TRADE RECEIVABLE POLICY, CORPORATE VALUE AND CASH HOLDINGS: EVIDENCE FROM THE UNITED STATES

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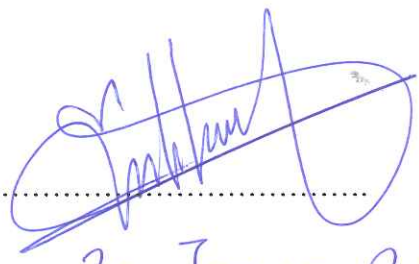
Signature..... 

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ABSTRACT

Trade Receivable Policy, Corporate Value and Cash Holdings:

Evidence From the United States

The aim of this thesis is to analyze the impact of trade receivable policy on corporate value and cash holdings of listed US firms. Trade receivable policy is proxied by share of trade receivables in total assets at firm level and an indicator variable that proxies the credit quality of trade receivables (TRQI). These variables are treated as endogenous variables to address omitted variables bias issue in all estimations. Based on a sample of 2,737 non-financial, non-utility firms that are listed in US for the time period from 2010 to 2016, we provide empirical evidence that level of investment in trade receivables has negative impact on corporate value and that this relationship is non-linear. Furthermore, the negative impact of investment in trade receivables is stronger and exists for firms with low profitability, whereas this impact is weaker and statistically insignificant for firms with high profitability. Therefore, the tendency of low-profitable firms to invest more in trade receivables, in an effort to improve their profit margins by acquiring new customers as documented by several related studies in trade credit literature, destroys corporate value. This thesis also provides empirical evidence regarding the impact of a worsening in TRQI on corporate value and cash holdings. The findings support our hypothesis that a deterioration in the credit quality of trade receivables leads to loss of corporate value. Moreover, as credit quality of trade receivables worsens firms tend to hold more cash, which is in line with the precautionary motive for holdings cash.

ÖZET

Ticari Alacak Politikası, Firma Değeri ve Hazır Değerler: Amerika Birleşik Devletleri Bulgusu

Bu tezin amacı firmaların ticari alacak politikalarının firma değerine ve hazır değerlere olan etkilerini incelemektir. Ticari alacak politikası ölçütü olarak ticari alacakların toplam aktif içindeki payı ve ticari alacakların kalitesini ölçen gösterge değişken kullanılmıştır. Atlanan değişkenler önyargısı ihtimaline karşın ticari alacak politikası ölçütü olan değişkenler tüm analizlerde endojen değişken olarak modellenmiştir. ABD borsalarında 2010-2016 yıllarında işlem gören 2,737 firmanın verisine dayanılarak yapılan analizlerde, ticari alacakların firma değeri üzerinde negatif ve doğrusal olmayan bir etki yarattığı sonucuna varılmıştır. Bu negatif etkinin düşük karlılıkla faaliyet gösteren firmalarda daha büyük çapta olduğunu göstermektedir. Yüksek karlılığı olan firmalarda ise bu etki istatistiki açıdan anlamlı değildir. Bu bulgular, kar marjını iyileştirmek için yeni müşteri edinerek ticari alacaklarını arttırma eğiliminde olan düşük karlı firmaların bunun bir sonucu olarak firma değerinde düşüş yaşadıklarını göstermektedir. Öte yandan, ticari alacak kalitesinin kötüleşmesi de firma değeri üzerinde olumsuz etki yaratmaktadır. Son olarak, ticari alacak kalitesinde kötüleşme olan firmaların daha fazla hazır değer bulundurduğu da ispatlanmıştır, ki bu bulgu hazır değerler literatüründeki önleyici güdü hipotezini destekler niteliktedir. Özetle, bu çalışma ile firma değerinin ticari alacakların toplam aktifler içindeki payının artışından ve ticari alacak kalitesindeki bozulmadan olumsuz etkilendiği ispatlanmıştır. Ticari alacak kalitesi bozulan firmaların daha fazla hazır değer bulundurma eğiliminde olduğu kanıtlanmıştır.

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To the memory of my parents,

Benâl and Celâl Özeralp

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ABBREVIATIONS

ABD	Amerika Birleşik Devletleri
ACP	Average Collection Period
AMEX	American Stock Exchange
CCC	Cash Conversion Cycle
CDS	Credit Default Swap
CEO	Chief Executive Officer
CFO	Chief Financial Officer
FTC	Federal Trade Commission
GDP	Gross Domestic Product
GMM	Generalized Method of Moments
NASDAQ	National Association of Securities Dealers Automated Quotations
NPV	Net Present Value
NYSE	New York Stock Exchange
SEC	Securities and Exchange Commission
SIC	Standard Industrial Classification
SME	Small and Medium Size Companies
TC	Trade credit
UK	United Kingdom
US	United States
VIF	Variance Inflation Factor
WCAP	Working capital

CHAPTER 1

INTRODUCTION

The size of a firm's investment in current assets and the financing of this investment constitute the most important and essential aspects of short-term financial policy. This thesis focuses on an important component of current assets, which is the extension of trade credit (TC) from business sellers to business buyers as part of normal business operations. A basic aspect of the trading relationship between the seller and the buyer is the delivery of goods and/or services. When suppliers offer extended payment terms to their customers by deferring receipt of cash to a future date, they become providers of not only goods/services but also TC to their customers. The practice of granting credit is extremely common among non-financial corporations (Demirguc-Kunt & Maksimovic, 2001; Pike, Cheng, Cravens, & Lamminmaki, 2005; Hill, Kelly, & Lockhart, 2012). Trade receivables comprise a significant portion of firms' assets. Over the period 1992 to 2012, publicly listed firms across the world invested on average 17% of their assets in trade receivables (El Ghoul & Zheng, 2016). Trade receivables represent a major investment of financial resources by businesses in the United States (US) as well. Listed non-financial US firms provided a total of USD 2.3 trillion TC to their clients in 2011. At the aggregate level, listed non-financial firms in the US invested 11.9% of their assets in TC (Aktas, Croci, & Petmezas, 2015). Moreover, Board of Governors of The Federal Reserve System reports that TC in the US economy represents more than 21% of US GDP (Goncalves, 2016). Based on the sample used in this study, in no sector of the US economy is the volume of trade receivables negligible.[1] Despite

[1] The average trade receivables to total assets ratio is 11%. At the industry level, wholesale trade companies invest 20.3% of their assets in trade receivables, construction firms and manufacturing

the decline in trade receivables to total assets ratio from 17.2% in 1987 to 9.5% in 2015 for listed non-financial and non-utility US firms (Harris & Roark, 2017), TC is still significant for the US economy. These confirm not only the economic significance of trade credit provision both at the micro and macro levels in the US, but also the commitment of non-financial firms in the financial field through TC.

Such extensive provision of TC necessitates rigorous analysis of its effects at firm level. TC literature has extensively researched the determinants of why non-financial companies provide credit to their customers whereas consequences of such behavior is still a relatively under-researched field, the scope of which has so far been limited to use of level of trade receivables as the main explanatory variable of interest. However, credit risk, which arises from the probability of nonpayment, should also be factored into models analyzing effects of trade credit provision, because not only the level of investment in trade receivables, but also the credit quality of trade receivables may well affect financial position and performance of firms. Trade receivables credit quality has become even more critical for firms after the 2008 global financial crisis. This is due to increased concerns about liquidity risk among treasury professionals at North American companies (Ross, Westerfield, & Jordan, 2012) as well as to the swift reduction in dependence of firms on short-term credit lines from financial institutions (Sagner, 2014). Suppliers are confronted with the risk of incurring large losses in case of their customers' default and this makes management of the credit quality of trade receivables an important aspect of short-term finance (Ross et al., 2012). As several funding sources such as bank lines of credit and commercial paper suddenly became unavailable in the aftermath of 2008 financial crisis, the importance of trade receivables credit quality became even more

firms invest 14.8% and 11.1%, respectively. Other non-financial and non-utility industries invest 5 to10% of their assets in trade receivables.

important as it affects the predictability, amount and timeliness of cash inflows from customers. Moreover, the complex nature of factors, such as contrasting economic conditions, commodity price and exchange rate movements, driving working capital (WCAP) trends globally oblige firms to ensure that WCAP management remains a strategic focus on a continuous basis.

Therefore, this thesis extends the literature regarding consequences of trade credit supply by analyzing the direct impact of not only the level of trade receivables but also the credit quality of trade receivables on corporate value and cash holdings for a large sample of listed US firms. The findings of the analysis presented in this thesis will also complement the literature regarding transmission of corporate failures through trade credit channel (Jorion & Zhang, 2009; Boissay & Gropp, 2013; Jacobson & Schedvin, 2015; Barrot, 2016). Additionally, the findings of this thesis are expected to be significant in guiding chief financial officers (CFO) who are responsible from effective management of the firm's WCAP in the prevailing business environment where converting increased sales into cash is becoming harder, capital expenditure is continuing to decline and the cost of cash is increasing (PwC's Annual Global Working Capital Study, 2018/2019).

Although supply of trade credit among non-financial firms in the US is quite sizeable, companies have been reallocating a portion of the funds invested in trade receivables to other types of assets for the last three decades (Harris & Roark, 2017). Share of trade receivables in total assets declined from 13.6% in 1982 to 11.8% in 2011 at the aggregate level (Aktas et al., 2015). Furthermore, based on a sample of non-financial and non-utility listed US firms data, Harris and Roark (2017) report that a median firm used to invest 17.2% of its assets in trade receivables in 1987, whereas the median value for the share of trade receivables in total assets has come

down to 9.5% in 2015. Similarly, days sales outstanding,[2] has also been on the downward trend from 55.4 days in 1987 to 47.1 days in 2015. For our sample, the median receivables-to-assets ratio and days sales outstanding are 9.2% and 47.1 days, respectively.

TC has attracted the attention of academia for several decades. Earliest research in this field focused on the role of variations in aggregate supply of trade credit on the consequences of monetary policy changes and found that firms with relatively stronger liquidity increase the supply of TC to relatively smaller and less liquid firms when monetary policy is tightened (Meltzer, 1960; Brechling & Lipsey,1963; Schwartz, 1974; Nilsen, 2002; Fisman & Love, 2003). Theoretical models explaining the major motives of trade credit supply focus on asymmetric and imperfect information not only in capital markets but also in product markets as the main factor that leads firms to offer credit to their clients (Mian & Smith, 1992; Blazenko & Vandezande, 2003). These major motives are: financing motive (also referred to as redistribution theory) (Schwartz, 1974; Emery, 1984; Smith, 1987; Biais & Gollier, 1997), efficiency motive (also known as transaction cost theories) (Ferris, 1981; Emery, 1984), price discrimination motive (Brennan, Maksimovic, & Zechner, 1988; Nadiri, 1969), investment motive (Emery, 1984; Oh, 1976; Kim & Atkins, 1978) and quality assurance motive (Lee and Stowe, 1993; Frank and Maksimovic, 1998; Emery & Nayar, 1998; Niskanen & Niskanen, 2006).

Empirical research in this field falls under two main categories. One stream focuses on the determinants of TC provision, whereas the other stream focuses on the consequences of such behavior. Under the first category, which is a relatively well-researched area, researchers aim to test TC theories and explore the determinants of

[2] Trade receivables divided by daily sales.

why companies invest part of their assets in trade receivables. Early studies in this area focused on testing these theories through use of financial indicators, which are mostly available on the financial statements of companies (Petersen & Rajan, 1997; Deloof & Jegers, 1996; Blazenko & Vandezande, 2003; Bougheas, Mateut, & Mizen, 2009; Garcia-Teruel & Martinez-Solano, 2010; Giannetti, Burkart, & Ellingsen, 2011). These studies document empirical support for several motives. Additionally, evidence supporting these motives has also been provided through surveys (Ng, Smith, & Smith, 1999; Wilson & Summers, 2002; Cheng & Pike, 2003; Pike et al., 2005; Niskanen & Niskanen, 2006; Paul & Wilson, 2006).

More recent studies focus on the impact of non-financial factors on firms' willingness to invest in trade receivables (Van Horen, 2004; Klapper, Laeven, & Rajan, 2012; Dass et al., 2014; Fabbri & Klapper, 2016; El Ghoul & Zheng, 2017; Ivashina and Iverson 2018). These studies provide evidence that non-financial factors such as supplier as well as buyer market power, strategic value of the supplier-customer relationship to the supplier, geographic proximity, industrial communality and even national culture determine behavior of suppliers in relation to the amount of TC they grant to their buyers.

As mentioned earlier, the second stream of empirical research in this field focuses on consequences of TC provision, which is a relatively under-researched area. This thesis' main contribution falls under this category. Early studies in this area focus on the relationship between components of WCAP and firm profitability (Deloof 2003; Lazaridis & Tryfonidis, 2006; Dary & James, 2018; Box, Davis, Hill, & Lawrey, 2018). More recent studies analyze other consequences of TC supply such as excess stock returns (Hill et al., 2012; Hill, Kelly, & Venkiteshwaran, 2015), cash holdings (Wu, Rui, & Wu, 2012), corporate value (Martinez-Sola, Garcia-

Teruel, & Martinez-Solano, 2013), sales growth (Yazdanfer & Ohman, 2015; Harris & Dudney, 2018). Additionally, Yao and Dang (2018) analyze the moderating role of managerial compensation incentive structure on the relationship between trade receivable policy and investors' assessment of such policy.

Moreover, a relatively new field of empirical research examine propagation of corporate bankruptcies via TC chains and explain the observed clustering of default both within the same industry and across different industries (Jorion & Zhang, 2009; Boissay & Gropp, 2013; Jacobson & Schedvin, 2015; Barrot, 2016). However, one question that has not been examined before is if and how trade receivables credit quality, as proxied by a combination of indicators such as time trend of trade receivables collection period, changes in trade receivables ageing structure, time trend of cash conversion cycle, time trend of profit margin and firm's growth rate, affect corporate value and cash holdings of firms. Moreover, there is a gap in the existing literature regarding large sample evidence on corporate value consequences of investment in trade receivables for US.

The objective of this thesis, therefore, is to analyze the corporate value and cash holdings consequences of trade receivable policy for a sample of listed US firms. This thesis provides first large sample US evidence regarding the relationship between trade receivable policy and corporate value. Furthermore, we also analyze the impact of investment in trade receivables on corporate value for firms with high and low profitability separately. More importantly, based on previous studies in TC and accounting literatures, we introduce a measure (TRQI) to capture the credit quality of trade receivables and analyze the corporate value and cash holdings consequences of deterioration in trade receivables credit quality. Thus, this thesis not only extends the existing literature by defining an indicator of trade receivables

credit quality and by testing its direct impact on corporate value and cash holdings, but also fills a gap in the literature by providing large sample evidence for US regarding the effect of investment in trade receivables on corporate value for the first time.

Well-established findings regarding the negative impact of TC supply on firm profitability (Deloof, 2003; Lazaridis & Tryfonidis, 2006; Gill et al., 2010) raises questions as to whether such behavior is value enhancing or not. Additionally, customer defaults are more frequent, and loss given default is higher for suppliers that issue more TC (Jacobson & Schedvin, 2015). Thus, as companies invest higher portion of their assets in trade receivables and as they offer longer trade terms to boost sales by capturing clients that are relatively more constrained, the suppliers' financial position and performance may be potentially impaired. This has been evidenced by Jorion & Zhang (2009), who found that suppliers with larger credit exposures to their customers have an increased likelihood of corporate failure. Similarly, Jacobson and Schedvin (2015) report that firms with relatively higher levels of investment in trade receivables experience more frequent customer defaults and higher loss given default. These, combined with strong evidence regarding the diminishing nature of returns to TC (Hill et al., 2015) and evidence regarding the potential riskiness of strategies involving liberal TC provision policies (Barrot, 2016), lead us to hypothesize that investment in trade receivables is negatively associated with corporate value.

Similarly, worsened credit quality of trade receivables is also expected to have negative impact on corporate value. Trend in average collection period of trade receivables can be treated as an indicator of trade receivables credit quality (Melumad & Nissim, 2009). An increase in average trade receivables collection days

may be an indication of a change in credit policies and the ageing structure of the TC portfolio. If the financially constrained buyers have the tendency and motivation to prefer extended TC to cash discount (Atanasova, 2012), an upward trend in average collection days across several years may further be a signal of problems in collecting receivables (Hill et al., 2015). As the credit exposure of the supplier gets riskier, implying worsened trade receivables credit quality (Jacobson & Schedvin, 2015), difficulties associated with conversion of trade receivables to cash start to emerge and cash flow forecasting becomes harder. Moreover, if the increase in trade receivables collection period cannot be offset by managerial actions regarding a reduction in inventory holding period and/or a proportionate increase in deferred payment period contracted with the supplier, this may further push cash conversion cycle up. Therefore, the risks associated with higher TC provision may lead to under-investment issues as well as higher costs associated with holding excess cash to mitigate for the extra credit risk. By defining TRQI, this thesis questions whether receivables from trading partners contribute to return on equity and whether trade receivables constitute a store of value. In doing so, we focus on the quality component of trade receivables, which reflects the collectability of these receivables. This approach aligns with the modern view of WCAP management (Sagner, 2014). As opposed to the traditional view of WCAP management which regarded current assets as a store of value to repay short-term debt, the modern view perceives excessive levels of current assets as an impediment to financial performance. Therefore, the modern view does not consider excessive levels of WCAP as a positive component of the balance sheet. The emphasis of this contemporary attitude towards WCAP management is that there is minimum in idle current asset accounts.

