.1 Research Design

The study seeks to find out the impact of trade credit use on profitability of manufacturing firms listed on the ZSE for the period 2009 to 2017. This is a quantitative study that uses annual panel data extracted from listed manufacturing firm's financial statements for the period 2009 to 2017. Only listed manufacturing companies were considered due to the easy access of financial statements. Panel data is advantageous over time series and cross section data because it is more informative, gives more variability, more efficiency, more degrees of freedom and less collinearity among variables. Panel data also takes into account heterogeneity among manufacturing firms, hence minimising possible biases that may be inherent when manufacturing firms were aggregated. Conversely, panel data can lead to heteroscedasticity (associated with cross-sectional data) and auto-collinearity (associated with time series data). Some of the shortcomings can be mitigated by employing either Fixed Effects Model (FEM) or Random Effects Model (REM) (Gujarati and Porter, 2009).

3.1.1 Study Population, Sampling Procedure and Sample

The target population includes all manufacturing firms operated in Zimbabwe for the period of 2009 to 2017. The research was restricted to manufacturing firms only because according to Kasozi (2017), the manufacturing sector is where trade credit is being practiced in its habitual form. For convenience, the population covered manufacturing firms that were listed on the ZSE as at 31 December 2017 which stands at 28. Only firms which were listed on the ZSE for the entire period of 2009 to 2017 were considered while firms that were listed on or delisted from the ZSE during 2009 to 2017 were excluded so as to create a balanced panel. In addition, the research sought to include all manufacturing firms that surpass the above condition, however depending on the availability of all financial statements either on the ZSE or on their websites for the period covered. Some firms were excluded from the sample because their 2017 financial

reports were not yet available both on the ZSE and their websites. As a way of data cleaning, Delta Corporation Limited Company was removed from the sample although it satisfied all of the above conditions. The reason was that Delta Corporation Limited proved to be an outlier, this was evidenced by its extremely above average profitability ratios that could contaminate the results. As a result, 15 manufacturing firms constituted the study sample.

3.1.2 Data Sources

Firm specific data were extracted from the ZSE listed manufacturing firms audited financial statements and annual reports for the period of 2009 to 2017. Ross *et al*. (2013) documented the debate between financial economists and corporate practitioners concerning the choice between the use of market values and book values. Financial economists believe in market values when measuring financial ratios because they reflect current values rather than historical. While corporate practitioners prefer book values because they are stable. The justification for corporate practitioners' view is that since stock markets are volatile, they also make market based financial ratios volatile. In addition, financial ratios which are used to evaluate the credit worthiness of a company and debt covenants restrictions are presented in book values and not in market values. As a result, this study used book values where data for listed manufacturing firms were gathered from their audited financial statements as well as annual reports.

3.2 Model Specification

Following a number of previous studies which tested the explanatory power of trade credit to corporate profitability, the model by Yazdanfar and Öhman (2016) was adopted and modified by adding leverage and sales growth. Leverage and sales growth were included due to theoretical and empirical backing respectively. The model was modified to:

$$\boldsymbol{roa_{it} = \beta_0 + \beta_1 tc_{it} + \beta_2 liq_{it} + \beta_3 size_{it} + \beta_4 age_{it} + \beta_5 lev_{it} + \beta_6 sgrowth_{it} + \varepsilon_{it}}$$

where roa_{it} represents the profitability measure ROA, tc_{it} represents trade credit ratio, liq_{it} represents liquidity ratio, $size_{it}$ represents firm size, age_{it} represents firm age, lev_{it} represents leverage (capital structure), $sgrowth_{it}$ represents sales growth and ε_{it} is the overall error term.

3.3 Definition and Justification of Variables

ROA was the dependent variable in this model while trade credit, size, age, liquidity, leverage and sales growth were independent variables.

Firm Profitability (roa_{it})

Although there are many accounting-based profitability measures, this study used Return on Assets (ROA) because according to Al-Matari *et al*. (2014) and Dietrich and Wanzenried (2011), other profitability measurements like Net Interest Margin (NIM), Return on Equity (ROE) and Return on Capital Employed (ROCE) among others are much narrower and they have many weaknesses compared to ROA. ROA was empirically applied by Jabangwe and Kadenge, (2015), Kapkiyai and Mugo (2015) and Yazdanfar and Öhman (2016) as a good indicator of profitability. According to Yazdanfar and Öhman (2014) and Abuzayed (2012), ROA is very useful in measuring profitability for firms with capital-intensive operations and manufacturing firms because their operating activities account for a greater portion of their assets. ROA is a ratio calculated by dividing Earnings Before Interest and Tax (EBIT) by total assets and it measures the operating efficiency of a firm in profit generation from its assets. ROA is the dependent variable in this study.

Trade Credit (tc_{it})

Accounts payable to total liabilities ratio as suggested by Achode and Rotich (2016), Kapkiyai and Mugo (2015)**,** Makori and Jagongo (2013) and Lazaridis and Tryfonidis (2006) was used to proxy trade credit. Emanating from the Transaction Cost Theory and Product Quality Verification Theory, trade credit positively affects firm profitability. However in empirical literature the impact is not unanimous hence the relationship between trade credit and firm profitability can best be settled as ambiguous.

