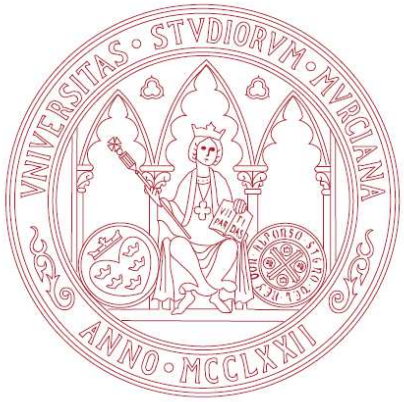

UNIVERSIDAD DE MURCIA

FACULTAD DE ECONOMÍA Y EMPRESA

SHORT-TERM FINANCIAL MANAGEMENT AND FIRM VALUE

GESTIÓN FINANCIERA DEL CIRCULANTE Y CREACIÓN DE VALOR EN LA EMPRESA

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A los amores de mi vida:

los pilares de mi existencia,

mi gran amiga desde que llegó al mundo

y mi compañero de viaje.

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SUMMARY IN SPANISH
(RESUMEN EN ESPAÑOL)

El activo y pasivo corriente tiene gran importancia en las empresas, como muestra el importante peso que tesorería, clientes, o proveedores representan dentro del balance. Así, para las empresas analizadas en esta tesis doctoral la tesorería media oscila entre 8% y el 11% de los activos totales (datos obtenidos de los capítulos 1 y 2, respectivamente), la inversión en clientes entre el 33%-34% (capítulos 3 y 4) y la financiación que proporcionan los proveedores se sitúa en torno al 25% (capítulo 5). Sin embargo, a pesar de esta manifiesta importancia del corto plazo, la literatura financiera se ha centrado fundamentalmente en el estudio de la política de inversión y financiación a largo plazo. Por ello, esta tesis doctoral se plantea con el objetivo de profundizar en el estudio de las decisiones financieras a corto plazo. Concretamente, se analizan las implicaciones de la tesorería, clientes y proveedores en el valor y la rentabilidad empresarial. La literatura económica argumenta que en ausencia de imperfecciones de mercado las decisiones financieras de las empresas no afectarían a su valor. En esta situación, la financiación externa siempre está disponible y a un precio razonable. Sin embargo, la existencia de imperfecciones abre la posibilidad a la existencia de un nivel óptimo que equilibre costes y beneficios y maximice el valor de la empresa.

La tesis está estructurada en tres partes. La primera parte comprende los capítulos 1 y 2, y se destina al análisis de la tesorería. En concreto, se estudia la relación entre la inversión en efectivo y el valor de la empresa, así como la velocidad de ajuste al nivel objetivo de tesorería. La segunda parte incluye los capítulos 3 y 4, en los cuales se analiza el crédito comercial desde el punto de vista de la inversión en clientes (crédito comercial concedido) y su efecto sobre el valor y la rentabilidad de las empresas. La última parte, Capítulo 5, investiga el valor del crédito comercial recibido (acreedores comerciales).

En la primera parte (Capítulo 1), se estudia la relación entre los niveles de tesorería mantenidos por las empresas y el valor de las mismas. La literatura previa ha estudiado los determinantes de los niveles de efectivo. Además, estudios recientes han investigado el incremento que se produce en el valor del accionista asociado a un incremento de una unidad monetaria invertida en tesorería. Este capítulo a diferencia de todos los trabajos previos destinados al estudio del valor marginal de la tesorería, considera la posibilidad de que exista una relación no lineal entre tesorería y valor. De este modo, se contribuye a la literatura al analizar empíricamente la existencia de un

nivel de tesorería que maximiza valor de la empresa desde la perspectiva del *trade-off* entre los beneficios y costes que presenta la inversión en activos líquidos. El mantenimiento de tesorería puede resultar beneficioso para la empresa debido al ahorro en costes de transacción al no tener que recurrir a financiación externa o liquidar activos para realizar los pagos necesarios. De este modo la tesorería puede prevenir que las empresas renuncien a oportunidades de inversión rentables. Además, las empresas acumulan dinero en efectivo para hacer frente a contingencias imprevistas y para cubrir el riesgo de déficits de caja futuros. Sin embargo, la tesorería implica un coste de oportunidad para la empresa debido a la baja rentabilidad de los activos líquidos. Además, mantener saldos de efectivo elevados puede incrementar los conflictos de agencia entre directivos y accionistas, ya que los primeros gozarían de una mayor discrecionalidad lo que podría hacer que se malgasten los recursos líquidos de la empresa. Por otro lado, se estudia si las desviaciones respecto a dicho nivel de tesorería reducen el valor de la empresa. Los resultados muestran una relación no lineal entre la tesorería y valor de la empresa. En particular, se encuentra una relación con forma de U invertida, que pone de manifiesto la existencia de un nivel que maximiza el valor de la empresa. Es decir, la tesorería aumenta el valor hasta el punto de inflexión (máximo de la función), a partir del cual los incrementos en el saldo de tesorería reducen el valor. Adicionalmente y consistente con lo anterior, los resultados demuestran que a medida que los niveles se alejan del punto de inflexión el valor de la empresa se reduce.

Dentro de esta primera parte, el capítulo 2 se centra en el estudio de la velocidad de ajuste de la tesorería hacia el nivel objetivo. En concreto se analiza si la velocidad con la que las empresas se ajustan a su objetivo depende de factores como las oportunidades de crecimiento, las restricciones financieras y, en última instancia, las dificultades financieras. Trabajos previos han demostrado que el comportamiento financiero de la empresa se caracteriza por un ajuste parcial hacia los niveles objetivos. Adicionalmente, esta investigación contribuye a la literatura, centrada fundamentalmente en empresas grandes, analizando la velocidad de ajuste para una muestra de pequeñas y medianas empresas (PYMES), las cuáles sufren mayores problemas de asimetría informativa y más dificultades de acceso a los mercados de capitales. Los resultados obtenidos muestran que las empresas con mayores oportunidades de inversión, mayores restricciones financieras, y aquellas con mayor probabilidad de sufrir dificultades financieras presentan un ajuste más rápido hacia su

nivel objetivo de tesorería. Esto sería consistente con la idea de que para estas empresas la flexibilidad financiera que aporta la tesorería es un recurso valioso y, por tanto, tratarán de estar cerca del nivel óptimo con el objetivo de aprovechar oportunidades de inversión rentables cuando surjan, así como para hacer frente a posibles imprevistos.

La segunda parte de esta tesis se dedica al estudio del crédito comercial concedido por las empresas a sus clientes. Los derechos de cobro que nacen con la venta aplazada suponen una inversión muy importante para la empresa. Por tanto, el objetivo es estudiar las posibles implicaciones de la inversión en clientes sobre el valor y la rentabilidad empresarial. En concreto, el capítulo 3 analiza el efecto del crédito comercial concedido sobre el valor de la empresa considerando el *trade-off* entre beneficios y costes, para lo que se estima una relación no lineal entre estas dos variables. En este sentido, la literatura ha explicado el uso del crédito comercial sobre la base de sus beneficios financieros, operacionales y comerciales. El crédito comercial puede mitigar las restricciones financieras de los clientes, reducir los costes de transacción al realizar los pagos de las facturas periódicamente, estimular las ventas en períodos de baja demanda, servir como mecanismo de discriminación de precios entre clientes que pagan a crédito y al contado, reducir la asimetría informativa entre el vendedor y el comprador respecto a la calidad del producto, e incluso mejorar la relación proveedor-cliente. Sin embargo la inversión en clientes implica un riesgo de impago y un coste de oportunidad para la empresa. Además, conceder crédito comercial es costoso ya que requiere financiación y conlleva unos costes administrativos. Por otro lado, este capítulo también investiga cómo las desviaciones respecto del nivel objetivo de tesorería afectan al valor de la empresa. Los resultados muestran una relación cuadrática entre clientes y valor como resultado de dos efectos contrapuestos; por un lado conceder crédito comercial a los clientes puede resultar beneficioso para la empresa debido al posible incremento de los flujos de caja, proveniente de unas mayores ventas o precios más elevados, pero por otro lado existen costes de financiación, pérdidas por créditos comerciales incobrables y costes de gestión del crédito comercial concedido. En consecuencia, existe una relación positiva entre crédito comercial concedido y valor a bajos niveles de clientes y una negativa para niveles elevados de inversión en clientes. Además, encontramos que las desviaciones respecto del nivel objetivo reducen el valor de la empresa.

Una vez estudiadas las implicaciones sobre el valor de la inversión en clientes, se analiza el efecto de la concesión de crédito comercial sobre la rentabilidad de las PYMES (capítulo 4). De este modo se contribuye a la literatura previa en dos aspectos importantes. En primer lugar, se proporciona evidencia empírica sobre la relación entre clientes y rentabilidad, lo cual no ha sido analizado previamente. En segundo lugar, se estudia si la rentabilidad de la inversión en clientes varía en función de las características de las empresas. Las empresas con mejor acceso a la financiación externa y mayor liquidez podrían incrementar su rentabilidad financiando el crecimiento de los clientes con mayores restricciones financieras. Además, la rentabilidad del crédito comercial también podía ser superior para empresas con mayor incertidumbre en su demanda, ya que éste ayuda a reducir costes operativos y alisar la demanda. Los resultados evidencian una relación lineal (positiva) entre clientes y rentabilidad, lo que implica que los beneficios de conceder crédito comercial en las PYMES superan a los costes. Esto puede deberse a una mayor asimetría informativa respecto a la calidad del producto y a que las presiones competitivas a las que están sujetas las PYMES hace que tengan que ofrecer crédito comercial para prevenir la pérdida de ventas y la consecuente disminución en la rentabilidad. Además, el efecto de la inversión en clientes sobre la rentabilidad varía en function del tamaño de la empresa, los flujos de caja y la variabilidad de las ventas. En particular, se encuentra una mayor rentabilidad del crédito concedido para las empresas más grandes, con mayor liquidez y con mayor incertidumbre en las ventas.

La tercera parte del trabajo (capítulo 5) se dedica al análisis del crédito comercial desde el punto de vista de la financiación (crédito recibido de los acreedores comerciales o proveedores de la empresa). En particular, el objetivo de este capítulo es analizar el efecto que tiene la financiación de los proveedores sobre el valor de la empresa y las posibles diferencias que pueden existir en función del acceso a la financiación por parte de la empresa. Hasta nuestro conocimiento sólo existe un artículo, elaborado con datos de empresas estadounidenses cotizadas, que trate las implicaciones de la financiación de proveedores sobre la riqueza del accionista y el efecto de las restricciones financieras y motivos operacionales en la relación proveedores-valor. Con este capítulo se contribuye a aportar nueva evidencia sobre a la escasa literatura existente, centrándonos además en el estudio de PYMES, en las que el crédito comercial tiene una especial relevancia debido a la mayor dificultad de acceso a los mercados financieros. Respecto a los resultados obtenidos, se encuentra

un valor positivo de la financiación de los proveedores. En segundo lugar, el valor del crédito comercial recibido para las empresas con mejor acceso a los mercados financieros y a la financiación interna es menor que para las empresas con restricciones financieras. Estos resultados apoyan el motivo financiero del crédito comercial. El crédito comercial puede aliviar las restricciones financieras de las empresas, ya que además de proporcionar financiación externa puede actuar como una señal informativa de la calidad crediticia de la empresa. En efecto, si dada la mayor información que poseen los proveedores sobre el funcionamiento de la empresa, conceden financiación, esto puede ser visto de forma positiva por el resto de prestamistas.

Las principales implicaciones para académicos, directivos y otros grupos de interés es que esta tesis doctoral demuestra la importancia de la gestión financiera del activo y del pasivo corriente en la maximización del valor de la empresa. Las políticas de tesorería y de crédito comercial (inversión en clientes y financiación de proveedores) son elementos importantes que afectan al valor de la empresa.

Una posible limitación de esta tesis es que está realizada en un período de crecimiento económico (excepto el capítulo 2). Desde nuestro punto de vista la robustez temporal de los resultados sería interesante. Cuando la información esté disponible, sería apropiado considerar un período más largo de análisis y comparar los resultados y conclusiones obtenidos, ya que debido a las restricciones financieras y de liquidez que sufren las empresas durante la actual crisis económica las relaciones encontradas podrían verse afectadas. Por tanto, esto sería un paso importante para la investigación futura. Adicionalmente el análisis podría extenderse investigando las implicaciones sobre el valor y la rentabilidad en función de la fase del ciclo de vida financiero en que se encuentre la empresa. Otro posible tema de investigación podría centrarse en los factores determinantes de la velocidad de ajuste hacia los niveles objetivos de clientes y proveedores. Por último, otra posible futura línea de investigación incluye el estudio del efecto de la inversión en inventarios sobre el valor y la rentabilidad de la empresa.

INTRODUCTION

Most corporate finance literature focuses on long-term financial decisions, such as capital structure and dividend policy. However, the economic importance of the current assets and liabilities is significant as they represent an important share of items on a firm's balance sheet. Specifically, the average cash holdings range from 8% to 11% of total assets, for listed US firms and Spanish small and medium-sized firms (SMEs), respectively, while the investment in receivables is 33% (34%), for Spanish listed firms (Spanish SMEs). Finally, the financing that suppliers provide represents a quarter of total assets; the average accounts payable to total assets ratio is 25% for Spanish SMEs[1]. Given the importance of operating assets and liabilities for firms, there is a body of literature analyzing the determinants of cash holdings, accounts receivable and accounts payable. However the effect of these short-term financial decisions on firm's value and profitability is scarce and in some cases inexistent. Therefore, the objective of this doctoral thesis is the study of short-term financial decisions, cash holdings, accounts receivable and accounts payable, and their impact on firms' value and profitability. The financial literature argues that in the absence of market imperfections, firms' financial decisions would not affect their value. In this theoretical situation, external finance is always readily available and at a reasonable price.

The thesis is structured in three parts. The first, Chapter 1 and Chapter 2, focuses on the study of cash holdings. Specifically, there is an analysis of the relationship between cash holding and firm value and the effect of growth and financing on the speed of adjustment towards target cash holdings. The second part includes Chapters 3 and 4, which analyze trade credit from the standpoint of investment in accounts receivable, in particular the effect of granting trade credit on firm value and profitability. The last part, Chapter 5, studies trade credit from the perspective of financing, and investigates the effect of trade payables on firm value. Below we explain in more detail the objective of each chapter.

The objective of Chapter 1 is to study the effect of cash holding on firm value. This contributes to the literature by empirically testing the existence of an optimum cash level which maximizes firm value from the perspective of the trade-off between costs and benefits of investing in liquid assets. From that of the benefits, the literature highlights the precautionary and transactional motive of cash holdings, while the

[1] This and previous data have been obtained from the following chapters.

investment in liquid assets is costly, due to agency conflicts and opportunity costs. The study first considers a non-linear relationship between cash holdings and firm value. Secondly, if a concave relation exists, it is studied whether deviations from the inflexion point (maximum) reduce firm value.

Chapter 2 examines the effect of growth and financing on the speed of adjustment towards target cash holdings. In the absence of costs of adjustment, the static tradeoff theory is correct, so each firm's observed cash ratio would be its optimal ratio. Nevertheless, capital market imperfections could lead to lags in adjustment to optimal cash holdings levels. The main contribution is to analyze the effect of firm's growth opportunities, financial constraints and financial distress on the speed of adjustment of cash. This research also contributes to the literature, mainly focused on large firm, by analyzing cash rebalancing behavior in SMEs, which face greater information asymmetry problems and financial constraints, given their greater difficulties in accessing capital markets because of market frictions.

Chapter 3 investigates the relationship between accounts receivable and firm value. The existence of market imperfections might impact on the trade credit decision and allow an opportunity for the credit policy to affect firm value. Trade credit literature suggests the existence of an optimal accounts receivable level when the marginal revenue of trade credit lending equals the marginal cost. Considering this tradeoff between benefits, mainly incremental cash flows from increased sales or higher prices, and costs associated with granting credit such as financing costs, losses from bad debts, and costs of managing credit, we contribute by estimating a non-linear relationship between trade credit granted and firm value. In addition, we study how deviations from the target receivables level affect firm value.

Chapter 4 introduces the management of accounts receivable in SMEs. Trade credit effects on SMEs profitability have not been explored in the literature. Therefore, the objective of this chapter is to provide empirical evidence of the effect of granting trade credit on SMEs' profitability. The effect of trade receivables on firm profitability could differ in the case of SMEs regarding large firms, since these firms usually have less bargaining power and need to guarantee the quality of the products they sell, and these firms could be forced to offer competitive credit terms to be successful. Therefore, despite the existence of both benefits and costs of granting trade credit

discussed in the previous chapter, the relationship between accounts receivables and firm value could be positive and linear. In this chapter, we contribute by studying this relationship and by analyzing the differences in the profitability of trade credit according to financial, operational, and commercial motives for trade credit use.

Chapter 5 analyzes the value of trade credit financing (accounts payable) as well as the variation in this value that arises from differences in access to financial markets and internal financing. This Chapter contributes to explain the effect of accounts payable on value and, more importantly, the differences in trade payables value by focusing on the financial motive. Trade credit as a financing source could help firms to overcome financial constraints, especially when institutional credit is unavailable. Moreover, it could be an instrument used by less creditworthy and constrained firms to acquire reputation and alleviate adverse selection. Also, trade credit received offers more financial flexibility than bank loans (Danielson and Scoot, 2004). Finally, it reduces transaction costs related to the reception, verification and payment of merchandise (Ferris, 1981; Smith, 1987). However, supplier financing could have an implicit cost, which depends on the cash discount for prompt payment and the discount period, although in Spain the cash discount is not widely used.

Finally, a summary of the main conclusions obtained from this thesis are presented.

PART 1

CORPORATE CASH HOLDING

CHAPTER 1

CORPORATE CASH HOLDING AND FIRM VALUE

1. INTRODUCTION

Corporate cash holding is receiving increasing attention in the finance literature. The special interest lies in the fact that corporations hold significant amounts of cash in their balance sheets. Specifically, Dittmar and Marth-Smith (2007) state that in 2003 the sum of all cash and marketable securities represented more than 13% of the sum of all assets for large publicly traded US firms. From another perspective, the aggregate cash held by publicly traded US firms in 2003 represents approximately 10% of annual US GDP. Consequently, the cash reserves of a firm are a relevant factor of study and one that affects firm's value. Liquidity management may therefore be a key issue for corporate policy.

The first studies to focus on this topic looked at antecedents of corporate cash holdings (Ferreira and Vilela, 2004; García-Teruel and Martínez-Solano, 2008; Kim, Mauer and Sherman, 1998; Opler, Pinkowitz, Stulz and Williamson, 1999; Ozkan and Ozkan, 2004). Most of these papers assume that a target cash level exists; proving that cash decisions follow a partial adjustment model, though no empirical evidence justifies why firms follow a partial adjustment model.

Recent papers investigate the marginal value of cash from different perspectives. They study how valuable or necessary cash is by analyzing the increase in shareholder value associated with one additional dollar held by the firm, splitting the sample into subsamples according to firm-specific conditions. Specifically, Pinkowitz, Stulz and Williamson (2006) estimate the marginal value of cash and find that the relation between cash holdings and firm value is much weaker in countries with poor investor protection than in other countries. Dittmar and Marth-Smith (2007) investigate how corporate governance impacts on firm value by comparing the value and use of cash holdings in poorly and well-governed firms. Another group of studies links the value of cash to firm's investment opportunities (Pinkowitz and Williamson, 2007) or to corporate financial policies (Faulkender and Wang, 2006). Drobetz, Grüninger and Hirschvogl (2010) study the marginal value of cash in connection with firm-specific and time varying information asymmetry, obtaining that information asymmetry decreases the marginal value of cash. Finally, Tong (2011) studies the effect of firm diversification on the value of corporate cash holdings by employing the Faulkender and Wang (2006) methodology to measure the marginal value of cash holdings.

Despite the increasing amount of literature on corporate cash holding, no studies focus on the straight link–on effect of corporate cash holdings on firm value. Corporate cash holdings have benefits and costs for the firm and, consequently, an optimum cash level may exist at which the value of the firm is maximum.

The benefits of holding cash balances are several. First, for precautionary motives, firms maintain liquidity to meet unexpected contingencies, so firms hold cash to protect themselves against the likelihood of cash shortfalls, thus reducing cash flow uncertainty. For transactional motives, firms need liquidity to face their current expenses (Keynes, 1936). Finally, cash could prevent underinvestment costs. Internal funds enable firms to undertake their profitable investment projects without raising outside funds at high transaction costs. The existence of such benefits should make cash holdings valuable to shareholders. However, holding liquid assets implies an opportunity cost. Furthermore, corporate liquidity can cause agency problems between managers and shareholders. The free cash flow might increase discretion by managers, which goes against shareholders' interest (Jensen, 1986).

Thus, a firm's optimum cash holding may be the outcome of a trade-off between the costs and the benefits of having liquid assets to derive an optimum cash level, as the Kim et al. (1998) model predicts. The firm balances the benefits of cash holdings against various costs of holding large cash reserves. The optimum cash level should be the point where marginal costs of cash just offset the marginal benefits.

This chapter contributes to the literature by testing empirically if firms have an optimum cash level at which to maximize their value. The study first considers a non-linear relationship between cash holdings and firm value. If a concave relation exists deviations from the inflexion point (maximum) will reduce firm value. This lead to the following question: Does firm value decrease if the level of cash moves away from its optimum level? The chapter addresses this question following Tong´s (2008), including the residuals of the optimum cash level regression. Using three different proxies for firm value means the results are robust.

This chapter provides new evidence for the relationship between corporate cash holdings and firm value. The results show empirically that an optimum level of cash

holdings exists at which firm value is maximum, for a sample of 472 listed US industrial companies during 2001-2007. Deviations from the optimum level reduce firm value.

The chapter continuous as follows. Section 2 reviews corporate finance literature, focusing on cash and firm value literature. Section 3, gives a general description of the sample and variables employed. Section 4, describes the quadratic model linking cash holding and firm value, analyses the effect on firm value of the deviation from optimum cash holding level, and reports the results. The main conclusions and implications of the study conclude the chapter.

2. THEORETICAL FOUNDATIONS AND HYPOTHESIS

According to Stiglitz (1974), in the absence of market imperfections, firms' financial decisions would not affect their value. In this theoretical situation, external finance is always readily available and at a reasonable price. The absence of a premium for liquidity or taxes would mean that keeping cash would have neither an opportunity cost nor fiscal disadvantages. So, keeping liquid financial assets would be irrelevant and decisions about investment in liquid assets would not affect shareholders' wealth (Opler, Pinkowitz, Stulz and Williamson, 2001). However, in practice, the irrelevance of cash does not hold. The existence of market imperfections implies a possible optimum cash level that balances costs and benefits and maximizes the value of the firm.

This suggests that firms trade off the costs and benefits of holdings cash to derive an optimum cash level. With regard to the benefits, firms need cash to meet the needs arising from normal activities, to take advantage of profitable future investment opportunities and to meet unforeseen events (transactional and precautionary motives). If capital market access were perfect, then regardless of the firm's liquidity, companies would always be able to fund positive net present value (NPV) projects. However, due to the presence of information asymmetry between creditors and debtors, obtaining external funding for firms is difficult and expensive because of problems relating to adverse selection. This can generate underinvestment problems because of the possibility that firms will choose not to issue, as they are not willing to

issue undervaluated securities, and will therefore pass up a positive-NPV investment (Myers, 1977).

As access to capital becomes more difficult, forgoing positive NPV projects is more likely (Faulkender and Wang, 2006). Therefore, higher cash holdings increase the likelihood of taking value-enhancing projects that would otherwise be forgone; cash holdings could reduce the firm's dependence on costly external financing. As Keynes (1936) was the first to propose, a major advantage of having liquid assets in the balance sheet is that firms can undertake valuable projects when they arise. Additionally, corporate liquidity reduces the likelihood of incurring financial distress costs if the firm's operations do not generate sufficient cash flow to meet obligatory debt payments (Faulkender and Wang, 2006). According to precautionary motive, firms hoard cash to protect themselves against adverse cash flow shocks, thus avoiding liquidity constraints costs. Nevertheless, depending on the firm's characteristics, the costs of cash shortfalls or the costs of raising funds would differ. Firms for which these costs are higher might hold large cash reserves.

As for the negative aspects of holding cash, the financial literature identifies two main costs. On the one hand, holding liquid assets implies an opportunity cost, due to the lower return of these assets relative to other investments of the same risk, especially if the firm gives up more profitable investments to hold that level of cash. Dittmar, Mahrt-Smith and Servaes (2003) refer to cost-of-carry as the difference between the return on cash and the interest that would arise to finance an additional dollar of cash. On the other hand, without wealth maximization, the benefit of corporate liquidity in undertaking projects without rising outside funds could turn into a cost, on account of the lack of monitoring by capital markets. Large cash reserves can increase agency conflicts between managers and shareholders, since managers can waste funds on inefficient investment which offers non-pecuniary benefits but which destroys shareholder value (Jensen and Meckling, 1976), or on their own pet projects. Following the free cash flow theory (Jensen, 1986), an overinvestment costs exists in those situations where cash facilitates investment in negative NPV projects. The existence of large free cash flow may also generate discretional behaviors in the managers that are harmful to shareholders' interests (Jensen, 1986), as increased managerial discretion could lead managers to squander corporate liquidity resources.

Consequently, the agency cost literature includes two confronting positions regarding cash balances. Myers and Majluf (1984) argue that firms optimally carry large cash balances to avoid having to raise outside capital because cash balances confer financial flexibility benefits but entail no agency costs. Meanwhile, Jensen (1986) proposes that firms optimally carry only minimal cash balances because excess cash balances entail agency costs but provide no flexibility benefits. For this reason, DeAngelo and DeAngelo (2007) consider that cash balances both entail agency costs and confer flexibility benefits and, thus, cash accumulation is no longer uniformly beneficial (as in Myers and Majluf, 1984) and investors will pressure firms to limit cash balances to mitigate agency costs, while also encouraging managers to maintain a cash cushion that is sufficient to fund moderate unanticipated capital needs that may arise.

A trade-off therefore may determine a firm's optimum cash holding between the costs and benefits of having liquid assets to derive an optimal cash level. However, the direct relationship between cash holding and firm value has not been the subject of studies to date.

In order to fill that gap in the literature, this chapter contrasts how the firm's cash holdings affect its value. The study estimates optimum cash holdings as the equilibrium between advantages and disadvantages of holding cash. According to the transactional motive and precautionary motive, cash is beneficial for firms. Firms need cash to carry out their normal activities, to take advantage of profitable future investment opportunities, and to meet unforeseen events. In contrast, the free cash flow theory postulates that cash holdings are detrimental for firms, since cash holdings imply agency costs (because managers have a large amount of funds under their control and they have more power). Thus, this study tests for two different effects of cash holding on firm value. On the one hand, at lower levels of cash, transaction and precautionary motives will predominate, and so an increase in cash levels is the precursor to increases in firm value. On the other hand, at higher levels of cash, the free cash flow and opportunity cost will predominate, and then an increase in cash levels is the forerunner to reductions in firm value. Thus, a non linear relationship (concave) between cash holdings and value of the firm is likely. The turning point will represent the maximum value of the company.

3. DATA AND VARIABLES

3.1 Data

Data from Balance sheets and Profit and Loss accounts come from the OSIRIS database. The study also uses US interest rates (short and long term debt), capital goods prices and the wholesale index.

In line with papers like Kim et al. (1998), or Opler et al. (2001), which employ a panel of US industrial firms to study determinants of cash holding, and Pinkowitz and Williamson (2001), who use a sample of industrial firms from US, Germany, and Japan to study the effect of bank power on cash holdings, this chapter also uses a sample of industrial firms, specifically, publicly traded US firms belonging to the SIC Code from 3000 to 5999, during 2001 to 2007.

Information screening eliminated cases with errors in the accounting data or lost values for some of the variables from the sample. Firms with fewer than five consecutive observations did not form part of the sample. A necessary requisite was to perform the Hansen test. The result is an unbalanced panel comprising 472 companies, representing 3,055 firm-year observations. The study does not use a sample of balanced panel data in the analysis in order to avoid surveillance bias.