Cash holdings literature guides us to anticipate a positive impact of worsened trade receivables credit quality on cash holdings. Firms with relatively higher share of trade receivables in total assets and longer trade receivables collection days may well face cash flow shortages resulting from delayed payments from the customers as well as inability of the client to honor its obligation in full. This situation may impair the future cash flow generation capability of the supplier. Such firms are expected to retain more cash because cash acts as a cushion against future cash flow shortages (Lins, Servaes, & Tufano, 2010). Suppliers with low trade receivables credit quality aims to maintain their internal resource availability by tightening the cash policy. Therefore, we anticipate that as credit quality of trade receivables worsens firms tend to have more cash. This expectation is also in line with Acharya, Davydenko, and Strebulaev (2012) in the sense that cash holdings respond to the possibility of a liquidity shortage.

We also address the econometric concern regarding the joint determination of trade receivable policy and corporate value as well as cash holdings by treating level of TC provided and trade receivables credit quality indicators as endogenous variables and by utilizing system GMM (Generalized Method of Moments) as the proper estimation technique in this thesis.

With this dissertation, we aim to contribute to the growing literature on the consequences of TC supply in several ways. To the best of our knowledge, we are the first to provide large sample US evidence regarding the direct impact of level of trade receivables investment on corporate value. Additionally, the analysis of the relationship between trade credit provision and corporate value is conducted separately for firms with high and low profitability, which also extends the literature on consequences of TC provision further. Moreover, this is the first study to define

an indicator of trade receivables credit quality, which no other researcher has attempted before, and analyze its direct impact on corporate value. Finally, this is the first study that analyze the cash holdings consequences of a deterioration in trade receivables credit quality, thereby extending the cash holdings literature.[3]

The remainder of the dissertation is organized as follows. Chapter 2 provides a summary of literature on TC and cash holdings and also develops the testable hypotheses. Chapter 3 describes the data and sample selection, provides variable definitions and presents the regression models and estimation methodology. Empirical results and robustness checks are delivered in Section Chapter 4. Finally, Chapter 5 provides a summary of the findings and concludes with suggestions for future research.

[3] The only study that analyzes the cash holdings consequences of TC supply was conducted by Wu et al. (2012) based on a sample of listed Chinese firms. The authors examine the direct impact of level of investment in trade receivables on cash holdings and do not address the credit quality of trade receivables.

CHAPTER 2

LITERATURE REVIEW

This chapter provides a survey of previous literature on supply of TC and cash holdings. First section provides an overview of literature regarding provision of TC and is followed by reviews of theoretical and empirical literatures in the same field. In the final section of this chapter, an extensive review of cash holdings literature, both theoretical and empirical, is provided.

2.1 Overview of trade credit supply literature

Non-financial firms' willingness to grant credit to their customers has attracted the attention of academia for several decades. Academic literature regarding such behavior has mainly been concerned about why non-financial companies provide credit to their customers. Earliest research focused on the role of variations in aggregate supply of TC on the consequences of monetary policy changes (Meltzer, 1960; Brechling & Lipsey,1963). Major finding of these studies is that firms with relatively stronger liquidity increase the supply of TC to relatively smaller and less liquid firms when monetary policy is tightened (Meltzer, 1960; Schwartz, 1974; Nilsen, 2002; Fisman & Love, 2003). From late 1960s onwards, researchers started to focus more on theoretical models that would explain the major motivations that lie at the heart of suppliers' willingness to extend TC. General consensus in the related literature is that TC results from asymmetric and imperfect information not only in capital markets but also in product markets (Mian & Smith, 1992; Blazenko & Vandezande, 2003). It is commonly agreed that firms choose to invest some part of their assets in trade receivables in order to achieve competitive advantage due to

imperfections in financial markets and product markets as well as lack of perfect substitutes for all commodities, and existence of transaction costs and information costs. As the focus of this study is on the supply of TC, scope is limited to the literature related with the extension of TC by suppliers. Major motives for supply of TC can be grouped under five main categories, which are: financing motive (also referred to as redistribution theory), efficiency motive (also known as transaction cost theories), price discrimination motive, investment motive and quality assurance motive.

2.2 Theoretical literature on trade credit supply

Major motivations for firms to invest in trade receivables can be grouped under five categories, which are; financing motive, efficiency motive, price discrimination motive, investment motive and quality assurance motive. In the subsequent sections, theoretical literature regarding these five motives is summarized. Additionally, other motives are provided in Section 2.2.6.

2.2.1 Financing motive

Financing motive proponents emphasize the advantages of the suppliers over financial institutions as a driver of TC supply (Schwartz, 1974; Emery, 1984; Smith, 1987; Biais & Gollier, 1997). Major advantage is the informational advantage in terms of identifying the creditworthiness of the buyer as well as the quality and timeliness of information about their customers. Schwartz (1974) was one of the pioneers in this area who proposed a theoretical model which rests on the idea that firms with relatively superior borrowing capacity have an incentive to utilize this capacity for the purpose of acting like a financial intermediary and providing credit

to their customers. As per Schwartz (1974), such firms would take advantage of this situation as long as the marginal benefit of providing credit is positive. Emery (1984) emphasizes the quality and timeliness of information acquired by the supplier about their customers as a major advantage, which enables sellers to provide TC to their customers at lower costs than financial intermediaries. The model proposed by Emery (1984) considers the marginal revenue and marginal costs of investing in trade receivables and derives the optimal level of such investment by equating marginal revenue to marginal cost. Hirshleifer, Lourie, and Ruchti (2019) also present very recent evidence regarding the informational advantage of the supplier.

The suppliers also have an advantage over financial institutions in terms of forcing repayment, because the supplier may threat the customer by stop-supply option, which would force the buyer to pay its supplier on time. Customers know this threat and the costs of replacing an existing supplier with a new one (Cunat, 2007). It is also costly for the supplier to replace its existing customer with a new one. As per Cunat (2007), it is these switching costs that puts suppliers in a more advantageous position compared to banks when it comes to debt repayment enforcement. Therefore, suppliers' ability to enforce debt repayment is better than that of banks. Additionally, in case of temporary liquidity shocks, suppliers, after trading off the costs of replacing an existing customer with a new one against the costs of providing liquidity insurance to its buyers, may choose to support their customers through granting TC to them. Therefore, the high implicit interest rate on TC is justified through the default premium and liquidity insurance premium phenomena.

Moreover, the input transaction between the seller and the buyer provides an informational advantage to the supplier because the input delivered to the buyer is illiquid and cannot be diverted as easily and profitably as cash (Burkart & Ellingsen,

2004). This advantage mitigates the suppliers' exposure to borrowers' opportunism, which is defined as borrower's tendency to draw off borrowed resources for private use. However, the return borrowers get when they divert inputs is lower than the return they get when they divert cash, because most inputs are less liquid than cash and cannot be easily redirected for unintended use. These characteristics of a competitive input market facilitate suppliers' willingness to provide TC. Additionally, a trade creditor is in a more advantageous position than a financial institution in salvaging value from repossessed goods in case of buyer default (Frank & Maksimovic, 2005). Thus, firms with relatively superior borrowing capacity have an incentive to utilize this capacity for the purpose of providing credit to their credit-rationed customers.

Smith (1987) criticize previous models for keeping silent on some aspects of TC supply such as why small firms offered TC and why there was wide cross-sectional variation in terms. As per Smith's (1987) model, buyers select either the seller or the financial institution as the lending source after assessing the respective quoted interest rates in relation to the buyer's own estimate of risk of default. Seller is also exposed to a decision process regarding the offer of TC terms. Buyers reveal their risk of default to the seller through the choice of credit terms. Thus, Smith's (1987) model treats the use of credit terms by suppliers as a monitoring device concerning buyer default risk. Once buyers signal increased risk of default to the seller through acceptance of TC, seller can take timely action to screen and monitor the buyer. If this process is managed properly, supplier will have preserved the present and future sales to firms that do not have access to low-cost financing. Additionally, by offering cash-payment and deferred payment options to the buyers

and observing the buyers' choices, seller has the advantage of identifying prospective defaults earlier than financial institutions.

Biais and Gollier (1997) provide an alternative rationale for TC provision. Their model is based on supplier's superior knowledge of the buyer that stems from the signaling process from the buyer to the seller. When the supplier receives a positive signal from the buyer, supplier provides TC to the credit-rationed buyer and this action of the supplier conveys information to the bank, which in turn updates its beliefs about the buyer and agrees to lend. Therefore, the outcome of the signaling process between the seller and the buyer arising from the trading relationship is used by the bank as an input in its lending relationship with the buyer. Consequently, banks that are unable to differentiate between good and bad buyers observe the behavior of suppliers and their TC granting patterns to obtain private information. Once good buyers are identified by the bank, lending relationships ensure that positive net present value projects of otherwise-credit-rationed buyers are financed.

2.2.2 Efficiency motive

Models that justify non-financial firms' investment in trade receivables through efficiency motive emphasize the operating efficiencies and cost improvements that both suppliers and customers can achieve by engaging in a credit relationship instead of exchanging cash against goods and services upon delivery. Ferris (1981) is one of the earliest contributors to the literature in this area. He emphasizes the efficiency improvements and cost reductions for both the seller and the buyer as an alternative motive for extension of TC. If the seller does not offer deferred payment terms to the customer, the buyer pays at the time goods are delivered. This process is relatively costly both for the seller and the buyer. Therefore, if the processes of delivery and

payment are combined, several costs and operational inefficiencies are imposed on the seller as well as the buyer. Ferris (1981) proposes that if the process of goods/services delivery is separated from the process of payment through extension of TC, both seller and the buyer will benefit provided that the present value of benefits resulting from granting of TC exceed the present value of its costs.

Emery (1984) draws attention to the demand-stabilizing role of TC provision. His main point is that in industries where there is strong seasonality, TC can be utilized as a tool to minimize the fluctuations in demand and can therefore create operating efficiencies for the supplier. In other words, when there is non-constant demand, suppliers can minimize the cost of responding to fluctuations in demand by shortening (lengthening) collection terms in times of demand surplus (shortage). Therefore, when firms face uncertain demand in the product market, firms' investment in trade receivables can help them regularize cash flow from sales and reduce costs of storage, production changes and extra capacity installment.

2.2.3 Price discrimination motive

Proponents of price discrimination motive propose that TC supply facilitates price discrimination between customers with different levels of creditworthiness. The segment of low-quality buyers, which are typically credit-rationed, is characterized as having relatively lower demand elasticity. Therefore, when suppliers offer TC to this segment, they capture the demand arising from low-quality customers. Brennan, Maksimovic and Zechner (1988) develop a theoretical model to show that TC can be utilized as a price discrimination tool to boost demand and support sales growth. Additionally, firms with relatively higher operating margins can use TC to price discriminate. Another example of this approach is the work of Nadiri (1969), who

views investment in trade receivables as a capital expenditure that provides return over time by establishing long-lasting relations between the lender and the borrower. In the model proposed by Nadiri (1969), the firm's objective is to maximize its net profit by selecting optimal price and optimal level of investment in trade receivables. In the basic estimating equation, determinants of the supply of TC are total sales, opportunity cost of investing in trade receivables, an indicator of changes in monetary policy and the lagged level of TC supply, which implies that it takes some time for the actual level of investment in trade receivables to adjust to the desired level. The empirical tests of the proposed model provide evidence that supports the model proposed by Nadiri (1969).

2.2.4 Investment motive

It takes time, effort and resources for suppliers to build long-lasting relationships with their customers. Therefore, suppliers can benefit in the long run by investing some part of its liquid assets in trade receivables by offering deferred payment terms especially to its relatively weaker customers. The seller would like to maintain its trading relationship with the buyer over the long term and knows that if the buyer survives in the long run, the supplier will have captured future business potential. In fact, the proponents of investment motive support the idea that by offering TC to its customers, suppliers create customer loyalty and generate repeat business over the long term. This motive is basically based on the supplier's willingness to create shareholder value by investing in wealth-creating selling opportunities. From the buyer's viewpoint, receipt of TC may be beneficial due to the supplier's willingness to maintain its relationship with the buyer over the long term. Thus, TC can also be viewed as insurance against temporary liquidity shocks confronted by the customers.

The investment motive also captures the role of TC as a short-term investment strategy. As per Emery (1984), imperfections in capital markets require firms to maintain liquid assets so that transaction costs, excess borrowing costs and insolvency costs are avoided. Firms can choose to maintain a part of these liquid assets in the form of trade receivables, which is preferable for the seller if the implicit interest rate on TC is higher than the market lending rate.

There are several other studies that focus on the evaluation of investments in accounts receivables in the same way as investments in other asset types. The proponents in this area approach trade receivable policy choice decision as an evaluation of possible alternatives by trading off marginal profitability of a specific alternative against the marginal opportunity cost incurred. Marginal opportunity costs of a more liberal trade receivable policy are generally defined as additional capital that is committed to the increased receivables and the additional bad-debt losses (Davis, 1966; Van Horne, 1974). This conventional practice of assessing the viability of additional investment in accounts receivables was challenged by Oh (1976), who proposed a refined version for calculation of change in average receivable balance so that marginal opportunity cost and bad debt losses are estimated properly. Oh (1976) sees the scarce resource allocated to additional receivables as cash flow as opposed to conventional approach that treats the scarce resource as funds. Kim and Atkins (1978) extended Oh (1976)'s model by incorporating the net present value concept, thus the model would be consistent with an overall objective of wealth maximization. Kim and Atkins (1978)'s model uses appropriate annuity factors for each element of the model so that not only the present value of each factor but also the net present value impact of a policy change would be estimated correctly. Optimal cash discount rate. Sartoris and Hill (1981) also

adopt a net present value framework to assess the cash flow implications of each alternative credit policy. The authors take the actual policy as a benchmark against the alternative credit policies and propose a model to estimate (for each alternative separately) the net effect of a possible policy change on cash flow. If any of the alternatives would result in increased net present value of cash flows, then credit policy decision-makers are recommended to replace the existing policy with the proposed one.

2.2.5 Quality assurance motive

Quality assurance motive proposes that TC exists because it helps build reputation for product quality so that repeated sales are ensured. This motive's main justification for existence of TC extension is information asymmetry that results from imperfect information in product markets. The quality of a product may not be readily and immediately apparent to a buyer. Therefore, the buyer needs time to scrutinize the goods and check out their quality or to make sure that a service has been properly delivered. This approach views granting of TC as an implicit guarantee (Niskanen & Niskanen, 2006). For suppliers that do not yet have a reputation for quality, TC is an especially useful tool to signal seller's confidence in the quality of his products (Frank & Maksimovic, 1998).

Lee and Stowe (1993) develop a model that seek to explain the existence of intra-industry variations in credit terms through quality assurance motive. Their model treats TC extension as a tool that conveys information about product quality, in the sense that the larger is the cash discount offered to the buyer by the seller, the more is the product risk born by the buyer. In other words, trade receivable terms (or conversely cash discounts) provide a signal to the buyer about the product quality.

Therefore, suppliers of good quality products can comfortably provide credit to their buyers because they feel confident about the quality of their products. As per Lee and Stowe (1993), for producers of high-quality products, TC serves as a built-in warranty that provides a guarantee for the quality of the product. However, sellers whose products are poor in quality choose not to provide deferred payment terms and offer large non-revocable cash discounts to their buyers so that product risk is passed on to the buyer. As per the model, the extent to which buyers and sellers are willing to share the product risk and asymmetric information about product quality are the major derivers of separating equilibrium in the market.

