FINANCIAL SECTOR DEVELOPMENT AND TRADE CREDIT: A CASE OF BRICS COUNTRIES

By

Shame Mugova

Student number: 21556779

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Supervisor: Dr F. Kwenda (PhD, Msc, B Com Hons) **Date**

DECLARATION

I, Shame Mugova, hereby declare that this thesis is original, and all the materials used are appropriately acknowledged and explicitly referenced. A list of references is appended to the thesis.

I also certify that the thesis has not heretofore been submitted in any of its parts or entirety for a degree in any other institution of higher learning locally or internationally.

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Shame Mugova Date

DEDICATION

To my mother and father for your love and support

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ABSTRACT

While there is a growing body of literature on trade credit's role in short-term financing, few studies have examined the relationship between trade credit use and financial sector development. This study investigates the hypothesis that firms in countries with poorly developed financial sectors rely on trade credit. The main objective is to critically examine the relationship between trade credit and financial sector development. The study uses listed firms in emerging economies and evaluates the causality of the relationship using panel data econometric techniques. A quantitative approach was used to explain the underlying relationship between trade credit and financial sector development in Brazil, Russia, India, China and South Africa (BRICS). The research setting is on emerging economies that are committed to developing their financial sectors. The study investigates the relationship between financial sector development and trade credit use amongst listed firms in BRICS countries as well as the extent of trade credit usage in these countries. It also explores the relationship between banking sector development and trade credit use by firms. The study finds that financial sector development does not influence trade credit use by firms in BRICS countries and that current levels of trade credit cannot be explained by past values of such development. Trade credit is not Granger caused by financial sector development and financial sector development does not assist in predicting trade credit use by firms. On the contrary, trade credit Granger causes financial sector development in BRICS countries. Current levels of financial sector development can be explained by past values of trade credit use by firms. Trade credit Granger causes financial sector development and firms' use of trade credit does help in predicting financial sector development. Finally, the study confirms the role of trade credit as an important source of finance for working capital within the trade credit-financial sector development discourse whilst also demonstrating the significance of banking sector development. An analysis of historical trade credit use in an economy helps to predict the level of financial sector development, which informs firms whether or not they need to increase bank loans or trade credit as sources of working capital. In light of these findings, it is recommended that firms in BRICS countries embrace efficient trade credit

management and adjust their policies in response to financial sector development in order to minimize their borrowing costs. Trade credit precedes banking sector development; therefore, it is important to the growth of firms before they gain access to bank credit or the banking sector itself develops. Bank managers and finance executives should study and analyse trade credit use patterns by firms because trade payables compete with bank loans. The implications of trade credit use for financial sector development and business-to-business relationships imply that this is an important area which should be regulated to reduce the probability of corporate default. Financial and international banking regulatory agencies should also study and analyse trade credit use as it has a causative and predictive effect on financial sector development.

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LIST OF ABBREVIATIONS

ABSA	Amalgamated Banks of South Africa
BC	Bank concentration
BC/BD	Bank credit to bank deposits
BD/GDP	Bank deposits to GDP
BRICS	Brazil, Russia, India, China and South Africa
CBMAs	Crossborder mergers and acquisitions
DCPS/GDP	Domestic credit to private sector (% of GDP)
DPDS/GDP	Domestic public debt securities (amounts outstanding) issued in domestic markets as a share of GDP
FDI	Foreign Direct Investment
FEVD	Forecast-error variance decompositions
FNB	First National Bank
GDP	Gross Domestic Product
GMM	General Method of Moments
IRF	Impulse-response functions
JSE	Johannesburg Stock Exchange
LL/GDP	Liquid liabilities to GDP
Nedbank	Netherlands Bank of South Africa
NDB	New Development Bank
NSE	National Stock Exchange of India
PDSD/GDP	Private debt securities (amounts outstanding) issued in domestic markets as a share of GDP
SMC/GDP	Stock market capitalization to GDP
SMTR	Stock market turnover ratio
SMTVT/GDP	Stock market total value traded to GDP
TPCL	Trade payables/ Current liabilities
TPTA	Trade payables/Total assets
TRCA	Trade receivables/Current assets
TRTA	Trade receivables/Total assets

VAR	Vector autoregression

CHAPTER 1: INTRODUCTION

1.1. Introduction

The borrowing and lending of money is direct and easy to grasp whilst trade credit dynamics are more complicated. When one borrows money, the decision is motivated by the assessment that one needs it. When one borrows goods for payment at some later date, factors such as cash flow management might be the driving force. The supplier only offers credit when they have established that one can pay one's bills on time. Credit negotiations can be integrated into one's financial plan. Credit is a customer's ability to obtain goods or services before payment, based on trust that payment will be made in the future (Entreprenuer 2017). Trade credit is the credit extended to a firm by suppliers who allow the firm to buy now and pay later (Entrepreneur 2017). Trade credit is when a company takes delivery of materials, equipment or other valuables without paying cash on the spot.

As long ago as 1923, W.C. Schluter defined credit as:

A trust, faith or confidence that reposes in a man or "house" which gives him or it a business reputation of willingness and ability to pay obligations, and, therefore, confers the power or ability to acquire goods or funds upon the promise of future payment or repayment (Schluter 1923).

Schluter's definition captures the essence of credit, as it includes the elements of trust, faith and confidence that are central to the sale of goods and services on credit terms because this is what creates the business relationship that is vital to successful trade.

The following short story explains and illustrates why credit is an important tool. The story helps to clarify draw parallels with trade credit in simple terms and its key importance to business. Teddy Cohen founded a company which came to be known as Nyore Nyore Zimbabwe Furnitures in 1965 in Rhodesia (now Zimbabwe). The firm was founded on the basic principle that, like other race groups, Africans needed credit at a time when there was racial discrimination in the country. While working in a furniture store, he discovered that blacks were not allowed to buy furniture on credit. Refusing to offer credit to the majority made no business sense. His reasoning was: forget racism; there's money to be made here. The company grew into one of

Zimbabwe's largest manufacturers, furnishing homes across the country. For over three decades, it was the store the emerging black middle class, and the poor, went to for affordable furniture and clothes. The name "Nyore Nyore" is a Shona word translated to English as "easily." While it was indeed easy to obtain credit, as stated in the Bible, the result was often: *"The rich ruleth over the poor, and the borrower* is *servant to the lender"* (Proverbs 22:7).

People were enslaved by debt and Nyore Nyore Zimbabwe Furnitures always had the power to repossess the furniture sold; they thus controlled their debtors. Families would be left with houses without furniture when there was a default. Mothers and children bore the grief of losing their furniture. However, it was also a source of joy and comfort when they obtained the goods on credit, for payment later whilst enjoying the comfort of luxurious furniture. Buying on credit came with costs such as interest and it was arguably more expensive than buying with cash. This story illustrates the success of an enterprise based on the ability to sell goods on credit. The same principles customer credit applies to intra-firm trade, as companies that extend trade credit have control over the borrower and can reprocess goods or cut future supplies. The advantages of suppliers over financial institutions such as reprocessing goods are widely discussed in the trade credit literature. A firm foregoes discounts when they use trade credit and there are also late-payment or delinquency penalties should a buyer extend payment beyond the agreed-upon terms.

Trade credit is an important source of funds for most firms and is crucial for those that are running out of bank credit. For the relationship between bank credit rationing and trade credit, see (Petersen and Rajan 1997) 'The best assumption to have is that any commonly held belief is wrong' (Ken Olson, Chief Executive Officer Digital Equipment Corporation). 'Every time we approach a problem we bring our accumulated experience and training to bear on it which includes our accumulated assumptions and biases, both conscious and unconscious' (Sloane 2006). This mental baggage can prevent us from accepting innovative ideas. The natural thing to do is the thing we have always done, but as Charles Ames, CEO of Uniroyal Goodyear, says, 'Blindly following organizational concepts that have worked elsewhere is a sure way to waste talent and get poor results' (Ames 1990: 2).

The northern pike is a large freshwater fish that feeds on other fish. One such pike was placed in one half of a glass aquarium, which had a glass partition dividing it. In the other half were many small fish. The pike made repeated efforts to snatch the small fish but hit the glass partition each time and received a painful bump on the nose. The partition was then carefully removed so that all the fish could move around the tank. The pike did not attack or eat the little fish. It had learnt that to attack the little fish was fruitless and painful, so it did not try again. From this story comes the "pike syndrome" which involves not adapting to changing circumstance and wrongly assuming a complete knowledge of a situation (Sloane 2006).

Finance managers can act like pikes when they approach the ever-changing financial sector with the same old mentality. If trade credit was used previously due to bank credit inaccessibility, the "pike syndrome" may mean that they stick to it despite improved access to finance brought about by development in the financial sector. Openness to change is always very important; Jack Welch's key business strategy is: change, before it's too late! The financial sector is evolving, and trade credit is gaining dominance as a source of working capital finance. The financial manager in a modern firm is constantly faced by an ever-changing financial environment with non-financial firms now also involved in financial intermediation, a role which was traditionally restricted to financial institutions. Financial intermediation is the use of a financial institution such as a bank to allocate funds between borrowers and lenders. Non-financial firms act as financial intermediaries when they extend trade credit to their customers. Banks have lost ground to other intermediaries such as finance companies and to securities markets, especially commercial paper and high yield securities markets (Allen and Santomero 2001). Functions which used to be exclusively for banks are now being performed non-bank entities.

Non-financial firms channel short-term funds from financial institutions to other firms, a role that should ideally be performed by the latter. Trade credit is complementary to the development of financial intermediaries. However, it may also mean that banks are losing ground to non-financial firms. Empirical studies on the relationship between trade credit and bank credit channels provide somewhat contradictory evidence, with most supporting the notion of substitution, while a few support that of complementariness (Huang, Shi and Zhang 2011). Further empirical studies proved that substitutability and complementariness coexist. A unifying theory is thus required to consider whether firms substitute trade credit with bank credit as the financial sectors of economies grow, especially since Ge and Qiu (2007) suggested that firms

in countries with poorly developed financial sectors use trade credit. This study therefore seeks to unravel the relationship between financial sector development and trade credit use by firms to provide a theoretical framework and models to contribute to the trade credit discourse. In doing so, it draws its framework from the trade credit and financial development literature.

The goal of financial management in financing working capital is to ensure a firm's liquidity. All sources of working capital finance, including trade and bank credit, have different costs, which influence the firm's cost of capital. Financial sector development results in reduced cost of capital and more alternative sources of finance. The choice between trade credit and bank credit should therefore influenced by the level of financial sector development. The common feature of financial theories is that suppliers have an advantage over other lenders in financing credit constrained firms (Burkart, Ellingsen and Giannetti 2005). What is not known is whether the financial sector develops on its own or responds to demand for financing by firms. The emergence and dominance of alternative financing sources such as trade credit may therefore impact on how the financial sector of a country ought to develop.

This study investigates the interplay between financial sector development and trade credit use amongst Brazil, Russia, India, China and South Africa (BRICS). Trade credit and bank loans are very important sources of short term finance for working capital, which can be used to finance firm growth. Financial sector development is an important component of an economy, as the level of such development determines firms' access to capital and overall economic performance. The cost differences between trade credit and bank loans, with the former carrying high implicit costs and their use as working finance sources makes this an important study because managers need to minimize the cost of capital and maximise returns.

1.2. Background of the study

The BRICS countries have rapidly growing economies and are emerging as global forces in industry and commerce. BRICS member countries are all developing or newly industrialised economies. Financial sector development starts with

entrepreneurs utilising personal savings and those of friends and family for start-up ventures (Bonin and Wachtel 2003: 6). Trade credit is a critical source of spontaneous inter-firm financing that is particularly important to small and growing firms. As firms grow, they turn to regular financial sector institutions for financing, starting with banks (Bonin and Wachtel 2003: 6). The next step in the growth of firms is accessing capital markets.

Using a variety of methodologies and data sets in different countries, recent research has shown that improved financial market development is associated with growth. One of the reasons is that the financial sector channels funds from those with surplus funds, given their investment opportunities, to those with a deficit of funds (relative to opportunities) (Fisman and Love 2003: 354). Therefore, an economy with a well-developed financial sector will be able to allocate resources to businesses and projects that yield the highest returns. However, Fisman and Love (2003) found that firms in countries with less developed financial markets tend to use trade credit provided by their suppliers to finance growth. They also found that industries that are more dependent on trade credit financing grow relatively more rapidly in countries with less developed financial intermediaries. This implies that, as the financial sector develops, there is significant reduction in the use of trade credit. Trade credit is synonymous with lending goods which is less flexible than bank loans where one can obtain cash. This implies that even though trade credit can play a significant role in providing external finance to support the growth of firms, an effective formal financial system may be necessary to sustain long-run growth.

The level of a country's financial development is typically measured by the services provided by financial intermediaries, for example the size of banks to Gross Domestic Product (GDP), the size of equity to GDP and credit issued to private firms (Ge and Qiu 2007: 513). Rajan and Zingales (1998) found that firms in industrial sectors with a greater need for external finance grow faster in countries with well-developed financial markets. However, they also raise an important question: in countries with a poorly developed financial system, how do firms finance their growth opportunities? Firms in China, the largest developing country with a rapidly growing economy but a poorly developed formal financial system use informal financial channels to finance their growth (Ge and Qiu 2007: 513). More specifically, Ge and Qiu (2007) compared the

use of trade credit between non-state- and state-owned firms and found that in a country with a poorly developed formal financial sector, firms can support their growth through non-formal financial channels that largely rely on implicit contractual relationships. This raises the question of whether firms have been substituting financing using implicit contractual relationships such as trade credit with bank credit as the financial sector has grown over time.

It should be noted that as economies develop, both banks and markets become larger relative to the size of the overall economy (Cull *et al.* 2013: 23). Improvements in banks' screening procedures increase capital market investors' confidence in the quality of securitized borrowers, which stimulates better informed trading in the capital market and thus capital market evolution (Cull *et al.* 2013: 23).

Hassan, Sanchez and Yu (2011) found a positive relationship between financial development and economic growth in developing countries. It should be noted that financial intermediation mobilizes savings, allocates resources, diversifies risks, and contributes to economic growth. It promotes growth because it enables a higher rate of return on capital. In turn, growth provides the means to implement costly financial structures (Greenwood and Jovanovic 1989: 146). Emerging evidence suggests that both the level of banking and the development of the stock market have a causal impact on economic growth (Beck, Demirgüç-Kunt and Levine 2000: 597).

Definition of terms

Trade credit refers to supplying goods to another company for payment at a later date and is usually used to complement lending by financial institutions. Firms use suppliers instead of banks for short term financing. In general companies tend to use trade finance when there are no bank loans or when they do not have access to such loans and other financial institutions.

The **financial sector** consists of institutions, instruments; markets and the regulatory framework that enable the offering of credit. There is no universal measure of financial sector development; therefore, several proxies are used, including the depth, size,

access, and soundness of the financial system. A measure of financial development can be obtained by examining the performance and activities of the financial markets, banks, bond markets and financial institutions (Adnan (2011). The World Bank's Global Financial Development Database was used to obtain proxies such as bank concentration (%), bank credit to bank deposits (%), bank deposits to GDP, liquid liabilities assets to GDP (%), stock market capitalization to GDP, stock market value traded to GDP and stock market turnover ratio.

1.3. BRICS countries

Except for Russia, the BRICS countries' engagement is founded on mutual benefits, with a focus on cooperation and promoting trade and investment, and other commercial activities (Mwase and Yang 2012). The common denominators amongst these countries are their large, relatively fast-growing economies and their significance in regional and international affairs. During the political, economic and financial turbulence that plagued the world in past decades, the BRICS countries appeared as pillars of relative political stability and economic prosperity (Chittedi 2010: 4). Globalisation renders financial sector development of interest since integration means that the recent global financial crises have affected numerous economies.

Financing working capital is an important issue for financial managers. This study on financial sector development and trade credit will thus provide knowledge for effective management of working capital. The BRICS group is well organized and committed to reforming their financial sectors (Chittedi 2010: 5). They are also committed to financial sector development, which renders this study a timely one because of the recent establishment of BRICS' New Development Bank. Financial sector development is crucial because it has a strong bearing on the BRICS countries' overall economic performance. Information on economic performance is of interest to scholars, banks, mutual organizations, importers, foreign exchange traders, rating agencies, portfolio managers, and institutional investors and so on (see, for instance, O'Neill 2005). BRICS countries are promoting trade and investment amongst the group and there has been an increase in intra-foreign direct investment (FDI). These countries hold more than 30% of global financial reserves, and have witnessed a

threefold increase in FDI among themselves (Wilson, Purushothaman and Goldman 2003: 79). Mergers and acquisitions amongst companies in the BRICS group will gain from this study as trade credit affects firm value and firms with subsidiaries in different countries need to understand how working capital is financed in the respective countries. Investors that are keen to invest in firms listed on BRICS stock exchanges also need to understand how these firms are funded. Moreover, with the BRICS countries reforming their financial regulations and policies in order to attract foreign portfolio flows and contribute to their stock market and banking sector development, there has been a fundamental shift in the financial structures of these countries and capital flows from developed nations (Chittedi 2010: 21).

Given this background, the five BRICS nations were selected for an empirical investigation of financial sector development and trade credit use. This was motivated by the fact that these countries have shown interest in promoting financial development by, for instance, reducing governmental intervention in national financial sectors, privatizing banks, and enhancing market capitalization and so on. The BRICS countries launched the New Development Bank (NDB) in 2015 to mobilize resources for development projects; this is an important step in coordinating development within member countries. The objectives of the multilateral bank can be better achieved if all members achieve financial sector development. Whilst financial sector development promotes growth, it is not known how it impacts on trade credit use, an important component of working capital financial management; hence the need for this study.

1.4. Problem Statement

A customer faces significant late payment penalties including the implicit cost of damaging a critical long-term relationship as well as explicit and significant pecuniary penalties (Petersen and Rajan 1994a: 3). Petersen and Rajan (1997) found that trade credit is an expensive substitute for institutional funding when the latter is unavailable. If firms have easy access to other sources of finance, they will probably not use large amounts of trade credit if it is expensive. Petersen and Rajan (1997) state that missing early payment discounts is expensive and that the decision to take advantage of such

discounts is driven not by the implicit cost of this credit but instead by whether the firm has an alternative source. Using a set of survey data, Ng, Smith and Smith (1999) concluded that the implicit interest on trade credit is high. Yang and Birge (2013) also allude to the fact that the implicit interest on common trade credit terms is surprisingly high. Despite operating in a country with a well-developed financial sector and having increased access to finance, firms in South Africa's formal sector still use significant trade credit. According to Kwenda and Holden (2013), approximately half of the country's listed firms' current assets were financed by trade credit. Trade credit has high implicit costs and previous studies support the view that firms use such credit when bank loans are unavailable. A study in China by Du, Lu and Tao (2012) shows that a country with a poorly developed financial sector can support growth through non-financial channels such as trade credit. Firms are still using trade credit to finance their working capital requirements at a higher cost than bank loans which may be considerably cheaper in a country with a relatively developed financial sector like South Africa. A study by Kwenda and Holden (2013) on firms listed on the Johannesburg Stock Exchange (JSE) revealed that they depend heavily on trade credit as a source of short term finance. This is puzzling considering its high implicit cost and the level of financial sector development. This raises the question: What is the relationship between financial sector development and the use of trade credit?

Firms in countries with well-developed financial sectors such as South Africa employ a lot of trade credit despite the fact that it should be playing a diminishing role. The question is whether the use of trade credit has any relationship with the state of development of the country's financial sector. Despite the development of the financial sector and increased access to finance, firms in the formal sector in South Africa still employ significantly more trade credit than those in other countries with under-developed financial sectors.

1.5. Aim of the study

The aim of the research is to:

- Investigate the relationship between financial sector development and trade credit and develop a trade credit model incorporating financial sector development.

1.6. Research objectives

This study investigates the impact of financial sector development on trade credit use amongst listed firms in BRICS countries, that is, firms listed on the BM&F Bovespa in Brazil, the Saint Petersburg Stock Exchange in Russia, the National Stock Exchange of India (NSE), the Shenzhen Stock Exchange in China and JSE in South Africa. Its objectives are to:

1. Examine the extent of trade credit usage in BRICS countries.
2. Determine whether listed firms in BRICS pursue a target trade credit policy.
3. Analyse financial sector development in BRICS countries.
4. Explore the relationship between trade credit and financial sector development in BRICS countries. This objective is broken down into two sub-objectives as follows:

   a) The relationship between banking sector development and trade credit use;

   b) The relationship between other measures of financial sector development and trade credit use.

1.7. Methodology

The research is a purely quantitative study which used econometric regressions to establish the effect of explanatory variables on the dependent variable. Panel data models were used to explain trade credit use and financial sector development.

1.8. Justification for the Study

BRICS countries are significant global economies that have enjoyed rapid growth. In 2003, before South Africa joined, the four BRIC countries collectively accounted for

more than a quarter of the world's land area, over 40% of its population and around 15% of global GDP. They were also deemed to be at a similar stage of newly advanced economic development (Wilson, Purushothaman and Goldman 2003: 77). However, they face important country-specific economic challenges. One is how to regulate their financial sectors to achieve the best possible economic growth. The opportunity for sustainable development provided by credit provision in the BRICS countries is huge; in 2012, their combined credit volumes exceeded US$13.8 trillion, roughly two-thirds of western European or North American credit volumes (World Wide Fund for Nature 2015). Traditionally, banks have been the main pillar of financial intermediation and, consequently, a fundamental source of systemic risk, which in its worst forms has resulted in financial crises. The implementation of Basel III which sets global regulatory standards regarding bank capital adequacy and liquidity renders this study crucial. Banks can fail not only due to credit losses, but also due to lack of liquidity to fund their operations. Unregulated non-financial companies provide credit to other firms through trade credit but are not included under Basel III. The fact that the banking sector is regulated may also give momentum to the rise of non-financial firms performing intermediary functions.

Increasing crossborder mergers and acquisitions (CBMAs) are an important channel for investment in emerging markets via FDI. This study will thus enable investors and FDI policy makers to understand how working capital financing operates in BRICS countries. It can be argued that intra-BRICS FDI will have a greater impact on productivity than FDI from developed countries (Gammeltoft 2008; Sane 2015). Investors in BRICS need to know how working capital is financed in the different countries considering the level of financial sector development and the implications for the return on their investments.

This study explored trade credit use in relation to financial sector development and developed an argument to manage trade credit, providing a basis for management practice. Halsey (2010) predicts that banks will play a reduced role in a recovered economy with supply-chain finance growing in popularity and use. The study provides a basis for firms to set their trade credit policies considering the level of financial sector development and how to amend policy in response to changes in such development. It adds the new dimension of financial sector development to existing trade credit

theory. Furthermore, the study provides evidence on the use of trade credit by firms in countries with developed financial sectors and those with less developed financial sectors and explains the hitherto unexplored relationship between trade credit use and financial sector development. Management must decide whether trade credit or bank loans are the best source of financing for working capital. The study provides the rationale for making this choice considering the level of financial sector development.

The cost differences between trade credit and bank loans, with the former having high implicit costs, and the use of these sources as working capital finance make this an important study because managers need to minimise the cost of capital and maximise returns. Trade credit and bank loans are important sources of finance which can be used to manage the growth of an enterprise; the study analysed trade credit and bank loans as sources of finance for organisational growth. The findings provide a basis for using both access to and provision of trade credit as business growth strategies. Financial sector development is very important; the research provides policy makers with information that will assist them to amend policy to improve financial sector development. The study investigated the impact of financial sector development on trade credit and assessed the relevance of trade credit theories for BRICS firms, thereby providing relevant findings that are applicable to local firms.

1.8.1. Context of the study

The BRICS countries' share of the global economy rose sharply from 8.2% in 2002 to 22.2% in 2015. The BRICS now represent two-thirds of the developing world's economy. Furthermore, these countries are committed to institutional building to deepen and sustain their co-operation; the study's findings on financial sector development could further this agenda. BRICS cooperation has resulted in increased trade, business and investment between member countries, with the BRICS Interbank Cooperation Mechanism playing an important role. From 2009 to 2015, trade between BRICS countries increased by 70%. Further increasing intra-BRICS trade will require financial sector development which will promote business growth in the respective countries.

1.9. Theory/practical problem from which the problem can be researched

Deloof and La Rocca (2015) confirm that local differences in banking development and small and medium enterprises' (SMEs) trade credit policy within countries matter. Cassia and Vismara (2009) state that, companies mainly obtain financing from suppliers when the prospects of obtaining such from banks are not particularly good, resulting in lower levels of local development in the banking system. Petersen and Rajan (1997) focused on small firms whose access to financial markets may be limited, mainly because they are not able to meet bank loan requirements. The study found that firms use more trade credit when credit is unavailable from financial institutions and banks are dominant institutions for corporate financing. Private firms in China grow rapidly with limited financing from banks; this suggests that firms in a country with poorly developed financial institutions fund their growth opportunities with trade credit (Ge and Qiu 2007: 514). However, Du, Lu and Tao (2012) found that access to bank loans is very important for company performance and growth and that trade credit cannot effectively substitute for bank credit in China. Burkart and Ellingsen (2004: 48) state that suppliers lend more generously than banks, and bank credit and trade credit can either complement each other or be substitutes. They also observe that trade credit is more prevalent in less developed financial markets. Bougheas, Mateut and Mizen (2009) argue that despite a firm having bank loans, inventories and sales will still be partly financed by trade credit. As noted earlier, non-state owned firms in China grow tremendously with limited support from banks (Ge and Qiu 2007: 514). However, Cull, Xu and Zhu (2009) study seems to contradict this conclusion as the accounts receivable to sales ratio for the firms in their sample is comparable to that in the US; this casts doubt on whether trade credit can account for more than a fraction of China's explosive growth.

1.10. Contribution to knowledge

The study explored trade credit use in relation to financial sector development and developed a theoretical model to manage trade credit as a basis for management practice. It provides a basis for firms to formulate their trade credit policies taking the level of financial sector development into account. The study adds the new dimension

of financial sector development to existing trade credit theories and provides a model to manage trade credit.

This study contributes to the discourse on short term financial management and financial sector development by analysing how they relate to each other, especially in emerging markets, an area that has not been explored before. Economies such as those of the BRICS countries are susceptible to rapidly changing financial sectors and products as well as financial upheavals. The global financial crisis reflects the growing interdependence of states and markets that cannot escape the linkages and spillovers of an integrated world economy. Working capital financing is crucial to the development and growth of business and trade credit is an important source of such finance.

The determinants of trade credit have been examined using time series analysis and panel data analysis (Bhole and Mahakud 2004: 11). However, previous studies have not incorporated the financial sector development variable. Financial development proxies such as bank concentration (%), bank credit to bank deposits (%), bank deposits to GDP, liquid liabilities assets to GDP (%), stock market capitalization to GDP, stock market value traded to GDP and stock market turnover ratio were used. The earlier literature proposes and tests the relationship between payables and receivables using the matching maturity hypothesis and the substitution hypothesis, respectively. The influence of financial sector development variables and the banking system on a firm's use of trade credit was also investigated. The examination of financial sector development's impact on the development of firms, and access to trade credit's influence on firm growth is the major contribution of this study. Trends and developments in financial sector development and trade credit in BRICS countries which have not been studied before provided empirical evidence. The findings are applicable to BRICS countries and other emerging economies. A theoretical model was developed to manage trade credit, providing a basis for management practice. The study adds the new dimension of financial sector development to existing trade credit theory and provides a model to manage trade credit in developing financial markets.

1.11 Brief Literature Review

Firms in countries with less developed financial sectors substitute bank credit with informal credit provided by their suppliers to finance growth. Fisman and Love (2003) found that industries that are more dependent on trade credit financing grow relatively more rapidly in countries with less developed financial intermediaries. Trade credit is a key source of working capital finance for firms in countries with under-developed financial sectors. Ferrando and Mulier (2013) show that, firms use the trade credit channel to manage growth and that, overall conditions in the financial market matter. During the financial crisis from mid-2009, there was increased use of trade credit, meant to compensate the decline in short-term bank loans (Ferrando and Mulier 2013: 2). Provision of trade credit complements the development of financial institutions at country level (Deloof and La Rocca 2015). Firms in countries with large, privately-owned banking systems offer more trade credit to their customers and accept more financing from them, suggesting that trade credit complements lending by financial institutions and should not be viewed as a funding substitute (Demirgüç-Kunt and Maksimovic 2001: 3).

While trade credit is widely used by small firms experiencing a decline in loan facilities, surprisingly, large firms increase their use of trade credit despite having access to other forms of credit. The reasons are financial in nature (Nilsen 1999: 2). The development of provincial banking in Italy led to increased provision of trade credit by SMEs and stimulated the redistribution of loans via trade credit (Deloof and La Rocca 2012: 3). Deloof and La Rocca (2015) confirm that local differences in banking development and SMEs' trade credit policy within countries matter. Local banking development, which is the main dimension of local financial development, stimulates product innovation and research as well as development expenditure and reduces financial constraints (Benfratello, Schiantarelli and Sembenelli 2008: 23). Provision of trade credit thus complements the development of financial institutions at country level (Deloof and La Rocca 2015: 2). Severin, Alphonse and Ducret (2004) provide new evidence on the role of trade credit as a substitute for bank loans. Furthermore, bank loans reduce the amount of trade credit a firm uses. Several studies have found that

in institutional environments where access to formal finance is limited, firms with better access to credit redistribute capital via trade credit to customers that are financially weaker (McMillan and Woodruff 1999; Demirguc-Kunt and Maksimovic 2001; Fisman and Love 2003; Cull, Xu and Zhu 2009).

Less financial sector development in a country results in firms being more likely to resort to trade credit, which is necessitated by the unavailability of bank credit. Private firms in China grow rapidly with limited financing from banks; this shows how firms in a country with poorly developed financial institutions fund growth opportunities (Ge and Qiu (2007). Ge and Qiu (2007) state that, this suggests that, in a country with a poorly developed formal financial sector, firms can support their growth through trade credit. Ge and Qiu's (2007) study focused on state and non-state owned firms. The differences in practices are mostly attributable to the differences between the two sectors. The study did not evaluate financial sector development and concluded that trade credit cannot substitute for a formal financial system, a subject the authors suggested required further investigation. Where the financial sector is underdeveloped, firms use informal sources of finance for their operations and expansion (Du, Lu and Tao 2012: 3). Du, Lu and Tao (2012) study investigated related factors which can influence the choice of bank loans or trade credit, focusing on firm performance and growth. They found that changes in the financial sector had minimal effect on the supply of bank loans. Petersen and Rajan (1997) observe that small firms might have limited access to capital and will thus tend to use trade credit instead of financial institutions. Furthermore, firms with better access to credit will give trade credit to their customers.

Firms in countries with under-developed financial sectors use informal credit provided by their suppliers to finance growth. Fisman and Love (2003) found that industries that are more dependent on trade credit financing grow relatively more rapidly in countries with less developed financial intermediaries. The implication is that as a country's financial sector develops, firms should substitute trade credit provided by their suppliers with bank credit. The decision to extend trade credit is also affected by other factors such as product quality. A firm's credit policy and investment in the buyer-seller relationship also determine the use of trade credit (Ng, Smith and Smith 1999: 12). A supplier may have an advantage over traditional lenders in investigating the credit

worthiness of its clients, as well as superior ability to monitor and enforce repayment (Petersen and Rajan 1997: 662).

The use of trade credit may reduce transaction costs. Instead of paying bills every time goods are delivered, a buyer might accumulate obligations and pay monthly or quarterly (Petersen and Rajan 1997: 663). The financial motive for using trade credit implies that it is a highly unattractive substitute for bank loans because it is tied to the purchase of goods, while loans may be unrestricted (Nilsen 1999: 2). Thus, improved access to bank credit due to financial sector development would mean that firms reduce the amount of trade credit used to finance their working capital. Another reason for using trade credit could be a matching approach whereby a firm finances short-term needs with short-term funds and long-term needs with long-term funds (Deloof and Jegers 1999: 946). Previous studies have not incorporated the financial sector development variable in their analysis and did not test whether the development of the financial sector over time has an impact on the receipt and extension of trade credit.

1.12 Trade Credit Theories

1.12.1. The substitution hypothesis

Trade credit can help firms to overcome the challenges presented by poorly developed or underdeveloped financial sectors (Danielson and Scott 2004: 580) and the non-availability of bank finance (Fisman and Love 2003: 355). The substitution hypothesis states that trade credit is a substitute for bank credit (Burkart and Ellingsen 2004: 570). If this theory holds, the expectation would be that in countries with developed financial sectors, firms have low trade credit usage compared with those in countries with poorly-developed financial sectors. If a firm faces cash flow constraints because bank loans are not available, it could respond by delaying some trade credit payments (Danielson and Scott 2004: 581). As a firm's trade credit payments slow, a greater portion of its working capital will be financed with trade credit and, in extreme cases, delayed trade credit payments could help fund capital investment (Danielson and Scott 2004: 580).

1.12.2. Product quality guarantee theory

As argued by Smith (1987) and Long, Malitz and Ravid (1993), trade credit allows a firm to verify product quality before paying. Long, Malitz and Ravid (1993) developed a model of trade credit in which asymmetric information leads sound firms to extend trade credit so that buyers can verify product quality before payment, while firms producing low-quality goods will sell for cash. The credit period enables buyers to reduce uncertainty in relation to product quality prior to payment (Pike *et al.* 2005: 213).

1.12.3. Financing advantage theories of trade credit

Emery (1984) suggests that differences between the market borrowing and market lending rates of interest provide a financial incentive for suppliers to engage in arbitrage, using surplus funds to finance customer purchases, rather than earning interest on the market. Suppliers may have an advantage over traditional lenders in investigating the credit worthiness of their clients, as well as superior ability to monitor and enforce repayment (Petersen and Rajan 1997: 663). It is typically less profitable for an opportunistic borrower to divert inputs than to divert cash (Burkart and Ellingsen 2004: 571).

1.12.4. Informational Asymmetry theory

Trade credit terms implicitly result in high interest rates that are an efficient screening device in intermediate goods markets when information about a buyer's default risk is asymmetric. By offering trade credit, a seller can identify prospective defaulters more quickly than if financial institutions were the sole providers of short-term financing (Smith 1987: 864). The main determinant of trade credit is asymmetric information between buyers and sellers and offering delayed payment guarantees product quality (Ng, Smith and Smith 1999: 1109). Asymmetric information between banks and firms can preclude financing of valuable projects while trade credit addresses this problem by incorporating private information held by suppliers about their customers in the lending relationship (Biais and Gollier 1997: 778).

1.12.5. The price discrimination theory

Trade credit can also be used to price discriminate. This theory was put forward by Nadiri (1969) who stated that in highly competitive markets, suppliers compete for customers using factors other than price. Trade credit may be offered even if the supplier does not have a financing advantage over financial institutions because he/she can charge different customers different prices (Petersen and Rajan 1997: 565).

Trade credit may allow suppliers to price discriminate using credit when direct discrimination through prices is not legally permissible (Petersen and Rajan 1997: 564). However, Burkart and Ellingsen (2004) argued that price discrimination theories cannot account for trade credit in competitive markets.

1.12.6. Signalling theory of trade credit

This theory holds that financial institutions observe a firm's access to and use of trade credit and use this information to judge its creditworthiness. Trade credit extension may be a means of signaling financial health and reputation and increasing sales (Wilson and Summers 2002: 318). Sellers extend trade credit to their customers only if they have received a good signal, and the positive message conveyed by the availability of trade credit induces the bank to also lend (Biais and Gollier 1997: 904). If the signaling theory holds, it could be argued that firms use trade credit to improve their access to bank finance, which implies that trade credit usage is reduced once a firm gains access to bank credit.

1.12.7. Transactions costs theories

Trade credit may reduce the transaction costs of paying bills by not paying them every time goods are delivered. A buyer might wish to accumulate obligations and pay them monthly or quarterly (Petersen and Rajan 1997: 566). The matching principle of finance states that short-term assets should be financed with short-term liabilities and long-term assets with long-term liabilities (Guin 2011: 41). A firm's current assets (CA)

and current liabilities (CL) are short-term assets and short-term financing, respectively; the matching principle implies that a firm's current assets should equal its current liabilities (Fosberg 2012: 87). If, however, a firm is managing its liquidity position well, it will tend to maintain more current assets than current liabilities.

1.13. Research Design

The study used mathematical modelling and regression analysis to establish the effect of explanatory variables on the dependent variable. Panel data allows for control of variables one cannot observe or measure like cultural factors; differences in business practices across companies; or variables that change over time but not across entities. Econometric models are statistical models used in finance economics research. An econometric model specifies the statistical relationship that is considered to hold between the various economic factors relevant to a distinct economic phenomenon. Panel data analysis is a statistical method that is extensively used in the social sciences and econometrics, which deals with cross sectional/times series panel data. The data for this study was collected over time across the same individual firms, mainly in relation to receivables and payables. The study focused on the BRICS countries. This method was used because it allows for multi-dimensional analysis. Panel data analysis has independently pooled panels, random effects models and fixed effects models. Panel data is a longitudinal dataset in which the behaviour of entities is observed across time. The research involved analysing financial sector development using a number of proxies and the behaviour of trade credit over time which made econometrics the most appropriate approach.

1.14. Methodology

The study used panel data models to identify the major determinants of demand for and supply of trade credit. Previous studies have not incorporated the financial sector development variable. Panel data usually contains more degrees of freedom and has more sample variability and less collinearity among variables than cross-sectional data, hence improving the efficiency of econometric estimates (Hsiao (2014) Baltagi

(2008). Panel data allows for controlling for individual heterogeneity; the study required that firms or countries are heterogeneous and time series and cross section studies do not control for this risk. However, panel data is not a panacea and cannot solve all the problems that a time series or cross section study could not handle (Baltagi (2008). Nonetheless, it provides a number of data points and longitudinal data allows the researcher to analyse a number of economic questions that cannot be addressed using cross sectional or time series data sets (Hsiao (2014). With panel data, one is better able to study the dynamics of adjustment (Baltagi (2008). It is also suited to studying the duration of economic states such as financial sector development and if the panels are long enough, they shed more light on the speed of economic policy changes (Baltagi (2008). In the presence of individual, specific fixed effects or serial correlation in the disturbances, the t statistic converges to a non-central normal distribution, with substantial impact on the size of the unit root test (Levin, Lin and Chu (2002). Since actual panel data has a wide variety of cross-section and time series dimensions, a Monte Carlo Simulation can be used to measure the extent to which these asymptotic results provide useful approximation for testing panel data of various finite dimensions (Levin, Lin and Chu (2002).

1.14.1. Model Specification

Panel data models provided information on trade credit behaviour, both across the BRICS countries and over time. They contain observations of multiple phenomena, in this case receivables and payables obtained over multiple time periods for the same firms. A number of financial sector development variables were used. Panel data analysis is suitable because it can be used to analyse data over a long period and can also show the country effect.

The dependent variable in the model is trade credit. Trade credit consists of both trade payables and trade receivables as a ratio of total assets. The financial sector development variables such as size of banks, stock markets and money market are used as independent variables. The direction of causality between financial sector development and trade credit is tested using granger causality.

1.15. Financial Sector Development

Financial development can be measured by a number of proxies including the depth, size, access, and soundness of a financial system. A measure of financial development can be obtained by examining the performance and activities of the financial markets, banks, bond markets and financial institutions (Adnan (2011). This research focused on the banking system, stock market and the money market. The banking system is very important as it complements trade credit and also because banks are the fulcrum of the financial system (Lynch (1996). The World Bank's Global Financial Development Database was used to obtain proxies such as bank concentration (%), Bank credit to bank deposits (%), Bank deposits to GDP, and Central bank assets to GDP (%). The research period was from 2001 to 2013. The database includes measures of size of financial institutions and markets, the degree to which individuals can and do use financial services (access), the efficiency of financial intermediaries and markets in intermediating resources and facilitating financial transactions (efficiency), and the stability of financial institutions and markets.

Trade credit was represented by Receivables/Total Sales and Trade Payable/Cost of Sales or the ratio of Trade Payables to Total Current Liabilities. Financial sector development proxies were bank concentration (%), Bank credit to bank deposits (%), Bank deposits to GDP, Liquid liabilities to GDP, Stock market capitalisation to GDP, and Credit to private sector to GDP (%).

1.16. Population/target population

The population refers to all firms listed on the JSE (a total of 394), 275 Russian companies listed on the St Petersburg Exchange, 1 319 firms listed on the NSE of India, 366 listed on the BM&F Bovespa of Brazil and 1 799 firms listed on the Shenzhen Stock Exchange of China. The sample consisted of all non-financial firms

listed on these stock exchanges. These firms are truly representative as they include the entire population of interest.

Table 1 BRICS stock exchanges, population and sample

Country	Stock Exchange	Population	Sample
Brazil	BM&F Bovespa	366	347
Russia	St Petersburg Exchange	275	122
India	National Stock Exchange	1319	983
China	Shenzhen	1799	1652
South Africa	Johannesburg Stock Exchange	394	249

Source: Own Construct

1.17. Sampling method

The empirical study is based on a sample of non-financial services listed firms in BRICS countries. Data were collected from their published financial statements for the accounting period 2001 to 2013. These were sourced from the Bloomberg online database which provides financial statements for firms listed on the world's stock exchanges.

All the non-financial firms were drawn from each stock exchange and the firms were followed for a period of 13 years from 2001-2013. Firms with data for at least five years were selected whilst those with data for less than five years were left out. Financial firms were excluded because they are part of the financial sector which acts as intermediaries and provides finance to non-financial firms. The concept of working capital does not apply to banks since financial institutions do not have typical current assets and liabilities such as inventories and accounts payable (Blokhin 2015).

1.18. Measuring instrument

The study is purely a quantitative study which employs econometric techniques to assess the trends in financial sector development and trade credit in BRICS countries. The relationship between financial sector development and trade credit is measured

with pairwise correlation. General methods of moments (GMM) and Granger causality are the panel data techniques used to estimate the direction of causality.

1.18.2. Methodology for objectives 1 and 2

Financial sector development data was collected from World Bank databases and other sources whilst trade credit was gathered from published financial statements and other sources. Data was collected from all BRICS non-financial listed companies' published financial statements in various industrial sectors for the period 2001-2013 and was analysed using descriptive statistics and trend analysis. A country mean was computed and then aggregated to establish the trend. The main aim of the analysis was to reveal and clarify trends in financial sector development and trade credit usage in BRICS countries. A comparative analysis of trade credit use and financial sector development amongst these countries was carried out separately and the data were presented using bar and line graphs.

1.18.3. Objective 3

The model used to investigate the impact of financial sector development on trade credit usage follows Bhole and Mahakud (2004) and the dynamic approach to analysing trade credit in corporate financing adopted by (Kwenda and Holden 2014). The generalized method of moments (GMM) estimation technique is used to control for unobservable heterogeneity and potential endogeneity problems. Firms have a target level of accounts payable and internally-generated resources, investment opportunities and short-term financial debt play an important role in the use of trade credit as a short-term source of financing among listed companies (Kwenda and Holden 2014). It was assumed that firms adjust towards their desired level of accounts payable. The adjustment process from real to desired levels of accounts payable involves time and costs.

$$tpta_{it} = \alpha + \sum_{k} \delta_k X_{kit} + v_{it}$$

where $tpta$ is trade credit to total assets (accounts payable level); firms are represented by subscript i = 1, …, N; time t = 1, … T; X_{it} is a k × 1 vector of explanatory

variables; δ_k is a vector of the unknown parameters to estimated; and v_{it} the random disturbance. It is then assumed that firms adjust their $tpta$ level according to the degrees of adjustment λ in order to reach their target level.

1.18.4. Objective 4

Causality between trade credit and financial sector development is then tested using Granger causality developed by Granger (1969) following the modifications of Abrigo and Love (2015) who adjusted the model for panel data. The panel vector autoregression model is estimated by fitting a multivariate panel regression of each dependent variable on lags of itself, lags of all other dependent variables and exogenous variables, if any. The estimation is by GMM. Joint estimation of the system of equations makes cross-equation hypothesis testing straightforward. Wald tests regarding the parameters may be implemented based on the GMM estimate and its covariance matrix. Granger causality tests, with the hypothesis that all coefficients on the lag of variable are jointly zero in the equation for variable, may likewise be carried out using this test (Abrigo and Love 2015).

1.19. Scope of the study

The study uses listed firms in BRICS countries. It is assumed that listed firms have better access to financial markets therefore are in a better position to take advantage of financial sector development.

The relevant exchanges are the BM&F Bovespa for Brazil, the Saint Petersburg Stock Exchange for Russia, the NSE of India, the Shenzhen Stock Exchange for China, and the JSE for South Africa. Financial sector development variables are available on the World Bank's Global Financial Development Database.

1.20. Limitations of the Study

Data from published financial statements is used whose quality the researcher has no control over. The study makes use of only published financial statements which are subject to manipulation; although there is standardisation by Bloomberg it is not 100% perfect. In some countries, for example, accounting standards have been shaped primarily by the needs of private creditors, while in others the needs of the tax authorities or central planners have been the predominant influence. Audit requirements may not be sufficiently developed in some countries to provide the level of enhanced reliability that is obtainable in other countries.

1.21. Specification Tests for Panel Analysis

Validity was ensured by specification tests of regression equations. Specification tests can be used to test whether models are correctly specified. Validity and reliability are important because the regression model must have goodness of fit, theoretical consistency and predictive power. The models were tested for appropriateness of panel methods. Specification tests for strict exogeneity were carried out as well as a test for serial correlation in the idiosyncratic errors.

1.22. Anonymity and confidentiality

Only secondary data were used. The empirical study is based on a sample of all non-financial services listed firms in BRICS countries. Data was collected from their financial statements for the accounting period 2001 to 2013. These are available on the Bloomberg online database, which provides financial statements for firms listed on the various world stock exchanges. The financial sector development variables were sourced from the World Bank Global Financial Development Database; the November 2015 report with annual figures up to 2013 was used.

1.23. Ethical considerations

No human subjects participated in this study; only secondary data was used from published financial statements.

1.24. Summary and Structure of the study

The chapter introduced the study by defining key concepts and stating the objectives, methodology and brief literature review. The BRICS countries overview and why these countries have been selected have been explained. Model specifications and specifications tests have also been covered. The chapter justifies the need for the study, the problem statement and the contribution to knowledge amongst other aspects.

Chapter One introduces the study, presents the background and outlines the theoretical background and problem statement. It provides a brief literature review and explanation of the methodology used. The need to investigate trade credit use and financial sector development is demonstrated. Both the theoretical framework and the discussion demonstrate the need for this research.

Chapter Two analyses trends in financial sector development in BRICS. The history and evolution of such development is discussed, and the variables used to measure it are explained. A review of the literature on financial sector development is followed by a discussion of the methodology and data presentation and analysis. The empirical findings on financial sector development are used to create an index of financial sector development through principal component analysis. A measure of financial sector development is developed that incorporates both financial intermediaries and financial markets.

Chapter Three analyses trade credit usage by listed firms in BRICS. It begins with an outline of the history and evolution of trade credit as well as previous literature on this subject. The methodology is discussed, and the data is presented and analysed, as well as the findings. Regressions are carried out and specifications tests for model selection are delineated. This is followed by an empirical investigation of trade credit targeting in BRICS to investigate the respective trade credit policies set by firms. The

chapter outlines and explains trade credit practices and trends among firms in BRICS. It concludes with the finding that trade credit is important and is used by all firms across BRICS.

Chapter Four builds on the analysis presented in Chapters Two and Three and tests the impact of banking sector development on trade credit use by firms. It sheds additional light on the issue of whether banking sector development can be used to predict trade credit use by firms or whether trade credit can be used to predict banking sector development in a country. The results presented in this chapter unequivocally point to the conclusion that trade credit use by firms has an impact on banking sector development. Trade credit "Granger-causes" banking sector development, whilst banking sector development does not "Granger-cause" trade credit use by firms. The findings emphasize the wisdom of considering banking sector development when formulating trade credit policies.

Chapter Five examines the role of financial sector development in the choice of trade credit as a source of financing working capital. The analysis also demonstrates that trade credit is important in predicting the level of financial sector development in a country. Trade credit "Granger-causes" financial sector development, whilst financial sector development does not "Granger-cause" trade credit use by firms.

Chapter Six presents overall conclusions, the study's contribution to knowledge and suggestions for further research. It argues that trade credit use by firms has a significant impact on financial sector development as it competes with the latter in performing an intermediating function. The study does not find evidence that firms in countries with poorly developed financial sectors use more trade credit than those in countries with developed financial sectors.

CHAPTER 2: FINANCIAL SECTOR DEVELOPMENT IN BRICS

2.1. Introduction

The financial sector plays a very important role in financing firms. Finance managers need to understand the level of financial sector development as this has a bearing on the firm's access to capital. Raising funds requires in-depth knowledge of both money and capital markets. The cost of capital used to evaluate investment decisions includes parameters such as interest rates that are largely influenced by financial sector development. It should be highlighted that an under-developed financial sector results in high demand for capital relative to supply which pushes the price of capital up. On the other hand, a more developed financial sector can result in high supply of capital relative to demand; therefore, the price of capital will be lower. A finance manager thus needs to be aware of the firm's level of access to capital markets and ensure that it is well-funded with the required working capital at optimal cost, i.e., neither too high nor too low. After determining the firm's short-term assets requirements and its specific components, the financial manager must decide how to finance these current assets. This chapter consists of two sections. The first examines the history of the financial sector and its evolution as well as theories of financial intermediation and overview of BRICS countries' financial sector development literature review. The second section discusses the methodology, presents and analyses the data and provides a conclusion.

2.2. Financial intermediaries and financial markets

Financial intermediation is the use of a financial institution to allocate funds between borrowers and lenders. This enables pooling of risk and information costs, and an efficient means of payment (Di Matteo and Redish 2015: 1). The financial sector consists of institutions, instruments, markets and a regulatory framework that enable credit to be offered. It is made up of two components, financial intermediaries and financial markets. Financial intermediaries are firms that mobilise surplus funds in the economy and lend to companies that require resources for investment.

While financial institutions' investors do not contract with firms, in contrast, in financial markets, investors contract directly with firms, thereby creating marketable securities (Gorton and Winton 2003: 3). Banks have existed since ancient times, taking deposits from households and making loans to economic agents requiring capital. The prices of securities are observable, while financial intermediaries are opaque. Bank loans are the predominant source of external funding in all countries and capital markets are insignificant in most (Gorton and Winton 2003: 4). Countries with poorly developed financial markets usually have small stock markets.

Intermediation develops as a response to costly market imperfections (Campbel and Kracaw 1980: 863). The intermediary's function is to achieve economies of scale in transactions costs, protect confidentiality and produce information (Campbel and Kracaw 1980: 863). Financial systems facilitate pooling, or the aggregation of household wealth to fund indivisible or efficient-scale enterprises (Sirri and Tufano 1995: 81). If aggregate wealth were not pooled to fund enterprises, firm size would be constrained by the wealth under the control of a single household (Temin 2004: 11). Pooling relieves society of this limitation, bridging firms' capital needs and households' investment ones (Sirri and Tufano 1995: 88; Temin 2004).

The financial system provides price information that helps to coordinate decentralized decision-making in various sectors of the economy (Merton 1995: 55). It offers a way to deal with asymmetric information and incentive problems when one party to a financial transaction has information that the other lacks (Merton 1995: 55). A financial system provides a means to transfer economic resources over time and across geographic regions and industries (Merton 1995) It also offers a way to manage uncertainty and control risk (Merton 1995: 56). Financial markets have only become major players more recently and only in a few countries, primarily the UK and the US (Allen and Santomero 1997: 1461) Theoretical and empirical studies have found that a well-developed financial system is beneficial to the economy as a whole (Scholtens and Van Wensveen 2000: 1243).

The financial system transfers funds from savers to borrowers, both households and corporates. To do so, it must pool funds, and screen and monitor borrowers (Philippon 2015: 3).. The financial sector provides a means of payments, easing the exchange of goods and services. The functions of the financial system include providing insurance (diversification, risk management) and information (trading in secondary markets) (Philippon 2015: 3).

2.3. History of the Financial Sector

2.3.1 History of banking

In early civilizations a temple was considered the safest refuge. It was a solid building, constantly attended, with a sacred character which itself might deter thieves (Gascoigne 2001). In Egypt and Mesopotamia gold was deposited in temples for safe-keeping. It lay idle, while others in the trading community or in government had desperate need of it. The idea of banks began as long ago as 1800 BC in Babylon at the time of Hammurabi. There are records of loans made by the priests of the temple during these times and moneylenders also made loans. In Greece and Rome, banks made loans and accepted deposits. They also changed money. In the Bible, Jesus famously drove the money changers out of the temple in Jerusalem. However, with the collapse of the Roman Empire, trade slumped, and banks temporarily vanished. Banking began to revive again in the 12th and 13th centuries in the Italian towns of Florence and Genoa (Lambert 2014).

In the 16th century a German family called the Fuggers from Augsburg became very important bankers. In England, banks developed in the 17th century. People also sometimes deposited their money with goldsmiths for safety. The goldsmith issued a note promising to pay the bearer a certain sum on demand. In time people began to exchange these notes instead of coins because it was easier and safer. Goldsmiths began to lend the money deposited with them in return for a high rate of interest. They also paid interest to people who deposited money in order to attract their savings. However, not only individuals borrowed money. Governments also needed to borrow, especially in wartime. The government borrowed money from wealthy individuals and later repaid them with interest from taxes collected (Lambert 2014).

2.3.2 History of Stock Markets

Stock markets started when countries in the New World began trading with each other (Bramble 2016). While many pioneer merchants wanted to start huge businesses, this required substantial amounts of capital that no single merchant could raise alone. As a result, groups of investors pooled their savings and became business partners and co-owners with individual shares in their businesses to form joint-stock companies. Originated by the Dutch, joint-stock companies became a viable business model for many struggling businesses. In 1602, the Dutch East India Company issued the first paper shares. This exchangeable medium allowed shareholder to conveniently buy, sell and trade their stock with other shareholders and investors.

The idea was so successful that the selling of shares spread to other maritime powers such as Portugal, Spain and France. Eventually, the practice found its way to England (Bramble 2016). Trade with the New World was big business and trading ventures were initiated. During the Industrial Revolution, other industries began using this idea to generate start-up capital. The influx of capital allowed for the discovery and development of the New World and for the growth of modern industrialized manufacturing.

As the volume of shares increased, there was a need for an organized marketplace to exchange them. Stock traders decided to meet at a London coffeehouse, which they used as a marketplace. Eventually, they took over the coffeehouse and, in 1773, changed its name to the "stock exchange." Thus, the first exchange, the London Stock Exchange, was founded. The idea made its way to the American colonies with an exchange started in Philadelphia in 1790 (Bramble 2016). The merchants of Venice were credited with trading government securities as early as the 13th century (Ali 2016). Soon after, bankers in the nearby Italian cities of Pisa, Verona, Genoa, and Florence also began trading government securities (Ali 2016).

2.4. Evolution of the financial sector

The traditional banking business of accepting deposits and making loans has declined significantly in the US in recent years (Allen and Santomero 1997: 1462). There has been a switch from directly held assets to pension funds and mutual funds. However, banks have maintained their position relative to GDP by innovating and switching to fee-producing activities. The decline in traditional banking business and the financial innovation undertaken by banks in the US is interpreted as a response to competition from financial markets (Allen and Santomero 1997: 1461).

Brealey, Leland and Pyle (1977) suggest that an intermediary can signal its informed status by investing its wealth in assets about which it has special knowledge. Diamond (1984) argued that intermediaries overcome asymmetric information problems by acting as delegated monitors. There has been extensive financial innovation, including the introduction of new financial products such as derivative instruments like swaps and options. This increase in the breadth and depth of financial markets is the result of increased use of these instruments by financial intermediaries and firms. The share of assets held by banks and insurance companies has fallen, while mutual funds and pension funds have dramatically increased in size. Traditional intermediaries have declined in importance even as the sector itself has been expanding (Allen and Santomero 1997: 1463).