3.2 Variables

The dependent variable in the study is firm value. Tobin's Q (Q) is a proxy for firm value. This is the ratio of the firm's market value to the replacement cost of its assets (Lewellen and Badrinath, 1997). Tobin´s Q is common in corporate finance studies to measure firm valuation (Lin and Su, 2008; McConnell and Servaes 1990; McConnell, Servaes and Lins, 2008; Morck, Shleifer and Vishny, 1988; Tong, 2008; among others). Two additional proxies for firm value test the robustness of the results. First, Market-To-Book ratio 1 (MKBOOK1), defined as the ratio of market value of firm (market value of equity plus book value of total debt) to book value of firm (total assets) - this is the approximation for Tobin´s Q that Chung and Pruitt (1994) suggest. Second,

Market-To-Book ratio 2 (MKBOOK2), which is the ratio of market value of equity to book value of equity.

The key independent variable is CASH, measured as cash and cash equivalent to total assets. According to the Federal Reserve System (FRS), cash equivalents are short-term, highly liquid investments that are easy to convert into cash and that carry an insignificant risk of loss in value. CASH and its square ($CASH^2$) serve to test for the existence of a non linear model. A positive relationship between cash and firm value when cash level is below the optimal is likely, as is a negative association between cash and value above the optimal cash holding level, pointing to a positive sign for variable CASH and a negative one for $CASH^2$.

The study also includes the control variables that McConnell and Servaes (1990), and Morck et al. (1988) consider as important determinants of Tobin´s Q. These control variables include investment in intangible assets, firm size, and leverage. INTANGIBLE is the ratio of intangible assets to total assets and measures the extent to which firms invest in intangible capital, and is the proxy of growth opportunities. The size (SIZE) is the natural logarithm of gross sales. Finally, the leverage (LEV) is total debt divided by shareholder equity.

Table 1 presents descriptive statistics for the variables in this study. The data are from 2001 to 2007, revealing that the mean cash ratio is 7.9% and the median is 4.48%. These values are in line with the median values in Kim et al. (1998) in the same market (USA), 8.1%, Ozkan and Ozkan (2004) in the UK, 9.9%, and García-Teruel and Martínez-Solano (2008) in Spain, 6.57%.

Table 1

Descriptive Statistics

Variable	*Obs*	*Mean*	*Std. Dev.*	*Median*	*perc 10*	*perc 90*
Q	3055	1.2550	0.8019	1.0262	0.6908	2.0418
MKBOOK1	3055	1.5730	0.9327	1.3023	0.9070	2.4941
MKBOOK2	3055	2.6527	12.3742	1.7406	0.7697	4.2151
CASH	3055	0.0790	0.0925	0.0448	0.0067	0.2031
INTANGIBLE	3055	0.1764	0.1583	0.1294	0.0152	0.4028
SIZE	3055	13.2897	2.1075	13.3636	10.4510	15.9889
LEV	3055	1.8885	4.0427	1.1970	0.3566	3.4623

The variables are the followings: ratio of the firm's market value to the replacement cost of its assets (Q), ratio market value of firm to total assets (MKBOOK1), ratio between market capitalisation to equity book value (MKBOOK2), ratio of cash and cash equivalents to total assets (CASH), ratio of intangibles to total assets (INTANGIBLE), natural logarithm of gross sales (SIZE) and ratio of total liabilities and debt to shareholders' equity (LEV).

Note that ten percent of firms in this sample have a very small ratio of cash. They hold less than one percent of cash over total assets. Ten percent of firms hold more than twenty percent of cash.

Important differences exist between the firm value proxies: the means of the variables Q, MKBOOK1 and MKBOOK2 are above their median value, indicating a strong scattering towards the right tail, that is, some companies' values are much higher than the others. The dispersion of MKBOOK2 is almost eight times higher than the other two variables. Therefore, the empirical distributions of these variables are very different. These divergences between these three proxies are one of the main reasons for including two additional different proxies to give robustness to the main results and to employ Tobin´s Q as dependent variable.

Table 2

Correlation Matrix

	Q	MKBOOK1	MKBOOK2	CASH	INTANGIBLE	SIZE
Q	1.0000					
MKBOOK1	0.9613***	1.0000				
MKBOOK2	0.2496***	0.2560***	1.0000			
CASH	0.2923***	0.2769***	0.0239	1.0000		
INTANGIBLE	-0.0216	-0.0561***	-0.0299	-0.1214***	1.0000	
SIZE	-0.0814***	-0.0648***	-0.0299*	-0.2395***	0.1054***	1.0000
LEV	0.0053	-0.0006	0.6050***	-0.0984***	-0.0380**	0.0821***

The variables are the following: ratio of the firm's market value to the replacement cost of its assets (Q), ratio market value of firm to total assets (MKBOOK1), ratio between market capitalisation to equity book value (MKBOOK2), ratio of cash and cash equivalents to total assets (CASH), ratio of intangibles to total assets (INTANGIBLE), natural logarithm of gross sales (SIZE) and ratio of total liabilities and debt to shareholders' equity (LEV). ***significant at 1%, **significant at 5%, *significant at 10% level

Table 2 presents the correlation matrix. No high correlations exists among the independent variables, which could lead to multi-collinearity problems and, consequently, inconsistent estimations.

4. CORPORATE CASH HOLDING AND FIRM VALUE

In order to study if an optimum level of cash holding exists we estimate Model 1, where the market value in firm i at time t depends on cash holdings and its square. The inclusion of these two variables in the model tests both the transactional and precautionary motives for holding cash and the free cash flow theory and opportunity costs, as well as optimally determining the breakpoint of the value-cash relationship. As above, the study also controls for intangible assets, size, and leverage, as in McConnell and Servaes (1990) and Morck et al. (1988).

Model 1:

$$V_{it} = \beta_0 + \beta_1 (CASH_{it}) + \beta_2 (CASH^2_{it}) + \beta_3 (INTANGIBLE_{it}) + \beta_4 (SIZE_{it}) + \beta_5 (LEV_{it}) + \eta_i + \lambda_t + \varepsilon_{it} \quad (1)$$

where the dependent variable (V_{it}) is the firm value, and the independent variables are $CASH_{it}$, which measures cash and cash equivalent to total assets holding by firm i at time t, $INTANGIBLE_{it}$ which measure the growth opportunities, $SIZE_{it}$ the size of the firms and LEV_{it} the leverage. η_i is the unobservable heterogeneity. The model measures both firms' particular characteristics and the characteristics of the sector in which they operate. λ_t are dummy variables that change in time but are equal for all firms in each of the periods considered. In this way, dummy variables seek to capture the economic factors that firms cannot control and which may affect their value. ε_{it} is the error term.

Following Arellano and Bond (1991), the study uses the GMM method of estimation on the model in first differences, which controls for unobservable heterogeneity and prevents potential endogeneity problems. All estimations are with the two-step estimator, considering all variables as endogenous and employing the lagged independent variables as instrument. This is because firms are heterogeneous, and various factors will always be influencing firm value that are difficult to measure or hard to obtain (see Himmelberg, Hubbard and Palia, 1999). Cash literature has often considered the endogeneity problem (e.g. Ozkan and Ozkan, 2004).

This estimation assumes no second-order serial correlation in the errors in first differences. Thus, in order to test the consistency of the estimations, the study includes the test for the absence of second-order serial correlation by Arellano and Bond (1991). m_2 is test statistic for second order autocorrelations in residuals, distributed as standard normal N (0,1) under the null hypothesis of no serial correlation. The study also uses the Hansen test for over-identifying restrictions, which tests for the absence of correlation between the instruments and the error term.

Table 3 shows the results of the estimation of model 1 using three different proxies for firm value. In the first column the calculation of firm value is Tobin´s Q (Q). In the second and third columns MKBOOK1 and MKBOOK2 are proxies for firm value respectively. Consistent with expectations, CASH is positive and statistically significant, while $CASH^2$ is negative and significant at 1% level for the three different specifications of dependent variables. This means that cash holding increases the value of the firm up to the breakpoint, after which, increases in the cash holding reduces the firms value.

Table 3

Corporate cash holdings and firm value

	Q (1)	MKBOOK1 (2)	MKBOOK2 (3)
CASH	0.8201***	2.0894***	16.6872***
	(2.78)	(6.3)	(4.92)
CASH^2	-2.9694***	-5.2281***	-56.3101***
	(-7.33)	(-10.64)	(-9.97)
INTANGIBLE	-2.5613***	-0.2019	-12.4402**
	(-5.43)	(-0.43)	(-1.97)
SIZE	-0.0019	-0.2669**	-2.0171*
	(-0.02)	(-2.31)	(-1.84)
LEV	0.0118***	0.0133***	2.7802***
	(5.55)	(5.51)	(13.2)
m_2	0.962	0.795	0.197
Hansen test (df)	76.57 (58)	69.42 (58)	54.42 (58)
p-value Hansen test	0.052	0.145	0.609

In column (1) the dependent variable is Q (Tobin´s Q). In column (2) the dependent variable employed to proxy firm valuation is MKBOOK1, which is market value of firm to total assets. In column (3) the dependent variable is MKBOOK2, which is the ratio of market capitalisation to equity book value. CASH and CASH^2 measure cash holding. Control variables are INTANGIBLE, SIZE, and LEV. Time dummies are included in all regressions. t statistics in brackets. ***significant at 1%, **significant at 5%, *significant at 10% level. m_2 is test statistic for second order autocorrelations in residuals. Hansen test is a test of overidentifying restrictions.

The stability of the estimated coefficients for three different specifications of dependent variables demonstrates the robustness of the findings regarding the non-linear relationship between cash holdings and firm value.

In accordance with control variables, LEV relates positively to the three proxies of firm value. Additionally, the coefficient of the variable SIZE is negative, but not always significant. Also, Demsetz and Villalonga (2001) report a non significant relation between firm size and firm performance. The results show a negative relationship between firm size and firm value when the proxy for firm value is MKBOOK1 and MKBOOK2, at the 5% level and 10% level, respectively. Furthermore, contrary to the expected result, INTANGIBLE has a negative and significant impact on firm value. However, this result is in line with Lin and Su (2008), who also find a negative relation for growth opportunities. This result implies that firms with higher growth opportunities present a lower value on the stock market. One explanation might be that firms with

more growth opportunities could face higher specific risk (Cao, Simin and Zhao, 2008), and, as Shin and Stulz (2000) state, Tobin's Q falls with the firm's unsystematic risk, showing that investment opportunities do not mitigate the adverse impact of increase of risk on firm's value.

4.1 Deviation from the optimal cash level

A quadratic relation (concave) occurs between firm cash holdings and firm value, as a consequence of two contrary effects. This section provides evidence to give an additional support to the fact that firm value declines if firms move away from this optimum.

Thus, the study analyzes the relation between deviations from optimal cash holdings and firm value. If a non-linear cash-value relationship exists in the first study, where an optimal point which maximizes firm value exists, deviations from this optimal cash level will probably reduce firm value. Specifically, model 1 eliminates variable CASH and $CASH^2$ and includes the residual estimated in the benchmark specification for antecedents of cash holdings as explanatory variable.

In order to do this, the study considers that benchmark specification for antecedents of cash holdings is according to the equation below, which has support in previous studies on antecedents of cash holdings (García-Teruel and Martínez-Solano, 2008; Kim et al., 1998; Opler et al., 1999; and Ozkan and Ozkan, 2004).

Model 2:

$$CASH_{it} = \beta_0 + \beta_1 (CFLOW_{it}) + \beta_2 (LIQ_{it}) + \beta_3 (LEV_{it}) + \beta_4 (SIZE_{it}) + \beta_5 (BANKD_{it}) + \beta_6 (INTANGIBLE_{it}) + \eta_i + \lambda_t + \varepsilon_{it} \quad (2)$$

where $CASH_{it}$ is cash and cash equivalent to total assets; $CFLOW_{it}$ is earnings after tax plus depreciation divided by gross sales; LIQ_{it}, proxy for liquid assets, is working capital less total cash and short term investment to total assets; LEV_{it}, leverage, is total liabilities and debt divided by shareholders' equity; $SIZE_{it}$ is the size of the firm;

$BANKD_{it}$ is the ratio of bank loans to total debt; and $INTANGIBLE_{it}$, proxy for growth opportunities, is intangible to total assets. η_i is the unobservable heterogeneity. λ_t are time dummy variables and ε_{it} is the error term.

The next step is to obtain residuals from Model 2 and include these in model 1 after eliminating CASH and $CASH^2$ (model 3). Thus, DEVIATION is the absolute value of these residuals. The aim is to find if deviations from the optimal cash level affects a firm's value, which estimation of the following model does.

Model 3:

$$V_{it} = \beta_0 + \beta_1 (DEVIATION_{it}) + \beta_2 (INTANGIBLE_{it}) + \beta_3 (SIZE_{it}) + \beta_4 (LEV_{it}) + \eta_i + \lambda_t + \varepsilon_{it} \quad (3)$$

where V_{it} is firm value, proxied as Tobin's Q, MKBOOK1, and MKBOOK2. The main dependent variable is $DEVIATION_{it,}$ defined as the absolute value of residuals of equation 2, and $INTANGIBLE_{it,}$ $SIZE_{it,}$ and LEV_{it} are control variables defined as above. $\beta_1<0$ is the expectation in Model 3, implying a negative relation between deviations from optimal cash holding level and firm value.

Table 4

Deviation from the optimal cash level and firm value (I)

	Q (1)	MKBOOK1 (2)	MKBOOK2 (3)
DEVIATION	-0.7256***	-1.0229***	-15.7288***
	(-2.60)	(-3.49)	(-7.93)
INTANGIBLE	-3.1915***	-1.2565**	-21.9361***
	(-7.09)	(-2.48)	(-3.98)
SIZE	-0.0592	-0.2529***	-2.4682***
	(-0.74)	(-2.93)	(-2.99)
LEV	0.0163***	0.0196***	2.9055***
	(8.24)	(8.29)	(16.69)
m_2	0.928	0.687	0.326
Hansen test (df)	93.52 (81)	92.26 (81)	78.26 (81)
p-value Hansen test	0.161	0.185	0.565

In column (1) the dependent variable is Q (Tobin´s Q). In column (2) the dependent variable employed to proxy firm valuation is MKBOOK1, which is market value of firm to total assets. In column (3) the dependent variable is MKBOOK2, which is the ratio of market capitalisation to equity book value. DEVIATION is the absolute value of residuals from optimal cash holding level regression. Control variables are INTANGIBLE, SIZE, and LEV. Time dummies are included in all regressions. t statistics in brackets. ***significant at 1%, **significant at 5%, *significant at 10% level. m_2 is test statistic for second order autocorrelations in residuals. Hansen test is a test of overidentifying restrictions.

Table 4 presents panel data regressions to explain whether deviations from optimum cash holding influence firm value (model 3) for three alternative measures of the firm value. In accordance with expectations, DEVIATION presents an inverse relationship with firm value, since its coefficient is negative and significant at 1%. Results prove the existence of a point that maximizes firm value, and as firms move away from this point so their value decreases. As before, the study proxies value as Tobin's Q, MKBOOK1 and MKBOOK2, and obtains the same results. However, this model does not distinguish whether these deviations are positive or negative.

In order to analyze the way in which both deviations, above and below optimal cash level, affect firm value, model 4 includes an interaction term. So, the definition of the variable INTERACT is Above-optimal*DEVIATION. Above-Optimal is a dummy variable that takes 1 for positive residuals and 0 otherwise. Hence, the estimation of model 4, defined as:

Model 4:

$$V_{it} = \beta_0 + \beta_1 (DEVIATION_{it}) + \beta_2 (INTERACT_{it}) + \beta_3 (INTANGIBLE_{it}) + \beta_4 (SIZE_{it}) + \beta_5 (LEV_{it}) + \eta_i + \lambda_t + \varepsilon_{it} \quad (4)$$

where V_{it} is firm value, proxied as Tobin's Q, MKBOOK1, and MKBOOK2. The main dependent variables are $DEVIATION_{it}$, absolute value of residuals, and $INTERACT_{it}$. As in the previous model, control variables are $INTANGIBLE_{it,}$ $SIZE_{it,}$ and LEV_{it}.

How do variables DEVIATION (coefficient β_1) and DEVIATION + INTERACT (coefficients $\beta_1 + \beta_2$) affect firm value? $\beta_1<0$ and $\beta_1 + \beta_2<0$ is the expectation. This finding implies a negative effect of both above-optimal and below-optimal deviations on firm value. In the case that residuals are positive, above-optimal variable takes the value 1, and $\beta_1 + \beta_2$ accounts for the effect on firm value. Otherwise, when residuals are negative, above-optimal variable takes the value 0. Therefore INTERACT is zero, and β_1 accounts for the effect.

Table 5

Deviation from the optimal cash level and firm value (II)

	Q (1)	MKBOOK1 (2)	MKBOOK2 (3)
DEVIATION	-1.2754***	-2.8190***	-13.5508***
	(-2.96)	(-6.4)	(-3.13)
INTERACT	0.8228**	2.3083***	-4.1597
	(2.03)	(4.74)	(-0.79)
INTANGIBLE	-3.1352***	-1.6044***	-20.1820***
	(-8.31)	(-3.67)	(-5.66)
SIZE	-0.1123	-0.3720***	-2.6427***
	(-1.59)	(-4.84)	(-4.45)
LEV	0.0168***	0.0192***	2.7967***
	(6.65)	(5.95)	(19.18)
m_2	0.871	0.601	0.293
Hansen test (df)	122.49 (101)	122.01 (101)	106.19 (101)
p-value Hansen test	0.072	0.076	0.342
F-test (p-value)	3.22 (0.0727)	3.27 (0.0707)	95.66 (0.0000)

In column (1) the dependent variable is Q (Tobin´s Q). In column (2) the dependent variable employed to proxy firm valuation is MKBOOK1, which is market value of firm to total assets. In column (3) the dependent variable is MKBOOK2, which is the ratio of market capitalisation to equity book value. DEVIATION is the absolute value of residuals from optimal cash holding level regression. INTERACT is Above-optimal*DEVIATION where Above-Optimal is a dummy variable that takes 1 for positive residuals and 0 otherwise. Control variables are INTANGIBLE, SIZE, and LEV. Time dummies are included in all regressions. t statistics in brackets. ***significant at 1%, **significant at 5%, *significant at 10% level. m_2 is test statistic for second order autocorrelations in residuals. Hansen test is a test of overidentifying restrictions. F-test refers to an F test on the null hypothesis that the sum of the coefficients of deviation and interact is zero. The p-value is noted in the brackets.

As table 5 shows, DEVIATION is negative and statistically significant in all three cases. On the other hand, INTERACT is positively related to firm value in columns 1 and 2. As Tong (2008) points out, INTERACT could be positive since positive and negative residuals offset each other. However, the interest here is in the sum of the coefficients $\beta_1+\beta_2$. An F test proves that $\beta_1+\beta_2$ remains negative and statistically significant. Indeed, the F-test reveals that the sum of these two coefficients is significant at higher than the 10% level. These results support the hypothesis that deviations on either side of optimal cash holding reduce firm value.

In column 3 Table 5, DEVIATION is once again negative and statistically significant, and INTERACT is not statistically significant. This finding means that firms can increase their value both by increasing their cash balances in those situations

when they are below-optimal cash level and by reducing their investment in liquid assets if they are above-optimal.

Finally, the results are strongly consistent with the hypothesis when using the three different proxies for firm value. All in all, a quadratic relationship between cash holdings and firm value emerges and deviations from optimal cash holdings (above and below the optimal level) significantly reduce firm value.

5. CONCLUSIONS

The aim of this chapter was to test the effect of cash holding on firm value. The chapter studies a sample of 472 US industrial firms with panel data from 2001-2007. The study first empirically tests for the existence of an optimum cash level that maximizes firm value. Secondly, the research analyzes whether deviations from the optimum cash level reduce firm value.

The availability of internal funds is beneficial in undertaking projects without raising external capital at high transaction costs. Corporate cash holdings may reduce cash flow uncertainty, whereas the free cash flow theory argues that the free cash flow implies agency cost of managerial discretion and opportunity cost. The two effects result in the directly opposite expectation concerning the influence of cash holdings on firm value.

The study attempts to separate these two effects to some extent by considering a non linear relationship, Cash-Value. The study's findings provide substantial support for the tradeoff theory. The tradeoff theory suggests the existence of an optimum cash level which results from weighting its marginal benefits and costs. The results prove the existence of a level of cash holding which maximizes firm value. This level varies depending on firm specifics like growth potential, access to capital markets, size, and leverage. Deviations from the optimum level reduce firm value. Hence, the management of firm liquidity is an important element and one that affects shareholder value.

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CHAPTER 2

THE EFFECT OF GROWTH AND FINANCING ON THE SPEED OF ADJUSTMENT OF CASH HOLDINGS

1. INTRODUCTION

According to the trade-off theory of cash holdings, firms balance the benefits and costs of holding liquid assets to determine optimal cash levels and tend to reach their target levels (Opler, Pinkowitz, Stulz and Williamson, 1999; Riddick and Whited, 2009). Nevertheless, capital market imperfections could lead to lags in adjustment to optimal cash holdings levels (Bates, Kahle and Stulz, 2009). Therefore, the objective of this chapter is to empirically study the speed of adjustment of cash holdings as well as the impact of growth opportunities, financial constraints and financial distress on firms' speed of adjustment of cash holdings towards their target levels.

The literature argues that there are two major reasons for holding cash: transactional and precautionary motives. Under the first, firms benefit from holding cash since they can save transaction costs by using cash to make payments without having to raise external capital or to liquidate assets (Han and Qiu, 2007; Opler et al., 1999). Myers and Majluf (1984) suggest that the existence of information asymmetries may increase the cost of external financing. Thus, cash reserves could save firms from foregoing good investments opportunities. Therefore, cash could prevent underinvestment costs, as internal funds enable firms to undertake their profitable investment projects without raising outside funds at high transaction costs. As a precautionary motive, firms stockpile cash to meet unexpected contingencies and to hedge for the risk of future cash shortfalls (Han and Qiu, 2007), thus avoiding liquidity constraints costs. In this sense, cash holdings protect constrained firms against the inability to obtain funds when valuable opportunities arise or when debt payment is due (Almeida, Campello and Weisbach, 2004; Faulkender and Wang, 2006). The precautionary motive for holding cash is closely related to the financial flexibility, since financially flexible firm is able to fund investment and/or liquidity shocks without damaging existing operating, investing, and financing policies (Lockhart, 2014).

However cash holdings are not without costs, since in addition to the opportunity costs forgone, because of the low rate of return of liquid assets (Opler et al., 1999), large cash reserves can increase agency conflicts between managers and shareholders due to increased managerial discretion, which could lead managers to squander corporate liquidity resources (Jensen, 1986). In this sense, firms with large cash reserves are exposed to the risk of inefficient investments when the firm does not

have enough investment opportunities (Jensen and Meckling, 1976). Nevertheless, in the case of SMEs, characterized by a higher coincidence between ownership and control, this agency cost should be lower or no existent. Additionally, there is a potential conflict of interest between the controlling shareholder and other shareholders if the former consume private benefits at the expense of minority shareholders (Ozkan and Ozkan, 2004; Shleifer and Vishny, 1997). Thus, firms should balance the costs and benefits of holding cash.

The determinants of corporate cash holdings assuming the existence of a target cash level have been studied in depth (García-Teruel and Martínez-Solano, 2008; Guney, Ozkan and Ozkan, 2003; Kim, Mauer and Sherman, 1998; Opler et al., 1999; Ozkan and Ozkan, 2004; among others).These papers provide that cash decisions follow a partial adjustment model. Moreover, the working paper of Dittmar and Duchin (2010) demonstrates that firms actively adjust their cash towards a target and examines how adjustment costs impact the speed of adjustment of cash. It also finds that firms with poorer corporate governance have slower adjustment and a lack of correlation between the speed of adjustment of cash and leverage. Finally, Venkiteshwaran (2011) finds that firms correct deviations from their targeted cash levels and the adjustment rate is higher for small, financially constrained firms and for firms that have cash deficiencies (below target). In spite of the growing line of research devoted to understanding the dynamics of cash holdings, this literature is still scarce and focuses mainly on large firms.

Therefore, the main contribution of this chapter is to study the speed of adjustment of cash holdings by analyzing the effect of growth and financing on the SMEs' adjustment speed towards their target cash level. We believe the speed of adjustment of cash holdings is not constant across firms, but will depend on the cost of being far from the optimal cash level. Specifically, the aim is to determine whether firms adjust cash holdings in response to their growth opportunities, financial constraints and financial distress. Additionally, we contribute to the literature on corporate cash holdings, mainly focused on large firms, by analyzing the speed of adjustment of cash in SMEs, which face greater information asymmetry problems and financial constraints, given their greater difficulty in accessing capital markets because of market frictions (Almeida et al., 2004; Berger and Udell, 1998). Moreover the coincidence between ownership and control in most SMEs means that agency problems associated with

debt are more significant (Berger and Udell, 2003). Therefore, a sample of SMEs is very interesting for the objective of this study.

Using a large sample of Spanish SMEs taken from 1998 to 2012, we find that firms try to adjust their cash holdings towards the target level and that there are differences in the rate of adjustment across firms. Specifically, the results show that firms' growth opportunities, financial constraints and financial distress affect the adjustment speed of cash holdings positively. The findings are consistent with the precautionary motive for cash holdings and the importance of maintaining financial flexibility for investment needs.

The rest of the chapter is structured as follows: Section 2 provides a literature review, examining the potential determinants of the speed of adjustment of cash holdings, and develops the hypothesis. Section 3 describes the sample, methodology and variables employed, while Section 4 reports the results of the research. Section 5 concludes.

2. LITERATURE REVIEW AND HYPOTHESIS

Jalilvand and Harris (1984) report that a firm's financial behavior is characterized by partial adjustment to long-term financial targets. As we stated in preceding section, the literature shows that firms have a target cash level determined by a tradeoff of the costs and benefits of holding liquid assets. In the absence of costs of adjustment, the static tradeoff theory is correct, and the firm's observed cash ratio would be its optimal ratio. However, there could be costs, and therefore lags, in adjusting to the optimum (Myers, 1984). Capital market imperfections could lead to lags in adjustment to optimal cash holding levels (Venkiteshwaran, 2011).

García-Teruel and Martínez-Solano (2008) argue that cash decisions may be affected by the existence of market imperfections. In the same vein, adjustment costs of cash could be related to market imperfections such as information asymmetry, agency conflicts or financial distress. The magnitude of adjustment costs and the cost of being off target will determine the speed of adjustment toward the target. In this

chapter, we first study the influence of growth opportunities on the adjustment speed of cash holdings, secondly, the effect of financial constraints, and finally the effect of financial distress.

2.1 Growth opportunities

According to Byoun (2011), financial flexibility is a firm's capacity to mobilize its financial resources in order to take preventive and exploitive actions, i.e. to take advantage of investment opportunities, in response to uncertain future contingencies in a timely manner to maximize the firm value. Kim et al. (1998) find that firms may achieve financial flexibility by accumulating cash reserves. The role of cash holdings in achieving financial flexibility has been analyzed in many studies (Acharya, Almeida and Campello, 2007; Almeida et al., 2004; Dittmar and Mahrt-Smith, 2007; Faulkender and Wang, 2006; Harford, Mansi and Maxwel, 2008; Opler et al., 1999; and Riddick and Whited, 2009), and these find that firms with large cash balances can cope better with cash flow shortfalls and/or higher growth opportunities. Actually, uncertainty about investment opportunities gives managers incentives to select financial policies that provide the flexibility to respond to unanticipated shocks (DeAngelo and DeAngelo, 2007). Among these financial policies would be the decision about investment in liquid assets.