Firm Size ($size_{it}$)

Firm size (natural logarithm of a firm's book value of total assets) is a variable that emanated from the Economic Model of Firm Performance. Firm size is the most important firm-specific variable that negatively affects firm profitability because it is considered to be the source of organisational costs that originates from diversification (Hansen and Wernerfelt, 1989). However the relationship is not unanimous because large firms may be more profitable as they enjoy economies of scale (Ravenscraft and Scherer, 1987). In addition to that, Isik and Tasgin (2017) and Yazdanfar and Öhman (2016) found that firm size positively affects ROA. On the other hand Olawale *et al*. (2017) found a negative relationship while Sivathaasan *et al.* (2013) found no relationship between firm size and profitability. Although the relationship between firm size and firm profitability is ambiguous, but following the belief that economies of scale are beneficial to manufacturing firms, a positive relationship is expected.

Firm Age (age_{it})

Firm age measures how old the firm is and it was proxied by the natural logarithm of the firm's number of years since the firm was established up to 2009-2017. Firm age determines the firm's reputation gained during the years of experience and it is also associated with the creation of goodwill. Age is therefore expected to affect firm profitability positively as García-Teruel and Martinez-Solano (2007), Jabangwe and Kadenge (2015) and Yazdanfar and Öhman (2016) found.

Liquidity (liq_{it})

Although there are several liquidity ratios, this study used the Current Ratio. Current Ratio is the balance sheet company liquidity and it is defined as the current assets to current liabilities ratio. It shows the firm's ability to pay its short term or current debt obligations. Liquidity access is an important prerequisite for investment and firm profitability (Lazaridis and Tryfonidis, 2006). Moodley *et al*. (2017) emphasised that profitability depends on resource availability. It follows that liquidity is a resource whose impact on firm profitability is expected to be positive.

Leverage (lev_{it})

Leverage ratio also called capital structure or debt to equity ratio is basically used to see how a firm is financed, that is to compare funds supplied by creditors (debt) to those supplied by owners (equity). Following the Modigliani-Miller Proposition 1, capital structure is irrelevant. Hence in this study, leverage was expected to have no relationship with firm profitability.

Sales Growth ($sgrowth_{it}$)

Sales growth rate is calculated as a percentage of present year's sales minus past year's sales divided by past year's sales. Generally, growth is perceived as having a positive impact due to the additional earnings that the firm generates when sales increase. Therefore sales growth is expected to have a positive relationship with profitability as found by Lazăr (2016) and Ikechukwu and Nwakaego (2015).

3.4 Estimation Procedure

When working with micro panel data, the Fixed Effects Model (FEM), Random Effects Model (REM) and Pooled Ordinary Least Squares (OLS) Model are three major estimation procedures that can be used by the researcher. The models were explained as follows:

Fixed Effects Model (FEM)

The FEM allows for individuality or heterogeneity among units (manufacturing firms) by allowing each firm to have its value of intercept. FEM produces Fixed Effects Estimators ($\hat{\beta}_{FE}$) that are also called the within estimators. It is called fixed effects due to the fact that though the intercept may be different across firms, each firm's intercept is time-invariant. With the assumption that $Cov(X_{it}, v_i) \neq 0$, the FEM can be presented as:

$Y_{it} = \alpha_{1i} + \beta X_{it} + \varepsilon_{it}$

$i = 1,2,3 \ldots 15$

$t = 1,2,3 \ldots 9$

where $\varepsilon_{it} = v_i + u_{it}$,

v_i are taken as unknown parameters that are to be estimated and u_{it} are the idiosyncratic shocks (the combination of cross-section and time series error component). β represents the slope coefficient of explanatory variable X_{it} which is constant across cross-sections. Y_{it} represents the dependent variable where $\boldsymbol{i}$ represents cross-section identifier while $\boldsymbol{t}$ represents time series identifier and α_{1i} are time-invariant cross section firm specific intercepts. However, inconsistent estimates can be obtained for the parameters when N is large and T is small (Johnston and DiNardo, 1997). We cannot consistently estimate v_i but we can estimate the remaining parameters consistently. One advantage of the FEM it that it "*solves the omitted variables problems by throwing away some of the variance that contaminates either OLS or the random effects estimator"* (Johnston and DiNardo, 1997).

Random Effects Model (REM)

Unlike the FEM where there are conditional inferences on the sampled cross-sectional units, REM is an alternative formulation which acknowledges that the sample was randomly selected and hence treat individual differences as random. According to Baltagi (2008), the loss of degrees of freedom can best be mitigated by assuming the randomization of α_{1i} and the REM becomes more efficient compared to the FEM. Instead of taking α_{1i} as fixed, we acknowledge that it is a random variable with the average population of α_1. Its breakdown is: $\alpha_{1i} = \alpha_1 + z_i$ where z_i is a random error term with a zero mean and constant variance.