Traditional theories of intermediation are based on transaction costs and asymmetric information. They are designed to account for institutions which take deposits or issue insurance policies and channel funds to firms. However, in recent decades there have been significant changes. Although transaction costs and asymmetric information have declined, intermediation has increased. New markets for financial futures and options are mainly markets for intermediaries rather than individuals or firms (Allen and Santomero 1997: 1463).

The financial intermediary never holds sufficient balances to guarantee full withdrawals, a condition that exposes it to potential runs (Cetorelli, Mandel and Mollineaux 2012: 2). The investments of intermediaries are naturally opaque; it is difficult to distinguish the problems specific to one intermediary from those affecting

the industry, with the result that observation of distress at one entity could lead to runs on others. Hence, financial intermediation activity carries significant social risk: the potential for systemic disruptions (Cetorelli, Mandel and Mollineaux 2012: 3).

2.5. The concept of financial sector development

The financial sector consists of financial intermediaries and financial markets. Banks are financial intermediaries, whilst stock markets and money markets are financial markets. Financial sector development, which is broadly defined as an increase in the volume, quality and effectiveness of financial intermediary services, is a complex concept and is likely a crucial structure for long-term economic growth (Graff 2003: 48). Financial sector development starts with entrepreneurs utilising personal savings and those of friends and family for start-up ventures (Bonin and Wachtel 2003: 6). As firms grow, they turn to regular financial institutions for financing needs, starting with banks, whilst the next step is accessing capital markets (Bonin and Wachtel 2003: 6). The financial sector is a category of firms or institutions that provide financial services to commercial and retail customers. It includes banks, investment funds and insurance companies sometimes referred to as financial intermediaries. Banks are intermediaries between households with a surplus and those with deficits and the transfer of funds is for both consumption and investment purposes. The financial sector consists of institutions, instruments, markets and a regulatory framework that enable credit to be offered. Financial sector development is crucial because it has a strong bearing on the BRICS countries' overall economic performance. A financial system needs to be resilient to systemic shocks, facilitate efficient financial intermediation and mitigate the macroeconomic costs of disruptions in such a way that confidence is maintained in the system.

There is a growing body of evidence that the development of a country's financial sector greatly facilitates its growth (Rajan and Zingales 2003: 2). Financial development is considered by many economists to be of paramount importance for output growth (Christopoulos and Tsionas 2004: 55). Using a variety of methodologies and data sets in different countries, recent research has shown that improved financial sector development is associated with growth (Khan 2001; Hassan, Sanchez and Yu 2011; Zhang, Wang and Wang 2012; Greenwood, Sanchez and Wang 2013). One

of the reasons is that the financial sector serves to distribute funds from those with surplus capital and thus investment opportunities, to those with a deficit of funds (relative to opportunities) (Fisman and Love 2003: 354). Therefore, an economy with a well-developed financial sector will be able to allocate resources to businesses and projects that yield the highest returns. Financial sector development affects a firm's investment via its ability to obtain external finance and small firms are disproportionately more disadvantaged in less financially developed countries than large firms (Love 2003: 766). The financial sector plays a critical role in facilitating economic growth by mobilizing savings, facilitating payments and trading of goods and services, and promoting efficient allocation of resources. A well developed and robust financial system is a key factor in maintaining financial stability in an economy given that it reduces the risk in the real economy (Sehrawat *et al.* 2016: 579).

The level of a country's financial sector development is typically measured by the services provided by financial intermediaries, for example, the size of banks to GDP, the size of equity to GDP and credit issued to private firms (Ge and Qiu 2007: 514). Rajan and Zingales (1998) found that firms in industrial sectors with a greater need for external finance grow faster in countries with well-developed financial markets. It should be noted that financial intermediation mobilizes savings, allocates resources, diversifies risks, and contributes to economic growth. It promotes growth because it enables a higher rate of return on capital. In turn, economic growth provides resources to assist financial sector development (Greenwood and Jovanovic 1989: 146). The level of banking and the development of the stock market have a causal impact on economic growth (Beck, Demirgüç-Kunt and Levine 2000: 598). The financial sector contributes to the overall economic development of an emerging economy. The stock market and an efficient financial system which includes banks are essential to foster economic development (Laopodis *et al.* 2016: 31). There is a dearth of research on the relationship between financial sector development in BRICS countries and trade credit use by firms. This study analyses financial sector development in relation to corporate finance.

2.6. Theories of financial intermediation

2.6.1 The traditional Arrow-Debreu model of resource allocation

According to the Arrow-Debreu theory, financial intermediaries have a role to play only because financial markets are not perfect (Scholtens and Van Wensveen 2000: 1243). They exist by the grace of market imperfections. As long as there are market imperfections, there are intermediaries; as soon as markets are perfect, intermediaries are redundant: they lose their function once savers and investors have perfect information to find each other directly, immediately and without any impediments, and thus without cost (Scholtens and Van Wensveen 2000: 1243). Thus, in a world with a tendency towards greater market transparency and efficiency, financial intermediaries are an endangered species. However, despite globalization, the information revolution and the much more prominent role of public markets, financial intermediaries appear to survive (Scholtens and Van Wensveen 2000: 1244).

The Modigliani-Miller theorem applied in this context asserts that financial structure does not matter: households can construct portfolios which offset any position taken by an intermediary and intermediation cannot create value (Fama 1980: 288).In the traditional Arrow-Debreu model of resource allocation, firms and households interact through markets and financial intermediaries play no role (Allen and Santomero 1997: 1464). When markets are perfect and complete, the allocation of resources is Pareto efficient and there is no scope for intermediaries to improve welfare. The extreme view that financial markets allow for efficient allocation and that intermediaries have no role to play is clearly at odds with what is observed in practice. Historically, banks and insurance companies have played a central role. The development of intermediaries tends to lead the development of financial markets themselves (Allen and Santomero 1997).

2.6.2 Cost Advantage theory

Financial intermediation theories are generally based on some cost advantage for the intermediary (Diamond 1984: 396). Schumpeter assigned a "delegated monitoring" role to banks; the banker must not only know what transaction s/he is asked to finance

and how it is likely to turn out but must also know the customer, his/her business and even his/her private habits, and, by frequently 'talking things over with him', obtain a clear picture of the situation (Diamond 1984: 396)..

Financial intermediaries may be brokers, middlemen, or dealers in assets that bring borrowers and lenders together at lower cost than if the parties had to come together directly (Ramakrishnan and Thakor 1984: 417). The basis of their existence, from this point of view is the cost of evaluating credit risks. Thus, the key to the theory of financial intermediaries as brokers is an explanation of why intermediation reduces the cost of exchanging capital (Ramakrishnan and Thakor 1984: 417). A major component is the cost of information production. The wide range of costs associated with direct finance justifies the existence of financial intermediaries, traditionally understood to be centralized agents performing under one roof the roles of screening, selection, monitoring, and diversification of risk while simultaneously providing credit and liquidity services to fund suppliers (Cetorelli, Mandel and Mollineaux 2012: 6)

2.6.3 Informational Asymmetry

In financial markets, informational asymmetries are particularly pronounced. Borrowers typically know their collateral, industriousness, and moral rectitude better than do lenders; entrepreneurs possess inside information about their own projects for which they seek financing (Brealey, Leland and Pyle 1977: 132). Lenders would benefit from knowing the true characteristics of borrowers. However, moral hazard hampers the direct transfer of information between market participants (Brealey, Leland and Pyle 1977: 133). Borrowers cannot be expected to be entirely straightforward about their characteristics, nor entrepreneurs about their projects, since there may be substantial rewards in exaggerating positive qualities (Brealey, Leland and Pyle 1977: 133). Verification of true characteristics by outside parties may be costly or impossible.

The financial intermediation theory builds on the notion that intermediaries serve to reduce transaction costs and informational asymmetries (Scholtens and Van Wensveen 2003: 8). When information asymmetries are not the driving force behind

intermediation activity and their elimination is not the commercial motive for financial intermediaries, the concept of value creation in the context of the value chain might be the driving force. Scholtens and Van Wensveen (2003) are of the view that risk and risk management drive value creation and that absorption of risk is the central function of both banking and insurance.

Financial sector development refers to a country's capability to efficiently and effectively channel savings into investment within its own borders (Kar, Nazlıoğlu and Ağır 2011: 1032). Hartmann *et al.* (2007) define financial sector development as the process of financial innovation, as well as institutional and organizational improvements in a financial system, which reduce asymmetric information, increase the completeness of markets, increase possibilities for agents to engage in financial transactions through (explicit or implicit) contracts, reduce transaction costs and increase competition.

Demirgüç-Kunt and Maksimovic (1999) and Rajan and Zingales (1998) found that financial institutions are important for firm and industrial expansion. Financial markets have also been identified as playing an important role in the financing decisions of firms, especially those that are listed (Agarwal and Mohtadi 2004: 12; Abor and Biekpe 2006). As a financial market develops, it becomes less costly for firms to raise finance, thus increasing the number of projects that can be accepted when a firm makes an investment appraisal.

Financial sector development may be bank based, stock market based or a combination of banking and stock market development (Chakraborty and Ray 2006: 320; Chakraborty 2008). A well-developed stock market should theoretically increase savings and efficiently allocate capital to productive investments that eventually increase the levels of economic growth (Joseph McCarthy, Naik and Padhi 2015: 34). A well-functioning stock market, a more globalized economy and increasing aggregate investment can potentially foster economic growth in emerging economies (Joseph McCarthy, Naik and Padhi 2015: 39).

The underdevelopment of capital markets in an economy limits risk-pooling and risk sharing opportunities for both households and firms (Herring and Chatusripitak 2007:

76). Firms should rely on financial markets for information about which investment projects to select and how such projects should be financed. Financial sector development is associated with the ability of the sector to acquire information, enforce contracts, facilitate transactions and create incentives for the emergence of particular types of financial contracts, markets and intermediaries, all at low cost (Levine 1999; Rajan and Zingales 2003: 9). This occurs when financial instruments, markets and intermediaries reduce information costs, improve enforcement of contracts and reduce transaction costs. Without efficient financial markets, these functions are likely to be performed less well and living standards will be lower than they might otherwise have been (Herring and Chatusripitak 2007: 79).

Financial sector development also increases investment through allocating capital to the private sector (Akinboade and Kinfack 2015: 56). Access to finance is crucial for companies. The second leading constraint on doing business after taxes and regulation is finance (World Bank 2000). However, Batra, Kaufmann and Stone (2003) rank lack of finance as the main constraint in Africa and China. Finance is the most important constraint on firm growth. Rajan and Zingales (1998) also found that the number of firms in an industry grows disproportionally faster in counties that have better financial development and that the number of firms in sectors that are more dependent on external finance grows faster in countries with superior financial development. Black and Strahan (2002) concluded that the odds of an individual starting a business increase if that individual were to move to a financially more developed region, and Guiso *et al.* (2004) found that GDP is higher in financially more developed regions. Thus, with greater access to finance, firms can grow faster (Akinboade and Kinfack 2015: 413).

Financial sector development improves trade at the national and international levels by facilitating transactions because the easier it is to make reliable financial transactions, the friendlier the trading environment (Claessens, Feijen and Laeven 2006: 17). Financial sector development also reduces the costs associated with the provision of external finance and increases the rate of economic growth (Khan 2001: 46). The cost of capital will be reduced, resulting in the growth and expansion of more businesses. Khan (2001) also predicts that financial sector development will raise the return on loans and reduce the spread between borrowing and lending rates.

The financial system requires reasonable legal and institutional infrastructure to support its efficient operation within a country (Chinn and Ito 2006). The institutional environment of a developed financial system involves policies, regulations, laws, and supervision (Adnan 2011: 96). Countries with a strong institutional environment and investors' safeguards achieve high levels of financial development (La Porta *et al*. 1997). The business environment impacts the financial system in terms of the availability of skilled workers, physical and technological infrastructure and the cost of doing business (Adnan 2011: 23).

Financial sector development reduces information asymmetry and price risk and is crucial for economic growth (Murinde 2012: 85). The banking sector generates revenue from mortgages and loans which is dependent on economic variables such as interest rates. Banks' roles are important in every country's economy as they are the key providers of credit to businesses, particularly in emerging economies. Stock markets and banks are clearly substitute sources for corporate finance because when a firm issues new equity, its need to borrow from banks declines (Arestis, Demetriades and Luintel 2001: 136). Stock markets are a very critical sector of an economy as they provide a platform for buyers and sellers to meet up and trade. Chinn and Ito (2006) found that development in the banking sector is a precondition for equity market development, and that developments in these two types of financial markets have synergistic effects. When the economy is stable and growing the financial sector benefits from additional investment as growth leads to more capital projects and increased personal investment.

Banking concentration can be defined as a decrease in the number of banks in the industry linked to an increase in their average size or in simple terms, fewer banks of bigger size (Boyd and Graham 1991: 236). Hake (2012) empirically examined the impact of banking sector concentration on corporate debt and found that concentration has a positive effect on corporate debt, implying that higher banking concentration increases such debt. According to Baert and Vander Vennet (2009), increased banking concentration associated with information advantage may result in more relations with firms; thus, there will be higher lending and an increased level of firm

leverage. Higher banking market concentration is associated with increased access to credit and is beneficial to firms' investment and growth (Abadi *et al.* 2016: 21).

Economies like China, and other emerging economies in the BRICS group require well-developed financial systems, particularly financial intermediation and a liberalized interest rate, all of which are important for the efficient allocation of credit, which, in turn, can help to maintain sustainable, high levels of economic growth (Liang and Jian-Zhou 2006: 136). Sound economic conditions usually lead to more capital projects which result in increased corporate borrowing. Corporate finance theory suggests that market imperfections such as an underdeveloped financial system may constrain firms' ability to fund investment (Bokpin 2010: 98). According to Bettin and Zazzaro (2009), one channel through which the economy grows is the development of financial sector.

2.6.4. Banking

Emerging markets confront more constraints than developed economies in terms of capital mobilization and accumulation (Bosworth, Collins and Reinhart 1999: 7). Furthermore, their capital markets are not well-developed; their most important source of capital derives from the banking sector. Money transferred through the banking system enables the recipient to gain access to banking products and services, thereby increasing demand for financial services. Remittances transferred through the banking system increase aggregate bank deposits, and this in turn affects credit intermediated by the banking sector. Acosta, Fajnzylber and Lopez (2007) argue that foreign capital flows from remittances to the economy might increase banks' loanable funds. Recipients of remittances that do not pass through the banking system are also likely to demand banking services for safe custody (Aggarwal, Demirgüç-Kunt and Pería 2011: 9), thereby increasing the level of banking activity.

The banking sector plays an important role in intermediation in the economy, such as receiving money from the public in the form of deposits and using such funds, in whole or in part, to grant loans and other credit facilities (Bettin and Zazzaro 2009: 5).Banks are the fulcrum of financial sector development in developing and emerging

economies. Most countries relying on their banking sector rather than financial markets (Adnan 2011: 3). Germany and Japan are classified as bank-based financial systems whilst the United States and United Kingdom are market-based systems (Levine 2002: 14).

2.6.5. Stock Market

The analysis of stock markets is crucial for the development and design of investment strategies (Tabak, Serra and Cajueiro 2010). Stock markets enable firms to raise capital from the public and this spurs the growth of firms and the economy. Well-developed stock markets provide liquidity, diversification, information, resource mobilisation for corporate finance, investment and growth (Bokpin 2010: 13). Countries with well-developed financial sectors have well-developed stock markets. While financial systems in developed economies are frequently dominated by stock markets, this is not the case in most emerging markets where they are less developed; may be inefficient and often suffer weak corporate governance. Underdevelopment of capital markets limits risk-pooling and risk-sharing opportunities for both households and firms (Herring and Chatusripitak 2007: 5). The size of the stock market can be measured by using the ratio of 'stock market capitalization as percentage of GDP' (Adnan 2011: 27).

2.6.3. Bond Market

According to Herring and Chatusripitak (2007), the lack of a bond market may render an economy less efficient and significantly more vulnerable to financial crisis. A sound legal environment and protection of minority shareholders and bondholders could foster the development of the financial sector. Contract enforcement is considered as one of the most important elements of the rule of law in any country, because it provides protection to both parties (Adnan 2011: 6).

2.6.4. Institutional Environment

The institutional environment of a developed financial system involves policies, regulations, laws, and supervision (Adnan 2011: 6). Financial sector development is shaped by a country's legal environment. A sound legal system entails the formulation and implementation of robust financial policies and a regulatory framework. The legal system is the primary determinant of financial development and hence long-run growth (Levine 2002: 3). Herger, Hodler and Lobsiger (2008) found that dysfunctional institutions are one of the main hurdles in financial development. Legal environments differ across countries and these differences matter for financial markets. Countries with a strong institutional environment and investor safeguards achieve high levels of financial development (La Porta *et al.* 2000: 56). Trade openness and institutions that constrain the political elite from unduly influencing financiers tend to promote financial development (Herger, Hodler and Lobsiger 2008: 5).The BRICS countries have different institutional environments, financial access and inclusion and therefore different levels of financial sector development.

2.6.5. Framework for benchmarking financial systems

A measure of financial development can be obtained by examining the performance and activities of the financial markets, banks, bond markets and financial institutions (Adnan (2011: 5). The World Bank's Global Financial Development Database was used to obtain proxies such as bank concentration percentage, bank credit as a percentage of bank deposits, bank deposits as a percentage of GDP, and Central bank assets as a percentage of GDP. A well-functioning financial system is one that exhibits allocative efficiency by mobilizing savings from depositors and selecting investment opportunities through credit lines to entrepreneurs (Gondo 2009). Banking sector development has commonly been measured using two quantity-based proxies (Aggarwal, Demirgüç-Kunt and Martinez Peria (2006); Giuliano and Ruiz-Arranz (2009). The first is the ratio of liquid liabilities of the financial system to GDP and the second is the ratio of domestic credit provided by the banking sector to GDP, which includes credit to the public and private sectors. Giuliano and Ruiz-Arranz (2009)

maintain that these indicators capture the banks' key function of channelling savings to worthy investment projects. Financial sector development can be measured by frameworks such as access, size, market structure efficiency and stability as discussed below.

2.6.5.1. Financial access

Well-functioning financial systems allocate capital based more on the expected quality of the project and entrepreneur and less on the latter's accumulated wealth and social connections (Čihák *et al.* 2013: 7). Efficient financial systems that overcome market frictions will more effectively identify and fund the most promising firms and not simply channel credit to large companies and rich individuals. Data on access to financial markets are relatively scant. Measures of market concentration are used to approximate access to stock and bond markets, based on the notion that a higher degree of concentration reflects greater access challenges for newer or smaller issuers.

2.6.5.2. Size of financial sector

Three indicators measure the size of the financial sector relative to GDP: the ratio of Central bank assets to GDP, the ratio of deposit money bank assets to GDP, and the ratio of other financial institutions to GDP (Beck, Demirgüç-Kunt and Levine 2000: 599).

2.6.5.3. Measures of Market Structure

The concentration of commercial banks equals the ratio of the three largest banks' assets to total banking sector assets. A highly concentrated commercial banking sector might reflect a lack of competition (Beck, Demirgüç-Kunt and Levine 2000: 598). Banks that are more concentrated have less vulnerability to liquidity or macroeconomic shocks (Ali, Intissar and Zeitun 2015: 75).

2.6.5.4. Financial depth

In terms of financial depth, the variable that has received much attention in the empirical literature on financial development is private credit to GDP. It is defined as domestic private credit to the real sector by deposit money banks as a percentage of local currency GDP. Private credit to GDP differs widely across countries, and correlates strongly with income level (Čihák *et al.* 2013: 9). Financial depth, approximated by private credit to GDP, has a strong statistical link to long-term economic growth; it is also closely linked to poverty reduction (Demirgüç-Kunt and Levine 2008: 600).

2.6.5.5 Financial efficiency

For intermediaries, efficiency is primarily constructed to measure the cost of intermediating credit. Efficiency measures for institutions include indicators such as overhead costs to total assets, net interest margin, lending-deposits spread, non-interest income to total income, and cost to income ratio (Čihák *et al.* 2013: 11). Financial integration may also encourage financial development, leading to financial efficiency in emerging markets (Chai and Rhee 2005: 1). An efficient financial system may affect economic growth through productive capital and technological accumulation (Chai and Rhee 2005: 1). The net interest margin equals the accounting value of a bank's net interest revenue as a share of its total assets. It can also be used as an indicator of the financial sector's competitive structure, although many factors may influence interest margins. Overhead costs equal the accounting value of a bank's overhead costs as a share of its total assets (Beck, Demirgüç-Kunt and Levine 2000: 599).

2.6.5.6. Financial stability

The Z-score is a common measure of financial stability. It compares buffers (capitalization and returns) with risk (volatility of returns) to measure a bank's solvency risk (Čihák *et al.* 2013: 13). The Z-score is defined as $Z \equiv (k+\mu)/\sigma$, where k is equity capital as a percentage of assets, μ is return as a percentage of assets, and σ is

standard deviation of return on assets as a proxy for return volatility. Variables such as nonperforming loan ratios may be better known than the Z-score, but they are also known to be lagging indicators of soundness (Čihák and Schaeck 2010: 21). An alternative indicator of financial instability is “excessive” credit growth. While a well-developing financial sector is likely to grow, very rapid growth in credit is one of the most common and robust factors associated with banking crises (Demirguc-Kunt and Detragiache 1997) (Kaminsky and Reinhart 1999).

2.7. Overview of BRICS countries’ financial sectors

This section reviews the characteristics of BRICS countries’ financial sectors. The analysis of the state of the financial sectors in the respective countries assists in evaluating the context of financial sector development which will help to determine the implications. A separate review of the BRICS financial sectors is necessary to make comparisons and explain the study’s findings.

2.7.1. Financial sector in BRICS: Background

BRICS countries are characterized by rapidly growing economies and are emerging as forces in global industry and commerce. BRICS member countries are all developing or newly industrialised economies. The formation of BRICS has enabled them to gain significance in regional and international affairs. The group is well organized and committed to reforming their financial sectors (Chittedi 2010: 7). These countries are promoting trade and investment amongst the group, resulting in increased intra-FDI. In 2003, before South Africa joined the group, BRIC accounted for more than 30% of the world’ financial reserves, and witnessed a threefold increase in FDI within the group (Wilson, Purushothaman and Goldman 2003: 4). Moreover, these nations embarked on reform of their financial regulations and policies to attract foreign portfolio flows and contribute to their stock market and banking sector development. This resulted in a fundamental shift in their financial structures and capital flows from developed nations (Chittedi 2010: 6). In 2003, BRIC countries accounted for more than 40% of the world’s population and around 15% of global GDP

and were deemed to be at a similar stage of newly advanced economic development (Wilson, Purushothaman and Goldman 2003: 4).

Financial markets in the BRICS community have expanded rapidly simultaneous with economic growth (Sharma and Manhas 2015: 7). Wait and Ruzive (2016: 3) found that higher levels of credit to the private sector and financial depth in the BRICS economies contributed to the higher levels of economic growth experienced in these countries compared to non-BRICS emerging economies. Financial sector development has an impact at the domestic and international levels. Samargandi and Kutan (2016: 4) found empirical evidence that credit to the private sector has a positive spill over effect on growth in some BRICS countries, specifically China and India. BRICS trade and cooperation has resulted in financial linkages among the countries and the recently launched New Development Bank (NDB). Economic globalization has led to growing integration of financial markets, both within and across BRICS member countries. BRICS financial markets are also integrated with those of countries outside the group. Market movements or shocks in one market affect other markets; thus what happens abroad affects the domestic market. Given this background, the five BRICS nations were selected for an empirical investigation of financial sector development. Such development facilitates economic growth and trade amongst the BRICS countries through providing an efficient system for settlement of payments.

2.7.1. Brazil

The Brazilian banking system is highly consolidated as a result of significant merger and acquisition activity. The six leading banks in the country account for 80% of overall bank assets (Keats 2015: 4). Brazil's financial system has grown in size, diversification, and sophistication, hand in hand with the country's economic progress (International Monetary Fund 2012). Various structural macroeconomic changes were implemented in the 1990s which are important determinants in the recent advance of financial services (Studart 2000; Baer and Coes 2001: 611). These include banking reform, privatization, external liberalization, and the Plan "Real" in 1994-1995. Banking reform (end of the 1980s) improved efficiency and flexibility in the banking sector and, together with monetary stabilization, resulted in improved funding for non-financial

firms. External market liberalization coupled with privatization, has been crucial in growing investment in Brazil. Finally, the Plan “Real” led to a decrease in inflation levels with subsequent relative monetary stability (Keats 2015: 3).

Brazil appears to have started a process of change that may lead to further financial development with positive benefits for economic growth. Since the enactment of the Plan “Real,” stock market capitalization and foreign investment have grown substantially (Studart 2000: 26). Studart (2000) notes that, the country shifted from a bank-oriented system that included a high level of state participation toward an economy with more active capital markets. The Brazilian bond market has grown significantly (Lima Crisóstomo, Javier López Iturriaga and Vallelado González 2014: 75). However, the high cost of external funding remains a challenge. Brazil’s capital markets are still much less developed than those in more advanced economies. Protection of minority shareholders and creditors remains inadequate. High levels of control (Dyck and Zingales 2004) and ownership concentration (La Porta and Lopez-de-Silanes 1998; López-Iturriaga and Crisóstomo 2010) remain significant characteristics of the Brazilian market. Furthermore, the institutional framework and capital market advances have not been sufficient to reduce the country’s interest rates that are high compared to European, North American, or even other non-developed countries (Lima Crisóstomo, Javier López Iturriaga and Vallelado González 2014: 63). Thus, although the recent changes in Brazil represent advances for capital markets and economic stabilization, the low degree of shareholder and creditor protection as well as high interest rates may limit Brazilian firms’ access to external funds (Lima Crisóstomo, Javier López Iturriaga and Vallelado González 2014: 63). They thus face financial constraints since they rely on internally generated funds for investment (Lima Crisóstomo, Javier López Iturriaga and Vallelado González 2014: 73).

2.7.2. Russia

In 2007 the Russian banking sector was developing fast and important financial sector reforms had been passed (Deutsche Bank (2007). Prior to the break-up of the Soviet Union, bank deposits (mainly household deposits) and loans to enterprises were each about half of GDP. The dissolution of the union created problems for monetary policy

and payments settlements (Bonin and Wachtel 2003: 18). Russia experienced disintermediation following hyperinflation; household deposits as a ratio of GDP fell to 2% and enterprise loans to GDP fell to 11% by 1993. Regulatory problems were also severe and new entrants were largely unsupervised. By the middle of the 1990s, there were more than 2 600 banks in Russia, about two-thirds of which were private banks (Bonin and Wachtel 2003: 18).

'Russia has far too many licensed banks,' said Christopher Weafer, a senior partner at Moscow-based consulting firm Macro Advisory. 'Cutting the number to between 200 and 300 would be a very positive step' (Corcoran 2015). In 2016 the Russian economy was in recession due to a sharp decline in oil prices and sanctions which negatively affected economic growth and the financial sector (World Bank (2016). Financial markets are fragile and the problems are compounded by rapid growth, inadequate legislation, poor implementation of laws, an unclear regulatory framework and unstable economic environment (Rautava 1996: 7).

The case of Russia is particularly interesting, as the country that was once the leader of the Soviet bloc had to create a stock market in the midst of its transition from a planned system to a market economy, during times of severe economic crisis (Goriaev and Zabotkin 2006: 2). Starting from scratch in late 1994, the Russian stock market is now one of the largest emerging markets in the world, with total market capitalization of over $600 billion or 80% of GDP at the end of 2005 (Goriaev and Zabotkin 2006: 3).

2.7.3. India

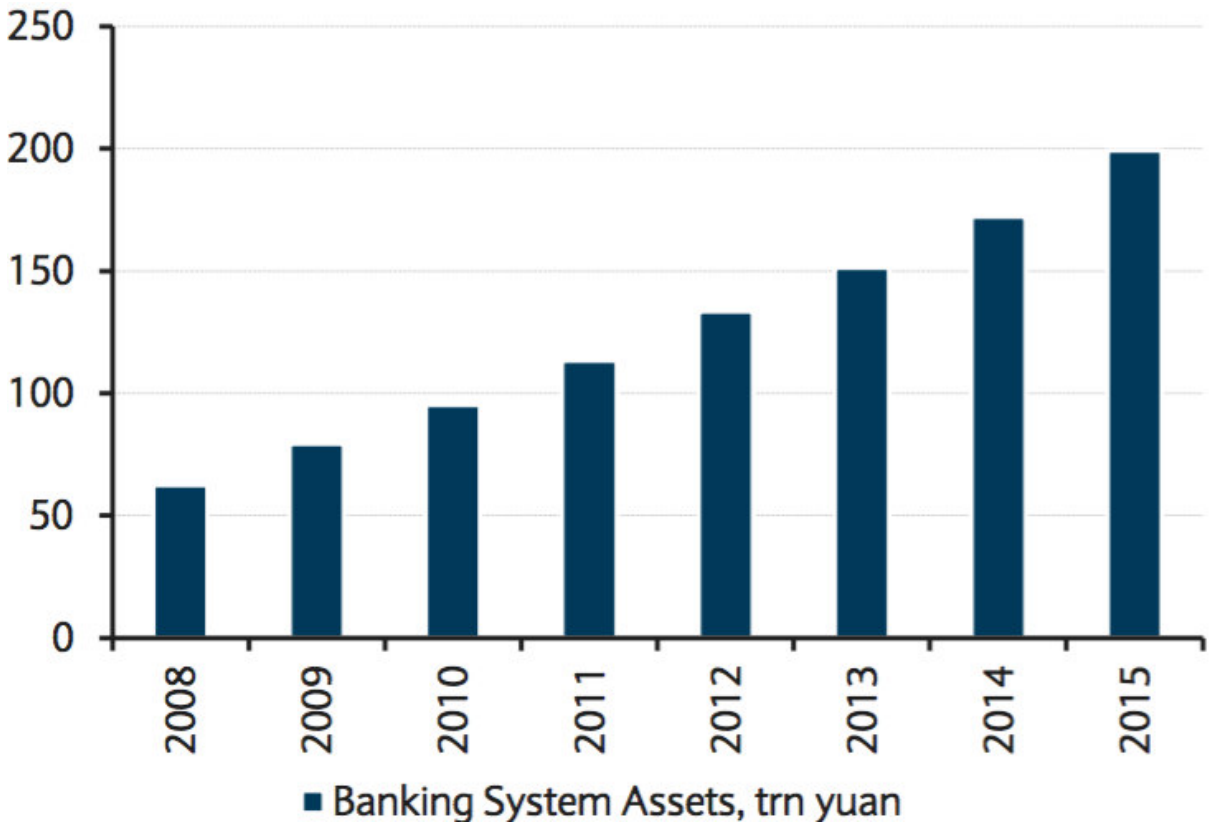
India has a diversified financial sector that is undergoing rapid expansion, both in terms of strong growth of existing financial services firms and new entities entering the market. The government of India has introduced several reforms to liberalise, regulate and enhance this sector (Foundation 2016). The Indian banking system is characterized by a large number of banks with mixed ownership. The commercial banking segment comprises 27 public sector banks in which the government has majority ownership, 40 private sector banks, and 33 foreign banks. Total bank assets

constituted just over 70% of GDP in 2003-04 (Prasad and Ghosh 2005: 4). Prior to the initiation of financial sector reforms in 1992, the Indian financial system essentially catered to the needs of planned development, and the government played a predominant role in every sphere of economic activity (Prasad and Ghosh 2005: 4).

2.7.4. China

The literature has focused on the relationship between financial sector development and China's economic growth. For example, Chang (2002) empirical findings supported neither the demand-following nor the supply-leading hypothesis for China. Liang (2005) showed that financial development and government deregulation of the financial sector significantly promoted China's economic growth. Financial reform in China has focused on allowing the market mechanism to operate more freely (Chen 2006: 245). A steady reform process has been underway since 1979, although the period 1998-1999 saw particularly rapid development of financial markets, with the restructuring of the People's Bank of China helping to ensure that the basic requirements of a free market financial system were in place (Wu, Chen and Shiu 2007: 73). The gradual process of reform has led to a number of significant changes in the country's financial sector, including the emergence of a range of different types of commercial banks. As a result, the development of China's banking system has followed a unique pattern. There are currently four main types of banks: state-owned commercial banks (SCBs), regional and national shareholding commercial banks, city commercial banks and foreign banks. Banks dominate the financial system, playing a very important role in fund allocation. The operational performance of China's commercial banks is thus an issue of great significance (Wu, Chen and Shiu 2007: 74). As at the first quarter of 2006, the big four state-owned commercial banks (the Industrial and Commercial Bank of China, Agricultural Bank of China, Bank of China, and China Construction Bank) had combined assets of RMB20,804.9 billion, accounting for 53.1% of the total assets of all banks in China. The shareholding commercial banks had total assets of RMB6,074.9 billion, representing 15.5% of total banking sector assets (Wu, Chen and Shiu 2007: 75). China's GDP growth has slowed but its debt has increased. The banking sector has tripled in size since 2008, and now stands at 200 trillion yuan (£22 trillion / $30 trillion) (Edwards 2016: 45).

Figure 1 Chinese banking system



Source: Harver Analytics, Barclays Research (2016)

The development of China's stock market began in earnest in 1992, following remarks about the importance of the stock market made by Deng Xiaoping during his tour of South China. ".. some people insist stock is the product capitalism. We conducted some experiments on stocks in Shanghai and Shenzhen, and the result has proven a success. Therefore, certain aspects of capitalism can be adopted by socialism. We should not be worried about making mistakes. We can close it [the stock exchange] and re-open it later. Nothing is 100% perfect." Deng Xiaoping. In 1996, when the stock exchanges in Shanghai and Shenzhen had been in existence for just four years, the total market value of the companies listed on them represented only 3.93% of China's GDP. Since then, however, reforms in the financial sector as a whole have been accompanied by rapid development of the stock market, changing both the structure of the country's financial markets and the pattern of business financing. The stock market has come to play an increasingly important role in China's economic development (Wu, Chen and Shiu 2007). Securitization is the natural outcome of

financial sector development; the higher the level of economic development, the higher the level of securitization. The combined market value of all companies listed on the domestic stock market as a percentage of GDP is referred to as the capitalization rate (Wu, Chen and Shiu 2007).

2.7.5. South Africa

South Africa's financial services sector is backed by a sound regulatory and legal framework. This sophisticated sector is comprised of dozens of domestic and foreign institutions providing a full range of services, commercial, retail and merchant banking, mortgage lending, insurance and investment. The South African banking system is well developed and effectively regulated and includes a Central bank, the South African Reserve Bank as well as a few large, financially strong banks and investment institutions, and a number of smaller banks. According to the Banking Association of South Africa, it was ranked 3rd out of 148 countries in the 2013/14 World Economic Forum Global Competitiveness Survey.

The most important financial institutions in the country are the banks and the stock market. Their assets amounted to 109% and 187% of GDP by the end of 2004 (International Monetary Fund, 2005). The financial sector's contribution to GDP has grown steadily and continues to increase. The banking sector contributes an estimated 35% of the value added of the financial sector, calculated using the gross values of net interest income and non-interest income (Hawkins 2004: 15). At the apex of the banking system is the South African Reserve Bank, which is, inter alia, the primary monetary authority and custodian of the country's gold and foreign exchange reserves. Its primary functions are to protect the value of the rand and control inflation. The banking sector is highly concentrated, with no government ownership. Between 1993 and 2002, the financial services sector grew nearly twice as fast, at an average of 4.5% per year. This sector has been relatively buoyant since 1996, outgrowing the rest of the economy each year (apart from 2002) and proving to be a source of growth for the overall economy (Akinboade and Kinfack 2015).

The South African banking industry currently boasts 77 banks; which include 12 local banks, five foreign banks, 14 branches of foreign banks, 41 foreign bank representatives, two mutual banks and a post bank (Odhiambo 2014). Investment and merchant banking remain the most competitive in the industry while the country's big five banks i.e. Amalgamated Banks of South Africa (ABSA), First National Bank (FNB), Standard Bank, Netherlands Bank of South Africa (Nedbank) and Capitec dominate the retail market.

The JSE is in the seventeenth largest stock exchange worldwide, the sixth largest among emerging markets and the largest on the African continent, with over 400 listed companies, more than 900 securities and market capitalization of over 900 billion US dollars in 2013 (Hawkins 2004; Hassan 2013a; Phiri 2015). It connects buyers and sellers in a variety of financial markets: equities, financial derivatives, commodity derivatives, currency derivatives and interest rate instruments. The JSE is licenced to operate under the Financial Markets Act, 19 of 2012, and is the largest African exchange by market capitalisation and value traded (Johannesburg Stock Exchange 2013: 3).

2.7.6. World Ranking of BRICS financial sector development

The World Economic Forum introduced an annual financial development index in its first financial development report of 2008. The index examined the financial strength of 55 financial systems in the world based on annual data from 2007-08 and is constructed using seven main financial elements. These include institutional environment, business environment, financial stability, banks, non-banks, financial markets, size, depth, and access. The method of standardization is used to construct the financial development index. The table below shows the ranking of BRICS.

Table 0-2 *Financial Development Report 2009 Results*

	Country RANK 2009	RANK SCORE
China	26	3.87
South Africa	32	3.48
Brazil	34	3.46
India	38	3.30
Russian Federation	40	3.16

Source: Adnan (2011: 8)

Khan and Semlali (2000) argue that bank credit to the private sector accurately reflects the role of financial intermediaries in channelling funds to the private sector. When financial development is measured by domestic credit as a percentage of GDP, South Africa surpasses all other BRICS countries (Mingiri 2014: 9). However, Khan and Semlali (2000) argue that this is a narrow measure of financial development. Sahoo and Dash (2013) note, that, the general populace needs access to safe and reliable financial institutions such as banks and financial instruments as well as financial incentives to save. Stability and depositors' confidence are thus required to facilitate financial sector development. The development of the financial sector serves to increase savings and investment, reduce poverty, stimulate SMEs, encourage foreign capital inflows, and ensure that finance is allocated to the best (i.e., most productive) projects (Djoumessi 2009: 10). Development also depends on the volume of savings the sector is able to mobilise. Claessens, Feijen and Laeven (2006) state that substantial gains can be realised from improved transaction services through a more developed financial system. Through facilitating transactions, financial development improves trade at the national and international levels.

The following section describes the financial sector development variables used in this study. This is followed by a presentation of the descriptive statistics and an analysis of BRICS financial sector development. The final section presents principal component analysis which is used to develop a single measure for financial sector development through constructing an index. There is no single measure of financial sector

development; hence, the use various proxies. Ten variables were used and for the purposes of this study they were reduced to a single measure through principal component analysis to facilitate the analysis of the relationship between trade credit and financial sector development carried out in Chapter 5.

2.8. Measures of financial development

Table 0-3 Financial development variables

Indicator	**Abbreviation**	**Importance**
Liquid liabilities to GDP	LL/GDP	Measures the size of financial intermediaries relative to the size of the economy (also known as broad money or M3)
Bank concentration	BC	Measures the banking structure, as the ratio of the three biggest banks' assets to the assets of all commercial banks in the system
Bank credit to bank deposits	BC/BD	Measures the financial resources provided to the private sector by domestic money banks as a share of total deposits
Bank deposits to GDP	BD/GDP	Determines the extent of banking in an economy and confidence in the financial sector
Stock market capitalization to GDP	SMC/GDP	Measures the size of the stock market. It is equal to the value of listed shares divided by GDP
Stock market turnover ratio	SMTR	Measures the efficiency of the stock market. It is equal to the total value of shares traded on a country's stock

		exchange divided by the stock market capitalization
Stock market total value traded to GDP	SMTVT/GDP	Measures the activity of the stock market. It is equal to the total value of shares traded on a country's stock exchanges divided by GDP
Domestic public debt securities (amounts outstanding) issued in domestic markets as a share of GDP	DPDS/GDP	Total amount of domestic public debt securities (amounts outstanding) issued in domestic markets as a share of GDP
Domestic credit to the private sector (% of GDP)	DCPS/GDP	Domestic credit to the private sector (% of GDP) reflects the role of financial intermediaries in channelling funds to the private sector
Private debt securities (amounts outstanding) issued in domestic markets as a share of GDP	PDSD/GDP	Total amount of domestic private debt securities (amounts outstanding) issued in domestic markets as a share of GDP

Source: Own Construct based on Global Financial Sector Development variables

2.9. Summary Statistics

Table 0-4 BRICS Summary statistics: Mean by categories of year

Year	BC/BD	BD/GDP	BC	LL/GDP	SMC/GDP	SMTVT/GDP	SMTR	DPDS/GDP	PDSD/GDP
2001	174,1340	40,4036	54,4362	90,7559	41,8495	49,3426	106,1760	11,4827	5,0844
2002	168,6629	42,0594	40,4885	93,4453	36,9600	31,3190	90,5841	12,0530	6,2326
2003	168,1886	44,9335	41,2880	96,9374	43,3403	30,1153	88,6067	15,4072	7,4822
2004	166,0978	45,0736	47,0400	96,1269	49,6274	36,0420	96,3875	16,3587	9,7383
2005	164,5325	44,8402	41,8379	96,4895	54,4747	36,6594	75,2980	16,3746	13,1405
2006	161,4185	45,4256	39,0352	98,9506	76,3784	47,2457	87,5547	15,3400	16,1395
2007	158,1188	47,9697	35,2667	101,9328	126,0161	103,4827	121,3000	16,3836	18,0827
2008	165,7443	48,4992	36,6177	100,5615	105,0810	117,0329	96,4120	15,8912	19,0019
2009	160,5680	52,3026	36,1282	109,6703	80,0262	110,2819	164,2567	16,7430	21,4756
2010	161,6238	53,4782	35,1330	115,2806	89,6213	104,2638	113,8602	19,5909	21,9780
2011	170,1201	53,4191	33,6900	116,5467	67,9948	81,6238	120,9645	22,1773	20,7654
2012	182,2380	52,7226	40,8696	119,5044	55,5492	63,0045	111,5150	24,4343	19,8566
2013	188,9680	52,9144	41,6087	118,8059	0,0000	0,0000	0,0000	20,4156	18,6671
Total	**168,4935**	**48,0032**	**40,2646**	**104,2314**	**68,6697**	**67,2991**	**105,7065**	**17,1271**	**15,2035**

Source: *Own construct based on Financial Development database 2011-2013*

Table 3 above shows the overall growth of BRICS from 2001 to 2013. While there have been fluctuations over the years, most proxies show growth in financial sector development over the years.

The bank credit to bank deposits ratio is the measure with the most growth in BRICS countries, implying that banks account for most of financial sector development. Least growth has been experienced amongst domestic public debt securities (DPDS/GDP) and private debt securities issued in domestic markets as a share of GDP (PDSD/GDP), suggesting that levels of securitisation are still very low amongst these countries. China has the highest LL/GDP, implying that the size of financial intermediaries relative to the size of the economy is big. This ratio that is also known as broad money or M3 measures the sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency (M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M2), plus travelers' checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents.

Stock market development ratios are the second most significant factor explaining financial sector development. SMTR exhibited the highest growth amongst other measures of stock market development. Emerging economies like BRICS countries still need to develop their stock markets to match those in developed economies. Some developed financial markets are referred to as market based and not bank based. Comparisons of banking sector development variables (see Appendix 1) show that China and South Africa have the most developed banking sectors and have experienced more growth than the other BRICS countries. BC/BD, which measures the financial resources provided to the private sector by domestic money banks as a share of total deposits has the highest growth, implying that more banks provide financing to firms in China and South Africa than in other BRICS economies.

Table 0-5 Statistics: Mean by country

Country	BC/BD	BD/GDP	BC	LL/GDP	SMC/GDP	SMTVT/GDP	SMTR	DPDS/GDP	PDSD/GDP	DCPS/GDP
Brazil	82.92	49.46	58.46	57.54	51.00	25.67	51.50	54.46	19.92	42.69
China	255.85	44.00	40.38	151.92	61.48	81.75	127.95	14.08	22.54	119.15
India	71.31	54.62	25.46	64.69	61.38	57.30	106.54	7.38	1.81	42.69
Russia	111.08	27.54	19.08	36.54	52.83	32.25	66.75	3.69	3.54	33.92
South Africa	120.62	56.46	82.92	42.54	175.71	85.69	50.37	30.31	16.85	139.85
Total	168.49	48.00	40.26	104.23	68.67	67.30	105.71	17.13	15.20	87.24

Source: *Own construct based on Financial Development database 2011-2013*

2.9.1. Bank credit to bank deposits

The bank credit to bank deposit ratio (BC/BD) is a commonly used statistic to assess a bank's liquidity. The bank's total loans are divided by its total deposits. BC/BD measures the financial resources provided to the private sector by domestic money banks as a share of total deposits. Domestic money banks comprise commercial banks and other financial institutions that accept transferable deposits such as demand deposits. Total deposits include demand, time and saving deposits in deposit money banks. It is the ratio of how much a bank lends from the deposits it has mobilised and thus indicates how much of a bank's core funds are being used for lending, the main banking activity. Bank credit to bank deposits is the ratio of claims on the private sector to deposits in deposit money banks; it gauges the extent to which banks funnel credit to the private sector (Beck, Demirgüç-Kunt and Levine 2010). A higher ratio indicates more reliance on deposits for lending and vice-versa. India has the lowest bank credit to bank deposits ratio with a mean of 71%, followed by Brazil with 83%. China and South Africa have the highest mean ratios of 256% and 121%, respectively possibly indicating that most bank deposits in these countries are channelled to lending activities.

2.9.2. Bank deposits to GDP

This measures the total value of demand, time and saving deposits at domestic deposit money banks as a share of GDP. It determines the extent of banking in an economy and confidence in the financial sector. The ratio of all checking, savings and time deposits in banks to economic activity is a stock indicator of deposit resources available to the financial sector for its lending activities (Beck, Demirgüç-Kunt and Levine 2009: 9). Banks need to attract deposits before they can lend. Russia has the lowest bank deposits to GDP of 27%, followed by China at 44%. South Africa and India have the highest bank deposits to GDP of 56% and 55%, respectively, which means that these countries are better able to mobilise deposit resources that will be available for lending activities. South Africa and India’s ability to attract high levels of deposits and savings is due to confidence in their banking sectors. Currency outside the banking system to base money is the share of base money that is not held as bank

deposits. The level and change in currency outside the banking sector are frequently used to estimate the extent of underdevelopment of the formal financial system (Schneider and Enste 2000: 263).

2.9.3. Bank concentration

Banks that are more concentrated are less vulnerable to liquidity or macroeconomic shocks (Ali, Intissar and Zeitun 2015). In many industrialized countries, banking is a highly concentrated industry. In South Africa, the top three banks control 77% of the market (Beck, Demirgüç-Kunt and Levine 2003). Higher banking concentration is desirable because it increases corporate debt (Hake 2012: 17). This is due to the fact that it could make banks more efficient because the standards of information sharing improve parallel to concentration (Jappelli and Pagano 2006: 16). Gonzalez and González (2008: 25) found that banking sector concentration has a positive impact on firm debt, which suggests that the information asymmetries between firms and banks are reduced. Brown, Jappelli and Pagano (2009) analysis of Business Environment and Enterprise Performance (BEEPS) 2005 firm survey data for 24 transition countries found that the more developed the information sharing standards between banks, the more the cost of investment financing declines, and the fewer obstacles there are to investment financing. Russia has the lowest level of bank concentration at 19% followed by India at 25%. South Africa and Brazil have the highest banking concentration at 83% and 58%, respectively. There is less competition in the banking market in these two countries due to high levels of concentration. This is desirable for an increase in corporate debt, but may also mean less competition, leading to higher loan costs. Therefore, it would be desirable to maintain a cautious stance on mergers in the banking sector that threaten to raise concentration to very high levels in South Africa and Brazil, whilst bank mergers may provide benefits to other BRICS countries with lower bank concentration. This implies that, as financial sectors grow, competition policy would have to be administered to prevent the banking market from becoming overly concentrated and potentially having a negative impact on firm leverage.

The market power hypothesis postulated by Carbo-Valverde, Rodriguez-Fernandez and Udell (2009) implies that higher concentration corresponds to increasing market

power. When banks exert their market power, loans are priced higher than under perfect competition; hence, fewer firms will take out a loan. Therefore, the market power hypothesis postulates that more banking sector concentration implies higher interest rates on loans and lower credit demand, which hampers growth. Black and Strahan (2002) have shown that fewer enterprises are established in a concentrated banking market.

2.9.4 Liquid liabilities to GDP

This is the traditional measure of financial depth, which equals the overall size of the formal financial intermediary system, i.e., the ratio of liquid liabilities to GDP (King and Levine 1993: 113), also known as broad money, or M3. They are the sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency (M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M2), plus travellers' checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents. Liquid liabilities consist of currency held outside the banking system plus the demand and interest-bearing liabilities of banks and nonbank financial intermediaries (King and Levine 1993: 720).

This is the broadest available indicator of financial intermediation, since it includes all three financial sectors. Liquid liabilities are a typical measure of financial depth, and thus of the overall size of the financial sector that does not distinguish between financial sectors or the use of liabilities (Beck, Demirgüç-Kunt and Levine 2000: 599). Russia has the least liquid liabilities to GDP at 37% followed by South Africa at 43%. China and India have the highest liquid liabilities to GDP of 152% and 65%, respectively. This implies that China and India's financial sectors are overall larger than other BRICS countries. China's financial intermediary system is far bigger than that of other BRICS economies. Russia and South Africa have the least depth of financial sectors based on liquid liabilities to GDP, which means there is still a lot of room and potential for growth in bank and non-bank financial mediation in these countries. Some financial systems have trillions of USD, such as developed

economies like the US, while small and poor countries' financial systems are very small. In similar vein, the variable, liquid liabilities to GDP, compares the BRICS financial sectors based on overall size.

2.9.5 Stock market capitalization to GDP

Stock market capitalization to GDP, which is the value of listed shares divided by GDP, is used to gauge the size of equity markets. It indicates the size of the stock market relative to the size of the economy and varies positively with the level of economic development (Beck, Demirgüç-Kunt and Levine 2009). The assumption behind market capitalization is that market size is positively correlated with the ability to mobilize capital and diversify risk. The stock market capitalization to GDP ratio is used to determine whether an overall market is undervalued or overvalued. Brazil has the lowest stock market capitalization to GDP at 51% followed by Russia at 53%. South Africa and China have the highest ratios of 175% and 61%, respectively. This means that, stock markets are more developed in South Africa and China than in other BRICS countries. South Africa's stock market capitalisation is over 150%, compared to other BRICS countries which average less than 60%. Its firms use stock markets to raise capital much more than other BRICS countries. Stock markets give corporates additional options to raise capital which is less risky than bank loans. Brazil and Russia need to develop their stock markets in order to improve their financial sectors and match other countries in BRICS.

2.9.6. Stock market total value traded to GDP

The value of shares traded is the total number of shares traded both domestic and foreign, multiplied by their respective matching prices as a percentage of GDP. The total value traded ratio measures the organized trading of equities as a share of national output, and should therefore positively reflect liquidity on an economy-wide scale. Brazil has the least stock market total value traded to GDP at 25% followed by Russia at 32%. South Africa and China have the highest ratios at 86% and 82%, respectively. The results thus show that high values of shares are traded in South

Africa and China compared to GDP. Large stock markets can lower the cost of mobilizing savings and thereby facilitate investment, and stock market liquidity is important for economic growth. A high stock market value traded to GDP is desirable because corporates can raise substantial amounts of capital through the stock exchanges and investors can easily buy and sell their shares. In other countries the stock market may be large, yet a smaller value of shares is traded. The larger the value traded, the better is financial sector development in the country. Brazil and Russia need to improve their stock market value traded to GDP in order to attract more trade from both domestic and international investors.

2.9.7. Stock market turnover ratio

This refers to the total value of shares traded during a period divided by the average market capitalization for that period. It measures the level of activity or liquidity of a stock market relative to its size. A small but active stock market will have a high turnover ratio whereas a large but less liquid one will have a low turnover ratio (Beck, Demirgüç-Kunt and Levine 2009). A stock market's turnover ratio measures how often shares change hands. Some emerging economies have very high turnover. The higher the turnover the more liquid the market is. South Africa has the lowest stock market turnover ratio at 50% followed by Brazil at 52%. China and India have the highest ratios at 128% and 107%, respectively. Thus, China and India have more liquid stock markets and higher levels of activity than South Africa and Brazil. High-income countries are likely to have significantly larger and more liquid stock exchanges with many more firms listed than middle- and low-income countries. Fewer firms are listed in South Africa and Brazil compared to China and India. This implies that there is a need to further develop the South African and Brazil stock exchanges to improve their liquidity and level of activity. Liquid stock markets will facilitate the raising of finance by firms as the stock market will attract more buyers.

2.9.8. Bond market

The size of the domestic bond market is measured by the ratios of private and public bond market capitalization to GDP. Bond market capitalization equals the total amount of outstanding domestic debt securities issued by private or public domestic entities. Herring and Chatusripitak (2007) note, that, the absence of a bond market may render an economy less efficient and significantly more vulnerable to financial crisis. The bond market promotes business growth by facilitating financing for both the corporate sector and the government. The development of the bond market reflects systematic progress in creditor protection and legal infrastructure in a country. Corporate bond markets need to be developed more than government bond markets in order to protect creditor rights. China's bond market has witnessed rapid growth in recent times, making it the third largest bond market in the world after the US and Japan. Its bond market is about $6.2 trillion, while India's is estimated to be about $1.1 trillion (Gandhi 2016). In China and South Africa, government bonds account for the bulk of the market compared to the US where corporate bonds account for the bulk. In South Africa, non-government issuance as a percentage of the total increased from 13% in 2002 to 48% in 2008, when corporate bonds reached close to a third of the domestic bond market's value (Hassan 2013b: 29). Brazil, Russia, India and China's corporate bond markets all grew at more than 20% compound annual growth between 2005 and 2014 (White paper on Indian Fixed Income Market 2015).

2.9.9. Outstanding domestic public debt securities

This refers to the total amount of domestic public debt securities (amounts outstanding) issued in domestic markets as a share of GDP. It covers long-term bonds and notes, treasury bills, commercial paper and other short-term notes. Governments borrow externally and as the financial sector develops, per capita income rises, while external public debt declines and is replaced by domestic debt (De la Torre, Ize and Schmukler 2011). The higher the outstanding domestic public debt securities ratio the more developed the financial sector is in that particular country**.** Russia has the lowest outstanding domestic public debt securities at 4% followed by India at 7%. Brazil and South Africa have the highest ratios of 54% and 30%, respectively. Brazil and South

Africa borrow more internally compared to other BRICS countries and consequently have more securities. Securitisation and innovation follow the development of the financial sectors; higher internal borrowing implies that the financial sectors are big and sustainable, because financial resources are available within the economies.

2.9.10. Outstanding domestic private debt securities

This measures the total amount of domestic private debt securities (amounts outstanding), issued in domestic markets as a share of GDP. It covers data on long-term bonds and notes, commercial paper and other short-term notes. India has the least outstanding domestic private debt securities at 2% followed by Russia at 4%. China and Brazil have the highest ratios of 23% and 20%, respectively. These indicators measure the size of the market for private bonds relative to the real economy. Countries with small financial markets tend to have small bond markets. Thus, China and Brazil have the largest financial sectors, i.e., the other BRICS countries need to develop their bond markets further and improve protection of creditor rights. The main determinant of the size of the bond market is the protection of creditor rights. Creditors are willing to purchase securities' products such as corporate bonds, only when they are convinced that their claims will be repaid without too much difficulty.