Consistent with this, the literature on cash holdings determinants has found that firms' growth opportunities positively affect cash levels (Ferreira and Vilela, 2004; Kim et al., 1998; Opler et al., 1999; and Ozkan and Ozkan, 2004). In line with this, Dittmar, Marth-Smith and Servaes (2003) state that according to the transaction costs motive, firms hold more cash when the costs of raising it and the opportunity costs of shortfalls are higher. In particular, they propose that firms with better investment opportunities will hold more cash because the opportunity cost of lost investment is larger for these companies. Furthermore, Faulkender and Wang (2006) find higher values of corporate liquidity for firms with greater growth opportunities. From our point of view, the higher value of cash for firms with larger growth opportunities could be related to a higher cost of being away from the optimal level of cash. Thus, firms' growth opportunities could affect the speed of adjustment to the target cash level, since cash reserves increase

the ability of firms to undertake profitable investment opportunities (Arslan-Ayaydin, Florackis and Ozkan, 2006).

Because of the value loss if the firm does not have enough cash holdings to take advantage of profitable investment opportunities when they arise, we would expect firms with greater growth opportunities to adjust faster towards their targets. We expect the cost of being away from the optimum to be greater for fast growing firms. These costs include a lack of financial flexibility, and firms might have to pass over attractive investment opportunities. In this sense, being at the target cash holding level could be beneficial for high growth firms because when profitable investment opportunities arise they can be financed internally, thus avoid financing costs. Our proxies for firm's growth are sales annual growth and growth in fixed assets investments (ratio of increase in fixed assets to total assets). Scherr and Hulburt (2001) argue that firms that have grown well so far are better prepared to continue to grow in the future. Also, as Bates et al. (2009) argue capital expenditures, the increment in fixed assets in our case, could proxy for growth opportunities.

2.2 Financial constraints

Stiglitz and Weiss (1981) argue that asymmetric information may cause lenders to ration credit. The precautionary motive for holding cash is based on the impact of asymmetric information on the ability of firms to raise funds (Dittmar et al., 2003) and means that firms anticipating future financial constraints accumulate cash to fund future investments (Almeida et al., 2004). In the same vein, Lockhart (2014) states that precautionary cash holdings are a way to hedge against the need to access the external market for investment or liquidity needs at times when external financing might be prohibitive (Acharya et al., 2007; Gamba and Triantis, 2008). Moreover, several surveys suggest that financial flexibility is very important in enabling firms to undertake future investments, especially when there is asymmetric information and contracting problems (Bancel and Mittoo, 2004; Brounen, De Jong, and Koedijk, 2004; Graham and Harvey, 2001; Pinegar and Wilbricht, 1989).

Financially constrained firms are expected to have higher incentives to hold large cash reserves (Hovakimian and Titman, 2006; Kim et al., 1998). As evidence of this, Acharya et al. (2007) find that financially constrained firms, which have higher hedging needs, accumulate more cash. The hedging role of cash reserves is most valuable for financially constrained firms, since it enables them to invest more in situations in which borrowing capacity is low (Acharya et al., 2007; Arslan et al., 2006). Consistent with this, the value of liquidity is higher for financially constrained firms, since higher cash holdings are associated with the level of investment (Denis and Sibilkov, 2010; Faulkender and Wang, 2006).

The importance of liquidity management lies in the fact that cash holdings reduce the impact of financing frictions on investment (Almeida et al., 2004). In other words, when external funds are rationed, investment spending will vary with the availability of internal funds (Fazzari, Hubbard, Petersen, Blinder and Poterba, 1988), given that constrained firms exhibit greater investment sensitivity than unconstrained firms (Arslan et al., 2006). So, financially constrained firms risk the inability to fund investment opportunities (Lockhart, 2014). In this sense, cash reserves allow financially constrained firms to hedge future investment against income shortfalls (Acharya et al., 2007). Therefore, we expect financially constrained firms to have the incentive to be at their optimal level in order to take advantage of profitable investment opportunities when they arise. Thus, financially constrained firms would adjust faster towards their target cash holdings. In order to test the effect of financial constraints on the speed of adjustment to target cash holdings, we have considered three proxies for firm's financial constraints: firm size, leverage and cash flow.

The main proxy for financial constraints is firm size, as it is a good proxy for financial constraints (Fazzari et al., 1988). Large firms are less subject to information asymmetry (Berger, Klapper and Udell, 2001; Jordan, Lowe and Taylor, 1998) than small firms and, therefore, less financially constrained (Fazzari and Petersen, 1993; and Whited, 1992). Unconstrained firms have better access to financial markets and therefore can raise external funds to finance projects and would be less dependent on their internal funds. Lian, Xu and Zhou (2010) argue that large firms are less sensitive when their actual cash reserves deviate from target levels, which may lower the adjustment speed.

In contrast, small firms are likely to have more constraints in accessing capital markets. They have a greater need for financial flexibility and resort to larger cash holdings to cope with future contingencies (Byoun, 2011). We believe that due to the worse access to financial markets, the cost of being away from the optimum could be higher. In this sense, constrained firms depend more on internal finance because of the high costs of raising external capital and it would be more beneficial to operate at their optimal level of cash holdings (Venkiteshwaran, 2011). From this perspective, smaller firms could be expected to show a faster adjustment to their target levels in order to take advantage of future profitable investments. Specifically, these companies will correct their deviations from the target level of cash faster.

In order to gain more insight into the effect of financial constraints on the adjustment speed of cash, we consider other variables that could indicate financial constraints such as low leverage and low cash flows. Arslan et al. (2006) state that financially constrained firms have restricted access to external finance and limited internal funds.

Low leverage could be the result of the difficulty of raising more external debt, and therefore could proxy for lower accessibility to external capital (John, 1993). By contrast, higher leverage indicates better access to external financial resources (Wu, Rui and Wu, 2012), since the leverage of a firm measures its ability to issue debt (Guney, Ozkan and Ozkan, 2007). Maybe when the level debt is high the adjustment towards target cash is not as important because firms with access to debt markets can use borrowing as a substitute for liquid assets (John, 1993). In the same sense, Arslan-Ayaydin, Florackis, and Ozkan (2014) argue that cash holdings and external debt act as substitutes for financing corporate investment. So, firms that have better access to external finance can more easily finance their operating activities or investment projects. Thus, we expect that it could be optimal for firms with more restricted access to debt (low leverage) to adjust their cash holdings faster in order not to limit investment and avoid financial problems.

Moreover, firms with a greater capacity to generate internal funds (cash flows) have more resources available, and can therefore substitute cash holdings (Kim et al., 1998). In line with this, Byoun (2011) finds that small firms with low operating cash flows hold more cash to achieve financial flexibility. This could be because when firms

experience a shortage of cash-flow, cash reserves can prevent them undertaking profitable investment opportunities (Almeida et al., 2004). That is to say, when cash flows are low, firms whose cash holding ratio is near the optimum would be able to invest in valuable investment opportunities. Hence, we expect lower cash flow firms to speed up the adjustment process to prevent future cash shortage and to take advantage of potential investment opportunities. In contrast, we expect lower adjustment speeds for firms with greater cash flows.

2.3 Financial distress

From Byoun's (2011) financial flexibility definition we can highlight the firm's capacity to take preventive actions in response to uncertain future contingencies. This could be related to firms' ability to avoid financial distress costs. Accordingly, Gamba and Triantis (2008) argue that financially flexible firms are able to avoid financial distress in the face of negative shocks. In turn, as mentioned above, greater financial flexibility can be achieved through cash reserves.

The speed of adjustment of cash could be influenced by the probability of financial distress. Guney et al. (2003), Ferreira and Vilela (2004) and Ozkan and Ozkan (2004) argue that firms in financial distress could raise their cash levels in order to reduce their default risk. Consequently, we expect that firms more likely to be financially distressed can adopt a hedging strategy by adjusting faster to their target cash holdings to avoid financial distress costs. We employ low interest coverage ratio (Asquith, Gertner and Scharfstein, 1994) and low z-score (Begley, Mings and Watts, 1996) as proxies for financial distress. We believe that having a cash holding ratio close to the optimum level could reduce the probability of financial distress and bankruptcy. Thus, we expect a positive effect on the speed of adjustment.

3. RESEARCH DESIGN

3.1 Sample

Our sample consists of an unbalanced panel of 33 696 SMEs with 212 499 firm-year observations over the period 1998-2012. The information used in this study was obtained from the SABI database (System of Iberian Financial Statement Analysis), made by Bureau Van Dijk. We select SMEs according to the requirements established by the European Commission's recommendation 2003/361/CE of 6th May 2003: fewer than 250 employees, turnover of less than €50 million or less than €43 million in total assets. Then, we apply a series of filters: (i) audited financial statements, due to the increased reliability of accounting information, (ii) non-missing data on the variables of the model, and (iii) errors in the accounting data. Finally, to reduce the impact of outliers, we eliminated 1% of the extreme values for all variables employed in the analysis.

3.2 Methodology

This section presents the methodology to analyze the speed of adjustment of cash holdings and the effect of growth opportunities, financial constraints and financial distress on cash holdings' adjustment. We use the following partial adjustment model (Dittmar and Duchin, 2010; García-Teruel and Martínez-Solano 2008; Guney et al., 2003; Opler et al., 1999; Ozkan and Ozkan, 2004; Venkiteshwaran, 2011; among others):

$$\Delta Cash_{it} = \gamma (Cash^{*}_{it} - Cash_{it-1}) + \varepsilon_{it} \quad (1)$$

where, $\Delta Cash_{it} = Cash_{it} - Cash_{it-1}$ is the change in corporate cash holding ratio for firm i from year t to year t-1 and $Cash^{*}_{it}$ is the target cash holdings. $Cash_{it}$ is observable; it is the ratio of cash and cash equivalents to total assets. The coefficient γ measures the rate of adjustment to the target cash holdings and it is expected to lie between 0 and 1. If γ is 1, the firms will adjust their cash levels to the optimal level immediately; if it is 0, this indicates that the costs of adjustment are so high that the firms cannot modify their

investment in liquid assets. Therefore, a higher value of *γ* indicates fast adjustment from the actual to the target level of cash.

However, target cash holding ($Cash^{*}_{it}$) is unobservable. Following the literature, we use a widely accepted cash model (Bates et al., 2009; and Opler et al., 1999), wherein the target cash holdings is determined by firm characteristics such as investment opportunities, firm size, cash flow to assets, net working capital to assets, leverage, industry cash flow risk and increase in fixed assets to total assets[1].Therefore, the model is the following:

$$Cash^{*}_{it} = \alpha + \Sigma\, \beta_k x_{kit} + v_{it} \qquad (2)$$

where, α is a constant term, x_{kit} is the vector of firm characteristics for a particular firm i at time t, and v_{it} is the error term.

Thus, substituting (2) in (1), the equation that explains the cash level kept by firms is

$$Cash_{it} = \alpha + \delta_0 Cash_{it-1} + \Sigma\, \delta_k x_{kit} + \eta_i + \lambda_t + \varepsilon_{it} \qquad (3)$$

where $\alpha = \rho\gamma$; $\delta_0 = (1 - \gamma)$; $\delta_k = \gamma\beta_k$; η_i is the unobservable heterogeneity; λ_t are time dummy variables and $\varepsilon_{it} = \gamma u_u$

We use this partial adjustment model, which includes lagged cash holdings and a set of variables widely accepted in the literature as potential determinants of target cash holdings, to study firms' adjustment speed of cash. Our explanatory variable is $Cash_{it-1}$, and we are interested in $\delta_{0,}$ since the adjustment speed is determined by 1 minus the parameter δ_0. A higher value of the variable coefficient δ_0 indicates lower adjustment speed. We then augment the model by including dummy variables and interacting them with lagged cash holdings to investigate whether there are differences in the adjustment speed of cash across firm characteristics, such as growth opportunities, financial constraints, and financial distress. The interaction variable captures the difference in the speed of adjustment between groups of firms. Like

[1] We employ the increase in fixed assets instead of capital expenditures and R&D expenditures because this information is not available.

Dittmar and Mahrt-Smith (2007), we include the dummy variable on its own, because if an endogenous relation exists, it is more likely to show up in the dummy variable than in the interaction term. Finally, we employ instrumental variables estimation to control for any endogeneity problems that may arise.

3.3 Variables definition

We begin by describing the variables of model 3. The dependent variable is $Cash_{it}$, which is the ratio of cash and cash equivalents to total assets (Bates et al., 2009; Ozkan and Ozkan, 2004; among others). The explanatory variable is lagged cash holdings ($Cash_{it-1}$). We should bear in mind that the adjustment speed is 1 minus the coefficient of $Cash_{it-1}$ (δ_0). The rest of independent variables are the determinants of target cash holdings; growth opportunities, firm size, cash flow to assets, net working capital to assets, leverage, industry cash flow risk, and increase in fixed assets to total assets. We proxy firm's growth opportunities by its sales annual growth [$GROWTH=(Sales_t - Sales_{t-1})/Sales_{t-1}$], because there is no information about SMEs market value and, therefore, we are not able to calculate their market-to-book ratio. In this sense, Scherr and Hulburt (2001) argue that firms that have grown well so far are better prepared to continue to grow in the future, and that growing firms have better investment opportunities (Niskanen and Niskanen, 2006). Firm size is calculated as the natural logarithm of firm's total assets (SIZE). We measure cash flow as net income plus depreciation divided by total assets (CFLOW). Meanwhile, net working capital is working capital minus cash to total assets (NWC). Leverage is the ratio of total debt to total assets (LEV). We measure cash flow risk as the standard deviation of industry cash flow (INDUSTRYRISK). Specifically, for each firm, we compute cash flow standard deviation for the previous five years and take the average across the two-digit NACE (Rev. 2)[2] code of the firm cash flow standard deviations. Finally, we include the increase in fixed assets to total assets (INCASSET).

Moreover, as additional proxy for firm's financial constraints we also include the ratio pre-tax operating profits plus depreciation over sales (OCF). Finally, the variables

[2] NACE is the European classification of economic activities. NACE is a classification derived from the ISIC (International Standard Industrial Classification) to enable international comparability.

designed to explain the differences in the adjustment speed of cash as a function of financial distress are coverage ratio and z-score. First, interest coverage ratio (COV) is calculated as earnings before interest, taxes, depreciation and amortization-to-interest expenses (Asquith et al., 1994). Second, the likelihood of financial distress is calculated according to the re-estimation of Altman's (1968) model carried out by Begley et al. (1996), given by

$$ZSCORE = 0.104 * X1 + 1.010 * X2 + 0.106 * X3 + 0.003 * X4 + 0.169 * X5$$

where $X1$ = Working capital/Total assets; $X2$ = Retained earnings/Total Assets; $X3$= Net operating profits/Total assets; $X4$ = Book value of capital/Book value of debt; $X5$ = Sales/Total assets. Nevertheless, to calculate the ratio $X4$, we replace market value of capital of the original model by book value of capital (Scherr and Hulburt, 2001), because the market value is not available in the case of SMEs. High values of both measures indicate lower financial distress.

Next, table 1 presents a brief descriptive analysis of the variables employed. The cash holdings ratio of the average firm in our sample is about 11% and the median value is 6.8%. Regarding the determinants of corporate cash holdings, the mean annual sales growth is 10.46%, while for the median firm in the sample the growth is 5.91%, and the average annual increase of fixed assets is 2.31%; the mean firm size is 8.6334 (natural logarithm of total assets); the ratio of cash flow to total assets has a mean value of 7.57%; working capital minus cash represents 4.8% of total assets; the percentage of debt regarding total assets is on average 62.96; finally, the mean cash flow variability is 10.21%.

Table 1

Descriptive Statistics

Variable	*Obs*	*Mean*	*Std. Dev.*	*Median*	*perc 10*	*perc 90*
CASH	272027	0.1106	0.1168	0.0680	0.0106	0.2773
GROWTH	272027	0.1046	0.3595	0.0591	-0.2003	0.4058
SIZE	272027	8.6334	0.8520	8.6327	7.5508	9.7721
CFLOW	272027	0.0757	0.0646	0.0645	0.0124	0.1615
NWC	272027	0.0480	0.1994	0.0367	-0.1949	0.3107
LEV	272027	0.6296	0.2085	0.6605	0.3232	0.8823
INDUSTRYRISK	272027	0.1021	0.1038	0.0532	0.0315	0.3309
INCASSET	272027	0.0231	0.0816	0.0031	-0.0474	0.1258
OCF	272027	0.0742	0.0993	0.0523	0.0024	0.1842
COV	272027	25.6561	103.3607	5.4057	1.1445	39.6792
ZSCORE	272027	0.5616	0.2647	0.5420	0.2317	0.9247

This table provides descriptive statistics for the data employed in the analysis. The data is from 1998 to 2012. The variables are ratio of cash and cash equivalents to total assets (CASH), sales annual growth (GROWTH), natural logarithm of total assets (SIZE), net income plus depreciation divided by total assets (CFLOW), working capital minus cash to total assets (NWC), total debt to total assets (LEV), average standard deviation of industry cash flow of five years (INDUSTRYRISK), increase in fixed assets to total assets (INCASSET), pre-tax operating profits plus depreciation over sales (OCF), earnings before interest, taxes, depreciation and amortization-to-interest expenses ratio (COV), and ZSCORE (defined in variables section).

4. RESULTS

4.1 Growth opportunities

In this section, we analyze how a firm's growth opportunities influence the speed of adjustment of cash. In column (1) of table 2, we estimate the dynamic model describe in section 3 (model 3) including the dummy variable DHIGHGROWTH, which takes value one if the firm sales annual growth (GROWTH) is greater than the median growth in the sample and zero otherwise, and an interaction term between lagged cash holdings ($CASH_{t-1}$) and DHIGHGROWTH. Thus, we assign to the high growth opportunities group those firms whose sales growth lies above the median sales growth in the sample. In contrast, firms are assigned to low growth opportunities group if sales growth is lower than the median size value in the sample. The difference in the speed of adjustment between small and large firms is captured by the interaction

variable ($CASH_{t-1}$* DHIGHGROWTH)[3]. In the second column of table 3, the model is estimated including the dummy variable DHIGHICASSET, which takes value one when the firm's increase in fixed assets (investment) to total assets is greater than the median value in the sample, and including an interaction term with lagged cash holdings ($CASH_{t-1}$).

The results show a positive and significant coefficient of $CASH_{t-1}$ variable, indicating that firms' decisions on investment in liquid assets try to achieve their optimal cash level. If we look at the interaction variables, we can observe an adjustment speed difference for high growth and low growth firms of 0.1525 or 0.2736, according to the variable used to proxy growth opportunities, sales annual growth or increase in fixed assets respectively. The results show a higher speed of adjustment for firms with better growth opportunities than for low growth firms, when the proxy of firm's growth opportunities is sales growth. Results are qualitatively unchanged if we use the increase in fixed assets as proxy for growth opportunities.

[3] The coefficient δ_0 for high sales growth firms will be the sum between the coefficient of lagged cash and the interaction with the dummy variable. However, the coefficient δ_0 for the group of firms with lower sales growth will be determined by $CASH_{t-1}$

Table 2

Growth opportunities and cash holdings speed of adjustment

	(1)	(2)
CASH $_{t-1}$	0.7005***	0.7786***
	64.47	42.92
CASH $_{t-1}$*DHIGHGROWTH	-0.1525***	
	-30.78	
DHIGHGROWTH	0.0177***	
	7.93	
CASH $_{t-1}$*DHIGHINCASSET		-0.2736***
		-48.16
DHIGHINCASSET		0.0086
		0.64
GROWTH	-0.0044	-0.0049
	-0.84	-1.19
CFLOW	0.1109***	0.1155***
	7.78	6.73
SIZE	-0.0081***	-0.0051
	-4.26	-1.30
NWC	0.1987***	0.1990***
	18.53	9.75
INCASSET	0.0011	0.0936
	0.03	0.73
LEV	0.0498***	0.0568***
	8.76	7.07
INDUSTRYRISK	0.0129	0.0219***
	1.64	2.77
Constant	0.1173***	0.0830*
	3.07	1.83
Observations	212499	212499
R-Squared	0.4284	0.4336

All estimations have been carried out using instrumental variables. In column (1) we estimate model 3 including DHIGHGROWTH, which takes value one when the firm's sales growth is greater than the median sales growth in the sample and zero otherwise, and an interaction term between lagged cash holdings and DHIGHGROWTH. In column (2) we estimate model 3 including DHIGHINCASSET, which takes value one when the firm's increase in fixed assets is greater than the median increase in fixed assets in the sample and zero otherwise, and an interaction term between lagged cash holdings and DHIGHINCASSET. The dependent variable is CASH. Independent variables are lagged cash holdings ($CASH_{t-1}$), GROWTH, CFLOW, SIZE, NWC, INCASSET, LEV, and INDUSTRYRISK. Time dummies are included in all regressions, although coefficients are not presented. t statistics are reported below coefficients. Significant at ***1 percent, **5 percent, *10 percent.

According to the literature review section, the findings support that the costs of cash shortfalls are higher for firms with greater growth opportunities, since the results show that faster growing firms adjust more quickly to their target cash holdings. In line with this, we find that firms with greater growth opportunities adjust faster towards the target level of cash to avoid restricting profitable investment opportunities. In contrast, firms with lower growth opportunities can adjust slowly to their target level without incurring high costs. Therefore, the value of being at the optimum cash level would be greater for high growth firms. This result could be explained because being close to the optimal cash increases the likelihood that a firm will be able to undertake potentially profitable investment projects in the future, by financing these investments internally.

The findings support the transaction cost motive for holding cash. Liquid assets may be used as a buffer against the possibility of having inadequate funds to implement valuable projects, since raising funds from external markets can be very costly, especially for firms that need prompt liquidity (Opler et al., 1999). Moreover, our results are in line with Almeida et al. (2004) and Acharya et al. (2007) who state that cash reserves increase the capacity and ability of firms to invest.

4.2 Financial constraints

In this section, we analyze the effect of firm size and firm access to external (leverage) and internal financing (cash-flow) on the speed of adjustment of cash.

First, we rank firms on the basis of the variable SIZE and assign to the financially constrained group those firms whose size lies below the median size in the sample, namely the dummy variable DSMALL takes value one. In contrast, firms are assigned to the unconstrained group if firm size falls above the median size value in the sample, in this case the dummy variable takes the value zero. In column (1) of table 3 we estimate model 3 including the dummy variable DSMALL and an interaction term between lagged cash holdings ($CASH_{t-1}$) and DSMALL. If we look at the interaction variable ($CASH_{t-1}$* DSMALL), we observe an adjustment speed difference for large and small firms of 0.2261, which is quicker for smaller firms. The results show that smaller firms try to adjust their cash holdings to the target level faster. In contrast, larger firms

can adjust slowly to their target level without incurring a high level of adjustment costs. The findings are consistent with the view that relative to unconstrained firms, constrained firms get greater benefit from being closer to cash holding targets. The reason is the relatively higher cost for small firms of being off target, since small firms suffer greater information asymmetries than larger firms as well as agency conflicts between shareholders and creditors. Moreover, small firms are more likely to be subject to financial restrictions (Almeida et al., 2004), which make it more difficult and expensive for them to obtain external financing and supposes a greater likelihood of suffering financial distress (García-Teruel and Martínez-Solano, 2008). The results support the importance of liquidity management for the investment of financially constrained firms (Fazzari et al., 1988).

Along with firm size, the adjustment speed of cash holdings could also be affected by the leverage of the firm. For this purpose in column (2) of table 3 we estimate model 3, including the dummy variable DLOWLEV, which indicates when the firm has a debt to assets ratio lower than the median leverage in the sample and zero otherwise, and an interaction term with lagged cash holdings ($CASH_{t-1}$). The difference in the speed of adjustment between low leverage and high leverage firms is 0.1537 ($CASH_{t-1}$*DLOWLEV). Firms with less debt adjust to the target faster. We find that firms with restricted access to external financing adjust towards their target cash level more quickly than firms with better access to financial markets. The findings are consistent with the view that cash holdings close to the optimal level are a way of preserving financial flexibility, especially for firms with less access to external debt, for which cash holdings are essential for investment.

Finally, in column (3) of table 3, we estimate our model, including the dummy variable DLOWCFLOW, which takes value one for firms with operating cash flows to sales lower than the median value in the sample and zero otherwise, and an interaction term with lagged cash holdings ($CASH_{t-1}$). The difference in the speed of adjustment between firms with low cash flow generation and high cash flow firms is 0.1981. Firms with lower cash flow adjust faster to their target, while the adjustment speed for firms with greater cash-flow generation is slower. Our results are consistent with Byoun (2011), who argues that low cash flow firms have greater need for financial flexibility, as we find that firms with lower cash flows show a more rapid adjustment.

Table 3
Financial constraints and cash holdings speed of adjustment

	(1)	(2)	(3)
CASH $_{t-1}$	0.7299***	0.7433***	0.7121***
	62.83	44.43	65.36
CASH $_{t-1}$*DSMALL	-0.2261***		
	-29.93		
DSMALL	0.0144***		
	6.63		
CASH $_{t-1}$*DLOWLEV		-0.1537***	
		-11.89	
DLOWLEV		0.0059**	
		2.09	
CASH $_{t-1}$*DLOWCFLOW			-0.1981***
			-30.77
DLOWCFLOW			0.0160***
			10.01
GROWTH	-0.0037	0.0004	-0.0043
	-0.97	0.10	-1.05
CFLOW	0.1270***	0.0994***	0.0626***
	8.41	5.84	2.82
SIZE	-0.0124***	-0.0045**	-0.0078***
	-4.51	-2.36	-4.07
NWC	0.1855***	0.2032***	0.1786***
	18.35	18.86	18.25
INCASSET	0.0084	0.0495	0.0443
	0.25	1.40	1.32
LEV	0.0427***	0.0309***	0.0430***
	7.65	5.00	7.65
INDUSTRYRISK	0.0135*	0.0113	0.0143*
	1.72	1.40	1.82
Constant	0.1643***	0.1025**	0.1177***
	3.97	2.54	3.09
Observations	212499	212499	212499
R-Squared	0.4375	0.4140	0.4433

All estimations have been carried out using instrumental variables. In column (1) we estimate model 3 including DSMALL, which takes value one when the firm size is smaller than the median size in the sample and zero otherwise, and an interaction term between lagged cash holdings and DSMALL. In column (2) we estimate model 3 including DLOWLEV, which takes value one when the firm leverage is smaller than the median leverage in the sample and zero otherwise, and an interaction term between lagged cash holdings and DLOWLEV. In column (3) we estimate model 3 including DLOWCFLOW, which takes value one when the firm operating cash flow is smaller than the median operating cash flow in the sample and zero otherwise, and an interaction term between lagged cash holdings and DLOWCFLOW. The dependent variable is CASH. Independent variables are lagged cash holdings ($CASH_{t-1}$), GROWTH, CFLOW, SIZE, NWC, INCASSET, LEV, and INDUSTRYRISK. Time dummies are included in all regressions, although coefficients are not presented.t statistics are reported below coefficients. Significant at ***1 percent, **5 percent, *10 percent.

The findings show that financially constrained firms adjust their cash holdings to their target faster. Particularly, firm size negatively affects the adjustment rate of cash, as does the level of debt and cash flow. This is consistent with the view that financially constrained firms have restricted access to external finance and limited internal funds and may forgo profitable investment opportunities (Arslan et al., 2006). In short, we find that firms with greater financial constraints and more growth opportunities adjust faster to their target cash holdings. In some sense, our results are consistent with Faulkender and Wang (2006), who find that the value of liquidity is higher for firms with greater investment opportunities and higher external financing constraints.

4.3 Financial Distress

Finally, we also analyze the effect of financial distress on the speed of adjustment of cash holdings. To do this, we classify firms according to two variables of financial distress (COV and ZSCORE).

