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**"The Days to Pay Accounts Payable Determinants
Financing, Pricing Motives and Financial Substitution Effect
A Panel Data GMM Estimation From European Western Countries"**

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Abstract: This paper proposes to elect the days to pay accounts payable determinants and our findings strongly support that the accounts payable problematic is closely related to short term financial decisions with a positive and significative influence of firm's profitability and size factors. The existence of a firm's negative working capital is confirmed to influence strongly the reduction of the trade credit obtained from suppliers in Western Europe countries in parallel with a joint contribution of short and long term bank financing as a substitute from trade debt. Firm characteristics related to negative working capital and fixed assets level, jointly or alone, give more importance to the role of short term bank financing on substituting or reducing the volume of trade credit obtained from suppliers. Negative working capital reinforces the role of long term bank financing. It seems to induce the presence of a corporate cost reduction strategy to preserve or increment the firm's market reputation and competition. The firm's return on assets implies an enlargement of the days to pay accounts payable in line with a rising creditworthiness. All interacted variables are responsible for the reduction of the days to pay accounts payable and the confirmation of the financial substitution effect introduces more financing discipline compatible with firm's cost reduction strategy and pricing motives included in a price discrimination strategy. Signs of future unbalanced capital structure and financial distress may appear due also to the more banking financing justified by firm's investment and negative working capital under finance motives point of view. The more firm's growth the less trade credit obtained and, on the contrary, profitability and size contribute to facilitate the trade credit obtained from suppliers under finance and pricing motives point of view, more over the stability on terms trade credit. As important as the days to pay accounts and/or days sales outstanding determinants are future investigations related to trade credit duration gap as a synthesis of the prior trade credit issues, to country and economic sector or union analysis, as well.

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1. Introduction

Corporate trade credit has been regarded as one of the most interesting and important topics in the finance field for a long time. This type of short-term financing is especially relevant not only among large publicly listed corporations but also for small and medium-sized enterprises (*SMEs*). Some empirical evidence on the main determinants of a firm's short-term debt, which includes trade credit as well as short-term bank financing and other short-term financing, is necessary given that firms follow a pecking order when they choose their sources of finance (Cosh and Hughes, 1994; Ang, 1991; Holmes and Kent, 1991). The fact that there is an industry-specific element to trade cedit intensiveness (Fishman and Love, 2003) further supports the need to better understand which factors drive companies to use this type of financing. Previous studies provide a series of explanations with respect to the use of trade credit by corporations. Most of this research focuses on accounts receivables (Smith, 1987; Emery, 1984; Ferris, 1981; Nadiri, 1969) and their explanations are proposed in light of two main motivations: the financing and the pricing motives. Some papers that also investigate firms' use of trade credit propose alternative explanations, which among others include the cost advantage, market power and tax arguments (Soufani and Potziouris, 2004). And other studies analyze the the relation between trade credit and the bank lending channel (Nilsen, 1999) and the importance of trade credit as a complement to lending by financial intermediaries (Séverin et al., 2004, Demirguc-Kunt and Maksimovic, 2001).

In developed countries, both small and large firms use trade credit to raise funds and can decide to borrow either from banks or from trade partners. But these sources of finance are not completely interchangeable (Miwa and Ramseyer, 2005), which means that they are used simultaneously by corporations and each of them has its own specificities. Regarding trade credit, previous finance literature attempts to explain its use by corporations. A stream of research emphasizes the importance of trade credit when analyzing the relation between raw materials and products in terms of value (Fishman and Love, 2003). Trade credit can also be used as a strategic instrument in oligopolistic supplier markets and when higher competition exists in resource markets. Additionally, firms sometimes provide credit to their customers as a way to give them enough time to test the products efficiently, which implies that trade credit can be considered as a guarantee for product quality. In this respect, the possibility of incurring in "sunk funds" due to a supplier-customer relationship in which tailor-made products are involved can be an important reason to increase the amount of trade credit (Fishman and Love, 2003; Cunat, 2000).

Other studies highlight that trade credit can be industry-specific by showing that there is little variation within industries and a wide variation across industries in terms of credit (Nilsen et al., 1999). These results are supported by subsequent research that finds that trade credit intensiveness is industry-specific and that the differences across and within industries in terms of trade credit found previously persist over time (Fishman and Love, 2003). Finally, recent finance literature proposes an agency theory perspective to explain trade credit, as an alternative to the tax, liquidity, transaction costs and product quality explanations (Bastos and Pindado, 2007). These authors base their arguments on the adverse selection and moral hazard phenomena, all of them focused on accounts receivables, and find a negative relation between the days of sales outstanding and the days to pay accounts payable.