2.9.11. Domestic credit to private sector (% of GDP)

Domestic credit to private sector (% of GDP) reflects the role of financial intermediaries in channelling funds to the private sector. This measure isolates credit issued to the private sector, as opposed to that extended to the public sector, and also excludes credits issued by the Central bank (Calderón and Liu 2003: 7). Domestic credit to private sector refers to financial resources provided to the private sector by financial corporations such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable that establish a claim for repayment. Credit is an important link in money transmission; it finances production, consumption, and capital formation, which in turn affect economic activity. South Africa performs far better than the other BRICS countries in terms of its ability to mobilise credit and channel it to the private sector (Mingiri 2014: 11).

Higher domestic credit to private sector is an indication of more financial services and therefore greater financial intermediary development. South Africa has a ratio of 140%, followed by China at 119% which means that they have the highest level of financial intermediary activity among all BRICS countries. This implies that it should be relatively easy to obtain corporate credit in South Africa and China. The rationale for using this indicator is that it supports the notion that financial sector development might lead to economic growth. It is also one of the best financial development sector indicators available in the literature on the real growth and size of the financial sector. Therefore, other BRICS countries need to focus on developing their financial sectors to improve intermediation, especially Brazil and Russia where intermediation is very low.

2.10. Principal Component Analysis (PCA)

The main objective of principal component analysis is to decrease the dimensionality in data. This technique attempts to retain all the variation available in data even when dealing with a large set of variables. It transforms the data into new variables, i.e., the principal components and they are not correlated (Adnan 2011: 14). Principal component analysis is normally applied as a method of variable reduction or for detection of the structure of the relationship among the included variables. The information available in a group of variables is summarized by a number of mutually independent principal components. Each principal is the weighted average of the underlying variables (Adnan 2011: 15). Jackson (2005: 1) notes, that, principal components analysis is a technique used to obtain linear transformation of a group of correlated variables until certain optimal conditions are achieved, the most important of which is uncorrelated transformed variables.

There is no single measure for financial sector development; hence, the use of principal component analysis to reduce the variables used in this study to a single measure. Principal component analysis is applied simultaneously to three categories of financial development, i.e., banks, stock market indicators and the money market.

To promote accuracy, principal component analysis was applied on the same group of financial indicators for each of the countries. The principal component helps to accurately describe the financial sector in BRICS and rank the five countries according to the level of financial sector development. Constructing an index helps to create a single variable that in some reasonable way summarizes the 10 variables that are its constituents in order to reduce financial development from 10 variables to 1, 2 or 3. In this instance, principal components (PC1 to PC10) are employed as an aggregate measure of financial development. The main strength of the construction of a financial development index using principal component analysis is that the weights of the index are based on the inner correlation of all the individual measures.

2.10.1. Principal Components: BRICS

Table 0-6 Ranking of BRICS countries

Country	**Financial Sector Development Index**
China	8,2691
India	7.9089
South Africa	7,3032
Russia	5.5733
Brazil	4.0109

Source*: Own construct based on World Bank Financial Development Data 2001-2013*

An index of financial sector development was constructed through principal component analysis. (See appendix 4 for principal component country by country). The index includes all financial sector development variables used and all 10 principal components generated. China has the most developed financial sector followed by India and South Africa. Principal component 1 is positive for each country, indicating that it can be used as the financial sector development of the respective country. All principal components were used to construct the index in order to capture all the variation caused by the financial sector development variables in this study. The negative and positive values for banking or stock market development in principal

component 2 may mean that financial development in that particular country is due to banking sector development or to the latter. In India, for instance, all banking sector development variables are negative while the stock market variables are positive in principal component 2, implying that most financial sector development in India may be due to stock market development. However, other countries may have stock market variables with both negative and positive values. For instance, South Africa has a positive SMC/GDP but negative values for SMTR and SMTVT/GDP, implying that financial sector development may be more due to stock market capitalisation to GDP and not to stock market turnover ratio and stock market total value traded to GDP.

Table 0-7 Principal component analysis: Sample data 2001-2003

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	3.88537	1.65917	0.3885	0.3885
Comp2	2.2262	.37525	0.2226	0.6112
Comp3	1.85095	.970566	0.1851	0.7963
Comp4	.880386	.271846	0.0880	0.8843
Comp5	.608539	.27344	0.0609	0.9451
Comp6	.3351	.232801	0.0335	0.9787
Comp7	.102299	.0390106	0.0102	0.9889
Comp8	.0632881	.0210019	0.0063	0.9952
Comp9	.0422862	.0367097	0.0042	0.9994
Comp10	.0055765	.	0.0006	1.0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Comp8	Comp9	Comp10	Unexp
BC/BD	0.4486	-0.0166	-0.3135	-0.1344	0.0634	-0.1629	0.1410	0.1939	0.1422	0.7576	0
BD/GDP	-0.1480	0.2569	0.4420	0.0238	0.8094	-0.1392	0.0370	-0.0650	0.0203	0.1886	0
BC	-0.0141	0.5173	-0.3131	-0.2706	0.1055	0.6434	0.3093	-0.1759	0.0782	-0.0556	0
LL/GDP	0.4619	-0.1268	-0.1582	0.0590	0.2864	-0.2143	0.3145	0.0926	0.4330	-0.5649	0
PDSD/GDP	0.4130	0.2266	0.0516	0.4420	-0.1188	-0.0711	-0.1304	-0.7335	-0.0268	0.0718	0
DPDS/GDP	-0.0720	0.4833	-0.1353	0.6788	-0.0674	-0.0005	-0.0404	0.5246	0.0267	-0.0085	0
SMC/GDP	0.0671	0.4379	0.4241	-0.3536	-0.3747	-0.1806	-0.1948	0.0823	0.5301	-0.0092	0
SMTR	0.3319	0.0537	0.5142	-0.0069	-0.2215	0.0710	0.5786	0.1763	-0.4498	-0.0183	0
SMTR	0.3136	-0.3240	0.3174	0.1704	0.1028	0.6678	-0.3413	0.1796	0.2360	0.0771	0
DCPS/GDP	0.4179	0.2559	-0.1315	-0.3072	0.1704	-0.0740	-0.5258	0.1878	-0.4953	-0.2382	0

Source*: Own construct based on World Bank Financial Development Data*

Principal component 1 has BC/BD, LL/GDP, PDSD/GDP and DCPS/GDP with the highest positive value above 0.45, meaning that there is a strong influence of these variables in this component. Principal component 2 has BC, DPDS/GDP and SMC/GDP with values above 0.4, implying there is a strong influence of these variables on this component. Principal component 3 values have BD/GDP, SMC/GDP and SMTR with values above 0.4, suggesting that these are the variables that mainly influence this component. All PC1 are positive in the individual countries, meaning that this value reflects financial sector development in all the BRICS countries.

Ten financial development variables were used for the principal component analysis. It is observed that the first four principal components explained the maximum variation for all the countries. The cumulative proportion of the variance given by the first four principal components is 88.43% whereas the first three principal components contain 79.63% of the variation. Collectively, the components from 5 to 10 explain only 5.4 % of variation. Therefore, they are considered as relatively unimportant as useful information is captured by the first four principal components.

2.10.2. Correlation of PCA and original variables

The association between the components and the original variables is known as the component's eigenvalue. In multivariate space, the correlation between the component and the original variables is called the component loadings. The correlation coefficients of PCA with original values will tell us how much of the variation in a variable is explained by the component. In order to select a subset of variables which are most important from the ten variables used, correlation of PCA and original values was carried out. The values with the highest correlations of PCA and original variables are more important in the principal component.

Table 0-8 Correlation of pca and original values

	pc1	pc2	pc3	pc4
BC/BD	**0.8842**	-0.0247	-0.4265	-0.1261
BD/GDP	-0.2918	0.3833	**0.6014**	0.0223
BC	-0.0278	**0.7719**	-0.4260	-0.2539
LL/GDP	**0.9106**	-0.1892	-0.2153	0.0554
PDSD/GDP	**0.8140**	0.3381	0.0702	0.4147
DPDS/GDP	-0.1419	**0.7210**	-0.1840	**0.6370**
SMC/GDP	0.1322	**0.6534**	**0.5770**	-0.3318
SMTVT/GDP	**0.6542**	0.0801	**0.6995**	-0.0065
SMTR	**0.6181**	-0.4834	0.4319	0.1599
DCPS/GDP	**0.8237**	0.3819	-0.1789	-0.2882

Source: Own construct

Table 7 shows the correlation between indicators of financial development and the first four principal components. Seven of the indicators of financial sector development are positively correlated with PC1 which is chosen as a measure of financial sector development.

Interpretation of the principal components is based on establishing which variables are most strongly correlated with each component. In other words, we need to decide which numbers are large within each column. In Table 7 the figures which show high correlation are indicated in bold text.

First Principal Component Analysis – PC1 is a measure of BC/BD, LL/GDP, PDSD/GDP, SMTVT/GDP, SMTR and DCPS/GDP, which all have correlation of above 0.5. Correlation of above 0.5 indicates that these are the factors with greater weight in the component.

Second Principal Component Analysis - PC2: The second principal component is a measure of BC, DPDS/GDP and SMC/GDP, which all have correlations of above 0.5.

Third Principal Component Analysis - PC3: The third principal component is a measure of BD/GDP, SMC/GDP and SMTVT/GDP all of which have correlation coefficients above 0.5.

Fourth Principal Component Analysis - PC4: The fourth principal component is a measure of only DPDS/GDP, the only one with a coefficient above 0.5.

One method of deciding on the number of components is to include only those that give unambiguous results, that is, where no variable appears in two different columns

as a significant contribution. PC1 and PC2 satisfy this criterion and will be retained for use in further regressions as measure of financial sector development. PC1 and PC2 represent all financial sector variables except BD/GDP which is measured through PC2 to a lesser extent because the correlation is 0.3833. PC3 will also be retained because it is a significant measure of BD/GDP, SMC/GDP and SMTVT/GDP whilst PC4 has been dropped because it measures a variable that has already been measured by PC2. The other criterion is to keep a component with an eigenvalue greater than one; PC1, PC2 and PC3 all have eigenvalues greater than 1. These three components also explain 79.65% of the variation which is a high percentage value. This study chooses PC1 as the single measure of financial sector development which will be used in Chapter 5. PC1 has seven of the ten indicators of financial sector development which are positively correlated with original values.

2.11. Summary

The development of an economy's financial markets is closely related to its overall development. Well-functioning financial systems provide sound and easily accessible information which can lower transaction costs and subsequently improve resource allocation and boost economic growth. Both banking systems and stock markets enhance growth, which is the main factor in poverty reduction. South Africa and China are the two BRICS countries with the most developed financial sectors. Domestic credit to private sector (% of GDP) reflects that financial intermediaries in South Africa and China are more efficient in channelling funds to the private sector compared to other BRICS countries. It should be noted that financial intermediation in China is comparatively large compared to the rest of BRICS; the LL/GDP is over 150% whilst all other countries are below 70%. This implies that the banking sector in China is very large compared to other BRICS countries. South Africa has the most developed stock market among these countries. Its SMC/GDP is 175% whilst all other BRICS countries are below 62%. Russia, India and Brazil need to develop their financial sectors to improve intermediation. China and South Africa also have high bank credit-to-bank deposit ratios which means that banks lend out most of the deposits they mobilise compared to the other BRICS countries. South Africa has the highest banking concentration as well as the highest bank deposits to GDP.

South Africa and China have the most developed stock markets amongst BRICS, and the highest stock market capitalization to GDP and stock market total value traded to GDP. China has the highest stock market turnover ratio. Capital markets are more developed in South Africa and China, where the banking sector is also more developed than the rest of BRICS implying a relationship with financial sub-sector development. South Africa has a developed stock market but also has the least liquidity as it has the least stock market turnover ratio amongst BRICS.

Brazil and South Africa have the most developed securities markets as well as the highest levels of domestic public debt securities and domestic private debt securities. Securitisation in public debt corresponds to securitisation of domestic debt. South Africa is consistent in its financial sector development as it also has high securitisation compared to China. BRICS countries should therefore prioritise financial sector development as this will promote economic growth through mobilising finance for businesses and trade within countries. The group would also benefit from an advanced financial system that facilitates transactions and payments.

CHAPTER 3 TRADE CREDIT IN BRICS

3.1. Introduction

This chapter analyses trade credit usage by listed firms in BRICS. Trade credit plays a very important role in financing working capital for firms. It should be highlighted that an under-developed financial sector results in firms using more trade credit than bank credit because of the unavailability of the latter. The growth and development of a country's financial sector should therefore result in firms using less trade credit and more bank credit. Trade credit is an interesting component of finance and investment as it finances both current assets as trade receivables and current liabilities as trade payables. The chapter begins with an outline of the history and evolution of trade credit and a review of previous literature on the topic. This is followed by a discussion on the methodology, the presentation and analysis of the data and the findings. Regressions are carried out and specifications tests for model selection are delineated. The next section presents the empirical investigation of trade credit targeting in BRICS to investigate the trade credit policies adopted by firms. The chapter also outlines and explains the trade credit practices and trends among firms in BRICS.

3.2. Definitions of trade credit

There are a number of definitions of trade credit based on the combination of the words trade and credit. Firstly, trade is defined as an economic concept involving the buying and selling of goods and services, with compensation paid by a buyer to a seller, or the exchange of goods or services between parties. Secondly, credit is described as a contractual agreement in which a borrower receives something of value now and agrees to repay the lender at a future date, generally with interest. Trade credit thus refers to deferred payment for goods or services purchased by one company from another, granted by the seller for a short period, primarily to give the buyer a means of financing inventories (Encyclopaedia Britannica 2010).

Trade credit is part of a joint commodity and financial transaction in which a firm sells a good or service and simultaneously extends credit for the purchase to the customer (Lee and Stowe 1993: 123). It is also defined as short-term credit linked to the sale of

goods given to the client by the supplier without any intermediary financial agent (Santos, Sheng and Bortoluzzo 2012: 10). Trade credit that is known as accounts payable is described as short-term loans provided by suppliers to their customers upon purchase of their products; it is automatically created when customers delay payment of their bills to suppliers (Guariglia and Mateut 2006: 429).

Trade credit is one finance vehicle for corporate firms. Other sources of finance include bank loans, venture capital and commercial paper. However, trade credit is probably the easiest and most important source of short-term finance available for business-to-business trade. It is an agreement in which a supplier allows a business to delay payment for goods and services already delivered (Fitzpatrick and Lien 2013: 39). Allowing payment after the receipt of the goods and services helps the business to better manage its short-term cash flows (Fitzpatrick and Lien 2013: 39). Trade credit is an alternative source of funding to credit provided by financial institutions, hereinafter referred to as bank loans.

3.3. The history of trade credit

Trade credit is an essential element of business life. It can be traced as far back as 1000BC (Christie and Baracuti 1981; (Cheng and Pike 2003). In its most elementary form, society carried out trade by means of barter. Modern commerce operates on the same principle as gold and silver coins, bankers' notes and bills of exchange can be considered as instruments to facilitate barter (Thornton 1802). The barter exchange system started at the beginning of human kind when money was not available. The primary transaction is the exchange of goods and money, following the exchange of goods. It is therefore important that goods can be exchanged when money is not available at present but will be available at a later date. Thornton (1802) defines money as an instrument to facilitate the exchange of goods.

The historical evolution of trade credit is somewhat obscure, with no substantial evidence as to its roots. Long, Malitz and Ravid (1993) suggest that it arose as a source of finance in colonial times to facilitate the exchange of goods and services.

Trade credit was extended for as long as a year, perhaps representative of the frequency of merchant visits to commercial centres. However, with improved transportation and the natural development of commercial activity, the process of offering trade credit was formalised and the contractual credit period was reduced.

Long, Malitz and Ravid (1993) observe that, the pure financing motive for trade credit emerged during colonial times in the US. At this time, there were no established financial institutions and trade credit provided the only means for new merchants to finance working capital. However, this does not explain why trade credit was widespread in England in the 18th century when central banking existed, or why it continued to be used after the US established financial institutions. Nor does it explain industry-specific terms or why trade credit exists in some competitive environments, but not others.

During colonial times, trade credit was extended for longer periods of about a year. Bad debts were almost non-existent, even though payment terms were quite uncertain. Travel was difficult; merchants usually purchased goods once a year. By the early 1800s, payment terms had been reduced to about six months. Merchants now visited commercial centres twice a year to buy goods. Transactions took place between suppliers and merchants, and previous purchases were paid for when new goods were purchased. Since few sellers could afford to carry financing for six months or longer, the "domestic draft" or "bill of exchange" came into being. After the American Civil War, the development of a nationwide transportation system brought about tremendous changes in the economy. Merchants now purchased goods more frequently. Manufacturers grew and sold their goods nationwide, and payments were frequently made by mail. Credit terms of one or two months became the norm. Following World War I, a variety of credit terms was observed. They were, however, relatively uniform and appeared to be based on the frequency of repurchase and the uniqueness of the product. Food and other perishable items typically had short terms of less than 30 days. In contrast, most perishable goods were sold net 30 to 60 days. The development of industry-specific terms is difficult to explain in the financial context but is consistent with the fact that trade credit is a means of verifying product quality for relatively unknown, unique goods.

The manufacturer or jobber of a standard, nationally advertised brand of goods, which the dealer must stock, can demand quick terms from the buyer while those selling substitute goods may offer a longer term in order to place their goods with the dealer (Ettinger and Golieb 1917: 58). Ettinger and Golieb (1917) note the historical importance of product quality guarantees and the availability of substitute goods that are similar, but not identical to each other. Consistent with this approach, agricultural goods produced in markets as close to perfectly competitive as possible, have always been sold for cash rather than on a credit basis (Long, Malitz and Ravid 1993: 120).

3.4. Trade credit and monetary policy

Trade credit can be viewed as a component of money supply. In the form of accounts payable, it complements primary money supply. Trade credit allows business and transactions to be carried out despite the lack of money, thereby avoiding cash shortages. During monetary contractions, small firms, which are likely to be more credit constrained, react by borrowing more from their suppliers (Fisman and Love 2003: 356). While scholarly examination of the history of trade credit and its potential ability to act as an inflationary agent dates back to Mill, it only received special attention in the 1950s in the work of Henderson and Tew (1959), the Radcliffe Committee and Rose (1957) and Sayers (1960).

Trade credit is not limited to firms ordinarily regarded as financial intermediaries; those whose main activity is manufacturing or trading also undertake a great deal of lending and borrowing. They extend "trade credit" to their customers, and they take "trade credit" from their suppliers (Sayers 1960: 713). Evidence of this lies in the large increase in trade credit recorded in *The Economist*'s accounts (Rose 1957: 398). The continued spread of trade credit in 1955-56 enabled businesses that were short of cash, including those whose bank advances were reduced, to draw on the more abundant resources of other firms, including those whose favoured status secured a further increase in bank credit or permission from the Capital Issues Committee to raise capital in the new-issue market (Rose 1957: 398).

Rose (1957) and Sayers (1960) assessed the importance of trade credit as an institutional mechanism through which periodic restrictive monetary policies were avoided during the 1950s. In the same vein, Brechling and Lipsey (1963) reconsidered the theory which predicts that trade credit may frustrate attempts by the monetary authorities to reduce private sector expenditure and conducted an empirical study to determine the extent to which this was the case in the 1950s.

3.5. Advantages and disadvantages of trade credit

3.5.1. Advantages of trade credit

Trade credit is perceived as equivalent to granting an “interest-free” loan to customers who regard this as a cheaper way to finance purchases than borrowing from financial institutions (Cheng and Pike 2003: 421). Interest is charged on loans from financial institutions whilst buying on trade credit terms may not involve interest where the cash and credit prices are equivalent.

Trade credit is particularly attractive to the seller firm when it can raise finance more cheaply than some of its customers; these benefits are passed on to customer firms (Cheng and Pike 2003: 421).

Trade credit is also an important source of intermediate finance for buyer firms, especially those with limited access to financial markets (Cheng and Pike 2003: 423). It is usually quicker and easier to obtain finance from suppliers through trade credit than to obtain bank credit. If firms have limited access to financial markets they can use trade credit as an alternative.

Monitoring the costs of existing customers are lower for suppliers of trade credit than for an unsecured bank loan because the supplier has more regular contact with the customer and is more informed regarding their trading position (Cheng and Pike 2003: 422).

The flexibility offered by allowing customers to delay payment to suppliers reduces the need for large cash balances for unexpected exigencies (Cheng and Pike 2003). Transactions can be carried out when cash is not available with the buyer receiving products for immediate use.

Trade credit also offers the advantage of improved information acquisition compared to the way financial institutions obtain information on their clients. The supplier may visit the buyer's premises more often than financial institutions would. The size and timing of the buyer's orders also give him/her an idea of the condition of the buyer's business (Petersen and Rajan 1997: 662).

Trade credit enables suppliers to control the buyer. This could be due to the fact that there are few economical alternative sources other than the supplier. In such a case, the supplier can threaten to cut off future supplies in the event of borrower actions that reduce the chances of repayment. A common explanation of trade credit is that suppliers have a monitoring advantage over banks (Burkart and Ellingsen 2004).

The supplier can also salvage value from existing assets. If the buyer defaults, the supplier can seize the goods supplied. The more durable the goods, the better collateral they provide and the greater the credit the supplier can offer.

The supplier has more financing advantage through using trade credit than financial institutions, especially in assessing creditworthiness. The supplier may be better able to assess the credit worthiness of his/her clients, as well as superior ability to monitor and enforce repayment (Petersen and Rajan 1997: 663). It is typically less profitable for an opportunistic borrower to divert inputs than to divert cash (Burkart and Ellingsen 2004: 572). As noted earlier, the cost of monitoring existing customers is lower for suppliers of trade credit than for an unsecured bank loan because the supplier has more regular contact with and is more informed regarding the customer’s trading position(Cheng and Pike 2003: 425).

3.5.2. Disadvantages of trade credit

Trade credit is typically more expensive than bank credit especially when customers do not use the early payment discount (Petersen and Rajan 1997: 664). Ng, Smith and Smith (1999) used a set of survey data to conclude that the implicit interest on trade credit is high. Similarly, Petersen and Rajan (1997: 665) concluded that, trade credit is an expensive substitute for institutional funding when the latter is unavailable.

A customer faces significant late payment penalties including the implicit costs of damaging a critical long-term relationship as well as explicit and significant pecuniary penalties (Petersen and Rajan 1994a: 301). Buying goods through trade credit may prove expensive, especially where discounts are foregone.

Businesses often offer a permissible delay in payment to their customers in order to increase sales, with a positive impact on demand but negative impacts on default risks and costs (Chern *et al.* 2014: 69). Whilst offering trade credit may help to increase sales, the consequent increase in default risk may outweigh the benefits in some cases.

Long payment terms are a strong impediment to the entry and survival of constrained, yet efficient firms (Barrot 2015: 52). Trade credit use follows industry practices and firms that do not offer trade credit in a market where this is the norm among established players may find it difficult to survive.

The supplier can stop the supply of intermediate goods in case of default by the customer (Cunat 2007: 11). In emerging economies, trade credit has a bad reputation because it often results from inter-firm arrears and soft budget constraints (Bonin and Wachtel 2003: 7). The sudden loss of supplies can result in further problems such as unfulfilled orders and damage the reputation of the defaulting company. The supplier can also repossess the goods which may interrupt production. Trade credit must be settled when the credit period ends, whilst bank loans can be re-negotiated and rolled over. Failure to meet trade credit obligations could have more serious immediate consequences than bank loans.

Trade credit is limited because it is only available when goods are purchased, unlike bank credit which can be used to purchase other goods. The finance motive for using trade credit implies that it is a highly unattractive substitute for bank loans because it is tied to the purchase of goods, while loans may be unrestricted (Nilsen 1999: 42). Trade credit can therefore not be diverted to fund critical areas that lack resources.

This study examines the extent and trends of the use of trade credit amongst listed companies in BRICS countries. The sample consisted of firms listed in the respective countries for the period 2001 to 2013. The following section reviews the trade credit literature in order to establish the reasons why firms use it and inform the analysis.

3.6. Trade Credit Literature Review

While arguments in favour of reducing, or even eliminating, trade credit are appealing, it is clear that, in well-developed economies, the majority of businesses rely heavily on the credit terms extended as a source of finance. The importance of trade credit is evident in its volume; for many companies, trade debtors are one of the largest asset categories on their balance sheet (Cheng and Pike 2003: 420). Trade debtors, or accounts receivable, represent around 21% of total UK assets (Cheng and Pike 2003: 421). Ng, Smith and Smith (1999) report that during the 1990s, vendor financing represented approximately 2.5 times the combined value of all new public debt and primary equity issues over the period of a year. During the 1990s, vendor financing accounted for an average $1.5 trillion of the book value of all assets of US corporations and as a component of money supply, trade credit, in the form of accounts payable, exceeded primary money supply (MI) by a factor of 1.5 on average (Ng, Smith and Smith 1999: 1111). As at 2009, trade payables as a form of financing the purchase of goods extended by suppliers to their customers represented the second largest liability on the aggregate balance sheet of non-financial businesses in the US (US Flow of Funds Account 2011). Second only to corporate bond liabilities, trade payables outstanding more than tripled the amounts owed to banks and were more than 20 times the value of assets financed in commercial paper markets. Considering its volume as a source of corporate funding, there is limited research on the origins or

effects of trade credit relationships on firms' other financial and real activities (Murfin and Njoroge 2012: 805).

The primary objective of a company offering trade credit to its customers is to stimulate end demand for the product or service (Huang 2003: 1112). Trade credit is used as form of short-term debt because it does not require any outright interest and often takes the form of an informal contract. It is most frequently used by small manufacturing businesses (Holmes and Kent 1991). Trade credit is a critical source of spontaneous inter-firm financing that is particularly important to small and growing firms (Richards and Laughlin 1980). Receiving goods now and paying later puts less pressure on cash flow. Companies tend to use trade finance when there are no bank loans or when they do not have access to such and other financial institutions.

Small firms suffering a decline in the availability of loans may use trade credit extensively. Surprisingly large firms also increase trade credit despite access to other forms of credit. This is due to financial factors (Nilsen 1999). Bougheas, Mateut and Mizen (2009) argue that despite a firm having access to bank loans, inventories and sales will be partly financed by trade credit. Kwenda and Holden (2014) stated that trade credit is an important source of funds even in well-developed financial markets. Trade credit theory highlights that suppliers are better able to obtain information about their clients than banks. This issue is discussed in further detail later in this chapter. Small firms are more likely to rely on trade credit than large firms as the latter are able to obtain loans on the local and foreign capital market and are also in a better position to generate cash internally.

Schiozer and Brando (2011) showed that the amount of trade credit supplied by Brazilian publicly traded firms is positively related to the amount of trade credit extended by their suppliers. In India, the trade dues to total funds ratio of public limited companies varied between 12% and 20% from 1966-2000 (Bhole and Mahakud 2004). De Carvalho and Schiozer (2012) survey of Brazilian SMEs found that they passed on trade credit terms and conditions received from suppliers to their clients. Saito and Bandeira (2010) investigated trade credit use and its relevance for large firms in Brazil and found that these firms lacked access to bank loans.

Cull, Xu and Zhu (2009) found that poorly performing state-owned enterprises (SOEs) were more likely to redistribute credit to firms with less access to loans via trade credit. Indian firms with greater access to bank credit offer less trade credit to their customers. On the other hand, firms with higher bank loans receive more trade credit (Vaidya 2011). Cook (1999) found that small firms in Russia that receive trade credit obtain access to bank loans. Despite increased access to finance, firms in the formal sector in South Africa still employ significant trade credit. According to Kwenda and Holden (2013), approximately half of current assets were financed by trade credit. A study in China by Du, Lu and Tao (2012) shows that a country with a poorly developed financial sector can support growth through non-financial channels such as trade credit.

Petersen and Rajan (1997) note, that small firms may have limited access to capital and will therefore tend to use trade credit instead of financial institutions. Furthermore, firms with better access to credit will give trade credit to their customers. The main determinants of trade credit are asymmetric information between buyers and sellers and guaranteeing product quality (Ng, Smith and Smith (1999). A firm's individual credit policy and investment in buyer-seller relationships are other determinants (Ng, Smith and Smith (1999). Trade credit can be used as a promotional tool as well as a relationship marketing one.

The matching approach whereby a firm finances short-term needs with short-term funds and long-term needs with long-term funds is another reason for using trade credit (Deloof and Jegers (1999). The matching principle of finance states that short-term assets should be financed with short-term liabilities and long-term assets with long-term liabilities (Guin 2011). A firm's current assets (CA) and current liabilities (CL) are short-term assets and short-term financing, respectively; the matching principle implies that a firm's current assets should equal its current liabilities (Fosberg 2012). If, however a firm is managing its liquidity position it will tend to maintain more current assets than current liabilities.

In business trade credit can be used to stimulate demand. Customers prefer trade credit because they may not have the cash and it also offers breathing space in managing their cash position and liquidity. Businesses often offer a permissible delay

in payment to their customers in order to increase sales. This has a positive impact on demand but negative impacts on default risks and costs (Chern *et al.* 2014). It is common for the supplier to offer the retailer a permissible delay in payments in order to stimulate demand from the retailer that can either pay all accounts at the end of the credit period or delay incurring interest on the unpaid and overdue balance due to the difference between interest earned and interest charged (Cheng, Chang and Ouyang (2012).

3.6.1 Trade Credit versus bank credit

While firms use both trade credit and bank loans, there is need to consider the cost differences. Ng, Smith and Smith (1999) used a set of survey data to conclude that the implicit interest on trade credit is high. Similarly, Petersen and Rajan (1997) found that trade credit is an expensive substitute for institutional funding when the latter is unavailable. If firms have easy access to other sources of finance, they will probably not use large amounts of trade credit if it is expensive. Yang and Birge (2013) also allude to the fact that the implicit interest on common trade credit terms is surprisingly high.

Trade credit (i.e., accounts payable) is described as short-term loans provided by suppliers to their customers upon purchase of their products and is automatically created when customers delay payment of their bills to suppliers (Guariglia and Mateut 2006). It is typically more expensive than bank credit, especially when customers do not use the early payment discount (Petersen and Rajan 1997). According to Berger and Udell (1998), in 1993, 15.78% of the total assets of small US businesses were funded by trade credit (Guariglia and Mateut 2006). A customer faces significant late payment penalties including the implicit costs of damaging a critical long-term relationship as well as explicit and significant pecuniary penalties (Petersen and Rajan 1994a). Marotta (2001) provides evidence that inter-firm credit received by Italian manufacturing firms is, if at all, only slightly more expensive than bank loans.

Cunat (2007) states that, the implicit interest rates in trade credit are commonly very high compared with the rates in bank credit; however, trade credit is widely used by

firms due to its advantages. The benefits include reduced transaction costs. Furthermore, it is less costly for firms to postpone trade credit payments than negotiable bank loans. Trade credit can also offer firms a greater degree of financial flexibility than bank loans. Due to its revolving nature, trade credit balances increases or decreases in business activity; when a firm faces temporary cash flow problems, it is less costly to delay trade credit payments than to renegotiate the payment terms of bank loan (Danielson and Scott 2004). Negotiating trade credit terms is also less complicated than a bank loan application. Firms in the same value chain are mutually dependent. For instance, manufacturers depend on their suppliers for raw materials and suppliers in turn depend upon the latter for a market.

3.6.2. Trade credit as a form of financing

Trade credit can be used for either transaction or financing purposes. The supplier lends goods and services which is a form of loan that expires at the end of the credit period. Kwenda and Holden (2013) study of firms listed on the JSE reveals that companies in South Africa depend heavily on trade credit as a source of short-term finance. Companies can borrow from banks for considerably longer periods than is the case with loans from trading partners through trade credit. Firms that borrow from banks also use trade partners when they face unexpected short-term exigencies and both large and small firms use trade credit to raise substantial funds (Miwa and Ramseyer 2005).A firm's cash flow and liquidity position makes the use of trade credit worthwhile since cash payment will not be immediately required.

Larger and older firms with strong internal financing or cash flow are less likely to use trade credit but financially constrained firms use more trade credit as an alternative source of funding and this relationship increases loan availability (Niskanen and Niskanen 2006). Variation in accounts payable is primarily caused by differences in the value of input transactions and improvements in customers' financial conditions tend to reduce the value of input purchases because risks are reduced and prices consequently fall (Ellingsen, Jacobson and von Schedvin 2016). The other reason given by Ellingsen, Jacobson and von Schedvin (2016) is that improved financial conditions may enable firms to undertake long-run investment that reduces their input

requirements, either through improved efficiency or by bringing more activities inside their boundaries.

3.6.3. Trade Credit Theories

The level of a firm's accounts receivable depends on how much it decides to lend to its customers. However, as Petersen and Rajan (1997) pointed out, there must also be a demand factor that affects the amount of trade credit a firm is able to extend. The motives for trade credit can be summarised under the broad headings of information asymmetry, efficiency, financing, investment and marketing or competitiveness.

3.6.3.1. The substitution hypothesis

Trade credit can help firms to overcome the challenges presented by poorly developed or underdeveloped financial sectors (Danielson and Scott 2004) and the non-availability of bank finance (Fisman and Love 2003). The substitution hypothesis states that trade credit is a substitute for bank credit (Burkart and Ellingsen 2004).If this theory holds, the expectation would be that in countries with developed financial sectors, firms have low trade credit usage compared with firms in countries with poorly-developed financial sectors. If a firm faces cash flow constraints because bank loans are not available, it could respond by delaying some trade credit payments (Danielson and Scott 2004). As trade credit payments slow, a greater portion of the firm's working capital will be financed with trade credit and, in extreme cases, delayed trade credit payments could help fund capital investment (Danielson and Scott 2004).

3.6.3.2. Product quality guarantee theory

As argued by Smith (1987) and Long, Malitz and Ravid (1993), trade credit allows a firm to verify product quality before paying. Long, Malitz and Ravid (1993) developed a model of trade credit in which asymmetric information leads sound firms to extend trade credit so that buyers can verify product quality before payment and showed that

firms producing low-quality goods will sell for cash. The credit period permits buyers to reduce uncertainty about product quality prior to payment (Pike *et al.* 2005). The main determinant of trade credit is asymmetric information between buyers and sellers and offering delayed payment guarantees product quality (Ng, Smith and Smith (1999). A firm's credit policy and investment in buyer-seller relationships are amongst other determinants of trade credit (Ng, Smith and Smith (1999).

Selling products on credit may signal that they are of good quality and are reliable. Inter-firm credit terms and credit policies vary across industries. Credit terms are contractual solutions to information problems concerning product quality and buyer creditworthiness (Ng, Smith and Smith 1999). Firms that are not certain about the quality of a product may prefer to buy it on credit so that they can test it before paying. The largest and most creditworthy buyers receive contracts with the longest maturities from smaller suppliers (Klapper, Laeven and Rajan 2012).

3.6.3.3. Financing advantage theories of trade credit

Emery (1984) suggests that differences between the market borrowing and market lending rates of interest provide a financial incentive to suppliers to engage in arbitrage, using surplus funds to finance customer purchases, rather than earning interest on the market. Suppliers may have an advantage over traditional lenders in investigating the credit worthiness of clients, and are often better able to monitor and enforce repayment (Petersen and Rajan 1997). It is typically less profitable for an opportunistic borrower to divert inputs than to divert cash (Burkart and Ellingsen 2004).

a. **Advantage in information acquisition**.

The supplier may visit the buyer's premises more often than financial institutions would. The size and timing of the buyer's orders also give him/her an idea of the condition of the buyer's business (Petersen and Rajan 1997). The buyer's inability to take advantage of early payment discounts may alert the supplier to deterioration in the buyer's creditworthiness. While financial institutions may collect similar information, the supplier may be able to obtain it faster and at lower cost because it is obtained in the normal course of business.

b. **Advantage in controlling the buyer**

The nature of the goods supplied may mean that there are few economical alternative sources. If so, the supplier can threaten to cut off future supplies in the event of borrower action that reduces the chances of repayment (Petersen and Rajan 1997). A common explanation for trade credit is that suppliers have a monitoring advantage over banks (Burkart and Ellingsen 2004). A financial institution may have more limited powers; the threat to withdraw future finance may have little immediate effect on the borrower's operations (Petersen and Rajan 1997). The supplier has the advantage in controlling the buyer, especially if they are a key supplier.

c. **Advantage in salvaging value from existing assets**

If the buyer defaults, the supplier can seize the goods. The more durable the goods supplied, the better collateral they provide and the greater the credit the supplier can supply (Petersen and Rajan 1997). It is typically less profitable for an opportunistic borrower to divert inputs than to divert cash (Burkart and Ellingsen 2004). Financial institutions can also reclaim a firm's assets to pay off the firm's loan. However, if the supplier already has a network to sell its goods, the costs of repossessing and resale will be lower than that of an institution.

3.6.3.4. Informational Asymmetry theory

Trade credit terms implicitly define a high interest rate that operates as an efficient screening device where there is asymmetric information about buyer default risk. By offering trade credit, a seller can identify prospective defaults more quickly than if financial institutions were the sole providers of short-term financing (Smith 1987). Trade credit is regarded as a contractual device to deal with informational asymmetry in intermediate goods markets and terms are established that enable information to be obtained about a buyer's default risk (Smith 1987). The main determinant of trade credit is asymmetric information between buyers and sellers and offering delayed payment would guarantee product quality (Ng, Smith and Smith 1999: 1109). Asymmetric information between banks and firms can preclude the financing of valuable projects; trade credit can alleviate this problem by incorporating private

information held by suppliers about their customers in the lending relationship (Biais and Gollier 1997).

Trade credit helps to address credit risk information asymmetry between financial and non-financial markets. Information asymmetry concerns the borrower's or buyer's payment intentions; that is, the lender or supplier does not know whether the borrower or buyer intends to pay on time. For a non-financial firm, two-part payment terms and prompt payment incentives can be used to identify the default risk of prospective buyers. Buyers reveal their poor access to finance markets when they forgo an attractive cash discount for early payment and choose to pay in full at a later stage. Prompt payment discount policies incur transaction costs to help identify earlier than otherwise customers with cash flow problems and signal the need for stronger monitoring and control (Cheng and Pike 2003).

3.6.3.5. The price discrimination theory

Trade credit can also be used as a means to price discriminate. This theory was put forward by Nadiri (1969) who stated that in highly competitive markets, suppliers compete for customers using fronts other than price. Trade credit may be offered even if the supplier does not have a financing advantage over financial institutions because it can be used to price discriminate (Petersen and Rajan 1997). The supplier can charge different customers different prices. Trade credit may allow suppliers to price discriminate when discrimination through prices is not legally permissible (Petersen and Rajan 1997). However, Burkart and Ellingsen (2004) argued that price discrimination theories cannot account for trade credit in competitive markets. Customers without liquidity constraints pay early and access the discount; monopolists can use trade credit as a tool for price discrimination.

Creditworthy customers usually receive favourable prices and trade credit. High-priced trade credit may be a subsidy targeted at risky customers (Petersen and Rajan 1997). The seller offers credit terms that fit the credit quality of the buyer; since trade credit exposes the seller to default risk, offering credit reduces the effective price to low-quality borrowers (Ng, Smith and Smith 1999). Provided that risky borrowers are the

more price-elastic segment of the market, offering credit results in gains for the seller (Ng, Smith and Smith 1999).

3.6.3.6. Signalling theory of trade credit

This theory holds that financial institutions observe a firm's access to and use of trade credit and use this information to judge its creditworthiness. Trade credit extension may signal financial health, reputation and increased sales (Wilson and Summers 2002). Sellers extend trade credit to their customers only if they receive a good signal, and the availability of trade credit induces banks to also lend (Biais and Gollier 1997). If the signaling theory holds, the expectation would be that firms use trade credit to improve their access to bank finance, which implies that trade credit usage will be reduced once a firm gains access to bank credit.

3.6.3.7. Transactions costs theories

An alternative theory of trade credit is that it exists to decrease the transaction costs of payment on delivery (Ferris 1981; Fisman and Love 2003). The buyer may find it economical to pay once a month or quarterly instead of making payment each and every time goods are delivered (Petersen and Rajan 1997).

Another reason for using trade credit is the matching approach whereby a firm finances short-term needs with short-term funds and long-term needs with long-term funds (Deloof and Jegers 1999). The matching principle of finance states that short-term assets should be financed with short-term liabilities and long-term assets with long-term liabilities (Guin 2011). Trade receivables finance short-term assets whilst trade payables finance short-term liabilities. A firm's current assets (CA) and current liabilities (CL) are short-term assets and short-term financing, respectively; the matching principle implies that a firm's current assets should equal its current liabilities (Fosberg 2012).If this theory holds, firms will match trade receivables and trade payables. If, however a firm is managing its liquidity position it will tend to maintain more current assets than current liabilities.

3.6.3.8. Financing Motive

The finance motive for using trade credit implies that it is a highly unattractive substitute for bank loans because it is tied to the purchase of goods, while loans may be unrestricted (Nilsen 1999). Trade credit is used to exploit and manage imperfections in financial markets. While the efficiency motive may explain relatively short periods of credit, the financing motive has greater relevance for longer-term credit. Ferris (1981) argues that trade credit becomes less an instrument of trade and more an instrument of finance as the length of the credit period increases, with the seller firm acting as a financial intermediary to grant an “interest-free” loan. Credit extension becomes a type of short-term loan between the seller and buyer that is tied to the exchange of goods in terms of value and timing (Ferris 1981).

In perfectly competitive markets, a customer can borrow in financial markets, using goods as collateral, at the same rate of interest as the seller. In such markets, trade credit becomes irrelevant; customers are indifferent to trade credit and bank credit (Cheng and Pike 2003). However, in practice, differences in transaction costs and information asymmetry often make trade credit more attractive than bank credit to both the buyer and seller. Collection and bad debt costs may be lower for the seller firm offering credit than a bank because information obtained as a by-product of the selling process gives the seller specialist knowledge of, and contact with, customers (Cheng and Pike 2003). Customers find bank borrowing to finance small purchases relatively expensive, preferring the seller to raise finance to cover the total credit extended to customers.

The use of trade credit frees cash flow as payment is not required immediately; it is thus a form of liquidity management. Demand for trade credit in the form of accounts payable can be considered as a way to obtain short-term financing, which is extensively used by corporations to postpone immediate cash payments and increase the cash flow available inside the company (Pike *et al.* 2005). Firms increase trade receivables when they have profitability problems, but reduce them when they face cash flow problems (Molina and Preve 2009).

3.6.3.9. Investment Motive

Trade credit can be used for wealth-creating investment in accounts receivable. Closely linked to the financing motive, the investment motive rests on the desire to create shareholder value by investing in wealth-creating selling opportunities (Cheng and Pike 2003). Much of the conventional trade credit literature regards each sale of goods or services as an isolated transaction, thereby adopting a short-term asset management perspective. However, Copeland and Khoury (1980) argue that receivables should be treated as an investment rather than the passive consequence of sales. The investment motive becomes particularly important if the seller can charge a higher price by offering credit terms, generating an implicit interest income for delayed rather than immediate payment. Trade credit therefore creates present-value revenue when the implicit interest income exceeds the seller's cost of capital, including credit screening and monitoring costs (Neale and Shipley 1985). Firms should invest in trade credit if the net present value of the revenue receivable with trade credit is greater than the NPV arising without it (Schwartz 1974; Ferris 1981).

3.6.3.10. Marketing and competitiveness motives

Firms may adopt trade credit policies that relate to their target growth rates; a firm wishing to grow may choose to extend trade credit with longer due periods than its competitors (Niskanen and Niskanen 2006). Trade credit can be used as a competitive tool and to generate additional cash flows by financing the sale of additional units to their poorer customers. It can assist with promotional and pricing decisions, and maintain or enhance competitiveness and corporate image. Trade credit eases the selling process by aiding marketing and sales in a number of ways (Cheng and Pike 2003). Firstly, it forms part of an integrated package of measures which can be employed to stimulate demand (Ingves 1984), providing further opportunity for the seller to differentiate its product-finance offering from its competitors.

The trade receivables policy of distressed firms is usually a trade-off between improving sales and its need for cash (Molina and Preve 2009). Kaplan (1967) was

one of the writers that argued that the credit function should be regarded as a promotional tool and not a purely financial one. Shipley and Davies (1991) found empirical evidence that trade credit provision is an important supplier selection criterion, especially when suppliers offer an identical mix of variables such as price, quality and delivery. The trade credit offer can extend flexible payment terms to support customer needs. Where demand is irregular, due to uncertainty or seasonality, the seller may temporarily relax the credit terms or standards to stimulate sales during slack demand periods (Nadiri 1969; Emery 1984). This has the effect of smoothing demand, thereby reducing the seller's capacity and stock- holding requirements (Cheng and Pike 2003).

3.6.3.11. Efficiency motive

Trade credit is offered to create cost and operating efficiencies through separating the exchange of goods, which is characterised by uncertainty, from the exchange of cash. By forewarning the trading partners of the timing of money flows, trade credit permits a reduction in precautionary money holdings and more effective management of net money accumulation (Ferris 1981). Cost efficiency can be achieved by separating shipment of goods from payment routines, i.e., payment on delivery is costly to monitor (Cheng and Pike 2003). The selling-delivery-collection process is governed by a series of costly contracts, both formal and informal, each with associated costs of negotiation and enforcement. Trade credit can reduce contracting costs for both selling and buying firms because separating delivery from payment reduces the risk of monetary theft, thereby reducing the need for costly employee monitoring (Stowe and Gehr 1985). It is therefore a valuable instrument for both supply chain management and for reducing payment transaction costs (Cheng and Pike 2003).

3.6.3.12. Transactions costs theories

First developed by Schwartz (1974), this theory posits that suppliers may have an advantage over traditional lenders in verifying the real financial situation or credit worthiness of their clients. Suppliers also have superior ability to monitor and enforce repayment of the credit (Bastos and Pindado 2007). All these factors may give

suppliers a cost advantage over financial institutions (Bastos and Pindado 2007). As noted earlier, trade credit may reduce the transaction costs of paying bills (Petersen and Rajan 1997). The matching principle of finance states that short-term assets should be financed with short-term liabilities and long-term assets with long-term liabilities (Guin 2011). A firm's current assets and current liabilities are short-term assets and short-term financing, respectively; the matching principle implies that a firm's current assets should equal its current liabilities (Fosberg 2012). If, however a firm is managing its liquidity position it will tend to maintain more current assets than current liabilities.

Trade credit can be used as a substitute for loans (Bastos and Pindado (2013). Therefore, financial sector development may lead firms to substitute trade credit with bank loans. Previous studies have not investigated the relationship between financial sector development and trade credit choice. Financial sector development presents more financing options to a firm. Financial sector development changes over time and a growth in this sector may impact on a firm's financing policy.

3.7. Methodology

3.7.1. Data sources and Sample

This empirical study is based on a sample of non-financial services listed firms in BRICS countries. Data was collected from their published financial statements for the accounting period 2001 to 2013. These are available on the Bloomberg online database which provides financial statements for firms listed on the world's stock exchanges. The firms included those listed on the BM&F Bovespa for Brazil, the Moscow Stock Exchange for Russia, NSE for India, the Shenzhen Stock Exchange for China and the JSE for South Africa**.** The companies were from the industrial goods, consumer goods, telecommunications, health, basic resources, technology, oil and gas and utilities sectors and data was analysed using descriptive statistics. A country mean of trade credit use is computed and then aggregated in order to establish the trend. The main aim of the analysis is to reveal and clarify trends in trade credit usage

in BRICS countries. A comparative analysis of trade credit usage amongst the countries is also carried out.

For the purpose of analysis in this chapter, trade credit demand is calculated as accounts payables/total current liabilities. This indicates how the firm finances the flow of inputs received from its suppliers. Trade credit supply is calculated as accounts receivables/total current assets. It indicates how much the firm extends trade credit to other firms. Supply and demand of trade credit directly measures the use of trade credit, which primarily finances sales and purchases. Overall trade credit is measured as an average of trade credit demand and supply for each firm. The measure of supply and demand of trade credit follows (Deloof and La Rocca 2012), whilst overall trade credit differs, because in this case an average of supply and demand is used instead of the net investment in net trade credit. Demand and supply of trade credit are the determinants of trade credit. Trade receivables over total assets, is used as a determinant of the supply of trade credit by firms and will be used in the analysis in Chapters 4 and 5. Trade payables over total assets, is used to determine trade credit demand and will be also be used in the analysis in Chapters 4 and 5.

3.7.2. Panel data

The panel model used follows that of Kwenda and Holden (2014) and Bhole and Mahakud (2004: 1277) but differs in the measurement of trade credit demand and supply and its determinants. The generalized method of moments (GMM) estimation technique is used to control for unobservable heterogeneity and potential endogeneity problems. In this model, trade credit demand trade payables/total assets ($TPTA$) and trade credit supply trade receivables/total assets ($TRTA$) are explained in terms of k explanatory variables. The behavioural equation for the panel data model can thus be specified as:

$$tpta_{it} = \alpha + \sum_{k} \delta_k X_{kit} + v_{it}$$

where $tpta$ is trade credit to total assets (accounts payable level); firms are represented by subscript i = 1, …, N; time t = 1, … T; X_{it} is a k × 1 vector of explanatory

variables; δ_k is a vector of the unknown parameters to estimated; and v_{it} the random disturbance. We then assume that firms adjust their $tpta$ level according to the degrees of adjustment λ in order to reach their target level.

3.8. Results and Analysis

3.8.1. Descriptive statistics

$$TRCA = \frac{Trade\ receivables}{Current\ assets}$$

$$TPCL = \frac{Trade\ payables}{Current\ liabilities}$$

$$tradecredit = (\frac{TRCA + TPCL}{2})$$

$$TRTA = \frac{Trade\ \ receivables}{total\ assets}$$

$$TPTA = \frac{accounts\ payables}{total\ assets}$$

Table 0-9 BRICS countries mean trade credit

		TRCA	TPCL	TRTA	TPTA	Trade credit
BRAZIL	Mean	0,3437	0,2475	0,1322	0,0846	0,2977
CHINA	Mean	0,2511	0,2795	0,1532	0,0987	0,2653
INDIA	Mean	0,3074	0,3621	0,1648	0,1246	0,3354
RUSSIA	Mean	0,2293	0,2630	0,0855	0,0940	0,2462
SOUTH AFRICA	Mean	0,3103	0,4252	0,1588	0,1443	0,3721

Source: Own construct based on published financial statements 2001-2013 data

Mean trade receivables to current assets, is highest in Brazil at 34.37% and lowest in Russia at 22.93%. Mean trade payables to current liabilities is highest in South Africa at 42.52% and least in Brazil. Brazilian firms invest more trade receivables relative to their total current assets than other BRICS countries and they also use the least trade payables relative to total current liabilities.

India has the highest mean $TRTA$ at 16.48% whilst it is least in Russia at 8.55%. Mean $TPTA$ is highest in South Africa at 14.43% and least in Brazil at 8.46%. Trade payables are used to finance total assets in South Africa more than any other country in BRICS. India leads other BRICS countries in using trade receivables as an investment. This could be due to the fact that Indian firms use trade credit as a competitive and promotional tool. It is also probable that they extend trade credit to their financial trading counterparts that are not listed on the stock exchange.

South Africa use trade credit extensively at 37% (see column 7, Table 8), i.e., both trade receivables and payables have a higher percentage of working capital than any other country. Trade receivables are used as an investment whilst trade payables are mainly used for financing. Trade receivables as a percentage of total assets in Brazil is 13% whilst in South Africa, it constitutes 16% of total assets. Russia uses the least trade credit at 25%, although mean payables and receivables in Russia, is higher than South Africa. India and South Africa have the lowest mean payables and receivables and high trade credit use at 34% and 37%, respectively. These two countries may have relatively smaller companies that rely more on trade credit than other BRICS countries. The other reason for extensive use of trade credit in South Africa could be that the country has an advanced legal system which makes it possible to enforce contracts. South Africa is a top performer in the Rule of Law Index 2016 and is ranked 46th globally. Brazil is ranked 52nd, India 66th China 80th and Russia 92nd (World Justice Project 2016).

Extension of trade credit creates receivables whilst receiving trade credit creates accounts payable. Trade credit provided is measured as the ratio of accounts receivable to current assets, whilst trade credit received is measured as the ratio of accounts payable to current liabilities. The ratio of accounts payable to current liabilities gives the percentage of working capital financed by trade credit. In the same way, the ratio of accounts receivables to current assets gives the percentage of trade credit investment in current assets. In Brazil $TRCA$ averages 34% whilst $TPCL$ averages 25% for the period 2001 to 2013 (see Table 8). Brazilian firms are net providers of trade credit. They provide more trade credit than other BRICS countries

whilst Russian firms have the least $TRCA$ at 23%. $TPCL$ exceeds $TRCA$ for China, India, Russia and South Africa, implying that firms in these countries are net receivers of trade credit. This suggests that there could be a relationship between trade received and provided by a company. $TPCL$ is highest in South Africa and least in Brazil whilst $TRCA$ is also high in the latter.

Table 8 shows that, $TPCL$ in South Africa averages 43% which is the highest amongst all BRICS countries implying that South African firms rely heavily on financing working capital through trade payables. Brazil has the lowest *TPCL* at 25%. South Africa ranks top in terms of overall use of trade credit at 37% followed by India at 34% (see Table 8). Russia has the least overall trade credit usage level at 25%. Receivables in India finance 16% of total assets, the same as South Africa, with these two countries outstripping the other BRICS members. In terms of financial sector development, they are ranked second and third. Russian firms use receivables to finance 8% of their total assets and are ranked lowest among the BRICS countries followed by Brazil. Brazil and Russia have the least developed financial sectors amongst BRICS. South Africa is ranked first in terms of financing total assets with trade payables at 14%, followed by India at 12%. South African firms finance total assets through trade payables more than other BRICS countries. Brazilian firms are ranked lowest in terms of using trade payables to finance their total assets; Brazil also has the least developed financial sector. Countries with more developed financial sectors use more trade payables and trade receivables than those with under-developed financial sectors.

Table 0-10 BRICS mean trade receivables and payables

	Brazil		China		India		Russia		South Africa	
year	Trade Receivables	Trade Payables	Trade Receivables	Trade Payable	Trade Receivables	Trade Payables	Trade Receivables	Trade Payables	Trade Receivables	Trade Payables
2001	688,79	560,10	56,81	33,32	2,54	2,59	73,32	52,89	75,95	64,52
2002	714,05	525,39	61,60	42,73	12,40	14,41	71,81	51,58	78,49	60,17
2003	748,18	614,71	80,33	56,77	14,98	17,82	89,52	64,52	102,78	81,18
2004	835,14	668,55	97,44	75,09	17,87	23,07	122,63	81,97	127,97	111,63
2005	941,93	753,29	101,37	91,82	24,24	31,46	165,88	103,85	138,02	128,80
2006	1067,68	873,08	124,79	117,96	31,76	36,97	274,81	163,06	144,50	128,19
2007	1219,01	1074,31	173,66	158,59	41,41	52,28	428,53	253,39	226,92	195,41
2008	1124,73	969,72	204,02	186,63	66,52	80,86	329,34	313,31	230,32	211,59
2009	1202,89	883,76	267,19	248,08	65,30	81,61	366,00	292,90	203,51	205,51
2010	1366,03	1051,57	365,69	328,07	80,27	101,96	438,27	342,05	243,14	243,93
2011	1457,60	1162,13	491,75	381,81	96,03	116,18	488,96	394,84	281,92	298,93
2012	1468,59	1156,13	574,35	433,28	103,60	118,71	602,19	469,30	272,89	330,63
2013	1437,23	1162,51	688,50	523,48	107,23	123,40	666,19	516,55	262,20	324,82
Total	1097,83	881,17	252,88	205,97	51,09	61,64	316,73	238,48	183,75	183,50

Source: Own construct based on published financial statements 2001-2013 data

In Table 9, the mean for trade receivables is very low in South Africa at 183.75 compared to Brazil at 1 097.83, implying that South African firms are considerably smaller than those in Brazil. Mean trade receivables and trade payables are lowest in India followed by South Africa. Brazil is the country with the highest mean trade receivables and trade payables followed by Russia. All these countries experienced an increase in trade credit use from 2001 to 2013.