The individual random differences z_i are called "*random effects*" and they are equivalent to the random error terms. Substituting $\alpha_{1i} = \alpha_1 + z_i$ into $Y_{it} = \alpha_{1i} + \beta X_{it} + \varepsilon_{it}$, we obtain:

$$Y_{it} = (\alpha_1 + z_i) + \beta X_{it} + \varepsilon_{it}$$

$$Y_{it} = \alpha_1 + \beta X_{it} + z_i + \varepsilon_{it}$$

$$Y_{it} = \alpha_1 + \beta X_{it} + w_{it}$$

where $w_{it} = z_i + \varepsilon_{it}$

The composite error term w_{it} is built of two components: z_i which is the individual specific error term and ε_{it} is the idiosyncratic term (the combination of time series and cross-section error component). The REM assumes non-estimation of z_i since it is now part of the composite error term. The REM is also called the Error Components Model (ECM) because of the composite error term that combines two error components. The assumptions of the REM or ECM according to Gujarati and Porter (2009) are that:

$z_i \sim N(0, \sigma^2{}_z)$

$\varepsilon_{it} \sim N(0, \sigma^2{}_\varepsilon)$

$E(z_i \varepsilon_{it}) = 0;\ E(z_i z_j) = 0 \quad (i \neq j)$

$E(\varepsilon_{it} \varepsilon_{is}) = \quad E(\varepsilon_{ij} \varepsilon_{ij}) = \quad E(\varepsilon_{it} \varepsilon_{js}) = 0\ \ (i \neq j;\ t \neq s)$

The meaning is that the firm specific error components are not correlated with each other and also they are not auto correlated across cross-section units and time series units. Emanating from the stated assumptions, it follows that:

$$E(w_{it}) = 0$$

$$Var(w_{it}) = \sigma^2{}_z + \sigma^2{}_\varepsilon$$

This means that the error term w_{it} is homoscedastic. In this case the Generalised Least Squares (GLS) is the most appropriate method because it allows us to extract information from both the between-group and within-group estimators.

Pooled Ordinary Least Squares (OLS) Model

Pooled OLS is the OLS technique that is run on panel data which completely ignores all individual specific effects (Cameron and Trivedi, 2005). In other words, the Pooled OLS ignores the panel structure of data and assumes that there is no distinction between manufacturing firms, thus one manufacturing firm is as good as another. By bunching together different manufacturing firms at different times, the individuality or heterogeneity that may

exist among the manufacturing firms is camouflaged (Gujarati and Porter, 2009). Although it may be hard to maintain, the assumption of the Pooled OLS is that $\sigma^2{}_z = 0$, meaning the variance across entities (manufacturing firms) is zero, that is to say there is an insignificant difference across manufacturing firms. The Pooled OLS model can be presented as:

$$Y_{it} = \alpha + \beta X_{it} + w_{it}$$

where α is the same for all entities.

According to Greene (2003), the case of the fixed effects is obvious because when the FEM is appropriate then it renders the Pooled OLS estimator inconsistent. However, in the case of the REM, the Pooled OLS may as well be consistent hence the need to test for poolability. In this study, the assumptions governing the Pooled OLS are less likely to hold since there are different manufacturing firms which are in different sectors producing different products, so individuality cannot be completely ignored.

Fixed Effects Model versus Random Effects Model

Theoretical requirements as well as advantages of each model determine which model to be adopted. According to Johnston and DiNardo (1997), whenever the REM is valid, still the FEM will produce consistent estimates, hence it is generalised that the FEM is more ideal than the REM unless if we can be sure that we can measure all time-invariant factors that are perhaps correlated with other regressors.

If the $X's$ (the regressors) and z_i(random effects) are assumed to be uncorrelated then the REM may probably be best, while if they are assumed to be correlated the FEM may be appropriate (Gujarati and Porter, 2009 and Johnston and DiNardo, 1997). Hence the main assumption made under the FEM is that $Cov(X_{it}, z_i) \neq 0$ while that of REM is $Cov(X_{it}, z_i) = 0$ (Gujarati and Porter, 2009). According to Johnston and DiNardo (1997), "*the fixed effects estimation solves the omitted variables problems by throwing away some of the variance that contaminates either OLS or the random effects estimator."* However, if T (number of time series data entries) is small and N (number of individual units) is large and also if the assumptions of the REM hold, the FEM is relatively less efficient compared to REM.

Following the fundamental differences of the two models, Judge *et al*. (1985) (cited in Gujarati and Porter, 2009) made the following observations concerning the choice between the FEM and the REM: If **T** is large and **N** is small, both estimated parameter values produced by FEM and REM will be statistically equivalent (or will have little differences), hence the choice will be based on convenience in computations and thus the FEM is preferred. When there is a large

N and a small T, estimates emanating from the two models can significantly differ and in this case the FEM is appropriate if there is a strong belief that individual units in the sample were not selected randomly. Otherwise the REM will be best when individual units were selected randomly.

Concisely, trying to find a simple rule that helps the researchers to navigate through the shortcomings of both the FEM and the REM is like choosing between the rock and the hard place (Johnston and DiNardo, 1997). This proves that panel data cannot provide a cure-all for all problems faced by econometricians although it is a hybrid of time-series and cross-section data (Johnston and DiNardo, 1997). However, this study used the outcome from the Hausman test to select the appropriate model between the FEM and REM.