We define a firm as being financially distressed if its interest coverage ratio (COV) is lower than the interest coverage ratio of the firm at the 20^{th} percentile of the annual COV variable distribution. In this case DCOV takes value one, and zero when interest coverage ratio is greater than or equal to the interest coverage ratio of the firm at the 80^{th} percentile of the annual COV variable distribution. In table 4, column (1) we estimate model 3 including the dummy variable DCOV and an interaction term between lagged cash holdings ($CASH_{t-1}$) and DCOV. Similarly, we sort firms according to the ZSCORE and assign to the financial distress group those firms whose ZSCORE variable is smaller than the ZSCORE of the firm at the 20^{th} percentile of the annual ZSCORE variable distribution. In contrast, we assign to the group less likely to suffer financial distress those firms whose ZSCORE variable is greater than or equal to the ZSCORE of the firm at the 80^{th} percentile of the annual ZSCORE variable distribution. So, DZSCORE is a dummy variable that takes the value one if the firm is considered to be in financial distress and zero otherwise. Column (2) presents the results including the dummy variable DZSCORE and an interaction term between lagged cash holdings ($CASH_{t-1}$) and DZSCORE. Note that low values of both measures indicate greater financial distress, therefore the indicator variables will take value one when the firm has

more probability of financial distress. Starting with COV variable (interest coverage ratio), we find faster adjustment speed of cash holdings for financial distressed firms. Specifically the adjustment speed conditional on being financial distressed is 0.1607 faster than the estimated adjustment speed of firms without financial difficulties. When the proxy of financial distress is z-score we obtain similar results, the estimated speed for firms more likely to be financial distressed is 0.1338 faster than for firms without financial difficulties. The empirical findings support our expectations regarding the positive relation between financial distress and the speed of adjustment towards target cash level. We find that firms with higher probability of financial distress tend toward their optimum cash level faster in order to reduce their default risk and to avoid financial distress costs. This would be consistent with Gamba and Triantis (2008), who find that financially flexible firms are able to avoid financial distress in the face of negative shocks.

Table 4

Financial distress and cash holdings speed of adjustment

	(1)	(2)
CASH $_{t-1}$	0.4642***	0.6326***
	5.45	66.33
CASH $_{t-1}$*DCOV	-0.1607***	
	-6.89	
DCOV	-0.0045	
	-0.37	
CASH $_{t-1}$*DZSCORE		-0.1338***
		-9.61
DZSCORE		0.0159***
		6.41
GROWTH	0.0405**	-0.0062
	2.56	-1.63
CFLOW	-0.0908	0.0943***
	-0.97	5.20
SIZE	0.0400**	-0.0071***
	2.54	-3.73
NWC	-0.0227	0.1960***
	-0.20	19.20
INCASSET	0.8508**	0.0358
	2.55	1.07
LEV	-0.0546	0.0457***
	-1.02	7.94
INDUSTRYRISK	0.0455*	0.0152*
	1.82	1.88
Constant	-0.1856*	0.1217***
	-1.69	2.88
Observations	82676	201687
R-Squared	0.4287	0.4287

All estimations have been carried out using instrumental variables. In column (1) we estimate model 3 including DCOV (defined previously) and an interaction term between lagged cash holdings and DCOV. In column (2) we estimate model 3 including DZSCORE (defined previously) and an interaction term between lagged cash holdings and DZSCORE. The dependent variable is CASH. Independent variables are lagged cash holdings ($CASH_{t-1}$), GROWTH, CFLOW, SIZE, NWC, INCASSET, LEV, and INDUSTRYRISK. Time dummies are included in all regressions, although coefficients are not presented. t statistics are reported below coefficients. Significant at ***1 percent, **5 percent, *10 percent.

5. CONCLUSIONS

Firms seek a target cash level in order to preserve financial flexibility. But they may temporarily deviate from their target cash holdings, and then gradually come back to the optimum. The observed and target cash may differ due to the presence of adjustment costs, and these costs, and therefore the speed of adjustment, are affected by firms' characteristics. The objective of this chapter is to study the speed of adjustment of cash and the impact of growth opportunities, financial constraints, and financial distress on the firm's speed of adjustment to the target cash holdings in SMEs.

First, we estimate the speed of adjustment of cash, supporting the existence of a target cash holding level. In addition, we find that the speed with which Spanish SMEs attempt to adjust their levels to the target level depends on firms financial constraints. The empirical evidence shows that smaller firms, firms with less access to external finance, and firms with less internal finance (lower cash-flows) tend to rebalance their cash holdings level faster than larger firms and firms with better access to both external and internal financing. The empirical analysis provides interesting results, such as financially constrained firms manage their cash ratios more actively towards the optimum. In terms of the effect of growth opportunities on the speed of adjustment of cash, the results indicate that firms with more growth options adjust more quickly to their target cash holding level. We have drawn the conclusion that both firms' financial constraints and growth opportunities are factors that affect the adjustment of cash, and they are closely related. Finally, firms with higher probability of financial distress adjust faster to their target cash level in order to avoid distress costs.

The conclusion we draw is that cash holdings contributes to achieving financial flexibility and this, in turn, increases the investment. Indeed, we find that rebalancing is more active for firms that value financial flexibility highly, for instance financially constrained firms, firms with more growth opportunities, and firms more prone to financial distress.

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PART 2

TRADE CREDIT GRANTED

CHAPTER 3

TRADE CREDIT POLICY AND FIRM VALUE

1. INTRODUCTION

Trade credit is given by a seller who does not require immediate payment for delivery of a product. Ferris (1981) consider trade credit as a particular type of short-term loan, which tied in both timing and value with the exchange of goods. Trade credit plays an important role in corporate financing policy. From the seller's point of view, the investment in accounts receivable is an important element in a firm's balance sheet. Specifically, in European countries, the level of trade debtors represents on average a quarter of total assets (Giannetti, 2003). Given the significant investment in accounts receivable by most firms, the choice of credit management policies could have important implications for the value of the firm (Pike and Cheng, 2001).

There is a wealth of empirical literature that analyses the determinants of accounts receivable in order to explain the existence and use of trade credit (Cheng and Pike, 2003; Deloof and Jegers, 1996; Elliehausen and Wolken, 1993; Long, Malitz and Ravid, 1993; Niskanen and Niskanen, 2006; Petersen and Rajan, 1997; Pike, Cheng, Cravens and Lamminmaki, 2005; among others). However, despite the huge amount of literature on trade credit, there are no studies that focus on the straight link of effect of accounts receivable on firm value.

The literature has explained the use of trade credit based on the advantages for suppliers from the financial, operational and commercial perspective. Some motivations for trade credit include mitigating customers' financial frictions (Meltzer, 1960); reductions in transaction costs (Emery, 1987; Ferris, 1981); stimulation of sales in slack demand periods by relaxing the credit terms (Emery, 1984); reductions in information asymmetry between buyer and seller (Long et al., 1993; Pike et al., 2005; Smith, 1987), because trade credit acts as a signal for product quality (Emery and Nayar, 1998; Lee and Stowe, 1993); a mechanism of price discrimination between cash and credit customers (Brennan, Maksimovic and Zechner, 1988; Petersen and Rajan, 1997). Finally, credit provision might improve the supplier-customer relation (Cuñat, 2007; Ng, Smith and Smith, 1999). Consequently, granting trade credit enhances a firm's sales.

However, trade credit is costly and involves an opportunity cost (Nadiri, 1969; Oh, 1976). Moreover, trade credit increases the level of investment in current assets and, therefore, may affect the profitability and liquidity of the company. Trade credit

also involves bearing the credit risk, due to the exposure to payment default, so granting trade credit may have negative effects on profitability and liquidity because of debt defaults (Cheng and Pike, 2003). Also, extending trade credit leads the seller to incur some additional administrative costs (Mian and Smith, 1992), due to costly credit management activity.

Thus, a firm's accounts receivable level can be viewed as being determined by a trade-off between costs and benefits of trade credit granted. The firm balances the benefits of credit granted against the various costs of holding large accounts receivable. Actually, Nadiri (1969) developed a model to select the optimal trade credit in order to maximise net profit. Afterwards, Emery (1984) established that there is an optimal level of accounts receivable when the marginal revenue of trade credit lending equals the marginal cost, and this condition produces an optimal credit period.

The purpose of this chapter is to analyze the effect of trade credit policy on firm value. The study hypothesizes that financial, operational and commercial benefits for trade credit preponderate at lower level of receivables, while opportunity and financing costs as well as credit risk dominate at higher levels of receivables. Accordingly, there may be a non-monotonic (concave) relation between firm value and the investment in trade credit; positive for low levels of trade credit granted and negative for high levels. In order to study this, we have chosen a sample of listed Spanish firms. We use these firms because of the great importance of trade credit in Spain, where firms have one of the longest effective credit periods in Europe (Marotta, 2001). Additionally, studying Spanish firms is interesting since there is previous literature which shows that those firms have a target level of trade credit to which they attempt to converge (García-Teruel and Martínez-Solano, 2010).

The importance of trade credit in Spain could be explained by the characteristics of the financial and legal system of the country. Trade credit should be more important than bank credit when creditor protection is weaker, because cash is easily diverted, while inputs are more difficult to divert, and inputs illiquidity facilitates trade credit (Burkart and Ellingsen, 2004). Demirgüç-Kunt and Maksimovic (2002) found that trade credit is relatively more prevalent in countries with weaker legal protection (La Porta, Lopez-de-Silanes, Shleifer and Vishny, 1998), as in the case of Spain. Another reason could be the different degree of development of financial

markets between countries. In Spain there has been no real disintermediation process, as has happened in other countries, because the development of capital markets and, in particular, institutional funds has been led by banks (Gallego, García and Saurina, 2002). As Demirgüç-Kunt and Maksimovic (2002) suggest, firms operating in countries with more developed banking systems grant more trade credit to their customers**.**

To our knowledge, no study to date provides empirical research on the effect of trade credit on firm valuation from the supplier's point of view. Our study fills this gap. This chapter contributes to the literature by testing empirically the existence of a non-linear relationship (concave) between accounts receivable and firm value. Later, with the aim of giving robustness to our initial analysis, we estimate the target level of trade credit and then study how deviations from the target affect firm value. The results obtained confirm our hypothesis showing that firm value increases with receivables up to a point and then starts decreasing with receivables. One of the main implications for researchers and managers is that management of trade credit is an important element which affects shareholder value.

The remainder of this chapter is organized as follows: in section 2, we review the trade credit literature and develop the hypothesis. In section 3, we give a general description of the sample and variables employed. Section 4 describes the model linking accounts receivable and firm value, and reports the results. Next, we analyse the effect on firm value of the deviation from target accounts receivable level. Finally, in section 5, we present the main conclusions and implications of our study.

2. THEORETICAL FOUNDATIONS AND HYPOTHESIS

Lewellen, McConnell and Scott (1980) develop a model in which, under competition and certainty, credit policy does not influence firms' market value. Relaxing these assumptions and taking into account the existence of uncertainty, they postulate that in an uncertainty environment, where there will exist the likelihood of default, and where there are costs involved in the credit evaluation process, there could be an effect of credit policy on firm value. Put another way, the existence of market imperfections

might impact on the trade credit decision and allow an opportunity for the credit policy to affect firm value, implying an optimal trade credit policy.

Firms may have incentives to offer credit, mainly because this can help to increase their sales and, consequently, result in higher profitability. Also, the incremental cash flows arising from the decision to extend credit can offer a valuable asset to the firm (Kim and Atkins, 1978; and Schwartz, 1974). The benefits of granting trade credit to customers stem from several motives.

First, trade credit reduces the information asymmetry between buyer and seller (Long et al., 1993; Pike et al., 2005; Smith, 1987) alleviating moral hazard problems between the firm and their customer, since it allows the customer to verify product quality before paying. This is especially relevant for products or services that take longer to verify (Smith, 1987). Trade credit is employed by the vendor firm to signal for product quality (Emery and Nayar, 1998; Lee and Stowe, 1993). Trade credit can also be interpreted as an implicit quality guarantee (Deloof and Jegers, 1996; Lee and Stowe, 1993; Long et al., 1993). In this sense, trade credit is used by firms' customers as a device to manage and control the quality of the items purchased (Long et al. 1993; and Smith, 1987). Hence, trade credit can help firms to strengthen long-term relationships with their customers (Ng et al., 1999; Wilner, 2000).

Trade credit can also be viewed as part of the firm's pricing policy designed to stimulate demand. Firms may extend the credit period or increase the cash discount, thus reducing the price to stimulate sales (Pike et al., 2005), so allowing firms to practice price discrimination. Similarly, Brennan et al. (1988) pointed out that vendor financing enables price discrimination between cash and credit customers. These authors also argue that vendor financing can be used to reduce competition since some firms can concentrate on the credit market while other firms maintain a larger market share in the cash market.

Ferris' Transaction Theory (1981) postulates that trade credit use brings down exchange costs. By permitting the exchange of the goods to be separated from the immediate use of money, trade credit may play an intermediary role in the synchronization of receipt from sales with the outflow of money for the supplier firm. It permits a reduction in precautionary money holdings, because supplier firms can

anticipate the flow of payments from its customers, and can manage net money accumulations more efficiently.

Finally, following Cuñat's (2007) reasoning, granting trade credit, especially when customers experience temporally liquidity shocks that may threaten their survival, could reinforce the supplier-customer relation. Recent research (Kestens, Van Cauwenberge and Bauwhede, 2012) finds that the negative impact of financial crisis on firm profitability is reduced for firms that have increased their trade receivables during the crisis period. This supports the idea that trade credit mitigates customers' financial frictions (Meltzer, 1960). Furthermore, trade credit can be viewed as a strategic investment in seeking to retain customers, in this sense trade credit acts as a signal to the customer that the supplier seeks a mutually beneficial longer-term trading relation (Cheng and Pike, 2003).

From an investment perspective, trade credit can generate an implicit interest income for delayed payment if the seller can charge a higher price by offering credit terms. Firms should invest in trade credit if the net present value of the revenue with trade credit is greater than the net present value without it (Ferris, 1981).

As a result of these benefits, we can expect a positive relationship between receivables and value. However, investing in accounts receivable also has costs. On the one hand, granting trade credit exposes the firm to financial risks. The role of firms as liquidity providers implies a risk of late payment and/or renegotiation in case of default and, at worst, an increase in delinquent accounts. It creates a potential cost of financial distress. According to the European Payment Index Report (2011)[1], 25 percent of all bankruptcies are due to late and/or non-payment of outstanding invoices. Late payment limits firms growth, exposes companies to liquidity problems, and in some cases firms go bankrupt. On the other hand, the granting of credit on sales requires the firm to forgo funds on which interest could be earned. Nadiri (1969) states that one cost of trade credit is "the carrying cost"; this is the real income foregone by tying up funds in receivables. This approach implies an opportunity cost. Also, granting credit forces firms to obtain additional funds from the capital market to fund the extra investment in receivables, thereby increasing their reliance on external funding.

[1] The European Payment Index Report, made by *Intrum Justitia*, provides an insight into the payment behavior of the 25 European countries participating in the survey.

Actually, trade credit granted will depend on the creditworthiness of the supplier and its access to capital markets (Emery, 1984; Mian and Smith, 1992; Petersen and Rajan, 1997; Schwartz, 1974; Smith, 1987).

Moreover, extending trade credit leads the seller to incur credit management costs. In particular, the seller must devote some time and energy to assessing the credit risk of the buyer and to structuring the delayed payment contract. The seller must also incur some costs to collect the payment from the buyer. According to Ng et al. (1999), the transaction costs associated with trade credit information and monitoring are incurred when informational asymmetries between buyer and seller are present, reputations are hard to establish, and a high level of specialized investment is involved.

Therefore, it might be argued that the initial positive trade credit-value relation would become negative at high levels of receivables because the costs of trade credit would surpass the benefits as the investment in receivables increases. Consequently, we test for two different effects of trade credit on firm value. At lower levels of trade credit, firms would benefit from the advantages of granting trade credit, such as increased sales and increase in revenues through interest income and reduction in transaction costs. However, at higher levels of trade credit, the existence of financing and opportunity costs as well as non-payment or late payment would exceed the benefits and reduce firm value. If a firm is having difficulty recovering its existing accounts receivable then granting more credit to its customers may reduce firm value.

In short, the theoretical basis for our hypothesis is that trade credit literature suggests the existence of an optimal accounts receivable (Emery, 1984; Lewellen et al., 1980; Nadiri, 1969). In this sense, Emery (1984) establishes that there is an optimal level of accounts receivable when the marginal revenue of trade credit lending equals the marginal cost, and this condition produces an optimal credit period. For that reason, credit managers should try to keep accounts receivable at their target level in order to avoid the erosion of the value of the firm by lost sales or uncollectable sales (Pike and Cheng, 2001). Consequently, one might expect a non linear relationship between trade credit and firm value determined by a tradeoff between costs and benefits of supplying trade credit, where there is a level of trade credit granted which maximizes firm value. Based on the above discussion, we test the following hypothesis:

H_1: The relationship between the investment in accounts receivables and firm value will be non-monotonic (concave); positive for low levels of trade credit granted and negative for high levels.

3. DATA AND VARIABLES

3.1 Data

The dataset comprises Spanish listed non-financial firms in the SABI database for 2001 to 2007. Because of the small size of the Spanish stock market (Yang, Min and Li, 2003), the sample consists of an unbalanced panel of 54 companies for which the information is available for at least five consecutive years[2] between 2001 and 2007. It represents 349 firm-year observations (after excluding observations with errors, missing values, and outlying observations).

3.2 Variables

The dependent variable in the study is firm value, which has usually been measured in the financial literature with Tobin's Q[3] (Berger and Ofek, 1995; McConnell and Servaes, 1990). In our study we specifically use the approximation for Tobin's Q that Chung and Pruitt (1994) suggest, which is defined as the market value of assets divided by the book value of assets. Specifically, it is calculated as the ratio of market value of equity plus book value of total debt to book value of total assets (Q) (this proxy has also been used in several papers such as Durnev and Kim, 2005; Gaio and Raposo, 2011; and La Porta, Lopez-de-Silanes, Schleifer and Vishny, 2002). We employ this simple measure to avoid a possible distortion because of the arbitrary assumptions about depreciation and inflation rates to estimate the firm's replacement

[2] To estimate with General Method of Moments it is a necessary requisite to have at least five years of continuous data to perform the m_2 test.

[3] It is worth pointing out that a firm's market value includes assets in place, as well as assets not yet in place, namely the net present value of current and future investment opportunities (Myers, 1977; and Smith and Watts, 1992). So, many studies also employ Tobin's Q as a proxy for a firm's growth opportunities.

value (Perfect and Wiles, 1994). Moreover, Chung and Pruitt (1994) demonstrate that at least 96.6 percent of the variability of Tobin's Q is explained by their proxy market value of equity plus book value of total debt to book value of total assets (Q). We have also constructed an additional proxy for firm value in order to test the robustness of the results. This is Market-To-Book ratio (MBOOK), defined as the ratio of market value of equity to book value of equity (Lins, 2003). The correlation between these two measures for firm value is 0.91.

The main independent variable to analyze is accounts receivable. We use two proxies: REC_1 as the fraction of accounts receivable over total sales (Petersen and Rajan, 1997; Niskanen and Niskanen, 2006) and REC_2 as the fraction of accounts receivable over total assets (Boissay and Gropp, 2007; Cuñat, 2007; Deloof and Jegers, 1999). We include the square of these variables (REC^2) to allow for nonlinearities. We expect a positive relationship between accounts receivable and firm value at lower levels of accounts receivable. Similarly, we expect a negative association between receivables and value at higher levels of accounts receivable. Hence, we expect a positive sign for variable REC and a negative one for REC squared.

We also include variables that could have an impact on firm value. Following the literature cited above, these control variables include firm sales growth, firm size, and leverage. GROWTH is measured as the annual sales growth rate. We expect this variable to be positively related to firm value, since firms that have grown well so far are better prepared to continue to grow in the future (Scherr and Hulburt, 2001). Also, growing firms have better investment opportunities (Niskanen and Niskanen, 2006). The size of the firm (SIZE) is measured by the natural logarithm of total sales. The empirical evidence on the relation between value and size of the firm is mixed. For instance, Lang and Stulz (1994) find a negative relation between firm size and firm value for U.S. companies, Berger and Ofek (1995) find a positive relation, and Demsetz and Villalonga (2001) report a nonsignificant relation. Therefore, we do not have a clear prediction for the relation between size and firm value. Finally, leverage (LEV) is measured as total debt divided by shareholder equity. Previous literature points in different directions with respect to the impact of debt on firm value (Harris and Ravid, 1991). Debt may yield a disciplinary effect when free cash flow exists (Jensen, 1986; Stulz, 1990). Firms can also borrow to create tax shields (Modigliani and Miller, 1963).

However, leverage can also have a negative effect on firm value because of the agency cost of debt (Jensen and Meckling, 1976). Hence, as with firm size, we cannot predict the effect of leverage on firm value.

Finally, trade credit granted has sector-specific levels and trends. Several authors, such as Smith (1987), Ng et al. (1999) and Fisman and Love (2003) find that trade credit terms are uniform within industries and differ across industries. Smith (1987) argues that within an industry both parts, buyers and sellers, face similar market conditions, while across industries market conditions and investment requirements in buyers may vary significantly. For this reason, we control for activity sector by including industry dummies in all regressions.

Appendix I provides a brief description of the variables used in this chapter. Table 1 reports the summary statistics of the variables.

Table 1

Descriptive Statistics

Variable	*Obs*	*Mean*	*Std. Dev.*	*Median*	*perc 10*	*perc 90*
Q	349	1.3465	0.5508	1.2152	0.8954	1.8362
MBOOK	349	1.9097	1.2473	1.5809	0.7433	3.6533
REC_1	349	0.3302	0.1724	0.2906	0.1664	0.5533
REC_2	349	0.2102	0.1140	0.1803	0.0896	0.3809
GROWTH	349	0.1375	0.2759	0.0892	-0.0734	0.3419
SIZE	349	13.0707	1.8839	13.2554	10.6354	15.5197
LEV	349	1.8980	1.2122	1.6196	0.6319	3.7145

This table provides descriptive statistics for the data employed in the analysis. The data is from 2001 to 2007. The variables are the followings: ratio of market value of firm to total assets (Q), ratio between market capitalisation to equity book value (MBOOK), ratio of accounts receivable to total sales (REC_1), ratio of accounts receivable to total assets (REC_2), annual growth rate of sales (GROWTH), natural logarithm of sales (SIZE), and ratio of total liabilities and debt to shareholders' equity (LEV).

First, we note that the mean investment in accounts receivable in our sample is about 21 percent over assets. This is in line with those reported in previous European studies. Giannetti (2003) provides details on firm balance sheets by country (Belgium, France, Ireland, Italy, Netherlands, Portugal, Spain, and UK). It represents the average balance sheet of a private company. Italy (42 percent) and Spain[4] (35 percent) present the highest ratios of trade debtors to total assets followed by Belgium, France and Portugal, holding more than a quarter of its assets invested in trade credit. The countries with less reliance on trade credit are UK (20.47 percent), and Netherlands (13.28 percent).

In table 2 we present the correlation matrix. There are no high correlations between independent variables, which could lead to multicolineality problems and, consequently, inconsistent estimations.

[4] This higher ratio of receivables in Giannetti (2003) is because of the data used. The study employs mainly data on unlisted companies.

Table 2

Correlation Matrix

	Q	MBOOK	REC_1	REC_2	GROWTH	SIZE	LEV
Q	1.0000						
MBOOK	0.9100***	1.0000					
REC_1	0.1337**	0.2053***	1.0000				
REC_2	-0.0120	0.0890*	0.5261***	1.0000			
GROWTH	0.0085	0.0703	-0.0259	-0.0057	1.0000		
SIZE	-0.1009*	0.0278	-0.3032***	-0.0627	0.1191**	1.0000	
LEV	-0.1419***	0.1268**	0.2032***	0.2086***	0.1109**	0.4686***	1.0000

The variables are the followings: ratio of market value of firm to total assets (Q), ratio between market capitalisation to equity book value (MBOOK), ratio of accounts receivable to total sales (REC_1), ratio of accounts receivable to total assets (REC_2), annual growth rate of sales (GROWTH), natural logarithm of sales (SIZE) and ratio of total liabilities and debt to shareholders' equity (LEV). ***significant at 1 percent, **significant at 5 percent, *significant at 10 percent level.

4. TRADE CREDIT AND FIRM VALUE

In order to study the effect of trade credit on firm value, we estimate Model 1, where firm value is regressed against accounts receivable, its square, and the control variables described above. The inclusion of variables REC and REC squared in the value model allows us to explicitly test both the benefits of trade credit and the negative effects of an excessive investment in accounts receivable.

Model 1:

$$V_{it} = \beta_0 + \beta_1 (REC_{it}) + \beta_2 (REC^2_{it}) + \beta_3 (GROWTH_{it}) + \beta_4 (SIZE_{it}) + \beta_5 (LEV_{it}) + \eta_i + \lambda_t + I_s + \varepsilon_{it} \quad (1)$$

where V_{it} is the firm value proxied as Tobin's Q, ratio of market value of firm to book value of firm, and MBOOK, ratio of market value of equity to book value of equity. The independent variable is REC_1, which measures accounts receivable to total sales by firm i at time t, and REC_1^2 (accounts receivable squared), which tests for a non-linear relation accounts receivable-value. In order to test the robustness of the results we employed an additional proxy for accounts receivable, REC_2, calculated as the fraction of accounts receivable over total assets. $GROWTH_{it}$, $SIZE_{it}$, and LEV_{it} are control variables; $GROWTH_{it}$ is the annual growth rate of sales, $SIZE_{it}$ is computed as the

natural logarithm of total sales, and LEV_{it} is measured as total debt divided by shareholder equity. η_i is the unobservable heterogeneity. λ_t control for time effects and are year dummy variables that change in time but are equal for all firms in each of the periods considered. In this way we try to capture the economic variables that firms cannot control and which may affect their value. Parameter I_s controls by the industry in which the firm operates. ε_{it} is the error term.

Following Arellano and Bond (1991), we employ the GMM method of estimation on the model in first differences, which controls for unobservable heterogeneity and prevents potential endogeneity problems of trade credit decisions. We use this technique because the firms are heterogeneous, and there are always factors influencing firm value that are difficult to measure or hard to obtain (see Himmelberg, Hubbard and Palia, 1999). Examples of this potential endogeneity are; abnormally high level of sales would lead to higher profits and also to more trade credit given; or profitable firms tend to act as intermediaries and borrow more in organized markets to lend more to their customers (Nilsen, 2002). This estimation assumes that there is no second-order serial correlation in the errors in first differences. For this reason, we use the test for the absence of second-order serial correlation proposed by Arellano and Bond (1991). We also employed the Hansen test for over-identifying restrictions, which tests for the absence of correlation between the instruments and the error term.

Table 3 contains the corporate value regressions using two different proxies for firm value (Model 1). In Columns 1 and 2 we calculate firm value as Tobin's Q (Q). In the third and fourth columns we calculate firm value as Market-To-Book ratio (MBOOK). The second and fourth columns present some robustness checks of this specification by altering the independent variable (REC). The results are qualitatively very similar.

Table 3

Trade Credit and firm value

	TOBIN´S Q		MBOOK	
	(1)	**(2)**	**(3)**	**(4)**
REC_1	2.2748***		4.1095***	
	6.52		4.83	
REC_1^2	-2. 0539***		-4.3197***	
	-7.38		-6.32	
REC_2		4.6915***		10.8655***
		9.59		10.76
REC_2^2		-6.3037***		-15.0724***
		-9.32		-11.07
GROWTH	0.0651***	0.0604***	0.1775***	0.1732***
	3.50	3.52	4.02	4.64
SIZE	0.0431	0.0783	-0.0582	0.1695
	0.89	1.44	-0.39	1.30
LEV	-0.0343	-0.0070	0.3137***	0.3630***
	-1.32	-0.40	4.08	6.13
m_2	0.063	0.116	0.082	0.056
Hansen test	30.77	39.80	35.71	34.52
(df)	(95)	(95)	(95)	(95)

All estimations have been carried out using the two-step GMM estimator. All variables are treated as endogenous and the lagged independent variables are used as instrument. In columns (1) and (2) the dependent variable is Q (Tobin's Q), which is market value of firm to total assets. In columns (3) and (4) the dependent variable employed to proxy firm valuation is MBOOK, which is the ratio of market capitalisation to equity book value. REC_1 and REC_2 measure accounts receivable. Control variables are GROWTH, SIZE, and LEV. Time and industry dummies are included in all regressions. m_2 is test statistic for second-order autocorrelations in residuals, distributed as standard normal N (0,1) under the null hypothesis of no serial correlation. Hansen test is a test for overidentifying restrictions, distributed as chi-square under the null of instrument validity. Significant at ***1 percent, ** 5 percent, * 10 percent.