Table 0-11 BRICS trade receivables minus trade payables

	Brazil	China	India	Russia	South Africa
	$Trade\ receivables - Trade\ payables$	$Trade\ receivables - Trade\ payables$	$Trade\ receivables - Trade\ payables$	$Trade\ receivables - Trade\ payables$	$Trade\ receivables - Trade\ payables$
2001	128,6978	23,48918	-0,04	20,42478	11,43478
2002	188,6573	18,86492	-2,01	20,23894	18,32751
2003	133,4766	23,56525	-2,84	25	21,6
2004	166,5826	22,34689	-5,20	40,65487	15,85153
2005	188,648	9,548852	-7,22	62,02655	9,218341
2006	194,5919	6,830164	-5,25	111,7434	16,31718
2007	144,6947	15,07279	-10,87	175,1416	31,5087
2008	155,0156	17,38754	-14,34	16,02655	18,72489
2009	319,1277	19,11279	-16,31	73,09735	-2
2010	314,4642	37,62492	-21,69	96,21239	-0,7860262
2011	295,4704	109,9403	-20,15	94,12389	-17,01747
2012	312,4579	141,0656	-15,11	132,8938	-57,74348
2013	274,7227	165,0164	-16,16	149,646	-62,62174
Total	216,6621	46,91274	-10,55	78,24847	0,1887807

Source: Own construct based on published financial statements 2001-2013 data

Brazilian firms have the highest $Trade\ receivables - Trade\ payables$, implying that they provide more trade credit than they receive, that is, they are net providers. Indian firms have the least $Trade\ receivables - Trade\ payables$ and the figures are all negative. These firms receive more trade credit than they provide, that is, they are net receivers. Listed firms rely heavily on the use of trade credit as a financing option whilst Brazilian firms use trade credit as an investment option. An interesting finding is that $Trade\ receivables - Trade\ payables$ are only negative in India whilst in all the other BRICS countries they have positive values. South Africa also has negative values from 2009 to 2013, implying that trade credit is used extensively as a financing option in this country. India has a culture of entrepreneurship and many small businesses. The other probable reason is that listed firms trade with small companies and such trade always favours the listed firms. More listed firms in India can thus obtain trade payables from their smaller trading counterparts than in any other BRICS country.

Table 0-12 BRICS average net working capital

year	Brazil	China	India	Russia	South Africa
	Net Working Capital	Net Working Capital	Net Working Capital	Net Working Capital	Net Working Capital
2001	296,49	64,38	2,57	88,84	34,84
2002	444,78	51,50	10,62	124,34	38,14
2003	593,22	52,54	13,29	142,08	35,40
2004	554,82	52,76	18,21	315,89	78,82
2005	680,23	18,19	33,50	457,19	89,55
2006	613,87	22,33	48,57	558,57	110,15
2007	702,59	88,16	80,71	506,66	120,38
2008	861,76	88,82	114,14	414,47	99,10
2009	1188,30	179,49	83,80	609,67	214,73
2010	1440,35	447,17	118,96	964,05	276,55
2011	1579,32	554,17	96,80	961,81	293,03
2012	1726,96	534,04	76,37	908,05	261,87
2013	1868,51	553,66	77,47	943,37	250,93
Total	965,48	208,25	59,61	538,08	146,35

Source: Own construct based on published financial statements 2001-2013 data

$$Net\ working\ capital = Curent\ assets - Current\ liabilities$$

Table 11 above shows that, India has the least networking capital followed by South Africa. These two countries also have the least mean trade payables and trade receivables (See Table 9). While India and South Africa's trade credit is least in absolute values, their trade credit is amongst the highest in percentage terms amongst all BRICS countries (refer to Table 8).

In Figure 2 (see Appendix 5), India and South Africa are the leading countries in financing total assets with trade receivables. Russia finances the least percentage of total assets with trade receivables. South Africa and India are also the leading countries in financing total assets with trade payables. Russia finances the least percentage with trade receivables. Thus India and South Africa both make extensive use of trade payables and trade receivables. They also lead in the use of trade credit amongst BRICS countries whilst they rank second and third in terms of financial development, which may imply that the use of trade credit is not linked to under-development of the financial sector.

The mean percentage of trade credit shows that only Brazilian firms are net trade credit providers whilst in every other BRICS country, firms are net trade credit receivers. In South Africa, India, China and Russia trade credit is an important financing option. In Brazil, firms provide more trade credit than they receive. Brazilian firms use trade credit as a way of facilitating access to bank debt and as an indication of a firm's quality (Saito and Bandeira 2010).

Trade credit in South Africa and India has been falling (see Figure 4 Appendix 5) whilst in China and Russia it increased between 2001 and 2013. There seems to be trend where trade credit averages amongst all BRICS countries converge around 30%. There also seems to be an optimal level of trade credit because of the trade-off between its advantages and costs. In South Africa the reason could be development of the financial sector, providing cheaper financing alternatives, whilst in countries like Russia and China it could be due to the unavailability of other sources.

$$Net\ Trade\ Credit\ (wk) = \frac{Trade\ receivables}{Current\ Assets} - \frac{Trade\ payables}{Current\ liabities}$$

South African, Indian, Russian and Chinese firms are net trade credit receivers (see Figure 5 Appendix 5). It is possible that listed firms receive trade credit from their counterparts that are not listed and in turn provide less trade credit than they receive. Brazilian firms, on the other hand, are net trade credit providers. Chinese firms used to be net trade credit providers but became net trade credit receivers after 2008, the

time of global financial crisis. While trade credit in China started to increase after the global financial crisis, the country has yet to reach the pre-financial crisis level when firms used to be net trade credit providers. Net trade credit declined in all BRICS countries following the 2008 financial crisis.

$$Net\ Trade\ Credit\ (TA) = \frac{Trade\ receivables}{Total\ assets} - \frac{Trade\ payables}{Total\ Assets}$$

Net trade credit is a firm's investment in trade credit and there were fluctuations throughout the period 2001 to 2003 (see Figure 5 Appendix 5). Whilst net trade credit fell for other BRICS countries for the last period, 2011 to 2013, it rose in China. Trade credit is an important source of financing for Chinese firms and its importance is increasing despite the fact that it has the most developed financial sector amongst the BRICS countries.

3.8.1.1. Trade credit growth

Table 0-13 Payables Growth Trend Index Base year 2001

	Payables Growth Trend Index Base year=2001				
	Brazil	China	India	Russia	South Africa
2001	100.00	100.00	100.00	100.00	100.00
2002	93.80	128.26	557.24	97.51	93.26
2003	109.75	170.39	689.23	121.98	125.82
2004	119.36	225.39	892.29	154.98	173.02
2005	134.49	275.60	1216.52	196.34	199.63
2006	155.88	354.06	1429.64	308.28	198.68
2007	191.81	476.01	2021.85	479.05	302.88
2008	173.13	560.16	3126.79	592.34	327.96
2009	157.79	744.60	3155.92	553.76	318.54
2010	187.75	984.69	3943.06	646.68	378.08
2011	207.49	1145.99	4492.80	746.48	463.34
2012	206.42	1300.49	4590.80	887.25	512.47
2013	207.55	1571.23	4771.89	976.58	503.46

Source: Own construct based on published financial statements 2001-2013 data

Payables growth is greater in India, followed by China than any other BRICS country. Brazil and South Africa experienced less growth in the use of trade payables.

Table 0-14 Receivables Growth Trend Index base year 2001

	Receivables Growth Trend Index Base=2001				
	Brazil	China	India	Russia	South Africa
2001	100.00	100.00	100.00	100.00	100.00
2002	103.67	108.43	487.66	97.95	103.35
2003	108.62	141.42	589.04	122.10	135.32
2004	121.25	171.53	702.73	167.25	168.48
2005	136.75	178.45	953.14	226.24	181.72
2006	155.01	219.68	1248.93	374.81	190.25
2007	176.98	305.72	1628.37	584.48	298.77
2008	163.29	359.15	2615.72	449.19	303.24
2009	174.64	470.36	2567.73	499.19	267.95
2010	198.32	643.75	3156.69	597.76	320.12
2011	211.62	865.66	3776.48	666.90	371.18
2012	213.21	1011.07	4074.14	821.34	359.29
2013	208.66	1212.02	4216.89	908.63	345.21

Source: Own construct based on published financial statements 2001-2013 data

India and China experienced higher growth in the use of trade receivables than any other BRICS country. Trade payables growth and trade receivables growth correspond, with India and China leading the way. Trade credit is becoming an important source of finance in both countries.

Table 0-15 Brazil trade credit use

BRAZIL		TRCA	TPCL	TRTA	TPTA	Trade credit	Net trade credit
2001	mean	0.3581	0.2509	0.1327	0.0750	0.3056	0.0577
2002	mean	0.3714	0.2487	0.1353	0.0825	0.3141	0.0527
2003	mean	0.3652	0.2345	0.1380	0.0744	0.3038	0.0635
2004	mean	0.3901	0.2513	0.1594	0.0869	0.3233	0.0725
2005	mean	0.3921	0.2532	0.1586	0.0889	0.3258	0.0697
2006	mean	0.3767	0.2526	0.1485	0.0835	0.3181	0.0650
2007	mean	0.3349	0.2476	0.1343	0.0756	0.2945	0.0587
2008	mean	0.3249	0.2372	0.1254	0.0799	0.2830	0.0455
2009	mean	0.3307	0.2393	0.1209	0.0786	0.2854	0.0423
2010	mean	0.3254	0.2554	0.1223	0.0794	0.2908	0.0429
2011	mean	0.3103	0.2496	0.1200	0.0865	0.2809	0.0335
2012	mean	0.3202	0.2438	0.1215	0.0867	0.2837	0.0348
2013	mean	0.3091	0.2536	0.1158	0.1156	0.2830	0.0001
Total		0.3437	0.2475	0.1322	0.0846	0.2977	0.0491

Source: *Own construct based on data from financial statements 2001-2013*

The mean figures for trade credit did not change much in Brazil over the period, fluctuating between 28% and 32%. The use of trade credit is more stable in Brazil than in any other BRICS country,

$$Net\ trade\ credit = \frac{Trade\ receivables}{Total\ assets} - \frac{Trade\ payables}{Total\ Assets}$$

Table 0-16 China trade credit use

CHINA		TRCA	TPCL	TRTA	TPTA	Trade credit	Net trade credit
2001		0.2164	0.1845	0.1201	0.0711	0.2004	0.0490
2002		0.2184	0.1976	0.1166	0.0790	0.2080	0.0376
2003		0.2433	0.2062	0.1304	0.0880	0.2247	0.0424
2004		0.2421	0.2212	0.1329	0.0993	0.2317	0.0336
2005		0.2501	0.2268	0.1373	0.1072	0.2385	0.0301
2006		0.2570	0.2431	0.1501	0.1152	0.2500	0.0349
2007		0.2647	0.2592	0.1645	0.1172	0.2620	0.0473
2008		0.2648	0.2623	0.1661	0.1103	0.2636	0.0558
2009		0.2597	0.2846	0.1644	0.1077	0.2723	0.0568
2010		0.2294	0.3114	0.1452	0.0964	0.2704	0.0488
2011		0.2345	0.3290	0.1532	0.0885	0.2817	0.0647
2012		0.2537	0.3281	0.1583	0.0874	0.2909	0.0708
2013		0.2775	0.3240	0.1694	0.0917	0.3007	0.0776
Total		0.2511	0.2795	0.1532	0.0987	0.2653	0.0500

Source: Own construct based on published financial statements 2001-2013 data

The mean figures for China show that the use of trade credit increased gradually from 20% in 2001 to 30% in 2013 (See Table 1). In contrast, India and South Africa's average trade credit (Tables 16 and 17, respectively) declined. These trends show that the use of trade credit differs from one country to another and that, despite having a developed financial sector, trade credit use is increasing in China.

China's $TRCA$ exceeded $TPCL$ from 2001 to 2007 and from 2008 $TPCL$ exceeded $TRCA$ (See Figure 7). This suggests that Chinese firms changed from being net providers of trade credit to net receivers. China's financial sector is more developed than other those of other BRICS economies; however, trade credit use has increased. It is becoming an important source of financing for Chinese firms.

Table 0-17 India trade credit use

		INDIA				
	TRCA	TPCL	TRTA	TPTA	Trade credit	Net trade credit
2001	0.3214	0.4754	0.1739	0.1498	0.3996	0.0241
2002	0.3373	0.3990	0.1738	0.1316	0.3691	0.0422
2003	0.3317	0.3902	0.1739	0.1313	0.3605	0.0426
2004	0.3239	0.3976	0.1756	0.1341	0.3623	0.0416
2005	0.3081	0.3860	0.1725	0.1335	0.3483	0.0390
2006	0.3104	0.3893	0.1747	0.1248	0.3508	0.0498
2007	0.3004	0.3707	0.1677	0.1245	0.3366	0.0432
2008	0.2967	0.3676	0.1653	0.1242	0.3324	0.0411
2009	0.2961	0.3569	0.1590	0.1218	0.3269	0.0372
2010	0.2816	0.3722	0.1550	0.1221	0.3275	0.0329
2011	0.3005	0.3182	0.1571	0.1148	0.3102	0.0423
2012	0.3114	0.3100	0.1575	0.1178	0.3112	0.0397
2013	0.3176	0.3250	0.1605	0.1226	0.3218	0.0379
Total	0.3074	0.3621	0.1648	0.1246	0.3354	0.0395

Source: Own construct based on data from financial statements 2001-2013

$$Net\ trade\ credit = TRTA - TPTA$$

In India $TPCL$ exceeded $TRCA$ for the period 2001 to 2011 and thereafter the ratios were almost equivalent (Table 16 above). Trade payables have been used more in India than trade receivables, implying that the former have been an important source of working capital finance for Indian firms. The trade credit averages in India show a general decline from about 39.9% to around 32.1%.

The mean for trade credit in South Africa decreased from 2001 to 2013, from an average of 46% to 34% (Table 17 below).

Table 0-18 South Africa trade use

		South Africa				
	TRCA	TPCL	TRTA	TPTA	Trade credit	Net trade credit
2001	0.3676	0.5266	0.1953	0.1971	0.4573	-0.0018
2002	0.3547	0.5217	0.1868	0.1984	0.4420	-0.0116
2003	0.3191	0.4580	0.1718	0.1718	0.3983	0.0000
2004	0.3169	0.4189	0.1676	0.1575	0.3725	0.0101
2005	0.3282	0.4736	0.1776	0.1663	0.4064	0.0114
2006	0.3313	0.4619	0.1815	0.1608	0.4018	0.0207
2007	0.3302	0.4301	0.1731	0.1418	0.3850	0.0313
2008	0.3068	0.3958	0.1565	0.1316	0.3561	0.0249
2009	0.2916	0.3797	0.1435	0.1161	0.3394	0.0274
2010	0.2931	0.3857	0.1419	0.1188	0.3409	0.0230
2011	0.2789	0.3954	0.1311	0.1223	0.3384	0.0087
2012	0.2746	0.3733	0.1309	0.1146	0.3279	0.0163
2013	0.2792	0.3861	0.1343	0.1209	0.3362	0.0135
Total	0.3103	0.4252	0.1588	0.1443	0.3721	0.0134

Source: Own construct based on data from financial statements 2001-2013

In South Africa $TPCL$ exceeded $TRCA$ for the entire period 2001 to 2013. Trade payables are used more than trade receivables in South Africa, implying that the former are an important source of financing working capital for the country's firms. South African firms are net receivers of trade credit and trade payables finance at least 40% of working capital.

Table 0-19 Russia trade credit use

			Russia				
		TRCA	TPCL	TRTA	TPTA	Trade credit	Net trade credit
2001		0.2287	0.3092	0.0799	0.0957	0.2689	-0.0158
2002		0.1955	0.3461	0.0696	0.0912	0.2708	-0.0216
2003		0.2262	0.3144	0.0888	0.0993	0.2703	-0.0105
2004		0.1971	0.2225	0.0769	0.0736	0.2098	0.0033
2005		0.2216	0.2419	0.0920	0.0881	0.2317	0.0039
2006		0.2125	0.2237	0.0889	0.0783	0.2181	0.0106
2007		0.2107	0.2333	0.0875	0.0756	0.2220	0.0119
2008		0.2152	0.2446	0.0772	0.0943	0.2299	-0.0171
2009		0.2443	0.2396	0.0806	0.0855	0.2420	-0.0049
2010		0.2324	0.2693	0.0859	0.0867	0.2508	-0.0009
2011		0.2205	0.2751	0.0798	0.1011	0.2478	-0.0212
2012		0.2521	0.2787	0.0896	0.1130	0.2654	-0.0234
2013		0.2812	0.3210	0.0998	0.1314	0.3011	-0.0316
Total		0.2293	0.2630	0.0855	0.0940	0.2462	-0.0090

Source: Own construct based on data from financial statements 2001-2013

The mean of trade credit in Russia fluctuated between 20% and 30% during the period under study and there is no trend of either increasing or decreasing.

In Brazil, the utilities sector ranks top in terms of trade receivables to current assets at 45% (see Table 20 Appendix 6) whilst the oil and gas industry has the least trade receivables to current assets at 26%. This difference is mainly due to the kind of products these sectors sell; it is likely that mostly utilities are paid on credit compared to oil and gas where a significant volume could be bought using cash. The consumer services sector ranks top in terms of $TPCL$ at 36%, whilst the health sector ranks lowest for $TRCA$. This could be because most trade credit takes place in business-to-business transactions and the health sector by its nature deals less with other businesses. The consumer services sector ranks top in overall use of trade credit at 37% whilst consumer goods and basic resources uses the least trade credit at 28%. This could be due to the fact that most consumer goods are cash purchases compared to capital and durable goods, whilst services are usually offered first and payment is made once they have been rendered.

In China, the telecommunications sector ranks highest in terms of trade receivables to current assets at 30% (see Table 21 Appendix 6) whilst the consumer services sector ranks lowest at 11%. The country's technology sector's $TPCL$ is highest at 34% whilst the utilities sector is lowest at 17%. Overall usage of trade credit is high in the industrial goods and technology sectors at 30% and least in consumer services. A possible explanation is that industrial goods are expensive and technology products are usually bought on credit, while consumer services are mainly paid for in cash.

In Russia, the health sector trade receivables to current assets is high compared to basic resources which is the least at 15% (See Table 22 Appendix 6). The health sector also has the highest ratio for $TPCL$ at 48% and the telecommunications sector the least at 18%.

In India, trade receivables to current assets is highest for the technology sector at 44% and least in the utilities sector at 21% (see Table 23 Appendix 6). The $TPCL$ for trade payables to current liabilities is highest in the industrial goods sector and least in the telecommunications sector at 25%.

In South Africa, the telecommunications sector has the highest trade receivables to current assets at 38% (see Table 24 Appendix 6), possibly because of the use of contracts for services and purchase of gadgets, and the oil and gas sector has the least $TRCA$ at 7%, probably because most fuel consumption is on a cash basis. The consumer services sector has the highest $TPCL$ at 50% and the health sector the lowest at 27%. Overall, the consumer services sector uses most of the trade credit at 40% and the oil and gas sector uses the least at 20%.

Table 0-20 BRICS ratios

	Ratio	Std.Err.	95% Conf.	Interval
$\frac{Trade\ payables}{current\ liabilities}$	0.2794	0.0036	0.2723	0.2865
$\frac{Trade\ receivables}{current\ assets}$	0.2567	0.0033	0.2503	0.2631
$\frac{Trade\ receivables}{total\ assets}$	0.0980	0.0017	0.9472	0.1013
$\frac{Trade\ payables}{total\ assets}$	0.0821	0.0014	0.0793	0.8478

Source: Own construct based on published financial statements 2001-2013 data

Trade payables as a ratio of current liabilities amongst BRICS countries averages 28% and trade receivables as a ratio of current assets averages 26%. Trade receivables as a ratio of total assets averages 10% and trade payables as a ratio of total assets averages 8%. Trade credit is commonly used to finance working capital requirements amongst all BRICS countries.

Trade payables

Firms have a target capital structure (target debt to equity ratio) and adjust from real to target level (Ozkan 2001). Accounts payable is part of the debt finance of the firm, and by implication, firms must have a target level of accounts payable (Kwenda and Holden: 272). If firms adopt a deliberate policy on the level of trade credit they will use to finance current assets and current liabilities, this has implications for financing choices. The current study tests if firms in BRICS countries pursue a target level of trade credit. Nadiri (1969) developed a model which demonstrated that real accounts

payable levels may not always equal desired levels, and that firms take time to adjust from actual to target levels. Therefore, financial sector development or lack thereof may affect a firm's speed and cost adjustment. If we establish that firms have deliberate trade credit policies through pursuing a target level, it will be interesting to investigate how their trade policies impact on financial sector development.

Trade receivables

Firms can raise large amounts of finance through trade credit which may have an impact on the quantity of funding to be raised through bank loans or stock markets. Martínez-Sola, García-Teruel and Martínez-Solano (2013) state that the existence of market imperfections might impact on the trade credit decision and cause the credit policy to affect firm value. Assuming an optimal trade credit policy, their results show a positive relationship between firm value and trade credit at low levels of receivables and a negative one at high levels.

When investment in accounts receivable is no longer beneficial, investors will pressure firms to limit the trade credit granted to mitigate opportunity costs and financial risk, and reduced profitability and liquidity while also encouraging managers to maintain investment in accounts receivable which maximizes operational, financial, and commercial benefits (Martínez-Sola, García-Teruel and Martínez-Solano 2013). Thus, firm value increases with receivables up to a point and then starts decreasing. There is an optimal debt level, implying that firms must have a target level of accounts receivable which minimizes the costs of receivables and maximizes the benefits.

The estimation model uses trade payables to total assets $TPTA_{it}$ and trade receivables to total assets $TRTA_{it}$.

$$TPTA_{it} = \alpha + \beta_0 tpta_{it-1} + \beta_1 \frac{Trade\ receivables}{Total\ assets} + \beta_2\, lnsize + \beta_3 growth + \eta_t + \varepsilon_{it} \quad (1)$$

$$TRTA_{it} = \alpha + \beta_0 trta_{it-1} + \beta_1 \frac{Trade\ payables}{Total\ assets} + \beta_2\, lnsize + \beta_3 growth + \eta_t + \varepsilon_{it} \quad (2)$$

Growth opportunities

Firms with more growth opportunities will generally have inadequate internal resources to finance them and would depend more on trade credit (Niskanen and Niskanen 2006). Total asset growth can either be positive or negative; therefore a variable $growth = \frac{(total\ asset - l.total\ asset)}{total\ asset}$ to represent growth.

Firm size

Firm size and age are generally used as proxies for a firm's creditworthiness and access to capital markets (García-Teruel and Martínez-Solano 2010; Akinlo 2012). Firm size is measured by $\ln size = \ln(total\ asstets)$. Large firms are more creditworthy and can therefore access more trade credit than small firms (Kwenda and Holden 2014). However, large firms can attract funds from broader sources and therefore depend less on trade credit.

3.8.2. Panel unit root tests

As the use of non-stationary data produces spurious regression results (Granger and Newbold (1974), it is important to test for stationarity. The data was tested for stationarity using the Augmented Dickey-Fuller Fisher-type procedure for panel unit roots and the results of the tests are presented in Table 20 below. The Augmented Dickey-Fuller Fisher-type tests for stationarity under the null hypothesis that all panels contain unit roots; that is, the series is not stationary. The results indicate that all variables in the model are integrated of order 0, which suggests the absence of unit roots in the data; this means that regressing the data in levels will not lead to spurious regressions and wrong inferences.

Table 0-21 Fisher-type unit root results

Variable	P	Z	L*	Pm	Order of integration
TR/TA	10000***	-53.2970	-54.2329	64.8556	0
TP/TA	9604***	-49.8712	-50.458	60.4175	0

, ** and * denote significance at 10%, 5% and 1%, respectively.*
Source: Own calculations using an unbalanced panel over the period 2001 to 2013. Data obtained from Bloomberg.

Using non-stationary data produces spurious regression results; therefore tests for stationarity of $TRTA$ were conducted using the Fisher-type panel unit root test. In the results presented above p=0.0000<0.05. Based on this the null hypothesis is rejected. Therefore, the panels are stationary.

Using non-stationary data produces spurious regression results; therefore tests for stationarity of $TPTA$ were conducted using the Fisher-type panel unit root test. In the results presented above p=0.0000<0.05. Based on this the null hypothesis is rejected. Therefore, the panels are stationary.

3.8.3. General Method of Moments

The first-difference two stage GMM approach was advanced by Arellano and Bond (1991) for a number of reasons. First, ordinary least squares regressions of dynamic panel data lead to biased and inconsistent estimates because the explanatory variables are not independent of the error term. Second, the fixed effect estimator produces biased but consistent estimates when *T* tends to infinity and not when *N* tends to infinity (Kwenda and Holden 2014). This is known as the dynamic panel bias or the Nickell bias (Nickell 1981). The Instrumental variable (IV) estimator suggested by Anderson and Hsiao (1981) produces consistent and efficient estimates in dynamic panels if the error term in levels is not serially correlated. However, its weakness is that it fails to use all the available moments, which means that it does not necessarily result in more efficient estimates (Kwenda and Holden 2014). GMM in first differences produces more efficient and consistent estimates; hence its preference over the Anderson and Hsiao estimator. GMM in first differences deploys additional instruments

obtained by applying the moment conditions that exist between the lagged dependent variable and the disturbances. Estimation of the dynamic error components model is considered using two alternative linear estimators that are designed to improve the properties of the standard first differenced GMM estimator (Blundell and Bond 1998).

Legitimacy of the instruments is carried out using the Sargan test, which is also known as the J test and is a test for overidentifying restrictions. The presence of the *nth*-order serial correlation in the instruments was tested using the *m*(*n*) test, which is asymptotically distributed as a standard normal under the null of no second-order serial correlation of the differenced residuals.

Table 0-22 Specification test results

	South Africa		Russia		India		China		Brazil	
	m^2	Sargan test	m^2	Sargan test	m^2	Sargan test	m^2	Sargan test	m^2	Sargan test
Lags	**1**		**2**		2		4		**4**	
TPTA	**0,5084**	**0,2988**	**0,2868**	**0,1356**	**0,8567**	**0,0686**	**0,7465**	**0,0727**	**0,1412**	**0,0704**
TRTA	**0,4855**	**0,5824**	**0,1670**	**0,4060**	**0,5948**	**0,0706**	**0,2663**	**0,1410**	**0,9054**	**0,3363**
TPCL	**0,3612**	**0,1107**	**0,8249**	**0,5946**	0,9007	-------	**0,7744**	**0,8066**	**0,0517**	**0,1756**
TRCA	**0,0971**	**0,5019**	**0,8391**	**0,1563**	0,1047	-------	**0,7609**	**0,1095**	**0,8851**	**0,3679**

Source: Own construct based on published financial statements data 2001-2013

The table 0-22 above reports the results of the Sargan test of overidentifying restrictions J as a test for instruments validity, although Blundell and Bond (2000) report Monte Carlo evidence that this test tends to over-reject, especially when the data are persistent and the number of time-series observations are large. According to the information derived from the m2 statistics and the Sargan test, different sets are used of lagged instruments across countries, ranging from instruments starting in t−1 for South Africa to instruments starting in t−4 in China and Brazil. For each country, the lag structure that best fitted the m2 and J tests. The different growth dynamics of firms between countries could be driving this; thus different lag structures are required to take this into account.

For trade receivables over total assets the model is valid for all the BRICS countries. The tests are also valid for trade payables over total assets $TPTA$ for all these countries. For $TPCL$ and $TRCA$ the model is valid for all BRICS countries except India.

3.8.4. Regression results

Table 0-23 Regression receivables to total assets

	Brazil	*Russia*	*India*	*China*	*South Africa*
	TRTA	TRTA	TRTA	TRTA	TRTA
L.TRTA	0.00115	0.350*	0.591***	0.0592**	0.346***
	(0.02)	(2.28)	(11.46)	(2.99)	(4.82)
TPTA	-0.216***	0.117**	0.110**	-0.0373**	0.335***
	(-4.67)	(2.80)	(2.78)	(-3.03)	(4.06)
lnsize	-0.237***	-0.0321	-0.0142**	-0.0201	-0.0192*
	(-5.07)	(-1.43)	(-2.60)	(-1.82)	(-2.50)
gr	-0.653***	0.0191	-0.00609	-0.0250***	0.000885*
	(-7.29)	(0.99)	(-1.30)	(-5.46)	(2.11)
_cons	0.409***	0.232	0.113***	0.268***	0.139***
	(6.51)	(1.56)	(4.37)	(8.51)	(3.83)
N	2022	841	6620	7764	2098

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Source: Own construct based on published financial statements 2001-2013

The lagged dependent variable $is\, TRTA_{t-1}$ *(trade receivables/total assets)*. The coefficient of $TRTA_{it-1}$ is precisely defined in model 2, which supports the principal argument of this study. $TRTA_{it-1}$ is positive and statistically significant at 1% in model 2 for South Africa, Russia, China and India and statistically insignificant at 5% for Brazil. Therefore, the dynamic approach used in this study is not rejected. South African, Russian, Chinese and Indian firms have target levels of trade receivables and these are consistent over time. Firms in these countries partially adjust towards their target levels in an attempt to reach their targets. The adjustment coefficient, which is calculated as 1 minus the coefficient of $TRTA_{t-1}$ (1 – 0.346) is 0.654 in model 2 for South Africa, providing some evidence that the speed of adjustment by South African firms towards their target trade credit usage level is relatively fast. For Russia, 1 minus the coefficient of $TRTA_{t-1}$ (1 – 0.35) is 0.65 in model 2, providing some evidence that the speed of adjustment by Russian firms towards their target trade credit usage level is relatively fast. The speed of adjustment by South African firms and Russian firms is 0.65. For India 1 minus the coefficient of $TRTA_{t-1}$ (1 – 0.59) is 0.41 in model 2,

providing some evidence that the speed of adjustment by Indian firms towards their target trade credit usage level is relatively slower than South Africa and Russia. In China, it is (1-0.0592), which is equal to 0.9408, the highest among all BRICS countries and very close to 1, testifying that the speed of adjustment in China is the fastest.

China is the country with the most developed financial sector amongst the BRICS countries and it also has the highest speed of adjustment. Chinese firms have better access to sources of finance than other BRICS firms; therefore the speed of adjustment is very fast. Granting trade credit forces firms to obtain additional funds from the capital market to fund the extra investment in receivables, thereby increasing their reliance on external funding (Martínez-Sola, García-Teruel and Martínez-Solano 2013). Brazil is the country with the least developed financial sector amongst BRICS countries and firms do not adjust trade credit level towards a target level, probably due to limited access to sources of finance. The findings confirm that the level of financial sector development has an effect on trade credit policy. In a country with a poorly developed financial sector, firms below the desired level of receivables find investment in such very costly. They may therefore stay off target because it is costly to adjust towards the target level of trade credit.

Table 0-24 Regression payables to total assets

	Brazil TPTA	Russia TPTA	India TPTA	China TPTA	South Africa TPTA
L.TPTA	0.542***	0.743***	0.154**	0.534***	0.426***
	(5.31)	(70.55)	(2.83)	(12.60)	(524)
TRTA	0.793***	-0.163***	-0.0784***	0.0585**	0.379***
	(19.14)	(-6.28)	(-3.93)	(2.66)	(5.14)
Lnsize	0.537***	0.252***	-0.0886***	0.149***	0.252***
	(8.67)	(6.48)	(-5.37)	(4.86)	(6.48)
Gr	1.319***	-0.0217*	-0.430***	0.00523	-0.00128***
	(9.95)	(-2.31)	(-7.02)	(1.32)	(-0.13)
_cons	-0.0900	0.153*	0.166***	0.00852	(-14.98)
	(-1.22)	(2.41)	(4.32)	(0.47)	
N	2022	723	6242	5661	0.0285*
					(0.57)
					723

t statistics in parentheses

$^{*}\ p < 0.05,\ ^{**}\ p < 0.01,\ ^{***}\ p < 0.001$
Source: *Own construct based on published financial statements data 2001-2013*

The lagged dependent variable $is\ TPTA_{t-1}$ *(trade payables/total assets)*. The coefficient of $TPTA_{it-1}$ is precisely defined in model 1, which supports the principal argument of this study. $TPTA_{it-1}$ is positive and statistically significant at 1% in model 2 for all five BRICS countries. Therefore, the dynamic approach used in this study is not rejected. South African firms have target levels of trade payables and these are consistent over time. South African firms partially adjust towards their target levels in an attempt to reach their targets. The adjustment coefficient, which is calculated as 1 minus the coefficient of $TRTA_{t-1}$ (1 – 0.426) is 0.574 in model 1 for South Africa, providing some evidence that the speed of adjustment by South African firms towards their target trade credit usage level is relatively fast. The speed of adjustment for Brazil (1-0.542) which is equal to 0.458 is very low, implying that the speed of adjustment by Brazilian firms is very slow. The speed of adjustment for Russia (1-0.743), which is equal to 0.257, is even lower, implying that Russian firms slowly adjust the levels of trade payables. Russia is amongst the two BRICS countries with the least developed financial sectors. The speed of adjustment for China (1- 0.154) which is equal to 0.846, is close to one, implying that the speed of adjustment by Chinese firms is very fast. The fact that China is the country with the most developed financial sector and has highest speed of adjustment confirms that financial sector development has an effect on speed of adjustment.

The speed of adjustment for India (1-0.534), which is equal to 0.466, is low, implying that the speed of adjustment of trade payables by Indian firms is relatively slow. Size was statistically insignificant whilst growth was statistically significant, which implies that firms re-balance trade payables in pursuit of growth opportunities.

China has the highest speed of adjustment for trade payables and is also the country with the most developed financial sector. Since Chinese firms have greater access to sources of finance, they can substitute trade payables with other financing sources when they are above target. Therefore, financial sector development has implications for the speed of adjustment. Russia and Brazil have the least developed financial

sectors and also have lower speeds of adjustment, implying that this could be due to limited alternatives for trade payables.

3.9. Summary and Conclusion

South Africa ranks top in overall use of trade credit at 37%, followed by India at 34%. Russia has the least overall trade credit usage at 25% followed by China at 27%. Trade payables as a ratio of current liabilities across listed firms in BRICS countries averages 28% and trade receivables as a ratio of current assets averages 26%. Thus, trade credit usage is not uniform across BRICS countries and also varies across sectors. China and Russia are experiencing an increase in trade credit usage whilst it is declining in South Africa and India. Trade credit is a mode of financing working capital that is used in all countries. Receivables and payables as a ratio of total assets are the determinants of trade credit supply and demand.

A GMM estimation technique was used to control for unobservable heterogeneity and potential endogeneity problems. The study found that listed firms in South Africa, Brazil, India, Russia and China have a target level of trade payables and trade receivables and they partially adjust towards these levels. The speed of adjustment towards the target level is relatively fast for trade receivables for South Africa and Russia, as shown by a coefficient of 0.65 for both countries. $TRCA$ levels are consistent over time in South Africa and firms partially adjust towards their target levels to reach their targets. The adjustment coefficient for Chinese firms is the highest and this is the country with the most developed financial sector implying that it has an effect on the speed of adjustment. The findings show that the adjustment of both receivables and payables is faster relative to current assets and current liabilities compared to the adjustment in relation to total assets.

South African and Brazilian firms partially adjust towards their target levels to reach their targets of $TPCL$. The adjustment coefficient is 0.893 for South Africa, providing some evidence that the speed of adjustment by South African firms towards their target trade credit level is very fast. The coefficient is 0.611 for Brazil, providing some evidence that the speed of adjustment by Brazilian firms towards their target trade

credit usage level is relatively fast but slower than that of South Africa. Firms in all five BRICS countries partially adjust towards target levels of $TPTA$ in an attempt to reach their targets. The adjustment coefficient for South African firms is 0.574. All five countries target $TRTA$ and partialy adjust towards the target. South Africa targets all ratios investigated and the speed is relatively faster than other countries. A probable reason is that the country's advanced financial sector makes it less costly to adjust from current levels of trade credit to desired levels compared to other BRICS countries. South Africa also ranks top in terms of the rule of law; such an institutional environment promotes trade credit. The evidence supports the argument that size and growth opportunities explain firms' use of supplier financing as a source of funds. Speed of adjustment of trade credit levels is affected by the level of financial sector development.

CHAPTER 4 TRADE CREDIT AND BANKING SECTOR DEVELOPMENT

4.1. Introduction

The chapter examines banking sector development and trade credit use by BRICS listed firms. It focuses exclusively on the banking sector and does not consider money markets and stock markets because banks are the fulcrum of financial sector development Lynch (1996). Banks as singled out as part of financial sector development because they are an immediate alternative to finance working capital compared to stock markets and money markets. Trade credit is used to finance working capital amongst other sources of capital such as bank loans and commercial paper. The growth of the financial sector presents alternative sources of finance which are cheaper than trade credit. It offers opportunities for financing through bank loans instead of trade credit. This chapter provides a basis for firms to set their trade credit policies considering the level of banking sector development and how to amend policy in light of changes in such development. The study investigates whether the use of trade credit is greater in countries with large banking systems and how competitiveness and the concentration of the banking sector affect the use of trade credit. The relationship between banking sector development and trade credit use is of paramount importance since bank loans and trade credit can be used as substitutes. The banking sector provides resources to firms that need external finance to grow. A review of the literature on banking and trade credit is followed by a description of the methodology used to test causation, and the findings and conclusion.

4.2. Literature Review

Trade credit (i.e., accounts payable) is described as short-term loans provided by suppliers to their customers upon purchase of their products and is automatically created when customers delay payment of their bills to suppliers (Guariglia and Mateut 2006). Trade credit is a critical source of spontaneous inter-firm financing that is particularly important to small and growing firms. As firms grow, they turn to regular financial sector institutions for financing, starting with banks (Bonin and Wachtel (2003). In emerging economies, trade credit has a bad reputation because it often results from inter-firm arrears and soft budget constraints (Bonin and Wachtel (2003).

Banks act as intermediaries between households with a surplus and those with a deficit. Emerging evidence suggests that both the level of banking and the development of the stock market have a causal impact on economic growth (Beck, Demirgüç-Kunt and Levine 2000). Financing working capital is important to financial managers and a study of banking sector development and trade credit will provide knowledge for effective working capital financial management. Exploring trade credit use in relation to banking sector development will help to manage trade credit. Halsey (2010) stated that banks will play a reduced role in a recovered economy with supply-chain finance growing in popularity and use.

The use of trade credit is very important for growing economies such as BRICS and even for developed economies with more developed banking sectors. Even in well-developed market economies, such as the US, supply of capital is frequently tied to the supply of goods in the form of trade credit, and vendor financing more generally (Demirgüç-Kunt and Maksimovic 2001). Lee and Stowe (1993) calculated that the amount of trade credit in 1985 in the US far exceeded the business lending of the entire banking system. Rajan and Zingales (1995) found that 18% of the total assets of US firms in 1991 consisted of accounts receivable.

The role of the credit market is very important in financing firm growth. The development of financial markets is associated with imperfections in the transmission of monetary shocks which can be divided into two separate channels. The first is the bank-lending channel of monetary policy and the second is the broad credit channel or balance sheet channel (Bernanke and Gertler 1995). Receivables and payables are balance sheet components that reflect the use and extension of trade credit. Banks usually create a monopoly of information in their dealings and relationships with clients and other lenders cannot easily obtain such information as it is also confidential. The bank-lending channel clearly emphasises the importance of bank lending. It presumes that financial market imperfections can arise due to informational asymmetries between borrowers and lenders (Atanasova and Wilson 2003). Some borrowers are unable to obtain funding on the public capital markets without paying large premiums, but banks specialise in providing "information intensive" loans and are therefore often able to reduce the premium on finance for their borrowers (Atanasova and Wilson

2003). Banks lend to clients that they have more detailed information on than competing banks or other lenders.

Unlike financial institutions, non-financial firms have a comparative advantage in exploiting informal means of ensuring that their borrowers repay. This suggests that optimally exploiting these advantages would require providing trade credit to some classes of borrowers and obtaining external financing from financial intermediaries as well as receiving trade credit from some of their suppliers (Demirgüç-Kunt and Maksimovic 2001). The existence of a large banking sector increases access to and availability of funding. Demirgüç-Kunt and Maksimovic (2001) found that the development of a country's banking system and legal infrastructure results in firms using less trade credit. That is, firms' use of bank debt relative to trade credit is higher in countries with efficient legal systems. Furthermore, Demirgüç-Kunt and Maksimovic (2001) suggest that the provision of trade credit is complementary to the development of financial intermediaries and should not be viewed as a substitute by policymakers.

Petersen and Rajan (1997) suggest that implicit borrowing from suppliers may provide an additional possibility amongst small firms in the US that have less well-established banking relationships. Firms with limited access to bank loans hold significantly higher levels of trade payables. The underdevelopment of the financial sector causes firms to carry higher levels of accounts payable. Petersen and Rajan (1997) note that their results imply that trade credit is used as a source of financing of last resort by very constrained firms. During monetary contractions, small firms, which are likely to be more credit constrained, react by borrowing more from their suppliers (Fisman and Love 2003).

4.2.1. Implicit cost of trade credit

Commonly used trade credit terms implicitly define a high interest rate that operates as an efficient screening device where there is asymmetric information about buyer default risk. Trade credit is viewed as a contractual device for dealing with informational asymmetry in intermediate goods markets (Smith 1987). The seller's objective is to maximize profit with respect to payment terms and the interest rate that

is implicitly defined when trade credit terms are quoted. Terms are established to function as a screening contract that elicits information about buyer default risk. High implicit interest (or penalty) rates that accompany trade credit enable the identification of low and high default risk buyers (Smith 1987). Sellers offering trade credit options can presume that a buyer who takes the cash discount satisfies financing demand through a third party at a low interest rate. However, if the buyer purchases the goods and pays late (e.g., at the end of 30 days), the buyer has implicitly borrowed at a higher rate defined by the trade credit terms. This indicates that lower cost third-party financing such as bank loans was not available to the buyer.

The trade credit provider is a supplier and not an independent finance specialist; the customer thus faces significant late payment penalties including the implicit cost of damaging a critical long-term relationship as well as explicit and significant pecuniary penalties (Petersen and Rajan 1994b). Firms often defer payments on goods sold even though banks exist. The implicit interest rate on such deferrals, commonly called trade credit, is high relative to comparable bank loans when cash discounts are offered, a fairly common practice across industries (Jain 2001). Marotta (2001) provides evidence that inter-firm credit received by Italian manufacturing firms is slightly more expensive than bank loans.

4.2.2. Cost

Firms use both trade credit and bank loans but there is need to consider the cost differences. Ng, Smith and Smith (1999) used a set of survey data to conclude that the implicit interest on trade credit is high. Similarly, Petersen and Rajan (1997) found that trade credit is an expensive substitute for institutional funding when the latter is unavailable. If firms have easy access to other sources of finance, they would probably not use large amounts of trade credit if it is expensive. Yang and Birge (2013) also allude to the fact that the implicit interest on common trade credit terms is surprisingly high. Petersen and Rajan (1997) state that missing early payment discounts is expensive and the decision to take advantage of early payment discounts is driven not by the implicit cost of this credit but by whether the firm has an alternative source of credit. Despite the development of the financial sector and increased access to

finance, firms in the formal sector in South Africa still employ significant trade credit. Kwenda and Holden (2013) note that, approximately half of current assets are financed by trade credit. Trade credit has high implicit costs and previous studies tend to support the view that firms use it when bank loans are unavailable. Du, Lu and Tao (2012) study in China shows that a country with a poorly developed financial sector can support growth through non-financial channels such as trade credit.

Firms are still using high cost trade credit to finance their working capital requirements rather than bank loans which may be considerably cheaper in a country with a relatively developed financial sector like South Africa. A study by Kwenda and Holden (2013) on firms listed on the JSE found that they depend heavily on trade credit as a source of short-term finance. This is puzzling in light of its high implicit cost and the level of financial sector development. One of the questions posed in this study is: If the financial sector develops, what could be the impact on the use of trade credit as a source of working capital finance amongst BRICS countries? Despite the development of the financial sector and increased access to finance, firms in the formal sector in BRICS countries still employ significantly more trade credit than those in other countries with under-developed financial sectors. They are still using high cost trade credit to finance their working capital requirements rather than bank loans which may be considerably cheaper in a country with a well-developed financial sector like South Africa.

Previous studies analysed the high cost of trade credit, and found that firms finance themselves with trade credit when other, cheaper sources of financing are not available (Petersen and Rajan 1994b, 1997). To minimize the costs of trade credit, firms must make payments within the discount (when available) or net period, limiting the maturity of their trade credit balances (Danielson and Scott 2004). Overdue trade credit refers to trade credit that has expired but is not repaid and firms are usually reluctant to have overdue trade credit because they may face significant late payment penalties, including the explicit cost of pecuniary penalties as well as the implicit one of damaging long-term relationships (Petersen and Rajan 1997). Unless firms lack funds, they would not delay trade credit repayment because of the significant penalty;

thus, overdue trade credit tends to be used for financing purposes in the presence of constraints on bank loans (Ge and Qiu 2007).

Cunat (2007) states that, the implicit interest rates in trade credit are commonly very high compared with the rates in bank credit, but trade credit is widely used by firms due to its advantages. Trade credit has the benefit of reducing transaction costs compared with bank credits. Furthermore, it is less costly for firms to postpone trade credit payments than negotiable bank loans. Trade credit can offer firms a greater degree of financial flexibility than bank loans. Due to its revolving nature, trade credit balances naturally increase or decrease with temporary fluctuations in business activity, and, when facing temporary cash flow problems, firms can find it less costly to delay trade credit payments than to renegotiate the payment terms of bank loan (Danielson and Scott 2004). Negotiating trade credit terms is less complicated than a bank loan application. Firms in the same value chain are mutually dependent. For instance, manufacturers depend on their suppliers for raw materials and suppliers in turn depend on the latter for a market.

4.2.3. Local banking development

Deloof and La Rocca (2015) confirm that local differences in banking development and SMEs' trade credit policy matter. Cassia and Vismara (2009) state that, companies mainly obtain financing from suppliers when the prospects of obtaining such from the banks are not particularly good, resulting in a lower level of development of the local banking system. Private firms in China grow rapidly with limited financing from banks. This shows how firms in a country with poorly developed financial institutions fund their prosperous growth opportunities (Ge and Qiu (2007). Ferrando and Mulier (2013) found that the degree of development of the financial system matters in relation to firms' vulnerability to financial market imperfections. In countries with a larger supply of bank loans or debt securities, firm growth's sensitivity to the trade credit channel is smaller (Ferrando and Mulier 2013).

Du, Lu and Tao (2012) found that access to bank loans is very important for company performance and growth and that trade credit cannot effectively substitute for bank

credit in China. Burkart and Ellingsen (2004) state that, suppliers lend more generously than banks, and bank credit and trade credit can either be complements or substitutes, but it is more prevalent in less developed financial markets. Bougheas, Mateut and Mizen (2009) model posits that, despite a firm having access to bank loans, inventories and sales will be still be financed in part by trade credit. Non-state-owned firms in China grow tremendously with limited support from banks (Ge and Qiu (2007). In contrast, Cull, Xu and Zhu (2009) found that the accounts receivable to sales ratio among the firms in their sample is comparable to those in the US. This casts doubt on whether trade credit can account for more than a fraction of China's explosive growth.

While trade credit is widely used by small firms suffering a decline in the availability of loans, surprisingly, large firms increase their trade credit despite access to other forms of credit. This is due to the fact that large firms use trade credit for financial reasons (Nilsen 1999). Provincial banking development in Italy increased the provision of trade credit by SMEs and stimulated the redistribution of loans via such credit (Deloof and La Rocca 2015) . Deloof and La Rocca (2015) confirmed that local differences in banking development and SMEs' trade credit policy matter. Local banking development, which is the main dimension of local financial development, stimulates product innovation and research and development expenditure and reduces financial constraints (Benfratello, Schiantarelli and Sembenelli 2008). Provision of trade credit is complementary to the development of financial institutions at the country level (Deloof and La Rocca 2015). Severin, Alphonse and Ducret (2004) provide new evidence on the role of trade credit as a substitute for bank loans. Increased access to bank loans reduces the amount of trade credit a firm uses. A number of studies have found that in institutional environments where access to formal finance is limited, firms with better access to credit redistribute it via trade credit to customers that are financially weaker (McMillan and Woodruff 1999; Demirguc-Kunt and Maksimovic 2001; Fisman and Love 2003; Cull, Xu and Zhu 2009).

4.2.4. Growth

Private firms in China grow rapidly with limited financing from banks. This shows how firms in a country with poorly developed financial institutions fund their prosperous growth opportunities (Ge and Qiu (2007). Ge and Qiu (2007) note that, this suggests that, in a country with a poorly developed formal financial sector, firms can support their growth through trade credit. Their study focused on state- and non-state-owned firms. The differences in practices in their study are mainy attributable to the differences between the two sectors they selected. They did not conduct an indepth evaluation of financial sector development and concluded by suggesting that trade credit cannot substitute for a formal financial system, an issue they suggested required further investigation. Where the financial sector is underdeveloped, firms use informal sources of finance for their operations and expansion. Du, Lu and Tao (2012) investigated factors which influence the choice of bank loans and trade credit focusing on firm performance and growth and found that there is a minimal link between changes in the financial sector and the supply of bank loans.

Petersen and Rajan (1997) state that, small firms' access to capital may be limited and they will thus tend to use trade credit instead of financial institutions. Furthermore, firms with better access to credit will offer trade credit to their customers. Firms in countries with less developed financial markets appear to substitute informal credit provided by their suppliers to finance growth. Fisman and Love (2003) found that industries that are more dependent on trade credit financing grow relatively more rapidly in countries with less developed financial intermediaries.

4.2.5. Profitability

The level of financial sector development differs amongst the countries in the BRICS group. Managers can create value by reducing their firm's terms for accounts receivable and inventories and shortening the cash conversion cycle which also improves the firm's profitability (Juan García-Teruel and Martinez-Solano 2007: 5). Working capital management is vital because of its effects on the firm's profitability and risk, and consequently its value (Smith 1980). Trade credit can be used to

increase a firm's sales by stimulating demand as it can be used as an effective price cut (Brennan, Maksimovics and Zechner 1988; Petersen and Rajan 1997). Trade credit incentivizes customers to acquire goods at times of low demand and enables them to check that the merchandise they receive is as agreed (quantity and quality) and to ensure that the services contracted are carried out (Smith 1987). It also helps firms to strengthen long-term relationships with their customers (Ng, Smith and Smith 1999). However, firms that invest heavily in inventory and trade credit can suffer reduced profitability. Deloof (2003) analysed a sample of large Belgian firms during the period 1992-1996 and found that they improved their profitability by reducing the terms for accounts receivable and reducing inventories. The study also found that less profitable firms wait longer to pay their bills.

4.2.6. Term structure of bank loans and trade credit

Compared to bank loans, trade credit is usually repaid within a short term, usually 10 to 30 days, with a 2% discount on the purchase price if the customer can repay within 10 days; otherwise full repayment is required within 30 days (Ng, Smith and Smith 1999). Short-term trade credit generally provides transactional services for firms. If the repayment term of trade credit is unusually long, it is likely that it is used by suppliers as financial support to customers (Ge and Qiu 2007). Firms in modern developed economies can choose to borrow from banks or from trade partners. Whether small or large, they borrow heavily from their trade partners, apparently at implicit rates that track the explicit rates banks would charge (Miwa and Ramseyer 2005). Nonetheless, they do not treat bank loans and trade credit interchangeably; rather, they borrow from banks when they anticipate needing money for relatively long periods, and turn to trade partners when they face short-term exigencies they did not expect. This contrast in the term structures of bank loans and trade credit follows from the fundamentally different way bankers and trade partners reduce the default risks they face. Because bankers seldom know their borrowers' industries first-hand, they rely on guarantees and security, unlike trade partners that know these industries well and instead closely monitor their borrowers. Because the costs of creating security interests are heavily front-loaded, bankers focus on long-term debt (Miwa and Ramseyer 2005).

4.2.7. Demand for products

The primary motivation for a company to offer trade credit to its customers is stimulating end demand for the product or service. Brennan, Maksimovics and Zechner (1988) suggest that vendor financing may be optimal for a firm when demand is less elastic in the credit market than in the cash market because of adverse selection and when the reservation prices of credit customers are systematically lower than those of cash customers. There are situations where buying a product on credit appears cheaper than using cash. The firm is in the middle of a credit chain, and produces goods for sale, holds inventories of goods that were produced but unsold at a cost and, in the face of uncertain demand for its products, extends trade credit to its financially constrained customers to obtain additional sales (Bougheas, Mateut and Mizen 2009). Trade credit represents a large portion of total assets among firms in the US and is widely considered as an opportunity for firms to capture sales that may not otherwise be possible (Harris 2015: 47). Molina and Preve (2009) investigated the trade receivables policies of distressed firms and found that there is a trade-off between a firm's willingness to gain sales and its need for cash. Businesses often offer a permissible delay in payment to their customers in order to increase sales, and this has a positive impact on demand but negatively impacts on default risks and costs (Chern *et al.* 2014). Trade credit can be used as a competitive tool and to generate additional cash flows by financing the sale of additional units to poorer customers (Niskanen and Niskanen 2006).

4.2.8. Country and Industry effects

Ng, Smith and Smith (1999) and, more recently, Costello (2013), provide compelling empirical evidence that there is indeed significant variation in payment terms across industries, but much less so within industries. Their results indicate that long payment terms are a strong impediment to the entry and survival of constrained, yet efficient firms (Barrot 2015). Based on several theories of trade credit, El Ghoul and Zheng (2016) found that after controlling for firm and country-level factors as well as industry effects, trade credit provision is higher in countries with higher collectivism, uncertainty avoidance, and masculinity scores. Trade credit can be industry-specific and there is

little variation within industries but wide variation across them (Nilsen 1999). Firms that do not use credit are more likely to be found in the services industries and in the wholesale and retail trades (Cole 2011). Trade credit intensiveness is also industry-specific and differences across and within industries in terms of trade credit were found to persist over time (Fisman and Love 2003).

Firms that use bank credit are larger, less profitable, less liquid and more opaque as measured by firm age, i.e., younger (Cole 2011). Trade credit is an important source of funds for most firms and is considered to be crucial for those that are running out of bank credit. The use of trade credit is associated with the nature of the transacted goods; suppliers of differentiated products and services have larger accounts receivable than suppliers of standardized goods and firms that purchase more services receive cheaper trade credit for longer periods (Giannetti, Burkart and Ellingsen 2011). While bankers may know how to run a heavily regulated financial intermediary, they know far less about the industries in which their borrowers compete and do not have special or comparative advantage in monitoring. They thus only lend to firms that can offer either third-party guarantees or security in the form of property (Miwa and Ramseyer 2005).

4.2.9. Access

Financial sector development can be measured by access. Firms in countries with more developed banking sectors have better access to bank loans than those operating in economies with under-developed financial sectors. Mateut, Bougheas and Mizen (2006) consider external finance from trade credit as an additional source of funding for firms that cannot obtain credit from banks and predict that when monetary policy tightens there will be a reduction in bank lending relative to trade credit. Du, Lu and Tao (2012) found that access to bank loans is central in improving firm performance and growth, while the availability of trade credit is much less important. Their results suggest that trade credit cannot effectively substitute for bank loans. (Du, Lu and Tao 2012) suggest the need for further development of China's formal financial institutions, which would enable the non-state sector to grow much faster than in recent decades.