The Hausman Test

The Hausman test is a formal test that is used to make a choice between the FEM and the REM. The test checks for any correlation that may be between z_i and X_{it} in a REM. According to Greene (2003), the Hausman test compares coefficient estimates that arise from the REM to those from the FEM. The idea that underlies the Hausman test is that both the Random Effects Estimators ($\hat{\beta}_{RE}$) and Fixed Effects Estimators ($\hat{\beta}_{FE}$) are consistent if z_i and X_{it} are uncorrelated.

According to Johnston and DiNardo (1997), if z_i and X_{it} are uncorrelated, $\hat{\beta}_{RE}$ is both consistent and efficient while $\hat{\beta}_{FE}$ is only consistent but not efficient. If z_i and X_{it} are correlated, then $\hat{\beta}_{FE}$ is both consistent and efficient while $\hat{\beta}_{RE}$ is now inconsistent and inefficient. The Hausman test follows a X^2 (Chi-square) distribution with K degrees of freedom. The null hypothesis is that z_i and X_{it} are uncorrelated, which means that both $\hat{\beta}_{RE}$ and $\hat{\beta}_{FE}$ are consistent but only $\hat{\beta}_{RE}$ is efficient, thus REM is appropriate. The alternative hypothesis being that z_i and X_{it} are correlated and only $\hat{\beta}_{FE}$ is consistent and efficient, thus FEM is appropriate. As a result, the Hausman test can be defined as:

$$H = \left(\hat{\beta}_{RE} - \hat{\beta}_{FE}\right)' \left[Var\left(\hat{\beta}_{FE}\right) - Var\left(\hat{\beta}_{RE}\right)\right]^{-1} \left(\hat{\beta}_{RE} - \hat{\beta}_{FE}\right) \sim X_K^2$$

where K represents the degrees of freedom.

Hence H_0: $Cov(X_{it}, z_i) = 0$

H_1: $Cov(X_{it}, z_i) \neq 0$

We reject the null hypothesis when the probability value is less than the significance level ($p < \propto$). Upon the rejection of the null hypothesis, it means z_i and X_{it} are correlated, hence the FEM is appropriate. However, failure to reject the null hypothesis means z_i and X_{it} are uncorrelated, hence the REM is appropriate and also the Pooled OLS is consistent thus raising the need to test for poolability. The Breusch-Pagan Lagrangian Multiplier (LM) is used to test for poolability.

The Breusch-Pagan LM Test for Random Effects versus Pooled OLS

The Breusch-Pagan LM Test is used to make a choice between the REM and the Pooled OLS by checking whether the variance components across entities are equal to zero or not. If the variance components across entities are equal to zero, the Pooled OLS becomes efficient while if the variance components are not equal to zero the REM becomes appropriate. This test is done after the REM is accepted under the Hausman test. The null hypothesis is that the variance components across entities are equal to zero against the alternative hypothesis that the variance components across entities are not equal to zero.

Hence H_0: ${\sigma^2}_z = 0$

H_1: ${\sigma^2}_z \neq 0$

We reject the null hypothesis when the probability value is less than the significance level ($p < \propto$). Upon the rejection of the null hypothesis the conclusion is that the REM is appropriate. Failure to reject the null hypothesis means the Pooled OLS is appropriate.

3.5 Conclusion

This chapter presented the methodology that was used in data collection and to examine the impact of trade credit use on manufacturing firm profitability in Zimbabwe. This includes an outline of the research design, study population; sampling procedure and sample, data sources, model specification and the tests that were carried. Definition and justification of variables as well as the estimation procedure were also included in this chapter. The next chapter concentrates on the estimation, presentation of results and the interpretation and discussion of the study findings.

CHAPTER FOUR

ESTIMATION, PRESENTATION AND INTERPRETATION OF RESULTS

4.0 Introduction

This chapter concentrates on the estimation, presentation of results and also the interpretation of the study findings following the methodological procedure laid in Chapter Three. This chapter will provide answers to the research questions that were asked. The chapter will present the descriptive statistics, correlation analysis, the Hausman test results, the Breusch-Pagan LM Test results, REM regression results and the interpretation thereof. Estimations were done using STATA version 13[10].

4.1 Descriptive Statistics

Table 1.1 presents a summary of three versions of test statistics which are the overall, between and within test statistics. The within captures time series dimensions (the variance within an individual unit over time) while the between captures cross-sectional dimensions of data (the variation between the individual units). The study made use of fifteen cross-sectional units (n=15) and nine-time periods (T=9) and as a result, 135 observations were obtained (N=135). The summary is useful in understanding the structure of data as well as locating the source of variations in data.

The variables labelled $code$ and $year$ are not genuine but they represent the cross-sectional and time dimension of data respectively. These variables are useful in making a decision on how the panel data should be classified. Variable $code$ had a maximum value of 15 which was equal to the number of individual units (15 firms), whilst $year$ had a maximum value of 9 which was equal to the number of time periods used in this study.