Overall, Bastos and Pindado (2007) conclude that the agency theory is a better candidate than the alternative traditional models to explain trade credit policy. The results in this study are complemented by Niskanen and Niskanen (2006), who document that larger and older firms with more internal financing are less likely to use trade credit whereas firms with a high ratio of current assets to total assets and firms subject to loan restructurings use more trade credit. In this context, in which few studies, if any, attempt to disentangle the factors that determine companies' accounts payable, our main objective is to identify the main determinants of trade credit policy as measured by the days companies have to pay their accounts payable.

To achieve this objective, we base our explanations on the financing and pricing motives of trade credit. In so doing, we contribute to the finance literature by complementing prior research that focuses on the bank financing substitution effect of trade credit. Our empirical evidence also emphasizes the importance of trade credit as a source of funds (Miwa and Ramseyer, 2005) and its use as a signal of firms' creditworthiness (Antov and Atanasova, 2007; Frank and Maksimovic, 2005), and we contribute to the stream of the literature that highlights the stability of trade credit contracts (Blasio, 2005). Finally, our paper is also related to the pricing motives of trade credit (Soufani and Poutziouris, 2004).

The remainder of the paper is organized as follows. In Section 2, we review the literature most closely related to our paper and present our testable hypotheses. Section 3 describes the empirical models and the variables used in the analyses. The data and the estimation method are presented in Section 4. The results of the paper are discussed in Section 5 and Section 6 highlights our main conclusions.

2. Theory and Hypotheses

2.1 – Trade Credit and Short Term Bank Financing

Bank financing and trade credit are closely related to each other. On the one hand, accurate information about companies' financial wealth is particularly important to both trade creditors and bank financial providers. On the ohter hand, trade creditors have a financial advantage over banks in the acquisition of information because they can obtain it by regularly visiting the buyer (Mian and Smith, 1992). Althouhg previous studies assume that firms consider trade credit as a second best alternative to bank financing in terms of growth promotion, it is not so clear that the substitution of trade credit for bank financing fosters industry competition (Fishman and Love, 2003). Recent works suggest that financial intermediaries can play an important role in the promotion of economic growth by helping to allocate capital to those firms with value-creating projects. Additionally, borrowing in the form of trade credit can become an alternative source of funding for firms that operate in poorly developed markets (Fishman and Love, 2003).

Short-term bank financing is one of several alternative sources of funds that can be regarded as a complement to trade credit in order to foster industry competition (Fishman and Love, 2003) and that can be used by corporations to reduce their transaction costs when they need to refinance their daily activities (Ferris, 1981). The relation between trade credit and short-term bank financing can also be analyzed in the context of financial crises. Specifically, prior research finds that the provision of trade credit increases right after the crisis, but it subsequently collapses in the following months and years (Love et al., 2007; Fishman and Love, 2003). It is particularly important to determine whether short-term bank financing can be a tool that promotes corporate growth and whether it is used by corporations either as a substitute or as a complement to trade debt. A company in a weak financial position tends to reduce the amount of trade credit offered to their customers in times of crises. Therefore, the reduction in aggregate credit provision is in part driven by the reduction in both trade and bank credit that follows a banking crisis. Under these circumstances, firms that previously acted as financial intermediaries and provided trade credit to other companies decide to reduce such facilities, thus leading to a reduction in the availability of liquidity in the form of trade credit (Love et al., 2007). In a credit rationing context, Cunningham (2004) confirms that trade credit is used by medium-wealth and low-wealth firms to help ease bank credit rationing.

Given the previous discussion, we can conclude that trade credit can become an effective but weak substitute for bank credit when the latter is unavailable (Fishman and Love, 2003). By contrast, some empirical works suggest that trade credit is perceived as a signal of companies' creditworthiness to the borrowers,

thus facilitating access to bank debt (Séverin et al., 2004; Demirguc-Kunt and Maksimovic, 2001). Alternatively, the demand of trade credit in the form of accounts payable can be considered as a way to obtain short-term financing, which is extensively used by corporations to postpone immediate cash payments and increase the cash flow available inside the company (Pike et al., 2005, Soufani and Poutziouris, 2004). Finally, with respect to the relation between trade credit and short-term bank financing, it should be noted that the ability of firms to obtain trade credit may be affected by the enforcement or information problems that prevent bank financing operations (Fishman and Love, 2003).

In relation to the use of trade credit as an alternative source of funds, Guariglia and Mateut (2006) show that firms use trade credit demanded to suppliers as a substitute for institutional finance at the margin when they are credit constrained, which contradicts previous findings by Kaplan and Zingales (1997) and Clearly (1999). Along the same lines, both small and large firms in well developed countries use trade credit to raise substantial funds and can choose to borrow either from banks or from trade partners, but in a simultaneous way, which suggests that bank loans and trade credit cannot be treated interchangeably (Miwa and Ramseyer, 2005).

Given the previous discussion and the arguments that support that bank financing may act as a substitute for trade credit funding, we formulate the first hypothesis of the paper as follows:

Hypothesis 1a: Short-term bank financing has a negative effect on trade debt as measured by the days to pay accounts payable.