Emery and Nayar (1998) examine a similar problem and develop a model to explain intra- and inter-industry variations in payment policy. As per the model proposed by Emery and Nayar (1998), TC extension sends signals about not only product quality but also the efficiency of the repair process of the seller. As per the rationale provided by Emery and Nayar (1998), suppliers of high-quality products can comfortably provide TC to their buyers, who are basically offered a time period from delivery time to payment time to test the quality of the product. High quality product suppliers are confident that their products would be hardly returned. Additionally, sellers, whose repair process efficiency is high, would also be willing to provide credit to their customers. By doing so, the supplier treats the time from delivery to payment as a defect correction period. Therefore, suppliers that are not willing to provide TC to their buyers may be signaling that either the quality of their products is low, or they have high repair costs or both.

2.2.6 Other views of trade credit extension

In addition to the above motives, renegotiation concessions in case of bankruptcy is another justification for existence of TC. Wilner (2000)'s rationale for acceptance of high implicit interest rates embedded in TC by the buyer, is based on the expected benefits from renegotiation concessions in case of buyer bankruptcy. Alternatively, Brick and Fung (1984) also provide a model even when there are no imperfections in credit markets. They propose that firms invest in trade receivables to arbitrage tax differences between sellers and buyers. As per this model, sellers that are exposed to higher effective tax rates are more likely to extend more credit to their buyers.

All of this suggests that TC provision is the outcome of a complex relationship between the seller and the buyer. Additionally, there are multiple factors that motivate the supplier to offer credit to its customers.

2.3 Empirical literature on trade credit supply

Empirical research in this area falls under two main categories. One stream focuses on the determinants of TC provision whereas the other stream focuses on the consequences of such behavior.

2.3.1 Determinants of TC extension

Under the first category, researchers aim to test the theories that are explained in Section 2.2 above and explore the determinants of firms' investment in trade receivables. Early studies in this area focus on testing TC theories through use of financial indicators, which are mostly available on the financial statements of companies. The study conducted by Petersen and Rajan (1997) is one of the most remarkable empirical studies in the related literature. By utilizing data on 3,404 firms

from the National Survey of Small Business Finance (NSSBF) that was conducted in 1988-1989 in U.S., Petersen and Rajan (1997) find empirical evidence that supports financing as well as price discrimination motives of TC. A review of similar studies covering both developed as well as emerging markets reveals that financing motive and quality assurance motive are the most common reasons for provision of TC (Deloof & Jegers, 1996; Blazenko & Vandezande, 2003; Bougheas et al., 2009; Garcia-Teruel & Martinez-Solano, 2010; Giannetti et al., 2011). These studies also document empirical support for investment motive, efficiency motive and price discrimination motive. Moreover, evidence supporting the existence of the five major motives has also been provided through surveys across developed markets such as US, UK, Australia and European Union countries (Ng et al., 1999; Wilson & Summers, 2002; Cheng & Pike, 2003; Pike et al., 2005; Niskanen & Niskanen, 2006; Paul & Wilson, 2006).

Additionally, Molina and Preve (2009) extend the empirical literature in this field by examining the behavior of trade receivable policy of distressed firms. By using data on listed US firms for 1978-2000 period, they find evidence that financially stressed firms have relatively lower level of investment in trade receivables. In a recent study by Chen and Kieschnick (2018), firm size, asset tangibility, profitability, SGA,[4] sales growth rate and firm's use of fixed-income products as a financing tool are found to be the most influential factors in the determination of corporate WCAP policies including investment in trade receivables based on a sample of listed US firms across 2000-2016 period. Furthermore, Chen and Kieschnick also find evidence that bank-reliant firms tend to extend more TC

[4] Selling, general and administrative expenses.

than firms that depend less on banks, whereas firms that do not depend on banks at all significantly reduce their extension of credit to their customers.

More recent studies focus on the impact of non-financial factors on extension of TC. Based on data from a survey conducted by the World Bank across small and medium sized companies operating in 42 developing countries, Van Horen (2004) showed that if the supplier has monopoly power, it bundles a lower portion of its goods with credit. On the contrary, Van Horen (2004) also provides empirical evidence that suppliers, when faced with customers with strong market power, tend to offer more credit. Using data from another World Bank Survey covering a large number of firms in Eastern Europe and Central Asia, Van Horen (2007) provides further evidence regarding the positive association between customer market power and granting of TC by the supplier. As per the findings of Van Horen (2007), if the supplier is risky and if the firm is operating in a country with under-developed financial system and a weak legal system, the positive relationship between customer market power and suppliers' extension of TC is stronger. Similarly, based on a novel dataset on almost 30,000 TC contracts between 56 large buyers on the Fortune 500 list and their respective suppliers, Klapper et al. (2012) provide evidence that smaller suppliers offer longest maturities to their largest and most creditworthy buyers whereas these suppliers offer early-payment discounts to their riskier clients. Furthermore, Dass et al. (2014) provide evidence on the role of TC supply among vertically related firms where the trade relation between the supplier and the buyer requires the upstream party to undertake relationship-specific investments. In such relationships, the supplier invests in the production of goods and/or intangible assets that are peculiar to its relationship with the customer. Based on data from US listed firms across 1997-2008 period, Dass et al. (2014) show that the level of relationship-

specific investments has a positive direct impact on the level of investment in trade receivables whereas the market power of the supplier has negative impact on such investment. Fabbri and Klapper (2016) provide similar evidence regarding the impact of supplier's bargaining power on TC supply. Based on firm-level data of Chinese firms obtained through World Bank Enterprise Survey conducted in 2003, Fabbri and Klapper (2016) document that suppliers with relatively weaker bargaining power provide more generous TC terms to their customers. In another study by Ivashina and Iverson (2018) based on data from US, geographic proximity and industrial communality are documented to be among the non-financial factors that determine behavior of suppliers in relation to the level of investment in trade receivables.

A major contribution to the empirical literature in this field was provided by Demirguc-Kunt and Maksimovic (2001) who studied the impact of banking system and the legal environment on the supply of TC. Based on data for the largest listed production firms in 40 countries across 1989-1996 period, Demirguc-Kunt and Maksimovic (2001) provided evidence that granting of TC is higher in countries with larger banking systems, especially when private ownership is more prevalent among the banks. Moreover, the authors also found that as the country's legal system gets more efficient, reliance on TC by firms is reduced. These findings were extended further by Cull, Xu, and Zhu (2007) who found that supplier credit and bank credit become substitutes, not complements, in transition economies with biased and inefficient banking systems. El Ghoul and Zheng (2017) extended the empirical literature regarding the cross-country differences in extension of TC by investigating the impact of national culture on firms' investment in trade receivables. By

employing Hofstede's four cultural dimensions[5] to proxy for national culture and using a sample of firm-level data of listed companies from 49 countries over the 1993–2013 period, they find that, suppliers located in countries with higher scores for each of the four dimensions tend to offer more TC to their customers. Therefore, each dimension, as defined by Hofstede, has positive impact on firms' tendency to provide TC to their clients.

Some studies examined non-financial firms' investment in trade receivables during times of economic downturn. Based on a sample of larger, publicly traded companies, Love, Preve and Sarria-Allende (2007) found that TC provision went up in Indonesia, South Korea, Malaysia, and the Philippines immediately after the 1997 Asian crisis. Firms in Mexico behaved similarly in 1994 after the currency crisis. Love et al. (2007) provided further evidence that the immediate increase in TC after the crisis was followed by a collapse of TC supply and an extended contraction for several years thereafter. Similarly, Love and Zaidi (2010) studied the behavior of small and medium sized firms whose access to bank credit is relatively limited compared to larger firms. Based on survey data from Thailand, Korea, Philippines and Indonesia, Love and Zaidi (2010) found that small and medium size enterprises reduced their investment in trade receivables after the 1998 financial crisis. Garcia-Appendini and Montoriol-Garriga (2013) studied the effects of 2007-2008 financial crisis on provision of TC by using a matched sample of suppliers and customers of US listed firms across 2005-2010 period. They found that pre-crisis liquidity position of the supplier has a positive direct impact on the supply of TC to their customers during the crisis. However, Garcia-Appendini and Montoriol-Garriga (2013) also report that in the post-crisis period suppliers decreased their investment in trade

[5] The dimensions are: uncertainty avoidance, collectivism, masculinity and power distance.

receivables to restore their impaired cash positions. Goncalves, Schiozer, and Sheng (2018) extend the work of Garcia-Appendini and Montoriol-Garriga (2013) by examining the impact of supplier's product market power on the supply of TC during the crisis using a sample of listed US firms from 2004 to 2010. Goncalves et al. (2018) find that high market power firms are able to provide liquidity to their suppliers by paying them earlier during the crisis. On the other hand, Goncalves et al. (2018) find that firms with high market power keep their pre-crisis collection terms unchanged during the crisis.

Another valuable contribution to TC literature was provided by research that documented the informational advantage of the TC provider compared to the financial institution (Biais & Gollier, 1997). Using a detailed data set on 132 bankrupt firms from US (both public and private) across 1998-2009 period, Ivashina and Iverson (2018) provide evidence that major suppliers of bankrupt firms have better predictions about recovery rates on past due receivables and thus they take action by selling claims much earlier than the other suppliers in case recovery rate is expected to be low. Ivashina and Iverson (2018) proposes that the hasty behavior of major suppliers in selling claims from their bankrupt customers is an indication of their informational advantage about the buyer. Additionally, the predictive power of sales of claims by informed suppliers and low recovery rates is particularly strong in case of more opaque private buyers that go bankrupt. Based on TC data from a proprietary data vendor, Hirschlifer et al. (2019) test whether TC suppliers possess private information about their customers. The data that is used by Hirschlifer et al. (2019) cover almost half a million TC records from June 2002 to November 2017 for 5,278 buyers that are listed on either NYSE or NASDAQ or AMEX. They find that greater is the change in TC provided by the supplier, higher is the future buyer

abnormal stock returns. Additionally, Hirschlifer et al. (2019) also provide evidence that timely payment ability of the buyer is also associated with future buyer abnormal stock returns. These findings suggest that TC suppliers possess private information about their customers.

2.3.2 Consequences of TC supply

The second stream of empirical research focuses on consequences of TC provision, which is a relatively under-researched area. Early studies in this area focus on the relationship between components of WCAP, including trade receivables, and firm profitability. Deloof (2003) was one of the pioneers in this area. Based on data of large non-financial Belgian firms for 1992-1996 period, he found that longer trade receivables terms are negatively associated with firm profitability. Lazaridis and Tryfonidis' (2006) findings are in line with those of Deloof (2003). Based on data of 131 companies listed in the Athens Stock Exchange from 2001 to 2004, Lazaridis and Tryfonidis (2006) found that firm profitability and trade receivables collection period are negatively associated with each other. Based on a small sample of 88 US firms listed on NYSE, Gill et al. (2010) report findings that are in line with Deloof (2003) and Lazaridis and Tryfonidis (2006).[6] However, contrary to findings of the above-mentioned studies, Dary and James (2018) find that profitability and level of investment in trade receivables is positively associated based on a sample of listed agro-food firms operating in US for the period between 2001 and 2014. Evidence provided by Dary and James (2018) indicates that studies based on small samples from specific business sub-segments may generate conflicting results, whose generalizability is highly questionable. In a recent study by Box et al. (2018),

[6] Knauer and Wöhrmann (2013) provide a list of studies that report a negative association between trade receivables days and profitability for several other countries.

findings indicate that future profitability is positively associated with contemporaneous TC collection period. Based on a large sample of US listed firms across 1977-2016 period, Box et al. (2018) present empirical evidence that firms offering longer terms to their buyers in excess of industry competitors end up with not only improved future profit margins but also noticeable gain in future sales and market share.

Although there are numerous studies documenting TC supply and profitability relationship for large firms, research focusing on small and medium sized companies (SME) is limited. Martinez-Sola, Garcia-Teruel, and Martinez-Solano (2014) provide large sample evidence regarding the profitability implications of investment in trade receivables by using a sample of 11,337 manufacturing SMEs operating in Spain within 2000-2007 period. Their findings indicate the existence of a statistically significant, positive, linear relationship between TC supply and firm profitability. In other words, SMEs that invest a higher portion of their assets in trade receivables have higher asset return. Findings of Martinez-Sola et al. (2014) also indicate that the positive impact of investment in trade receivables on firm profitability is greater for firms that are financially unconstrained and have volatile demand as well as for those that have higher market share.

Molina and Preve (2009) extend the literature on consequences of TC extension by examining the trade receivable policy of distressed firms and the consequences of these policies based on a large sample of listed US firms for 1978-2000 period. They find that for firms facing profitability problems, usually before getting into financial distress, increased trade provision to gain market share is a cost-effective strategy only if the firm has market power. Similarly, firms facing cash flow problems, usually during financial distress stage, can benefit from a reduction

of trade receivables terms to obtain cash without sacrificing much on sales only if the firm has market power. Both strategies are not applicable to firms operating in competitive industries as the consequences of these strategies can make the situation worse for such companies. Therefore, distressed firms should be cautious about implementing either looser or tighter trade receivables strategies as the severity of negative consequences depend largely on whether the firm has market power or not.

First large sample evidence regarding stock market's assessment of TC provision was presented by Hill et al. (2012) by employing the valuation framework developed by Faulkender and Wang (2006) based on a sample of US listed firms for 1971-2006 period. The results indicate a positive and statistically as well as economically significant relationship between supply of TC and annual excess stock returns. Additionally, they find that some product market characteristics such as sales volatility and product quality moderate the relationship between investment in trade receivables and shareholder wealth. The results of the study by Hill et al. (2012) indicate that future revenue growth potential associated with granting of TC and liquidity reserve characteristic of trade receivables are recognized by the investor. Hill et al. (2015) extended the study of Hill et al. (2012) by providing evidence that is consistent with diminishing returns from extending TC. Hill et al. (2015) also report that diminishing returns to TC is lower for firms that are larger, that have higher market share and higher payout ratios. Another extension of Hill et al. (2012) study is provided by Yao and Dang (2018) who examine the moderating role of managerial incentives on the relationship between excess stock return and provision of TC. Yao and Deng (2018) use data of US listed firms for the period from 1992 to 2014 and find a negative relationship between vega[7] and market value of trade

[7] Vega measures how sensitive CEO wealth is to stock volatility,

receivables. Therefore, Yao and Deng (2018) study emphasizes the importance of managerial compensation incentive structure on the relationship between trade receivable policy and investors' assessment of such policy.

Wu, Rui, and Wu (2012) document evidence regarding the cash holdings consequences of TC extension. Using a sample of listed Chinese firms from 1999 to 2009, they report that trade receivables and cash holdings are negatively associated indicating that firms treat cash and trade receivables as substitutes. Additionally, they find that substitutability of trade receivables for cash is stronger in regions with greater financial depth. Furthermore, Wu et al. (2012) report that upon the implementation of new receivable policy in 2007 that enables firms to offer trade receivables as security against loans, the substitute ratio of receivables for cash increased significantly.

Martinez-Sola et al. (2013) examine the impact of TC supply on corporate value. Using Spanish listed firms data from 2001 to 2007, they document the existence of a non-linear relationship in the form of an inverted U-shape between trade receivables and corporate value. They also report that deviations from target trade receivables level has negative impact on corporate value.

Yazdanfer and Ohman (2015) examined the sales growth implications of investment in trade receivables for SMEs. Based on a large sample of 13,548 Swedish SMEs across 2009-2012 period, Yazdanfer and Ohman (2015) report a statistically significant, positive relationship between trade receivables and sales growth. Further evidence in this area was provided by Harris and Dudney (2018) based on an unbalanced panel of US firms with 51,737 firm-year observations from 1996 to 2010. As per Harris and Dudney's (2018) findings, firms that offer differentiated products and firms that operate in services sector can boost sales and

gain market share by securitizing their trade receivables. Their findings indicate that standardized goods manufacturers do not benefit from securitization of trade receivables in terms of generating sales growth and achieving market share increase. Additionally, Harris and Dudney (2018) provide evidence that securitization of trade receivables has no direct impact on firm profitability.

A distinct and relatively new field of empirical research in TC literature examines the propagation of corporate bankruptcies via TC chains and explains the observed clustering of default both within the same industry and across different industries. Research in this area is motivated by the goal of quantifying the impact of buyer defaults on trade creditors along the supply chain, because the uncollectability of trade receivables in case of buyer default constitutes a shock to the suppliers cash flow and this event may impair the ongoing operations of the TC provider and may also create financial stress for the supplier. Moreover, the liquidation of the defaulting buyer would make it necessary for the supplier to write off the current TC exposure and would also lead to loss of future business. Seiden (1964) report for US that 9% of all business failures are the result of poor quality of TC extended by the failing firm. Jorion and Zhang (2009) pioneered modern research in this area by presenting evidence on counterparty risk among industrial corporations based on a sample of 251 US bankruptcies over the period 1999 to 2005. Jorion and Zhang (2009) found negative market response in terms of stock price under-performance and increased CDS spreads of supplier firms in case of buyer bankruptcy. They also provide evidence that the likelihood of supplier failure is higher for firms with larger TC exposures. Findings of Jorion and Zhang (2009) are further supported by Jacobson and Schedvin (2015), who provide evidence that customer defaults are more frequent, and loss given default is higher for suppliers that issue more TC.