Table 4.1: Summary Statistics

Variable		Mean	Std. Dev.	Min	Max	Observations	
code	overall	8	4.34	1	15	N =	135
	between		4.47	1	15	n =	15
	within		0	8	8	T =	9
year	overall	2013	2.59	2009	2017	N =	135
	between		0	2013	2013	n =	15

[10] Full tables of the outputs are found in the Appendices.

	within		2.59	2009	2017	T =	9
roa	overall	0.029	0.12	-0.45	0.22	N =	135
	between		0.09	-0.16	0.16	n =	15
	within		0.08	-0.34	0.31	T =	9
tc	overall	0.21	0.20	0.04	1.35	N =	135
	between		0.15	0.07	0.67	n =	15
	within		0.14	-0.35	0.89	T =	9
liq	overall	0.43	0.21	0.06	0.83	N =	135
	between		0.18	0.12	0.67	n =	15
	within		0.11	0.05	0.73	T =	9
lev	overall	0.35	0.89	-5.85	5.47	N =	135
	between		0.41	-0.64	1.12	n =	15
	within		0.80	-4.86	4.86	T =	9
size	overall	17.22	0.93	14.80	19.27	N =	135
	between		0.90	15.84	18.82	n =	15
	within		0.32	16.06	17.88	T =	9
age	overall	4.05	0.46	2.89	4.66	N =	135
	between		0.47	3.08	4.62	n =	15
	within		0.06	3.85	4.22	T =	9
sgrowth	overall	0.25	0.64	-0.94	3.86	N =	135
	between		0.21	-0.13	0.61	n =	15
	within		0.61	-0.75	3.50	T =	9

The dependent variable roa had an overall minimum of -0.45, an overall maximum of 0.22 and a mean of 0.029. This shows that the average profitability in the manufacturing industry was low and less volatile as indicated by the overall variation of 0.12 for the period 2009 to 2017. Profits were less volatile both within (0.08) and between (0.09) the sampled firms. Variables size, age and liquidity have more between than within variance. These variables

appear like deterministic variables where some firms are older, larger and have more liquidity than others. Leverage varies more within manufacturing firms as shown by higher within variations of 0.80 compared to between variations of 0.41. The higher within variations show that manufacturing firms changed their capital structure more often. On average, the manufacturing sector was less leveraged for the period 2009 to 2017 as indicated by the mean of 0.35. This means that on average, manufacturing firms issued more equity than debt. Sales growth had more within variations (0.61) than between variations (0.21). The overall mean of sales growth was 0.25 meaning that sales were growing at the average rate of 25% for the period 2009 to 2017.

4.2 Correlation Analysis

Correlation analysis is a test for multicollinearity and it also gives a picture about the relationship among variables. Correlation predict connections between the dependent variable (roa) and independent variables ($tc, size, age, lev, liq$ and $sgrowth$). Trade credit was inversely related to ROA while leverage, liquidity, size, age and sales growth were positively related to ROA. All independent variables' absolute values of correlations were fairly low which means there was no risk of multicollinearity among independent variables thus guaranteeing efficiency of their coefficients.

Table 4.2: Correlation Matrix

	roa	tc	liq	lev	size	age	sgrowth
roa	1.0000						
tc	-0.4525	1.0000					
liq	0.2456	0.0375	1.0000				
lev	0.0510	-0.0622	0.1879	1.0000			
size	0.4812	-0.3704	0.0617	-0.0727	1.0000		
age	0.1005	-0.1342	-0.1440	-0.0644	0.4668	1.0000	
sgrowth	0.0461	0.0020	0.0413	0.1042	-0.2017	-0.1706	1.0000

4.3 Hausman Test

As specified in Chapter Three, the Hausman specification test is a formal test that is used to select the most appropriate model between the FEM and the REM. The null hypothesis is that

the REM is the preferred model against the alternative hypothesis that the appropriate model is the FEM.

Table 4.3: Hausman Test Results

---- Coefficients ----

	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
tc	-0.0817	-0.1382	0.0565	0.0315
liq	0.1222	0.1100	0.0123	0.0486
lev	0.0051	0.0040	0.0011	0.0023
size	0.0841	0.0596	0.0245	0.0211
age	-0.3018	-0.0364	-0.2654	0.1530
sgrowth	0.0081	0.0147	-0.0066	0.0049

$X^2(6) = 5.33$: p-value = 0.5017

The Hausman test p-value of 0.5017 follows that the probability value is more than the significance level. As a result, we fail to reject the null hypothesis which implies that z_i and X_{it} are uncorrelated, meaning that both $\hat{\beta}_{RE}$ and $\hat{\beta}_{FE}$ are consistent but only $\hat{\beta}_{RE}$ is efficient, thus REM is appropriate. Therefore, to find out whether there are significant differences across manufacturing firms or not, we use the Breusch-Pagan LM test.

4.4 Breusch-Pagan LM Test for Random Effects versus Pooled OLS

As specified in Chapter Three, the Breusch-Pagan LM test helps to decide between the Random Effects regression and the Pooled OLS. The null hypothesis is that variance across entities is zero, against the alternative hypothesis that the variance is a non-zero. If the variance across entities is zero we pool the manufacturing firms and ignore the panel structure by running the OLS model. If the variance is not equal to zero, we adopt the REM.

Table 4.4: Breusch-Pagan LM Test Results

	Var	sd = sqrt(Var)
roa	0.0136	0.1166
e	0.0067	0.0817
u	0.0029	0.0537

Test: Var(u) = 0

chibar2(01) = 19.98

Prob > chibar2 = 0.0000

The p-value of 0.0000 follows that the probability value is less than the significance level. As a result, we reject the null hypothesis and conclude that the variance across manufacturing firms is not equal to zero and thus the REM is appropriate.