Consistent with our expectations, REC is positive and statistically significant, while REC^2 is negative and significant at 1 percent for the two different specifications of dependent variables (firm value), and, moreover, for two alternative measures of accounts receivable. Our findings provide evidence of a significant non-monotonic relation between investment in accounts receivable and firm value. Specifically, the shape of the above-mentioned relationship is concave. We find two opposing effects related to the benefits and cost of trade credit. This means that accounts receivable increase the value of the firm up to the breakpoint, after which, increases in receivables reduce the firm's value. At low levels of trade credit, the relation receivables-value is

positive (consistent with financial, operational, and commercial motives for trade credit). On the contrary, at high levels of trade credit the relation between receivables and firm value is negative (consistent with the arguments of opportunity and financing costs, as well as financial risks).

However, it should be noted that Tobin's Q and the ratio of market value of equity to book value of equity are not unambiguous measures of value. Previous literature has also used them as measures of growth opportunities. In this sense, an alternative explanation is possible: longer trade credit terms designed to capture customers may increase firm growth by increasing market share and maintaining and establishing new commercial relations. Nevertheless, these benefits could not be unlimited, since longer periods imply higher investment in trade credit (higher receivables-assets ratio), therefore there will come a point at which extending additional credit to customers limits firm growth opportunities, since there are less funds available for profitable investment projects.

Regarding the control variables, GROWTH is positively related to the two proxies of firm value in all four cases. Empirical evidence (Claessens, Djankov, Fan, and Lang, 2002; Durnev and Kim, 2005; La Porta et al., 2002; Maury and Pajuste, 2005; Tong, 2008) also reports a positive sign for sales growth. As for firm size, like Demsetz and Villalonga (2001), we report a non-significant relation between SIZE and firm value. Finally, LEV is significant in two of the four regressions (when the dependent variable is MBOOK). The positive coefficient on the debt variable is consistent with a tax argument (Modigliani and Miller, 1963), and a free-cash-flow argument (Jensen, 1986). In general, the stability of the estimated coefficients for two different specifications of the dependent variable and for different proxies of accounts receivable supports our findings for the non-linear relationship between accounts receivable and firm value[5].

Suppliers will be willing to finance their customers as long as the benefit of investment in accounts receivable is higher than the costs of trade credit granted. To the extent that firms can reap the benefits of investing in trade credit (e.g. reducing asymmetries in product quality; lower transaction costs; lower cash inventories;

[5] The results do not change if we introduce interest rates, measured as 1-year treasury bills.

improved relations with customers; increased demand and sales) and that these benefits outweigh credit management costs, financial risks, and opportunity costs, firms should continue to extend trade credit. In contrast, firms should not finance their customers in cases where granting trade credit adversely affects the profitability and liquidity of the firm. These two effects imply a "reverse U-shaped" distribution of the level of accounts receivable with respect to a firm value.

4.1 Robustness: Deviation from the target trade credit level

We have shown that there is a quadratic relation (concave) between firm accounts receivable and firm value, as a consequence of two contrary effects. In order to give robustness to the results we provide evidence that firm value would be reduced if firms under- or overinvest in trade credit.

A firm's accounts receivable deviations are defined relative to benchmark accounts receivable. Tong (2008) develops an approach to study the relation between deviations on either side of optimal CEO ownership and firm value. We follow this approach to analyze the relation between deviations from target or desired accounts receivable and firm value. So, if a non-linear accounts receivable-value relation is confirmed in our first study, where a level which maximizes firm value exists, it is expected that deviations from this accounts receivable level will reduce firm value.

In order to do this, we consider that the benchmark specification for the determinants of accounts receivable is explained by the equation below, which has been supported by previous studies on the determinants of accounts receivable (for instance, García-Teruel and Martínez-Solano, 2010; Niskanen and Niskanen, 2006; and Petersen and Rajan, 1997).

Model 2:

$$REC_{it} = \beta_0 + \beta_1 (GROWTH_{it}) + \beta_2 (SIZE_{it}) + \beta_3 (STLEV_{it}) + \beta_4 (FCOST_{it}) + \beta_5 (CFLOW_{it}) + \beta_6 (TURN_{it}) + \beta_7 (GPROF_{it}) + \eta_i + \lambda_t + I_s + \varepsilon_{it} \quad (2)$$

where REC_{it} is accounts receivable. As in the previous section we employ two measures; REC_1, which is the ratio of accounts receivable to total sales and REC_2, which is the ratio of accounts receivable to total assets; $GROWTH_{it}$ is the annual growth rate of sales; $SIZE_{it}$ is the natural logarithm of sales; $STLEV_{it}$ is short-term financing calculated as current liabilities to total sales; $FCOST_{it}$ represents the cost of external financing measured as the ratio of financial expenses to outside financing less trade creditors; $CFLOW_{it}$ is the internal financing computed as earnings after tax plus depreciation-amortization to total sales; $TURN_{it}$ is the proxy for product quality, total sales to total assets less net account receivable; $GPROF_{it}$ is the profit margin measured as earnings before interest and taxes, depreciation and amortization to total sales. As above, η_i is the unobservable heterogeneity, λ_t control for time effects, parameter I_s controls by industry, and ε_{it} is the error term. A brief description of the variables used in this section is provided in Appendix I.

Next, we obtain residuals from Model 2 and we include these residuals in model 3. In this way, we define DEVIATION as the absolute value of these residuals. The aim is to find if deviations from the target accounts receivable level affect a firm's value. In order to do this we estimate the following model:

Model 3:

$$V_{it} = \beta_0 + \beta_1 (DEVIATION_{it}) + \beta_2 (GROWTH_{it}) + \beta_3 (SIZE_{it}) + \beta_4 (LEV_{it}) + \eta_i + \lambda_t + I_s + \varepsilon_{it} \quad (3)$$

where V_{it} is firm value, proxied as Tobin's Q, and MBOOK. The main dependent variable is $DEVIATION_{it,}$ defined as the absolute value of residuals of equation 2. The rest of the variables are defined as above. We expect $\beta_1<0$ in Model 3, implying a negative relation between deviations from target accounts receivable level and firm value.

In Table 4 we present panel data regressions to explain whether deviations from target accounts receivable influence firm value (model 3). In line with our expectations, DEVIATION is inversely related to firm value, since its coefficient is negative and significant at 1 percent. These results verify that as firms move away from the target accounts receivable level this decreases its value. As before, we proxy value

as Tobin's Q (columns 1 and 2) and MBOOK (columns 3 and 4) and we obtain the same results. Regarding control variables, the coefficient of the variable GROWTH is positive and significant at 1 percent, SIZE is not significant in any of the four regressions, and LEV is positively related to firm value in all columns.

Table 4

Deviation from the target accounts receivable level and firm value

	TOBIN'S Q		**MBOOK**	
	(1)	**(2)**	**(3)**	**(4)**
DEVIATION	-0.2977***	-0.5430***	-0.7644***	-0.8467***
	-7.34	-5.02	-5.18	-3.21
GROWTH	0.0713***	0.0765***	0.1609***	0.1698***
	5.84	6.56	4.66	6.72
SIZE	-0.0627	-0.0625	-0.1540	-0.1029
	-1.46	-1.23	-1.51	-1.21
LEV	0.0472**	0.0564***	0.2211***	0.2984***
	2.40	2.67	3.60	5.73
m2	0.143	0.117	0.081	0.063
Hansen test	39.65	41.01	37.68	39.77
(df)	(42)	(42)	(42)	(42)

All estimations have been carried out using the two-step GMM estimator. All variables are treated as endogenous and the lagged independent variables are used as instrument. In columns (1) and (2) the dependent variable is Q (Tobin's Q), which is market value of firm to total assets. In columns (3) and (4) the dependent variable employed to proxy firm valuation is MBOOK, which is the ratio of market capitalisation to equity book value. Columns (1) and (3) correspond to the dependent variable REC_1 (trade credit divided by total sales) in the determinants regression. Likewise, Columns (2) and (4) correspond to REC_2 (trade credit divided by total assets). Control variables are GROWTH, SIZE, and LEV. Time and industry dummies are included in all regressions. m_2 is test statistic for second-order autocorrelations in residuals, distributed as standard normal N (0,1) under the null hypothesis of no serial correlation. Hansen test is a test for overidentifying restrictions, distributed as chi-square under the null of instrument validity. Significant at ***1 percent, **5 percent, *10 percent.

Finally, the results confirm our hypothesis. All in all, we find a quadratic relationship between accounts receivable and firm value and, moreover, deviations from the desired level of accounts receivable significantly reduce firm value.

5. CONCLUSIONS

Trade credit policy might have important implications for corporate value because of the large amount of capital invested in accounts receivable. Lewellen et al. (1980) postulate that the existence of market imperfections might impact on the trade credit decision and allow an opportunity for the credit policy to affect firm value, so implying an optimal trade credit policy. Following this line of argument, in this chapter we contrast the effect of trade credit granted on firm value, assuming that the relation trade credit-value is non-linear, and consequently, there should be a level of trade credit which maximizes firm value.

A salient result of our study is that accounts receivable both entail costs and confer benefits. Hence, investment in accounts receivable is no longer uniformly beneficial and investors will pressure firms to limit trade credit granted to mitigate opportunity cost and financial risk, and reduction in profitability and liquidity while also encouraging managers to maintain an investment in accounts receivable which maximizes operational, financial, and commercial benefits. Firm value increases with receivables up to a point and then starts decreasing with receivables. So we can conclude that, in effect, there is an inverted U-shaped relationship between the investment in accounts receivable and firm value, where a level of trade credit exists at which firm value is maximized. The relation between these variables is positive when the investment in trade credit is low, and it becomes negative for higher levels of trade credit. Moreover, deviations from the desired receivables level reduce firm value.

It is worth pointing out the implications of our study for researchers and managers. We find that the management of trade credit is an important element, which affects shareholder value. It may be tempting to argue that, given that the average accounts receivable in our sample is below target receivables, on average firms could increase their firm value by increasing their investment in accounts receivable. However, our estimations do not incorporate firm-specific costs or benefits of receivables. Perhaps for firms that are below the desired level of receivables, increasing investment in receivables any higher is costly. The target value found may be not necessarily right for an individual firm. However, we can state that trade credit affects firm value and that there is a target value on average.

One limitation of this approach is that analyzing the relation between accounts receivable and firm value is not sufficient to conclude that there is an optimum level of accounts receivable, but it is a theoretical question, which should be solved analytically.

The analysis might be extended in several directions by investigating the value of investment in accounts receivable across industries or countries. It would be also interesting to test whether there is a nonlinear receivables-profitability relation for a sample of SMEs. These firms may be forced to grant trade credit despite the costs associated to it, because not granting trade credit would lose sales, and profitability would decrease, implying a linear relation between the investment in trade credit and profitability.

Appendix I

Variables definition

Variable	*Definition*
Q_{it}	Tobin's Q (Chung and Pruitt, 1994) is the proxy for firm value. Ratio of market value of firm to book value of firm. It is calculated as market value of equity plus book value of total debt to total assets.
$MBOOK_{it}$	Market-To-Book ratio is defined as the ratio of market value of equity to book value of equity.
REC_{1it}	Accounts receivable. Fraction of accounts receivable over total sales.
REC_{2it}	Accounts receivable. Ratio of accounts receivable to total assets.
$GROWTH_{it}$	Growth opportunities, which is the rate of annual sales growth.
$SIZE_{it}$	The size of the firm is computed as the natural logarithm of gross sales.
LEV_{it}	Leverage is measured as total debt divided by shareholder equity.
$DEVIATION_{it}$	DEVIATION is defined as the absolute value of residuals of optimal accounts receivable.
$STLEV_{it}$	Short-term leverage is short-term financing calculated as current liabilities to total sales
$FCOST_{it}$	Cost of external financing is the ratio of financial expenses to outside financing less trade creditors
$CFLOW_{it}$	Cash-Flow is the internal financing computed as earnings after tax plus depreciation-amortization to total sales
$TURN_{it}$	Firm's asset turnover is calculated as the ratio of sales over assets minus accounts receivable
$GPROF_{it}$	Profit margin is Earnings Before Interest, Taxes, Depreciation and Amortization to total sales

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CHAPTER 4

TRADE CREDIT AND SME PROFITABILITY

1. INTRODUCTION

Investment in accounts receivable is an important part of a firm's balance sheet. On average, a quarter of total assets for European countries is invested in accounts receivable (Giannetti, 2003), while this amount is even higher in the case of European SMEs (García-Teruel and Martínez-Solano, 2010). These important levels of trade credit granted by firms to customers can have important implications for firm value and profitability (Pike and Cheng, 2001). Lewellen, McConnell, and Scott (1980) demonstrated theoretically that the presence of market imperfection implies that trade credit decisions may affect the value of the firm.

Literature on trade credit granted focuses on determining factors (Deloof and Jegers, 1996, 1999; Elliehausen and Wolken, 1993; García-Teruel and Martínez-Solano, 2010; Long, Malitz and Ravid, 1993; Ng, Smith and Smith, 1999; Niskanen and Niskanen, 2006; Petersen and Rajan, 1997; Pike, Cheng, Cravens and Lamminmaki, 2005; Wilson and Summers, 2002; among others); on financial factors (Mian and Smith, 1992; Schwartz, 1974), operational (Emery, 1987; Ferris, 1981); and on commercial motives (Brennan, Maksimovic and Zechner, 1988; Nadiri, 1969; Smith, 1987). However, financial literature analysing the effect of trade credit policy on firm profitability and value remains scarce. García-Teruel and Martínez-Solano (2007) study the working capital effect on firms' profitability and analyse the impact of the days accounts receivable, but they do not focus on investment in trade credit. To our knowledge, the only research examining this relation is Hill, Kelly, and Lockhart (2012), who study the shareholder wealth implications of corporate trade credit investment for a sample of US listed firms. Trade credit effects on SMEs profitability remain unexplored, despite the relatively greater effect of accounts receivable on the assets of these firms compared to large firms. In fact, problems of asymmetric information and greater difficulty in accessing capital markets mean trade credit is more intensive in SMEs (Berger and Udell, 1998; Petersen and Rajan, 1997).

The aim of the current chapter is twofold: to provide empirical evidence of the effect of granting trade credit on SMEs' profitability and to study whether profitability from granting trade credit differs according to a firm's characteristics. We set up a panel of 11 337 small to medium-sized Spanish businesses during the period 2000 to 2007. Spanish SMEs provide an excellent setting for the purpose of this study. Firms

operating in countries with more developed banking systems grant more trade credit to their customers (Demirgüç-Kunt and Maksimovic, 2002). This is the case of the Spanish market, which has one of the longest trade credit periods in Europe (Marotta, 2001). Moreover, Spanish SMEs have a greater preponderance of smaller firms than northern European and Scandinavian countries (Mulhern, 1995).

The results of this study provide empirical evidence of a linear relation between trade receivables and profitability of SMEs, which implies that the benefits of supplier financing outweigh the costs associated with trade credit. Furthermore, the effect of receivables on firm profitability differs depending on certain firms' characteristics. According to the financial motive for trade credit, larger and more creditworthy (financially unconstrained) firms will extend trade credit to their smaller customers (Schwartz, 1974), thus increasing sales and generating an implicit rate of return. In this sense, we find that unconstrained firms, e.g. larger and more liquid firms, obtain higher returns on receivables compared to smaller and less liquid firms. The operational motive for trade credit predicts that firms with variable demand will extend more trade credit than firms with relatively stable demand. We find evidence consistent with the view that trade credit helps firms to smooth demand, since our results show higher profitability of receivables for the subsample of uncertain demand firms than for stable demand firms. Nevertheless our results are in some sense, contrary to the commercial motive for trade credit. We do not find that it is more profitable for firms without an established reputation to extend trade credit, nor is this so for smaller market share firms.

This research provides valuable insights for managers since the results suggest that by increasing the investment in trade credit, SMEs can enhance their profitability, especially for financially unconstrained firms, firms with volatile demand, and firms with more market share.

The remainder of the chapter is organised as follows. In the next section, we review the trade credit literature and discuss predictions for the relations between the supply of trade credit and firm profitability. Section 3 describes the sample, variables, and methodology. In section 4, we report the results, and section 5 concludes.

2. REVIEW OF LITERATURE

2.1. Trade credit-profitability relationship

The first research question we try to answer is whether trade credit increases profitability. There are many reasons that lead suppliers to extend credit. Chiefly, granting trade credit enhances firm's sales and consequently may result in higher profitability. Meltzer (1960) states that a primary function of trade credit is to mitigate customers' financial frictions, thus facilitating increased sales and market share growth (Nadiri, 1969). In addition to resolving financing frictions, trade credit can boost sales by alleviating informational asymmetry between suppliers and buyers in terms of product quality (Long et al. 1993; Smith, 1987). In this sense, the seller's investment in trade credit facilitates exchange by reducing uncertainty about product quality. Trade credit also enables price discrimination (Brennan et al., 1988); by varying the period of credit or the discount for prompt payment, firms can sell their products at different prices depending on the demand elasticity of customers. In a long-term perspective, trade credit might give future profits by establishing and maintaining permanent commercial relations (Ng et al., 1999; Wilner, 2000). In addition to increasing sales, trade credit may increase revenues through implicit interest rates (Emery, 1984), or it may reduce operating and transaction costs (Emery, 1987; Ferris, 1981). However, the provision of trade credit entails negative effects such as default risk or late payment, which may damage firm profitability. Moreover, extending supplier financing involves administrative costs associated with the granting and monitoring process, as well as transaction costs for converting receivables into cash (Emery, 1984; Kim and Atkins, 1978; Sartoris and Hill, 1981). Furthermore, carrying receivables on the balance sheet implies direct financing and opportunity costs, thus reducing the funds available for expansion projects.

Theoretical models argue that there is an optimal trade credit policy (Emery, 1984; Nadiri, 1969; Lewellen et al., 1980). Lewellen et al. (1980) demonstrated that trade credit can be used to increase firm value when financial markets are imperfect, so implying an optimal trade credit policy. Likewise, Emery (1984) argues that the optimal level of accounts receivable occurs when the marginal revenue of trade credit is equal to the marginal cost. Consequently, one might expect a non-monotonic (concave) relationship between trade credit and firm value determined by a tradeoff

between the costs and benefits of supplying trade credit, where there is a level of trade credit granted that maximises firm value (Lewellen et al., 1980). However, these theoretical models do not find empirical support for a non-monotonic relationship. Instead, when studying listed US firms, Hill et al. (2012) find a linear relation between trade credit and firm value, where the benefits of granting trade credit surpass the costs.

This linear effect between trade credit policy and firm value may be more evident for the case of SMEs. Cheng and Pike (2003) find that firms operating in competitive markets are forced to offer industry credit terms. Moreover, SMEs usually have less bargaining power and need to guarantee the quality of the products they sell. In this sense, SMEs could be forced to grant trade credit despite the costs associated, since not to do so would lead to loss of sales and lower profitability. Furthermore, firms may use trade credit policies that are related to their target growth rates; a firm willing to grow may choose a strategy of extending more trade than its competitors (Niskanen and Niskanen, 2006). Since SMEs usually are high-growth firms, they can employ trade credit terms as a competitive tool to continue to increase sales. Based on the above, we test the following hypothesis:

H_1: The profitability in SMEs is positively related with the investment in trade credit

2.2. Trade credit motives and firm profitability

According to the financial literature, firms may extend credit to their customers for financial, operational, and commercial motives. In this section we review the implications of trade credit motives on firms' profitability.

Schwartz (1974) developed the financial motive for the use of trade credit. He suggests that when credit is tight, financially stable firms will increasingly offer more trade credit to maintain their relations with smaller customers, who are "rationed" from direct credit market participation. The seller firm acts as a financial intermediary to customers with limited access to capital markets, thus financing their customers'

growth. Larger firms are thought to be better known and have better access to capital markets than smaller firms, in terms of availability and cost, and should therefore face fewer constraints when raising capital to finance their investments (Faulkender and Wang, 2006). Hence, the financial motive predicts a positive connection between extending trade credit and firm size (Mian and Smith, 1992; Petersen and Rajan, 1997; Schwartz, 1974).

On the other hand, according to Emery (1984) the objective of the financial motive for extending trade credit is to maximise the rate of return on the liquid reserve. Therefore, sellers may grant credit if the implicit rate of return[1] earned on receivables exceeds that of other investments, thus assuming a financial intermediary's role of providing funds to borrowers. The existence of financial market imperfections allows vendor firms to have information and collection cost advantages over financial intermediaries. Thus, suppliers can afford to lend to customers at a cheaper rate than banks (Fabbri and Menichini, 2010). In addition to obtaining a return from trade credit, liquid suppliers can optimise sales by financing the growth of less liquid buyers or customers with limited capital market access (Meltzer, 1960; Schwartz, 1974). Cuñat (2007) argues that granting trade credit, especially when customers experience temporally liquidity shocks that may threaten their survival, could reinforce the supplier-customer relationship. Hence, more liquid firms will grant trade credit to firms with low liquidity as an alternative to investing in marketable securities, as well as mitigating buyers' financial constraints (Emery, 1984; Petersen and Rajan, 1997). Consequently, according to the financial motive, we establish the following hypothesis:

H_2: The profitability of trade credit is higher for larger and more liquid firms.

Emery (1987) focuses on operational motive, addressing the role of variable product demand in a firm's operating decisions. According to this, firms may use trade credit to accommodate variable demand, which in turn could increase a seller's wealth because of the reduction in operating costs. As demand fluctuates, sellers face two alternatives: either they can allow the selling price to fluctuate so that the market always clears or they can vary production to match demand. Either option is quite

[1] In trade credit arrangements it is very common to offer early payment discount to the customer. The most common payment term is 2/10, net 30 (Ng et al., 1999), by which a customer takes 2% discount on the purchase price if the payment is made within 10 days; otherwise, the payment is in full within 30 days. This translates into an over 40% annual rate.

costly. If the price varies, potential buyers face extremely high costs of information searches. If production varies, sellers face extremely high production costs (Long et al., 1993). Trade credit could, therefore, help to smooth irregular demand by stimulating sales through relaxing trade credit terms in slack demand periods (Emery, 1984, 1988; Nadiri, 1969). Since the operational motive predicts that unstable demand firms grant more trade credit (Long et al., 1993), we test the next hypothesis:

> *H_3: The profitability of trade credit is higher for firms with variable demand than for firms with stable demand.*

Lastly, from a commercial perspective, Nadiri (1969) argues that availability of alternative payment terms can expand the market by increasing product demand. According to the commercial motive, trade credit improves product marketability by facilitating firm's sales. Hill et al. (2012) argue that for firms with less market share (less market power), trade credit should prove more beneficial, as these firms have stronger incentives to increase sales. Moreover, continuing with the commercial motive, smaller firms that have worse reputations need to use more trade credit in order to guarantee their products (Long et al., 1993).

Hence, for small firms with a low market share, trade credit may be a necessary marketing tool, because in addition to guaranteeing product quality through the credit period, it may also provide a way to offer preferential terms to attract new customers. However, this does not necessarily imply higher profitability. As Wilson and Summers (2002) state, trade credit for small growing firms is a necessity rather than an option, since a new entrant firm should offer competitive terms to be successful. So, for larger market share firms it may be more beneficial to grant trade credit because of their dominant market position, they have many advantages in trade credit extension, such as greater ability to enforce contracts and to evaluate customers' credit risks, and more flexibility in credit terms offered. These contrasting arguments mean we cannot make a clear prediction for the result expected.

3. DATA, VARIABLES, AND METHODOLOGY

3.1. Data

The financial and accounting data used in this study were obtained from the SABI database (System of Iberian Financial Statement Analysis) made by Bureau Van Dijk. This database provides company financial statements, ratios, activities, and information on managers and ownership structure for more than 1,250,000 Spanish businesses and some 400,000 Portuguese firms. Therefore, it is the reference database for Spanish samples used in most studies of SMEs (Baños-Caballero, García-Teruel and Martínez-Solano, 2012; García-Tabuenca and Crespo-Espert, 2010; López-Gracia and Sogorb-Mira, 2008; among others).

We select Spanish SMEs according to the requirements established by the European Commission's recommendation 2003/361/CE of 6 May 2003, under which SMEs are those meeting the following criteria for at least three years: fewer than 250 employees, turnover of <€50 million or <€43 million in total assets. In addition, a series of filters is applied. The observations of firms with anomalies in their accounts were eliminated, for example negative values in their assets or sales, and firms whose total assets differ from total liabilities and equity. Finally, to reduce the impact of outliers, we eliminated 1% of the extreme values for all variables employed in the analysis. The final sample consists of an unbalanced panel of 71,635 firm-year observations for 11,337 manufacturing companies for 2000-2007. We chose a sample of manufacturing firms because of the homogeneity across industries in credit terms.

3.2. Variables

The dependent variable to be analysed is return on assets (ROA). This variable is defined as the ratio of earnings before interest and taxes (EBIT) to total assets (Michaelas, Chittenden and Poutziouris, 1999; Titman and Wessels, 1988). The key independent variable is the investment in accounts receivable (REC) calculated as the ratio of accounts receivable to total assets (Boissay and Gropp, 2007; Cuñat, 2007; Deloof and Jegers, 1999).

Additionally, all regressions include control variables found by previous literature to explain firm profitability (e.g. Deloof, 2003): firm size (SIZE), growth opportunities (GROWTH), and its leverage (DEBT). SIZE is the logarithm of total assets. There is no consensus about the relation between value and firm size. For instance, Lang and Stulz (1994) find a negative relation between firm size and performance for US companies, whereas Berger and Ofek (1995) find a positive relation. So, we cannot establish a clear relation between firm size and profitability. Growth opportunities (GROWTH) are measured by sales annual growth ($Sales_t$ – $Sales_{t-1}$)/$Sales_{t-1}$. In this sense, Scherr and Hulburt (2001) assume that firms that have grown well so far are better prepared to continue to grow in the future and that growing firms have better investment opportunities (Niskanen and Niskanen, 2006). Thus, we expect a positive relation between growth opportunities and firm profitability. Finally, DEBT is the ratio of debt to total assets. Previous literature points in different directions with respect to the impact of debt on firm value and profitability (Harris and Raviv, 1991; Joh, 2003). Debt may yield a disciplinary effect when free cash flow exists (Jensen, 1986; Stulz, 1990). Firms can also use debt to create tax shields (Modigliani and Miller, 1963). However, information asymmetry and agency conflicts associated with debt for smaller firms could lead creditors to demand higher returns (Pettit and Singer, 1985). So, it is not clear a priori which effect predominates. Furthermore, since good economic conditions tend to be reflected in a firm's profitability and trade credit depends on macroeconomic factors, controls were applied for the evolution of the economic cycle using the variable GDP, which measures annual GDP growth[2] (Niskanen and Niskanen, 2006). Finally, time and sectorial dummies are included in all regressions.

Table 1 offers descriptive statistics of the variables employed in this chapter. The ROA is around 6.5%. The economic importance of trade credit is evident. Consistent with the study of Giannetti (2003), we find that, for the average company, accounts receivable represents the largest asset category on the balance sheets; the investment in accounts receivable is over 34% of total assets and the number of days for accounts receivable is around 97 days. Together with this, the average firm has growth sales of 9 % annual, and 64% of leverage.

[2] GDP growth rate was extracted from Eurostat.

Table 1

Descriptive Statistics

Variable	*Obs*	*Mean*	*Std. Dev.*	*Perc 10*	*Median*	*Perc 90*
ROA	71635	0.0647	0.0595	0.0089	0.0547	0.1397
REC	71635	0.3424	0.1662	0.1319	0.3290	0.5714
SIZE	71635	7.0826	1.0863	5.6699	7.0493	8.5832
GROWTH	71635	0.0882	0.2162	-0.1308	0.0629	0.3250
DEBT	71635	0.6402	0.1919	0.3652	0.6633	0.8781
GDP	71635	0.0405	0.0031	0.0330	0.0410	0.0430

This table shows descriptive statistics: number of observations, 10% and 90% percentiles, mean, median, and standard deviation. The variables are the following: ROA (Return on Assets), REC investment in trade credit (receivables to total assets), SIZE company size, GROWTH sales growth, DEBT debt to total assets, GDP annual GDP growth.