Based on a sample of Swedish bankrupt firms for the period from 2007 to 2011, Jacobson and Schedvin (2015) also report that the bankruptcy risk of the supplier is substantially higher if a credit loss, arising from customer default, is incurred. Therefore, findings of Jacobson and Schedvin (2015) study justify the spreading of corporate failures through TC chains. The question of how far corporate failures get transmitted is examined by Boissay and Gropp (2013), who document that the spreading of corporate failures through the TC chain is terminated when it reaches unconstrained suppliers. They also provide evidence that suppliers that experience customer defaults have themselves an increased likelihood of default. The transmission of defaults from the customer to the supplier is widespread across financially constrained members of the supply chain. As per the findings of Boissay and Gropp (2013), unconstrained suppliers tend to absorb the payment defaults of their customers and that is where the TC default transmissions along the supply chain ceases. Findings of Barrot (2016) also provides empirical evidence regarding the increased probability of default for suppliers that invest a relatively higher portion of their assets in trade receivables. As per findings of Barrot (2016), strategies involving liberal trade receivable policies is potentially riskier specifically for liquidity-constrained firms, which are typically younger and smaller, have relatively higher leverage and lower cash and payout ratios. Barrot (2016) studies the effects of a regulation on corporate defaults. The regulation, which became effective in France in 2006 imposed a trade collection period limit of 30 days across the entire trucking industry. Barrot (2016) found that after this regulation became effective, corporate defaults across the trucking industry decreased considerably and that this effect was more prevalent among financially weaker firm.

Academic research regarding the credit quality of TC is limited to Seiden's (1964) study, whose aim was to obtain and analyze reliable US data that would anticipate credit difficulties at macro level. Seiden (1964) based his study on limited financial data from FTC-SEC Quarterly Financial Report for Manufacturing Corporations, SEC quarterly series on current assets and current liabilities of all corporations, Credit Research Foundation's quarterly survey that capture data regarding aging of receivables and the proportion of past due TC for wholesale and manufacturing firms, data from American Credit Indemnity Company regarding delinquencies, and Dun & Bradstreet weekly and monthly series on the number of business failures and their liabilities for all business sectors. The data covered the post-World War II era from 1947 to 1962. Seiden (1964) used three types of predictive measurements to anticipate credit difficulties, which are trends in financial ratios, movements in Dun & Bradstreet's credit ratings and changes in the distribution of trade debt among business borrowers representing differing degrees of risk. He found that the predictive measures generally anticipated changes in credit difficulties among different business sectors during the years that follow. Although Seiden's (1964) work was based on data with serious limitations and with a need for considerable refinement and improvement, it constitutes a major first step in predicting future credit difficulties through analysis of current trends in TC. Modern research in the related field include Jorion and Zhang (2009), Boissay and Gropp (2013), Jacobson and Schedvin (2015) and Barrot (2016) as summarized above.

To the best of our knowledge, there has been no study to date that has attempted to define an indicator of trade receivables credit quality. Therefore, this thesis contributes to the existing literature on consequences of TC provision by defining a variable that indicates the credit quality of TC risk exposure of the

supplying firm and by testing its direct impact on two important aspects of financial management; firms value and cash holdings.

2.4 Overview of cash holdings literature

The literature on cash holdings presents three alternative theories that justify the rationale for firms to retain cash. These theories are known as trade-off theory, pecking order theory and free cash flow theory. According to the trade-off theory, there is an optimal level of cash holdings that is decided by trading off the marginal benefits of holding liquid assets against the marginal cost of such investment (Miller & Orr, 1966; Kim, Mauer, & Sherman, 1998). It is argued that due to imperfections in capital markets, firms should hold cash at the optimal level, otherwise corporate value would be impaired. Possible benefits of holdings cash are; reduction in the likelihood of financial distress, execution of optimal investment policy and minimization of transaction costs (Bates, Kahle, & Stulz, 2009). Major cost of holding liquid assets is the relatively lower rate of return (Ferreira & Vilela, 2004).

Pecking order theory (also known as financing hierarchy theory) proposes that firms retain cash and equivalents so that future investment opportunities are financed as and when they appear (Myers, 1984; Myers & Majluf, 1984). Due to information asymmetries between the insiders and outsiders, firms choose to finance investments first by retained earnings, then by safe debt, then by risky debt, and finally by equity. Therefore, asymmetric information costs and other financing costs are minimized, and impairment of corporate value is avoided. As per the pecking order theory, firms accumulate cash to ensure that internal funds are sufficiently available when investment opportunities arise and thus costly external financing (either debt or equity) is avoided.

Alternatively, free-cash flow theory proposes that managers are inclined to waste corporate resources (Jensen & Meckling, 1976). This tendency of managers may reveal itself in the form of discretionary use of cash by managers, such as excess perquisite consumption and investing in projects that would not be attractive for financing by capital market agents. Such managerial behavior may consequently be value-destroying. By hoarding cash, entrenched managers try to gain discretionary power over corporate investment decisions by increasing the amount of assets under their control, especially when incentives of managers and investors are not synchronized and adjusted accordingly. Therefore, cash holdings may reflect the managers' tendency to accumulate cash in an effort to keep away from the discipline of capital markets. In a nutshell, as per the free cash flow theory, agency problems are major determinants of cash holdings.

Empirical literature on the determinants of cash holdings is massive. One of the most remarkable studies on the empirical front was conducted by Opler, Pinkowitz, Stulz and Williamson (1999) based on data of listed US companies. They document evidence and support for trade-off theory and pecking order theory. Their study was followed by many others, some of which used US listed firms data (Bates et al., 2009; Harford, Klasa, Maxwell, 2014; Chung, Kim, Kim, and Zhan, 2015; Graham and Leary, 2018) while some others used both public as well as private firm data (Gao, Harford, & Li, 2013). Studies focusing on other developed markets (Ferreira & Vilela, 2004; Ozkan & Ozkan, 2004; Guney, Ozkan, & Ozkan, 2007; Iskandar-Datta & Jia, 2012) and emerging markets (Al-Najjar, 2013; Hall, Mateus, & Mateus, 2014) have also contributed to the understanding of cash holdings determinants considerably. Some other studies tested agency theory either by using single-country samples or by utilizing multi-country panel data (Pinkowitz, Stulz, &

Williamson, 2003; Dittmar & Mahrt-Smith, 2007; Harford, Mansi, & Maxwell, 2008; Loncan, 2018).

Additionally, there is an increasing number of studies focusing on several other factors that explain the variation in cash holdings such as product market dynamics (Haushalter, Klasa, & Maxwell, 2007), organizational structure of the firm (Subramaniam, Tang, & Yue, 2011), the nature of supplier-buyer relationships (Itzkowitz, 2013), family control (Duran, Lozano, & Yaman, 2016), level of multinationality (Fernandes & Gonenc, 2016), dependence on skilled labor (Ghaly et al., 2017) and earnings quality (Farinha, Mateus, & Soares, 2018). Furthermore, in a multi-country survey conducted across CFOs from 29 countries, Lins et al. (2010) investigated the derivers of financial liquidity with special focus on non-operational cash holdings and lines of credit. Their major finding is that CFOs employ non-operational cash holdings and lines of credit to hedge against different risks. As per the survey evidence, non-operational cash, which comprises about 2% of assets, is used to mitigate risks associated with liquidity shocks in bad times. Additionally, credit lines, which comprises about 15% of assets, is used to finance future investments available in good times. Moreover, survey evidence presented by Powell and Baker (2010), based on managerial views of large US companies, provide support for an optimal trade-off approach to cash holdings. As per the views of managers surveyed, financing hierarchy theory and agency theory have limited effect in motivating managers in their decisions and actions regarding the level of cash held by firms.

CHAPTER 3

DATA AND METHODOLOGY

The objective of this chapter is to present details of the sample construction process and data used in this study, to provide the model specifications and to deliver variable definitions.

3.1 Data

For empirical analysis, we collect data from Bloomberg, which provides real-time and historical financial market data, covering all sectors worldwide. The initial sample is composed of publicly traded, US-incorporated firms listed on NYSE, NASDAQ and AMEX from 2010 to 2016. Firms operating in the financial sector, which have four-digit Standard Industrial Classification (SIC) codes between 6000 and 6999, are excluded from the sample due to the specific nature of their financial statements. Utility firms are also excluded to eliminate the possible impact of regulation on TC. Additionally, firms that have negative revenue, missing trade receivables, and missing SIC code are not included in the sample. The final sample includes 2,737 firms and the aggregate sample is composed of 17,112 firm-year observations. As some measures used in the regressions are not available for some firms and as some measures are computed over a three-year period (such as trade receivables credit quality indicator and cash flow volatility), the sample size used in several of the analyses is smaller. All continuous variables are winsorized at the 1 percent and 99 percent levels to minimize the influence of outliers.

3.2 Methodology

In line with the aim of this thesis, two model specifications are provided to analyze the impact of trade receivable policy on corporate value and one model specification is presented for examining the impact of trade receivable policy on cash holdings. Variable definitions are provided in Section 3.3.

3.2.1 Corporate value model specification

The first model aims to analyze the impact of the level of investment in trade receivables on corporate value. The econometric model takes the following form:

$$TQ_{i,t} = \beta_0 + \beta_1 TQ_{i,t-1} + \beta_2 REC_{i,t} + \beta_3 REC^2_{i,t} + X_{i,t} \beta_4 + \text{Year Dummies} + \varepsilon_{i,t} \quad (1)$$

As will be explained below in further detail, we utilize system GMM to estimate the above model. Therefore, the model includes lagged value of the dependent variable as one of the explanatory variables. REC is the key variable of interest, which proxies the level of investment in trade receivables. The non-linearity of the relationship between investment in trade receivables and corporate value is tested by adding REC^2, which is the polynomial term for REC. Moreover, $X_{i,t}$ represents the set of time-variant, firm-specific control variables as defined in Section 3.3. below. We also include dummy variables in the model for each year to control for economic factors that may affect the corporate value of firms. $\varepsilon_{i,t}$ is the error term. i and t are indicators of firm and year, respectively.

Second version of the corporate value model seeks to analyze the impact of trade receivables credit quality on corporate value. This model is an extension of Model 1 and incorporates an indicator variable that proxies the credit quality of trade receivables. Hence, the econometric model takes the following form:

$$TQ_{i,t} = \beta_0 + \beta_1 TQ_{i,t-1} + \beta_2 REC_{i,t} + \beta_3 REC^2_{i,t} + \beta_4 TRQI_{i,t} + X_{i,t} \beta_5 + \text{Year Dummies} + \varepsilon_{i,t} \quad (2)$$

TRQI (trade receivables credit quality indicator) in Model 2 is an indicator variable, the definition of which is provided in Section 3.3.

3.2.2 Cash holdings model specification

The third model aims to analyze the direct effect of trade receivables credit quality on cash holdings of firms. The econometric model is:

$$CASH1_{i,t} = \beta_0 + \beta_1 CASH1_{i,t-1} + \beta_2 TRQI_{i,t} + Q_{i,t} \beta_3 + \text{Year Dummies} + \varepsilon_{i,t} \quad (3)$$

Model 3 includes lagged value of the dependent variable (CASH1) as one of the explanatory variables. Similar to Model 2, TRQI (trade receivables credit quality indicator) is an indicator variable, the definition of which is provided in Section 3.3. $Q_{i,t}$ represents the set of time-variant, firm-specific control variables as explained in Section 3.3. below. We also include dummy variables in the model for each year to control for economic factors that may affect the corporate value of firms. $\varepsilon_{i,t}$ is the error term. i and t are indicators of firm and year, respectively.

3.2.3 Estimation strategy

The dynamic panel data model is estimated via system GMM as suggested by Blundell and Bond (1998) and Brown and Petersen (2011). The system GMM estimator is superior when compared to the Arellano-Bond difference estimator, because system GMM estimator utilizes all available moment conditions. This estimator combines a set of moment conditions obtained from the difference equations with an additional set of moment conditions obtained from the level equations. It is argued that the additional set of instruments improve the efficiency of the estimator.

There are mainly two reasons for the choice of system GMM as the estimation strategy in this thesis. First, by employing system GMM, we address the potential endogeneity issue related with the key variables of interest, which may result from a possible correlation between each of these variables and unobserved factors (both permanent and time-varying) affecting corporate value and cash holdings separately. If left unaddressed, these unobserved factors, such as corporate governance, corporate culture and diversification, may lead to biased estimators, which is referred to as omitted variables bias. This issue is discussed in detail in the following section. Second, system GMM is appropriate for models where lagged value(s) of the dependent variable are included in the model specification as independent variables to account for the partial adjustment process towards the target level of the dependent variable. System GMM is widely used in the related literature (Martinez-Sola et al., 2013; Rong & Xiao, 2017).

In all multivariate regressions, system GMM is executed by xtabond2 module in Stata (Roodman, 2009). Model specification is assessed by employing two tests. First, we report the second-order Arellano-Bond tests for serial correlation in the error term. The null hypothesis of this test is absence of second-order serial correlation in the errors of the first-difference estimation equation. Additionally, we report the Hansen tests for the validity of the instruments. If the model is correctly specified, instruments should be uncorrelated with the error term. The null hypothesis of Hansen test is absence of correlation between over-identifying instruments and the errors. We prefer the one-step GMM estimator instead of two-step estimator because standard errors from two-step GMM are downward biased (Arellano & Bond, 1991). Additionally, standard errors are robust to heteroscedasticity in all estimations.

All multivariate regression results tabulated in the subsequent sections present the p-values for ar(1) and ar(2), which are Arellano-Bond first and second order serial correlation tests, respectively. The null hypothesis of this test is the absence of serial correlation in first-differenced errors. The expected result of ar(1) is evidence against the null hypothesis because when the idiosyncratic errors in the panel are independently and identically distributed, the first-differenced errors become first-order auto-correlated. However, at orders two and above, there must be no autocorrelation in the first-differenced errors. Therefore, we expect the p-value of ar(2) to be above 0.05. Moreover, the Hansen test p-value is also reported as part of multivariate regression estimation results. The Hansen test, which allows us to evaluate the validity of the instruments, is a test of overidentifying restrictions. Its null hypothesis is the absence of correlation between the instruments and the error terms. Therefore, we expect the p-value of Hansen test to be above 0.05.

For both the corporate value and cash holdings models, industry dummies are excluded from the regressions, because when they are included in the regressions, the coefficients of industry dummies are not statistically significant. Additional tests provide evidence that coefficients of industry dummies are not jointly significant as well.

3.2.4 Endogeneity of key variables of interest

Although number of studies examining the impact of non-financial factors on TC provision is limited (Van Horen, 2004 and 2007; Klapper et al., 2012; Dass et al., 2014; Fabbri & Klapper, 2016; Ivashina & Iverson, 2018), studies documenting the impact of several unobserved non-financial factors on corporate value and cash holdings are plenty. Intuitively, these non-financial factors affecting corporate value

and cash holdings may well have an impact on REC and TRQI, which are the key variables of interest in the models as specified above.

The impact of corporate governance on corporate value has been documented extensively (Hermalin & Weisbach,1991; Carter, Simkins, & Simpson, 2003; Chhaochharia & Grinstein, 2007). The relationship between diversification and value is also well-documented in the finance and organizational structure literatures (Berger & Ofek, 1995; Denis, Denis & Yost, 2002; Doukas & Kan, 2006). Similarly, the extant literature on organizational structure provides evidence regarding the corporate value consequences of factors relating to organizational structure (Barney, 1986; Hansen & Wernerfelt, 1989; Hillman & Keim, 2001). Cash holdings literature, on the other hand, provides evidence that companies with strong corporate governance structures behave differently than firms with relatively weak governance structures (Dittmar & Mahrt-Smith, 2007; Harford et al., 2008). Additionally, Haushalter et al. (2007) show that product market dynamics determine the way firms behave in regarding their cash management strategy and practices. Furthermore, Subramaniam et al. (2011) find that diversification has negative impact on cash holdings. These factors affecting either corporate value or cash holdings or both may well be affecting management's strategy regarding investment in trade receivables. If so, these factors are captured by the error term in the above model specifications for corporate value and cash holdings. Therefore, to avoid omitted variables bias arising from these factors, an appropriate estimation strategy is chosen, which is system GMM.