4.5 The Random Effects Model

Emanating from both the Hausman specification test and the Breusch-Pagan LM test results, the study adopts the REM. As a result the interpretation of results and conclusions concerning this study followed the REM assumptions and explanations as outlined in Chapter Three.

The results of the REM on Table 4.5 show that the coefficient of trade credit was negative and statistically significant at 1% level of significance. Therefore, trade credit negatively affects firm profitability with a unit increase in trade credit leading to 0.1382 units decrease in ROA. This means that manufacturing firms with higher level of trade credit are less profitable compared to those with lower level of trade credit. This shows that the implicit costs of trade credit such as foregone early payment discounts are greater than the benefits of using trade credit as a financing tool. This negative relationship is in contrary to the suggestions of the Transaction Cost and Product Quality Verification Theory whilst supporting the proposition by Ng *et al*. (1999) that firms that rely on trade credit risk losing early payment discounts and this diminishes their profitability. In this case the choice to use supplier provided finance (trade credit) compromises firm profitability. This relationship however supports the findings by Yazdanfar and Öhman (2016), Ikechukwu and Nwakaego (2015), Lazaridis and Tryfonidis (2006) and Deloof (2003).

Table 4.5: Estimation Results of the Random Effects Model

roa	Coef.	Std. Err.	Z	P>|z|	[95%Conf. Interval]	
tc	-0.1382	0.0489	-2.83	0.005	-0.2341	-0.0424
liq	0.1100	0.0556	1.98	0.048	0.0009	0.2190
lev	0.0040	0.0089	0.45	0.651	-0.0134	0.0215
size	0.0596	0.0165	3.61	0.000	0.0273	0.0920
age	-0.0364	0.0370	-0.98	0.326	-0.1090	0.0362
sgrowth	0.0147	0.0119	1.24	0.216	-0.0086	0.0380
_cons	-.8745	0.2624	-3.33	0.001	-1.3888	-0.3602

R-sq: Within = 0.1137

Between= 0.6362

Overall = 0.3834

The coefficient of leverage was positive but insignificant, meaning that leverage does not affect profitability of firms in the manufacturing sector. This result supports the MM Proposition 1 capital structure irrelevance theory which states that the choice between equity financing and debt financing and the combination of both does not affect firm profitability. The value of a levered firm is always equal to the value of an unlevered firm. Manufacturing firms can issue either debt or equity without fear of putting their profitability at jeopardy. In contrast to this result, Lazăr (2016) found a negative relationship between leverage and firm profitability whilst Olawale *et al*. (2017) and Sivathaasan *et al.* (2013) found positive relationship.

Contrary to the Economic Model of Firm Performance, size was positively related to profitability and its coefficient was statistically significant at 1% level of significance, meaning that large manufacturing firms are more profitable than small manufacturing firms. This is because large manufacturing firms are in a position to enjoy economies of scale which enable them to offer competitive products to customers thereby increasing profitability. The results show that a unit increase in firm size results in 0.0596 units increase in a firm's ROA. Hansen and Wernerfelt (1989) stated that size is the source of x-inefficiencies or organisational costs hence proposed a negative impact on firm profitability. However a positive relationship was also found by Isik and Tasgin (2017), Yazdanfar and Öhman (2016) and Jabangwe and Kadenge (2015).

The coefficient of liquidity was positive and significant at 5% level of significance. This means that liquidity had a positive impact on firm profitability with a unit increase in liquidity resulting in 0.11 units increase in a firm's ROA. Firms with greater access to cash or cash equivalents are more likely to attain higher levels of profitability than those with poor access to cash or cash equivalents. A probable explanation is that firms with low liquidity levels may fail to honour their current obligations during the specified time period and as a result, they can be charged late payment penalties which adversely affect their profits. On the other hand, firms with high liquidity ratios are more profitable because they are charged low interest rates when borrowing because their perceived default risk levels are low. A positive relationship was also found by Yazdanfar and Öhman (2016).

The coefficients of age and sales growth were insignificant, meaning that age and sales growth have no impact on firm profitability. The constant of the model had a negative value which

was statistically significant at 1% significance level. This means that a firm that is just entering the manufacturing sector or a firm that is not doing anything will record a ROA of 87.45% (loss). This loss is an indication of sunk costs or retrospective costs that the firm entering the sector incur. The Model's within, between and overall R-squared values were 11.37%, 63.62% and 38.34% respectively. This indicates that the $\hat{\beta}_{RE}$ can explain 11.37% of the within variation, 63.62% of the between variation and 38.34% of the overall variation of firm profits.