Table 2 shows the correlation matrix for the variables defined above. There is a significant positive correlation between the ROA and accounts receivable to assets (0.1595). This shows that the supply of trade credit is associated with an increase in firms' profitability. As regards control variables, SIZE is positively related to ROA, although the correlation is very small (0.0099). There is a significant positive correlation between GROWTH and ROA (0.2071), while DEBT is negatively correlated with ROA (-0.2226). With regard to the correlations between independent variables, there are no high values between them that could lead to multicolineality problems.

Table 2

Correlation Matrix

	ROA	**REC**	**SIZE**	**GROWTH**	**DEBT**	**GDP**
ROA	1.0000					
REC	0.1595***	1.0000				
SIZE	0.0099***	0.0635***	1.0000			
GROWTH	0.2071***	0.0973***	0.0237***	1.0000		
DEBT	-0.2226***	0.0018	-0.117***	0.1631***	1.0000	
GDP	0.0060	-0.0005	-0.0775***	-0.019***	0.0357***	1.0000

This table reports the correlation matrix. The variables are the following: ROA return on assets; REC investment in trade credit (receivables to total assets); SIZE company size; GROWTH sales growth; DEBT debt to total assets; GDP annual GDP growth. *** significant at 1 percent level.

Table 3 reports ROA and accounts receivable by sector of activity. Ng et al. (1999) find that trade credit practice is likely to show a wide variation across industries in credit terms, but little variation within industries. Thus, we split the sample according to the NACE (Rev. 2)[3] two-digit code (10-33), giving a total of 24 industries. Manufacture of beverages is the industry with the lowest investment in receivables with a value of 23.97%, followed by Manufacture of food products, and Manufacture of furniture with an investment in receivables of 29%. This result is not surprising as these industries rely heavily on cash sales. In contrast, firms that fall into the category of Manufacture of electrical equipment, Manufacture of computer, electronic, and optical products, and Repair and installation of machinery and equipment have the highest ratio of receivables over assets, with an average ratio of 39.5%. We find that differences in the means are statistically significant (ANOVA test).

[3] NACE is the European classification of economic activities. NACE is a classification derived from the ISIC (International Standard Industrial Classification) to enable international comparability.

Table 3

Accounts receivable and ROA by industry

	Obs	ROA	REC
1 Manufacture of food products	7189	0.0539	0.2908
2 Manufacture of beverages	1349	0.0456	0.2397
3 Manufacture of tobacco products	0		
4 Manufacture of textiles	3145	0.0518	0.3199
5 Manufacture of wearing apparel	1605	0.0591	0.3041
6 Manufacture of leather and related products	1702	0.0578	0.3548
7 Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	4529	0.0601	0.3361
8 Manufacture of paper and paper products	1479	0.0549	0.3453
9 Printing and reproduction of recorded media	5052	0.0577	0.3291
10 Manufacture of coke and refined petroleum products	23	0.0960	0.3663
11 Manufacture of chemicals and chemical products	2907	0.0715	0.3667
12 Manufacture of basic pharmaceutical products and pharmaceutical preparations	136	0.0721	0.3077
13 Manufacture of rubber and plastic products	3880	0.0631	0.3517
14 Manufacture of other non-metallic mineral products	6400	0.0680	0.3558
15 Manufacture of basic metals	1358	0.0712	0.3742
16 Manufacture of fabricated metal products, except machinery and equipment	14791	0.0724	0.3701
17 Manufacture of computer, electronic and optical products	898	0.0780	0.3998
18 Manufacture of electrical equipment	1713	0.0745	0.4035
19 Manufacture of machinery and equipment n.e.c.	5211	0.0694	0.3564
20 Manufacture of motor vehicles, trailers and semi-trailers	1085	0.0753	0.3238
21 Manufacture of other transport equipment	275	0.0720	0.3415
22 Manufacture of furniture	3788	0.0625	0.2904
23 Other manufacturing	1462	0.0665	0.3334
24 Repair and installation of machinery and equipment	1658	0.0749	0.3866
ANOVA		0.0000	0.0000

ANOVA is p-value of ANOVA test. It provides a statistical test of whether or not the means of several groups are all equal. If the null hypothesis is rejected, there are significant differences between groups. ROA is the return on assets; ratio of earnings, before interest and taxes to total assets. REC is the investment in trade credit; receivables to total assets. Manufacture of tobacco products is not included in the sample.

3.3. Methodology

We start from Ordinary Least Squares (OLS) as our initial method of estimating. Then, we introduce a fixed effect estimation (FE) to control for the presence of individual heterogeneity. Fixed effect estimation[4] assumes firm-specific intercepts that capture the effects of those variables that are particular to each firm and that are constant over time. However, corporate finance literature has pointed out the potential endogeneity problems in financial decisions[5]. We therefore perform the Hausman (1978) test to compare the estimation's coefficients made by instrumental variables (we employ the first lag of the independent variable as instrument) and by ordinary least squares, under the null hypothesis of exogeneity of the explanatory variables. As we reject the null hypotheses, we also estimate using instrumental variables. Our results are consistent for all estimators used.

4. RESULTS

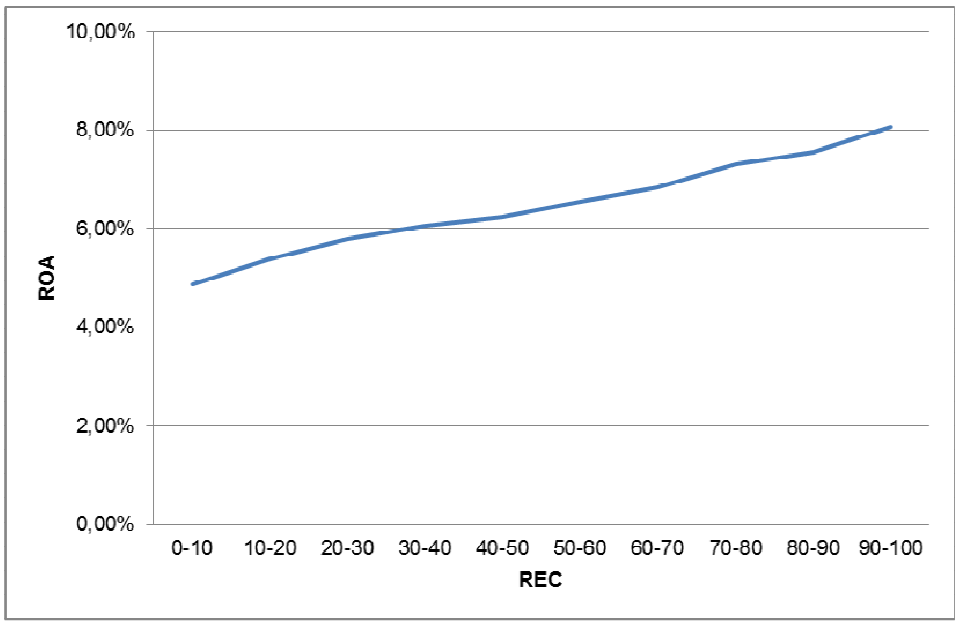
4.1. Trade Credit-Profitability Relationship

First, in order to have a preliminary idea of the relation between firm profitability and the investment in receivables, figure 1 represent the mean values of ROA variable for each decile of the variable REC. We observe greater profitability for firms with more trade credit investment. This suggests a linear and positive relation between trade credit and profitability, as we can see that higher investment in trade credit is related to better profitability.

[4] We perform the Hausman (1978) test; if the null hypothesis is rejected, only within-group estimation is consistent; if accepted, random-effects estimation is the best option, since not only is it consistent, it is also more efficient than the within-group estimator.

[5] The investment in trade credit may be influenced by the firm's profitability and the positive relationship between trade credit and return on assets could be explained if more profitable firms grant more trade credit to their customers because of their greater financial capacity.

Figure 1: Mean value of ROA for each decile of REC



However, the results of this analysis are not sufficient to describe the relation between trade credit and firm profitability, since control variables have not been taken into account, so we conducted further analyses. Specifically, in table 4 (columns 1, 3, and 5) we regress trade credit (REC) on profitability (ROA) including SIZE, GROWTH, DEBT, and GDP as control variables.

According to expectations, our results confirm Hypothesis 1 of a positive relationship between the investment in trade credit and SMEs profitability[6]. The supply of trade credit is beneficial despite the existence of credit management costs, as well as late payment and exposure to payment default. Although the results are not presented, this positive relationship is maintained when we regress REC on profitability (ROA) and control variables for each of the 24 industries established in Table 3 and for the three methods of estimation. These results are consistent with those reported by Hill et al. (2012) for U.S. listed firms. As we discussed above, the greater information asymmetry regarding product quality and the competitive pressures that SMEs are normally subject to means that they offer trade credit to prevent loss of sales, and decrease in profitability. In addition, high-growth firms, in many cases SMEs, can

[6] We also test for the existence of a non-linear relationship between trade credit and profitability including variable REC^2 in the regression. Results reject this hypothesis and confirm a linear relationship.

employ trade credit terms as a competitive tool to continue to increase firm sales and, therefore, firm profitability.

Trade credit granted also has sector-specific levels and trends; consequently we also analyse the industry effect on our results. Several authors, such as Smith (1987), Ng et al. (1999), and Fisman and Love (2003), find that trade credit terms are uniform within industries and differ across industries. Smith (1987) argues that within an industry both parts, buyers and sellers, face similar market conditions, while across industries, market conditions and investment requirements in buyers may vary significantly. Paul and Boden (2008) suggest that firms need to match normal industry terms to maintain their market competitiveness. If the credit granted by a firm is not competitive compared to firms in the same sector, it could have negative effects on firm profitability. To take into account the industry effect, we employ the variable ADJUSTEDREC, which is firm accounts receivable minus industry mean accounts receivable. We present the results in columns 2, 4, and 6 (table 4). ADJUSTEDREC is positively and significantly related to ROA. Since this variable is positive for firms with more receivables than the average firm in their industry, the results provide empirical evidence that higher investment in trade credit than the industry mean increases firm profitability. In this sense Niskanen and Niskanen (2006) argue that a firm willing to grow, or one whose sales are declining, may choose a strategy of extending more trade credit than the average firm in its industry to increase its sales. This result is also consistent with Hill et al. (2012), although from a different motivation, who state that trade credit may help customers facing liquidity problems, which could facilitate future sales.

Table 4

Effect of trade credit on profitability

	(1) OLS	(2) OLS	(3) FE	(4) FE	(5) IV	(6) IV
REC	0.0445***		0.0555***		0.0556***	
	(35.30)		(27.28)		(34.44)	
ADJUSTEDREC		0.0445***		0.0553***		0.0555***
		(35.26)		(27.13)		(34.37)
SIZE	-0.0009***	-0.0009***	0.0183***	0.0184***	-0.0007***	-0.0007***
	(-4.75)	(-4.73)	(21.14)	(21.19)	(-3.45)	(-3.44)
GROWTH	0.0638***	0.0639***	0.0498***	0.0498***	0.0672***	0.0672***
	(66.07)	(66.1)	(60.43)	(60.51)	(62.47)	(62.53)
DEBT	-0.0836***	-0.0836***	-0.1851***	-0.1851***	-0.0818***	-0.0818***
	(-76.72)	(-76.71)	(-67.96)	(-67.97)	(-70.22)	(-70.22)
GDP	-0.0987	-0.2931	-0.2041	-0.4472	-6.3398	-6.2163
	(-0.07)	(-0.20)	(-0.17)	(-0.37)	(-0.62)	(-0.61)
Constant	0.1146*	0.1357**	0.0629	0.0917*	0.3718	0.3828
	(1.85)	(2.18)	(1.23)	(1.80)	(0.85)	(0.87)
R-squared	0.1563	0.1562	0.0874	0.0847	0.1536	0.1535
$Hausman_1$			0.00	0.00		
$Hausman_2$					0.00	0.00
Observations	71635	71635	71635	71635	60298	60298

The dependent variable is ROA (Return on Assets). REC investment in trade credit (receivables to total assets); ADJUSTEDREC is REC less industry mean REC; SIZE company size; GROWTH sales growth; DEBT debt to total assets; GDP annual GDP growth. Time and sectorial dummies are included in all regressions, although coefficients are not presented. Results obtained using ordinary least squared, fixed-effects, and instrumental variables estimations. t statistics in brackets. ***significant at 1%, **significant at 5%, *significant at 10% level. Hausman is p-value of Hausman (1978) test. $Hausman_1$ compares within-group and random-effects estimators. $Hausman_2$ compares the estimations for instrumental variables and OLS.

4.2. Trade credit motives and profitability

To test the hypothesis put forward that the relation between firm profitability and trade credit differs according to firms' characteristics, we develop the following model that relates firm profitability to trade credit, incorporating interaction between the receivables ratio and dummy variables measuring size, liquidity, sales volatility, and market share.

$$ROA_{it} = \beta_0 + (\beta_1 + \beta_2\, DUMMY_{it}) \times REC_{it} + \beta_3\, DUMMY_{it} + \beta_4\, SIZE_{it} + \beta_5\, GROWTH_{it} + \beta_6\, DEBT_{it} + \beta_7\, GDP_t + \eta_i + \lambda_t + I_s + e_{it} \quad (1)$$

We employ dummy variables to study the effect of financial, operational, and commercial motives on firm profitability. How do receivables affect firm profitability? If we solve the brackets of model 1, we obtain: $\beta_1 \times REC_{it} + \beta_2 \times REC_{it} \times DUMMY_{it}$. Therefore, in the case that $DUMMY_{it}$ takes value 1, $\beta_1 + \beta_2$ accounts for the effect on firm profitability. Otherwise, when $DUMMY_{it}$ takes value 0, the interaction variable is 0, and β_1 accounts for the effect. Moreover, like Dittmar and Mahrt-Smith (2007), we include in the model the $DUMMY_{it}$ variable on its own, because if an endogenous relation exists, it is more likely to show up in the dummy variable than in the interaction with receivables. $SIZE_{it}$, $GROWTH_{it}$, $DEBT_{it}$, and GDP_t are the control variables described above. η_i is the unobservable heterogeneity; λ_t control for time effects and are year dummy variables that change in time but are equal for all firms in each of the periods considered; parameter I_s controls by the industry in which the firm operates, and ε_{it} is the error term.

In order to test the financial motive for trade credit, we segmented the sample according to firm size, measured as DSIZE - a dummy variable that takes value one if firm SIZE of that year (logarithm of total assets) is less than or equal to the median firm size in the sample, and zero otherwise - and liquidity measured as DLIQ - a dummy variable that takes value one if firm liquid assets (cash and cash equivalents to total assets) are smaller than or equal to the median liquid assets. For SMEs, the firm size is a common proxy for financial constraints (Almeida, Campello and Weisbach, 2004; Faulkender and Wang, 2006) or creditworthiness (Petersen and Rajan, 1997). As stated in Hypothesis 2, we expected larger and more liquid firms to have greater profitability from receivables than smaller and less liquid firms.

In columns 1, 3, and 5 of table 5 we present the results for the effect of firm size on the profitability of receivables, using ordinary least squares (OLS), fixed effects (FE) and instrumental variable estimation (IV), respectively. The REC×DSIZE negative coefficient indicates that trade credit investment is more profitable for larger firms than for smaller firms (except for fixed effect estimation). For instance, with the OLS method of estimation (column 1), the profitability of receivables for the subsample of smaller firms (DSIZE=1) is 0.0502 + (-0.011) = 0.0392, while for the subsample of larger firms (DSIZE=0) this value is 0.0502. As for instrumental variable estimation (column 5), the figures are 0.0731 for larger firms and 0.0379 for smaller firms[7]. This result is consistent with the view that unconstrained firms (larger firms) offer trade credit to finance their customer's growth because of their greater financial capacity, thus increasing profitability. Trade credit implies accounts receivable financing, since it requires the seller to seek financing from a third party (usually a bank). An alternative accounts receivable financing is factoring. Summers and Wilson (2000) find that firms with more difficulty in raising institutional finance use more factoring. The use of factoring by small firms that are under financial pressure and credit rationed is more likely. According to the extent to which the firm uses factoring, the profitability of receivables might decrease because of the costs of subcontracting (e.g. commissions and interest costs). In short, accessing capital markets is more difficult and expensive for smaller firms, so these firms obtain less profitability from receivables than larger firms. These results support the financial motive for trade credit and are not consistent with product quality guarantee argument. Other reasons explaining this higher return could be the existence of scale economies associated to trade credit management in larger firms (fixed costs associated with the granting and monitoring process). Hence, the internalisation of credit management is greater the larger the firm (Summers and Wilson, 2000). In addition to cost savings, a large customer base could help to identify buyers' financial problems, since the experience with some customers will yield information on the default risk of others (Ng et al., 1999). Larger firms have more sophisticated and efficient credit management through increased capacity to invest in specialised personnel and procedures or information technologies (Mian and Smith, 1992; Peel, Wilson and Howorth, 2000). They are therefore better able to enforce contracts and may suffer fewer bad debts.

[7] The results do not change if we eliminate control variable SIZE from the estimations.

Table 5

Firm characteristics and profitability of receivables (I)

	(1) OLS	(2) OLS	(3) FE	(4) FE	(5) IV	(6) IV
REC	0.0502***	0.0493***	0.0566***	0.0654***	0.0731***	0.0672***
	(27.68)	(26.98)	(20.47)	(26.52)	(28.49)	(24.93)
REC×DSIZE	-0.0110***		-0.0019		-0.0352***	
	(-4.45)		(-0.57)		(-11.22)	
DSIZE	0.0001		-0.0014		0.0089***	
	(0.09)		(-0.94)		(6.72)	
REC×DLIQ		-0.0068***		-0.0093***		-0.0244***
		(-2.79)		(-3.68)		(-7.66)
DLIQ		-0.0126***		-0.0071***		-0.0063***
		(-13.45)		(-7.16)		(-5.34)
SIZE	-0.0023***	0.0001	0.0176***	0.0183***	-0.0019***	0.0004*
	(-6.99)	(0.61)	(19.15)	(21.21)	(-5.47)	(1.70)
GROWTH	0.0638***	0.0622***	0.0498***	0.0487***	0.0672***	0.0658***
	(66.09)	(64.85)	(60.42)	(59.34)	(62.51)	(61.66)
DEBT	-0.0838***	-0.0735***	-0.1851***	-0.1795***	-0.0827***	-0.0717***
	(-76.77)	(-65.69)	(-67.95)	(-65.91)	(-70.74)	(-59.94)
GDP	-0.0962	-0.0241	-0.1924	-0.2573	-5.5482	-7.6420
	(-0.07)	(-0.02)	(-0.16)	(-0.21)	(-0.54)	(-0.76)
Constant	0.1243**	0.1046*	0.0680	0.0633	0.3425	0.4181
	(2.00)	(1.70)	(1.33)	(1.25)	(0.78)	(0.96)
R-squared	0.1568	0.1707	0.0875	0.0971	0.1531	0.1674
$Hausman_1$			0.00	0.00		
$Hausman_2$					0.00	0.00
Observations	71635	71635	71635	71635	60298	60298

The dependent variable is ROA (Return on Assets). REC investment in trade credit (receivables to total assets); DSIZE is a dummy variable that takes the value one whether SIZE is less than the median firm size; REC× DSIZE is receivables to assets ratio multiplied by DSIZE; DLIQ is a dummy variable that takes the value one whether LIQ is less than the median firm liquidity; REC× DLIQ is receivables to assets ratio multiplied by DLIQ; SIZE company size; GROWTH sales growth; DEBT debt to total assets; GDP annual GDP growth. Time and sectorial dummies are included in all regressions, although coefficients are not presented. Results obtained using ordinary least squared, fixed-effects, and instrumental variables estimations. t statistics in brackets. ***significant at 1%, **significant at 5%, *significant at 10% level. Hausman is p-value of Hausman (1978) test. $Hausman_1$ compares within-group and random-effects estimators. $Hausman_2$ compares the estimations for instrumental variables and OLS.

In columns 2, 4, and 6 of Table 5 we examine the effect of the liquidity of the firm on the value of the accounts receivable using OLS, FE, and IV, respectively. Since the interaction variable (REC×DLIQ) coefficient β_2 is negative and significant, the sum of the coefficients (REC+REC×DLIQ) $\beta_1 + \beta_2$ is lower than β_1, indicating that the profitability of receivables is lower for the subsample of less liquid firms (DLIQ=1). We find that liquidity is a factor that positively affects the profitability of receivables[8]. This may be because more liquid firms are able to provide financing to their customers when they experience temporary liquidity shocks that may threaten their survival (Cuñat, 2007). Suppliers would lend to their customers in financial trouble when another source of financing is not available. Hence, trade credit can be used to mitigate customers´ financial frictions, which may facilitate future sales and reinforce a long-term relation with them. Moreover, this positive effect can be explained by the fact that the implicit return on receivables is greater than the return on alternative investment, as Petersen and Rajan (1994) and Atanasova (2007) find. Finally, trade credit terms and, therefore, the implicit interest rate charged by firms may be different depending on the firm's market position, thus explaining the differences in the profitability of trade credit. Larger and/or more liquid firms could offer worse credit terms - a shorter period of payment or fewer discounts for prompt payment - to their smaller and less liquid customers, thus obtaining higher profitability from receivables. Larger and more liquid (unconstrained) firms, with their advantageous access to capital, can offer flexible credit terms to help the buyer in financial difficulties and preserve customers' value. Therefore, the results confirm Hypothesis 2 since profitability of receivables is higher for larger and liquid firms.

To test the effect of the operational motive for trade credit on firm profitability, we now split the sample according to SALESVOL – the variable reflecting demand variability. Following Long et al. (1993), this is the standard deviation of sales (3 years) divided by mean sales over a 3-year period. DSALESVOL is a dummy variable that takes value one if SALESVOL is smaller than or equal to the median sales volatility in the sample. According to the operational motive, trade credit incentivises customers to acquire merchandise at times of low demand (Emery, 1987). Long et al. (1993) find a direct relation between trade credit levels and demand uncertainty. Thus, we expected a greater effect of trade credit on firm profitability for the subsample of uncertain or

[8] Additionally, we analyse the effect of inventories on the profitability of receivables. In line with Bougheas, Mateut and Mizen (2009) and Daripa and Nilsen (2005), we find that the profitability of receivables is higher for lower inventory firms.

variable product demand. Results reported in columns 1 (OLS), 3 (FE), and 5 (IV) of Table 6 for equation 1 including dummy variable DSALESVOL and the interaction REC×DSALESVOL show support for this hypothesis (H_3). Since the interaction coefficient β_2 is negative and statistically significant, the profitability of receivables for firms with uncertain demand is higher than for firms with a stable demand. The negative effect of the variable REC×DSALESVOL on firm profitability may be a result of costs reduction for firms with uncertain demand. Hence, trade credit policy can be used to mitigate the consequences of uncertain sales (Emery, 1987), and the finding supports the operational motive for trade credit.

Table 6

Firm characteristics and profitability of receivables (II)

	(1) OLS	(2) OLS	(3) FE	(4) FE	(5) IV	(6) IV
REC	0.0502***	0.0403***	0.0578***	0.0529***	0.0697***	0.0631***
	(29.47)	(22.31)	(-25.73)	(19.52)	(28.56)	(24.01)
REC×DSALESVOL	-0.0133***		-0.0091***		-0.0331***	
	(-5.42)		(-3.99)		(-10.79)	
DSALESVOL	-0.0076***		-0.0046***		-0.0006	
	(-8.10)		(-5.27)		(-0.56)	
REC×DMKSHARE		-0.0050**		-0.0010		-0.0284***
		(-2.03)		(-0.29)		(-8.90)
DMKSHARE		-0.0164***		-0.0169***		-0.0064***
		(-15.49)		(-11.57)		(-4.82)
SIZE	-0.0008***	-0.0072***	0.0175***	0.0148***	-0.0006***	-0.0063***
	(-4.31)	(-24.47)	(-20.17)	(16.78)	(-3.06)	(-20.00)
GROWTH	0.0623***	0.0626***	0.0512***	0.0480***	0.0658***	0.0659***
	(64.84)	(65.15)	(-62.15)	(58.10)	(61.47)	(61.50)
DEBT	-0.0885***	-0.0836***	-0.1863***	-0.1822***	-0.0865***	-0.0823***
	(-80.71)	(-76.94)	(-68.62)	(-66.99)	(-73.86)	(-70.82)
GDP	-0.2089	-0.2993	-0.2318	-0.2547	-7.0612	-7.1043
	(-0.14)	(-0.20)	(-0.19)	(-0.21)	(-0.70)	(-0.70)
Constant	0.1273**	0.1751***	0.0739	0.0965*	0.4062	0.4478
	(2.06)	(2.83)	(1.45)	(1.90)	(0.93)	(1.03)
R-squared	0.1665	0.1657	0.0952	0.0885	0.1634	0.1615
$Hausman_1$			0.00	0.00		
$Hausman_2$					0.00	0.00
Observations	71635	71635	71635	71635	60298	60298

The dependent variable is ROA (Return on Assets). REC investment in trade credit (receivables to total assets); DSALESVOL is a dummy variable that takes the value one if SALESVOL is less than the median sales volatility; REC×DSALESVOL is receivables to assets ratio multiplied by DSALESVOL; DMKSHARE is a dummy variable that takes the value one whether MKSHARE is less than the median market share; REC×DMKSHARE is receivables to assets ratio multiplied by DMKSHARE; SIZE company size; GROWTH sales growth; DEBT debt to total assets; GDP annual GDP growth. Time and sectorial dummies are included in all regressions, although coefficients are not presented. Results obtained using ordinary least squared, fixed-effects, and instrumental variables estimations. t statistics in brackets. ***significant at 1%, **significant at 5%, *significant at 10% level. Hausman is p-value of Hausman (1978) test. $Hausman_1$ compares within-group and random-effects estimators. $Hausman_2$ compares the estimations for instrumental variables and OLS.

Finally, to test the commercial motive for trade credit, we split the sample according to firm market share. We define DMKSHARE as a dummy variable that takes value one if MKSHARE is smaller than or equal to the median market share in the sample, where MKSHARE is the ratio of annual firm sales to annual industry sales. In columns 2 (OLS), 4 (FE), and 6 (IV) of Table 6, we estimate equation 1 including DMKSHARE and REC×DMKSHARE to get additional information about the effect of trade credit to stimulate sales and consequently enhance profitability. The results indicate that for firms with greater market presence the supply of trade credit is more profitable than for firms with smaller market shares, since REC×DMKSHARE is statistically significant and negatively signed, except for the FE estimation. Unlike Hill et al. (2012), we find evidence that the incentives to extend financing are higher for firms with larger market shares. There may be several reasons. On the one hand, firms with market power are not forced to grant trade credit in the same way as firms with less market presence, so these firms will evaluate credit risks and grant trade credit to their customers with higher credit quality. On the other hand, dominant suppliers are in a better position to enforce their payment terms and to enforce contracts, so they may suffer less debt defaults. Furthermore, if the firm sells a specific product that is not easily replaceable, the cost of interruption (for the buyer) in the supply of the inputs will be higher, and therefore the buyer is less likely to default. Finally, the above argument can be applied here; larger market share firms could offer worse credit terms to their customers than lower market power firms, thus obtaining higher profitability from receivables. This argument could be related to price discrimination, since the vendor firm might charge a higher price to credit customers than to cash customers, thus obtaining a higher profit margin and therefore greater profitability. To conclude, empirical results show that the profitability of receivables is positively related to firm market share and firm size, thus giving more support to the financial motive.

Results in Tables 7 and 8 examine the robustness of earlier results. We find almost identical results when using different proxies to split the sample into subsamples according to firm characteristics (D2SIZE, D2LIQ, D2SALESVOL, and D2MKSHARE). Specifically, for each year, we sort firms according to their size (natural logarithm of total assets) and assign to the financially constrained (unconstrained) group those firms whose size variable is smaller (greater) than or equal to the size variable of the firm at the 25^{th} (75^{th}) ‰ of the annual size variable distribution. We repeat the process with the remaining variables: LIQ, SALESVOL, and MKSHARE.