Trade credit also has a signalling effect on banks, thereby improving access to bank loans. Agostino and Trivieri (2014) found that trade credit offers certain information to banks. Availability of supplier credit might thus be crucial in facilitating access to institutional funding for new firms entering the market. These findings support the hypothesis that suppliers have superior ability to obtain information about their customers compared to banks. Banks seem to consider suppliers a reliable source of information on firms' financial conditions even after several years of lending relationships (Agostino and Trivieri 2014).

4.2.10. Financial Crisis

Lin and Chou (2015) found that a severe financial crisis causes firms to increasingly turn to their suppliers as a source of finance. Their study revealed that, trade credit accounts payable increased faster than accounts receivable in China, suggesting that, both large and small firms provide significantly less trade credit to customers during a financial crisis. Love, Preve and Sarria-Allende (2007) argue that a decline in aggregate trade credit ratios is driven by reduced supply of trade credit that follows a bank credit crunch. This is consistent with the ‘‘redistribution view’’ of trade credit provision, whereby bank credit is redistributed via trade credit from financially stronger firms to weaker firms.

4.2.11. Information monopoly

The proprietary borrower information that banks obtain through their relationships results in an information monopoly that creates holdups and leads to high interest rates (Gama, Paula and Van Auken 2015). Tsuruta (2008) shows that when the interest rate the bank sets is too high or is subject to a sharp increase, the ratio of trade payables increases and the bank offers fewer loans. Banks do not disclose confidential information on their relationship with their clients, making it difficult for a firm to switch to another bank to obtain a loan. Trade credit is a viable alternative to short-term debt, especially when a firm's main bank is unwilling to increase its exposure to liquidity constraints (Gama, Paula and Van Auken 2015). Suppliers that can control their

customers' credit risk may provide additional credit and thus alleviate concerns associated with holdup costs. Trade creditors address the problem of bank information monopolies in Japan (Tsuruta 2008). Nilsen (1999) found that large firms also increase trade credit to a greater extent than small firms. This is puzzling since large firms are often older and better established, and are thus less prone to the information problems that block small firms from open market credit (Nilsen 1999).

Monetary policy contractions exacerbate credit constraints stemming from asymmetric information, incentive problems and limited collateral. During such periods, financial intermediaries reduce the supply of credit to smaller businesses. Although trade credit is a less desirable alternative for corporate financing, it may play a special role in alleviating credit rationing (Atanasova and Wilson 2003).

4.2.12. Competitive markets

A retailer may fund its business by borrowing credit either from a competitive bank market or from a manufacturer, provided it is also to the latter's benefit to extend trade credit (Chen 2015). Trade credit integrates financing with the supply chain, making it more directed to the firm's needs. A trade credit price contract makes both channel members better off and is a unique financing equilibrium; trade credit better integrates the channel than bank credit by centralizing the financing of distribution at the manufacturer (Chen 2015).

If the trade credit market is more competitive than the bank credit market, trade credit outperforms bank credit for the retailer; otherwise, the retailer's preferred credit type hinges on the relative diversion risk level of trade credit over bank credit (Cai, Chen and Xiao 2014). In the dual-credit scenario, when the bank credit market is more competitive than the trade credit market, the retailer borrows bank credit prior to trade credit, but switches to exhaust the trade credit limit prior to borrowing bank credit as internal capital declines. However, if the trade credit market is more competitive, the retailer will only access trade credit regardless of the internal capital level (Cai, Chen and Xiao 2014).

Firms end up using a mix of trade credit and bank loans due to capital market imperfections and they are used as either complementary or as substitutes for each other (Yang 2011). During tight monetary periods, trade credit mainly operates as a substitute for bank borrowing, while during looser monetary episodes, even when the economy is weak, trade credit and bank loans complement each other (Yang 2011). Atanasova (2007) tested for the existence of credit constraints and their effect on corporate financing policies and found support for the hypothesis that firms access trade credit as a substitute for institutional finance when they are credit constrained.

In developing economies, it may be efficient for suppliers to act as financial intermediaries as trade credit reduces the need to raise funds on inefficient financial markets while enabling profitable real transactions (Maksimovic and Frank 2005). Trade credit can exist even in the presence of a competitive banking sector as the market rations bank credit and trade credit thus enables them to increase their leverage (Cunat 2007). Suppliers do not lend much to their customers at the beginning of their commercial relationship but levels of credit increase as the relationship evolves.

4.2.13. Business-to-business relationships

Cunat (2007) suggests that the emergence of trade credit may be a natural consequence of a commercial interaction, despite the existence of a competitive banking sector. This is based on two essential elements. Firstly, suppliers are better able to enforce debt repayment than banks because they could halt the supply of intermediate goods to their customers. Secondly, suppliers may act as liquidity providers, supporting their customers when they experience temporary liquidity shock. Trade credit may be justified by the interaction between a supplier and a customer that engage in specific production processes in a context of limited enforceability of debt. This gives suppliers an advantage in enforcing non-collateralized debts and allows them to lend beyond the maximum amount that banks are willing to lend. This, trade credit can exist even in the presence of a competitive banking sector (Cunat 2007).

4.2.14. Substitution and complementary effect

The relationship between bank credit and trade credit has been studied in terms of two hypotheses: the substitution hypothesis and the complementary hypothesis. Psillaki and Eleftheriou (2015) study shows that trade credit for small firms during periods of tight monetary conditions generally complement rather than act as a substitute for bank credit, thus providing empirical support for the redistribution view of trade credit. Casey and O'Toole (2014) found that firms that are denied credit for working capital tend to turn to trade credit, while informal and intercompany lending tends to act as a substitute for bank loans. Du, Lu and Tao (2012) concluded that, access to bank loans is central to improving firm performance and growth, while the availability of trade credit is much less important. Their results suggest that trade credit cannot be a substitute for bank loans. (Du, Lu and Tao 2012) suggest the need for further development of China's formal financial institutions. Difficulty in gaining access to bank credit positively influences the use of trade credit, and therefore demonstrates the substitutability of bank credit and trade credit.

There is a significantly positive relationship between the supply of trade credit (i.e., accounts receivable) and bank loans and a significantly negative relationship between demand for trade credit (i.e., accounts payable) and bank loans, indicating a complementary and substitution effect between trade credit and bank loans (Lin and Chou 2015). Burkart and Ellingsen (2004) used a deterministic model to show that trade credit can either complement or be a substitute for bank credit. They also explained why trade credit has shorter maturity and is more prevalent in less developed credit markets.

Nilsen (1999) found that small firms increase trade credit, a substitute credit, indicating strong loan demand and that it supports the bank lending channel. During monetary contractions banks restrict some firms' loans; small firms do not voluntarily cut back on such loans since the alternatives are less desirable. Small and medium-size manufacturing firms and those with a low export share are less likely to have access to bank finance, especially in tight periods. Furthermore, financially constrained firms with limited access to bank finance tend to substitute trade credits for bank loans more aggressively as monetary policy tightens (Özlü and Yalçın 2012).

Both large and small firms provide significantly less trade credit (accounts receivable) and receive less trade credit (accounts payable) during financial crisis. Once the crisis has passed, large firms still provide significantly less trade credit to their customers but receive more trade credit from their suppliers than smaller firms (Yang 2011).

Credit constraints imposed by banks have a direct effect on trade credit demand; firms whose last loan application was denied are more likely to consider trade credit to be an important source of finance. Danielson and Scott (2004) found evidence to support (Petersen and Rajan 1994b) pecking order of debt financing. When bank credit is not available, firms increase their reliance on potentially expensive sources of funds, including trade credit.

4.2.15. Trade credit as investment

From an investment perspective, trade credit can generate implicit interest income on delayed payment if the seller can charge a higher price by offering credit terms (Martínez-Sola, García-Teruel and Martínez-Solano 2013). Whilst trade credit can be used as an investment vehicle, bank credit can only be used as a financing mechanism. Firms should invest in trade credit if the net current value of the revenue receivable with trade credit is greater than that without it (Martínez-Sola, García-Teruel and Martínez-Solano 2013).

4.2.16. Bank lending channel

The development of the financial sector is associated with ups and downs with periods of liquidity constraint, especially when deposits are low and financial institutions limit lending**.** Bernanke, Lown and Friedman (1991) and Kashyap and Stein (1997) assert that banks' asset decisions also play an important role in monetary policy independent of the cost of capital. The theory predicts that a reduction in reserves induces banks to scale back lending activities and this disproportionately affects a class of firms that cannot readily switch to other funds, i.e., those without access to credit markets. Small manufacturers, for instance, may be more dependent on banks than other firms, and without alternative financing, they may be forced to limit desired investment (or current production) at a given market interest rate (Nilsen 1999). Small firms that are

commonly held to be credit constrained use more trade credit during monetary contractions, causing steady demand for credit. This supports the bank lending channel as these firms switch from loans to trade credit, their only practical alternative (Nilsen 1999).

4.3. Methodology

There is a need to investigate the relationship between a firm's trade credit and the development of the financial sector. The literature notes that, trade credit is an expensive substitute for bank credit. The primary purpose is to establish whether firms in countries with poorly developed banking sectors use trade credit and what would happen if the financial sector develops. If the financial sector has an effect on the use of trade credit, firms in countries with developed financial sectors would be expected to use less trade credit and more bank credit. Principal component analysis is used to develop a measure of banking sector development which incorporates all the banking sector development measures used in this study. Pairwise correlation is used to investigate the use of trade payables and trade receivables on financial sector development variables. The study also tests Granger causality between the banking sector and trade credit and vice versa.

Data was collected from the published financial statements of all non-financial listed companies in the BRICS countries in various industrial sectors for the period 2001-2013. These are available on the Bloomberg online database which provides financial statements for firms listed on the world's stock exchanges. The data was analysed using econometrics. The empirical study is based on a sample of these firms. The firms were listed on the BM&F Bovespa for Brazil, the Saint Petersburg Stock Exchange for Russia, the NSE for India, the Shenzhen Stock Exchange for China and the JSE for South Africa. Banks were excluded because they are part of the financial sector which act as intermediaries and provide finance to non-financial firms. The concept of working capital does not apply to banks since financial institutions do not have typical current assets and liabilities such as inventories and accounts payable.

4.3.1. Pairwise Correlation

The correlation coefficient, often referred to as the Pearson correlation or Pearson's correlation, is a measure of the strength and direction of the association between two continuous variables. It generates a coefficient called the Pearson correlation coefficient, denoted as *r*. A Pearson's correlation seeks to draw a line of best fit through the data of two variables, and the Pearson correlation coefficient, *r*, indicates how far all these data points are from this line of best fit. Its value can range from -1 for a perfect negative linear relationship to +1 for a perfect positive linear relationship. A value of 0 (zero) indicates no relationship

If the p-value is less than the significance level (α = 0.05): Decision: Reject the null hypothesis. Conclusion: "There is sufficient evidence to conclude that there is a significant linear relationship between independent variables and trade credit because the correlation coefficient is significantly different from 0." If the p-value is not less than the significance level (α = 0.05) Decision: Do not reject the null hypothesis. Conclusion: "There is insufficient evidence to conclude that there is a significant linear relationship between dependent variables and trade credit because the correlation coefficient is not significantly different from 0."

If the test concludes that the correlation coefficient is significantly different from 0, we say that the correlation coefficient is "significant". Conclusion: "There is sufficient evidence to conclude that there is a significant linear relationship between x and y because the correlation coefficient is significantly different from 0." What the conclusion means: There is a significant linear relationship between x and y. We can use the regression line to model the linear relationship between x and y in the population. If the test concludes that the correlation coefficient is not significantly different from 0 (it is close to 0), we say that correlation coefficient is "not significant".

Trade receivables and banking sector development

Table 0-25 Pairwise correlation trade payables and banking sector

	$\frac{Trade\ payables}{Total\ assets}$	$\frac{BC}{BD}$	$\frac{BD}{GDP}$	BC	$\frac{DCP}{GDP}$
$\frac{Trade\ payables}{Total\ assets}$	1.0000				
	29831				
$\frac{BC}{BD}$	-0.1122*	1.0000			
	0.0000				
	29831	40261			
$\frac{BD}{GDP}$	0.0599*	-0.4797*	1.0000		
	0.0000	0.0000			
	29831	40261	40261		
BC	0.0402*	0.1368*	0.0642*	1.0000	
	0.0000	0.0000	0.0000		
	29831	40261	40261		
$\frac{DCPS}{GDP}$	-0.0729*	0.8368*	-0.1292*	0.3958*	1.0000
	0.0000	0.0000	0.0000	0.0000	
	29831	40261	40261	40261	

**99% and 95% statistically significant*

Source: Own construct based on banking sector development variables 2001-2013 and receivables

Null Hypothesis H_0: The population correlation coefficient is not significantly different from 0. There is no significant linear relationship (correlation) between banking sector (independent variables) and trade credit in the population.
Alternate Hypothesis H_1: The population correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between the independent variable and $TPTA$ in the population.

Bank credit to bank deposits and $TPTA$ has weak negative correlation of -0.1122 p value 0.0000<0.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between bank credit to bank deposits and trade receivables over total assets in the population. The increase in bank credit will reduce the level of trade credit. Bank credit and trade credit are thus substitutes. The findings show that if credit

from banks is available, firms will reduce trade credit by substituting it with bank loans, affirming the findings of Danielson and Scott (2004) and Burkart and Ellingsen (2004).

Bank deposits to GDP and $TPTA$ has a weak positive correlation of 0.0599 p value 0.0000<.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between bank credit to bank deposits and trade payables over total assets in the population. An increase in bank deposits may also result in an increase in trade payables. The growth of bank deposits does not necessarily result in reduced use of trade payables. The use of trade payables may therefore free up cash, resulting in increased bank deposits by a firm.

Bank concentration and $TPTA$ has positive correlation of 0.0402 p value 0.0000<.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between bank concentration and trade receivables over total assets in the population. The increase in bank concentration will cause an increase in trade payables because concentration results in less competition. It becomes relatively difficult for firms in an economy with a concentrated banking sector to obtain credit.

Domestic Private Credit Sector to GDP and $TPTA$ has negative correlation of -0.0729 p value 0.0000<.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between bank credit to bank deposits and trade payables over total assets in the population. The increase in domestic credit to the private sector will reduce the level of trade credit. Bank credit and trade credit are substitutes. The findings show that if credit is available from banks, firms will reduce trade credit.

Table 0-26 Pairwise correlation trade receivables and banking sector

	$\frac{Trade\ receivables}{Total\ assets}$	$\frac{BC}{BD}$	$\frac{BD}{GDP}$	BC	$\frac{DCP}{GDP}$
$\frac{Trade\ receivables}{Total\ assets}$	1.0000				
$\frac{BC}{BD}$	-0.0044	1.0000			
	0.4473				
	29989	40261			
$\frac{BD}{GDP}$	0.0548*	-0.4797	1.0000		
	0.0000	0.0000			
	29989	40261	40261		
BC	-0.0394*	0.1368*	0.0642*	1.0000	
	0.0000	0.0000	0.0000		
	29989	40261	40261	40261	
$\frac{DCPS}{GDP}$	0.0162*	0.8368 *	-0.1292*	0.3958*	1.0000
	0.0000	0.0000	0.0000	0.0000	
	29989	40261	40261	40261	

**99% and 95% statistically significant*

Source: Own construct based on banking sector development variables 2001-2013 and receivables

Null Hypothesis H_0: The population correlation coefficient is not significantly different from 0. There is not a significant linear relationship (correlation) between financial sector (independent variables) and trade credit in the population.
Alternate Hypothesis H_1: The population correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between the independent variable and $TRTA$ in the population.

Bank credit to bank deposits and $TRTA$ has weak negative correlation of -0.0044 p value 0.4473>0.05. Based on this, the null hypothesis is not rejected. The correlation coefficient is not significantly different from 0. There is not a significant linear relationship (correlation) between bank credit to bank deposits and trade receivables over total assets in the population. The use of trade receivables does not have a relationship with the bank credit to bank deposits ratio. The probable reason is that a

firm can extend trade credit (receivables) without necessarily taking a loan from the bank or increasing its bank deposits.

Bank deposits to GDP and $TRTA$ has positive correlation of 0.0548 p value 0.0000<.05. Based on this result, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between bank credit to bank deposits and trade receivables over total assets in the population. An increase in bank credit to GDP will result in an increase in the use of trade receivables. The probable reason is that firms that are financed re-distribute funding to their financially constrained trading partners through trade receivables.

Bank concentration and $TRTA$ has negative correlation of -0.0394 p value 0.0000<0.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between bank concentration and trade receivables over total assets in the population. An increase in bank concentration can result in less trade credit (receivables) offered by firms. This could be due to the fact that, with less competition it becomes difficult for firms to access credit from banks.

Domestic credit to private sector and $TRTA$ has positive correlation of 0.0162 p value 0.0052<0.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between bank credit to bank deposits and trade receivables over total assets in the population. An increase in domestic credit to private sector will result in increased use of trade receivables. The reason could be that firms that are financed re-distribute funding to their financially constrained trading partners through trade receivables, confirming the re-distribution hypothesis (Cull, Xu and Zhu (2009), Kestens, Van Cauwenberge and Bauwhede (2012); Blasio (2005).

4.3.2. Principal Component Analysis

Principal component analysis which was used to perform variable reduction for financial sector development in Chapter 2 is employed here for banking sector variables. This method enables the construction of a single variable of the components of banking sector development which is further used in regressions in this chapter.

Table 0-27 Principal component banking sector

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2,1150	0,9590	0,5288	0,5288
Comp2	1,1561	0,4936	0,2890	0,8178
Comp3	0,6625	0,5960	0,1656	0,9834
Comp4	0,6665		0,0166	1,0000

Principal components (eigenvectors)

Variable	Comp1	Comp2	Comp3	Comp4	Unexplained
Bank credit to bank deposits	**0,6471**	0,1833	0,2560	0,6943	0
Bank deposits to GDP	-0,3346	0,6582	0,6242	0,2554	0
Bank concentration	**0,2818**	0,6931	-0,6444	0,1580	0
Domestic credit to private sector to GDP	**0,6244**	0,2299	0,3599	-0,6540	0

Variable	Comp1	Comp2	Comp3	Comp4
Bank credit to bank deposits	**0,6471**	-0,1833	0,256	0,6943
Bank deposits to GDP	-0,3346	0,6582	0,6242	0,2554
Bank concentration	**0,2818**	0,6931	-0,6444	0,158
Domestic credit to private sector to GDP	**0,6244**	0,2299	0,3599	-0,654

Source: Own construct based on financial sector development 2001-2013

Principal component 1 has BC/BD, BC, and DCPS/GDP with the two highest positive values above 0.5, implying that these variables have strong influence in this component. Principal component 2 has BCD/BC, BC and DPDS/GDP with two

variables with values above 0.5, implying that these variables strongly influence this component. In the individual countries, all PC1 are positive; this reflects banking sector development in all the BRICS countries.

Four banking sector development variables were used for the principal component analysis. It is observed that two explain the maximum variation for all the countries. The cumulative proportion of the variance given by the first two principal components is 81.78%. All of the components from 3 to 4 explain only 18.22 % of variation. Therefore, they are considered as relatively unimportant considering that useful information is captured by the two principal components.

First Principal Component Analysis – pc1 is a measure of BC/BD, BC, DCPS/GDP, which all have correlation of above 0.2.
Second Principal Component Analysis – pc2: The second principal component is a measure of BD/GDP, BC and DCPS/GDP which all have correlations of above 0.2.

One method of deciding on the number of components is to include only those that give unambiguous results, i.e., where no variable appears in two different columns as a significant contribution. Pc1 satisfied this criterion and will be retained for use in further regressions as a measure of banking sector development. Pc1 represents all banking sector variables except BD/GDP. Pc2, pc3 and pc4 will be dropped because the variables they measure have already been measured by pc1. The other criterion is to keep a component with an eigenvalue greater than one; pc1 and pc2 have eigenvalues greater than 1. The three components also explain 81.78% of the variation which is a high percentage value. Only pc1 will be used because only one variable is required to represent banking sector development.

4.3.3. Panel Vector Autoregression

Industry depends on the banking sector for financing and the two sectors are interdependent. This chapter investigates whether the banking sector has a causative effect on firms' use of trade credit and whether trade credit policies set by firms have an effect on banking sector development. Chapter 3 established that firms adopt trade credit policy that sets the percentage of working capital to be financed through such

credit. It is therefore necessary to test whether such policies impact on what banks do. If firms set a target for trade credit, it is likely to have an effect on the amount raised through bank credit.

Banking sector development is expected to lead a fall in trade credit use by firms and there is thus a need to investigate the causative effect on the interdependence of firms and banks. Since domestic interdependencies are known to produce domestic business cycle fluctuations from idiosyncratic sectoral shocks (Long Jr and Plosser 1983), and spillovers from the financial sector to the real economy (Canova and Ciccarelli 2013), it is important to test causation. Panel vector autoregressions (VAR) are the best test of such impacts on an economy.

Panel VAR models are used in macroeconomics and finance to address a variety of empirical questions of interest to applied macroeconomists and policymakers. Financial sector development is a macroeconomics subject and this study seeks to come up with findings of interest to policy makers. Panel VAR is thus the appropriate methodology. Panel VARs are particularly suited to address issues in the policy arena, as they are able to capture both static and dynamic interdependencies, treat the links across units in an unrestricted fashion, easily incorporate time variations in the coefficients and in the variance of the shocks, and account for cross sectional dynamic heterogeneities (Canova and Ciccarelli 2013). In VAR models all variables are treated as endogenous and interdependent, in both a dynamic and a static sense, although in some relevant cases, exogenous variables could be included.

VAR models have been traditionally used in time series and were introduced in panel data settings by Holtz-Eakin, Newey and Rosen (1988). Since 1988 panel VAR models have been used in multiple applications across different fields. Panel VAR model selection, estimation and inference in a generalized method of moments (GMM) framework is used in this study to analyse the relationship between trade credit use and financial sector development amongst BRICS countries. This study follows Abrigo and Love (2015) who introduced an updated package of programs with additional functionality, including sub-routines to implement Granger (1969) causality tests, and optimal moment and model selection following Andrews and Lu (2001).

A panel vector autoregression model is estimated by fitting a multivariate panel regression of each dependent variable on lags of itself, lags of all other dependent variables and exogenous variables, if any. The estimation is by GMM. Joint estimation of the system of equations makes cross-equation hypothesis testing straightforward. Wald tests on the parameters may be implemented based on the GMM estimate and its covariance matrix. Granger causality tests, with the hypothesis that all coefficients on the lag of variable are jointly zero in the equation for variable, may likewise be carried out using this test (Abrigo and Love 2015).

Granger causality is a statistical concept of causality that is based on prediction. There are occasions when it is difficult to decide the direction of causality between two related variables and whether or not feedback is occurring (Granger 1969). Testable definitions of causality and feedback are proposed and illustrated by the use of simple two-variable models. Granger causality is a mathematical formulation based on linear regression modeling of stochastic processes (Granger 1969). More complex extensions to nonlinear cases exist; however these are often more difficult to apply in practice.

$$Y_{it} = tc_{it-1}A_1 + tc_{it-2}A_2 \ldots\ldots + tc_{it-p+1}A_{p-1} + tc_{it-p}A_p + fd_{it} + \mu_{it} + e_{it} \quad (1)$$

Where tc_{it} is a $(1 \times k)$ vector of dependent variables; fd_{it} is a $(1 \times l)$ vector of exogenous covariates; $\mu_{it}$and e_{it} are $(1 \times k)$ vectors of dependent variable-specific fixed-effects and idiosyncratic errors, respectively. The $(k \times k)$ matrices $A_1, A_2 \ldots\ldots, A_{p-1}, A_p$ and the $(l \times k)$ matrix B are parameters to be estimated.

Various estimators based on GMM have been proposed to calculate consistent estimates of the above equation, especially in fixed T and large N settings (Abrigo and Love 2015). With the assumption that errors are serially uncorrelated, the first-difference transformation may be consistently estimated equation-by-equation by instrumenting lagged differences with differences and levels of tc_{it} from earlier periods as proposed by Anderson and Hsiao (1982).

Arellano and Bover (1995) proposed forward orthogonal deviation as an alternative transformation, which does not share the weaknesses of the first-difference transformation. Instead of using deviations from past realizations, it subtracts the average of all available future observations, thereby minimizing data loss. Potentially, only the most recent observation is not used in estimation. Since past realizations are not included in this transformation, they remain as valid instruments. For instance, in a second-order panel VAR only $T_I \geq 4$ realizations are necessary to have instruments in levels.

Efficiency can be improved by including a longer set of lags as instruments. However, in general, this has the unattractive property of reducing observations, especially with unbalanced panels or missing observations. As a remedy, Holtz-Eakin, Newey and Rosen (1988) proposed creating instruments using observed realizations, with missing observations substituted with zero, based on the standard assumption that the instrument list is uncorrelated with the errors.

While equation-by-equation GMM estimation yields consistent estimates of panel VAR, estimating the model as a system of equations may result in efficiency gains (Holtz-Eakin, Newey and Rosen 1988). Suppose the common set of $L \geq k_p + l$ instruments is given by the row vector Z_{it}, where $fd_{it} \in Z_{it}$, and equations are indexed by a number in superscript. Consider the following transformed panel VAR model based on equation (1) but represented in a more compact form:

$$tc_{it}^{*} = tc_{it}^{*}A + e_{it}^{*}$$

$$tc_{it}^{*} = \left[\; tc_{it}^{1*} \;\; tc_{it}^{2*} \ldots\ldots tc_{it}^{k-1*} \;\; tc_{it}^{k*} \; \right]$$

$$tc_{it}^{*} = \left[tc_{it-1}^{*} \;\; tc_{it-2}^{*} \ldots. tc_{it-p+1}^{*} \;\; tc_{it-p}^{*} \;\; fd_{it}^{*} \right]$$

$$e_{it}^{*} = \left[e_{it}^{1*} \;\; e_{it}^{z*} \ldots\ldots e_{it}^{k-1*} \; e_{it}^{k*} \; \right]$$

$$A^{'} = \left[A_1^{'} \;\; A_2^{'} \ldots A_{p-1}^{'} \;\; A_p^{'} \;\; B^{'} \;\; \right]$$

(2)

where the asterisk denotes some transformation of the original variable. If we denote the original variable as m_{it}, then the first difference transformation implies that $m_{it}^{*} = m_{it} - m_{it-1}$while for the forward orthogonal deviation $m_{it} = m_{it} - \overline{m_{it}} \sqrt{T_{it}/(T_{it}+1)}$ where T_{it} is the number of available future observations for panel i at time t, and m_{it} is its average. Suppose we stack observations over panels, then over time. The GMM estimator is given by

$$A = \left(\overline{TC^{*\prime}}\, Z\, \widehat{W} Z'\, \overline{TC^{*}}\right) \text{^}{-1} (TC^{*\prime}\, Z\, \widehat{W} Z'\, \overline{TC^{*}}) \tag{3}$$

Where $\widehat{W}$ is a $(L \times L)$ weighting matrix assumed to be non-singular, symmetric and positive and semi-definite. Assuming that $\mathrm{E}[Z'e] = 0$ and rank $\mathrm{E}[\overline{Y^{*\prime}}\, Z] = kp + l$, the GMM estimator is consistent. The weighting matrix $\widehat{W}$ may be selected to maximise efficiency (Hansen 1982)

Dynamic panel data models with unobserved individual effects and macroeconomic models with rational expectations are usually estimated using GMM (see Hansen (1982). The problem of selecting the correct model and correct moment conditions in a GMM context is addressed by (Andrews and Lu 2001). The estimation procedure for the order of an auto-regression can be based on the law of the iterated logarithm for the partial auto-correlations.

4.3.4. Model Selection

Panel VAR analysis is predicated on choosing the optimal lag order in both panel VAR specification and moment condition. Andrews and Lu (2001) proposed consistent moment and model selection criteria (MMSC) for GMM models based on Hansen (1982) statistic of over-identifying restrictions. Their proposed MMSC are analogous to various commonly used maximum likelihood-based model selection criteria, namely the Akaike information criteria (AIC) (Akaike 1969), the Bayesian information criteria (BIC) (Schwarz 1978), and the Hannan-Quinn information criteria (HQIC) (Hannan and Quinn 1979).

The GMM selection criteria are based on the J statistic for testing over-identifying restrictions. The selection criteria resemble the widely used likelihood-based selection criteria BIC, HQIC, and AIC. A strongly consistent estimation procedure for the order of an autoregression can be based on the law of the iterated logarithm for the partial auto-correlations. The J statistic is an analogue of (minus) the log likelihood function and the bonus terms are analogues of (minus) the term that penalizes the use of more parameters in a standard model selection criterion.

Applying Andrews and Lu's MMSC to the GMM estimator in (3), their proposed criteria select the pair of vectors (p, q), that minimizes,

$$MMSC_{BIC,n}(k,p,q) = J_n(k^2p, k^2q) - (|q| - |p|)k^2 \ln n$$

$$MMSC_{AIC,n}(k,p,q) = J_n(k^2p, k^2q) - 2k^2(|q| - |p|)$$

$$MMSC_{HQIC,n}(p,q) = J_n(k^2p, k^2q) - Rk^2(|q| - |p|) \ln n$$

where $J_n(k,p,q)$ is the J statistic of over-identifying restriction for a k-variate panel VAR of order and moment conditions based on lags of the dependent variables with sample size n.

Impulse Response

Without loss of generality, we drop the exogenous variables in our notation and focus on the autoregressive structure of the panel VAR in equation (1). Lütkepohl (2005) and Hamilton (1994) show that a VAR model is stable if all moduli of the companion matrix are strictly less than one, where the companion matrix is formed by

$$\mathcal{A} = \begin{matrix} A_1\ A_2 \ldots . A_p A_{p-1} \\ \left[\!\!\left[\begin{matrix} I_k\ O_k \ldots . O_k O_k \\ O_k I_k \ldots . O_k O_k \\ . \\ . \\ O_k O_k \ldots . I_k O_k \end{matrix} \right]\!\!\right] \end{matrix}$$

Stability implies that the panel VAR is invertible and has an infinite-order vector moving-average (VMA) representation, providing known interpretation of estimated

impulse-response functions and forecast error variance decompositions. The simple impulse-response function Φ_i may be computed by rewriting the model as an infinite vector moving-average, where Φ_i are the VMA parameters.

4.4. Results and analysis

4.4.1 Trade receivables

Table 0-28 Selection order criteria

Selection order criteria			No. of obs		17131	
Sample: 2004 -2012			No. of panels		3042	
			Ave. no of T		5.631	
lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.9901	293.8882	8.23E-59	215.899	277.8882	257.4541
2	0.9862	170.3397	8.24E-36	131.3451	162.3397	152.1227

Source: Own construct based on selection order criteria

Based on the three model selection criteria by Andrews and Lu (2001) and the overall coefficient of determination, second-order panel VAR is the preferred model, since this has the smallest MBIC, MAIC and MQIC. While we also want to minimize Hansen's J statistic, it does not correct for the degrees of freedom in the model like the model and moment selection criteria by Andrews and Lu (2001). Based on the selection criteria, we fit a second-order panel VAR model with the same specification of instruments as above using GMM estimation.

4.4.1.1. Granger Causality banking sector trade receivables

Granger causality needs to satisfy two assumptions: that the future cannot cause the past and the past causes the present or future. A cause contains unique information about an effect that is not available elsewhere.

Table 0-29 GMM Estimation Trade receivables 1

	(1) pc1
pc1	
L.pc1	0.652***
	(54.94)
L.TRTA	1.039**
	(2.74)
TRTA	
L.pc1	-0.00221
	(-0.90)
L.TRTA	0.548***
	(8.96)
N	23527

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Own construct banking sector development and trade receivables 2001-2013

Ho: Lagged (1 lag) $TRTA$ does not cause banking sector development (pc1)
H1: Lagged (1 lag) $TRTA$ causes banking sector development (pc1)

P=0.000<0.01. Based on this, the null hypothesis is rejected; therefore Lagged (1 lag) $TRTA$ does cause banking sector development. We are confident at 99% level that the use of trade receivables will have an impact on banking sector development. The reason is that if a firm receives trade credit, it will improve its access to bank loans.

Ho: Lagged (1 lag) banking sector development (pc1) does not cause $TRTA$
H1: Lagged (1 lag) banking sector development (pc1) causes $TRTA$

P=0.0000<0.01. Based on this, the null hypothesis is rejected. Therefore, Lagged (1 lag) banking sector development causes $TRTA$. We are confident at 99% level that banking sector development will have an impact on trade receivables. The reason is that if a firm obtains credit from a bank, it will in turn re-distribute funding to its financially constrained trading partners.

Panel VAR-Granger causality Wald test banks and trade receivables

Ho: Excluded variable does not Granger-cause Equation variable

Ha: Excluded variable Granger-causes Equation variable

Table 0-30 Panel VAR-Granger causality Wald test trade receivables 1

Equation/Excluded	Chi2	Df	Prob>chi2
pc1			
TRTA	7.512	1	0.006
All	7.512	1	0.006
TRTA			
pc1	0.811	1	0.368
All	0.811	1	0.368

Source: Own construct Panel VAR-Granger

H_O: Lagged (1 lag) $TRTA$ does not cause banking sector development (pc1)

H_1: Lagged (1 lag) $TRTA$ causes banking sector development (pc1)

P=0.006<0.05. Based on this, we reject the null hypothesis. Therefore, lagged $TRTA$ (1 lag) does cause banking sector development.

H_O: Lagged (1 lag) banking sector development (pc1) does not cause $TRTA$

H_1: Lagged (1 lag) banking sector development (pc1) causes $TRTA$

P=0.368>0.05. Based on this, the null hypothesis is not rejected. Therefore, Lagged (1 lag) banking sector development does not cause $TRTA$.

Granger causality is a statistical concept of causality that is based on prediction. According to Granger causality, $TRTA$ "Granger-causes" banking sector development; therefore, past values of $TRTA$ should contain information that helps to predict banking sector development over and above the information contained in past values of trade receivables alone. Banking sector development does not "Granger-cause" $TRTA$; therefore past values of banking sector development do not contain information that helps to predict trade receivables. The use of trade receivables competes with the banking sector in financial intermediation. Therefore, the use of

trade receivables will impact on banking sector development. The level of historical banking sector development does not help to predict the use of trade receivables. Firms make decisions to use trade receivables based on their own internal needs such as increasing sales and using receivables as investment. The decision to use trade receivables is not affected by historical values of banking sector development.

Panel vector autoregression model estimates are seldom interpreted by themselves. What is of interest is the impact of exogenous changes in each endogenous variable on other variables in the panel VAR system. Prior to estimating impulse-response functions (IRF) and forecast-error variance decompositions (FEVD), the first process is to check the stability condition of the estimated panel VAR. The resulting table and graph of eigenvalues confirm that the estimate is stable.

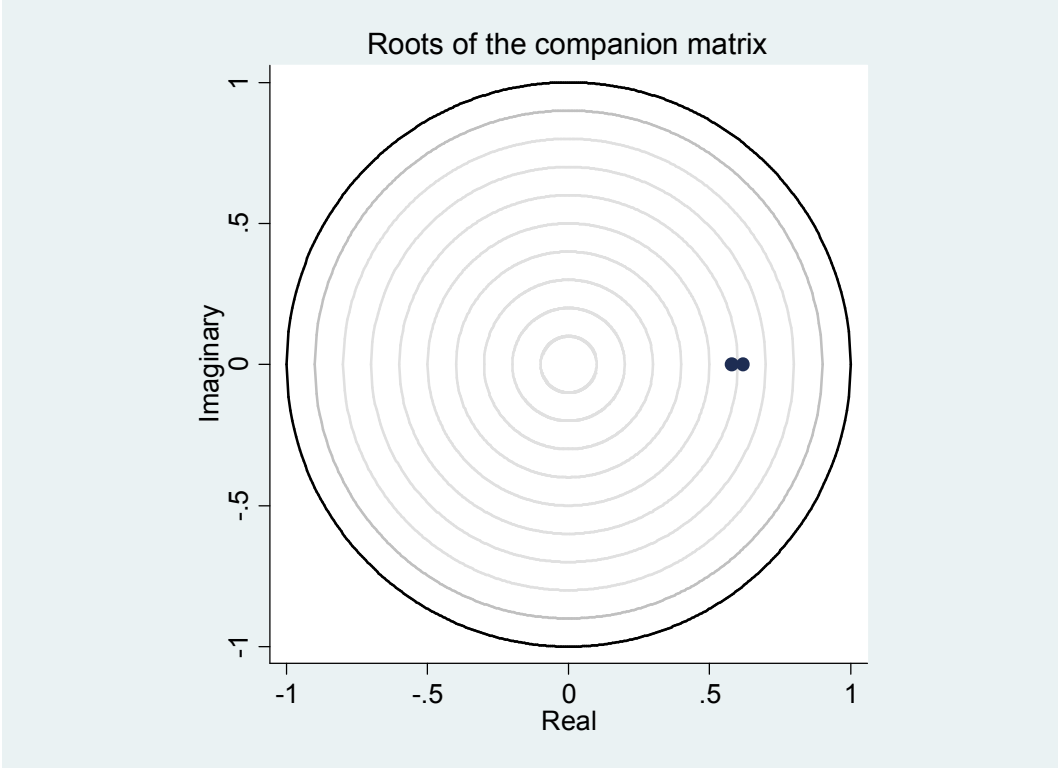
Eigenvalue stability condition

Eigenvalue		
Real	Imaginary	Modulus
0.6197	0	0.6970
0.5796	0	0.5796

All the eigenvalues lie inside the circle.

pVAR satisfies stability condition

Figure 2 Unit circle one



Source: Own construct Granger causality results

The above findings on causality imply that shocks in trade receivables levels have a direct impact on banking sector development, while the current level of banking sector development has some impact on trade receivables only in the future. Using this causal ordering, an implied impulse-response function (IRF) is calculated and the implied forecast-error variance decomposition (FEVD) is also calculated. The IRF confidence intervals are computed using 200 Monte Carlo draws based on the estimated model.

Table 0-31 Forecast-error variance decomposition trade receivables 1

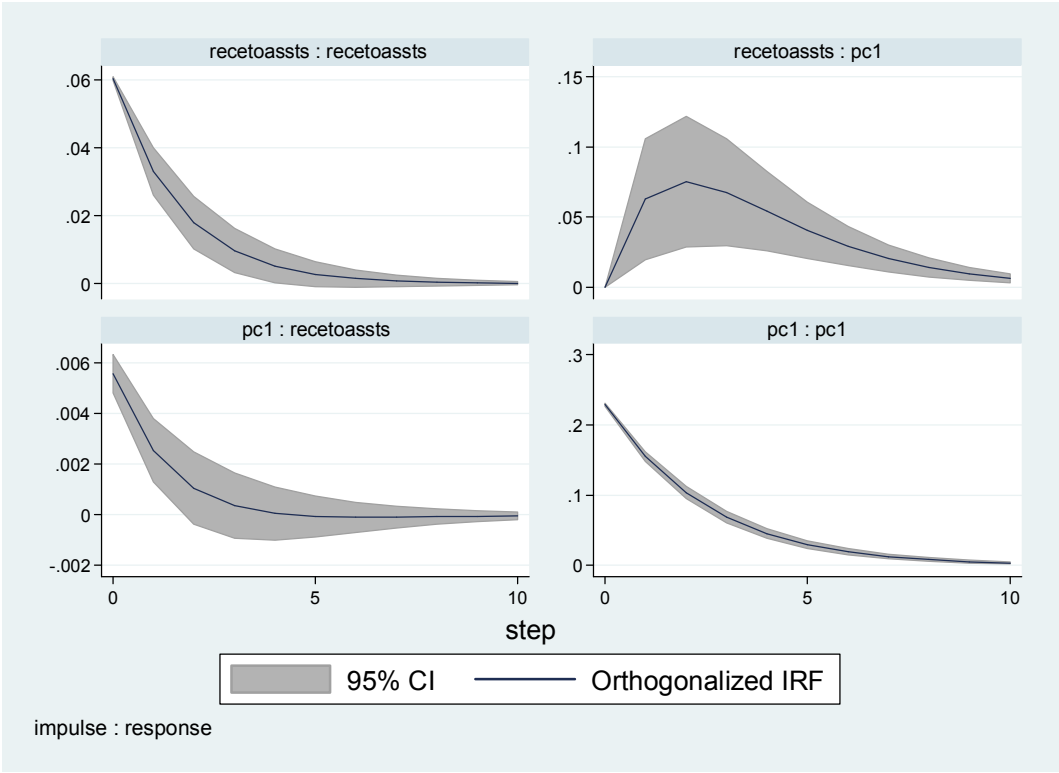
Response variable and forecast horizon		Impulse pc1	Variable $TRTA$
pc1	0	0	0
	1	1	0
	2	0.9510	0.049
	3	0.9008	0.0992
	4	0.8662	0.1338
	5	0.8458	0.1542
	6	0.8346	0.1654
	7	0.8289	0.1711
	8	0.8261	0.1739
	9	0.8248	0.1752
	10	0.8242	0.1758
$TRTA$			
	0	0	0
	1	0.0084	0.9916
	2	0.0078	0.9922
	3	0.0075	0.9925
	4	0.0074	0.9926
	5	0.0074	0.9926
	6	0.0074	0.9926
	7	0.0074	0.9926
	8	0.0074	0.9926
	9	0.0074	0.9926
	10	0.0074	0.9926

FEVD standard errors and confidence intervals based on 200 Monte Carlo simulations

Source: Own construct based on banking sector variables and trade receivables

Based on the FEVD estimates, we see that only 0.74% of variation in $TRTA$ by firms can be explained by the level of banking sector development. On the other hand, $TRTA$ explains 17.6% of variation in banking sector development. In terms of levels, the IRF plot shows that a positive shock on $TRTA$ leads to decreased banking sector development, which implies a downward trend in banking sector development amongst the BRICS countries. It is also noteworthy that a current shock in banking sector development has negative impacts on both $TRTA$ and banking sector development. On the other hand, the effect of a current shock on banking sector development has a persistent negative impact on future $TRTA$.

Figure 3 Impulse response one



recetoassts=trade receivables/trade payables

pc1=financial sector development

Source: Own construct Granger causality results

4.4.2. Trade payables

Table 0-32 Selection order two

Selection order criteria	No. of obs	16986	
Sample: 2004 -2012	No. of panels	3028	
	Ave. no of T	5.61	

lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.9882	147.4825	6.54E-28	69.5613	131.4825	111.0624
2	0.9222	796257	2.09E-16	40.6652	71.6257	614157

Source: Own construct selection order criteria

Based on the three model selection criteria by Andrews and Lu (2001) and the overall coefficient of determination, second-order panel VAR is the preferred model, since this has the smallest MBIC, MAIC and MQIC. While we also want to minimize Hansen's J statistic, it does not correct for the degrees of freedom in the model like the model and moment selection criteria by Andrews and Lu (2001). Based on the selection criteria,

we fit a first-order panel VAR model with the same specification of instruments as above using GMM estimation.

4.4.2.1. Granger Causality banking sector and trade payables

Granger causality needs to meet two assumptions: that the future cannot cause the past and the past causes the present or future. A cause contains unique information about an effect that is not available elsewhere.

Table 0-33 GMM Estimation Trade payables 1

	(1) pc1
pc1	
L.pc1	0.542***
	(9.59)
L.TPTA	-4.680***
	(-8.58)
TPTA	
L.pc1	0.0107
	(1.11)
L.TPTA	0.599***
	(6.00)
N	23368

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Source: Own construct GMM Estimation results

H_0: Lagged (1 lag) $TPTA$ does not cause banking sector development (pc1)

H_1: Lagged (1 lag) causes banking sector development (pc1)

P=0.0000<0.01. The null hypothesis is thus rejected. Therefore, Lagged (1 lag) $TPTA$ does cause banking sector development.

H_0: Lagged (1 lag) banking sector development (pc1) does not cause $TPTA$

H_1: Lagged (1 lag) banking sector development (pc1) causes $TPTA$

P=0.0000<0.01. Based on this, the null hypothesis is rejected. Therefore, Lagged (1 lag) banking sector development causes $TPTA$.

Panel VAR-Granger causality Wald test banks and trade payables

Ho: Excluded variable does not Granger-cause Equation variable

Ha: Excluded variable Granger-causes Equation variable

Table 0-34 Panel VAR Granger causality trade payables one

Equation/Excluded	Chi2	Df	Prob>chi2
pc1			
TPTA	73.606	1	0.000
All	73.606	1	0.000
TPTA			
pc1	1.243	1	0.265
All	1.243	1	0.265

Source: Own Construct banking sector and trade payables

H_0: Lagged (1 lag) $TPTA$ does not cause banking sector development (pc1)
H_1: Lagged (1 lag) $TPTA$ causes banking sector development (pc1)

P=0.000<0.01. Based on this, the null hypothesis is rejected. Therefore, Lagged (1 lag) $TPTA$ does cause banking sector development.

H_0: Lagged (1 lag) banking sector development (pc1) does not cause $TPTA$
H_1: Lagged (1 lag) banking sector development (pc1) causes $TPTA$

P=0.265>0.01. Based on this, the null hypothesis is not rejected. Therefore, Lagged (1 lag) banking sector development does not cause $TPTA$.

Granger causality is a statistical concept of causality that is based on prediction. According to Granger causality, $TPTA$ "Granger-causes" banking sector development; therefore, past values of $TPTA$ should contain information that helps to predict banking sector development over and above the information contained in past values of trade payables alone. Banking sector development does not "Granger-cause" $TPTA$; therefore past values of banking sector development do not contain information

that helps to predict trade payables. The use of trade payables cannot be predicted from historical levels of banking sector development but rather from current levels. The use of trade payables competes with the banking sector in financial intermediation. Trade credit and bank loans are both complementary and substitutes for each other. Therefore, the use of trade payables will impact on banking sector development. The level of historical banking sector development does not help to predict the use of trade payables. Firms make decisions to use trade payables based on their own internal cash constraints and current unavailability of funds from the banking sector. The decision to use trade payables is not affected by historical values of banking sector development.

Panel vector autoregression model estimates are seldom interpreted by themselves. What is of interest is the impact of exogenous changes in each endogenous variable on other variables in the panel VAR system. Prior to estimating impulse-response functions (IRF) and forecast-error variance decompositions (FEVD), the first process is to check the stability condition of the estimated panel VAR. The resulting table and graph of eigenvalues confirm that the estimate is stable.

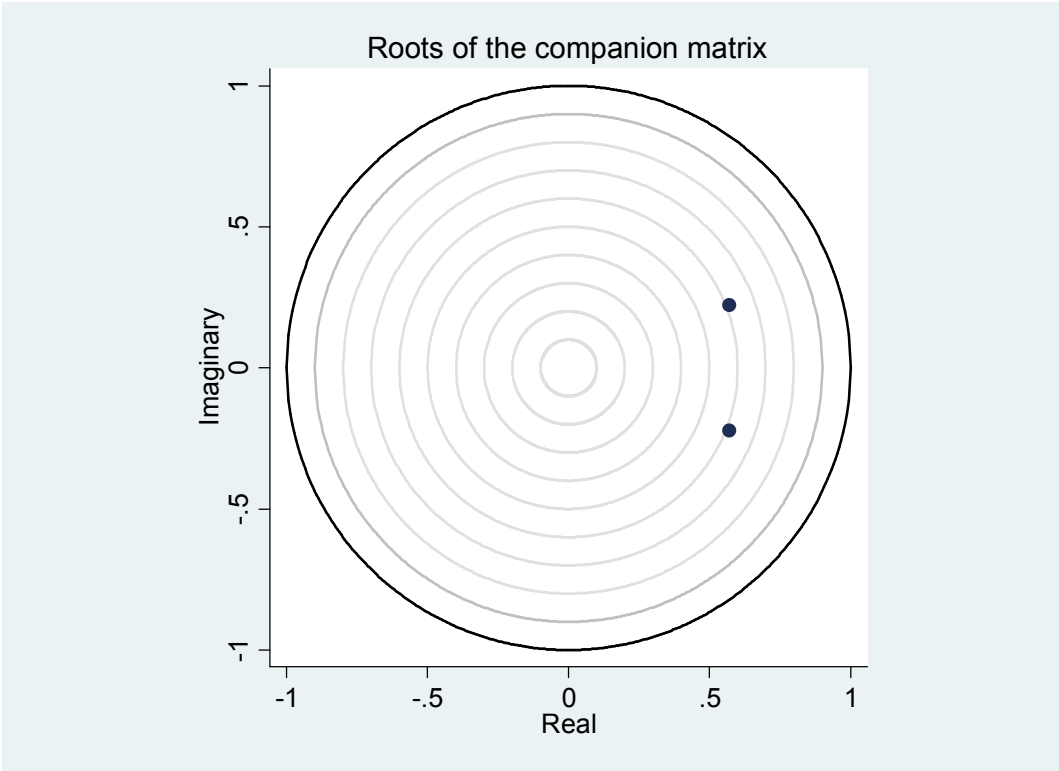
Eigenvalue stability condition

Eigenvalue		
Real	Imaginary	Modulus
0.5702	-0.2223	0.6120
0.5703	0.2223	0.612

All eigenvalues lie inside the unit circle

pVAR satisfies stability condition

Figure 4 Unit root circle two



Source: *Own construct Granger causality results*

Following the above findings on causality, it follows that shocks in trade payables levels have a direct impact on banking sector development, while the current level of banking sector development has some impact on trade payables only in the future. Using this causal ordering, an implied IRF is calculated as well as the implied FEVD. The IRF confidence intervals are computed using 200 Monte Carlo draws based on the estimated model.

Table 0-35 Forecast-error variance decomposition trade payables 1

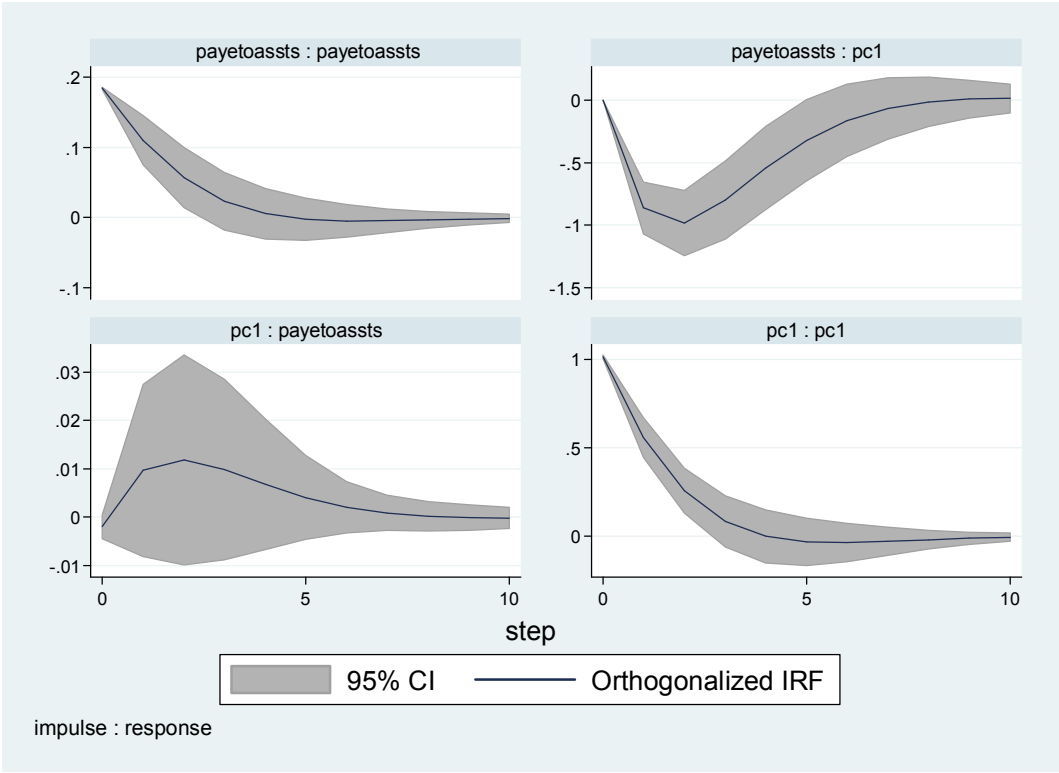
Response variable and forecast horizon		Impulse variable	
		pc1	TPTA
pc1	0	0	0
	1	1	0
	2	0.6434	0.3566
	3	0.4513	0.5486
	4	0.3760	0.6241
	5	0.3487	0.6513
	6	0.3403	0.6597
	7	0.3384	0.6616
	8	0.3382	0.6618
	9	0.3382	0.6618
	10	0.3382	0.6618
TPTA			
	0	0	0
	1	0.0001	0.9999
	2	0.0021	0.9979
	3	0.0048	0.9952
	4	0.0067	0.9933
	5	0.0076	0.9924
	6	0.0079	0.9921
	7	0.0080	0.9920
	8	0.0080	0.9920
	9	0.0080	0.9920
	10	0.0080	0.9920

FEVD Standard errors and confidence intervals based on 200 Monte Carlo simulations

Source: Own construct based on banking sector variables and trade payables 2001-2013

Based on the FEVD estimates, we see that only 0.8% of variation in $TPTA$ by $TPTA$ firms can be explained by the level of banking sector development. On the other hand, $TPTA$ explains 66.1% of variation in banking sector development. In terms of levels, the IRF plot shows that a positive shock on $TPTA$ leads to decreased banking sector development which is temporary; this implies a downward trend in banking sector development amongst the BRICS countries. It is also noteworthy that a current shock in the banking sector development has positive impacts on $TPTA$. The effect of a current shock on banking sector development has a persistent positive impact on future $TPTA$.

Figure 5 Impulse response two



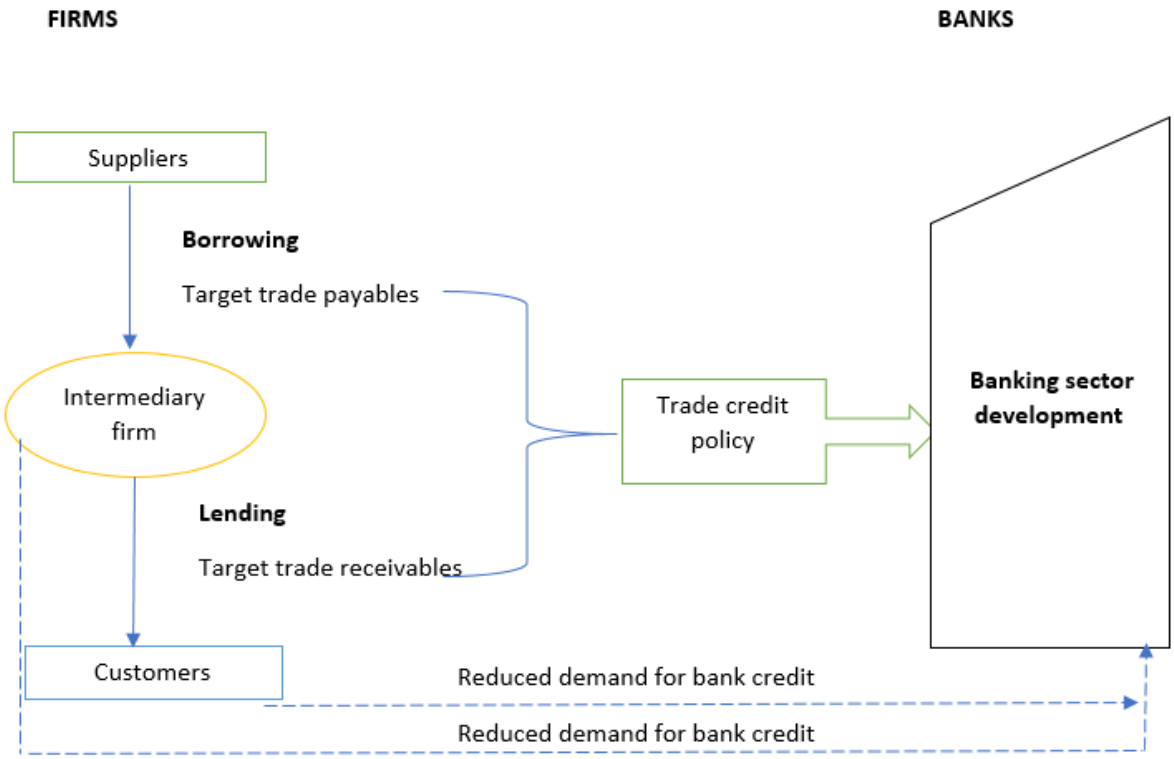
payetoassts=Trade payables/Total assets

pc1= banking sector development

Source: *Own construct based on Granger causality results*

4.5. Discussion and analysis of findings

Figure 6 Firms and banking sector development model



Source: Own construct trade credit and banking sector development model

Firms formulate and pursue target trade credit policies that set the percentage of working capital to be financed through trade credit. It should be noted that trade payables reduce banking sector development temporarily but will result in increased banking sector development in the long-run (see Figure 10). The dotted line in Figure 11 for reduced demand for bank credit illustrates the temporary effect, whilst the long run effect is development of the banking sector as firms grow and demand more capital from banks for expansion. The findings prove that what firms do influences banking sector development. Setting target trade credit levels has the effect of reducing the percentage component of working capital that will be financed through bank credit. Figure 11 above illustrates that, when firms obtain and extend trade credit, this has the effect of reducing their demand for bank credit. Firms act as intermediaries as they borrow from suppliers and lend to customers; in other words, they assume a role traditionally assumed by banks, thereby taking business from banks. Trade credit has the ultimate effect of reduced financial sector development in the short-run. Banks face

competition from firms performing intermediary roles given that suppliers have financing advantages over banks according to the financing advantages and the asymmetric information theories of trade credit.