4.6 Conclusion

This chapter focused on the estimation, presentation and interpretation of the research findings. From the findings, it can be concluded that trade credit, firm size and liquidity level were important firm specific predictors of profitability in the manufacturing sector because their coefficients were found to be significant. Trade credit had a negative impact on manufacturing firm profitability whilst firm size and liquidity positively affected firm profitability. The negative relationship between trade credit and profitability supported Ng *et al.* (1999)'s proposition while contrasting the sentiments of the Transaction Cost Theory and Product Quality Verification Theory. Nevertheless, leverage was irrelevant for the Zimbabwean manufacturing sector as depicted by the MM Proposition 1. The next chapter gives the summary of the whole study, policy recommendations based on the findings of the study and suggestions for further study.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

5.0 Introduction

This chapter provides the summary of the whole study, conclusions of the overall study and gives policy implications based on the findings of the study. Limitations that were encountered in carrying out this research and suggestions for further studies were also included in this chapter.

5.1 Summary and Conclusions of the Study

The purpose of this study was to investigate the impact of trade credit use on corporate profitability focusing on the Zimbabwean manufacturing industry for the period 2009 to 2017. As a result, the study focused on establishing the relationship between trade credit and profitability of 15 manufacturing firms listed on the ZSE for the period 2009 to 2017. The study also investigated other firm specific variables that affected manufacturing firm's profitability. The manufacturing sector was less profitable, it failed to meet the target level of capacity utilization, contribution to GDP and contribution to export promotion irrespective of the efforts by the government through STERP 1, STERP II, IDP and SI 64.

Following the decline in the fraction of banking sector loans and advances to the manufacturing sector, manufacturing firms used trade credit as a source of finance. For the period 2009 to 2017, the manufacturing value added was declining, capacity utilisation was fluctuating below 60% despite the target of 100%. Trade credit use in the manufacturing sector was trending upwards while profitability was declining during the period 2009 to 2017. Given the knowledge concerning the impact of trade credit use on firm profitability, the researcher attempted to find out if the use of trade credit as a financing tool had an impact on profitability of manufacturing firms listed on the ZSE. The presence of inconsistencies on the reviewed studies and lack of empirical evidence on the impact of trade credit use on manufacturing firms in Zimbabwe during the multi-currency system motivated the researcher. Manufacturing firms' profitability is important because the manufacturing sector had significant contribution to GDP during its good times.

The study made use of panel data that was collected from fifteen sampled manufacturing firms listed on the ZSE for the period 2009 to 2017. Data used in this study was gathered from sampled manufacturing firm's financial reports. Based on the results of the Hausman Specification test and Breusch-Pagan LM test, the study used the REM. Estimations in this

study were carried out using STATA version 13. Although the main goal of this study was to determine the impact of trade credit use on manufacturing firm profitability, the study also determined the firm specific variables that affect profitability. Firm specific variables were adopted from the theories of firm performance, capital structure theories and from some empirical studies. Firm specific variables were firm size, firm age, leverage, liquidity and sales growth. The results displayed that trade credit negatively affects manufacturing firm profitability. The coefficient of leverage was insignificant meaning that the choice between equity financing and debt financing and their combination does not affect firm profitability (capital structure is irrelevant). Liquidity and firm size positively affected firm profitability. Coefficients of firm age and sales growth were insignificant.

5.2 Policy Implications

The findings of this study have several policy implications to financial managers in the manufacturing sector. The findings acknowledged that larger manufacturing firms with low trade credit levels and high access to liquidity are likely to be more profitable than others. Therefore, for manufacturing firms to be profitable, they should reduce their trade credit levels and increase their size and liquidity levels.

Manufacturing firms were advised to reduce the use of trade credit by paying their suppliers early or making cash purchases and opt for debt and equity finance. By paying their suppliers early or making cash purchases, firms may benefit from early payment discounts and reduction of implicit costs associated with trade credit. The use of debt and equity is reinforced by the findings on leverage which supported the MM Proposition 1 capital structure irrelevance theory. This is because when capital structure is irrelevant, the choice between debt financing and equity financing and their combination does not affect firm profitability. For them to attract debt and equity finance, manufacturing firms should put effort to improve their credit worthiness. Manufacturing firms that already have access to mainstream finance should consider borrowing from banks in order to make cash payments than entering into credit terms with their suppliers. Manufacturing firms may as well open doors for international investors who want to buy stocks, thus embracing the new economic dispensation where foreign investors are being encouraged to invest in Zimbabwe under the unveiled "Zimbabwe is open for business" mantra. This will increase the availability of equity finance and hence reduce the forced circumstances of trade credit use.

Apart from that, manufacturing firms should strive to increase their size by investing in assets with positive NPV. As the firm increases in size, it enjoys economies of scale which enhances profitability. Manufacturing firms should also engage in intensive cash management techniques in order to increase and preserve their liquidity levels since liquidity had a positive impact on firm profitability. This is because liquidity is a resource necessary for production and firms with high liquidity levels are charged low interest rates when borrowing because they have low perceived default risk.

5.3 Limitations of the Study and Suggestions of Areas for Further Study

Limitations that were encountered in carrying out this study can be used to indicate directions for further study. The sample of this study was limited to manufacturing firms that were listed on the ZSE. As a result, the findings cannot be generalised on small manufacturing companies and non-financial firms that are not into manufacturing. Future researchers are encouraged to extend this research on SMEs and other non-financial firms apart from those in the manufacturing sector. This study did not include organisational variables that were proposed by the Organisational Model of Firm Performance because they were difficult to capture. Future researchers can therefore try to capture and include organisational variables. This study concentrated on the demand side (trade payables) of trade credit and did not take into account the supply side (trade receivables) where trade credit is taken as an investment in current assets. Future researchers can study the supply side of trade credit.