3.3 Variables

As the objective of this thesis is to analyze the corporate value and cash holdings consequences of trade receivable policy, two main models are specified. The first main model is the corporate value model that is used to examine the corporate value consequences of investment in trade receivables. The second main model is the cash holdings model that is used to analyze the cash holdings consequences of TC provision. The definitions for the set of dependent, independent and control variables for each of these models are provided below.

3.3.1 Dependent variables

Following Mitton and O'Connor (2012), Rong and Xiao (2017), Fauver, McDonald, and Taboada (2018), dependent variable of the corporate value model is Tobin's Q (TQ), which is computed as the sum of market capitalization, total liabilities, preferred equity and minority interest scaled by book value of assets. To ensure robustness of the results, we also use an alternative measure of corporate value which is enterprise value scaled by book value of assets (Ushijima, 2016). Enterprise value (EV) is calculated by adding market value of equity and market value of debt and then by subtracting excess cash (including marketable securities).

In line with the existing literature on cash holdings (Kim et al., 1998; Bates et al., 2009; Iskandar-Datta & Jia, 2012; Gao et al., 2013; Hall et al., 2014), dependent variable of the cash holdings model is CASH1, which is computed as natural logarithm of cash and marketable securities scaled by total assets. To ensure robustness of the results, we also use an alternative measure of cash holdings (CASH2), which is defined as cash and marketable securities scaled by total assets.

3.3.2 Independent variables

The following sections provide detailed definitions of the variables used in the models. TC variables are the key variables of interest. They indicate not only the level of investment in trade receivables but also the credit quality of TC exposure of the firms. The variable that proxies level of investment in trade receivables is derived from the existing literature, whereas the indicators of trade receivables credit quality are developed by the author. Definitions of control variables for both the corporate value and cash holdings models are also provided in the subsequent sub-sections.

3.3.2.1 Trade receivable policy variables

The models incorporate two variables that proxy trade receivables policy. The first key variable of interest is REC, which is calculated as trade receivables[8] divided by total assets in line with several studies in the extant literature (Wu et al., 2012; Martinez-Sola et al., 2013; Yao & Dang, 2018; Dary & James, 2019). REC is a measure of a firm's level of investment in trade receivables.

Despite several benefits of investment in trade receivables that have been put forward by proponents of financing, investment and efficiency motives for credit issuance by the supplier to the buyer, there are several costs and potential risks, including counterparty risk, associated with extension of TC. It has been well documented in the related literature that level of investment in trade receivables is negatively associated with firm profitability (Deloof, 2003; Lazaridis & Tryfonidis, 2006; Gill et al., 2010). Furthermore, customer defaults are more frequent, and loss given default is higher for suppliers that issue more TC (Jacobson & Schedvin, 2015). Suppliers with larger TC exposures have an increased likelihood of corporate

[8] Trade receivables include accounts receivable and notes receivable as reported on the firm's fiscal year-end balance sheet.

failure (Jorion & Zhang, 2009). These, combined with robust evidence of diminishing returns to TC (Hill et al, 2015) and evidence regarding the potential riskiness of strategies involving liberal trade receivable policies (Barrot, 2016) lead us to hypothesize that investment in trade receivables is negatively associated with corporate value.

The literature regarding the corporate value consequences of TC supply lacks large sample evidence on the shape of the relationship between investment in trade receivables and corporate value. Martinez-Sola et al. (2013)[9] found a non-monotonic relation between investment in accounts receivable and firm value and conclude that the shape of the relationship is concave. In a recent study, Dary and James (2019) provide small sample evidence that investment in TC is linearly associated with and has positive impact on corporate value.[10] This thesis explores the shape of the relationship between corporate value and TC supply by including a linear as well as a polynomial term for REC in the first version of the corporate value model (Model 1). Therefore, this thesis will provide first large sample evidence regarding the impact of investment in trade receivables on corporate value.

The second key variable of interest is trade receivables credit quality indicator (TRQI) that takes the value 1 to indicate worsened credit quality of trade receivables and 0 otherwise. TRQI is included in Model 2 and Model 3 to analyze the direct impact of a deterioration in credit quality of trade receivables on corporate value and cash holdings, respectively. Based largely on TC provision literature and partly on accounting literature, we define five indicators of worsened credit quality of trade receivables and a combination of two or more of these indicators form the

[9] The authors' evidence is based on a small sample of 54 Spanish listed firms for the period from 2001 to 2007

[10] Dary and James (2019) work with a sample of 204 agro-food firms, that are engaged in food and drinks businesses (both manufacturing and non-manufacturing) over the period 2001-2014.

three versions of TRQI (TRQI1, TRQI2 and TRQI3) whose detailed explanations are provided below. We initially explain the five components of TRQI and then provide definitions of TRQI1, TRQI2 and TRQI3.

One of the TRQI components is the trend in average collection period (ACP). Following Gitman and Zutter (2012, pp. 604), ACP is calculated by dividing year end trade receivables (net of allowances for bad debt) on the balance sheet by daily sales figure (trade receivables / annual sales * 365). ACP measures the average time it takes for the company to collect its trade receivables from customers. ACP for the current year has limited information regarding the credit quality of trade receivables, however ACP trend may be a good signal of the credit quality of trade receivables. An increase in ACP from one year to the other may be an indication of a change in credit policies (Melumad & Nissim, 2009). Furthermore, if this trend continues for several years, it may further be a signal for problems in collecting receivables (Hill et al., 2015). It has been documented in the TC literature that financially constrained buyers have the tendency and motivation to prefer extended TC terms to cash discount (Atanasova, 2012). If this is the case, then the longer the collection terms are, the more constrained are the portfolio of buyers that are offered TC by the supplier. Therefore, the credit exposure of the supplier gets riskier as ACP goes up and this implies worsened trade receivables credit quality (Jacobson & Schedvin, 2015). The upward trend in ACP may reflect either the firms' reluctance about canceling credit lines for their existing and/or seasoned customers whose credit quality have deteriorated over time or the firm's passion and eagerness about growing sales through acquisition of new customers that are more constrained. In most of the cases, the firms experience both of these situations. Therefore, an

increase in average collection period may be a sign that these forces are in action as a result of which trade receivables credit quality would be endangered.

Another component of TRQI is ACP bucket migration indicator. Once an invoice is issued and the goods and/or services are delivered to the customer on a deferred basis, the supplier's collection unit makes sure that the buyer honors its obligation by the due date and in full. Throughout the process of converting trade receivables into cash, collection unit continuously follow up aging of receivables via the aging report, which is a tool to monitor trade receivables credit quality by listing the total amount of unpaid and/or overdue invoices by groupings of days in the form of 30-day buckets (Sagner, 2014). In this report, all trade receivables are categorized according to the length of time an invoice has been outstanding. For instance, if an invoice has been outstanding for 40 days, it is reported under 30-60 day bucket. Similarly, 0-30 day bucket captures invoices that were issued within the last 30 days and so forth. When a firm extends trade receivable terms by offering longer payment terms to its customers, this is reflected in the receivables aging report in the form of a slower than normal collection process as a consequence of company's decision to take greater credit risk in its sales practices. For the purpose of defining ACP bucket migration indicator, we categorize ACP into five buckets from 1 to 5. A firm belongs to bucket 1 if it has an ACP of less than 30 days. Similarly, a firm belongs to bucket 2 if it has an ACP of less than 60 days. Buckets 3 and 4 represent ACP of less than 90 and 120 days, respectively. Finally, firms with ACP of 120 days and higher are placed in bucket 5. Therefore, a migration from a lower to a higher bucket represents an increase in ACP from year t-1 to t such that bucket at time t is above the bucket at time t-1.

Trend of cash conversion cycle (CCC) constitutes another component of TRQI. CCC is calculated by adding the average age of inventory (ending inventory / cost of revenue *365) and ACP and then by subtracting average payment period (accounts payable / annual purchases *365)[11] from this sum (Gitman & Zutter, 2012, pp. 603). CCC proxies the efficiency of WCAP process end-to-end. As has been documented in the extant literature, WCAP management process efficiency explains part of the variation in corporate profitability (Goddard, Tavakoli, & Wilson, 2005). The ultimate goal of WCAP management is to contribute to corporate value by effectively managing current assets and current liabilities and by maintaining a balance between risk and reward at the same time. It is widely believed that the lower the funds tied up in WCAP, the higher the funds available for expansion. Size of funds tied up in inventory, accounts receivable and accounts payable determine the length of the cash conversion cycle. Firms are expected to adopt aggressive WCAP management strategies that would minimize CCC. Therefore, simultaneous lengthening of ACP and CCC may indicate that the company's CCC is affected by the change in the trade receivable policy and that higher amount of funds, which would otherwise be invested in positive NPV projects, are tied up to WCAP. If the company could offset the increase in ACP by shortening inventory days and/or lengthening payable days, each of which has their respective costs, CCC would remain unchanged. However, if the upward trend in ACP is accompanied by an upward trend in CCC, that would indicate a worsening of liquidity position due to deterioration in the credit quality of trade receivables.

Profitability trend indicator is yet another component of TRQI. The literature on determinants of investment in trade receivables also presents evidence regarding

[11] Annual purchases are calculated by adding cost of goods sold and ending inventory and then subtracting beginning inventory from this sum.

the behavior of firms that experience profitability problems. Such firms extend trade receivables collection terms to improve profitability (Molina & Preve, 2009). Therefore, profitability trend indicator takes the value 1 if the company's operating profit margin has been going up for the last three years and 0 otherwise.

Finally, aggressive sales growth is another component of TRQI. Given the empirical evidence regarding the positive impact of TC extension on sales growth (Yazdanfer & Ohman, 2015) and firms' tendency to boost revenue through sales pull-in activities (Melumad & Nissim, 2009), an indicator of aggressive sales growth would also signal worsened trade receivables credit quality. Aggressive sales growth reflects the use of trade receivables investment policy as a tool to improve profitability and to boost sales (Molina & Preve, 2009; Hill et al., 2012; Harris & Dudney, 2018).This indicator takes the value 1 if the company is in the top 25 percentile within its industry for a given year and 0 otherwise. Sales growth rate at time t is calculated as the natural logarithm of $sales_t$ / $sales_{t-1}$.

Based on the above discussion, we define three alternative indicators for trade receivables credit quality, detailed definitions of which are provided below.
The first one is TRQI1, which is an indicator variable that takes the value 1 if the company has upward ACP trend for the last 3 years and migration from a lower ACP bucket to a higher ACP bucket within time t-1 to t. Otherwise TRQI1 takes the value 0. Therefore, TRQI1 has two components, which are ACP trend and ACP bucket migration. A rise in the collection period reflects lengthening of credit terms of sale and such terms involve greater risk exposure as an inevitable consequence (Seiden, 1964). As the trend in ACP is a rather rough measure of changes in credit standards, TRQI1 also involves ACP bucket migration as an additional measure. Therefore, upward trend in collection period combined with migration from a lower to a higher

ACP bucket (in terms of aging of trade receivables) is a more accurate measure of trade receivables credit quality capturing both direction and size of the change in ACP over time.

The second indicator of worsened credit quality of trade receivables is TRQI2. It takes the value 1 if the company has upward trend in both ACP and CCC (cash conversion cycle) for the last 3 years and migration from a lower ACP bucket to a higher ACP bucket within time t-1 to t. Otherwise TRQI2 takes the value 0. TRQI2 is an extended version of TRQI1 and takes into account the trend in CCC over the last three years.

TRQI3 is the third indicator of a deterioration in trade receivables credit quality. This indicator variable takes the value 1 if the company has upward trend in ACP, CCC and operating margin (operating profit / sales) for the last 3 years and has experienced a migration from a lower to a higher ACP bucket within the last year and is in the highest sales growth quartile (above 75 percentile) within its industry calculated separately for each year. Otherwise TRQI3 takes the value 0. Therefore, the five components are combined under TRQI3 to indicate worsened credit quality of trade receivables. If the upward trends in ACP and CCC occur at the same time as upward trend in profitability and excessive growth in sales, this may indicate that the firm has decided to grow and expand by targeting more risky customer segments through longer collection period.

As these are indicators of bad (worsened) trade receivables credit quality, we anticipate a negative relationship between TRQI and corporate value, because a worsened trade receivables credit quality may lead to loss of corporate value due to under-investment issue (PwC's Annual Working Capital Study 2018/19) resulting mainly from bad debt losses and unexpected shocks to operating cash flow process.

TRQI is the key variable of interest not only in the corporate value model but also in the cash holdings model. Cash holdings literature provides guidance regarding the direction of TRQI's impact on cash holdings. In a survey of CFOs from 204 firms across 29 countries in 2005 (Lins et al., 2010), the CFOs were asked to rank the importance of factors in deciding how much excess cash to hold. The CFOs' responses clearly emphasize the role of cash as a cushion against future cash flow shortages. Firms that has an upward trend in average collection period are exposed to higher credit risk and thus have higher probability of facing customer defaults (Jacobson & Schedvin, 2015). This situation impairs the future cash flow generation capability of the supplier. Moreover, the upward trend in average collection period can also restrict firm's access to external capital and can make external financing more costly. These may force the firm to adapt a tighter cash policy. Based on the above discussion, the precautionary motive for corporate cash holdings predicts that TRQI is positively related to cash holdings. Suppliers with low trade receivables credit quality aim to maintain their internal resource availability by tightening the cash policy so that they do not miss future investment opportunities. The expectation of positive sign for TRQI in the cash holdings model also aligns with the findings documented by Acharya et al. (2012) that cash holdings respond to the possibility of a liquidity shortage.

3.3.2.2 Control variables

Definitions of control variables regarding corporate value model and cash holdings model are provided in Table 1 and Table 2, respectively.

Table 1. Control Variable Definitions – Corporate Value Model

Variable	Notation	Definition
Size	SIZE	Natural logarithm of total assets
Leverage	LVRG1	Total liabilities / total assets
Asset Tangibility	PPE	Plant, property and equipment (net) / total assets
Growth	GROWTH	Sales growth rate calculated as the natural logarithm of $Sales_t$ / $Sales_{t-1}$
Profitability	ROA	EBITDA / total assets, where EBITDA is earnings before interest, taxes, depreciation and amortization

Table 2. Control Variable Definitions – Cash Holdings Model

Variable	Notation	Definition
Size	SIZE	Natural logarithm of total assets
Leverage	LVRG2	Net debt / shareholders' equity
Cash Flow	OCF	Cash flow from operations / total assets
Growth Opportunity	MTB	(Book value of assets – book value of equity + market value of equity) / book value of assets
Net Working Capital	NWCAP	(Current assets – current liabilities – cash and marketable securities) / total assets
Tangibility	PPE	Plant, property and equipment (net) / total assets
Research and Development	RD	Research and development expense / total assets
Cash Flow Volatility	OCFVOL	Standard deviation of operating cash flow from t-3 to t divided by average total assets net of cash and marketable securities over the same period[12]

[12] OCFVOL definition is in line with Guney et al. (2007).

Following Cline and Yore (2016), Rong and Xiao (2017) and Fauver et al. (2018), we include size (SIZE), leverage (LVRG1), asset tangibility (PPE), growth (GROWTH) and profitability (ROA) as control variables in the corporate value model. Similarly, consistent with the majority of previous studies in cash holdings literature (Opler et al., 1999; Bates et al., 2009), we include size (SIZE), leverage (LVRG2), cash flow from operations (OCF), market-to-book (MTB), net working capital (NWCAP), asset tangibility (PPE), research and development intensity (RD) and operating cash flow variability (OCFVOL) to control for firm-specific determinants of cash holdings.

3.4 Descriptive statistics and correlation matrix

As presented in Section 3.1 above, two model specifications are tested. In the first and second models, the dependent variables are corporate value and cash holdings, respectively. The descriptive statistics and correlation matrix for the corporate value model variables are presented in Section 3.4.1, whereas the descriptive statistics and correlation matrix for the variables used in cash holdings model are presented in Section 3.4.2.

3.4.1 Corporate value model

The descriptive statistics for the variables of the corporate value model are given in Table 3. An average firm in the sample has sales of USD 2.8 billion whereas the median firm has lower sales, which is USD 444 million. In terms of asset size, the average firm with total asset size of USD 3.4 billion is more than six times bigger than the median firm that has total assets of USD 511 million.