Table 7

Firm characteristics and profitability of receivables. Robustness (I)

	(1) OLS	(2) OLS	(3) FE	(4) FE	(5) IV	(6) IV
REC	0.0604***	0.0596***	0.0538***	0.0775***	0.0880***	0.0839***
	(22.71)	(21.18)	(10.88)	(17.33)	(23.53)	(19.97)
REC×D2SIZE	-0.0210***		-0.0012		-0.0500***	
	(-5.89)		(-0.20)		(-11.00)	
D2SIZE	-0.0065***		0.0345***		0.0044*	
	(-2.88)		(3.83)		(1.71)	
REC×D2LIQ		-0.0178***		-0.0221***		-0.0419***
		(-4.85)		(-4.14)		(-8.60)
D2LIQ		-0.0182***		-0.0128***		-0.0101***
		(-13.15)		(-6.03)		(-5.71)
SIZE	-0.0057***	0.0000	0.0213***	0.0168***	-0.0052***	0.0003
	(-8.90)	(-0.01)	(14.00)	(11.96)	(-7.54)	(1.04)
GROWTH	0.0637***	0.0616***	0.0518***	0.0473***	0.0660***	0.0667***
	(46.38)	(44.09)	(43.22)	(36.55)	(42.86)	(42.84)
DEBT	-0.0840***	-0.0725***	-0.1998***	-0.1657***	-0.0833***	-0.0704***
	(-54.19)	(-44.39)	(-47.42)	(-38.01)	(-50.12)	(-40.19)
GDP	1.2044	1.2820	1.3791	1.8042	-2.0972	-2.1752
	(0.70)	(0.62)	(1.01)	(1.04)	(-0.19)	(-0.16)
Constant	0.0963	0.0537	-0.0336	-0.0213	0.2179	0.1852
	(1.34)	(0.62)	(-0.57)	(-0.29)	(0.45)	(0.32)
R-squared	0.1563	0.2025	0.0873	0.1274	0.1520	0.2007
$Hausman_1$			0.00	0.00		
$Hausman_2$					0.00	0.00
Observations	35819	35822	35819	35822	29969	30210

The dependent variable is ROA (Return on Assets). REC investment in trade credit (receivables to total assets); D2SIZE is a dummy variable that takes the value one whether SIZE variable is less than or equal to the SIZE variable of the firm at the 25th percentile of the annual SIZE variable distribution, and zero when SIZE variable is greater than or equal to the SIZE variable of the firm at the 75th percentile of the annual SIZE variable distribution; REC×D2SIZE is receivables to assets ratio multiplied by D2SIZE; D2LIQ is a dummy variable that takes the value one whether LIQ is less than or equal to the LIQ of the firm at the 25th percentile of the annual LIQ variable distribution, and zero when LIQ is greater than or equal to the LIQ of the firm at the 75th percentile of the annual LIQ variable distribution; REC×D2LIQ is receivables to assets ratio multiplied by D2LIQ; SIZE company size; GROWTH sales growth; DEBT debt to total assets; GDP annual GDP growth. Time and sectorial dummies are included in all regressions, although coefficients are not presented. Results obtained using ordinary least squared, fixed-effects, and instrumental variables estimations. t statistics in brackets. ***significant at 1%, **significant at 5%, *significant at 10% level. Hausman is p-value of Hausman (1978) test. $Hausman_1$ compares within-group and random-effects estimators. $Hausman_2$ compares the estimations for instrumental variables and OLS.

Table 8

Firm characteristics and profitability of receivables. Robustness (II)

	(1) OLS	(2) OLS	(3) FE	(4) FE	(5) IV	(6) IV
REC	0.0590***	0.0458***	0.0677***	0.0537***	0.0816***	0.0700***
	(24.54)	(17.38)	(19.36)	(11.95)	(23.19)	(17.75)
REC×D2SALESVOL	-0.0224***		-0.0153***		-0.0464***	
	(-6.39)		(-3.70)		(-10.39)	
D2SALESVOL	-0.0107***		-0.0086***		-0.0025	
	(-8.00)		(-5.30)		(-1.52)	
REC×D2MKSHARE		-0.0126***		-0.0046		-0.0387***
		(-3.47)		(-0.76)		(-8.15)
D2MKSHARE		-0.0251***		-0.1732***		-0.0135***
		(-13.22)		(-5.10)		(-5.76)
SIZE	-0.0011***	-0.0080***	0.0184***	0.0146***	-0.0009***	-0.0072***
	(-4.01)	(-18.22)	(14.56)	(10.93)	(-2.79)	(-15.03)
GROWTH	0.0538***	0.0618***	0.0439***	0.0503***	0.0575***	0.0646***
	(42.38)	(45.40)	(38.22)	(41.48)	(39.64)	(42.21)
DEBT	-0.0896***	-0.0852***	-0.2031***	-0.1851***	-0.0879***	-0.0836***
	(-56.19)	(-55.26)	(-47.59)	(-46.29)	(-50.96)	(-50.51)
GDP	0.6030	0.2891	-0.6876	0.2362	27.2413*	-8.6947
	(0.35)	(0.20)	(-0.45)	(0.18)	(1.74)	(-0.81)
Constant	0.0963	0.1636***	0.0991	0.1564***	-1.0673	0.5278
	(1.33)	(2.64)	(1.52)	(2.75)	(-1.59)	(1.14)
R-squared	0.1686	0.1711	0.0858	0.0412	0.1660	0.1654
$Hausman_1$			0.00	0.00		
$Hausman_2$					0.00	0.00
Observations	35818	35816	35818	35816	29248	30004

The dependent variable is ROA (Return on Assets). REC investment in trade credit (receivables to total assets); D2SALESVOL is a dummy variable that takes the value one whether SALESVOL is less than or equal to the SALESVOL of the firm at the 25th percentile of the annual SALESVOL variable distribution, and zero when SALESVOL is greater than or equal to the SALESVOL of the firm at the 75th percentile of the annual SALESVOL variable distribution; REC×D2SALESVOL is receivables to assets ratio multiplied by D2SALESVOL; D2MKSHARE is a dummy variable that takes the value one whether MKSHARE variable is less than or equal to the MKSHARE variable of the firm at the 25th percentile of the annual MKSHARE variable distribution, and zero when MKSHARE variable is greater than or equal to the MKSHARE variable of the firm at the 75th percentile of the annual MKSHARE variable distribution; REC×D2MKSHARE is receivables to assets ratio multiplied by D2MKSHARE; SIZE company size; GROWTH sales growth; DEBT debt to total assets; GDP annual GDP growth. Time and sectorial dummies are included in all regressions, although coefficients are not presented. Results obtained using ordinary least squared, fixed-effects, and instrumental variables estimations. t statistics in brackets. ***significant at 1%, **significant at 5%, *significant at 10% level. Hausman is p-value of Hausman (1978) test. $Hausman_1$ compares within-group and random-effects estimators. $Hausman_2$ compares the estimations for instrumental variables and OLS.

We also test an additional specification with all the dummies together but without the interactions between them and receivables, and the results do not change. We find a positive relation between receivables and profitability. Moreover, we find that smaller firms are more profitable, maybe because of greater internal flexibility. Furthermore, results show that less liquid firms and less market share firms are less profitable. Finally, firms with more stable sales could be less risky (less variability of economic returns) but less profitable businesses.

Regarding the results of the control variables in Tables 4 to 8, we find contradictory empirical evidence for the relation between size and profitability. Overall, we report a negative coefficient of the variable SIZE in OLS and IV estimations, and a positive one in FE estimations, but the coefficient of the variable SIZE is not always significant. Demsetz and Villalonga (2001) also reported a non-significant relation between firm size and firm performance. GROWTH is positive in all cases, so growth in sales causes profit to grow. Moreover, sales growth could be an indicator of a firm's investment opportunities, and it is an important factor in allowing firms to enjoy improved profitability. Consistent with agency costs of debt, we find a negative effect of debt on profitability[9]. Finally, we do not find a significant relationship between GDP growth and ROA[10].

Summing up, we find a positive relationship between accounts receivable and firms' profitability. Moreover, there are differences in the value of receivables according to firms' characteristics. In this sense, we find higher profitability of receivables for larger and more liquid firms (that suffer less credit constraints) as well as for larger market share firms. Furthermore, uncertain demand firms have higher receivables profitability. Thus, the evidence supports the financial and operational motives for trade credit. However, we do not find results supporting the commercial motive for trade credit since we find lower profitability from receivables for less market presence firms and for small firms with lower reputation in product markets.

[9] The relation receivables-profitability does not change if we include control variables squared. Moreover, in general, the relation between ROA and control variables does not change either.

[10] However, when time dummies are excluded we find a positive association between GDP growth and firm profitability for OLS and FE estimations. When economic conditions are good, i.e. high GDP growth, firms will enjoy a higher profitability.

5. CONCLUSIONS

Trade credit management is particularly important in the case of SMEs since an important part of their assets is invested in accounts receivables. Consequently, efficient trade credit management could improve firm profitability significantly. Though the impact of trade credit policy on SME profitability is highly important, no studies have been carried out to examine this relation. The objective of this chapter is to provide empirical evidence of the effect of trade credit on the profitability for a sample of Spanish manufacturing SMEs during the period 2000-2007

We find a positive linear relationship between the investment in trade credit and firm profitability derived from the fact that the benefits associated to trade credit surpass the costs of vendor financing. Further evidence supports the financial motive for trade credit, showing that financially unconstrained firms (larger and more liquid firms) obtain extra profitability by granting trade credit than do financially constrained firms. The findings also support the operational motive for trade credit. Actually, the use of trade credit is more profitable for firms with variable demand than for firms with stable demand. In this sense, trade credit might be used to smooth demand, thus lowering operating costs and therefore enhancing firm profitability. However, we do not find evidence for the commercial motive, nor that extending trade credit is more profitable for less market share firms than for firms with greater market presence, nor that smaller firms with no reputation in product markets obtain higher profitability from trade credit.

These results show the important role of trade credit as a determinant of SME profitability and provide valuable insights for academics and managers since the results suggest that by increasing their investment in trade credit SMEs might enhance their profitability, especially in the case of financially unconstrained firms, firms with volatile demand, and larger market share firms. Moreover, higher investment in trade credit than the industry mean increases firms' profitability. This chapter highlights the importance of current assets management in the maximisation of firm value and opens an important field for future research. However this study is also relevant for other groups of stakeholders, such as financial institutions and policy makers, since financial institutions play a key role in the financing of short-term commercial trade, and policy

makers, in view of the importance of trade credit for SMEs profitability, should enforce trade agreements to combat late payment in trade credit.

To finish, one possible limitation is that the study focuses on a period of economic expansion (2000-2007). From our point of view, the over-time robustness of the findings is interesting. It would be appropriate to replicate this study in a period of economic downturn, like the present, when data are available, in order to compare the results and draw conclusions. Due to liquidity and financial constraints arising from the current financial crisis, the relations obtained could be different. Late payment or non-payment in commercial transactions has increased significantly and because of this the positive relation found between the investment in trade credit and profitability could differ. Therefore, this is an important step for future research.

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PART 3

TRADE CREDIT RECEIVED

CHAPTER 5

ACCESS TO FINANCING AND THE VALUE OF ACCOUNTS PAYABLE

1. INTRODUCTION

Accounts payable are a spontaneous source of credit arising when firms make purchases on credit. Commercial debt is an important component in firms' financing. García-Teruel and Martínez-Solano (2010) show that accounts payable represent about 25% of total liabilities and equity for a sample of Spanish SMEs. Perhaps because of this, the practice of trade credit has attracted research attention. Studies have focused on explaining the determinants of accounts payable (Deloof and Jegers, 1999; Elliehausen and Wolken, 1993; García-Teruel and Martínez-Solano, 2010; Ge and Qiu, 2007; Huyghebaert, 2006; Niskanen and Niskanen, 2006; Petersen and Rajan, 1997; among others). However the value of trade credit financing by firms remains virtually unexplored in the financial literature, even though accounts payable may affect firm value.

Trade credit received may affect value in different ways. Firms may overcome financial constraints (Schwartz, 1974). This is especially important in countries with less developed financial markets where trade credit is an alternative channel to financial markets (Fisman and Love, 2003; Ge and Qiu, 2007). Trade credit may also be an instrument used by less creditworthy and constrained firms to acquire reputation and alleviate adverse selection (Antov and Atanasova, 2007; Biais and Gollier, 1997). Moreover, trade credit received offers more financial flexibility than bank loans (Danielson and Scoot, 2004). Finally, it reduces transaction costs related to the reception, verification and payment of merchandise (Ferris, 1981; Smith, 1987).

A recent line of research investigates the shareholders' value of cash (Dittmar and Marth-Smith, 2007; Drobetz, Grüninger and Hirschvogl, 2010; Faulkender and Wang, 2006; Khieu and Pyles, 2012; Pinkowitz, Stulz and Williamson, 2006; Pinkowitz and Williamson, 2007; Tong, 2011), the shareholders' value of receivables (Hill, Kelly and Lockhart, 2012), and the valuation of net operating working capital (Kieschnick, Laplante and Moussawi, 2013). However, to the best of our knowledge, the search for estimates the value of accounts payable is scarce. The only exception is a paper by Hill, Kelly and Lockhart (2013), who examine the relationship between shareholder wealth and supplier financing for a sample of listed US firms.

In this context, the purpose of this chapter is to provide empirical evidence of the effects of trade credit financing on firm value. In order to do this we use a sample of Spanish SMEs. This chapter attempts to contribute to the existing literature in the following ways. First, we extend the research on trade credit by analyzing the effect of accounts payable on firm value, and whether this effect depends on the access to financing. Second, we employ a sample of SMEs, for which commercial credit is especially important given their greater difficulty in accessing capital markets because of market frictions such as information asymmetries and agency costs (Berger and Udell, 1998; Petersen and Rajan, 1997). A small firm faces difficulties in accessing financial markets since it is typically less known and thus more vulnerable to capital markets imperfections (Almeida, Campello and Weisbach, 2004). Therefore, for small firms which suffer greater information asymmetries and have less access to external capital, trade credit would be more important (Niskanen and Niskanen, 2006). Borrowing in the form of trade credit provides an alternative source of funds, to which must be added the importance of the signaling effect of trade credit for SMEs. In this sense, Biais and Gollier (1997) argue that trade credit communicates good information. Therefore, trade credit could be an instrument that less creditworthy and constrained firms use to acquire reputation and alleviate adverse selection (Antov and Atanasova, 2007). Thus, a sample of Spanish SMEs provides an interesting setting to analyze how accounts payable influences firm valuation and the differences in the marginal value of payables depending on their access to internal and external finance. Third, we present empirical evidence for a sample of Spanish SMEs in the context of the continental model (civil law), unlike Hill et al. (2013) who studied a sample of listed US companies. Civil law countries are characterized by weaker investor protection and less-developed capital markets (La Porta, Lopez-de-Silanes, Shleifer and Vishny, 1997), especially compared to common law countries. The literature highlights the significant role for trade credit as a source of firms' financing in countries with less developed financial markets (Fisman and Love, 2003). Firms in countries with larger banking systems take more financing from suppliers (Demirgüç-Kunt and Maksimovic, 2002). Moreover, in firms in countries with legal systems of common law origin there is a higher degree of reliance on accounts payable (Demirgüç-Kunt and Maksimovic, 2002; Fisman and Love, 2003). The importance of trade credit is higher regarding bank credit when creditor protection is weaker because cash is easily diverted, while inputs are more difficult to divert (Burkart and Ellingsen, 2004). Perhaps because of this, Demirgüç-

Kunt and Maksimovic (2002) show that Spanish firms are among the largest users of trade credit.

Our results show a positive relationship between accounts payable and firm value. Moreover, the value of suppliers financing is lower in firms with better access to alternative financing, either in the form of internally generated cash flows or external debt. In the same way, firms with less access to external finance in terms of cost have greater accounts payable value. The findings are consistent with the financial motive of trade credit. In conclusion, the financing that suppliers provide is a valuable resource for firms, especially for companies with less borrowing capacity and lower cash-flow generation.

The rest of the chapter is organized as follows: in section 2, we review the main theories of trade credit and the expected relationships between accounts payable and firm value. In section 3, we describe the sample as well as the regression specification and variables. Section 4 presents the results and Section 5 concludes.

2. RELATED LITERATURE AND HYPOTHESIS

2.1. Accounts payable and firm value

This section analyzes the effect of supplier financing on firm value. We expect that trade credit financing adds value to the company because of the benefits this source of funding provides. From a financial point of view, one of the main advantages of accounts payable is that trade credit could help firms to overcome financial constraints (Schwartz, 1974), especially when institutional credit is unavailable (Danielson and Scott, 2004) or prohibitively expensive. Moreover, the extension of trade credit by firms' suppliers could give a positive signal to the investors about the creditworthiness of the firm, due to the better knowledge that suppliers have about the situation of firm regarding financial institutions (Biais and Gollier, 1997). In this sense, commercial debt subjects the company to permanent assessment and control by their suppliers, who will not be able to grant a firm more credit unless it has good prospects. Therefore, trade credit could reduce the agency problems associated with information

asymmetry between the firm and its lenders, while encouraging bank financing (Biais and Gollier, 1997).

Furthermore, trade credit can alleviate the agency conflict between managers and owners, since accounts payable is restricted to funding inventory and services (Hill et al., 2013), limiting the use of firm's resources for private benefits. Nevertheless, in the case of SMEs, characterized by higher coincidence between ownership and control, this agency cost should be lower or non existent, although the agency problems associated with debt are more significant (Berger and Udell, 2003).

In addition to these benefits, trade credit can reduce transaction costs by separating the exchange of goods from the exchange of money and enabling the payment of bills to be performed periodically rather than through immediate payment on delivery of merchandise (Emery, 1987; Ferris, 1981; Nadiri, 1969). Another advantage of supplier financing is the financial flexibility it brings to the company. Trade credit helps firms to improve their cash flows by reducing the speed of cash outflows. Besides, it varies with company activity. Also, it could be less costly to delay trade credit payments than to renegotiate the payment terms of bank loans in the case of temporary cash flow problems (Danielson and Scott, 2004).

Trade credit offers other advantages apart from financing and transactional benefits. In particular, trade credit received allows customers a period of time to verify the quality of the products before payment, thus reducing information asymmetry between sellers and buyers (Deloof and Jegers, 1996; Emery and Nayar, 1998; Lee and Stowe 1993; Long, Malitz and Ravid 1993; Ng, Smith and Smith, 1999; and Smith, 1987).

However, supplier financing may have an implicit cost, which depends on the cash discount for prompt payment and the discount period (Ng et al., 1999; Wilner, 2000). Furthermore, trade credit could expose the firm to refinancing risk, since suppliers as a spontaneous source of financing can stop providing credit at any time during the relationship. Finally, late trade credit payments imply other potential costs such as late payment penalties, deterioration in credit reputation, higher prices or less favorable delivery dates in the future, so worsening the relationship with the supplier (Danielson and Scott, 2004; Wu, Rui and Wu, 2012).

Notwithstanding, as Hill et al. (2013) point out, it seems that trade credit is not as expensive as previous studies suggest, because the cash discount is not widely used (Giannetti, Burkart and Ellingsen, 2011). In a similar context to Spain - Italy - Marotta (2005) finds that the proportion of suppliers offering discounts is very low. What is more, according to the European Payment Guide made by Intrum Justitia (2013)[1], the most common payment term offered in Spain is 60 days, and trade credit contracts are in net terms with no cash discount. Moreover, the cost of trade credit depends on penalties for delays. However, the majority of companies do not apply penalties for late payment (Marotta, 2005; Pike and Cheng, 2001; Wilner, 2000). Consequently, we expect a positive relationship between accounts payable and firm value.

2.2 Access to financing and the value of accounts payable

The financing theory justifies the use of trade credit because credit market imperfections cause financial institutions to ration credit (Emery, 1984; Lewellen, McConnell and Scott, 1980; Schwartz, 1974; and Smith, 1987). Namely, firms use trade credit because credit from financial institutions is limited. According to Meltzer (1960), one motivation for trade credit is to mitigate customers' financial frictions. Schwartz (1974) developed the financial motive for the use of trade credit. He focuses on the role of financial intermediation performed by nonfinancial firms. When credit is tight, firms that have easier (cheaper) access to capital markets will utilize their borrowing capacity for the purpose of passing credit on to their customers with limited access to capital markets. Theoretical models and empirical papers have developed financial theories to explain how financial market imperfections can affect the demand for trade credit (Biais and Gollier, 1997; Burkart and Ellingsen, 2004; Fabbri and Menichini, 2010; Nilsen, 2002; Ng et al., 1999; Petersen and Rajan, 1997). In this section, we go one step further, and analyze the effect of the access to external finance and internal financing on the value of accounts payable according to the financing motive of the trade credit.

[1] The European Payment Guide, made by Intrum Justitia, provides an international comparison of the payment customs and practices of 29 European countries plus Turkey and Russia participating in the survey.

Modigliani and Miller (1958) state that under perfect capital markets financing choices would not affect firm value, and therefore would be irrelevant. However, imperfections in financial markets would affect the financing decisions of firms. The existence of asymmetric information and opposing interests between lenders and borrowers can mean companies are unable to obtain external funds (Stiglitz and Weiss, 1981). Because of these difficulties in accessing finance, firms cannot always fund their positive net present value (NPV) projects. Therefore, easier access to debt increases the likelihood of taking on positive value-creating projects that might otherwise be forgone. Berger and Udell (2002) state that small firms' external debt financing is mainly provided by commercial banks and other financial institutions, as well as by suppliers. Therefore, trade credit is one of the main sources of financing for firms with difficulties in accessing financial markets. So, for financially constrained firms higher trade credit increases the probability of taking positive NPV projects (Faulkender and Wang, 2006). In this case, trade credit prevents underinvestment costs and might increase firm value, while it does not provide this benefit for firms with better access to debt. Moreover, Fazzari and Petersen (1993) state that firms try to maintain a stable level of fixed investment, which may be hampered by the existence of financial constraints if firms have no access to external funds to offset cash-flow fluctuations. These authors assert that firms facing finance constraints smooth fixed investment in the short run with working capital.

We expect firms with better access to external and internal financing have lower accounts payable value. To conduct the analysis, the variables employed to proxy access to external funds are leverage ratio, financial costs and short-term bank debt while the proxy for internal financing is cash flow.

We proxy firm's access to external financial resources by leverage ratio, since the leverage of a firm measures its ability to issue debt (Guney, Ozkan and Ozkan, 2007), and so higher leverage indicates better access to external funds (Wu et al., 2012). Almeida and Campello (2007) distinguish between quantity constraints and costs constraints on external funds. In Hennessy and Whited (2007) a proxy for financing constraints is the cost of external funds. Similarly, the second proxy for access to external funds is financial costs; a high cost of financing cause financial constraints for firms. Therefore the hypothesis to be tested is that more leveraged firms

have less payables value. Moreover, if firms face increased costs of finance, the value of trade credit would be higher.

In order to gain a better understanding of the effect of the access to external financial resources on the value of trade credit, we employ short-term bank debt. Petersen and Rajan (1994) argue that relationships with financial institutions increase the availability of finance from financial institutions to the firm. We are interested in short-term bank debt, since it can be considered the most important alternative external source of funds for accounts payable (Deloof and Jegers, 1999). Firms use trade credit as a substitute of short-term finance to institutional loans, especially when bank credit is unavailable (Fisman and Love, 2003; Nilsen, 2002; Petersen and Rajan, 1997; and Wilner, 2000; among others). Firms with more short-term bank debt may have less trade credit financing value, since they have more access to external funding sources to cover their short term financial needs. Because of this substitution effect, we expect a negative relationship between short-term bank debt and the value of accounts payable.

Finally, we focus on internal financing. Deloof and Jegers (1999) argue that firms' trade credit financing is determined by their capital needs and by internally generated cash flows as predicted by Myers and Majluf (1984). In the same vein, previous studies have found that firms with a greater capacity to generate internal funds have more resources available, and consequently will decrease their demand for financing through their suppliers (Deloof and Jegers, 1999; Niskanen and Niskanen, 2006; Petersen and Rajan, 1997). In this sense, we expect that firms high enough internal cash flows to service debt obligations and to finance investment, would place less value on the credit received by suppliers.

3. RESEARCH DESIGN

3.1. Sample

Our sample consists of a panel of 7 952 Spanish SMEs with 33 822 firm-year observations over the 1998-2007 period. The information used in this study has been

obtained from the SABI database (System of Iberian Financial Statement Analysis), made by Bureau Van Dijk. We select Spanish SMEs according to the requirements established by the European Commission recommendation 2003/361/CE of 6th May 2003: fewer than 250 employees, turnover of less than €50 million or less than €43 million in total assets. Then, we apply a series of filters, such as non-missing data on the variables of the model, total assets different from total liabilities and equity, negative financial expenses, or ratio of debt to assets higher than one. All the variables employed in the analysis are truncated at the 1% and 99% levels to minimize the effect of outliers.

3.2. Regression specification and variables

Our regression specifications are primarily based on the valuation method of Fama and French (1998) so as to study the influence of debt and dividends on firm value. Extending their valuation regression, like Pinkowitz et al. (2006), Dittmar and Mahrt-Smith (2007) and Drobetz et al. (2010) we examine whether a change in accounts payable leads to a change in firm value. Pinkowitz et al. (2006) modify Fama and French's model to estimate the value of cash. Following this procedure, a straightforward way to estimate the relation between value and trade credit received is to include the change in accounts payable. So the baseline equation to test the marginal value of account payable is

$$V_{it} = \alpha + \beta_1 dPAY_{it} + \beta_2 dPAY_{it+1} + \beta_3 dA_{it} + \beta_4 dA_{it+1} + \beta_5 E_{it} + \beta_6 dE_{it} + \beta_7 dE_{it+1} + \beta_8 RD_{it} + \beta_9 dRD_{it} + \beta_{10} dRD_{it+1} + \beta_{11} I_{it} + \beta_{12} dI_{it} + \beta_{13} dI_{it+1} + \beta_{14} dV_{it+1} + \lambda_t + I_s + \eta_i + e_{it} \quad (1)$$

where V_{it} is the proxy for firm value, which is calculated as the book value of assets minus book value of equity plus a proxy for the market value of equity. Since we are studying unlisted firms, we measure the value of equity as net profit plus depreciation over the average return on equity of the sector[2]. PAY_{it} corresponds to accounts payable. A_{it} is total assets, E_{it} is earnings before interest and taxes (EBIT), RD_{it} is the increase in intangible assets from year t-1 to year t, and I_{it} is interest expense. Note

[2] The market value of equity is calculated considering that the shareholders' cash flow follows a perpetual rent (no growth) which is discounted by the average return on equity of the industry.

that dX_{it} is compact notation for the one-year change, X_{it} - $X_{it-1.}$ Likewise dX_{it+1} is the change in the level of X from year t to year t+1, X_{it+1} - X_{it}. All variables are scaled by the book value of total assets A_{it}. λ_t and I_s are time and industry dummy variables, respectively, which are included in the model to account for time trends and time-invariant industry heterogeneity. η_i is the unobservable heterogeneity and ε_{it} is the error term.

In this way we examine whether changes in accounts payable are associated with firm value. The theories on trade credit are all about marginal costs and benefits (Emery, 1984), so they should be examined by studying changes in accounts payable. However, one concern with this regression could be that the increase in payables may change expectations about future growth as well; for this reason the Fama-French model includes lead variables (dX_{it+1}) to take in expectations.

Next, we include interaction variables between the change in payables and dummy variables defined below to test the influence of the financing motive on the value of trade credit. The model to estimate is

$$V_{it} = \alpha + \beta_1 dPAY_{it} + \beta_2 dPAY_{it+1} + \beta_3 [dPAY_{it} \times DUMMY_{it}] + \beta_4 DUMMY_{it} + \beta_5 dA_{it} + \beta_6 dA_{it+1} + \beta_7 E_{it} + \beta_8 dE_{it} + \beta_9 dE_{it+1} + \beta_{10} RD_{it} + \beta_{11} dRD_{it} + \beta_{12} dRD_{it+1} + \beta_{13} I_{it} + \beta_{14} dI_{it} + \beta_{15} dI_{it+1} + \beta_{16} dV_{it+1} + \lambda_t + I_s + \eta_i + e_{it} \quad (2)$$

Throughout this analysis, our focus is on the value of trade credit received, captured by its coefficient (β_1) and the coefficients of the interactions between the change in payables and the determinant ($DUMMY_{it}$) under investigation (β_3). When $DUMMY_{it}$ takes value 1, $\beta_1+\beta_3$ accounts for the effect of accounts payable on firm value. Otherwise, when $DUMMY_{it}$ takes value 0, the interaction variable ($dPAY_{it} \times DUMMY_{it}$) is 0, and β_1 accounts for the effect. So, the interaction variable captures the difference in the value of trade credit financing between groups of firms. Moreover, like Dittmar and Mahrt-Smith (2007), we include the $DUMMY_{it}$ variable on its own because if an endogenous relation exists, it is more likely to show up in the dummy variable than in the interaction with the change in payables.