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Appendices

Appendix A: Summary Statistics

```
. xtsum code year roa tc liq lev size age sgrowth
```

Variable		Mean	Std. Dev.	Min	Max	Observations	
code	overall	8	4.336585	1	15	N =	135
	between		4.472136	1	15	n =	15
	within		0	8	8	T =	9
year	overall	2013	2.591605	2009	2017	N =	135
	between		0	2013	2013	n =	15
	within		2.591605	2009	2017	T =	9
roa	overall	.0286702	.1166227	-.4485514	.2217783	N =	135
	between		.0864307	-.1604919	.1572763	n =	15
	within		.081096	-.3365506	.3078502	T =	9
tc	overall	.2143546	.2027595	.0437052	1.34549	N =	135
	between		.1498782	.0666125	.6740519	n =	15
	within		.1413826	-.350301	.8857931	T =	9
liq	overall	.4318826	.2066382	.0599813	.8300684	N =	135
	between		.1812317	.1086197	.6658505	n =	15
	within		.1086983	.0498148	.7299979	T =	9
lev	overall	.3492505	.8920715	-5.848182	5.471291	N =	135
	between		.4114294	-.6406756	1.119263	n =	15
	within		.7978867	-4.858256	4.858304	T =	9
size	overall	17.22802	.9295626	14.7955	19.26946	N =	135
	between		.8997456	15.83612	18.81649	n =	15
	within		.3207419	16.05746	17.87561	T =	9
age	overall	4.047643	.4580407	2.890372	4.663439	N =	135
	between		.4685349	3.08407	4.624652	n =	15
	within		.0581576	3.853945	4.221669	T =	9
sgrowth	overall	.25064	.6413855	-.9363119	3.858996	N =	135
	between		.2078431	-.133248	.6071305	n =	15
	within		.608897	-.7464413	3.502506	T =	9

Appendix B: Correlation Matrix

```
. correlate  roa tc liq lev size age sgrowth
(obs=135)
```

	roa	tc	liq	lev	size	age	sgrowth
roa	1.0000						
tc	-0.4525	1.0000					
liq	0.2456	0.0375	1.0000				
lev	0.0510	-0.0622	0.1879	1.0000			
size	0.4812	-0.3704	0.0617	-0.0727	1.0000		
age	0.1005	-0.1342	-0.1440	-0.0644	0.4668	1.0000	
sgrowth	0.0461	0.0020	0.0413	0.1042	-0.2017	-0.1706	1.0000

Appendix C: Hausman Specification Test

```
. quietly xtreg roa tc liq lev size age sgrowth, fe

. estimates store fixed

. quietly xtreg roa tc liq lev size age sgrowth, re

. estimates store random

. hausman fixed random
```

	Coefficients			
	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
tc	-.081697	-.1382441	.0565472	.0315315
liq	.1222278	.1099545	.0122733	.0486014
lev	.0051239	.0040195	.0011044	.0023352
size	.0841414	.0596494	.0244921	.0211159
age	-.301792	-.0364129	-.2653791	.1529644
sgrowth	.008106	.0147082	-.0066022	.0049287

b = consistent under Ho and Ha; obtained from xtreg
B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 5.33
Prob>chi2 = 0.5017

Appendix D: Breusch-Pagan Lagrangian Multiplier Test for Random Effects

```
. quietly xtreg roa tc liq lev size age sgrowth, re

. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        roa[code,t] = Xb + u[code] + e[code,t]

        Estimated results:
                     |       Var     sd = sqrt(Var)
             ---------+------------------------------
                 roa |   .0136008       .1166227
                   e |   .0066735       .0816916
                   u |   .0028864       .0537248

        Test:   Var(u) = 0
                             chibar2(01) =    19.98
                          Prob > chibar2 =   0.0000
```

Appendix E: Random Effects Model

```
. xtreg roa tc liq lev size age sgrowth, re

Random-effects GLS regression                   Number of obs      =       135
Group variable: code                            Number of groups   =        15

R-sq:  within  = 0.1137                         Obs per group: min =         9
       between = 0.6362                                        avg =       9.0
       overall = 0.3834                                        max =         9

                                                Wald chi2(6)       =     33.44
corr(u_i, X)   = 0 (assumed)                    Prob > chi2        =    0.0000
```

roa	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
tc	-.1382441	.0489014	-2.83	0.005	-.2340891	-.0423991
liq	.1099545	.0556236	1.98	0.048	.0009342	.2189748
lev	.0040195	.0088945	0.45	0.651	-.0134134	.0214525
size	.0596494	.0165284	3.61	0.000	.0272542	.0920445
age	-.0364129	.0370427	-0.98	0.326	-.1090152	.0361895
sgrowth	.0147082	.0118946	1.24	0.216	-.0086049	.0380213
_cons	-.8745281	.2624008	-3.33	0.001	-1.388824	-.360232
sigma_u	.05372484					
sigma_e	.08169164					
rho	.301924	(fraction of variance due to u_i)				