Firms set target trade credit levels and current levels may not always equal their desired level. Adjustment of current levels to desired levels involves costs which are influenced by access to capital and financial sector development. Financial sector development helps to reduce the cost of adjustment and increase its speed. Firms that are above their trade credit targets borrow more from banks whilst those below target increase their trade credit. The adjustment process probably impacts financial sector development by either demanding more or less finance from banks.

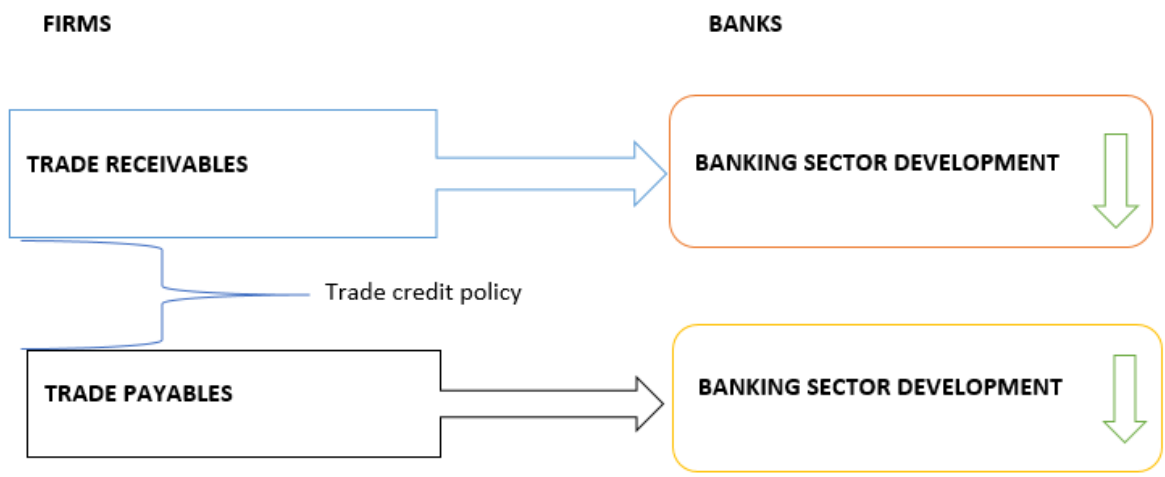
Banks experience lower demand for their services which mean that they must innovate in order to take advantage of market opportunities. Smith (1987) established that if a buyer purchases goods and pays late (for example at the end of 30 days) he/she has implicitly borrowed at a higher rate defined by the trade credit terms. This indicates that lower cost third-party financing such as bank loans was not available to the buyer. It should be noted that firms charge higher interest (implicit) than banks and have the advantage in obtaining lending business over banks. It should therefore follow that firms may make more profits than banks from short-term lending (for example 30 days). As firms make trade credit decisions after analyzing all the reasons to use such to finance their working capital, the major findings on causality affirm that their actions affect banking sector development.

If we assume that the supplier, the intermediary firm and customers all have access to bank credit, but maintain a target trade credit policy which they will not adjust because bank loans are available or cheaper, firms may not finance working capital with 100% bank credit. Whilst bank credit may be cheaper, they use trade credit because they enjoy certain benefits as they act as intermediaries that borrow from suppliers and lend to customers. The lack of causality in the direction of banking sector development to trade credit explains why firms in countries with developed banking sectors and those with under-developed banking sectors use trade credit. China and South Africa are countries in BRICS with developed financial sectors that also use

more trade credit, which may imply that financial sector development promotes the intermediary role of firms, thereby increasing trade credit use instead of reducing it.

4.6. Trade credit and banking sector development causality

Figure 7 Trade credit and banking sector development direction of causality

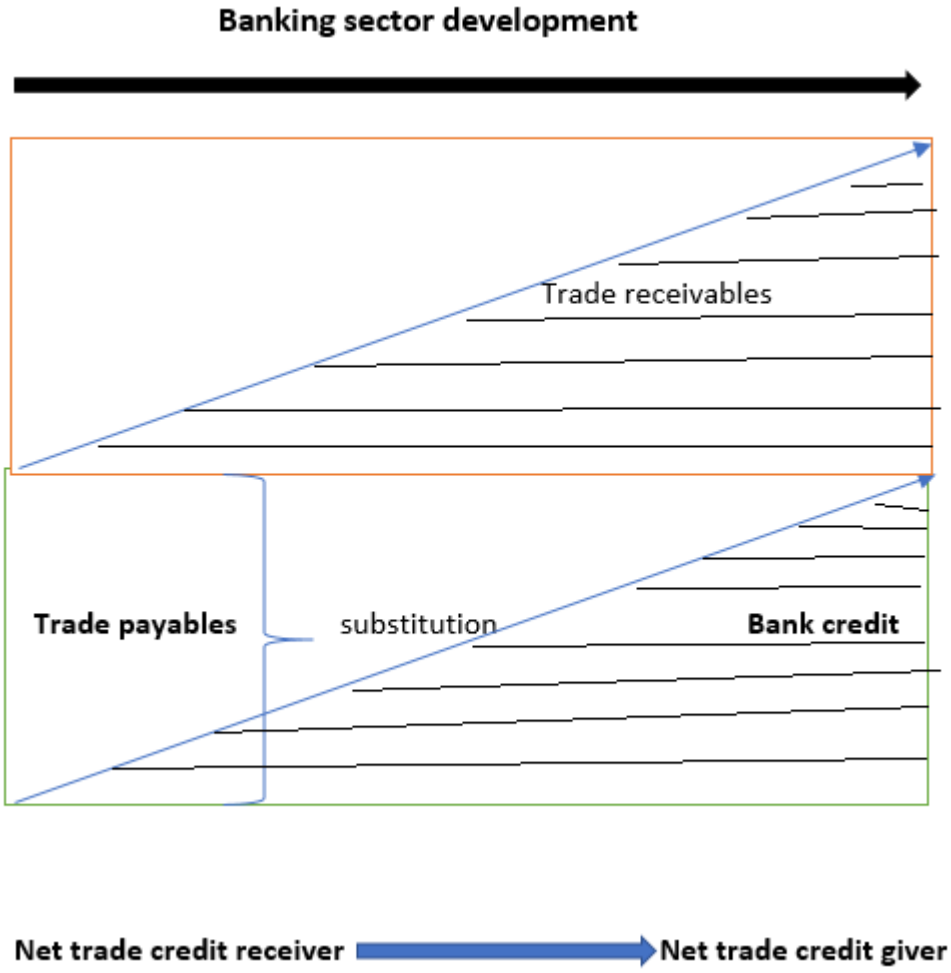


Source: Own construct trade credit and banking sector development causality

The use of trade credit by firms takes precedence over banking sector development. In the short-run, trade credit removes the intermediary role supposed to be performed by financial institutions. In the long-run, as firms grow through trade credit, they demand more capital from banks, resulting in banking sector development. The use of trade receivables and trade payables results in firms performing an intermediary role which negatively affects the development of the banking sector in the short-term. Firms that fail to take advantage of discounts, borrow from counterpart firms at high implicit interest rates than bank credit. Firms with limited access to bank credit resort to trade credit and banks lose business to suppliers. Banks also compete with suppliers in financing firms since through trade credit suppliers have financing and monitoring advantages over banks. The use of trade receivables and trade payables through firms' trade credit policies can result in reduced banking sector development as firms assume the intermediary role.

4.7. Banking sector development and trade credit working capital management

Figure 8 Banking sector development and trade credit substitution model



Source: Own construct banking sector development and trade credit

Firms must substitute trade payables which are expensive, with bank credit as the banking sector develops. At the same time they should increase their lending through trade receivables. Bank credit is cheaper than trade payables whilst a higher implicit interest rate is charged on lending through trade receivables. For firms to fully benefit from their intermediary role they should develop from net trade credit receivers to net credit providers at the same time as minimising their borrowing costs and increasing their lending through trade receivables (see Figure 13 above). In order for firms to take advantage of these opportunities they need to maintain a flexible trade credit target which is adjusted as the banking sector develops. The development of the banking sector is also important for firms in that they can minimize the costs of adjusting trade

credit levels from current to desired levels. The speed of adjustment is fast in countries with developed financial sectors.

4.8. Should firms be regulated as banks?

Banking regulation originated in microeconomic concerns about the ability of bank creditors (depositors) to monitor the risks on the lending side and macroeconomic concerns regarding the stability of the banking system in the case of a bank crisis. Firms receive trade payables from their creditors who are better able to monitor risks than banks according to the financing advantage of trade credit theory. Banks are vulnerable to self-fulfilling panics because their liabilities are short term and unconditional, while their assets are long term and illiquid. If a depositor suspects that other depositors will withdraw their funds in the near future, it is rational for that depositor to rush to the bank and withdraw his or her deposits before others do so. Thus, belief in a run causes a run. Firms do not pose the same social risk as banks and should therefore not be regulated in a similar manner when they perform intermediary roles through trade credit. Trade credit is not regulated like other credit agreements. However, given the increasing importance of trade credit in working capital finance and growth, and the risk that it poses if a firm collapses, there should be some control to minimize risks and losses to trading counterparts.

Trade credit precedes banking sector development; therefore, it is important to the growth of firms before they gain access to bank credit or the banking sector itself develops. While trade credit usurps the intermediary role which should be performed by financial institutions, it will result in firms' growth. Firms that grow demand more financing from banks; therefore, trade credit will contribute positively to banking sector development in the long run. Countries must have legal systems that support the establishment of trade credit contracts. Trade credit will also require specific collection and debt enforcement practices regulated by law. Trade credit is different in every sector and in some industries long payment terms are a strong impediment to the entry and survival of liquidity constrained firms. Regulation of trade credit should therefore aim to reduce the probability of corporate default and regulate competition caused by

such credit in specific sectors. The primary purpose of regulation should be to ensure that firm assets retain sufficient liquidity to meet their obligations and to discourage illiquidity.

Regulations should specify the manner in which credit providers must provide information on trade credit agreements. They should also outline requirements for termination and cancellation of trade credit agreements. Termination of trade credit agreements affects the customer and procedures thus need to be regulated and standardized. Suppliers can repossess goods; procedures to be followed by a credit provider before debt enforcement should also be outlined. When goods are returned to the credit provider, he/she should be expected to sell them. If the proceeds from the sale are more than the consumer's debt, the credit provider must refund any surplus. If the proceeds are less than the consumer's debt, the consumer should be obliged to pay the outstanding amount.

4.9. Summary and Conclusion

Since the trade payables ratio to total assets "Granger-causes" banking sector development, the past values of trade payables to total assets should contain information that helps to predict banking sector development over and above the information contained in past values of trade payables alone. Banking sector development does not "Granger-cause" the trade payables ratio to total assets; therefore, the past values of banking sector development do not contain information that helps to predict trade payables. The use of trade payables cannot be predicted from historical levels of banking sector development but rather from the current level of such development.

Trade receivables to total assets “Granger-causes" banking sector development; therefore, the past values of trade receivables to total assets should contain information that helps to predict banking sector development over and above the information contained in past values of trade receivables alone. Banking sector development does not "Granger-cause" trade receivables to total assets; therefore,

the past values of banking sector development do not contain information that helps to predict trade receivables. The use of trade receivables competes with the banking sector in financial intermediation. Current levels of banking sector development can only help to predict future trade receivables.

Banking sector development does not cause trade credit use by firms in BRICS countries. Current levels of trade credit cannot be explained by past values of banking sector development. Trade credit is not “Granger-caused” by banking sector development and banking sector development does not help to predict trade credit. In contrast, trade credit causes banking sector development in the BRICS countries. Current levels of banking sector development can be explained by the past values of trade credit use by firms. Trade credit “Granger-causes” banking sector development and trade credit does help to predict banking sector development. We can conclude that in a country which relies heavily on trade credit, the banking sector is under-developed. The level of banking sector development in a country can be determined by analyzing trade credit use. On the other hand, it is not possible to determine the level and use of trade credit in a country by merely looking at a time series of its banking sector development. The findings explain why, in countries with well-developed banking sectors, firms continue to use trade credit. Trade credit use is also synonymous with countries with under-developed banking sectors. Interestingly examining trade credit use patterns will help to predict the level of banking sector development. The findings support the hypothesis that firms rely on trade credit in countries with under-developed banking sectors. The lack of Granger causality from the direction of banking sector development to trade credit explains why firms in countries with both developed and under-developed banking sectors use trade credit. The impulse and response showed that a current banking crisis will affect future trade payables and receivables. The current level of banking sector development does not affect the current level of trade credit, but affects the level of trade payables and receivables in the following period. Knowledge of current banking sector development helps a firm to determine whether to increase or reduce trade credit use.

CHAPTER 5 TRADE CREDIT AND FINANCIAL SECTOR DEVELOPMENT

5.1. Introduction

The financial sector plays a very important role in financing firms. The finance manager must understand the level of financial sector development as this has a bearing on the firm's access to capital. The previous chapter analyzed banking sector development and trade credit use. This chapter analyses the financial sector as a whole, consisting of banks, stock markets and money markets. The previous chapter established that trade credit "Granger-causes" banking sector development. It is therefore important to investigate whether financial markets such as money and capital markets also have a causative effect on trade credit use. Money and capital markets present alternative sources of finance which are characteristic of a growing financial sector. This can influence trade credit policy at firm level if there are better alternatives to trade credit. The chapter begins with a review of relevant literature, followed by a discussion on the methodology, data analysis and conclusions.

5.2. Literature review

The development of the financial sector offers firms alternative sources of finance. Demirgüç-Kunt and Maksimovic (1996) found that, in general, there is a significant positive relationship between bank development and leverage and a negative but insignificant relationship between stock market development and leverage. The development of the banking sector increases corporate debt, providing opportunities for firms to substitute trade credit with bank loans. Demirgüç-Kunt and Levine (1996) found that stock market and financial intermediary development proceed simultaneously.

The development of the financial sector which includes the banking sector, capital markets and securitisation, offers cheaper sources of finance as the cost of capital in developed markets is expected to fall. Demirgüç-Kunt and Maksimovic (1996) results imply that initial improvements in the functioning of a developing stock market produce a higher debt-equity ratio for firms and thus more business for banks. They suggest

that, in countries with developing financial systems, stock markets and banks play different yet complementary roles. No attempts have previously been made to formally model the effects of financial sector development on firms' trade credit choices or on their investment in receivables. This chapter empirically explores the effect of financial market development, particularly components of the financial sector other than the banking sector such as stock market development, money markets and money supply on the financing choice through trade credit.

There is a need to examine whether financial sector development facilitates trade credit use by scrutinizing why trade credit is used and the rationale for using it, given the level of financial sector development. Through an improved legal system, financial sector development can improve trade credit use because of better enforcement of contracts whilst a developed financial sector offers capital from banks and financial institutions at lower cost than trade credit. Financial sector development reduces the costs of external finance to firms, but trade credit may increase it because of its implicit costs. Financial sector development improves firms' access to funding and therefore should reduce both the cost of capital and the differential cost of external finance and may also result in reduced trade credit use. For a country's financial sector development to have any effect on trade credit use we have to assume that firms finance themselves largely in their own country. World capital markets are not perfectly integrated; therefore, development of the domestic financial sector is critical for local industry. There has been little research on the effect of the level of development of financial markets on a firm's policies (Demirgüç-Kunt and Maksimovic 1996).

Trade credit is closely related to financial sector development as its use reduces demand for cash; thereby complementing macro-economic variables such as money supply. Money should include unutilized trade credit available along with demand deposits and currency (Laffer 1970). Trade credit provides a critical source of spontaneous inter-firm financing that is particularly important to small and growing firms. According to Bonin and Wachtel (2003), as firms grow, they turn to regular financial institutions for financing, starting with banks, whilst the next step is accessing capital markets. Trade credit supplements capital market credit in a manner that presumably reduces the efficacy of any given amount of aggregate monetary control, but also mitigates the discriminatory effects believed to be generated by restrictive

monetary policy (Schwartz 1974). Therefore, firms operating in countries with advanced stock markets can borrow more from equity markets and reduce their use of trade credit. Stock markets serve important functions even in economies with well-developed banking sectors. The reason is that equity and debt financing are generally not perfect substitutes (Demirgüç-Kunt and Maksimovic 1996).

During monetary contractions, small firms, which are likely to be more credit constrained, react by borrowing more from their suppliers (Fisman and Love 2003). Under-developed financial sectors provide limited sources of finance; therefore firms operating in such environments are likely to depend heavily on the use of trade credit. The most constrained American firms face far less scarcity of funding from formal institutions than companies in many other countries, where stock markets are in their infancy, and formal lenders are rare (Fisman and Love 2003). Trade credit is likely to be heavily used in countries where financial sector development is poor. A natural extension of Petersen and Rajan (1997) reasoning is that firms with financing needs in such countries will be more likely to fall back on supplier financing in the form of trade credit as a means of funding growth.

Firms may have limited access to financial institutions and may fail to access loans due to their inability to meet the requirements, in which case trade credit is an alternative. Firms that are not listed on stock exchanges are not able to raise funds through public equity issues. Smaller firms may not be able to raise finance through other modes such as commercial paper and bonds. It should be noted that countries with more developed financial sectors have bond markets whilst countries with poorly developed financial sectors may not. A firm's ability to raise capital through equity markets, money markets and bond markets is entirely dependent on the growth of the financial sector. It should follow that firms operating in countries with developed financial sectors have a better choice of sources of funding other than trade credit. In emerging economies, trade credit has a bad reputation because it often results from inter-firm arrears and soft budget constraints (Bonin and Wachtel (2003). The financial sector distributes funds from those with surplus capital, given their investment opportunities, to those with a deficit of funds (relative to opportunities) (Fisman and Love 2003). Therefore, an economy with a well-developed financial sector will be able to allocate resources to businesses and projects that yield the highest returns.

It should be noted that as economies develop, both banks and markets become larger relative to the size of the overall economy (Cull *et al.* 2013). Improvements in banks' screening methods that derive from the evolution of the banking sector increase capital market investors' confidence in the quality of securitized borrowers, which stimulates trading in the capital market and thus capital market evolution (Cull *et al.* 2013). The development of the financial sector has also been shown to occur simultaneously with trade credit use. In developed countries, both small and large firms use trade credit to raise funds and can decide to borrow either from banks or from trade partners, but these sources of finance are not completely interchangeable (Miwa and Ramseyer 2005). This means that bank loans and trade credit are used simultaneously by corporations and each has its own reasons. Large firms increase trade credit use, a more complex decision since they are typically assumed to have wide access to other (bank) financing. The reasons are related to financial specificities (Oliveira Marques 2010).

Maximizing their own profits, firms with easy access to money markets are motivated to sell monetary resources to firms that have productive investment opportunities but restricted ability to obtain funds (Schwartz 1974: 665). This means that firms with access to the money market will extend funding to their trading partners through trade credit, thereby acting as financial intermediaries. If larger firms have higher accounts receivable, we could interpret this to mean that they have better access to capital markets; since they are less credit constrained they offer more credit to their customers (Petersen and Rajan 1997). Some firms that lack access to the capital market could over-rely on short-term sources of finance such as trade credit. Hassan, Sanchez and Yu (2011) found a positive relationship between financial development and economic growth in developing countries. It should be noted that financial intermediation mobilizes savings, allocates resources, diversifies risks, and contributes to economic growth. It promotes growth because a higher rate of return is earned on capital, and growth in turn provides the means to implement costly financial structures (Greenwood and Jovanovic 1989). Emerging evidence suggests that both the level of banking and the development of the stock market have a causal impact on economic growth (Beck, Demirgüç-Kunt and Levine 2000).

For firms in poorly developed financial markets, implicit borrowing in the form of trade credit offers an alternative source of funds (Fisman and Love 2003). Fisman and Love (2003) showed that industries with higher dependence on trade credit financing exhibit higher rates of growth in countries with weaker financial institutions. Ferrando and Mulier (2013) found that the intensity of use of trade credit differed with the level of financial sector development. During the financial crisis from mid-2009 there was increased use of trade credit, likely to compensate for the strong decline in short-term bank loans (Ferrando and Mulier (2013: 2). The provision of trade credit is complementary to the development of financial institutions at country level (Deloof and La Rocca 2015). Financial intermediaries can play an important role in promoting economic growth by helping to allocate capital to firms with value-creating projects. Furthermore, borrowing in the form of trade credit can become an alternative source of funding for firms that operate in poorly developed markets (Fishman and Love, 2003).

Firms in countries with less developed financial markets appear to substitute informal credit provided by their suppliers to finance growth. Fisman and Love (2003) found that industries that are more dependent on trade credit financing grow relatively more rapidly in countries with less developed financial intermediaries. Trade credit can act as both complementary to and as a substitute for bank loans. Firms in countries with large, privately owned banking systems offer more trade credit to their customers and obtain more financing from them, suggesting that trade credit complements lending by financial institutions and should not be viewed as a funding substitute (Demirgüç-Kunt and Maksimovic 2001).

Ductor and Grechyna (2015) show, that, the effect of financial development on economic growth depends on the growth of private credit relative to real output growth. Their findings also suggest that the effect of financial development on growth becomes negative if rapid growth in private credit is not accompanied by growth in real output. Ductor and Grechyna (2015) empirical evidence supports theories that postulate the existence of an optimal level of financial development given by the characteristics of an economy.

An entrepreneurial firm operating in an environment without a functioning equity market is financed by inside equity, trade credit, and bank borrowing. Limited access to equity markets suggests that such a firm is likely to have a sub-optimally high debt-equity ratio for its scale of operations and may pass up growth opportunities that would be exploited if a functioning equity market existed (Demirgüç-Kunt and Maksimovic 1996). For firms in poorly developed financial markets, implicit borrowing in the form of trade credit may provide an alternative source of funds (Fisman 2001). Fisman (2001) results are consistent with the hypothesis that financial intermediaries rather than stock markets are close substitutes for trade credit.

Information asymmetries and imperfections in capital markets affect a firm's ability to raise funds and invest (Demirgüç-Kunt and Maksimovic 1996). Stock trading transmits information about the firm's prospects to potential investors and creditors. The stock market value/GDP measure enables assessment of the possibility of local firms accessing stock markets, thus reducing their dependence on traditional banking relationships. High values imply enhanced household investment opportunities, since larger stock markets also tend to increase firm and risk diversity. A firm's ability to extend credit will depend on its ability to raise funds in capital markets (Petersen and Rajan 1997: 672). Some firms have easier (cheaper) access to capital markets than their customers; they thus have an incentive to utilize their borrowing capacity for the purpose of passing credit on to their customers if it will be to their advantage. Small firms start out using only their owners' resources. If they survive the dangers of under-capitalization they are likely to be able to make use of other sources of funds such as trade credit and short-term loans (Chittenden, Hall and Hutchinson 1996). Small firms' access to capital markets may be limited, Petersen and Rajan (1997) found evidence that firms use more trade credit when credit from financial institutions is unavailable. Schwartz (1974: 652) suggests that because of the financing motive, trade credit will flow predominantly from firms with relatively easy access to capital markets to those that can put funds to productive use, but have relatively poor access to capital markets.

Trade debt appears to be closely related to money and was therefore deemed relevant in the context of the money market. This study therefore tests the use of trade credit vis-à-vis money markets in the BRICS countries. For the purpose of this investigation,

trade credit is defined as the portion of trade credit which has been used. Unutilized trade credit available through current terms is not considered as it is merely potential and not measurable because it differs from one organisation to another.

The volume of trade credit is influenced by transactional factors and financial position. The level of credit demanded and the period are affected by the need for short-term finance; thus trade credit is used to complement and/or substitute for other sources of funds (Paul and Wilson 2007). Therefore, firms can use trade credit to complement loans from financial institutions or resort to it when their access to such institutions is limited. Trade credit can be used when a company is facing liquidity challenges; such firms usually delay paying creditors in order to improve their cash position (Ductor and Grechyna 2015). This implies that the use of trade credit can be motivated by firm-specific factors. The growth of the financial sector improves a firm's access to alternative, cheaper funding. A firm's access to capital is also a function of internal conditions and factors, which enable the firm to become eligible for funding.

Firm-specific factors are likely to affect demand and supply of trade credit. Future business prospects affect the volume of trade credit, mainly for small firms whose liquidity is constrained. Non-transactional factors such as an increase in cash flow reduce the need for trade credit and trade payables also act as a complement to bank loans (Ductor and Grechyna 2015). Cash flow levels impact the trade credit used or extended by firms. Trade credit can occur as firms transact in the normal course of business, but conditions such as liquidity constraints also influence demand for trade credit. Firm-specific characteristics enhance the use of trade credit as a financing option for working capital. Trade credit is an important source of short-term finance and is a substantial component of both corporate liabilities and assets, especially in the case of intermediate companies (Summers and Wilson 2000).

The growth of the BRICS countries' financial sectors is likely to have an impact on trade credit use as a developed financial sector renders firm-level characteristics less influential. Couppey-Soubeyran and Héricourt (2011: 1) show that most firm-level characteristics lose their influence on trade credit when financial development is high enough. That is, a developed financial sector gives companies more financing options which may be cheaper than trade credit. Financial development promotes trade by

making transactions and exchange of money efficient and trade credit is consequently primarily driven by trade relationships. Therefore, there is a possibility that a developed and advanced financial sector could go hand-in-hand with more trade credit use, but not driven by firm-specific characteristics such as financial position. The critical question is: why would firms still finance through trade credit given that cheaper, alternative sources of finance are available within an economy with an advanced financial sector?

The financing of firms through trade credit has benefits and costs, and there is always a need to minimize costs. The finance manager needs to maximize shareholder wealth; therefore, investment in trade credit is of paramount importance. When investment in accounts receivable is no longer beneficial, investors will pressure firms to limit trade credit granted to mitigate opportunity costs and financial risk, and reduced profitability and liquidity while also encouraging managers to maintain investment in accounts receivable which maximizes operational, financial, and commercial benefits (Martínez-Sola, García-Teruel and Martínez-Solano 2013). That is, firm value increases with receivables up to a point and then starts decreasing.

The size of a business has an impact on its use of trade credit. Large firms usually buy on trade credit, while small businesses often have weak bargaining power and in order to secure a market they agree to large companies' terms (Klapper, Laeven and Rajan 2012). The largest and most creditworthy buyers receive contracts with the longest maturities from smaller suppliers, with the latter perhaps extending credit to the former as a way of certifying product quality (Klapper, Laeven and Rajan 2012). Firms that are creditworthy and have a low probability of defaulting obtain trade credit from their trading counterparts. Suppliers with weak bargaining power are more likely to extend trade credit, sell a larger share of their goods on credit, and offer longer payment periods before imposing penalties (Fabbri and Klapper 2015). The decision to extend trade credit is also a marketing one; offering such credit helps to secure customers and is also based on relationship management. Important customers extend the payment period beyond what has been offered by their supplier and generate overdue payments. Suppliers with weak bargaining power are less likely to offer trade credit when credit-constrained by banks; they use trade credit as a competitive strategy (Fabbri and Klapper 2015).

A dominant proportion of a firm's time and resources is dedicated to managing working capital, and trade credit is a major component of such capital. Trade credit appears on both sides of the balance sheet. For the buyer, it is a source of financing through accounts payable, while for the seller, it is an investment in accounts receivable (Long, Malitz and Ravid 1993). A firm's working capital and cash flow position will determine the use of trade credit. Financially constrained firms take longer to settle debts whilst some companies use maturity matching for assets and liabilities (Delannay and Weill 2004). The flexibility offered by trade credit lies in the fact that a firm may take long to settle debts without negotiating the period. The use and extension of trade credit is largely determined by firm-specific characteristics. It plays an important role in financing and the determinants of trade receivables and trade payables depend on finance needs (Delannay and Weill 2004). Specific financing conditions for companies in transition countries may mean that, trade credit plays a critical role because of limited development of the financial sector. Receiving and extending trade credit to trading partners may be the result of an under-developed financial sector.

Quality products are usually sold on credit and its use may signal that a firm's products are reliable. Trade credit extension can be used as a multi-faceted marketing and relationship management tool and or as a means of signalling information to the market or to specific buyers about the firm, its products and its future prospects or commitment (Summers and Wilson 2003). In business-to-business relationships firms are interdependent, i.e., a manufacturing firm is dependent on its suppliers for raw materials, whilst suppliers rely on the firm for a market for their products. Thus, credit extension is very customer focused; for example, by encouraging frequent purchases which offer the potential for relationship development or accommodating customers' demand for credit to help finance their production (Summers and Wilson 2003). Firms usually need to manage repeated purchases and in some cases a particular supplier may be the sole supplier and the relationship should be mutually beneficial.

Business deals and terms of payment are generally negotiated and each party will seek favourable terms. The requirements and bargaining power of large customers can influence a firm to extend more credit. Firms will vary terms in anticipation of capturing new business, to attract specific customers and in order to achieve specific

marketing objectives (Summers and Wilson 2003). Trade credit can be used to stimulate demand for a company's products.

There is variation in inter-firm credit terms and credit policies across industries. Credit terms are contractual solutions to information problems concerning product quality and buyer creditworthiness (Ng, Smith and Smith 1999). Industries and products differ; some products are more suitable to be sold on credit whilst a firm's credit policy is influenced by firm-specific factors. Credit policy choices are based on whether the firm requires cash payment or is prepared to extend credit. Companies either adopt simple net terms or terms with discounts for prompt payment. Credit terms refer to the written or stated policies given to a customer with regard to the timing of payments; discounts for early settlement; the method of payment; and ownership of goods prior to payment (Wilson and Summers 2002). Discounts for early payment seem to be offered to riskier buyers to limit the potential non-payment risk when credit is extended for non-financial reasons (Klapper, Laeven and Rajan 2012).

When trade credit is offered it is important to ensure that the debt is repaid on time. Price variation and late payment penalties can be used to ensure that the loan is repaid. Commonly used trade credit terms implicitly define a high interest rate that operates as an efficient screening device when there is asymmetric information about buyer default risk (Smith 1987). It is easy for trading partners to become aware that their customers are not liquid if they constantly delay payments. By offering trade credit, a seller can identify prospective defaulters more quickly than if financial institutions were the sole providers of short-term financing (Smith 1987). Start-up firms do not usually have a track record with banks and maybe unable to obtain bank finance; they thus resort to suppliers. Huyghebaert (2006) found that start-ups use more trade credit when financial constraints are severe, when suppliers have a financing advantage over banks in financing high-risk firms, when entrepreneurs value the private benefits of control and when transaction costs are important.

The influence of relationships between customer and supplier is complex. A concentrated supplier base is positively associated with late payment because increased knowledge of suppliers' credit management procedures is used to pay late without penalties (Howorth and Reber 2003). A concentrated supplier base may mean

that suppliers compete for customers and trade credit may also be a form of incentive; penalties may be relaxed so as ensure that the customer does not switch suppliers. The decision to pay off a trade credit loan is also tied to the supplier's debt collection procedures; the liquidity management principle implies delaying payments and collecting as fast as one can. Trade credit can be used for finance without increasing costs, especially where no late penalties are paid (Howorth and Reber 2003). Marotta (2005) found no evidence that financing through trade credit is more expensive than loans. Managers can improve firm profitability by increasing their investment in receivables and the effect is greater for financially unconstrained firms (larger and more liquid firms), for firms with volatile demand, and for those with bigger market shares (Martínez-Sola, García-Teruel and Martínez-Solano 2014).

The levels of trade credit granted by firms to customers can have important implications for firm value and profitability (Pike and Cheng 2001). Firm value and profitability are important aspects of financial management which makes trade credit a worthwhile tool to obtain and extend financing. Extending trade credit and using trade finance also assist cash flow management and improve profitability. However, despite its benefits, providing trade credit also carries the risk of default or late payment, which could damage firm profitability (Martínez-Sola, García-Teruel and Martínez-Solano 2014). A firm should manage the default risk and the disadvantages of trade credit. According to Coricelli (1996), trade credit favours growth by providing newly-established companies with access to private credit markets. Growth can be achieved by means of financing through financial institutions, but can also be achieved economically through trade credit as the latter does not require collateral. Cook (1999) points out that trade credit may be a very useful financing tool because suppliers have more information on their trading partners than banks and understand their industries better than financial institutions.

To provide evidence on the role of trade credit in emerging economies such as BRICS, it is therefore important to investigate the determinants of trade credit extension and demand considering the size of the financial sector. Demirgüç-Kunt and Maksimovic (2001) emphasize that there is a link between the characteristics of trade credit use and a country's development. They observe that development of banking and legal systems, favours the use of trade credit. The BRICS countries exhibit very different

behaviour in the use of trade credit, which may support a differentiated approach to the use of soft trade credit. This can be attributed to differences in financial development in emerging countries. Thus, this study sought to investigate whether financial sector development has an impact on the use of trade credit. Firms in countries with under-developed and developed financial sectors make use of trade credit. Trade credit can be a substitute for bank credit among small and medium-sized companies, as large companies are generally expected to be less credit-rationed. However, despite the fact that large firms have more access to bank credit, they also use trade credit.

State-controlled listed firms in China receive preferential treatment when borrowing from commercial banks; in contrast, private firms rely on informal finance and trade credit (Wu, Firth and Rui 2014). Private firms located in higher social trust regions use more trade credit from suppliers, extend more trade credit to customers, and collect receivables and pay payables more quickly. Social trust thus helps private firms to overcome institutional difficulties in financing their activities. It is likely to be important in explaining trade credit in countries with relatively weak or capricious enforcement of contracts and where there is discrimination in bank lending (formal financing). China is characterized as having both weak legal enforcement and biased lending policies, and has highly disparate levels of social trust across its various regions (Zhang and Ke 2003). Weak legal enforcement of contracts and lending policies are factors of financial sector development.

The Chinese private sector experiences discrimination in borrowing from banks. China has maintained a state-dominated financial system that favours SOEs, particularly large-scale ones engaged in state-preferred industries, in the allocation of bank loans (Firth *et al.* 2009). Non-state firms, especially private firms, have restricted access to bank loans from the state-controlled banking system (Allen *et al*. 2005). As Guiso, Sapienza and Zingales (2004) point out, whether or not trade credit is extended depends not only on the legal enforceability of the contract, but also on the extent to which suppliers trust customers. Hence, trust plays an important role in trade credit (Wu, Firth and Rui 2014).

The length of a buyer-seller relationship has a positive impact on the use of trade credit, especially for longer-term credit that is frequently used for transactions in differentiated goods. The relative bargaining power between the buyer and the seller also matters for the use/non-use of trade credit (Uchida, Uesugi and Hotei 2010). New customers rarely receive trade credit but after some time their relationship is assessed and they are considered eligible. Long-term trade-creditor firm relationships induce dependent trade creditors to grant more concessions in debt renegotiations than nondependent creditors (Wilner 2000). A longer trading relationship is associated with increased credit, as is prior information gathering and customers identified through business networks receive more credit (McMillan and Woodruff 1999).

Transaction costs can be reduced through making a payment once a month compared to making payments every day or week when goods are delivered. Uchida, Uesugi and Hotei (2010) found that reduced transaction costs are an important determinant of the use of trade credit. The legal infrastructure and rule of law enable enforcement of contracts, including trade credit contracts. The challenge of locating trading partners and the absence of legal enforcement of contracts may result in less trade credit (McMillan and Woodruff 1999). In certain industries technological requirements may ensure that there is only one supplier who can supply the goods with the required specifics. A firm trusts its customer enough to offer credit when the customer finds it hard to locate an alternative supplier (McMillan and Woodruff 1999).

Managerial competency, the availability of a business plan, belonging to trade associations, previous relationship, location, business size, insurance and incorporation are significant determinants of access to trade credit by new SMEs in South Africa (Fatoki and Odeyemi 2010). The use of trade credit requires careful management of cash flow. Trade associations promote networking and obtaining trade credit requires good negotiation skills. Large firms usually find it easier to obtain trade credit than small firms, mainly because of their creditworthiness and reputation.

Working capital management also requires good stock management because holding stock incurs costs. A firm is in the middle of a credit chain that produces goods for sale and holds inventories of goods produced but unsold at a cost. In the face of uncertain demand for its products, it extends trade credit to its financially constrained customers

to obtain additional sales (Bougheas, Mateut and Mizen 2009). Inventory management reduces the costs of holding stock and it is more economical to sell the goods on credit. Paul and Wilson (2007) show that the level of credit demanded and the period are affected by the need for short-term finance; thus, trade credit is used to complement and/or substitute for other sources of funds. Highly profitable firms both give and receive less trade credit, whilst firms with greater access to bank credit offer less trade credit to their customers (Vaidya 2011). On the other hand, firms with higher bank loans receive more trade credit and holdings of liquid assets have a positive influence on both accounts receivable and payable (Vaidya 2011).

5.2.1. Cost

Small or large, firms borrow heavily from their trade partners, apparently at implicit rates that track the explicit rates banks would charge. However, they do not treat bank loans and trade credit as interchangeable (Miwa and Ramseyer 2005). Bank loans are usually used when a firm requires funds for a longer period while trade credit is used when funding is required for shorter periods. Thus, firms borrow from banks when they anticipate needing money for relatively long periods, and turn to trade partners when they face short-term exigencies they did not expect (Miwa and Ramseyer 2005). Trade credit use involves implicit costs and penalties for late payment; however, firms may still use it to improve profitability. The high implicit interest rates associated with trade credit should not be evaluated without taking into account the benefits of less creditworthy and constrained firms using it to build their reputation and alleviate adverse selection (Antov and Atanasova 2007). It is therefore possible that the use of trade credit may result in lower total borrowing costs.

In order to minimize short-term financing costs and finance working capital, corporations issue commercial paper instead of seeking bank loans. This is an alternative to short-term bank loans that offers reduced short-term financing costs (Nippani and Pennathur 2004). It has been a perfect solution to reduce transactional costs for those that pay promptly (Nadiri 1969; Ferris 1981). It is thus possible to argue that financial development contributes to reduced transaction costs of payments and will benefit firms with high transaction costs (Fisman and Love 2003).

Molina and Preve (2009) found that firms increase their level of trade receivables, presumably in an attempt to buy market share, when they have profitability problems, but change their policy when they are in financial distress, effectively reducing their investment in trade receivables. When a firm is in financial distress it would prefer cash payments rather than accounts receivable. Whilst the use of trade credit may improve profitability there is a chance that customers may default. Trade credit involves bearing credit risk, because of exposure to payment default; granting trade credit may thus have negative effects on profitability and liquidity (Cheng and Pike 2003). In extending trade credit, the seller incurs additional administrative costs (Mian and Smith 1992) linked to credit management (Martínez-Sola, García-Teruel and Martínez-Solano 2013).

5.2.2. Signalling

If the use of trade credit is perceived as a favourable signal of the creditworthiness of the borrower, some firms will use trade credit in addition to conventional institutional loans despite its higher cost (Antov and Atanasova 2007). The use of trade credit creates the opportunity to obtain institutional loans and also contributes to lower total borrowing costs. Trade credit is an important source of funds (Miwa and Ramseyer 2005) and its use signals firms' creditworthiness (Antov and Atanasova 2007).

Biais and Gollier (1997) propose that firms without relationships with banks resort more to trade credit and emphasize that suppliers have a monitoring advantage. Banks and suppliers receive different signals about a borrower's creditworthiness. Although trade credit is more costly than bank credit, suppliers may act as liquidity providers, insuring against temporary liquidity shocks that could endanger relationships with their customers. Therefore, the relatively high implicit interest rates of trade credit are the result of insurance and default premiums (Cunat 2007).

5.2.3. Advantage of suppliers

Bankers seldom know their borrowers' industries first-hand, but rely on guarantees and security. Because trade partners know those industries well, they monitor their borrowers closely (Miwa and Ramseyer 2005). The cost of creating security is heavily front-loaded; therefore, bankers focus on long-term debt. Asymmetric information between banks and firms can preclude financing of valuable projects. Trade credit can alleviate this problem by incorporating the private information held by suppliers about their customers in the lending relationship (Biais and Gollier 1997: 903).

Smith (1987) and Biais and Gollier (1997) argue that suppliers have an informational advantage over other types of external investors, such as banks. This could stem from industry expertise or from frequent and repeated interaction with their customers. Suppliers are therefore better equipped to screen solvent customers. Trade credit is used by suppliers to discriminate between their cash-rich and cash-poor buyers when price discrimination is not allowed. Burkart and Ellingsen (2004) hypothesize that it is typically less profitable for an opportunistic borrower to divert inputs than to divert cash, which increases the advantage of suppliers over banks in lending to their clients. (Wilner 2000) argues that suppliers are more willing than banks to grant concessions to customers in debt renegotiation, in order to sustain their trade relationships. (Cunat 2007) posits that once relationship-specific investments have been made, customers have weaker incentives to default on their suppliers than on their banks, while suppliers have stronger incentives to lend to their clients that are experiencing temporary financial distress. Suppliers may thus be willing to offer credit when banks may not.

5.2.4. Firm size

Cole (2011) found that firms that use no credit are significantly smaller, more profitable; more liquid and of better credit quality; but hold fewer tangible assets. On the other hand, smaller firms that are not profitable and are financially constrained are likely to resort to the use of trade credit. Firms that use trade credit are larger, more liquid, of worse credit quality, and are less likely to primarily provide services (Cole 2011). Trade

credit is usually used because of a lack of internal funding such as sufficient cash. Niskanen and Niskanen (2006) document that, larger and older firms with more internal financing are less likely to use trade credit, whereas those with a high ratio of current assets to total assets and firms subject to loan restructuring use more trade credit. Firms with higher levels of current assets may be holding a lot of stock and trade credit may be a way to sell more stock.

5.2.5. Financial Position

Companies can borrow from banks for considerably longer periods than the loans they receive from trading partners through trade credit. Firms that borrow from banks also use trade partners when they face short-term exigencies they did not expect and both large and small firms use trade credit to raise substantial funds (Miwa and Ramseyer 2005).The cash flow and liquidity position of a firm makes the use of trade credit a worthwhile option since cash payment will not be immediately required. Larger and older firms with strong internal financing or cash flow are less likely to use trade credit, but financially constrained firms use more trade credit as an alternative source of funding and that relationship increases loan availability (Niskanen and Niskanen 2006). Variation in accounts payable is primarily caused by variation in the value of input transactions and improvements in customers' financial conditions tend to reduce the value of input purchases because risks are reduced and prices fall (Ellingsen, Jacobson and von Schedvin 2016). Ellingsen, Jacobson and von Schedvin (2016) add that, improved financial conditions may enable firms to undertake long-run investments that reduce their input requirements, either through improved efficiency or by bringing more activities inside the boundaries of the firm.

5.2.6. Sales

Selling on credit usually stimulates sales as the customer's cash is freed up for use elsewhere. Trade credit represents a large portion of total assets among firms in the US and is widely considered as an opportunity for them to capture sales that might not otherwise be possible (Harris 2015: 47). Yazdanfar and Öhman (2015) state that,

supplying trade credit is a way to increase sales growth, supporting the previous findings of Niskanen and Niskanen (2006) and Petersen and Rajan (1997). Yazdanfar and Öhman (2015) add that, lagged sales growth, size, age, and industry affiliation affect sales growth and a firm's credit policy is directly associated with its sales strategies. Success seems to be related to its ability to collect and prevent default on investment in accounts receivable. Extension of trade credit is tied to both costs and benefits; managers should thus be concerned about how accounts receivable are managed.

5.2.7. Profitability

Martínez-Sola, García-Teruel and Martínez-Solano (2014) suggest that managers can improve firm profitability by increasing their investment in receivables. The effect is greater for larger, more liquid firms, those with volatile demand, and for firms with more market share. Receivables, is an asset on the balance sheet and investment in receivables whilst managing costs will improve profitability. Small firms may rely on trade credit and eventually reduce the amount they use as they grow. The greater a firm's growth the less trade credit obtained. In contrast, profitability and size facilitate trade credit from suppliers in terms of the finance and pricing motives point of view, as well as the stability of terms of such credit (Oliveira Marques 2010). Trade credit is costly and involves an opportunity cost (Nadiri 1969). It also increases the level of investment in current assets and may therefore, affect the profitability and liquidity of the company (Martínez-Sola, García-Teruel and Martínez-Solano 2013).

5.2.8. Cash flow Management

Molina and Preve (2009) investigated the trade receivables policies of distressed firms and found that there is a trade-off between a firm's willingness to gain sales and its need for cash. Cash needs may result in less trade credit extended whilst sufficient cash may enable firms to offer more trade credit. Firms increase trade receivables when they have profitability problems, but reduce them when they have cash flow problems (Molina and Preve (2009). Trade credit is regarded as a mechanism that

separates the exchange of money from the uncertainty present in the exchange of goods. Trading partners can time their money flows; credit permits a reduction in precautionary money holdings and more effective management of net money accumulation (Ferris 1981). Trade credit is a particular type of short-term loan that is tied both in terms of timing and value to the exchange of goods (Ferris 1981). Typically, when trade credit is used, the trader delivering goods will simultaneously grant credit to the one receiving the goods. The loan permits the receiver of the goods to postpone his/her use of money until the end of the loan period.

5.8.9. Trade credit policy and firm value

Firms can raise large amounts of finance through trade credit which will impact the quantity of funding required to be raised through bank loans or stock markets. Martínez-Sola, García-Teruel and Martínez-Solano (2013) state that market imperfections might impact on the trade credit decision and cause the credit policy to affect firm value. Assuming an optimal trade credit policy, their results show a positive relationship between firm value and trade credit at low levels of receivables and a negative one at high levels. Trade credit is costly due to implicit costs; therefore, its use will impact on the company's cost of capital and consequently firm value. The trade receivables policy of distressed firms is a trade-off between the firm's willingness to gain sales and its need for cash (Molina and Preve 2009).

The use of trade credit frees cash flow as payment is not required immediately. It is thus a form of liquidity management. Demand for trade credit in the form of accounts payable can be considered as a way to obtain short-term financing, which is extensively used by corporations to postpone immediate cash payments and increase the cash flow available inside the company (Pike *et al.* 2005). Firms increase trade receivables when they experience profitability problems, but reduce them when they have cash flow problems (Molina and Preve 2009).

5.3. Results and Analysis

5.3.1 Pairwise Correlation

The correlation coefficient, often shortened to Pearson correlation or Pearson's correlation, is used here as a measure of the strength and direction of the association that exists between financial sector development and trade credit. If the p-value is less than the significance level (α = 0.05): Decision: Reject the null hypothesis. Conclusion: "There is sufficient evidence to conclude that there is a significant linear relationship between independent variables and trade credit because the correlation coefficient is significantly different from 0.” If the p-value is not less than the significance level (α = 0.05) Decision: Do not reject the null hypothesis. Conclusion: "There is insufficient evidence to conclude that there is a significant linear relationship between dependent variables and trade credit because the correlation coefficient is not significantly different from 0."

Table 0-36 Pairwise of financial sector development and receivables

	$\frac{Trade\ receivables}{Total\ assets}$	$\frac{BC}{BD}$	$\frac{BD}{GDP}$	BC	$\frac{LL}{GDP}$	$\frac{PDSD}{GDP}$	$\frac{DPDS}{GDP}$
$\frac{Trade\ receivables}{Total\ assets}$	1,0000						
	29989						
$\frac{BC}{BD}$	-0,0044*	1,0000					
	0,4473						
	29988	40261					
$\frac{BD}{GDP}$	0,0548*	-0,4797*	1,0000				
	0,0000	0,0000					
	29988	40261	40261				
BC	-0,0394*	0,1368*	0,0642*	1,0000			
	0,0000	0,0000	0,0000				
	29988	40261	40261	40261			
$\frac{LL}{GDP}$	-0,0212*	0,9276*	-0,3097*	-0,1004*	1,0000		
	0,0000	0,0000	0,0000	0,0000			
	29988	40261	40261	40261	40261		
$\frac{PDSD}{GDP}$	-0,0019*	0,6365*	-0,1474*	0,1167*	0,6709*	1,0000	
	0,7402	0,0000	0,0000	0,0000	0,0000		
	29703	39849	39849	39849	39849	39849	
$\frac{DPDS}{GDP}$	-0,0447*	-0,1458*	0,2083*	0,4747*	-0,1916*	0,3585*	1,0000
	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	
	29988	40261	40261	40261	40261	38849	40261
$\frac{SMC}{GDP}$	0,0498*	-0,1026*	0,3713*	0,2720*	-0,1861*	0,2610*	0,1563*
	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
	27107	37294	37294	37294	37294	36882	37294
$\frac{SMTVT}{GDP}$	0,0586*	0,2800*	0,1560*	-0,2298*	0,4042*	0,6050*	-0,1526*
	0,0008	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
	27107	37294	37294	37294	37294	36882	37294
SMTR	0,0466*	0,3278*	-0,0717*	-0,4657*	0,5399*	0,4089*	0,4064*
	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
	27107	37294	37294	37294	37294	36882	37294

$\frac{DCPS}{GDP}$	0,0162*	0,8368*	-0,1292*	0,3958*	0,7234*	0,6665*	0,0061
	0,0052	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
	29989	40261	40261	40261	40261	40261	40261

Source: Own construct financial sector development and trade receivables/total assets 2001-2013

Null Hypothesis H_0: The population correlation coefficient is not significantly different from 0. There is not a significant linear relationship (correlation) between financial sector (independent variables) and trade credit in the population.
Alternate Hypothesis H_1: The population correlation coefficient IS significantly different from 0. There is a significant linear relationship (correlation) between the independent variable and $TRTA$ in the population.

Bank credit to bank deposits and $TRTA$ has weak negative correlation of -0.0044 p value 0.4473>0.05. The null hypothesis is thus not rejected. The correlation coefficient is not significantly different from 0. There is no significant linear relationship (correlation) between bank credit to bank deposits and trade receivables over total assets in the population. An increase or decrease in bank credit to bank deposits does not impact on $TRTA$. The use of trade receivables does not have a relationship with bank credit to bank deposits ratio. The probable reason could be that a firm can give trade credit (receivables) without necessarily taking a loan from the bank, or increasing its bank deposits.

Bank deposits to GDP and $TRTA$ has positive correlation of 0.0212 p value 0.0000<.05. The null hypothesis is thus rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between bank credit to bank deposits and trade receivables over total assets in the population. Bank deposits to GDP will increase bank credit to firms which will in turn be re-distributed to financially constrained firms through receivables.

Bank concentration and $TRTA$ has negative correlation of -0.0394 p value 0.0000<0.05. Based on this, the null hypothesis is rejected. The correlation coefficient

is significantly different from 0. There is a significant linear relationship (correlation) between bank concentration and trade receivables over total assets in the population. An increase in bank concentration can result in less trade credit (receivables) offered by firms. This could be because less competition makes it difficult for firms to access credit from banks.

Liquid liabilities to bank deposits and $TRTA$ has positive correlation of 0.0548 p value 0.0002<.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between bank credit to GDP and trade receivables over total assets in the population. Liquid liabilities are used to finance short-term needs; therefore, an increase in liquid liabilities may also result in some increase in trade receivables as firms seek to match current assets and current liabilities.

Outstanding domestic private debt securities and $TRTA$ has negative correlation of -0.0019 p value 0.7402>0.05. Thus, the null hypothesis is not rejected. The correlation coefficient is not significantly different from 0. There is no significant linear relationship (correlation) between outstanding domestic private debt securities to GDP and trade receivables over total assets in the population. There is no relationship between domestic private debt securities and the use of trade receivables. The probable reason could be that the two financing sources cannot be used as complements or substitutes.

Outstanding domestic public debt securities and $TRTA$ has negative correlation of -0.0447 p value 0.0000<0.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is significant linear relationship (correlation) between outstanding domestic private debt securities to GDP and trade receivables over total assets in the population. There is relationship between domestic public debt securities and the use of trade receivables.

Stock Market Capitalisation to GDP and $TRTA$ has positive correlation of 0.0498 p value 0.0000<0.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between stock market capitalisation to GDP and trade receivables over

total assets in the population. The under-valuation of stock markets also promotes the use of trade receivables. An undervalued stock is defined as one that is selling at a price significantly below its assumed intrinsic value. Investors prefer these kinds of markets because share prices have the potential to increase. The higher stock market capitalisation to GDP the higher trade receivables will be because the financial markets are well resourced as they attract investors. Firms can obtain funding and redistribute it through the use of trade receivables as an investment.

Stock Market Value Traded to GDP and $TRTA$ has positive correlation of 0.0586 p value 0.0052<0.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between stock market value traded to GDP and trade receivables over total assets in the population. A developed stock market also promotes trade receivables as listed firms are able redistribute funding to financially constrained firms that may be unlisted.

Stock Market Turnover Ratio and $TRTA$ has positive correlation of 0.0466 p value 0.0000<0.05. The null hypothesis is thus rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between stock market turnover ratio to GDP and trade receivables over total assets in the population. A high stock market turnover ratio means that the stock market is highly liquid, which implies that firms can easily raise funds on the capital market and will in turn use receivables as an investment. The rationale could be that advanced and developed financial markets also promote trade credit.

Domestic credit to private sector as a percentage of GDP and $TRTA$ has positive correlation of 0.0162 p value 0.0052<0.05. The null hypothesis is thus rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between domestic credit to private sector to GDP and trade receivables over total assets in the population. Increased domestic credit to the private sector will result in increased use of trade receivables. The probable reason could be that firms that are financed redistribute funding to their financially constrained trading counterparts through trade receivables.