Following the literature, we employ several proxies of availability of financial resources to examine its influence on the relationship between trade credit financing

and firm value. The proxy for firm's access to external funds is leverage ratio, defined as the book value of debt minus accounts payable divided by the book value of total assets. So, DLEV will take value one if firm leverage is greater than or equal to the industry median, and zero otherwise. The variable measuring the cost of external financing is DFCOST, which equals one when the firm's financial cost, calculated as the ratio of financial expenses to total debt minus accounts payable, exceeds or equals its industry median, and zero otherwise. Next, to see whether substituting commercial credit for bank credit influences the relationship between trade credit and firm value, we employ the DSTDEBT dummy variable, which takes value one if the ratio of short-term bank debt to the book value of total assets is greater than or equal to the industry median, and zero otherwise, respectively. Finally, we employ cash-flow (net income plus depreciation) as proxy for the capacity of firms to generate internal resources. Therefore, DCFLOW will take value one if firm cash flow is greater than or equal to the industry median cash flow, and zero otherwise.

4. EMPIRICAL RESULTS

4.1. Descriptive statistics

Table 1 describes the characteristics of the sample firms. It contains the descriptive statistics of the variables employed in the study. The mean annual change in accounts payable as a percentage of firm's total assets is 1.15%. Also, the average ratio of accounts payable to total assets (PAY) is about 25%. This value is higher than in Giannetti et al. (2011) for their sample of US small firms (20%). It supports a more intensive use of trade credit in civil law countries than in common law countries (Demirgüç-Kunt and Maksimovic, 2002). In turn, this value is higher than publicly traded companies because of the greater importance of trade credit financing for SMEs. Giannetti (2003) states that the average balance sheet of a listed company (in eight European countries, including Spain) seems to have less trade credit. Short-term finance basically consists of commercial credit from suppliers and bank credit, with accounts payable being the most important item in firms' current liabilities. The economic importance of trade credit can be justified by the benefits of this source of funding, outlined in the previous section.

Table 1: Descriptive Statistics

Variable	*N*	*Mean*	*Perc. 25*	*Median*	*Perc. 75*	*Std. Dev.*
$\mathbf{V_t}$	33822	1.3899	1.0011	1.2427	1.6628	0.6209
$\mathbf{dPAY_t}$	33822	0.0115	-0.0221	0.0087	0.0496	0.0852
$\mathbf{dPAY_{t+1}}$	33822	0.0165	-0.0264	0.0072	0.0512	0.0942
$\mathbf{PAY_t}$	33822	0.2509	0.1202	0.2200	0.3534	0.1663
$\mathbf{dA_t}$	33822	0.0631	-0.0167	0.0625	0.1471	0.1410
$\mathbf{dA_{t+1}}$	33822	0.0789	-0.0239	0.0567	0.1574	0.1678
$\mathbf{E_t}$	33822	0.0734	0.0291	0.0600	0.1058	0.0696
$\mathbf{dE_t}$	33822	0.0024	-0.0185	0.0022	0.0228	0.0466
$\mathbf{dE_{t+1}}$	33822	0.0036	-0.0191	0.0027	0.0248	0.0496
$\mathbf{RD_t}$	33822	0.0039	0.0000	0.0000	0.0012	0.0111
$\mathbf{dRD_t}$	33822	0.0010	0.0000	0.0000	0.0003	0.0134
$\mathbf{dRD_{t+1}}$	33822	0.0007	0.0000	0.0000	0.0001	0.0166
$\mathbf{I_t}$	33822	0.0145	0.0053	0.0123	0.0208	0.0117
$\mathbf{dI_t}$	33822	0.0003	-0.0021	0.0000	0.0028	0.0060
$\mathbf{dI_{t+1}}$	33822	0.0008	-0.0019	0.0002	0.0034	0.0065
$\mathbf{dV_{t+1}}$	33822	0.0896	-0.2436	0.0614	0.3906	0.6767
$\mathbf{LEV_t}$	32541	0.3349	0.1711	0.3197	0.4735	0.1979
$\mathbf{FCOST_t}$	32540	0.0556	0.0230	0.0378	0.0598	0.1174
$\mathbf{STDEBT_t}$	30498	0.1545	0.0291	0.1176	0.2456	0.1445
$\mathbf{CFLOW_t}$	33787	769.28	253.00	511.00	992.00	861.36

The table shows descriptive statistics of the model variables: number of observations (N), 25% and 75% percentiles, mean, median, and standard deviation. dX_t is past one-year change, $X_t - X_{t-1.}$ Likewise dX_{t+1} is the change in the level of X from year t to year t+1, $X_{t+1} - X_t$. All variables are scaled by the book value of total assets A_t. V_t is the proxy for firm value, which is calculated as the book value of assets minus book value of equity plus a proxy for the market value of equity. PAY_t corresponds to accounts payable. A_t is total assets, E_t is earnings before interest and taxes (EBIT), RD_t is the increase in intangible assets from year t-1 to year t, and I_t is interest expense. LEV_t is firm's leverage ratio, defined as the book value of debt minus accounts payable divided by the book value of total assets. $FCOST_t$ is the ratio of financial expenses to total debt minus accounts payable. $STDEBT_t$ is short-term bank debt to book value of total assets. Finally, $CFLOW_t$ is net income plus depreciation (in thousands of euros).

4.2. Accounts payable value

Following the literature, we estimate regressions using ordinary least squares (OLS) with standard errors that are robust to heteroskedasticity and account for firm-level clustering (Petersen, 2009). Additionally, in order to give robustness to the results, we use the Fama and MacBeth (1973) method. This technique produces standard errors robust to correlation between firms at a given moment in time.

The results of model 1 are presented in table 2. The variable dPAY measures the effect of trade credit financing on firm value. In the first column, we estimate model 1 using ordinary least squares with robust standard errors, while in the second column our estimation method is the Fama-MacBeth, in order to analyze the value of an additional euro of financing received by suppliers. The findings show that firm value is positively and significantly related to an additional euro of accounts payable. Estimates indicate that an additional 1€ of accounts payable increases firm value by 0.11€ (column 1) or 0.13€ (column 2). The magnitude of the coefficients is comparable to Hill et al. (2013). Using a different valuation approach, they find that the market values an additional $1 of trade payables at $0.15. The positive and significant coefficient of accounts payable (dPAY) indicates that there is a positive relationship between financing by accounts payable and firm value. The findings are consistent with the aforementioned benefits of trade credit financing such as mitigating financing frictions and adverse selection problems (Biais and Gollier, 1997; Schwartz, 1974), transaction cost saving (Ferris, 1981), financial flexibility (Danielson and Scoot, 2004), verify product quality before paying (Long et al.,1993; Smith, 1987), and these advantages outweigh the implicit interest (if there is discount for prompt payment), refinancing risk and other potential disadvantages associated to accounts payable.

Table 2: Accounts Payable Value

	(1) OLS	(2) Fama-Macbeth
$dPAY_t$	0.1130***	0.1340***
	(3.49)	(3.84)
$dPAY_{t+1}$	0.0948***	0.1395**
	(3.32)	(2.49)
dA_t	0.0297	0.0811*
	(1.25)	(2.13)
dA_{t+1}	0.3463***	0.2906*
	(15.84)	(2.18)
E_t	4.8990***	4.3675***
	(103.94)	(13.21)
dE_t	0.6574***	0.6243***
	(10.76)	(14.34)
dE_{t+1}	2.3136***	1.8807***
	(31.02)	(4.24)
RD_t	6.1523***	5.6276***
	(17.03)	(24.79)
dRD_t	-2.2804***	-1.7937***
	(-8.74)	(-5.97)
dRD_{t+1}	1.6343***	2.0771***
	(9.41)	(3.99)
I_t	1.4264***	1.6360**
	(6.82)	(3.07)
dI_t	-2.7426***	-2.6951***
	(-6.56)	(-3.51)
dI_{t+1}	-1.3800***	-0.4178
	(-3.48)	(-1.03)
dV_{t+1}	-0.3596***	-0.3356**
	(-39.83)	(-3.28)
Constant	0.0233	0.7369
	(0.32)	(1.59)
R-squared	0.5665	0.6336
Observations	33822	33822

This table reports the value of accounts payable. All variables are standardized by the book value of total assets. dX_t is the past one-year change, X_t - $X_{t-1.}$ Likewise dX_{t+1} is the change in the level of X from year t to year t+1, X_{t+1} - X_t. The dependent variable is firm value V_t, defined as the book value of assets minus book value of equity plus a proxy for the market value of equity. PAY_t corresponds to accounts payable. A_t is total assets, E_t is earnings before interest and taxes (EBIT), RD_t is the increase in intangible assets from year t-1 to year t, and I_t is interest expense. Column (1) presents the estimation of model 1 using ordinary least squares (OLS) with robust standard errors. Column (2) estimates the same model using the method of Fama and MacBeth (1973). Legend: * p<.1; ** p<.05; *** p<.01. We report p-values under the coefficient estimates. Industry and time dummies are included (unreported).

However, we are particularly interested in the differences in the value of accounts payable between groups of firms. The benefits attributable to commercial credit might differ, based on the firm's access to internal and external finance and, therefore, the value of supplier financing could be different. Specifically, we analyze the influence of the financing motive of trade credit on the value of accounts payable. To empirically contrast the differences in the value of payables we estimate equation (2). The objective is to determine whether there is a value discount or premium of trade credit for firms with high leverage, high financial costs, high short-term debt, and firms with greater internal cash flow. The results are presented in Tables 3 and 4.

To test for the influence of leverage and financial costs on the value of accounts payable, we have estimated equation 2 by including the interactions between dPAY and DLEV dummy, and between dPAY and DFCOST dummy. We present the findings in Table 3. In this way we classify firms into two subgroups according to their leverage ratio and financial costs ratio. The interaction coefficient represents the premium or discount associated with the value of trade credit for a given characteristic. It is expected that the need for additional funding of high-leveraged firms will be lower, and therefore accounts payable will render less value. Results confirm a negative relationship between the value of payables and the availability of other external sources of funds (DLEV×dPAY). Specifically, firms have lower values of trade credit when they have access to external financing. Consistent with these results, in columns 3 and 4 of Table 3, we can see that the coefficient of the interaction variable (DFCOST×dPAY) is positive and statistically significant, indicating a value premium of accounts payable for firms with high financial cost. The relation between payables value and financial costs is positive, i.e. financially constrained firms, which bear high financial costs, have more accounts payable value. Another explanation could be that when the cost of debt is high, an increase in accounts payable (sometimes free financing) will decrease the cost of capital, which in turn increases the value of trade credit.

Table 3: Access to Financing and Accounts Payable Value (I)

	(1) OLS	(2) Fama-Macbeth	(3) OLS	(4) Fama-Macbeth
$dPAY_t$	0.3908***	0.3258***	0.1643***	0.1563***
	(9.82)	(5.56)	(3.87)	(3.66)
$dPAY_{t+1}$	0.0520*	0.0421***	0.0767***	0.1012*
	(1.78)	(3.55)	(2.63)	(2.31)
$DLEV_t \times dPAY_t$	-0.2253***	-0.1415*		
	(-4.77)	(-2.05)		
$DLEV_t$	0.1738***	0.1867***		
	(31.80)	(17.57)		
$DFCOST_t \times dPAY_t$			0.0966**	0.1088**
			(2.05)	(2.50)
DFCOSTt			-0.1327***	-0.1361***
			(-24.12)	(-24.35)
dA_t	-0.0928***	-0.0344	-0.0513**	0.0121
	(-3.76)	(-0.71)	(-2.11)	(0.24)
dA_{t+1}	0.3949***	0.3503**	0.3709***	0.3131*
	(17.69)	(2.61)	(16.60)	(2.17)
E_t	5.1400***	4.6468***	4.9658***	4.4350***
	(104.43)	(14.10)	(101.07)	(13.15)
dE_t	0.4710***	0.3946***	0.5970***	0.5522***
	(7.57)	(6.01)	(9.48)	(13.48)
dE_{t+1}	2.2590***	1.8578***	2.2455***	1.7678***
	(29.79)	(4.32)	(29.55)	(3.83)
RD_t	5.4665***	4.9896***	5.6672***	5.2124***
	(15.04)	(22.69)	(15.68)	(23.45)
dRD_t	-1.8768***	-1.4210***	-2.0304***	-1.6748***
	(-7.18)	(-4.91)	(-7.80)	(-6.20)
dRD_{t+1}	1.4894***	1.8075***	1.6135***	1.9385***
	(8.73)	(4.58)	(9.44)	(4.34)
I_t	-2.2636***	-2.0833**	4.4243***	4.7278***
	(-9.53)	(-3.41)	(17.68)	(7.59)
dI_t	-1.7687***	-1.5732***	-2.5513***	-2.4444***
	(-4.24)	(-3.55)	(-5.93)	(-3.82)
dI_{t+1}	-2.9443***	-2.1795***	-2.1831***	-1.3777***
	(-7.30)	(-3.79)	(-5.37)	(-3.61)
dV_{t+1}	-0.3620***	-0.3396**	-0.3609***	-0.3360**
	(-38.95)	(-3.28)	(-38.33)	(-3.20)
Constant	0.1232*	0.6439	0.1927**	0.8171
	(1.82)	(1.43)	(2.05)	(1.72)
Observations	31889	31889	31367	31367
R-squared	0.5769	0.6558	0.5722	0.6439

This table reports the impact of leverage and financial costs on the value of accounts payable. All variables are standardized by the book value of total assets. dX_t is the past one-year change, X_t - $X_{t-1.}$ Likewise, dX_{t+1} is the change in the level of X from year t to year t+1, X_{t+1} - X_t. The dependent variable is firm value V_t, defined as the book value of assets minus book value of equity plus a proxy for the market value of equity. All independent variables are standardized by the book value of total assets. PAY_{it} corresponds to accounts payable. A_{it} is total assets, E_{it} is earnings before interest and taxes (EBIT), RD_{it} is the increase in intangible assets from year t-1 to year t, and I_{it} is interest expense. $DLEV_t$ is a dummy variable which takes value one if firm leverage is greater than or equal to the industry median, and zero otherwise. $DFCOST_t$ equals one when the firm's financial cost exceeds or equals its industry median and zero otherwise. Columns (1) and (3) present the estimation of model 2 using ordinary least squares (OLS) with robust standard errors. Columns (2) and (4) estimate the same model using the method of Fama and MacBeth (1973). Legend: * p<.1; ** p<.05; *** p<.01. We report p-values under the coefficient estimates. Industry and time dummies are included (unreported)

Furthermore, columns 1 and 2 of table 4 give the results when employing the ratio of short-term financial debt to total assets as proxy of access to external financing. We find a negative coefficient of variable DSTDEBT×dPAY, suggesting that firms with better access to short-term debt have less marginal value of payables than firms with poorer access. This indicates that better access to external financing, in the form of short-term debt, reduces the value of trade credit financing, as short-term debt could be a substitute for trade credit.

According to the firm cash-flow, the effect of payables on value may also differ. Firms that generate more internal resources will have less need to resort to credit from their suppliers. In this sense, Petersen and Rajan (1997) find that a firm's ability to generate cash internally decreases its demand for trade credit. Consistent with this, the value of accounts payable is lower, as shown by the negative impact of accounts payable on firm value for higher cash-flow firms (negative coefficient of the variable DCFLOW×dPAY).

Together the results show that firm leverage, short-term financial debt and cash flow moderate the impact of accounts payable on firm value. However, firms' financial costs reinforce the accounts payable-firm value relationship. Namely, we obtain that access to financial markets and internal financing have a negative effect on the value of accounts payable. But, using a different approach, Hill et al. (2013) reach the same conclusion, since their results indicate a value premium for payables held by financially constrained firms.

The findings are in line with the financing motive of trade credit (Emery, 1984; Petersen and Rajan, 1997; Schwartz, 1974), according to which trade credit is mainly used by firms that are constrained by their institutional lenders, as firms value trade credit relatively less when credit from financial institutions is available and at lower cost. Furthermore, the results show that for firms with better access to financing the signaling role of trade credit is less valuable than for financially constrained firms. This supports the view that the extension of trade credit by suppliers, who have access to superior information about the borrowers than the banks because of a closer relationship, reveals favorable information to other lenders, thus increasing their

willingness to lend (Biais and Gollier, 1997; and Jain, 2001). Therefore, trade credit received might reduce the informational asymmetry between borrowers and lenders, so mitigating financial constraints.

Table 4: Access to Financing and Accounts Payable Value (II)

	(1) OLS	(2) Fama-Macbeth	(3) OLS	(4) Fama-Macbeth
$dPAY_t$	0.1757***	0.1900***	0.1990***	0.2784***
	(4.07)	(4.50)	(6.04)	(3.69)
$dPAY_{t+1}$	0.0802***	0.1736	0.0986***	0.1550**
	(2.63)	(1.75)	(3.59)	(2.37)
$DSTDEBT_t \times dPAY$	-0.1318***	-0.1490*		
	(-2.75)	(-2.31)		
$DSTDEBT_t$	0.0293***	0.0510**		
	(5.35)	(3.23)		
$DCFLOW_t \times dPAY_t$			-0.1178**	-0.2487*
			(-2.46)	(-2.09)
$DCFLOW_t$			0.2058***	0.1818***
			(41.48)	(10.18)
dA_t	0.0242	0.0564*	-0.0254	0.0373
	(0.97)	(2.25)	(-1.11)	(0.84)
dA_{t+1}	0.3763***	0.2677	0.3419***	0.2488
	(16.12)	(1.66)	(16.16)	(1.85)
E_t	4.9629***	4.5195***	4.1479***	3.7009***
	(92.24)	(12.80)	(81.64)	(12.47)
dE_t	0.5895***	0.5442***	0.6236***	0.6414***
	(8.66)	(9.13)	(10.50)	(7.43)
dE_{t+1}	2.3098***	1.8513***	2.1664***	1.6973***
	(28.60)	(4.05)	(30.14)	(4.18)
RD_t	5.5750***	5.2220***	5.7656***	5.4182***
	(15.03)	(18.61)	(16.52)	(33.09)
dRD_t	-2.0151***	-1.5941***	-1.9397***	-1.5288***
	(-7.67)	(-5.82)	(-7.70)	(-5.84)
dRD_{t+1}	1.5592***	1.9540***	1.5365***	2.0760***
	(8.77)	(3.68)	(9.38)	(3.71)
I_t	0.1021	0.1151	2.6618***	2.7129***
	(0.40)	(0.18)	(13.17)	(5.19)
dI_t	-2.2894***	-2.3041**	-3.0058***	-2.8488***
	(-5.21)	(-3.15)	(-7.46)	(-4.10)
dI_{t+1}	-2.1211***	-1.3468**	-0.8507**	-0.1226
	(-5.05)	(-3.29)	(-2.24)	(-0.25)
dV_{t+1}	-0.3655***	-0.3388**	-0.3359***	-0.2959**
	(-36.52)	(-3.26)	(-38.13)	(-3.07)
Constant	-0.1713	0.7376	0.1846***	0.6779
	(-1.22)	(1.54)	(3.15)	(1.53)
Observations	28114	28114	33110	33110
R-squared	0.5675	0.6411	0.5827	0.6481

This table reports the impact of short-term debt and cash flows on the value of accounts payable. All variables are standardized by the book value of total assets. dX_t is the past one-year change, $X_t - X_{t-1}$. Likewise dX_{t+1} is the change in the level of X from year t to year t+1, $X_{t+1} - X_t$. The dependent variable is firm value V_t, defined as the book value of assets minus book value of equity plus a proxy for the market value of equity. All independent variables are standardized by the book value of total assets. PAY_{it} corresponds to accounts payable. A_{it} is total assets, E_{it} is earnings before interest and taxes (EBIT), RD_{it} is the increase in intangible assets from year t-1 to year t, and I_{it} is interest expense. $DSTDEBT_t$ is a dummy variables which take value one if the ratio of short-term bank debt to the book value of total assets is greater than or equal to the industry median, and zero otherwise, respectively. $DCFLOW_t$ is a dummy variable which takes value one if firm cash flow is greater than or equal to the industry median, and zero otherwise. Columns (1) and (3) present the estimation of model 2 using ordinary least squares (OLS) with robust standard errors. Columns (2) and (4) estimate the same model using the method of Fama and MacBeth (1973). Legend: * p<.1; ** p<.05; *** p<.01. We report p-values under the coefficient estimates. Industry and time dummies are included (unreported)

5. CONCLUSIONS

This study examines the relationship between accounts payable and firm value. The findings indicate that the use of supplier financing has a positive effect on firm value. For our sample of SMEs with limited access to finance and with a higher degree of information asymmetry, accounts payable, in addition to being an important source of funding, could help firms signal their credit quality and, therefore, mitigate financial constraints. These benefits, as well as transaction cost saving, financial flexibility and the possibility of verifying product quality before paying, exceed the implicit interest (if there is cash discount), refinancing risk and other potential disadvantages associated to late payment.

Furthermore, the results suggest that the value of supplier financing is conditional on internal and external finance, so supporting Meltzer's (1960) financial motive for trade credit use. In our empirical study, we find that firms with higher leverage, and therefore better access to alternative external financing, value the credit received from suppliers less. In contrast, for firms facing higher financing costs, and therefore suffering financial constraints, the value of accounts payable is higher. In line with this, the payables-value relation is weaker for firms with higher short-term financial debt. Regarding the negative relation between short-term financial debt and value of payables, this is consistent with the substitution hypothesis, according to which firms substitute short-term bank debt and commercial debt. Firms which have access to short-term financial debt value less accounts payable than firms that do not. Finally, for firms that generate higher cash flows, the value of payables is lower than for firms with lower cash-flows.

Lastly, as expected, firms with better access to external financing (in terms of availability and cost) and higher internal financing have lower value of trade credit financing. A conclusion drawn from this study could be that the weight of suppliers in the firm's financial structure will depend on the magnitude of the benefits relative to the firm's other potential financing choices.

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CONCLUSIONS

The main objective of this thesis is to analyze short-term financial decisions and their impact on firms' value and profitability. Most corporate finance literature focuses on long-term financial decisions, such as capital structure and dividend policy. However, the economic importance of the current assets and liabilities is significant as they represent an important share of items on a firm’s balance sheet. Given the importance of short-term financial decisions, there is a body of literature analyzing the determinants of cash holdings, accounts receivable and accounts payable. However the effect of these short-term financial decisions on firm's value and profitability is scarce, and in some cases inexistent.

This thesis is organized into three parts. The first part, Chapters 1 and 2, focuses on the study of cash holdings, the relationship with firm value and the determinants of the adjustment speed to target cash level. The second part includes Chapters 3 and 4, which analyze trade credit from the standpoint of investment in accounts receivable and its effect on firms' value and profitability. The last part, Chapter 5, studies trade credit from the perspective of financing, and investigates accounts payable value.

Initially, we study the relationship between cash holding and firm value (Chapter 1). This contributes to the literature by empirically testing the existence of a target cash level which maximizes firm value from the perspective of the trade-off between costs and benefits of investing in liquid assets. The findings show a nonlinear relationship between cash holdings and firm value (inverted U-shaped), where there is a cash level that maximizes firm value. Namely, cash holding increases the value of the firm up to the breakpoint (target cash balance), after which, increases in the cash holding reduces the firm's value. The financial flexibility provided by cash holdings may be beneficial for the firm to a certain level, beyond which the opportunity costs of cash and free cash flow problem can damage firm value. This research provides evidence that supports the view that firms behave according to a trade-off model. Furthermore, it is found that deviations from optimal cash holdings, both above and below the optimal level, significantly reduce firm value.

Secondly, this dissertation analyzes the effect of growth and financing on the speed of adjustment to the target cash level (Chapter 2). The main contribution is to study the differences in the adjustment speed of small and medium-sized firms (SMEs)

according to growth opportunities, financial constraints and financial distress. The empirical results show that firms adjust their cash holdings toward the target level, consistent with the rebalancing of cash, but that the adjustment is not instantaneous. Furthermore, there are differences in the speed of adjustment across firms. Specifically, firms with high growth opportunities show faster adjustment to their target cash holdings. In addition, financially constrained firms and those most likely to suffer financial distress adjust more readily. For these firms it is more beneficial to be at their optimal cash level to fund future investment and/or liquidity shocks without upsetting existing operating, investing, and financing policies. The findings are consistent with the precautionary motive for cash holdings and the importance of maintaining financial flexibility for investment needs.

Next the relationship between accounts receivable and firm value is examined. The contribution is to contrast the effect of trade credit granted on firm value considering the tradeoff between benefits and costs associated with investing in accounts receivables (Chapter 3). In order to do this, a non-linear relationship between trade credit granted and firm value is estimated. In addition, the chapter studies how deviations from the target affect firm value. The results show a quadratic relationship between accounts receivable and firm value, as a result of two opposing effects related to the benefits and costs of trade credit. Accordingly, there is a positive relation between firm value and trade credit at low levels of receivables and a negative one at high levels. Additionally, we find that deviations from target accounts receivable level decrease firm value. We provide evidence that firm value would be reduced if firms underinvest or overinvest in trade credit.

After studying the value implications of accounts receivable, the effect of granting trade credit on the profitability of small and medium-sized firms is investigated (Chapter 4). Our contribution is to provide empirical evidence on the relation between receivables and profitability and to study whether profitability from granting trade credit differs according to a firm's characteristics, which remain unexplored in previous literature. The results provide empirical evidence of a positive linear relation between trade receivables and profitability of small and medium-sized firms (SMEs), which implies that the benefits of associated with trade credit outweigh the costs. The greater information asymmetry regarding product quality and the competitive pressures that SMEs are normally subject to means that they offer trade credit to prevent loss of

sales, and decrease in profitability. Furthermore, the effect of receivables on firm profitability differs depending on firm size, cash flows and sales variability. Specifically, the results show that larger, more liquid firms and uncertain demand firms obtain higher returns on receivables. The findings are consistent with financial and operational motives for trade credit.

Lastly, this research examines the relationship between trade credit financing and firm value, and how firms' access to finance influences the value of accounts payables (Chapter 5). It extends the research on trade credit and firm valuation studying the effect of trade payables on firm value and linking payables value to the financing motive of trade credit. Firstly, the results show a positive value of supplier financing. Secondly, they show lower value of accounts payable for firms with better access to financial markets and internal financing. In the contrast, for financially constrained firms the value of accounts payable is higher. These results are in agreement with the financing motive for trade credit use. Trade credit can alleviate firms' financial restrictions because in addition to providing external financing, trade credit could act as an informative signal of the credit quality of the company, reducing information asymmetry between borrowers and lenders.

The main implication for academics, managers and others stakeholders is that this thesis demonstrates the importance of current assets and current liabilities management in the maximisation of firm value. Cash and trade credit policies (accounts receivable and accounts payable) are important elements which affect shareholder value.

A possible limitation is that the research is mainly focused on a period of economic expansion. From our point of view, the over-time robustness of the findings would be interesting. When data become available, it would be appropriate to considered a longer period of analysis, and then to compare the results and conclusions. Due to liquidity and financial constraints arising from the current financial crisis, the relations obtained could be different. Therefore, this is an important step for future research. Moreover, the analysis might be extended by investigating the value and profitability implications according to the life cycle of financial progress. Another possible research topic could focus on the study of partial adjustment models of accounts receivables and accounts payables, and the determinants of the adjustment

speed to the targets levels. Finally, future lines of research include studying the effect of inventories on firm value and/or profitability, testing the shape of the relationship between these variables (linear or non linear). It would also be interesting to study the value of a monetary unit invested in inventories, as well as the possible factors which influence the value of inventories.