Table 3. Descriptive Statistics - Corporate Value Model

Variable	N	Min	Median	Max	Mean	Std. Dev.
TQ	15265	0.6476	1.6773	14.8687	2.2961	1.8039
EV	15231	0.0405	1.2193	12.6623	1.7392	1.6127
REC	16936	0.0000	0.0919	0.5169	0.1099	0.0982
SIZE	16865	0.1781	6.2394	11.3467	6.1777	2.2053
LVRG1	15093	0.0492	0.5052	2.3745	0.5321	0.2997
PPE	16982	0.0000	0.1316	0.9099	0.2183	0.2265
GROWTH	13578	-1.3838	0.0602	1.7777	0.0849	0.2988
ROA	16708	-2.9650	0.0911	0.4122	-0.0231	0.3707
TRQI1	8509	0.0000	0.0000	1.0000	0.0166	0.1277
TRQI2	7352	0.0000	0.0000	1.0000	0.0014	0.0369
TRQI3	7392	0.0000	0.0000	1.0000	0.0005	0.0233

Such difference between the mean and median values for size, when measured by either sales or total assets, is due to fact that top 10% of observations belong to firms that are very big. For instance, observations at 90, 95 and 99 percentiles have total asset sizes of USD 8.2 billion, USD 17.2 billion and USD 48.1 billion, respectively. Similarly, observations at 90, 95 and 99 percentiles have total sales revenue of USD 6.6 billion, USD 13.2 billion and USD 41 billion, respectively. The composition of the sample with respect to market capitalization is similar to the composition with respect to total assets and sales. The median firm has a market capitalization of USD 704 million, which is nearly one sixth of the mean market capitalization value of USD 4.2 billion. The sample is mostly composed of firms operating in manufacturing and services industries, which make up 54% and 20% of all observations, respectively. Firms operating in mining, retail, transportation and communications industries make up 21% of the sample, whereas the remaining 5% of firms operate in construction, wholesale trade and agriculture industries.

Table 4 provides the correlation matrix for the independent variables included in the corporate value model specification. Highest correlation is between SIZE and

ROA, which is equal to 0.5207. The correlation between TRQI2 and TRQI3 is the second largest correlation. This can be ignored because the impact of these two variables on corporate value is tested separately. The other correlations do not exceed 0.30. Although the correlations between the independent variables are low enough to continue to empirical analysis, we also calculate and report in the last column of Table 4 the Variance Inflation Factor (VIF) to verify the absence of multicollinearity among the independent variables. VIF is an index that shows how much the variance of an estimated regression coefficient is increased due to multicollinearity. 5 or 10 are widely accepted as common critical VIF values (Studenmund, 2006). As indicated in Table 4, the VIF values of all explanatory variables are below 5. Therefore, we can conclude that multicollinearity is not a concern.

Table 4. Correlation Matrix – Corporate Value Model

Variable	REC	SIZE	LVRG1	PPE	GROWTH	ROA	TRQI1	TRQI2	TRQI3	VIF
REC	1									1.16
SIZE	0.0001	1								1.47
LVRG1	0.0454*	0.1881*	1							1.17
PPE	-0.1802*	0.2596*	0.1127*	1						1.18
GROWTH	0.0046	-0.0542*	-0.0235*	-0.0892*	1					1.03
ROA	0.2342*	0.5207*	-0.0514*	0.1978*	0.0269*	1				1.48
TRQI1	0.0379*	-0.0021	0.0016	-0.0272*	0.0207*	-0.0010	1			1.00
TRQI2	0.0159	-0.0165	0.0070	-0.0174	0.0331*	0.0000	0.2596*	1		1.00
TRQI3	0.0167	-0.0203*	0.0042	-0.0193	0.0646*	-0.0024	0.0899*	0.3157*	1	1.01

Note: * p<0.1

3.4.2 Cash holdings model

The descriptive statistics for the variables of the cash holdings model are given in Table 5.

Table 5. Descriptive Statistics – Cash Holdings Model

Variable	N	Min	Median	Max	Mean	Std. Dev.
CASH1	16037	-6.9875	-1.8973	-0.0147	-2.0827	1.3824
CASH2	16038	0.0009	0.1500	0.9854	0.2506	0.2620
SIZE	16865	0.1781	6.2394	11.3467	6.1777	2.2053
LVRG2	15595	-2.3163	0.0000	12.6452	0.2296	1.3420
OCF	16861	-2.4256	0.0726	0.3435	-0.0157	0.3062
MTB	13640	0.6707	1.6777	12.0752	2.2367	1.6158
NWCAP	15556	-1.3107	0.0229	0.5249	0.0215	0.1993
PPE	16982	0.0000	0.1316	0.9099	0.2183	0.2265
RD	16365	0.0000	0.0089	1.5240	0.0905	0.1879
OCFVOL	8923	0.0038	0.0353	0.5127	0.0600	0.0711
TRQI1	8509	0.0000	0.0000	1.0000	0.0166	0.1277
TRQI2	7352	0.0000	0.0000	1.0000	0.0014	0.0369
TRQI3	7392	0.0000	0.0000	1.0000	0.0005	0.0233

Table 6 provides the correlation matrix for the independent variables in the cash holdings model specification. The highest correlation is between OCF and RD, which is equal to -0.7467. The correlation between OCF and OCFVOL is the second largest correlation, which is -0.6210. The third highest correlation is between OCFVOL and RD, which is 0.5940. The next two highest correlations are between SIZE and OCF (0.5158) and between SIZE and OCFVOL (-0.5073). The other correlations do not exceed 0.50. Additionally, we calculate and report in the last column of Table 4 the Variance Inflation Factor (VIF) to verify the absence of multicollinearity among the independent variables. As indicated in the last column of Table 6, the VIF values of all explanatory variables are below 5. Therefore, we can conclude that multicollinearity is not a concern.

Table 6. Correlation Matrix – Cash Holdings Model

Variable	SIZE	LVRG2	OCF	MTB	NWCAP	PPE	RD	OCFVOL	TRQI1	TRQI2	TRQI3	VIF
SIZE	1											1.56
LVRG2	0.,3567*	1										1.27
OCF	0.5158*	0.2410*	1									2.79
MTB	-0,2746*	-0,2589*	-0.2483*	1								1.31
NWCAP	0.1473*	0.0827*	0.3482*	-0.2723*	1							1.22
PPE	0.2596*	0.2696*	0.2266*	-0.2123*	-0.0212*	1						1.21
RD	-0.4654*	-0.3448*	-0.7467*	0.3899*	-0.3834*	-0.2741*	1					2.96
OCFVOL	-0.5073*	-0.3026*	-0.6210*	0.3258*	-0.2573*	-0.2353*	0.5940*	1				1.90
TRQI1	-0.0021	0.0071	-0.0099	0.0051	0.0053	-0.0272*	.0040	-0.0125	1			1.00
TRQI2	-0.0165	-0.0048	-0.0050	0.0129	-0.0090	-0.0174	-0.0052	-0.0043	0.2596*	1		1.00
TRQI3	-0.0203*	-0.0123	-0.0077	0.0369*	0.0005	-0.0193*	0.0017	0.0046	0.0899*	0.3157*	1	1.00

Note: * p<0.1

CHAPTER 4

EMPIRICAL FINDINGS

This chapter presents the empirical results regarding the relationship between level of investment in trade receivables and corporate value. Additionally, results of multivariate regression regarding the corporate value and cash holdings consequences of trade receivables credit quality are also provided in this chapter. Section 4.1 presents the results on the relationship between corporate value and firm's investment in trade receivables. Moreover, empirical results regarding trade receivables investment and corporate value relationship for high and low profitability sub-groups are also provided separately. Section 4.2 displays the findings on the corporate value consequences of trade receivables credit quality. Finally, empirical results regarding the cash holdings consequences of trade receivables credit quality are presented in Section 4.3.

4.1 Trade receivable policy and corporate value

Multivariate regression results regarding the relationship between a firm's trade receivable policy and value are reported and discussed in this section. First, we present findings regarding the direct impact of investment in trade receivables on corporate value. Second set of results provide empirical evidence regarding the relationship between corporate value and TC provision for high and low profitability sub-groups separately.

4.1.1 Impact of investment in trade receivables on corporate value

Table 7 presents the results of multivariate regression on the relationship between investment in trade receivables and corporate value (baseline specification as in

Model 1). Model 1 includes TQ as the dependent variable, first lag of TQ, REC (both linear and quadratic terms) and controls as explanatory variables. The set of control variables include SIZE, LVRG1, PPE, GROWTH and ROA. REC is included in the model to proxy for investment in trade receivables and is treated as an endogenous variable as discussed in Section 3.1.4. Year dummies are also included in the regressions although the results are not reported for brevity.

Table 7. Investment in Trade Receivables and Corporate Value (Dependent Variable: TQ)

Variables	Dependent Variable: TQ	
	Coefficient	Robust Standard Error
REC	-10.9051***	3.3403
REC^2	22.9813***	7.0274
SIZE	-0.0782***	0.0163
LVRG1	0.3725***	0.0812
PPE	-0.7204***	0.1866
GROWTH	0.1436*	0.0825
ROA	0.5172***	0.1855
Lagged TQ	Yes	
Year Dummies	Yes	
Number of Obs.	8482	
ar(1)	0.000	
ar(2)	0.478	
Hansen p-value	0.094	

Note: This table reports the system GMM regression results of the direct impact of REC on TQ. The estimates are robust to heteroscedastic standard errors. REC is included as an endogenous variable and is instrumented by lag 2. Explanations regarding ar(1), ar(2) and Hansen statistics are provided in Section 3.2.3. *, **, *** denote statistical significance at 10%, 5% and 1% levels, respectively.

As per the estimation results, REC coefficients, both linear and polynomial terms, are statistically significant at 1% level. REC coefficient is -10.9051. This implies that as companies invest more in trade receivables, corporate value is reduced. This suggests that, despite several benefits of investment in trade receivables, the costs and potential risks involved in TC supply outweighs the benefits. Therefore, investment in trade receivables has negative impact on corporate value. This finding

supports our hypothesis that investment in trade receivables is negatively associated with corporate value. Additionally, REC^2 coefficient is positive (22.9813) and is statistically significant at 1% level. Thus, the relationship between REC and corporate value is non-linear and concave. This implies that the negative impact of a rise in REC has a more severe impact on corporate value for high-value firms compared to the impact of a similar increase on low-value companies. Therefore, companies that tighten their trade receivables investment policies can improve the value of their respective firms. Control variables are statistically significant, and their signs are in line with similar studies in the literature. While size and asset tangibility have negative impact on corporate value, leverage, growth and profitability affect corporate value positively.

The robustness of the model is assessed by utilizing enterprise value (scaled by book value of assets) as an alternative measure of corporate value. Table 8 presents the results of multivariate regression on the relationship between REC and EV. Consistent with the estimations reported in Table 7, the results show a negative, non-linear and significant relationship between REC and EV. Results regarding the control variables are qualitatively the same. In line with the results presented in Table 7, SIZE and PPE have negative impact on EV and both are statistically significant at 1% level. Additionally, LVRG1, GROWTH and ROA have positive effect on EV, and their statistical significance levels align with those reported in Table 7. Therefore, the results of baseline corporate value specification (Model 1) are robust to the use of TQ and enterprise value as two alternative measures of the dependent variable.

Table 8. Investment in Trade Receivables and Corporate Value (Dependent Variable: EV)

Variables	Dependent Variable: Enterprise Value	
	Coefficient	Robust Standard Error
REC	-9.1599***	3.2180
REC^2	19.0338***	6.4979
SIZE	-0.0639***	0.0157
LVRG1	0.2826***	0.0796
PPE	-0.5823***	0.1843
GROWTH	0.1493*	0.0785
ROA	0.5303***	0.1789
Lagged EV	Yes	
Year Dummies	Yes	
Number of Obs.	8498	
ar(1)	0.000	
ar(2)	0.543	
Hansen p-value	0.078	

Note: This table reports the system GMM regression results of the direct impact of REC on EV. The estimates are robust to heteroscedastic standard errors. REC is included as an endogenous variable and is instrumented by lag 2. Explanations regarding ar(1), ar(2) and Hansen statistics are provided in Section 3.2.3. *, **, *** denote statistical significance at 10%, 5% and 1% levels, respectively.

A recent paper by Dary and James (2019) investigates the relationship between investment in TC and firm profitability. Dary and James (2019) focus on US listed manufacturing and non-manufacturing food and drinks firms (agro-food firms)[13] for the period 2001-2014. The empirical results indicate a significant positive effect of TC investment on firm profitability. Dary and James (2019) re-examine this relationship by utilizing TQ as an alternative performance measure for robustness purposes. They find that investment in TC has positive and statistically significant impact on corporate value, which is proxied by TQ. Their results are specific to agro-food firms. To ensure the robustness of our model, we also re-test Model 1 by limiting our sample to agro-food firms as defined by Dary and James (2019). This limitation leaves us with 266 observations. The results are in line with those of Dary

[13] Sample includes all firms falling under two-digit SIC code 10 and three-digit SIC codes from 200 to 209.

and James (2019) in the sense that the coefficient of REC is positive and statistically significant at 10% level. Moreover, ar(2) p-value of 0.266 and Hansen p-value of 0.272 justify the lack of serial correlation and lack of overidentifying restrictions, respectively. Thus, although REC is negatively associated with TQ for the whole sample, impact of REC on corporate value may be positive when we restrict the sample to a specific industry or a set of industries.

4.1.2 How does investment in trade receivables affect corporate value for firms with high profitability versus low profitability?

As per empirical evidence provided by Petersen and Rajan (1997), loss-making firms tend to extend more credit. This finding was re-confirmed by Molina and Preve (2009), who found that when firms start facing profitability problems, they tend to increase the supply of TC to their clients in an effort to buy market share. Similarly, findings of Giannetti et al. (2011) and Garcia-Appendini and Montoriol-Garriga (2013) suggest that firms with lower profit margins behave differently in the sense that they extend more TC to their clients. Garcia-Appendini and Montoriol-Garriga (2013) interpret such behavior as an attempt to achieve profit margin improvements by attracting new clients. These findings suggest that firms with high and low profitability tend to behave differently regarding their investments in trade receivables. Therefore, we may expect that such behavior also influences the relationship between a firm's trade receivables investment and corporate value. This motivates us to analyze the relationship between a firm's investment in trade receivables and corporate value for high-profit and low-profit firms separately.

High-profit and low-profit sub-groups are determined separately for each year and industry. Industry groupings are based on two-digit SIC codes. High-profit

firms are those that are above the industry median in a given year. Similarly, low-profit firms are those that are below the industry median in a given year. ROA is used as profitability measure. After the data is split into high-profit and low-profit firms, we re-run Model 1 for the two sub-groups separately to analyze the impact of investment in trade receivables on corporate value. As sub-groups are formed with respect to their profitability performance, we already control for profitability. Therefore, ROA is not included in the models in the sub-groups regressions. The results are presented in Table 9. In columns 1, 2 and 3, dependent variable is TQ whereas in columns 4, 5 and 6, dependent variable is EV. Columns 1 and 4 in Table 9 present the baseline corporate value model results for the whole sample. Column 2 and 5 provide the estimation results of corporate value model for high-profit firms whereas columns 3 and 6 provide the estimation results of corporate value model for low-profit firms.

As per the estimation results, REC coefficients, both linear and polynomial terms, are statistically significant at 1% level for low-profit sub-group (columns 3 and 6). Therefore, the regression results for low-profit firms (columns 3 and 6) are very similar to the results for the whole sample (columns 1 and 4). The relationship between REC and corporate value for low-profit firms continues to be significantly negative. The coefficient of REC is 32% above that for the whole sample as a whole when we use TQ as the dependent variable. Similarly, the coefficient of REC is 48% above that for the whole sample as a whole when we use EV as the dependent variable. Furthermore, the non-linearity and concavity of the relationship between REC and corporate value is evidenced by estimation results for low-profit group. Therefore, the negative and non-linear relationship between REC and corporate value only exists among firms with low profitability. Additionally, control variables

are also statistically significant, and their signs are in line with the baseline model (Model 1).

Table 9. Investment in Trade Receivables and Corporate Value for High-profit and Low-profit firms

Variables	Dependent Variable: TQ			Dependent Variable: EV		
	Whole Sample (1)	High (2)	Low (3)	Whole Sample (4)	High (5)	Low (6)
REC	-10.91***	-6.17	-14.48***	-9.16***	-5.40	-13.59***
REC^2	22.98***	12.85	28.47***	19.03***	10.92	26.69***
ROA	0.52***			0.53***		
SIZE	-0.08***	-0.04***	-0.11***	-0.06***	-0.03*	-0.09***
LVRG1	0.37***	0.09***	0.75***	0.28***	0.04	0.59***
PPE	-0.72***	-0.53**	-0.82***	-0.58***	-0.45*	-0.69***
GROWTH	0.14***	0.13**	0.18***	0.15***	0.18	0.18*
Lagged Dep.Var.	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
N	8482	4871	3611	8498	4881	3617
ar(1)	0.00	0.00	0.00	0.00	0.00	0.00
ar(2)	0.48	0.68	0.05	0.54	0.62	0.08
Hansen p-value	0.09	0.21	0.05	0.08	0.32	0.14

Note: This table reports the system GMM regression results of the direct impact of REC on corporate value for high-profitable and low-profitable firm sub-groups separately. The estimates are robust to heteroscedastic standard errors. REC is included as an endogenous variable and is instrumented by lag 2. Explanations regarding ar(1), ar(2) and Hansen statistics are provided in Section 3.2.3. *, **, *** denote statistical significance at 10%, 5% and 1% levels, respectively.