Table 0-37 Pairwise financial sector development and trade payables

	$\frac{Trade\ payables}{Total\ assets}$	$\frac{BC}{BD}$	$\frac{BD}{GDP}$	BC	$\frac{LL}{GDP}$	$\frac{PDSD}{GDP}$	$\frac{DPDS}{GDP}$
$\frac{Trade\ payables}{Total\ assets}$	1,0000						
	29989						
$\frac{BC}{BD}$	-0,0726*	1,0000					
	0,0000	0,0000					
	29988	40261					
$\frac{BD}{GDP}$	0,0649*	-0,4747*	1,0000				
	0,0000	0,0000					
	29988	40261	40261				
BC	-0,0108	0,1368*	0,0642*	1,0000			
	0,0608	0,0000	0,0000				
	29988	40261	40261	40261			
$\frac{LL}{GDP}$	-0,0764*	0,9276*	-0,3097*	-0,1004*	1,0000		
	0,0000	0,0000	0,0000	0,0000			
	29988	40261	40261	40261	40261		
$\frac{PDSD}{GDP}$	-0,6920*	0,6365*	-0,1474*	0,1167*	0,6709*	1,0000	
	0,0000	0,0000	0,0000	0,0000	0,0000		
	29703	39849	39849	39849	39849	39849	
$\frac{DPDS}{GDP}$	-0,0503*	-0,1458*	0,2083*	0,4747*	-0,1916*	0,3585*	1,0000
	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	
	29988	40261	40261	40261	40261	38849	40261
$\frac{SMC}{GDP}$	0,1025*	-0,1026*	0,3713*	0,2720*	-0,1861*	0,2610*	0,1563*
	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
	27107	37294	37294	37294	37294	36882	37294
$\frac{SMTVT}{GDP}$	0,0203*	0,2800*	0,1560*	-0,2298*	0,4042*	0,6050*	-0,1526*
	0,0008	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
	27107	37294	37294	37294	37294	36882	37294
SMTR	-0,0202*	0,3278*	-0,0717*	-0,4657*	0,5399*	0,4089*	0,4064*

	0,0009	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
	27107	37294	37294	37294	37294	36882	37294
$\frac{DCPS}{GDP}$							
	-0,0165*	0,8368*	-0,1292*	0,3958*	0,7234*	0,6665*	0,0061
	0,0043	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
	29989	40261	40261	40261	40261	40261	40261

Source: Own construct financial sector development and trade payables/total assets 2001-2013

Null Hypothesis H_0: The population correlation coefficient is not significantly different from 0. There is not a significant linear relationship (correlation) between the financial sector (independent variables) and trade credit in the population.
Alternate Hypothesis H_1: The population correlation coefficient IS significantly different from 0. There is a significant linear relationship (correlation) between the independent variable and $TPTA$ in the population.

Bank credit to bank deposits and $TPTA$ has a negative correlation of -0.0726 p value 0.0000<0.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between bank credit to bank deposits and trade payables over total assets in the population. Increased bank credit will reduce the level of trade credit. Bank credit and trade credit are substitutes. The findings show that if credit from banks is available, firms will reduce undesirable trade credit.

Bank deposits and $TPTA$ has positive correlation of 0.0649 p value 0.0000<0.05. The null hypothesis is thus rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between bank credit to bank deposits and trade payables over total assets in the population. An increase in bank deposits may also result in an increase in trade payables. The growth of bank deposits does not necessarily result in reduced use of trade payables. The use of trade payables may therefore free up cash, resulting in increased bank deposits among firms.

Bank concentration and $TPTA$ has negative correlation of -0.0108 p value 0.0608>0.05. The null hypothesis is not rejected. The correlation coefficient is not

significantly different from 0. There is no significant linear relationship (correlation) between bank concentration and trade payables over total assets in the population. Increased bank concentration will cause an increase in trade payables because it results in less competition. It becomes relatively difficult for firms in an economy with a concentrated banking sector to obtain credit.

Liquid liabilities to GDP and $TPTA$ has negative correlation of -0.0764 p value 0.0000<.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between liquid liabilities to GDP and trade payables over total assets in the population. An increase in liquid liabilities will lead to a reduction in trade payables in order to minimise the firm's exposure to debt.

Outstanding domestic private debt securities and $TPTA$ has negative correlation of -0.0692 p value 0.000<0.05. The null hypothesis is thus rejected. The correlation coefficient is significantly different from 0. There is a no significant linear relationship (correlation) between outstanding domestic private debt securities to GDP and trade payables over total assets in the population. An increase in domestic private debt securities may lead to a gradual reduction in trade payables as a source of financing for firms.

Outstanding domestic public debt securities and $TPTA$ has negative correlation of -0.0503 p=value 0.0000<0.05. The null hypothesis is thus rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between outstanding domestic public debt securities to GDP and trade payables over total assets in the population. If public companies increase their use of public securities to raise capital, this will reduce trade payables as a source of financing.

Stock Market Capitalisation to GDP and $TPTA$ has negative correlation of 0.1025 p value 0.0000<0.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between stock market capitalisation to GDP and trade payables over total

assets in the population. Well-developed stock markets will result in less use of trade payables. A high stock market capitalization to GDP ratio implies that the stock market is undervalued and there is potential for stock prices to rise. Such stock markets attract investors and make it relatively easy for firms to raise capital; trade payables will consequently be reduced.

Stock Market Value Traded to GDP and $TPTA$ has positive correlation of 0.0203 p value 0.0008<0.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between stock market value traded to GDP and trade payables over total assets in the population. Developed stock markets have a high stock market value traded to GDP ratio, which promotes firms' use of trade payables. The probable reason is that advanced stock markets also promote trade credit; as firms grow, they gain market power and are able to demand trade credit from their trading counterparts.

Stock Market Turnover Ratio and $TPTA$ has positive correlation of -0.0202 p value 0.0009<0.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between stock market turnover ratio and trade payables over total assets in the population. Share turnover is a measure of stock liquidity. A positive relationship implies that if liquidity is high, firms can raise capital and increase the use of trade payables because, as they grow in size, they are in better position to negotiate trading terms with suppliers.

Domestic credit to private sector as a percentage of GDP and $TPTA$ has negative correlation of -0.0165 p value 0.0043<0.05. Based on this, the null hypothesis is rejected. The correlation coefficient is significantly different from 0. There is a significant linear relationship (correlation) between domestic credit to private sector as a percentage of GDP and trade payables over total assets in the population. If domestic credit to the private sector increases, firms can reduce their use of trade payables. When there is a decrease in domestic credit to the private sector, firms will increase the use of trade payables.

Industry depends on the financial sector for capital and the two sectors are interdependent. Currency and banking crises in economies should be viewed as twin events. Financial sector development leads to economic growth and economic growth spurs the growth of the financial sector Domestic interdependencies are known to produce domestic business cycle fluctuations from idiosyncratic sectoral shocks (Long Jr and Plosser (1983), and spillovers from the financial sector to the real economy are the key in understanding the recent global financial crisis (Canova and Ciccarelli 2013).

5.3.2 Trade receivables

5.3.2.1. Panel Vector Autoregression

The Granger (1969) approach is used to answer the question of whether financial sector development causes trade credit use by firms in the BRICS countries. The specific question is how much of current trade credit can be explained by the past values of financial sector development and then to determine whether adding lagged values of financial sector development can improve the explanation. Trade credit is said to be "Granger-caused" by financial sector development if the latter helps to predict the former, or if the coefficients on the lagged financial sector development are statistically significant. A two-way causation is tested, although causation does not imply it is the effect or result of.

Table 0-38 Selection order criteria three

Selection order criteria			No. of obs		14109	
Sample: 2004 -2012			No. of panels		2879	
			Ave. no of T		4.901	
Lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.9857	746.1173	8.40E-156	669.6807	730.1173	710.005
2	0.9125	132.4562	1.16e-27	94.23862	124.4569	114.4007

Source: Own construct selection order criteria

The GMM selection criteria are based on the J statistic for testing over-identifying restrictions. The selection criteria resemble the widely used likelihood-based selection

criteria BIC, HQIC, and AIC. A strongly consistent estimation procedure for the order of an auto-regression can be based on the law of the iterated logarithm for the partial auto-correlations. The J statistic is an analogue of (minus) the log likelihood function and the bonus terms are analogues of (minus) the term that penalizes the use of more parameters in a standard model selection criterion.

5.3.2.2. Granger Causality of financial sector development and trade receivables

Granger causality needs to meet two assumptions: that the future cannot cause the past and the past causes the present or future. A cause contains unique information about an effect that is not available elsewhere.

Table 0-39 GMM Estimation Trade receivables 2

	(1) pc1
pc1	
L.pc1	0.827***
	(146.81)
L.TRTA	0.0961
	(1.83)
TRTA	
L.pc1	0.00552**
	(3.26)
L.TRTA	0.594***
	(14.01)
N	20399

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Source: Own construct GMM estimation results

H_0: Lagged (1 lag) $TRTA$ does not cause financial sector development (pc1)

H_1: Lagged (1 lag) $TRTA$ causes financial sector development (pc1)

P=0.0961>0.05.We cannot reject the null hypothesis; therefore Lagged (1 lag) $TRTA$ does not cause financial sector development.

H_0: Lagged (1 lag) financial sector development (pc1) does not cause $TRTA$

H_1: Lagged (1 lag) financial sector development (pc1) causes $TRTA$

P=0.0052<0.05. Based on this result, the null hypothesis is rejected, therefore Lagged (1 lag) financial sector development causes $TRTA$

The reason is that if a firm obtains credit from the financial sector it will in turn redistribute funding to its financially constrained trading partners.

Panel VAR-Granger causality Wald test for trade receivables

Ho: Excluded variable does not Granger-cause Equation variable

Ha: Excluded variable Granger-causes Equation variable

Panel VAR-Granger causality test

Equation/Excluded	Chi2	Df	Prob>chi2
pc1			
TRTA	3.357	1	0.067
All	3.357	1	0.067
TRTA			
pc1	10.614	1	0.001
All	10.614	1	0.001

Source: Own construct financial sector development and trade receivables/total assets

H_0 : Lagged (1 lag) $TRTA$ does not cause financial sector development (pc1)

H_1 : Lagged (1 lag) $TRTA$ causes financial sector development (pc1)

P=0.067>0.05. Based on this, we cannot reject the null hypothesis. Therefore, lagged (1 lag) $TRTA$ does not cause financial sector development.

H_0 : Lagged (1 lag) financial sector development (pc1) does not cause $TRTA$

H_1 : Lagged (1 lag) financial sector development (pc1) causes $TRTA$

P=0.001<0.05. Based on this result, the null hypothesis is rejected. Therefore, lagged (1 lag) financial sector development causes $TRTA$

Granger causality is a statistical concept of causality that is based on prediction. According to Granger causality, $TRTA$ does not "Granger-cause" financial sector development. Therefore, past values of $TRTA$ do not contain information that helps to predict financial sector development over and above the information contained in the past values of trade receivables alone. Financial sector development does "Granger-cause" $TRTA$; therefore; past values of financial sector development do contain information that helps to predict trade receivables. The use of trade receivables competes with the financial sector in financial intermediation. Therefore, the use of trade receivables will impact on financial sector development. The level of historical financial sector development helps to predict the use of trade receivables. Firms increase their use of trade receivables if they have access to capital from the financial sector. The decision to use trade receivables is determined by the level of financial sector development.

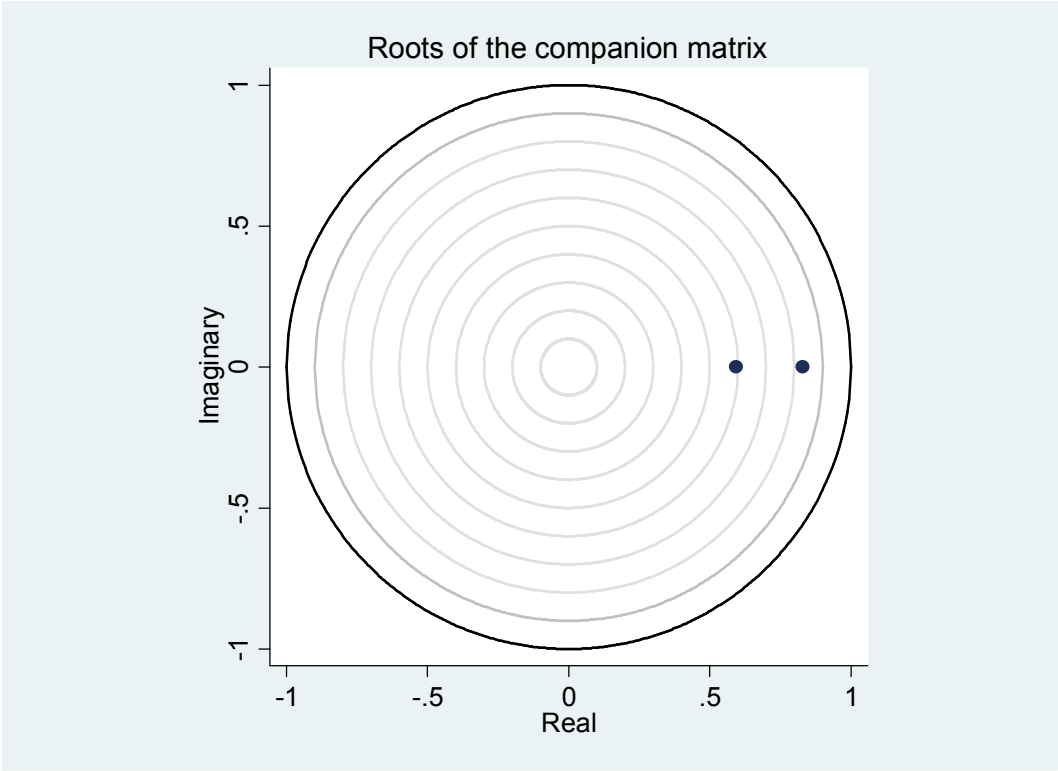
Panel vector autoregression model estimates are seldom interpreted by themselves. What is of interest is the impact of exogenous changes in each endogenous variable on other variables in the panel VAR system. Prior to estimating impulse-response functions (IRF) and forecast-error variance decompositions (FEVD), the first process is to check the stability condition of the estimated panel VAR. The resulting table and graph of eigenvalues confirm that the estimate is stable.

Eigenvalue stability condition

Eigenvalue		
Real	Imaginary	Modulus
0.8289	0	0.8289
0.5920	0	0.5920

All the eigenvalues lie inside the unit circle. pVAR satisfies the stability condition

Figure 9 Unit circle three



Source: Own construct based on Granger causality results

Table 0-40 Forecast-error variance decomposition trade receivables

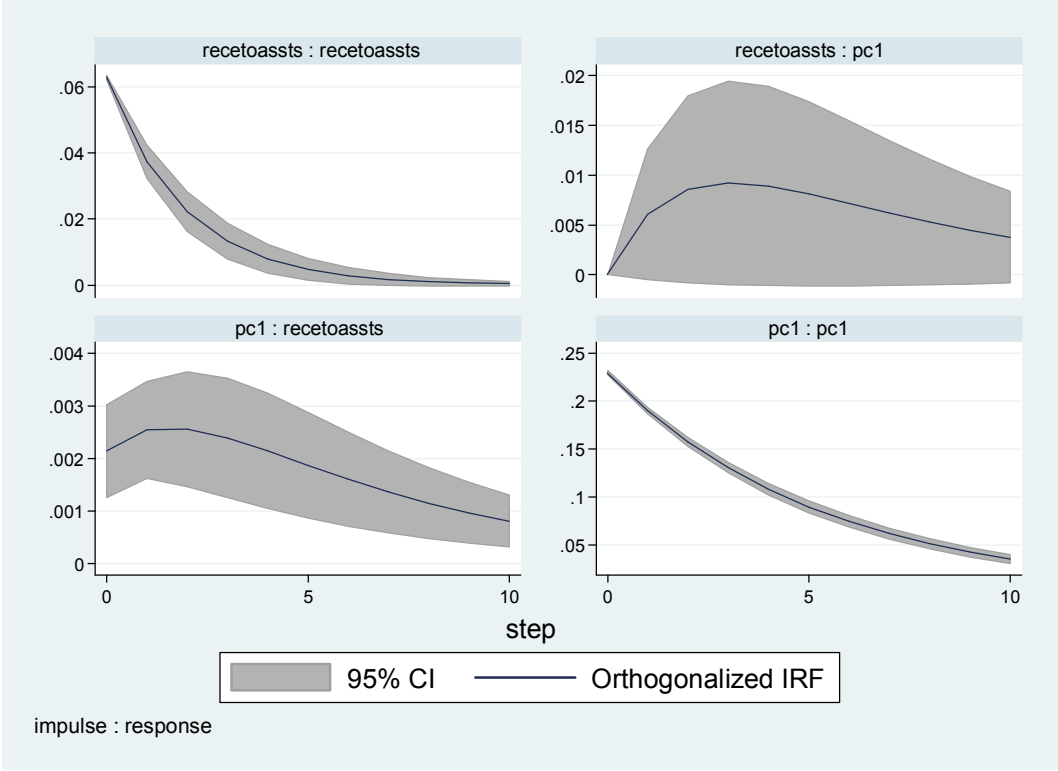
Response variable and forecast horizon		Impulse variable	
		pc1	TRTA
pc1	0	0	0
	1	1	0
	2	0.9996	0.0004
	3	0.9990	0.001
	4	0.9985	0.0015
	5	0.9981	0.0019
	6	0.9977	0.0023
	7	0.9975	0.0025
	8	0.9973	0.0027
	9	0.9971	0.0028
	10	0.9971	0.0029
TRTA			
	0	0	0
	1	0.0012	0.9988
	2	0.0020	0.9979
	3	0.0030	0.9970
	4	0.0039	0.9961
	5	0.0046	0.9954
	6	0.0051	0.9949
	7	0.0055	0.9945
	8	0.0058	0.9942
	9	0.0060	0.9940
	10	0.0061	0.9938

FEVD standard errors and confidence intervals based on 200 Monte Carlo simulations

Source: Own construct based on financial sector development and trade payables/total assets 2001-2013

Based on the FEVD estimates, we see that only 0.62% of variation in $TRTA$ by firms can be explained by the level of financial sector development. On the other hand, $TRTA$ explains 0.29% of variation in financial sector development. In terms of levels, the IRF plot shows that a positive shock on $TRTA$ leads to decreased financial sector development, which implies a downward trend in financial sector development amongst the BRICS countries. It is also noteworthy that a current shock in financial sector development has negative impacts on both $TRTA$ and financial sector development. The effect of a current shock on financial sector development has a persistent, negative impact on future $TRTA$.

Figure 10 Impulse response three



recetoassts= Trade receivables/Total assets

pc1= financial sector development

Source: Own construct based on Granger causality results

5.3.3. Trade payables

5.3.3.1. Panel Vector Autoregression

Table 0-41 Selection order criteria three

Selection order criteria	No. of obs	14109	
Sample: 2004 -2012	No. of panels	2879	
	Ave. no of T	4.901	

lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.9927	352.5937	2.53E-71	276.1572	336.5937	316.4814
2	0.9868	165.0934	1.18E-34	126.8751	157.0934	147.0372

Source: Own construct selection order criteria

Based on the three model selection criteria by Andrews and Lu (2001) and the overall coefficient of determination, second-order panel VAR is the preferred model, since this has the smallest MBIC, MAIC and MQIC. While we also want to minimize Hansen's J statistic, it does not correct for the degrees of freedom in the model like the model and moment selection criteria by Andrews and Lu. Based on the selection criteria, we fit a first-order panel VAR model with the same specification of instruments as above using the GMM estimation.

5.3.3.2. Granger Causality of financial sector development and trade payables

Granger causality needs to meet two assumptions: that the future cannot cause the past and the past causes the present or future. A cause contains unique information about an effect that is not available elsewhere.

Table 0-42 GMM Estimation trade payables

	pc1
pc1	
L.pc1	0.824***
	(116.57)
L.TPTA	2.016***
	(17.06)
TPTA	
L.pc1	0.00226
	(1.25)
L.TPTA	0.636***
	(15.58)
N	20399

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Source: Own construct based on GMM estimation results

H_0: Lagged (1 lag) $TPTA$ does not cause financial sector development (pc1)

H_1: Lagged (1 lag) $TPTA$ causes financial sector development (pc1)

P=0.0000<0.05. Based on this, the null hypothesis is rejected. Therefore, Lagged (1 lag) $TPTA$ does cause financial sector development.

H_0: Lagged (1 lag) financial sector development (pc1) does not cause $TPTA$

H_1: Lagged (1 lag) financial sector development (pc1) causes $TPTA$

P=0.0000<0.05. Based on this, the null hypothesis is rejected. Therefore, lagged (1 lag) financial sector development causes $TPTA$.

The reason is that if a firm obtains credit from the financial sector it will in turn redistribute funding to its financially constrained trading partners.

Panel VAR-Granger causality Wald test trade payables

Ho: Excluded variable does not Granger-cause Equation variable

Ha: Excluded variable Granger-causes Equation variable

Table 0-43 Granger causality results trade payables

Equation/Excluded		Chi2	df	Prob>chi2
pc1				
	TPTA	291.184	1	0.000
	All	291.184	1	0.000
TPTA				
	pc1	1.5620	1	0.211
	All	1.5620	1	0.211

Source: Own construct Panel VAR Granger Wald test

H_0 Lagged (1 lag) $TPTA$ does not cause financial sector development (pc1)

H_1: Lagged (1 lag) $TPTA$ causes financial sector development (pc1)

P=0.0000<0.05. We reject the null hypothesis. Therefore, lagged (1 lag) $TPTA$ does cause financial sector development.

H_0: Lagged (1 lag) financial sector development (pc1) does not cause $TPTA$

H_1: Lagged (1 lag) financial sector development (pc1) causes $TPTA$

P=0.211>0.05. Based on this result, the null hypothesis is not rejected. Therefore, lagged (1 lag) financial sector development does not cause $TPTA$.

Granger causality is a statistical concept of causality that is based on prediction. According to Granger causality, $TPTA$ "Granger-causes" financial sector development. Therefore, past values of $TPTA$ should contain information that helps to predict financial sector development over and above the information contained in past values of trade payables alone. Financial sector development does not "Granger-cause" $TPTA$; therefore past values of financial sector development do not contain information that helps to predict trade payables. The use of trade payables competes with the financial sector in financial intermediation. Therefore, the use of trade payables will impact on financial sector development. The level of historical financial sector development does not help to predict the use of trade payables. Firms make decisions to use trade payables based on their own internal needs such as financing and cash flow. This decision is not affected by historical values of financial sector development.

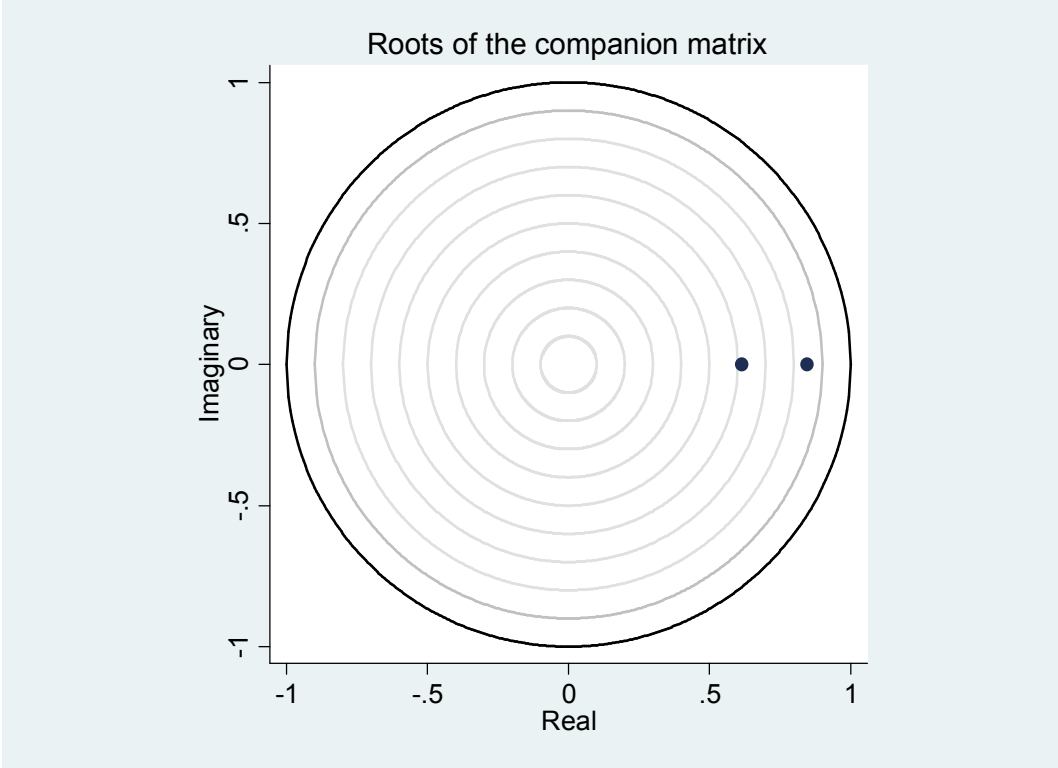
Panel vector autoregression model estimates are seldom interpreted by themselves. What is of interest is the impact of exogenous changes in each endogenous variable on other variables in the panel VAR system. Prior to estimating impulse-response functions (IRF) and forecast-error variance decompositions (FEVD), the first process is to check the stability condition of the estimated panel VAR. The resulting table and graph of eigenvalues confirm that the estimate is stable.

Eigenvalue stability condition

Eigenvalue		
Real	Imaginary	Modulus
0.8458	0	0.8458
0.6145	0	0.6144

All the eigenvalues lie the inside the circle. pVAR satisfies stability condition.

Figure 11 Unit root cycle four



Source: Own construct based on Granger causality results

Table 0-44 Forecast-error variance decomposition trade payables

Response variable and forecast horizon		Impulse pc1	Variable TPTA
pc1	0	0	0
	1	1	0
	2	0.9154	0.0846
	3	0.8194	0.1805
	4	0.7445	0.2555
	5	0.6909	0.3091
	6	0.6535	0.3465
	7	0.6273	0.3727
	8	0.6090	0.3910
	9	0.5961	0.4039
	10	0.5870	0.4130
TPTA			
	0	0	0
	1	0.0094	0.9906
	2	0.0105	0.9895
	3	0.0114	0.9886
	4	0.0121	0.9879
	5	0.1257	0.9874
	6	0.0129	0.9871
	7	0.0132	0.9868
	8	0.0134	0.9866
	9	0.0135	0.9865
	10	0.0136	0.9863

FEVD standard errors and confidence intervals based on 200 Monte Carlo simulation

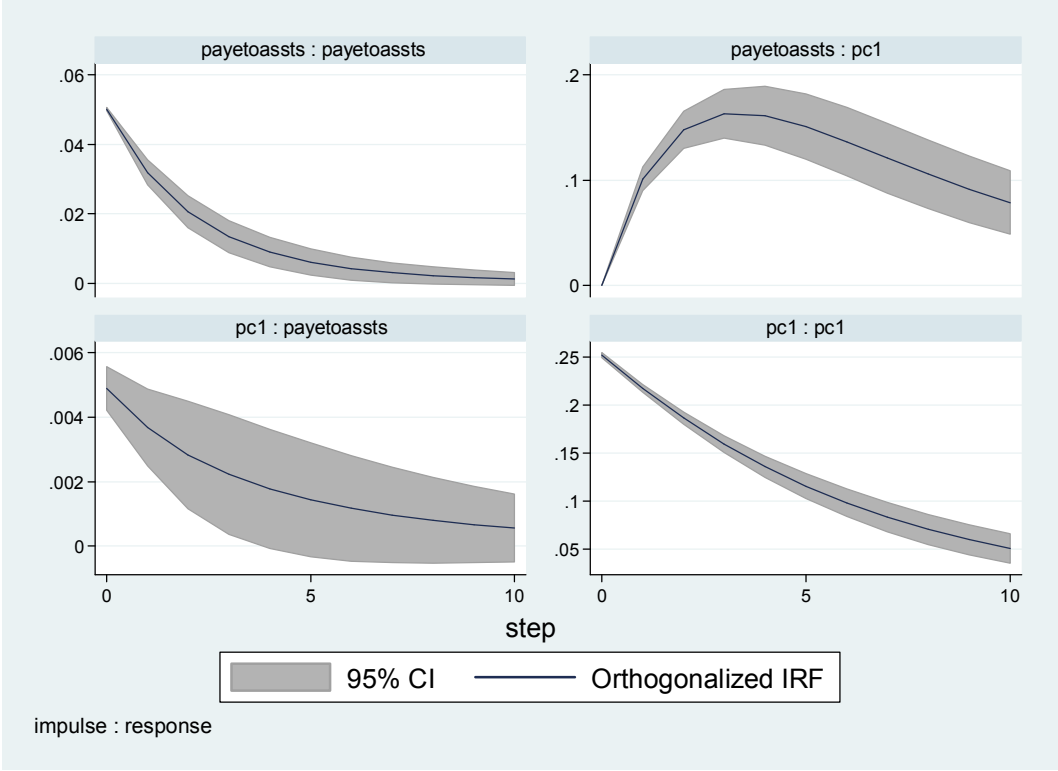
Source: Own construct based on financial sector development and payables/total assets

Based on the FEVD estimates, we see that only 1.4% of variation in $TPTA$ by firms can be explained by the level of financial sector development. On the other hand, $TPTA$ explains 41.3% of variation in financial sector development.

The impulse-response functions describe the reaction of one variable to innovations in another variable in the system, while holding all other shocks equal to zero (Love and Zicchino 2006). In terms of levels, the IRF plot shows that a positive shock on $TPTA$ leads to decreased financial sector development, which implies a downward trend in financial sector development amongst the BRICS countries. It is also noteworthy that a current shock in financial sector development has a positive effect

on $TPTA$ which is temporary. The effect of a current shock on financial sector development has a persistent, negative impact on future $TPTA$.

Figure 12 Impulse response four



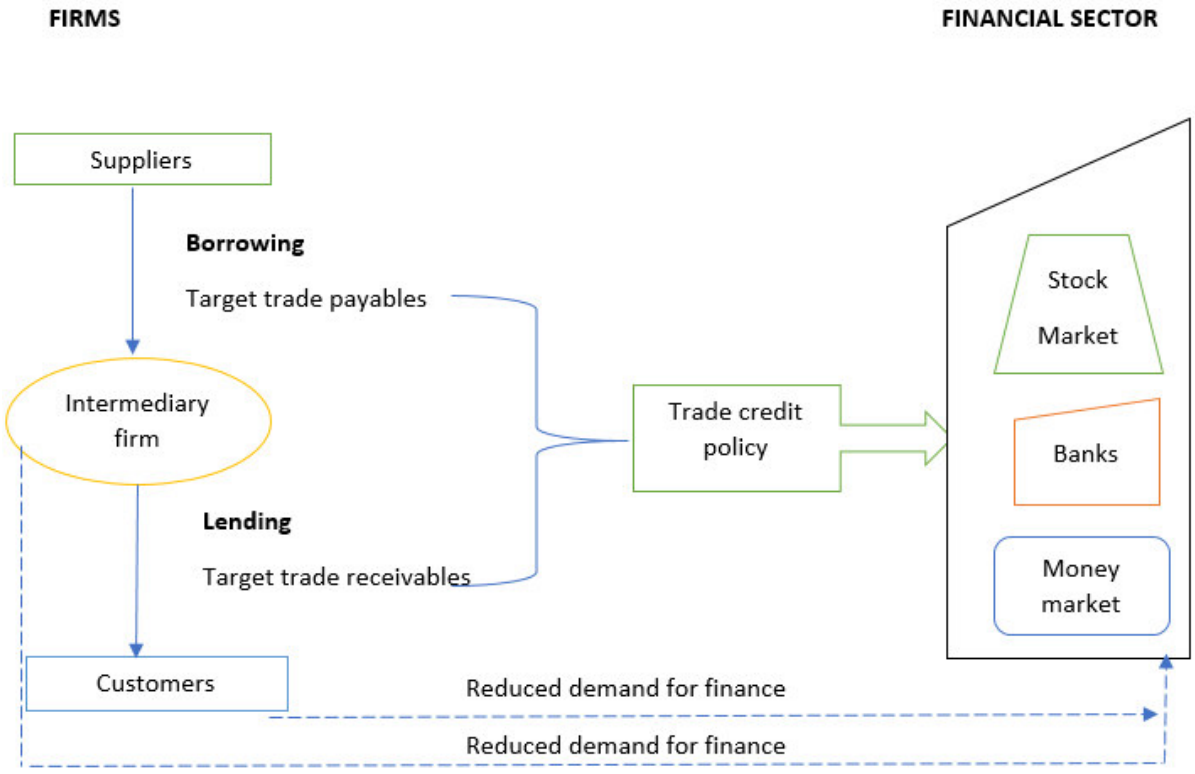
payetoassts=Trade payables/Total Assets

pc1=financial sector development

Source: Own construct based on Granger causality results

5.4. Discussion and analysis of findings

Figure 13 Trade credit and financial sector development model



Source own construct: Trade credit and financial sector development model

Firms set trade credit policies that state the percentage of working capital to be financed through trade credit. The findings reveal that what firms do influences financial sector development. Setting target trade credit levels has the effect of reducing the percentage of working capital that will be financed through bank credit. Figure 18 above illustrates that when firms obtain and extend trade credit, this reduces their demand for bank credit. Firms act as intermediaries as they borrow from suppliers and lend to customers; in other words, they assume the role which financial intermediaries traditionally assume, thereby taking business from the financial sector. Trade credit has the ultimate effect of reduced the level of financial sector development. The financial sector faces competition from firms in performing their intermediary roles given that suppliers have financing advantages over banks

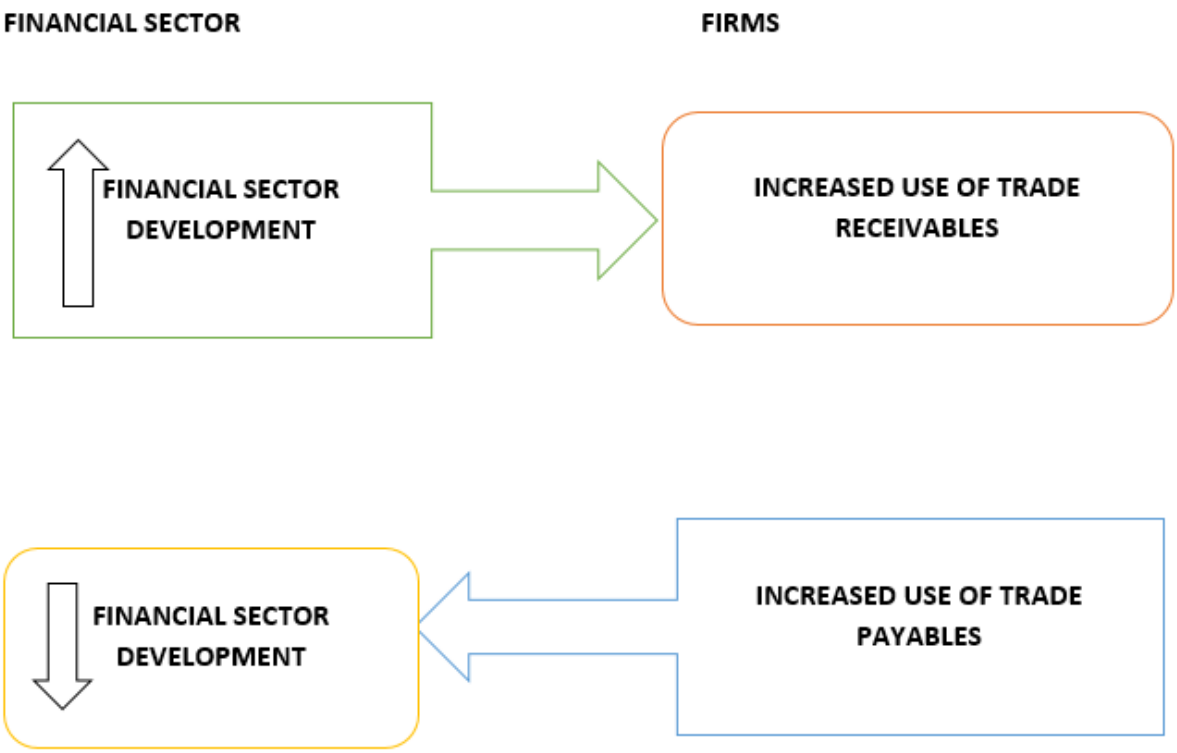
(financing advantages theory of trade credit). The asymmetric information theory of trade credit also favours firms.

Financial intermediaries experience lower demand for their services which means that they must innovate to take advantage of opportunities in the market. Smith (1987) established that if a buyer purchases goods and pays late (for example, at the end of 30 days) he/she has implicitly borrowed at a higher interest rate defined by the trade credit terms. This indicates that lower cost third-party financing such as bank loans was not available to the buyer. It should be noted that firms charge higher interest (implicit) than banks and have the advantage in offering loans ahead of banks. It should therefore follow that firms may make more profit than banks from short-term lending (30 days). As firms make trade credit decisions after analyzing all their reasons to use trade credit to finance their working capital, the major findings on causality affirm that their actions affect financial sector development.

If we assume that the supplier, intermediary firm and customers all have access to bank credit, but maintain a target trade credit policy which they will not adjust because bank loans are available or are cheaper, firms may not finance working capital with 100% bank credit. Whilst bank credit may be cheaper, firms use trade credit due to certain benefits they enjoy as they act as intermediaries, borrowing from suppliers and lending to customers. The lack of causality in the direction of financial sector development to trade payables explains why firms in countries with developed banking sectors and in those with under-developed financial sectors use trade credit. China and South Africa are BRICS countries with developed financial sectors but they use more trade credit, which may imply that financial sector development also promotes the intermediary role of firms, thereby increasing trade credit use instead of reducing it.

5.5. Financial sector and trade credit direction of causality

Figure 14 Financial sector development and trade credit direction of causality



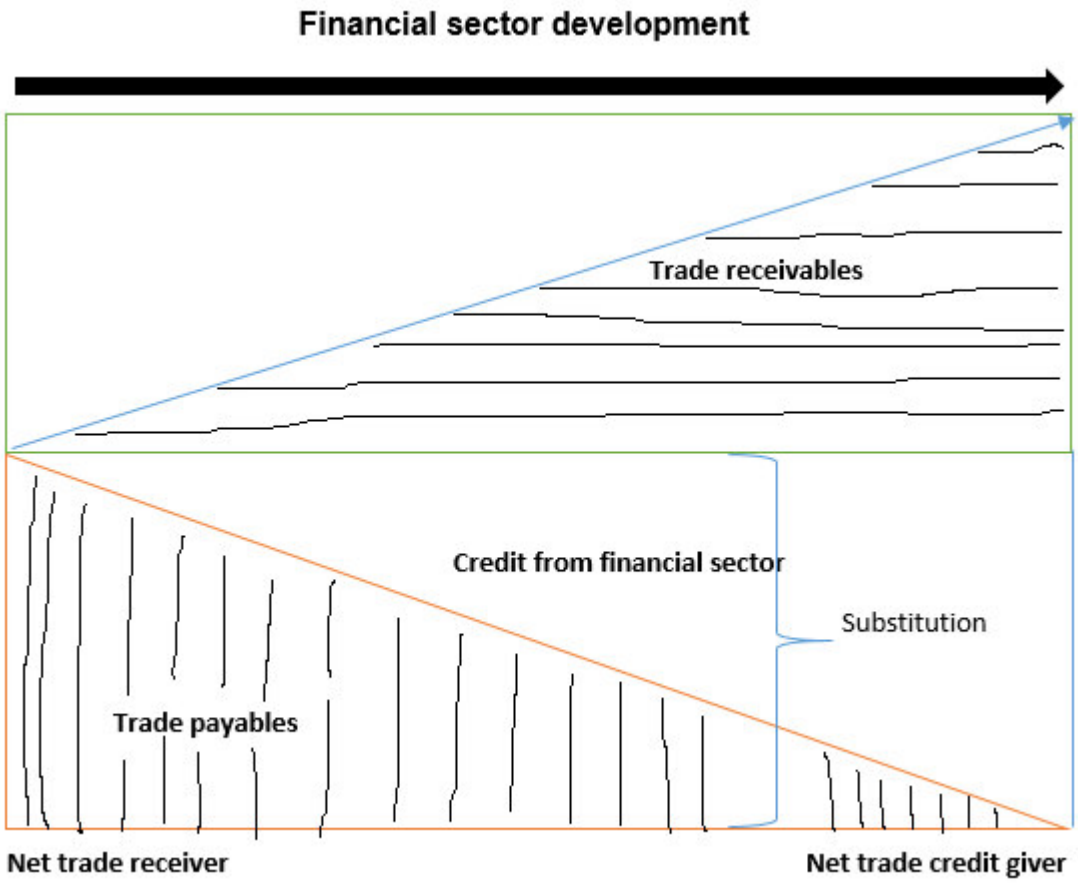
Source: Own construct based on financial sector development and causality

TP/TA causes financial sector development and financial sector development causes TRTA. It should be noted the causative direction between financial sector development and TRTA is less than 1% variation whilst the causative direction between TP/TA is 40% (see forecast-error variance decomposition). Therefore, trade payables have a very important influence on financial sector development. An increase in financial sector development will lead to reduced levels of trade payables as firms have more alternatives for finance (see Figure 19). This finding is consistent with the hypothesis that firms will reduce the use of trade credit as the financial sector develops. Increased use of TP/TA will lead to increased financial sector development which is temporary and will fall in the long-run (see Figure 19). In the short-run, financial sector development increases as firms grow and increase their bank deposits but continued use of trade payables will have a negative impact on financial sector development. The use of trade payables removes the intermediary role from the financial sector and

therefore has a long-term negative effect on financial sector development as firms demand less finance from the financial sector.

5.6. Financial sector development and trade credit working capital management

Figure 15 Financial sector development and working capital management model



Source: Own construct trade credit and financial sector development

Firms must substitute trade payables which is expensive with credit from the financial sector as the financial sector develops. At the same time, they should increase their lending through trade receivables. Credit from the financial sector is cheaper than trade payables whilst lending through trade receivables will increase profits due to a higher implicit interest rate. Substituting trade credit with credit from the financial sector will minimise borrowing costs whilst lending through trade receivables will increase profit from lending. For firms to fully benefit from performing intermediary roles, they

should develop from net trade credit receivers to net credit providers while at the same time minimizing their borrowing costs and increasing their lending through trade receivables as illustrated in Figure 20 above. In order for firms to take advantages of these opportunities they need to maintain a flexible trade credit target. The development of the banking sector is also important for firms so that they can minimize the costs of adjusting trade credit levels from current to desired levels. The speed of adjustment is fast in countries with developed financial sectors.

5.7. Should firms be regulated as the financial sector?

Transnational networks which come in different forms, seek to respond to problems of a transnational character by promoting cooperation in policy formulation, setting standards and enforcing such standards. Trade credit can be regulated by national governments but regulation through transnational networks seems more appropriate. Financial regulation through transnational networks allows firms to retain autonomy from the political actors within their jurisdictions. If the rules and standards that a financial regulator prefers have to be taken through the national legislative process, they might be diluted by political actors. Regulators can by-pass national legislative processes by engaging fellow regulators in foreign jurisdictions through their transnational networks. Transnational networks flourish because they are backed by expert communities who wish to retain autonomy in their areas. Networks in the regulation of financial services such as the Financial Stability Board, the Basel Committee or a new transnational network specifically dealing with trade credit should consider enacting policies and standards to govern trade credit as firms perform intermediary functions which require high levels of liquidity.

The findings on Granger causality in this study prove that trade credit policies by firms, especially trade payables, affect the financial sector. Thus, consideration should be given to regulating firms in order to ensure a stable and growing financial sector. Firms borrow from the financial sector and lend to their trading counterparts; therefore, their collapse or bankruptcy affects the financial sector. Policies, standards and norms for firms in different industries and sectors should be formulated to reduce the probability

of corporate default and potential damage to lending firms if a firm collapses. Firms' liquidity differs among sectors and issues such as cash operating cycles are different in various industries. Policies and standards can only be sector-specific; however, firms that implement the guidelines should retain their autonomy on the ratios to follow given prevailing conditions in the specific economy. Regulators can by-pass national legislative processes by engaging fellow regulators in foreign jurisdictions through their transnational networks.

5.8. Summary and Conclusion

Trade payables over total assets "Granger-causes" financial sector development; therefore, past values of trade payables over total assets should contain information that helps to predict financial sector development over and above the information contained in past values of trade payables alone. Financial sector development does not "Granger-cause" trade payables over total assets; therefore, past values of financial sector development do not contain information that helps to predict trade payables. The current level of financial sector development has an impact on the future use of trade payables. On the other hand, the use of trade payables can impact the level of financial sector development since trade payables compete with the financial sector in intermediation.

Financial sector development "Granger-causes" trade receivables over total assets; therefore, past values of financial sector development should contain information that helps to predict the level of trade receivables over total assets over and above the information contained in past values of financial sector development alone. Trade receivables over total assets "Granger-cause" financial sector development; therefore, past values of trade receivables over total assets do not contain information that helps to predict financial sector development. The level of financial sector development has the effect of increasing trade receivables. The use of trade receivables can impact the level of financial sector development but to a lesser extent than trade payables. Trade receivables compete with loans from the financial sector as a source of funds.

Financial sector development does not cause trade credit use by firms in BRICS countries. Current levels of trade payables cannot be explained by past values of financial sector development; however, trade receivables can be predicted using financial sector development but the degree of causality is weak at less than 1% variation. Trade credit is not "Granger-caused" by financial sector development and financial sector development does not help to predict trade credit. In contrast, trade credit (trade payables) "Granger-causes" financial sector development in the BRICS countries. Current levels of financial sector development can be explained by past values of trade credit (trade payables) use by firms. Trade credit "Granger-causes" financial sector development and helps to predict financial sector development. We can determine the level of financial sector development in a country by analyzing trade credit (trade payables) use. On the other hand, we cannot establish the level and use of trade credit use in a country by merely looking at its financial sector development. The findings provide the rationale for why firms in countries with well-developed financial sectors use trade credit. Trade credit use is also synonymous with countries with under-developed financial sector development. The study of trade credit use patterns will help to predict the level of financial sector development. The results support the hypothesis that firms rely on trade credit in countries with under-developed financial sectors as the findings on Granger causality reveal that trade credit (trade payables) takes precedence over financial sector development. On the other hand, financial sector development takes precedence over trade receivables, meaning that firms increase their use of trade receivables following financial sector development when they would have gained access to other sources of capital. The lack of Granger causality from the direction of financial sector development to trade payables explains why firms in countries with developed and under-developed financial sectors use trade credit (trade payables).

The impulse and response showed that a current financial sector crisis will affect future trade payables and receivables. The current level of financial sector development does not affect the current level of trade credit, but rather affects the level of trade payables and receivables in the following period. Knowledge of current financial sector development assists in determining whether to increase trade credit use or reduce it.

CHAPTER 6 GENERAL CONCLUSIONS AND CONTRIBUTIONS

6.1. Introduction

This study presented a background and the context of the BRICS countries and motivated why financial sector development and trade credit is a phenomenon of interest. A link was developed between trade credit and bank credit which are substitutes. Financial sector development is expected to result in reduced use of trade credit by firms. Trends in financial sector development and trade credit use in BRICS countries were analysed and discussed. Firms' trade credit policies in these countries were investigated and it was established that they set policies on trade credit targets and adjust towards their desired levels. The speed and cost of the adjustment process are influenced by the level of financial sector development. The relationship between banking sector development and trade credit use by firms was investigated and it was established that the use of trade credit has a causal effect on banking sector development. The influence and causality of financial sector development which includes stock markets and money markets on trade credit was also investigated and it was established that trade payables have a causal effect on financial sector development and that financial sector development has a causal effect on trade receivables. This final chapter consolidates the study's findings and overall conclusions. It outlines the research background, discusses the study's primary and secondary contributions and implications, makes recommendations for future research and presents a final conclusion.

6.2. The research background

The usage of trade credit is puzzling in light of its high implicit cost and the level of financial sector development. This study sought to determine the relationship and impact of financial sector development on firms' use of trade credit. Firms use high cost trade credit to finance their working capital requirements rather than bank loans which may be considerably cheaper in countries with well-developed financial sectors. The study explored trade credit use in relation to financial sector development.

6.2.1. Financial sector development and banking sector development

The study distinguished between financial sector development which refers to the development of the banking sector, money markets and stock markets and banking sector development. This was done in order to investigate the banking sector's relationship with trade credit as it is the immediate alternative to working capital finance compared to money markets and stock markets. The term financial sector refers to a combination of financial intermediaries and financial markets. It should be noted that financial intermediaries, for example, banks are different from financial markets such as stock exchanges.

The study investigated whether financial sector development and banking sector development influence a firm's use of trade credit. Financial sector development and banking sector development have an impact on the development of firms. Development of the financial sector improves firms' access to finance while trade credit is a key alternative source of finance for firm growth. Trade credit can thus have an impact on financial intermediation and financial sector development. Financial sector development can be predicted using historical patterns of trade credit, specifically trade payables which is used as a source of finance. On the other hand, the level of trade payables cannot be predicted using a country's historical financial sector development, but trade receivables can be predicted using financial sector development.

The findings are applicable to BRICS countries and other emerging economies. The study contributes the unique finding that future trade credit levels are a function of current financial sector development. The impulse-response findings showed that, a current financial shock or crisis will affect the level of trade receivables and trade payables in the following trading period. Therefore, current trade credit levels are a function of the level of financial sector development during the previous trading period. The implication is that managers need to understand the level of current financial sector development as this informs decisions on increasing or reducing trade credit. A financial crisis can result in temporary reduction in trade payables and trade receivables and an increase thereafter. The probable reason is that lending is more risky; therefore, trade receivables and trade payables are reduced and at the same

time finance from the financial sector is limited; assuming firms re-distribute finance to other financially constrained firms without access to capital. The study added the new dimension of financial sector development to the existing trade credit theory and provided a model to manage trade credit in developing financial markets.

The development of an economy's financial markets is closely related to its overall development. Well-functioning financial systems provide sound and easily accessible information which can lower transaction costs and subsequently improve resource allocation and boost economic growth. South Africa and China are the two BRICS countries with most developed financial sectors; however, both also rely heavily on trade credit as a source of financing. The efficiency of financial intermediaries in South Africa and China in channeling funds to the private sector seems to also promote trade credit which is a form of financial intermediation between firms. Firms in countries with developed financial sectors have more alternative sources of financing but do not necessarily reduce the level of trade credit use in favour of other sources of finance. Development of the financial sector in terms of the development of the legal and institutional environment promotes the use of trade credit. South Africa has a highly developed financial sector and highly advanced legal system, which makes enforcement of contracts easier and therefore, promotes trade credit. The other reason why firms in countries with developed financial sectors use trade credit could be that they obtain finance from the financial sector and in turn redistribute to their trading counterparts. The findings confirmed that financial sector development has a causative effect for firms to increase the use of trade receivables. An analysis of mean trade payables and receivables seems to confirm that firms either match the two, or are net trade credit receivers or providers.

There is need for consistent financial sector development, that is, the development of both financial institutions and financial markets (stock markets). South Africa has the most developed securities markets and banking sector in BRICS. It is consistent in its financial sector development and also has high securitization compared to China which has the largest banking sector amongst BRICS countries. BRICS countries should therefore prioritize financial sector development as this will promote economic growth through mobilizing finance for businesses and trade within countries and the

group. Financial sector development will also lead to improved and advanced financial systems, which facilitate transactions and payments.

Trade credit usage is not uniform across BRICS countries and also varies across sectors. Countries like China and Russia are experiencing an increase in trade credit usage whilst it is declining in South Africa and India. Trade credit is a mode of financing working capital used in all countries. The study found that listed firms in BRICS countries have a target level of trade payables and receivables to total assets and they partially adjust towards target levels. The speed of adjustment is relatively fast for trade receivables for South Africa. Financial sector development helps to increase the speed of adjustment and minimize the costs of staying off target. Only India does not maintain target trade receivables to current assets and trade payables to current liabilities. In countries with advanced financial sectors like South Africa, it is less costly to adjust from current to desired levels of trade credit than in other BRICS countries. South Africa also ranks first in terms of the rule of law; such an institutional environment promotes trade credit. The evidence supports the argument that size and growth opportunities, explain firms' use of supplier financing as a source of funds.

6.3. Primary contributions

6.3.1. Financial sector development and trade credit

The first primary contribution of this study lies in uncovering how financial sector development affects trade credit use by listed firms. The empirical findings shed some light on the relationship between trade credit use and financial sector development amongst BRICS countries. Financial sector development does not cause trade payables use by firms in BRICS countries. Current levels of trade payables cannot be explained by past values of financial sector development. Trade payables, is not "Granger caused" by financial sector development and financial sector development does not help to predict firms' use of trade payables. In contrast, trade payables targeting, which was established by this study as a deliberate policy by firms "Granger-causes" financial sector development in BRICS countries. Firms set deliberate targets for the percentage of trade payables to be used which has the effect of reducing their

demand for finance from the financial sector. Current levels of financial sector development can be explained by the past values of trade payables use by firms. Trade credit "Granger-causes" financial sector development and firms' use of trade credit helps to predict financial sector development. We can determine the level of financial sector development in a country by analyzing trade credit use. On the other hand, we cannot establish the level and use of trade credit in a country by merely looking at a time series of its financial sector development. The findings provide the rationale for why firms in countries with well-developed financial sectors still use trade credit. Trade credit use is also synonymous with countries with under-developed financial sectors. The study of trade credit use patterns will thus help to predict the level of financial sector development. The findings support the hypothesis that firms rely on trade credit in countries with under-developed financial sectors and trade payables use takes precedence over financial sector development and not vice-versa. It should be noted that the variation in trade receivables after financial sector development is relatively weak. The lack of Granger causality from financial sector development to trade explains why firms in countries with developed and under-developed financial sectors use trade credit.

The impulse and response showed that a current financial sector crisis will affect future trade payables and receivables. The current level of financial sector development does not affect the current level of trade credit but rather affects the level of trade payables and receivables in the following trading period. Knowledge of current financial sector development helps a firm to determine whether it needs to increase trade credit use or reduce it. These results extend the earlier findings of Deloof and La Rocca (2012) who concluded that lower levels of provincial banking development were linked to a stronger decline in trade credit at the start of the global financial crisis. The findings of this study describe the intermediating mechanisms of both trade credit and the financial sector. The new findings reveal and explain why firms in countries with developed financial sectors and those with under-developed financial sectors use trade credit. Ge and Qiu (2007) found that in a country with a poorly developed formal financial sector, firms can support their growth through trade credit. This contradicted Berger and Udell (1998) and Guariglia and Mateut (2006) findings that firms in countries with developed financial sectors such as the US also rely on trade credit as a source of financing. Even in well-developed market economies, such as the US, the

supply of capital is frequently bundled with the supply of goods, in the form of trade credit, and vendor financing more generally (Demirgüç-Kunt and Maksimovic 2001). Lee and Stowe (1993) calculated the amount of trade credit in 1985 in the US and found that it far exceeded the business lending of the entire banking system.

6.3.2. Bank development and trade credit

Banking sector development does not “Granger-cause” trade credit use by firms in BRICS countries. Current levels of trade credit cannot be explained by the past values of banking sector development. Trade credit is not “Granger-caused” by banking sector development and banking sector development does not help to predict trade credit. In contrast, trade credit causes banking development in BRICS countries. Current levels of banking sector development can be explained by past values of trade credit use by firms. Trade credit “Granger-causes” banking sector development and also helps to predict banking sector development. We can conclude that in a country which relies heavily on trade credit, the banking sector is under-developed because trade credit precedes banking sector development. We can determine the level of banking sector development in a country by analyzing trade credit use. On the other hand, we cannot establish the level and use of trade credit in a country by merely looking at a time series of its banking sector development.

There was only one direction of causality between trade credit and banking sector development; thus, firms’ trade credit policies affect banking sector development. Trade receivables and payables represent lending and borrowing, an intermediary function which will result in reduced demand for bank credit and an assumption of roles that would normally be carried out by banks.