For high-profit firms, there is some noticeable difference compared to low-profit firms. First, REC coefficient for high-profit firms is lower than reported for the whole sample. Additionally, REC coefficient is not statistically significant for high-profit firms. This implies that as firms with low profitability invest more in trade receivables, corporate value is reduced. Therefore, the tendency of low-profitable firms to invest more in trade receivables in an effort to improve their profit margins by acquiring new customers. as documented by Petersen and Rajan (1997), Molina and Preve (2009), Giannetti et al. (2011) and Garcia-Appendini and Montoriol-

Garriga (2013), may destroy corporate value. Therefore, companies that experience profitability problems may destroy corporate value if they choose to improve their profit margins by investing more in trade receivables.

The robustness of the model to alternative measures of profitability is assessed by utilizing ROE (EBITDA[14] divided by book value of equity). When the data is split into high-profit and low-profit firms by using ROE instead of ROA as the measure of profitability, results are very similar to those reported in Table 9. Therefore, the model is robust to alternative definitions of profitability.

4.2 Impact of trade receivables credit quality on corporate value

Table 10 presents the results of multivariate regression on the relationship between trade receivables credit quality and corporate value. Model 2 includes TQ as the dependent variable, first lag of TQ, REC (both linear and quadratic terms), TRQI and controls as explanatory variables. The set of control variables include SIZE, LVRG1, PPE, GROWTH and ROA. REC and TRQI are included in the model to proxy investment in trade receivables and trade receivables credit quality, respectively. Both REC and TRQI are treated as endogenous variables as discussed in Section 3.1.4. Year dummies are also included in the regressions although the results are not reported for brevity. Column 1 re-states the results of the corporate value model (Model 1), whereas columns 2, 3 and 4 present the results of the corporate value model (Model 2), with TRQI1, TRQI2 and TRQI3 as the main variables of interest, respectively.

[14] EBIDTA represents earnings before interest, taxes, depreciation and amortization.

Table 10. Trade Receivables Credit Quality and Corporate Value (Dependent Variable: TQ)

Variables	Dependent Variable: TQ			
	(1)	(2)	(3)	(4)
REC	-10.9051***	-9.9095**	-7.9952**	-8.8093***
	(3.340)	(4.0403)	(3.2098)	(3.2209)
REC^2	22.9813***	22.9634***	17.3907***	18.0814***
	(7.0274)	(8.0675)	(6.7260)	(6.6452)
TRQI1	-	-2.5882	-	-
		(1.8177)		
TRQI2	-	-	-4.5694***	-
			(0.3982)	
TRQI3	-	-	-	-3.4022**
				(1.3602)
SIZE	-0.0782***	-0.0662***	-0.0561***	-0.0621***
	(0.0163)	(0.0245)	(0.0195)	(0.0198)
LVRG1	0.3725***	0.3148***	0.2130**	0.2277**
	(0.0812)	(0.1050)	(0.0927)	(0.0923)
PPE	-0.7204***	-0.6335**	-0.5155**	-0.5746***
	(0.1866)	(0.2715)	(0.2042)	(0.2076)
GROWTH	0.1436*	0.1197	0.1052	0.0780
	(0.0825)	(0.1022)	(0.0978)	(0.0969)
ROA	0.5172***	0.3911	0.3605**	0.3845**
	(0.1855)	(0.2543)	(0.1706)	(0.1735)
Lagged TQ	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Number of Obs.	8482	6912	6097	6117
ar(1)	0.000	0.000	0.000	0.000
ar(2)	0.478	0.110	0.098	0.076
Hansen p-value	0.094	0.054	0.149	0.086

Note: This table reports the system GMM regression results of the direct impact of TRQI1, TRQI2 and TRQI3 on TQ. REC, TRQI1, TRQI2 and TRQI3 are included as endogenous variables and are instrumented by their respective lag 2. Robust standard errors are in parentheses. Explanations regarding ar(1), ar(2) and Hansen statistics are provided in Section 3.2.3. *, **, *** denote statistical significance at 10%, 5% and 1% levels, respectively.

As per the estimation results, respective coefficients of TRQI1, TRQI2, TRQI3 are -2.5882, -4.5694 and -3.4022. TRQI1 is not statistically significant (p-value: 0.154) whereas TRQI2 and TRQI3 are statistically significant at 1% and 5% levels, respectively. This implies that as trade receivables credit quality deteriorates, corporate value is reduced. In other words, as the credit exposure of the supplier gets riskier, firms confront a reduction in corporate value. This implies that a strategy involving looser collection terms is far from achieving a reasonable balance between

profits and risk and thus destroys corporate value. This finding supports our hypothesis that worsened trade receivables credit quality may lead to loss of corporate value. Additionally, there are no major issues regarding the signs and significance levels of control variables when TRQI is included in the corporate value model. SIZE, LVRG1, PPE and ROA continue to be statistically significant and sign of each control variable aligns with their respective signs in the baseline model (Column 1).

The robustness of the model is assessed by utilizing enterprise value (scaled by book value of assets) as an alternative measure of corporate value. The model, as specified in Model 2, includes enterprise value as the dependent variable, first lag of enterprise value, REC (both linear and quadratic terms), TRQI and controls as explanatory variables. Table 11 presents the results of multivariate regression on the relationship between trade receivables policy variables and EV. Column 1 re-states the results of the corporate value model (Model 1), whereas columns 2, 3 and 4 present the results of the corporate value model extended by inclusion of TRQI1, TRQI2 and TRQI3, respectively, as the main variable of interest (Model 2). Consistent with the estimations with TQ, the results show a negative relationship between TRQI and EV. TRQI1 is statistically significant at 5% level, whereas TRQI2 and TRQI3 are statistically significant at 1% level. Results regarding the control variables are similar to those reported in Table 8. When TRQI is included in the corporate value model as an additional explanatory variable, SIZE and PPE continue to be statistically significant and they both have negative impact on enterprise value. Additionally, LVRG1 and ROA, both of which have positive impact on enterprise value, also continue to be statistically significant. Sign of GROWTH also remains unchanged when TRQI is included in the model. However,

as per the results presented in Table 10, GROWTH is not statistically significant (columns 2, 3 and 4).

Table 11. Trade Receivables Credit Quality and Corporate Value (Dependent Variable: EV)

Variables	Dependent Variable: Enterprise Value			
	(1)	(2)	(3)	(4)
REC	-9.1599***	-6.0426	-6.1094**	-7.0895**
	(3.2180)	(3.9891)	(2.9452)	(3.0128)
REC^2	19.0338***	15.9413**	13.6192**	14.7972**
	(6.4979)	(7.6864)	(6.0295)	(6.0222)
TRQI1	-	-3.7364**	-	-
		(1.7927)		
TRQI2	-	-	-5.0856***	-
			(0.3611)	
TRQI3	-	-	-	-3.8251***
				(1.4032)
SIZE	-0.0639***	-0.0416*	-0.0428**	-0.0485***
	(0.0157)	(0.0237)	(0.0174)	(0.0180)
LVRG1	0.2826***	0.1970**	0.1465*	0.1596**
	(0.0796)	(0.0995)	(0.0772)	(0.0783)
PPE	-0.5823***	-0.3585	-0.3485*	-0.4164**
	(0.1843)	(0.2709)	(0.1885)	(0.1963)
GROWTH	0.1493*	0.1448	0.1360	0.1185
	(0.0785)	(0.1014)	(0.0910)	(0.0891)
ROA	0.5303***	0.2857	0.3875**	0.4156**
	(0.1789)	(0.2449)	(0.1585)	(0.1636)
Lagged EV	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Number of Obs.	8498	6923	6116	6136
ar(1)	0.000	0.000	0.000	0.000
ar(2)	0.543	0.115	0.207	0.147
Hansen p-value	0.078	0.030	0.063	0.031

Note: This table reports the system GMM regression results of the direct impact of TRQI1, TRQI2 and TRQI3 on EV. Robust standard errors are in parentheses. REC, TRQI1, TRQI2 and TRQI3 are included as endogenous variables and are instrumented by their respective lag 2. Explanations regarding ar(1), ar(2) and Hansen statistics are provided in Section 3.2.3. *, **, *** denote statistical significance at 10%, 5% and 1% levels, respectively.

As an additional robustness check, we have also analyzed the impact of each TRQI component on corporate value separately. In this analysis, five components of TRQI, which are ACP trend, CCC trend, ACP bucket migration, profit margin trend and aggressive growth indicator, are included in the corporate value model each one at a

time. The aim of this analysis is to identify the individual impact of each TRQI component on corporate value. Moreover, this analysis will reveal whether any of the TRQI components is statistically significant in explaining the variation in corporate value on an individual basis. Table 12 presents the results of the multivariate regression on the relationship between each TRQI component and corporate value. Columns 1 through 5 state the results of the corporate value model with dependent variable TQ, whereas columns 6 through 10 present the results of the corporate value model with the alternative dependent variable EV. As per the empirical results, ACP trend, ACP bucket migration and aggressive growth indicator are not statistically significant in any of the models. CCC trend, which has negative impact on corporate value, is not statistically significant (p-value: 0.2528) when the dependent variable is TQ. However, when the alternative dependent variable of EV is used, coefficient of CCC trend is statistically significant at 10% level (p-value: 0.0611) and is negative (-0.29). Moreover, profit margin trend has positive impact on corporate value and is statistically significant at 5% level in both models. These results indicate that, TRQI components do not have significant impact on corporate value when tested individually. However, when these components are combined to represent the credit quality of trade receivables on a company's books, their collective impact on corporate value is statistically significant and intuitively reasonable. Finally, as indicated by the results presented in columns 1 through 10 of Table 12, control variables continue to be statistically significant and have the same sign as those in the baseline model (Model 1).

Table 12. Trade Receivables Credit Quality Components and Corporate Value

Variables	Dependent Variable: TQ					Dependent Variable: EV				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ACP Trend	-0.1242					-0.2544				
	(0.4491)					*(0.1018)*				
CCC Trend		-0.1929					-0.2898*			
		(0.2528)					*(0.0611)*			
ACP Bucket Migration			-0.4559					0.2382		
			(0.7031)					*(0.8186)*		
Profit Margin Trend				0.3921**					0.3230**	
				(0.0287)					*(0.0287)*	
Aggressive Growth					0.0449					0.0601
					(0.2309)					*(0.1002)*
REC	-10.77***	-7.49**	-11.98***	-10.28***	-11.86***	-7.29**	-6.09**	-8.56***	-6.96**	-8.80***
REC^2	22.37***	15.61**	24.58***	19.79***	24.31***	15.23**	13.07**	17.84***	14.23**	18.00***
SIZE	-0.08***	-0.06***	-0.08***	-0.08***	-0.08***	-0.06***	-0.04**	-0.06***	-0.06***	-0.06***
LVRG1	0.35***	0.21**	0.38***	0.33***	0.40***	0.25***	0.14*	0.25***	0.22**	0.30***
PPE	-0.73***	-0.50**	-0.79***	-0.73***	-0.78***	-0.50**	-0.35*	-0.55***	-0.47**	-0.57***
GROWTH	0.08	0.06	0.13	0.06		0.09	0.10	0.19**	0.09	
ROA	0.50**	0.36**	0.53***	0.43**	0.56***	0.45**	0.39**	0.50***	0.38*	0.49***
Lagged Dep. Var.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No of Observations	6912	6117	8392	6755	8589	6923	6136	8408	6770	8602
ar(1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ar(2)	0.15	0.06	0.41	0.08	0.50	0.21	0.12	0.80	0.15	0.53
Hansen p-value	0.04	0.01	0.15	0.11	0.39	0.01	0.01	0.17	0.02	0.40

Note: This table reports the system GMM regression results of the direct impact of TRQI components on corporate value. The estimates are robust to heteroscedastic standard errors. REC and TRQI components, which are ACP trend, CCC trend, ACP bucket migration, profit margin trend and aggressive growth, are included as endogenous variables and are instrumented by their respective lag 2 and their coefficient p-values are presented in parentheses. Explanations regarding ar(1), ar(2) and Hansen statistics are provided in Section 3.2.3. *, **, *** denote statistical significance at 10%, 5% and 1% levels, respectively.

4.3 Impact of trade receivables credit quality on cash holdings

Table 13 presents the results of multivariate regression on the relationship between TRQI and cash holdings. Model 3 includes CASH1 as the dependent variable, first lag of CASH1, TRQI and controls as explanatory variables. Three versions of TRQI, which are TRQI1, TRQI2 and TRQI3 are tested separately. The set of control variables include SIZE, LVRG2, OCF, MTB, NWCAP, PPE, RD and OCFVOL. TRQI is included in the model to proxy trade receivables credit quality and is treated as an endogenous variable as discussed in Section 3.1.4. Year dummies and lagged values of the dependent variable are also included in the regressions although the results are not reported for brevity. First column in Table 13 presents the results of the estimation where dependent variable (CASH1) is regressed on the control variables, lagged value of CASH1 and year dummies. Estimation results regarding the direct impact of TRQI1, TRQI2 and TRQI3 on CASH1 are presented in columns 2, 3 and 4, respectively.

As per the estimation results presented in column 2 of Table 13, coefficient of TRQI1 is negative but is not statistically significant. However, TRQI2 and TRQI3 coefficients, as presented in columns 3 and 4 of Table 13, respectively, are positive and they are both statistically significant at 1% level. This suggests that firms, whose trade receivables credit quality is inferior, take action towards increasing their cash holdings. This finding is in line with precautionary motive for holding excess cash in the sense that lengthening of average collection period indicates increased credit risk. This situation triggers management of the firm to take precautionary action by increasing their cash holdings to mitigate higher credit risk. Additionally, deterioration in the credit quality of trade receivables may make it harder and/or more costly for the firm to access external capital. This may be another reason why

firms with inferior trade receivables credit quality hold more cash. Thus, TRQI2 and TRQI3 coefficients imply that firms take proactive action in case of a deterioration in trade receivables credit quality over time.

Table 13. Trade Receivables Credit Quality and Cash Holdings (Dependent Variable: CASH1)

Variables	Dependent Variable: CASH1			
	(1)	(2)	(3)	(4)
TRQI1	-	-1.3844 (1.1860)	-	-
TRQI2	-	-	1.1671*** (0.2148)	-
TRQI3	-	-	-	1.3790*** (0.2884)
SIZE	-0.0473*** (0.0080)	-0.0448*** (0.0080)	-0.0449*** (0.0085)	-0.0452*** (0.0085)
LVRG2	-0.0018*** (0.0002)	-0.0016*** (0.0002)	-0.0017*** (0.0002)	-0.0017*** (0.0002)
OCF	0.6027*** (0.0724)	0.6361*** (0.0823)	0.8938*** (0.0984)	0.8831*** (0.0974)
MTB	0.0348*** (0.0063)	0.0359*** (0.0070)	0.0284*** (0.0083)	0.0288*** (0.0082)
NWCAP	-0.9091*** (0.1059)	-0.8462*** (0.1099)	-0.8803*** (0.1123)	-0.8718*** (0.1124)
PPE	-0.7288*** (0.0954)	-0.7063*** (0.0954)	-0.7709*** (0.1012)	-0.7537*** (0.1019)
RD	0.9213*** (0.1403)	1.0184*** (0.1664)	1.4930*** (0.2225)	1.4780*** (0.2213)
OCFVOL	1.3054*** (0.1885)	1.2297*** (0.2360)	1.6128*** (0.2865)	1.5702*** (0.2802)
Lagged CASH1	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Number of Obs.	6557	6270	5481	5501
ar(1)	0.000	0.000	0.000	0.000
ar(2)	0.708	0.733	0.930	0.878
Hansen p-value	0.146	0.220	0.184	0.128

Note: This table reports the system GMM regression results of the direct impact of TRQI1, TRQI2 and TRQI3 on CASH1. Robust standard errors are in parentheses. TRQI1, TRQI2 and TRQI3 are included as endogenous variables and are instrumented by their respective lag 2. Explanations regarding ar(1), ar(2) and Hansen statistics are provided in Section 3.2.3. *, **, *** denote statistical significance at 10%, 5% and 1% levels, respectively.