The findings provide the rationale for why firms in countries with well-developed banking sectors still use trade credit. There is no causality in the direction of banking sector development to trade credit. Trade credit use is also synonymous with countries with under-developed banking sectors. The study of trade credit use patterns will thus help to predict the level of banking sector development. The findings support the

hypothesis that firms rely on trade credit in countries with under-developed banking sectors as the use of trade credit precedes banking sector development according to the causality findings. The lack of Granger causality from banking sector development to trade credit explains why firms in countries with developed and under-developed banking sectors use trade credit. The impulse and response showed that a current banking crisis will affect future trade payables and receivables. The current level of banking sector development does not affect the current level of trade credit, but rather affects the level of trade payables and receivables in the following period. Knowledge of current banking sector development helps a firm to decide whether to increase or reduce trade credit use in the next trading period.

6.4. Secondary contributions

6.4.1. Financial sector development and trade receivables

There is a positive relationship between trade receivables and bank deposits to GDP and between trade receivables and domestic credit to private sector to GDP. Bank development increases firms' access to loans and in turn firms that have access to bank finance increase trade credit to their trading counterparts. On the other hand, an increase in bank concentration reduces competition and reduces access to finance; firms also reduce trade receivables. If bank deposits decrease, the ratio of bank credit to bank deposits increases, but this will result in less finance being available to firms and in turn they will reduce trade receivables.

Liquid liabilities are used to finance short-term needs; therefore, an increase in liquid liabilities may also result in some increase in trade receivables as firms seek to match current assets and current liabilities. There is no relationship between domestic private debt securities and the use of trade receivables because the two financing sources cannot be used as complements or substitutes. There is also no relationship between domestic public debt securities and the use of trade receivables. The under-valuation of stock markets also promotes the use of trade receivables as under-valued stock markets attract many investors and firms can easily raise capital. A developed stock market also promotes trade receivables as listed firms are able to redistribute funding

to financially constrained firms that may be unlisted. A high stock market turnover ratio means that the stock market is highly liquid, which implies that firms can easily raise funds on the capital market and will in turn use receivables as an investment. The rationale is that advanced and developed financial markets also promote the use of trade credit, specifically trade receivables amongst listed firms.

6.4.2. Financial sector development trade payables

An increase in bank credit will reduce the level of trade credit. Bank credit and trade credit are substitutes. The findings show that if credit is available from banks, firms may or may not reduce trade credit. The growth of bank deposits does not necessarily result in reduced use of trade payables. The use of trade payables may also free up cash, which may result in increased bank deposits by a firm. Increased bank concentration will cause an increase in trade payables because bank concentration results in less competition and reduced access to bank loans by firms. It becomes relatively difficult for firms in an economy with a concentrated banking sector to obtain credit. An increase in liquid liabilities will lead to a reduction in trade payables in order to minimize the firm's exposure to debt. An increase in domestic private debt securities may lead to gradual reduction of trade payables as a source of financing for firms. If public companies increase the use of public securities to raise capital this will reduce trade payables as a source of financing.

A high stock market capitalization to GDP ratio implies that the stock market is undervalued and there is potential for stock prices to rise. Such stock markets attract investors and make it relatively easy for firms to raise capital; trade payables will consequently be reduced. Advanced stock markets also promote trade credit; as firms grow, they increase their market power and are able to demand trade credit from their trading counterparts. Liquidity of stock markets help firms grow in size and they are in a better position to negotiate trading terms with suppliers. If domestic credit to private sector is increased, firms can reduce their use of trade payables. When there is a decrease in domestic credit to the private sector, firms increase their use of trade payables.

6.4. Contribution to knowledge – theoretical

The study contributes to existing knowledge by considering the causative effects of financial sector development. To the best of the researcher's knowledge, it is the first to examine the relationship between trade credit and financial sector development (financial intermediaries and financial markets combined). It differs fundamentally from earlier studies that focused on access to bank credit. Previous investigations did not investigate whether there is a causal relationship between financial sector development and trade credit. In investigating the specific questions raised, a more refined understanding and explanation has been gained of the intermediating functions of the financial sector and trade credit within the trade credit discourse. The study has provided an understanding of how trade credit use can be used to predict the level of financial sector development in a country.

The study concluded that firms in BRICS countries with developed financial sectors do not necessarily reduce trade credit. South Africa, India and China have comparatively more developed financial sectors but firms in those countries use more trade receivables and trade payables relative to total assets compared to Brazil and Russia that have the least developed financial sectors. These findings seem to affirm previous observations that firms in countries with developed financial sectors such as the US rely heavily on trade credit. Yano and Shiraishi (2014) confirmed that a competitive market environment, a well-functioning legal system, and increased bank loans to private firms promote the development of trade credit in China. The theory developed will help firms to manage trade credit by providing a basis for management practice. Finance managers need to study and analyze financial sector development in order to plan the level of trade credit in the following trading period, i.e., whether they need to increase or reduce it. A shock or crisis in the financial sector will require managers to reduce trade credit in the following trading period. The study provided a basis for firms to set their trade credit policies taking the level of financial sector development into consideration. Policy makers should formulate policies that enable the financial sector to grow and increase firms' access to capital in order to facilitate firm growth. Regulations on trade credit should aim to reduce the probability of

corporate default and regulate the competition caused by trade credit in specific sectors.

6.5. Implications

Financing working capital using trade credit competes with the financial sector in terms of intermediation, thereby resulting in slower financial sector development. Trade credit provides an opportunity for firms to finance their working capital using suppliers instead of financial institutions. Development of the financial sector will increase trade credit use as risk; cost and defaults are also likely to fall in developed financial markets. Policy makers should thus formulate policies that enable the financial sector to grow and increase firms' access to capital. Financial crises and shocks need to be managed as they have the potential to affect trade since firms react by reducing trade credit in the following trading period. Policy makers should consider trade receivables and trade payables as competitors to financial institutions' financial intermediation. A policy that makes finance from financial institutions cheaper will help to develop the formal financial sector by ensuring that firms that are financially constrained and fail to take advantage of trade discounts have access to finance. Increased use of trade credit by firms reduces the level of financial sector development. Trade credit is complementary to the development of the financial sector and should not be viewed as a substitute by policymakers.

Managers need to analyse the level of financial sector development in order to set their trade credit policies. Knowledge of the current level of financial sector development helps finance managers to decide whether to increase or reduce trade credit in the next trading period. Analysis of trade credit patterns also helps finance managers to predict the level of financial sector development. The level of trade credit used in an economy helps in predicting whether the financial sector is growing or contracting. Prior knowledge of the future direction of financial sector development helps managers to set flexible trade credit policies that focus on whether they need to increase or reduce trade credit levels.

Bank managers and finance executives should study and analyse trade credit use patterns by firms because trade payables compete with bank loans. Suppliers have advantages in monitoring their debtors compared to banks. Bank managers should consider trade payables as a competitor to the loans they offer. If firms rely on trade credit, it will impact on financial sector development. Banks should also improve their financial intermediary role so that the loans are comparatively cheap for firms and they can finance working capital with bank credit and less trade payables. Firms' use of trade payables also has a positive effect for banks as this can increase cash deposits by firms as trade payables reduce their cash needs. However, bank managers should monitor their clients so that they do not unnecessarily increase trade payables as this increases their obligations and therefore increases the risk of cash flow and liquidity problems which affect their ability to repay loans. Loans offered to firms by banks also have a positive impact on trade receivables. Therefore, banks should monitor their clients to ensure that they do not unnecessarily increase trade receivables which may result in an increase in bad debts. If firms have poor cash flow because of late payments from their debtors and increased bad debts, this will impact on their ability to repay bank loans.

The National Credit Act, 2005 of South Africa lists the credit agreements which it regulates but does not include trade credit. While it regulates all businesses, companies, close corporations and individuals who do business on credit, provide loans, or charge interest on overdue accounts, it is not specific to trade credit. The Act is mainly intended to protect customers who buy goods on credit from retailers and does not address trade credit agreements for business-to-business relationships. The implications of trade credit use for financial sector development and business-to-business activities mean that this is an important area which should be included in the regulations in order to reduce the probability of corporate default. Firms that collapse will affect other firms in the supply chain; therefore, liquidity should be regulated taking into account conditions in different sectors.

6.5.1 Structuring working capital

Trade credit is an important source of working capital finance regardless of the level of financial sector development. Ability to reduce the costs of financing using trade credit depends on a firm's access to financial institutions which in turn depends on the level of financial sector development. Managers need to consider the cost of capital in formulating working capital financing combinations; a developed financial sector provides opportunities to minimize the cost of capital. The level of financial sector development helps to determine whether trade credit should be increased or reduced. An analysis of historical trade credit use in an economy helps to predict the level of financial sector development and informs firms whether they need to increase bank credit or trade credit as sources of working capital.

A flexible target should be maintained of trade receivables to total assets and trade payables to total assets. Firms need to determine their target for receivables and payables so that they can adjust towards their targets. Predicting the target level of trade credit is an important step, as is predicting the level of financial sector development. The level of financial sector development helps to determine the sources of capital to be considered in making the adjustment and the importance of financial sector development is that it increases the speed of adjustment and minimizes the costs of staying off target.

6.6. Repercussions of trade credit or financial sector development

The use of trade credit will result in high costs of financing due to high implicit costs. Financial sector development will lead to increased use of trade receivables and reduced use of trade payables. Trade credit will either increase or decrease because of financial sector development. Increased use of trade credit will compete with the financial sector in terms of intermediating and will therefore result in reduced financial sector development. In the long run, however, use of trade credit leads to the growth of firms, thereby increasing demand for expansion credit from the financial sector which will positively contribute to financial sector development. A developed financial sector promotes the use of trade credit by firms, particularly receivables.

6.7. Limitations and suggestions for future research

This study used factors of financial sector development such as the banking system, stock markets and money markets. It employed published financial statements, the quality of which the researcher had no control over. Causality is closely related to the idea of cause-and-effect, although it is not exactly the same. Granger causality does not test a true cause-and-effect relationship. It does not mean that there is a causal link in the true sense of the word. Trade credit is only helpful in being predictive of financial sector development and not in literally causing financial sector development. Firms need to use trade credit in financing working capital before the development of the financial sector. Trade credit precedes financial sector development. Precedence must be given to trade credit in working capital structuring when credit from the financial sector is unavailable. Further research could develop a trade credit model which incorporates the different industrial sectors and financial sector development in order to determine how trade credit policies should differ across sectors.

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Appendices

Appendix 1 BRICS comparative Financial Sector Development

		BC/BD			
Country	**Brazil**	**Russia**	**India**	**China**	**South Africa**
Year					
2001	65	96	60	276	140
2002	69	93	62	267	114
2003	60	100	60	268	118
2004	59	110	67	258	125
2005	59	108	73	252	121
2006	63	114	76	242	125
2007	72	120	74	234	126
2008	80	135	75	247	120
2009	92	118	71	237	124
2010	105	107	76	235	119
2011	116	111	76	251	110
2012	116	116	79	273	113
2013	122	116	79	286	113
mean	**83**	**111**	**71**	**256**	**121**

Source: Own construct based on Global Financial Development Database

		BD/GDP			
Country	**Brazil**	**Russia**	**India**	**China**	**South Africa**
Year					
2001	43	15	44	38	51
2002	41	17	47	40	50
2003	43	18	49	44	51
2004	44	19	49	44	51
2005	47	21	50	42	52
2006	51	23	51	41	56
2007	54	27	54	43	59
2008	56	28	59	40	63
2009	55	36	61	46	64
2010	49	36	60	51	59
2011	50	37	61	50	59
2012	54	39	62	47	59
2013	56	42	63	46	60
mean	**49**	**28**	**55**	**44**	**56**

Source: Own construct based on Global Financial Development Database

		BC			
Country	**Brazil**	**Russia**	**India**	**China**	**South Africa**
Year					
2001	33	34	25	73	89
2002	34	26	24	59	0
2003	44	29	24	58	0
2004	53	24	24	53	100
2005	63	15	25	41	99
2006	62	24	24	35	99
2007	64	21	25	27	99
2008	64	23	26	29	99
2009	67	15	27	27	99
2010	72	13	27	24	99
2011	66	7	27	23	99
2012	67	9	28	37	98
2013	71	8	25	39	98
mean	**58**	**19**	**25**	**40**	**83**

Source: Own construct based on Global Financial Development Database

		LL/GDP			
Country	Brazil	Russia	India	China	South Africa
year					
2001	45	21	55	133	48
2002	43	23	58	138	42
2003	45	26	59	144	42
2004	46	27	60	142	40
2005	50	29	61	141	41
2006	54	33	63	143	42
2007	57	38	68	145	44
2008	59	38	71	140	46
2009	64	46	70	157	46
2010	64	46	71	169	41
2011	69	47	72	170	40
2012	75	49	73	174	40
2013	77	52	61	179	41
mean	58	37	65	152	43

Source: Own construct based on Global Financial Development Database

		SMC/GDP			
Country	**Brazil**	**Russia**	**India**	**China**	**South Africa**
year					
2001	33	19	26	42	127
2002	27	28	23	34	130
2003	32	42	34	35	152
2004	43	44	47	32	169
2005	50	54	57	60	200
2006	57	83	71	128	230
2007	79	101	110	107	216
2008	63	62	94	79	201
2009	52	48	65	85	195
2010	67	63	82	59	143
2011	58	49	70	44	132
2012	51	41	59	0	0
2013					
mean	**51**	**53**	**61**	**61**	**176**

Source: Own construct based on Global Financial Development Database

		SMTVT/GDP			
Country	**Brazil**	**Russia**	**India**	**China**	**South Africa**
year					
2001	13	7	75	44	55
2002	10	8	42	27	59
2003	10	14	40	25	61
2004	12	18	47	32	62
2005	15	19	49	30	71
2006	20	34	56	42	92
2007	32	50	73	138	121
2008	41	42	83	156	136
2009	41	47	77	147	126
2010	38	50	64	147	99
2011	39	52	48	112	87
2012	37	46	35	84	79
2013			0	0	0
mean	**26**	**32**	**57**	**82**	**86**

Source: Own construct based on Global Financial Development Database

		SMTR			
Country	**Brazil**	**Russia**	**India**	**China**	**South Africa**
year					
2001	36	40	197	81	45
2002	36	37	164	68	53
2003	34	45	137	82	39
2004	33	51	112	112	42
2005	35	39	92	82	39
2006	41	63	94	101	50
2007	54	58	81	174	56
2008	70	55	91	113	65
2009	76	116	123	227	58
2010	63	84	75	160	47
2011	67	123	57	179	63
2012	73	90	58	161	59
2013	0	0	0	0	0
mean	**52**	**67**	**107**	**128**	**50**

Source: Own construct based on Global Financial Development Database

		DPDS/GDP			
Country	**Brazil**	**Russia**	**India**	**China**	**South Africa**
year					
2001	43	2	1	9	30
2002	39	2	1	11	30
2003	52	2	2	14	35
2004	58	3	3	14	35
2005	59	3	3	14	32
2006	57	4	3	13	27
2007	59	4	3	15	25
2008	52	3	3	16	22
2009	57	4	3	16	26
2010	63	5	9	16	32
2011	57	5	22	15	32
2012	56	5	30	15	32
2013	56	6	15	15	36
mean	**54**	**4**	**7**	**14**	**30**

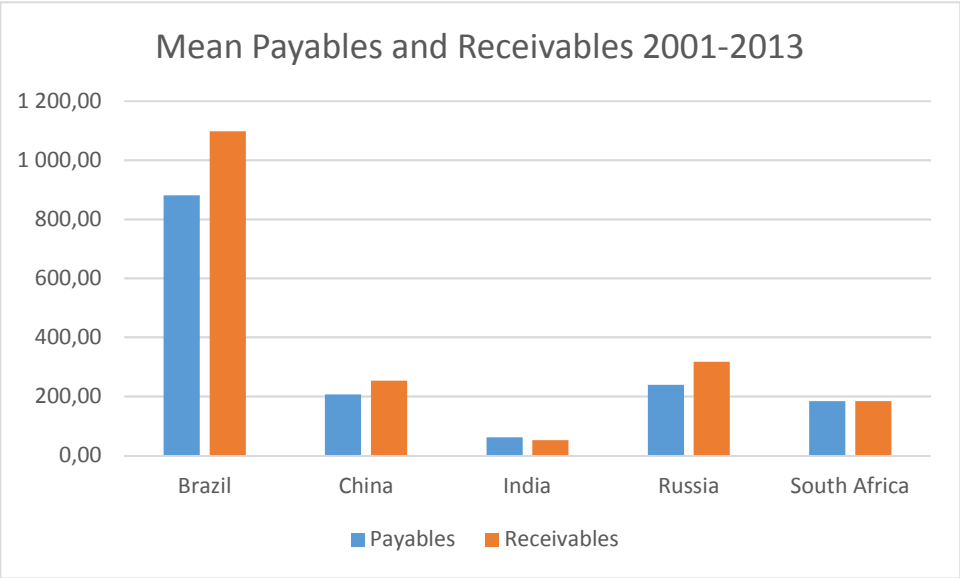
Source: Own construct based on Global Financial Development Database

		PDSD/GDP			
Country	**Brazil**	**Russia**	**India**	**China**	**South Africa**
year					
2001	8	0	0	7	10
2002	8	0	0	9	12
2003	13	0	0	10	15
2004	13	0	1	14	16
2005	15	2	2	20	16
2006	17	3	3	25	16
2007	19	3	3	28	18
2008	21	4	4	29	18
2009	26	5	5	32	20
2010	28	6	5	32	22
2011	29	5	2	30	19
2012	31	6	0	29	18
2013	31	7	0	28	19
mean	**20**	**4**	**2**	**23**	**17**

Source: Own construct based on Global Financial Development Database

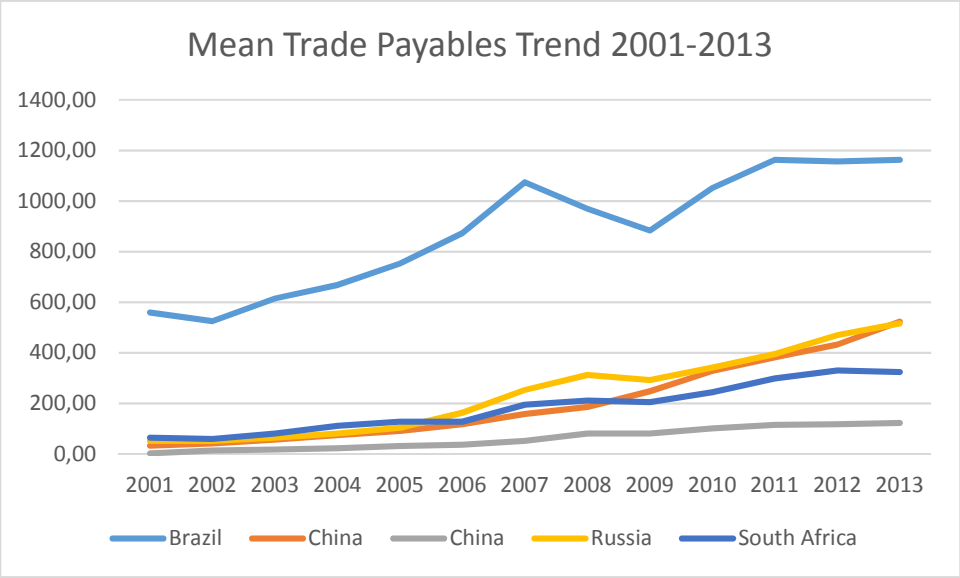
Appendix 2Trend graphs

Figure 16 Mean payables and mean receivables



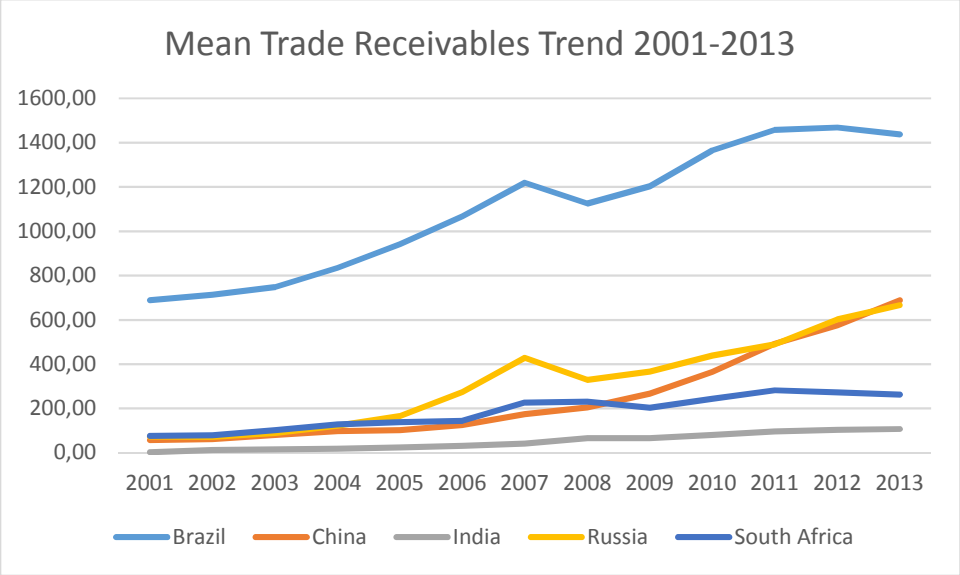
Source: Own construct based on published financial statements 2001-2013 data

Figure 17 Mean trade payables trend 2001-2013



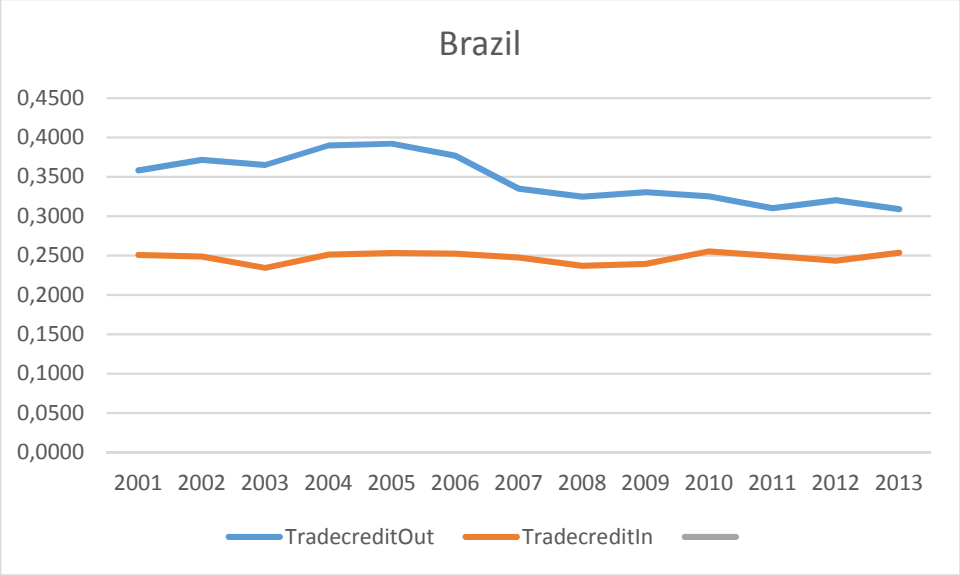
Source: Own construct based on published financial statements 2001-2013 data

Figure 18 Mean trade receivables trend 2001 to 2013



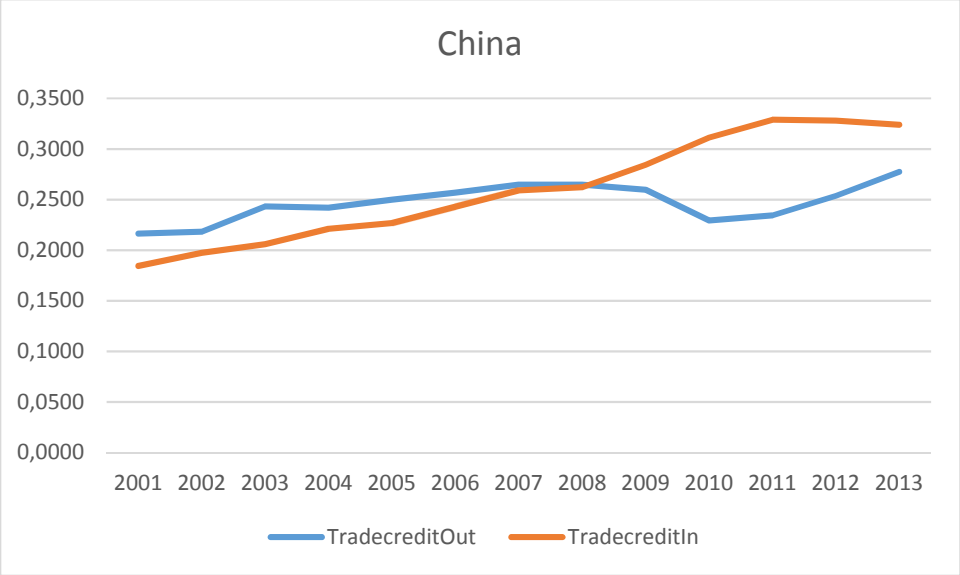
Source: Own construct based on published financial statements 2001-2013 data

Figure 19Brazil trade credit trends



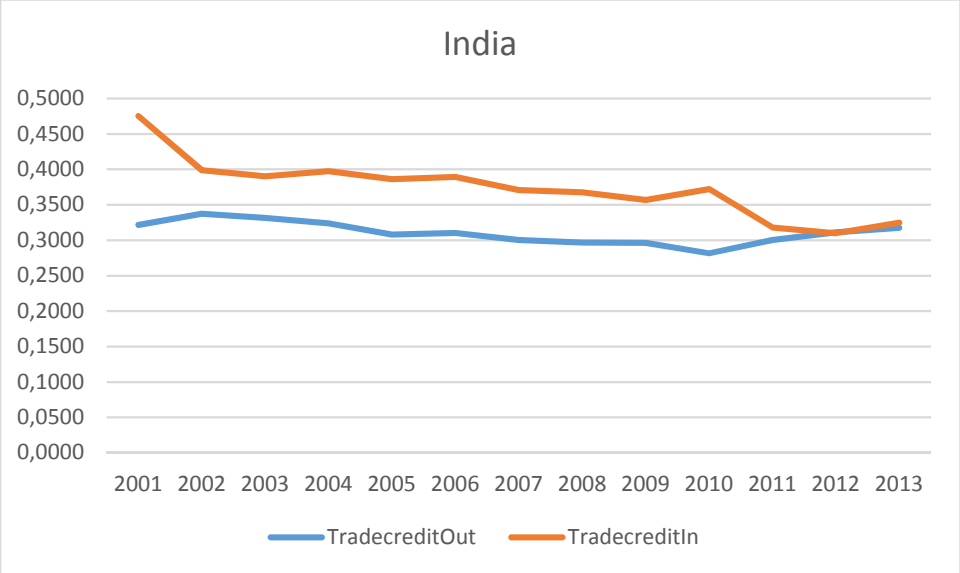
Source: Own construct based on published financial statements 2001-2013 data

Figure 20 China trade credit trends



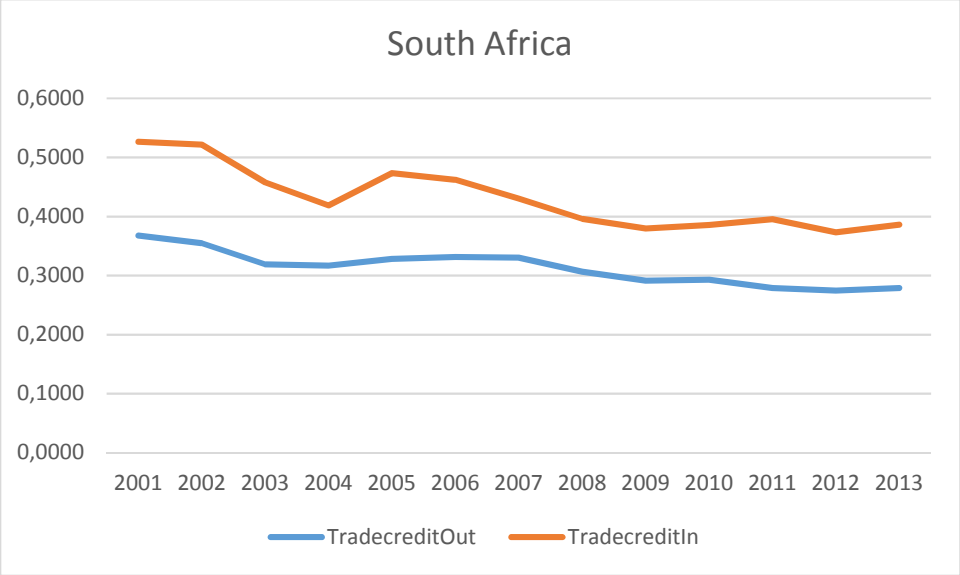
Source: Own construct based on published financial statements 2001-2013 data

Figure 21 India trade credit trends



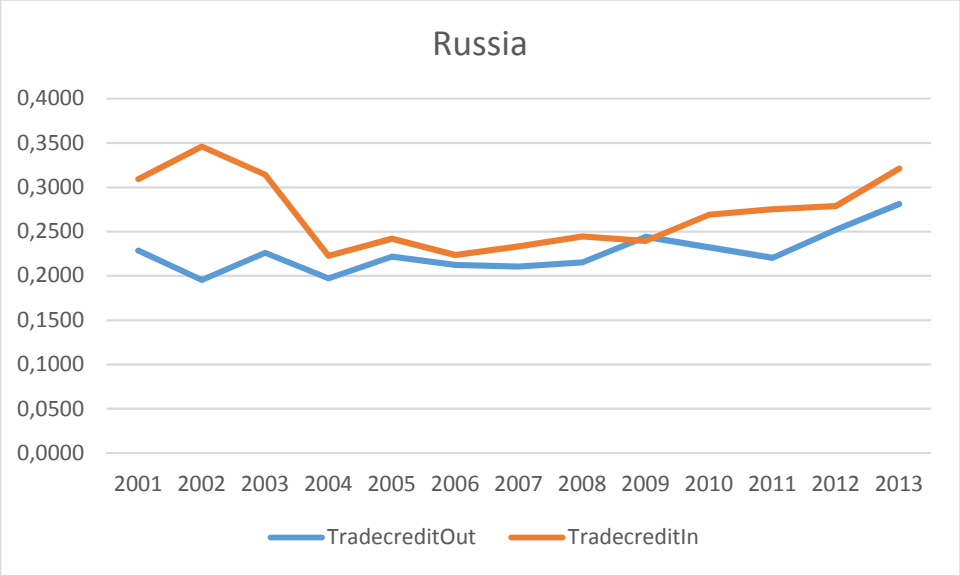
Source: Own construct based on published financial statements 2001-2013 data

Figure 22 South Africa trade credit use



Source: Own construct based on published financial statements 2001-2013 data

Figure 23 Russia trade credit trends



Source: Own construct based on published financial statements 2001-2013 data

Appendix 3 Regression Results

Table 0-1 Regression trade credit in

	South Africa	*Russia*	*Brazil*	*China*
	TPCL	TPCL	TPCL	TPCL
L.TPCL	0.107**	0.165	0.389***	-0.268***
	(2.69)	(1.80)	(6.17)	(-6.35)
TPCL	1.848***	0.944*	0.278	-0.229***
	(12.08)	(2.35)	(1.07)	(-5.51)
TRTA	0.172	0.155	0.0210	-0.281***
	(1.93)	(1.37)	(0.52)	(-7.81)
Lnsize	0.0607**	0.0225	0.00620	-0.618***
	(3.00)	(1.53)	(0.39)	(-7.40)
Gr	0.00140*	0.0172	0.0162*	1.035***
	(2.20)	(0.74)	(2.08)	(6.85)
_cons	-0.300**	-0.00439	0.0655	0.433***
	(-2.66)	(-0.04)	(0.59)	(6.55)
N	1986	841	2939	6243

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 0-2 Regression trade credit out

	Russia	South Africa	Brazil	China
	TRCA	TRCA	TRCA	TRCA
L.TRCA	0.0592	0.0685*	0.0876**	-0.173
	(0.93)	(1.99)	(3.09)	(-1.30)
TPTA	-0.0485	-0.0746*	0.00578	-0.165**
	(-1.35)	(-2.25)	(0.42)	(-3.09)
TRTA	1.735***	1.664***	0.0321**	-0.116*
	(8.93)	(23.05)	(2.89)	(-2.06)
Lnsize	0.0756*	0.0416***	1.585***	-0.183
	(2.49)	(5.02)	(16.95)	(-1.72)
Gr	-0.0397*	-0.00113***	0.00111	0.222**
	(-2.35)	(-5.61)	(0.11)	(2.59)
_cons	-0.428*	-0.189***	0.0770	0.357***
	(-2.22)	(-4.25)	(1.17)	(3.32)
N	841	2041	2586	6242

Appendix 4 Principal component BRICS countries

Table 0-3 Principal components: BRICS

	Brazil										
	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Comp8	Comp9	Comp10	Index
BC/BD	0,2996	-0,4196	0,2952	0,3006	0,0522	0,0002	-0,0559	0,3608	0,2650	0,5920	
BD/GDP	0,3040	0,1618	0,5544	0,4042	0,3896	0,1736	-0,0494	0,0237	0,0342	0,4704	
BC	0,3320	0,3372	0,1523	0,2168	0,0088	-0,8255	0,0255	0,1185	0,1265	-0,0168	
LL/GDP	0,3452	-0,1713	0,1251	0,0930	0,4657	0,1978	0,1435	0,4787	0,0383	-0,5657	
PDSD/GDP	0,3482	-0,0898	0,2540	0,1439	0,0316	0,0913	-0,8050	-0,2640	0,2116	-0,1166	
DPDS/GDP	0,2355	0,5552	0,4984	0,1700	0,2190	0,4604	0,2773	-0,0318	0,0051	0,1375	
SMC/GDP	0,2744	0,4494	0,2719	0,7472	0,1006	0,0611	-0,1612	-0,0525	0,1828	-0,1203	
SMTVT/GDP	0,3430	-0,0861	0,2848	0,0955	0,5206	-0,0265	0,1545	0,2747	0,6410	-0,0529	
SMTR	0,3311	-0,2361	0,2777	0,2084	0,4551	0,1055	0,1074	-0,2525	0,6037	-0,2369	
DCPS/GDP	0,3354	-0,2664	0,1470	0,1737	0,3021	-0,1164	0,4322	-0,6430	0,2400	0,0467	
	3,1484	0,2343	0,0832	0,0807	0,0293	0,1215	0,0689	0,0126	0,0946	0,1374	**4,0109**
	China										
	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Comp8	Comp9	Comp10	
BC/BD	0,2966	0,3054	0,4147	0,6438	0,1486	0,1423	0,2638	-0,0317	0,1678	0,3020	
BD/GDP	0,2973	0,3924	0,1101	0,2230	0,0674	-0,4416	0,4464	-0,3953	0,1453	0,3458	
BC	0,3778	0,0912	0,3066	0,1943	0,2799	0,0002	-0,0503	0,0004	0,7876	-0,1263	
LL/GDP	0,2934	0,4031	0,1184	0,3060	0,2981	-0,2323	0,0882	0,1904	0,1286	-0,6630	
PDSD/GDP	0,3804	-0,0542	0,0970	0,3395	0,3656	0,1546	-0,2793	0,1192	0,4990	0,4785	
DPDS/GDP	0,3499	0,0190	0,4068	0,2468	0,6825	0,3505	0,1205	0,0026	0,1208	-0,1816	
SMC/GDP	0,2714	-0,4212	0,3297	0,0153	0,2473	-0,3646	0,2805	0,5899	0,0011	0,1380	
SMTVT/GDP	0,3467	-0,1915	0,4692	0,1227	0,2368	-0,1896	-0,4711	-0,5258	0,0929	-0,0940	
SMTR	0,3504	0,0625	0,4458	0,3763	0,1650	0,6443	0,2948	-0,0410	0,0332	-0,0316	
DCPS/GDP	0,1048	0,6005	0,0737	0,2672	0,2495	-0,0083	-0,4907	0,4075	0,2013	0,2045	
	1,7199	1,2072	1,5442	0,5827	1,0833	0,0555	0,2028	0,3162	1,1850	0,3723	**8,2691**
	India										
	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Comp8	Comp9	Comp10	
BC/BD	0,362	-0,0423	0,3141	0,03	0,4909	0,4387	-0,3757	0,2269	0,0503	0,3727	

BD/GDP	0,3734	-0,0588	0,2357	-0,0607	-0,4624	-0,0116	-0,2754	-0,502	0,2214	0,455	
BC	0,2985	-0,1192	0,6287	-0,1778	0,4978	-0,4497	-0,0509	0,1275	0,026	-0,018	
LL/GDP	0,3797	-0,0102	0,1158	0,1016	-0,5035	-0,014	-0,0488	0,65	-0,3916	0,0068	
PDSD/GDP	0,2606	0,447	0,0754	-0,6013	0,0022	0,3392	0,4994	-0,0143	0,0067	0,0187	
DPDS/GDP	0,2308	-0,5215	0,1448	0,4132	0,0668	0,3061	0,6091	-0,107	0,0378	0,0312	
SMC/GDP	0,3117	0,3046	-0,3906	0,2761	0,0003	-0,4998	0,2892	0,139	0,4646	0,1125	
SMTVT/GDP	0,0884	0,6209	0,2606	0,564	0,1565	0,1235	-0,048	-0,2566	-0,3334	-0,0398	
SMTR	-0,3423	0,1723	0,4349	0,1626	-0,1011	0,3062	-0,054	0,3886	0,6071	0,1052	
DCPS/GDP	0,3911	-0,0261	-0,029	0,0187	0,0689	-0,1935	-0,2622	-0,0992	0,312	-0,7918	
	2,3539	0,7667	1,1622	0,7264	0,0786	0,7321	0,2827	0,5529	1,0009	0,2525	**7,9089**

Russia

	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Comp8	Comp9	Comp10	
BC/BD	0,2088	0,5391	0,6229	-0,1938	-0,3058	0,3455	0,0096	0,0061	0,1504	0,067	
BD/GDP	0,3566	-0,1572	0,0885	0,006	0,1803	-0,1777	-0,229	0,318	0,1396	0,7766	
BC	-0,3082	0,2699	0,2021	0,6843	0,5105	0,2139	-0,048	0,1097	0,0359	0,0327	
LL/GDP	0,3625	-0,0755	0,0577	0,0344	0,1385	-0,149	-0,228	0,4557	0,4565	-0,5907	
PDSD/GDP	0,3543	-0,0379	0,0497	-0,1416	-0,4973	0,0314	0,724	-0,229	0,1601	-0,0048	
DPDS/GDP	0,339	-0,0667	-0,4128	-0,0396	-0,1126	0,7904	-0,227	0,0086	-0,1394	-0,0125	
SMC/GDP	0,1249	0,6852	-0,5744	0,091	-0,134	-0,2104	0,2096	0,251	0,0159	0,0851	
SMTVT/GDP	0,3517	0,1772	-0,0627	0,2356	0,0418	-0,2428	-0,3972	-0,7374	0,1501	-0,0277	
SMTR	0,3098	-0,2995	0,0507	0,638	-0,5348	0,069	0,3346	0,0378	-0,0191	0,013	
DCPS/GDP	0,3565	0,098	0,2251	0,0236	0,1685	-0,2176	-0,0624	0,1359	-0,8246	-0,1844	
	2,2471	0,5935	-0,3761	1,5317	0,9807	0,1072	0,0766	0,3503	-0,025	0,0873	**5,5733**

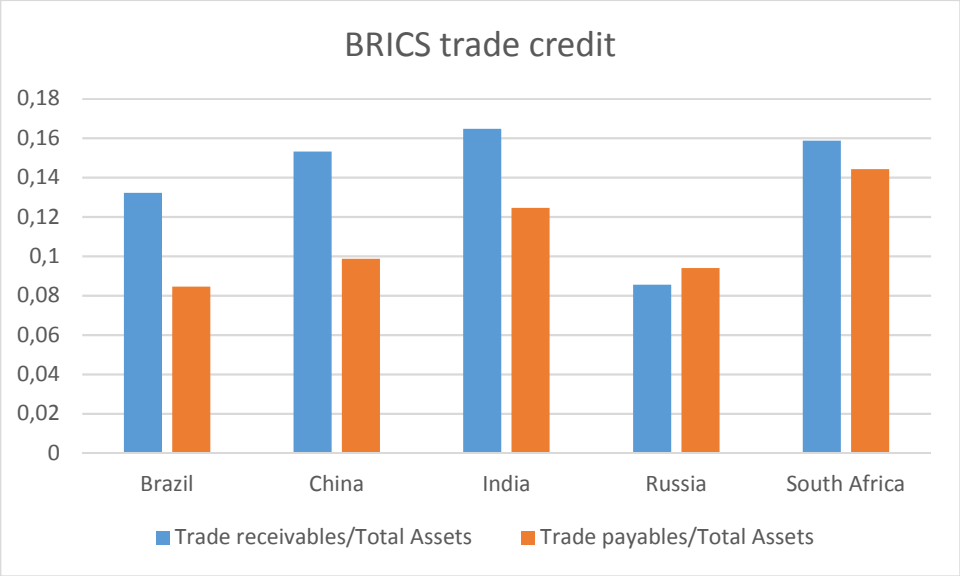
South Africa

	Comp1	Comp2	Comp3	Comp4	Comp5	Comp6	Comp7	Comp8	Comp9	Comp10
BC/BD	0,0486	0,5814	0,3588	-0,0909	-0,0167	0,361	0,2453	-0,5735	0,0519	-0,0156
BD/GDP	0,3924	-0,2073	-0,0274	0,4425	-0,2252	0,0048	0,0169	-0,2036	0,6887	0,1992
BC	0,2995	-0,0698	0,5341	-0,1055	0,451	0,2273	-0,5652	0,184	-0,0256	0,0051
LL/GDP	0,1661	0,5552	-0,0878	-0,407	-0,2799	0,1743	0,051	0,5598	-0,1754	0,1879
PDSD/GDP	0,283	-0,4692	0,1229	-0,0139	-0,3924	0,3442	0,1219	-0,1765	-0,5593	0,2308
DPDS/GDP	-0,3703	-0,2692	0,2511	0,0604	0,0495	0,5195	0,4281	0,4043	0,3178	-0,0606

SMC/GDP	0,3341	0,106	-0,0262	0,7702	-0,1574	0,0048	-0,0626	0,2247	0,2415	0,3818	
SMTVT/GDP	0,432	-0,0008	-0,2287	0,1383	-0,1378	0,2373	-0,0102	0,0818	0,0456	-0,811	
SMTR	0,2954	-0,0294	-0,4918	-0,0492	0,6731	0,2205	0,3243	-0,0379	-0,0939	0,224	
DCPS/GDP	0,3516	-0,0328	0,4522	-0,0221	0,1185	-0,5425	0,5569	0,171	-0,0929	-0,1179	
	2,2324	0,1641	0,8572	0,0196	0,1161	1,5512	1,1064	0,6341	0,3984	0,2237	**7,3032**

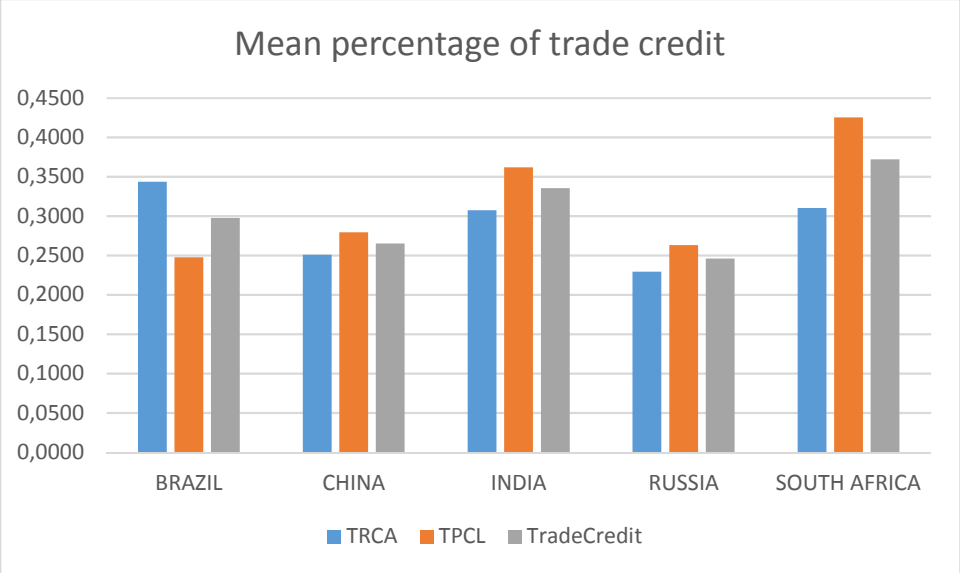
Appendix 5 Trade credit bar charts and trends

Figure 24 BRICS mean trade credit



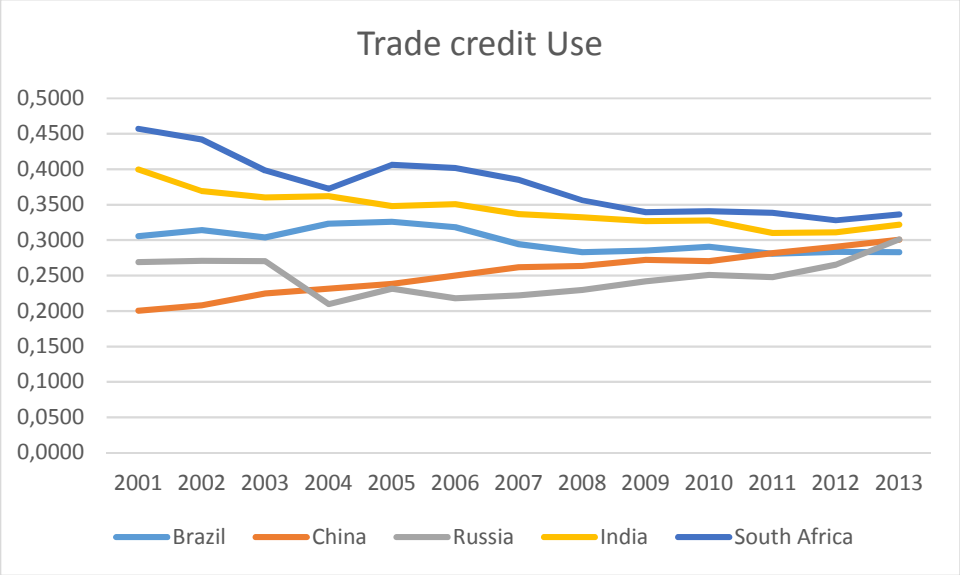
Source: Own construct based on published financial statements 2001-2013 data

Figure 25 Bar chart of BRICS trade credit use



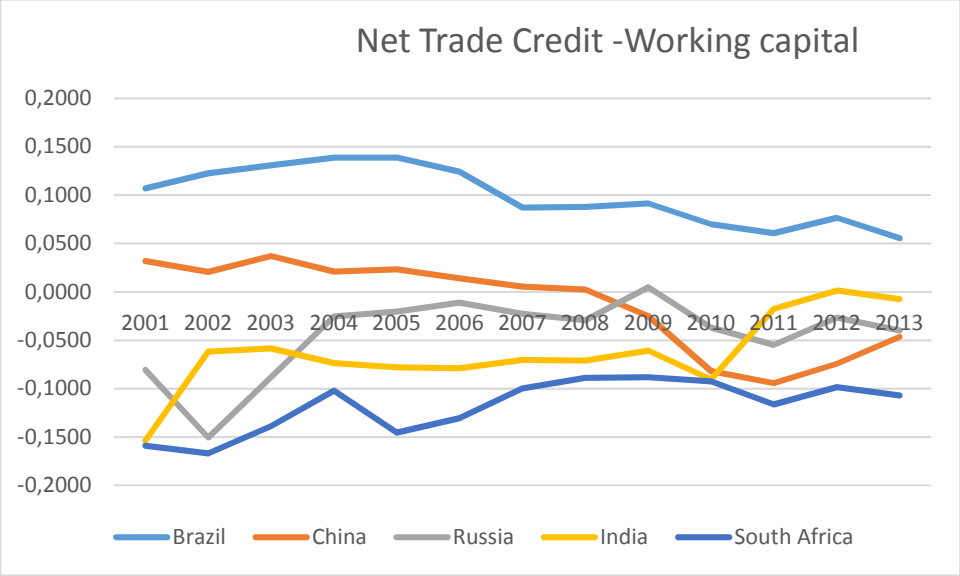
Source: Own construct based on published financial statements 2001-2013 data

Figure 26 BRICS trade credit trends



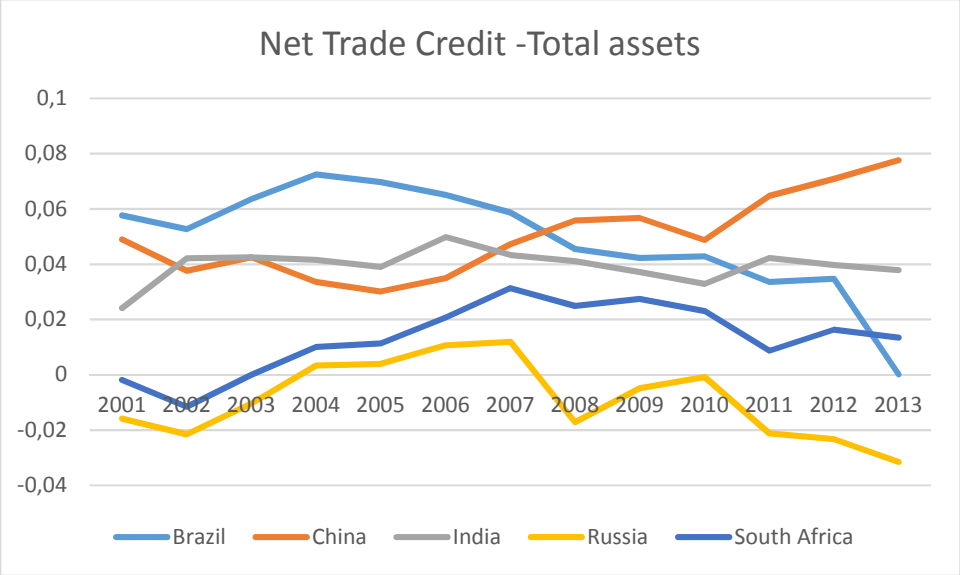
Source: Own construct based on published financial statements 2001-2013 data

Figure 27 Net trade credit: Working capital



Source: Own construct based on published financial statements 2001-2013 data

Figure 28 Net trade credit: Total assets



Source: Own construct based on published financial statements 2001-2013 data

Appendix 6 Trade credit descriptives by sector

Table 0-4 Brazil trade credit use

		BRAZIL				
Sector	TRCA	TPCL	TRTA	TPTA	trade credit	Net trade credit
Industrial goods	0.3232	0.2259	0.1375	0.0667	0.2762	0.0708
Consumer services	0.3716	0.3612	0.1852	0.1370	0.3692	0.0482
Consumer goods	0.3320	0.2183	0.1496	0.1082	0.2771	0.0414
Telecoms	0.3901	0.2716	0.0890	0.0733	0.3434	0.0157
Health	0.3046	0.1942	0.1291	0.0474	0.2494	0.0817
Basic Resources	0.3024	0.2604	0.0978	0.0736	0.2826	0.0242
Technology	0.3175	0.2757	0.1225	0.0779	0.3003	0.0446
Oil&gas	0.2564	0.3333	0.1012	0.0953	0.2971	0.0059
Utilities	0.4555	0.2049	0.0941	0.0472	0.3312	0.0469
Total	0.3437	0.2475	0.1322	0.0846	0.2977	0.0421

Source: Own construct based on published financial statements data 2001-2013

Table 0-5 China trade credit use by sectors

		CHINA				
Sector	TRCA	TPCL	TRTA	TPTA	trade credit	Net trade credit
Industrial goods	0.2947	0.3127	0.1909	0.1097	0.3006	0.0812
Consumer services	0.1130	0.2260	0.0644	0.0993	0.1637	-0.0349
Consumer goods	0.2147	0.2713	0.1269	0.1031	0.2300	0.0239
Telecoms	0.3013	0.2442	0.2481	0.0776	0.3258	0.1705
Health	0.2579	0.2518	0.1508	0.0723	0.2231	0.0786
Basic Resources	0.2437	0.2395	0.1285	0.0799	0.2083	0.0486
Technology	0.2651	0.3383	0.1964	0.1164	0.3128	0.0800
Oil&gas	0.2820	0.3044	0.1907	0.1114	0.3021	0.0792
Utilities	0.2765	0.1690	0.0750	0.0515	0.1264	0.0235
Total	0.2511	0.2795	0.1532	0.0987	0.2653	0.0612

Source: Own construct based on data from financial statements 2001-2013

Table 0-6 Russia trade credit by sectors

		RUSSIA				
Sector	TRCA	TPCL	TRTA	TPTA	trade credit	Net trade credit
Industrial goods	0.1649	0.2363	0.0566	0.0766	0.1332	-0.0200
Consumer services	0.1639	0.3641	0.0720	0.1862	0.2583	-0.1142
Consumer goods	0.2475	0.3108	0.1210	0.1159	0.2369	0.0050
Telecoms	0.2366	0.1786	0.0396	0.0371	0.0767	0.0025
Health	0.4208	0.4809	0.2640	0.2605	0.5245	0.0035
Basic Resources	0.1492	0.2467	0.0552	0.0586	0.1138	-0.0034
Technology	0.2014	0.2076	0.0812	0.0800	0.1612	0.0012
Oil&gas	0.3296	0.2756	0.1171	0.1108	0.2279	0.0062
Utilities						
Total	0.2293	0.2630	0.0855	0.0940	0.2166	-0.0149

Source: Own construct based on data from financial statements 2001-2013

Table 0-7 India trade credit by sectors

		INDIA				
Sector	TRCA	TPCL	TRTA	TPTA	trade credit	Net trade credit
Industrial goods	0.3277	0.3827	0.1939	0.1438	0.3377	0.0500
Consumer services	0.2414	0.3442	0.1105	0.0966	0.2071	0.0139
Consumer goods	0.2708	0.3699	0.1409	0.1362	0.2771	0.0047
Telecoms	0.2922	0.2538	0.0736	0.0768	0.1504	-0.0032
Health	0.3181	0.3585	0.1639	0.1096	0.2735	0.0543
Basic Resources	0.3105	0.3553	0.1550	0.1175	0.2726	0.0375
Technology	0.4367	0.3196	0.2582	0.0996	0.3579	0.1586
Oil&gas	0.2639	0.3698	0.1324	0.1042	0.2366	0.0282
Utilities	0.2078	0.2996	0.0616	0.0555	0.1171	0.0060
Total	0.3074	0.3621	0.1648	0.1246	0.2478	0.0389

Source: Own construct based on data from financial statements 2001-2013

Table 0-8 South Africa trade credit use by sectors

		SOUTH AFRICA				
	TRCA	TPCL	TRTA	TPTA	trade credit	Net trade credit
Industrial goods	0.3409	0.4261	0.1766	0.1497	0.3264	0.0269
Consumer services	0.3015	0.4971	0.1730	0.2030	0.3760	-0.0300
Consumer goods	0.2993	0.4532	0.1533	0.1521	0.3054	0.0013
Telecoms	0.3830	0.3421	0.1199	0.1273	0.2472	-0.0074
Health	0.3769	0.2676	0.0943	0.0591	0.1534	0.0352
Basic Resources	0.2489	0.3853	0.1131	0.0899	0.2030	0.0233
Technology	0.3539	0.4191	0.2311	0.1652	0.3963	0.0659
Oil&gas	0.0670	0.3012	0.0043	0.1363	0.1406	-0.1320
Utilities						
Total	0.3103	0.4252	0.1588	0.1443	0.2685	-0.0021

Source: Own construct based on data from financial statements 2001-2013