Moreover, such proactive action may signal to the market that the firm is capable of managing this situation and also that management has taken proper action to mitigate

increased credit risk. Considering the increased focus on liquidity in the period following the 2008-2009 crisis, such precautionary approach to cash management is highly sensible. Findings regarding TRQI2 and TRQI3 also align with Acharya et al. (2012) who report that cash holdings respond endogenously to the possibility of a liquidity shortage. Therefore, the excess cash held by firms with inferior trade receivables credit quality acts as a cushion against a possible cash flow deficit in the future. These findings regarding TRQI2 and TRQI3 support our hypothesis that firms hold more cash as the credit quality of their trade receivables worsens. The findings also align with US firms' increased concern about liquidity risk and their tendency to build up cash reserves following the global financial crisis in 2008 (Ross et al., 2012).

As per the baseline results presented in column 1 of Table 13, coefficients of all control variables are statistically significant at 1% level. SIZE coefficient is negative, which indicates that as companies grow information asymmetry is reduced and cost of external financing decreases. Thus, bigger firms tend to hold less cash than smaller firms. The negative sign of LVRG2 coefficient provides support for the financing hierarchy theory, which predicts that when investments exceed retained earnings debt grows and cash holdings fall. OCF coefficient, which is positive, reflects firms' preference for internal over external finance. MTB coefficient is positive and is consistent with the predictions of trade-off and pecking order theories that firms with valuable growth opportunities hold more cash. NWCAP coefficient, which is negative, confirms that cash and NWCAP are substitutes of each other. PPE coefficient is negative and thus verifies that fixed assets are alternative sources of liquidity. RD coefficient is positive and statistically significant at 1% level. This result indicates that high RD firms have more growth opportunities and they tend to

hold higher levels of cash due to mitigate greater cost of financial distress. OCFVOL coefficient is positive and is in line with the existing literature that predicts firms to hold more cash for precautionary purposes in case of high volatility of cash flow. These findings are in line with several previous studies in the related literature (Opler et al., 1999; Bates et al., 2009; Riddick & Whited, 2009; Drobetz & Gruninger, 2007; Dass et al., 2014; Harford et al., 2014; Doring, Drobetz, Janzen, & Meier, 2018).

In order to ensure the robustness of the model to alternative definitions of the dependent variable, we re-test the model with CASH2 as the dependent variable. Model 3 includes TRQI and controls as explanatory variables. Year dummies and lags of dependent variable are also included as explanatory variables. Table 14 presents the results of multivariate regression on the relationship between trade receivables credit quality indicators and CASH2. Consistent with the results from previous regression, signs of the control variables are in line with previous research in the relevant literature. The signs and significance levels of control variables remain unchanged when CASH2 is employed in the model as the dependent variable. TRQI1 is not statistically significant. However, TRQI2 and TRQI3 coefficients are both positive and continue to be statistically significant at 1% levels. Therefore, the positive and significant impact of trade receivables credit quality on cash holdings persist even when we use an alternative definition of the dependent variable. This robustness check provides further evidence that support our hypothesis. Therefore, our conclusions remain the same.

Table 14. Trade Receivables Credit Quality and Cash Holdings (Dependent Variable: CASH2)

Variables	Dependent Variable: CASH2			
	(1)	(2)	(3)	(4)
TRQI1	-	0.2382	-	-
		(0.1930)		
TRQI2	-	-	0.5904***	-
			(0.0382)	
TRQI3	-	-	-	0.6272***
				(0.0406)
SIZE	-0.0067***	-0.0059***	-0.0072***	-0.0068***
	(0.0011)	(0.0011)	(0.0012)	(0.0012
LVRG2	-0.0002***	-0.0002***	-0.0002***	-0.0002***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
OCF	0.0680***	0.0871***	0.0991***	0.1013***
	(0.0178)	(0.0193)	(0.0167)	(0.0165)
MTB	0.0059***	0.0053***	0.0055***	0.0052***
	(0.0015)	(0.0018)	(0.0019)	(0.0019)
NWCAP	-0.1521***	-0.1423***	-0.1473***	-0.1422***
	(0.0178)	(0.0180)	(0.0170)	(0.0173)
PPE	-0.0945***	-0.0803***	-0.0891***	-0.0859***
	(0.0114)	(0.0119)	(0.0103)	(0.0107)
RD	0.1603***	0.1725***	0.2006***	0.1987***
	(0.0335)	(0.0386)	(0.0416)	(0.0413)
OCFVOL	0.3542***	0.3244***	0.2273***	0.2212***
	(0.0542)	(0.0539)	(0.0507)	(0.0510)
Lagged CASH2	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Number of Obs.	6557	6270	5481	5501
ar(1)	0.000	0.000	0.000	0.000
ar(2)	0.517	0.597	0.435	0.264
Hansen p-value	0.006	0.122	0.057	0.053

Note: This table reports the system GMM regression results of the direct impact of TRQI1, TRQI2 and TRQI3 on CASH2. Robust standard errors are in parentheses. TRQI1, TRQI2 and TRQI3 are included as endogenous variables and are instrumented by their respective lag 2. Explanations regarding ar(1), ar(2) and Hansen statistics are provided in Section 3.2.3. *, **, *** denote statistical significance at 10%, 5% and 1% levels, respectively.

As an additional robustness check, we have also analyzed the impact of each TRQI component on cash holdings separately. In this analysis, five components of TRQI, which are ACP trend, CCC trend, ACP bucket migration, profit margin trend and aggressive growth indicator, are included in the cash holdings model each one at a time. The aim of this analysis is to identify the individual impact of each TRQI component separately. Moreover, this analysis will reveal whether any of the TRQI

components are statistically significant in explaining the variation in cash holdings on an individual basis. Table 15 presents the results of the multivariate regression on the relationship between each TRQI component and cash holdings. Columns 1 through 5 state the results of the cash holdings model with dependent variable CASH1, whereas columns 6 through 10 present the results of the cash holdings model with the alternative dependent variable CASH2. As per the empirical results, CCC trend, profitability trend and aggressive growth indicator are not statistically significant in any of the models. ACP trend, which has negative impact on cash holdings, is statistically significant at 5% level (p-value: 0.0245) when the dependent variable is CASH1. However, when the alternative dependent variable of CASH2 is used, ACP trend is not statistically significant (p-value: 0.3942). Moreover, ACP bucket migration has positive impact on cash holdings and is statistically significant at 5% level (p-value: 0.0328) when the dependent variable is CASH2, whereas the coefficient of ACP bucket migration is not statistically significant when the dependent variable is CASH1. These results indicate that, TRQI components do not have significant impact on corporate cash levels when tested individually. However, when these components are combined to represent the credit quality of trade receivables on a company's books, their collective impact on cash holdings is statistically significant and intuitively reasonable. Finally, as indicated by the results presented in columns 1 through 10 of Table 15, control variables continue to be statistically significant at 1% level and have the same sign as those in the baseline model (Model 3).

Table 15. Trade Receivables Credit Quality Components and Cash Holdings

Variables	Dependent Variable: CASH1					Dependent Variable: CASH2				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ACP Trend	-0.2928**					0.0144				
	(0.0245)					*(0.3942)*				
CCC Trend		-0.0823					-0.0031			
		(0.5148)					*(0.8502)*			
ACP Bucket Migration			0.6105					0.2848**		
			(0.4046)					*(0.0328)*		
Profitability Trend				-0.0392					-0.0154	
				(0.6923)					*(0.2684)*	
Aggressive Growth					-0.0556					0.0123
					(0.7438)					*(0.6246)*
SIZE	-0.04***	-0.05***	-0.05***	-0.04***	-0.05***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***
LVRG2	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***
OCF	0.66***	0.87***	0.83***	0.76***	0.65***	0.08***	0.10***	0.13***	0.09***	0.08***
MTB	0.04***	0.03***	0.03***	0.04***	0.04***	0.01***	0.01***	0.01***	0.01***	0.01***
NWCAP	-0.86***	-0.87***	-0.91***	-0.86***	-0.89***	-0.15***	-0.15***	-0.14***	-0.15***	-0.14***
PPE	-0.70***	-0.76***	-0.72***	-0.72***	-0.71***	-0.09***	-0.09***	-0.08***	-0.09***	-0.09***
RD	1.03***	1.47***	1.12***	1.14***	1.01***	0.18***	0.21***	0.18***	0.21***	0.17***
OCFVOL	1.25***	1.55***	1.34***	1.46***	1.41***	0.32***	0.22***	0.27***	0.33***	0.32***
Lagged Dep. Var.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No of Observations	6270	5501	6264	6101	6369	6270	5501	6264	6101	6369
ar(1)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ar(2)	0.81	0.89	0.74	0.87	0.89	0.43	0.23	0.62	0.34	0.45
Hansen p-value	0.37	0.04	0.40	0.36	0.31	0.05	0.06	0.10	0.08	0.02

Note: This table reports the system GMM regression results of the direct impact of TRQI components on cash holdings. The estimates are robust to heteroscedastic standard errors. TRQI components, which are ACP trend, CCC trend, ACP bucket migration, profit margin trend and aggressive growth, are included as endogenous variables and are instrumented by their respective lag 2 and their coefficient p-values are presented in parentheses. Explanations regarding ar(1), ar(2) and Hansen statistics are provided in Section 3.2.3. *, **, *** denote statistical significance at 10%, 5% and 1% levels, respectively.

CHAPTER 5

CONCLUSION

The size of a firm's investment in current assets and the financing of this investment constitute the most important and essential aspects of short-term financial policy. Chief Financial Officers believe that the corporate value impact of effective working capital management is no less than the value impact of any other activity in which they are engaged (Servaes & Tufano, 2006). The practice of granting credit is extremely common among non-financial corporations. Trade receivables, which represent a major investment of financial resources by US businesses, has economic significance both at the micro and macro levels. Extensive provision of trade credit confirms the commitment of non-financial firms in the financial field through trade credit. Increased concerns about liquidity risk among treasury professionals at North American companies and rapidly declining reliance of businesses on short-term credit lines from banks and other sources after the 2008 global financial crisis imply that not only the level of firms' investment in trade receivables but also the credit quality of these receivables have become even more critical for firms. Therefore, management of the credit quality of trade receivables has become an important and critical aspect of short-term finance as quality issues regarding a firm's trade receivables may well affect the predictability, amount and timeliness of cash inflows from customers.

In this thesis, we aim to investigate not only the consequences of level of investment in trade receivables, but also the consequences of a worsening in the credit quality of trade receivables. We document first large sample US evidence regarding the relationship between the level of investment in trade receivables and

corporate value. Furthermore, this relationship is analyzed separately for firms with high and low profitability. Additionally, we develop a measure to capture weakening in credit quality of trade receivables and analyze the corporate value and cash holdings consequences of such deterioration in trade receivables credit quality.

Based on a sample of publicly traded, US-incorporated non-financial and non-utility firms listed on NYSE, NASDAQ and AMEX from 2010 to 2016, we provide large sample evidence regarding the direct impact of the level of investment in trade receivables on corporate value. As per the regression results, a firm's level of investment in trade receivables has negative impact on corporate value and this relationship is non-linear. This implies that the negative impact of a rise in trade receivables investment has a more severe impact on corporate value for high-value firms compared to the impact of a similar increase on low-value companies. This constitutes first large sample evidence for US regarding the corporate value consequences of investment in trade receivables. This relationship is re-tested for a sub-sample of agro-food firms to see whether our model would generate the same result for that specific business segment as reported by Dary and James (2019), who found a significant positive effect of TC investment on firm profitability. Our results are in line with those of Dary and James (2019) in the sense that the coefficient of REC is positive and statistically significant at 10% level. However, this finding, which is specific to agro-food firms, raises concerns about the generalizability of large sample evidence to each industry in the sense that the negative relationship between level of investment in trade receivables and corporate value may be reversed when we test the model with smaller sub-samples from different industries or business segments.

Next, we examine the relationship between a firm's investment in trade receivables and corporate value for high-profit and low-profit firms separately. This is due to several findings in trade credit literature suggesting that high and low profitability firms tend to behave differently regarding their investments in trade receivables (Petersen & Rajan, 1997; Molina & Preve, 2009; Giannetti et al., 2011; Garcia-Appendini & Montoriol-Garriga, 2013). These findings indicate that firms with lower profit margins extend more trade credit to their clients. Our results indicate that the negative and non-linear impact of investment in trade receivables is statistically significant for low-profit firms, whereas this relationship is negative but is not statistically significant for high-profit firms. Therefore, companies that experience profitability problems may destroy corporate value if they choose to improve their profit margins by investing more in trade receivables.

Moreover, we also demonstrate for the first time in trade credit literature that a deterioration in the credit quality of trade receivables has direct impact on corporate value. To analyze the impact of trade receivables credit quality on corporate value, we define three alternative indicators for trade receivables credit quality. These indicators, which take the value 1 if there is a deterioration in credit quality of trade receivables and 0 otherwise, mainly represent trends in average collection period and cash conversion cycle as well as whether the firm has recently experienced a migration from a lower ACP bucket to a higher ACP bucket. These indicators are derived from several discussions in trade credit as well as accounting literatures regarding the credit quality of trade receivables (Melumad & Nissim, 2009; Hill et al., 2015; Atanasova, 2012; Jacobson & Schedvin, 2015; Hirschlifer et al., 2019). Therefore, based on several studies in trade credit and accounting literatures, we are the first to define an indicator variable that proxies deterioration in

the credit quality of trade receivables. The findings of the multivariate regressions that analyze the impact of trade receivables credit quality on corporate value indicate that as the credit exposure of the supplier gets riskier, firms experience a reduction in corporate value. This implies that a strategy involving looser collection terms is far from achieving a reasonable balance between risk and return and thus destroys corporate value.

Finally, our thesis also brings out new evidence regarding the cash holdings consequences of a deterioration in the credit quality of trade receivables. The findings suggest that firms with worsened credit quality of trade receivables tend to have higher levels of cash. This finding is in line with precautionary motive for holding excess cash in the sense that weakening of trade receivables credit quality indicates increased credit risk. This situation triggers management of the firm to take precautionary action that reveals itself in the form of increased cash holdings. Deterioration in the credit quality of trade receivables may also make it harder and/or more costly for the firm to access external capital and this may be another reason why firms with inferior trade receivables credit quality hold more cash. Considering the increased focus on liquidity in the period following the 2008-2009 crisis (Ross et al., 2012), such precautionary approach to cash management is highly sensible. Our findings also align with Acharya et al. (2012) who report that cash holdings respond endogenously to the possibility of a liquidity shortage. Therefore, the excess cash held by firms with inferior credit quality of trade receivables acts as a cushion against a possible cash flow deficit in the future.

Our findings regarding the impact of trade receivables credit quality also aligns with the findings of Harris and Roark (2017), who provide evidence that market-wide increases in cash flow risk is a major factor explaining the decline in

aggregate trade credit levels across US listed firms. Therefore, a deterioration in credit quality of trade receivables may lead to unexpected shocks to operating cash flow and may create further volatility. This helps explain the negative impact of deterioration in trade receivables credit quality on corporate value as well as the precautionary excess cash held by companies that experience a decline in the credit quality of trade receivables over time.

With this thesis, we contribute to both trade credit literature and cash holdings literature in several ways. To the best of our knowledge, this is the first attempt to define an indicator of trade receivables credit quality. Furthermore, this study analyzes the impact of a deterioration in trade receivables credit quality on both corporate value and cash holdings. Additionally, we are the first to investigate the nature of the relationship between a firm's level of investment in trade receivables and corporate value for a large sample of US firms. Finally, to the best of our knowledge, this is the first study to analyze the impact of investment in trade receivables on corporate value for high profitable and low profitable firms separately.

In a nutshell, our findings present strong empirical evidence that it is not only the level of investment in trade receivables but also the credit quality of trade credit provided to customers that have corporate value and cash holdings consequences. Additionally, firms should be very cautious when implementing liberal trade receivable policies as such a strategy may have unfavorable corporate value consequences. Finally, firms' tendency to hold excess cash following a deterioration in trade receivables credit quality may retain such firms from investing their assets in other alternatives with higher rates of return.

Research in this area may be extended further by utilizing bad debt expense and net write-offs as additional variables, which may be useful in analyzing the credit quality of trade receivables (Melumad & Nissim, 2009). Additionally, an assessment of the corporate value and cash holdings consequences of trade receivables policy for private firms may provide useful further insights in this area. By capturing both publicly quoted companies and privately held firms, such analysis would allow us to obtain a complete and more thorough picture of how trade receivables policy of firms impact corporate value and cash holdings of firms. Finally, the analysis of trade receivables credit quality indicator and its consequences in emerging markets may well provide valuable insights into the role of trade credit in countries with relatively less developed capital markets.

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