Hypothesis 1b: Short-term bank financing has a positive effect on trade debt as measured by the days to pay accounts payable.

2.2 – Trade Credit

It is expected that a reduction in the days sales outstanding may imply a consequent reduction in the days to pay accounts payable, excluding the financial distress case where a reduction in the sales payment outstanding is parallel with an increase of accounts payable (Preve, 2003). Inversely, an enlargement of the days sales outstanding (accounts receivable) will imply an enlargement of the days to pay accounts payable; i.e., a better implementation of short term trade credit strategy on the receipt of accounts receivable will provide a reduction on the volume of accounts payable[1], compatible with a cost reduction strategy. It is

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[1] The aim of some studies is to predict whether a transaction will be settled on due date or at most within 10 days past the due date or not among a generic five-class transaction rating system; one of them found that the naïve no-change model (0-10 days delay in payment) performs best in terms of overall efficiency of classification (over 80% of transactions are classified correctly), using financial ratios. A creditor is on average best off if it simply infers

recognizable to know if the bilateral or multiple relationships between companies is made proof that can be beneficial for both or all involved (Petersen and Rajan, 1997, 1995, 1994) and if trade credit offers solutions to informational asymmetries between buyers and sellers, product quality uncertainty reduction concerning buyer payments intentions and price discrimination opportunities (Pike et al., 2005). More over, the purpose of decisions related to the extend of trade credit is to encourage customers to purchase goods and/or services and jointly with inventories are investments that are necessary for day-to-day operations of the business (Drake and Fabozzi, 2008).

In terms of comparative advantage, firms should obtain external financing from financial institutions and markets and lend to some classes of borrowers in order to optimally exploit their advantage in managing trade credit. Firms in countries with large, privately owned banking systems offer more trade credit to their customers and take more financing from them, suggesting that trade credit is a complement to lending by financial institutions and should not be viewed as a funding substitute (Demirguc-Kunt and Maksimovic, 2001). The amount of credit extended to a more creditworthy buyer is an increasing function of seller creditworthiness in conjunction with the special nature of the explained variable and to an unchangeability of credit terms time measure by firm's trade credit contracts stability over time (Blasio, 2005). Trade credit is a short term corporate financial source and accounts that firms simultaneously take and extend credit to other firms with *similar levels of creditworthiness* (Frank and Maksimovic, 2005) besides the differences across financial systems (Demirguc-Kunt and Maksimovic, 2001). Another very important corporate advantage of trade credit is determined by inter-firms relationship, where trade credit helps firms to improve their reputation and can work as a signal about firm's quality and thus facilitates access to bank debt (Séverin et al., 2004; Demirguc-Kunt and Maksimovic, 2001). Recent findings support the conclusion that trade credit have a relatively high use and some evidence is showed in favour of a stronger *trade credit channel* than *bank credit channel*, with the aim of jointly considering the roles played by trade credit received and extended (Guariglia and Mateut, 2006). More over, the days of sales outstanding are negative and directly related to the days to pay accounts payable (Bastos and Pindado, 2007). It is also expected that the trade credit's dynamic remains quite unchangeable (Soufani & Poutziouris, 2004). It is known the effective firm power to decide over the trade credit volume extended to clients and the high inelasticity of firms on trade credit demanded to suppliers. It it is not sure that high quality firms are prone to increase the trade credit offered to clients or

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likely future payment behaviour from its own analytical accounts in ledger and this is the most cost-effective strategy for the creditor (Gergeta and Valentincic, 2007).

that clients use the same argument to demand more trade credit from suppliers. Considering the last previous arguments, we are in position to formulate the following hypothesys:

Hypothesis 2a: The days of sales outstanding have a negative impact on the days to pay accounts payable.

Hypothesis 2b: The days of sales outstanding have a positive impact on the days to pay accounts payable.

2.3 – Trade Credit and Profitability

The negative or positive evolution of net income, as a percentage of firm total assets (return on assets), is one of the most important sources of information about the negative or positive performance of corporate operational cash flow and, consequently, in the firm ability to enlarge or reduce the correspondent days to pay accounts payable, in alignment with Deloof and Jegers, 1999. The higher the external financing costs is the higher will be trade credit obtained from suppliers, even conditioned by other trade credit determinants like ratios of trade credit's capacity of access (no statistically significant) (Cos and Hernando, 1999*)* or firms in relation of group, as a long term debt significant alternative (Deloof and Jegers, 1999*).* If trade credit has been considered by firms as the second best alternative to bank financing why claim that trade credit exists only to reduce transaction costs besides being the main source of corporate financing in USA (Wilner, 2000*)*? In order to minimize short-term financing costs and grant the financing working capital requirements, corporations issue *commercial paper* instead of seeking *bank loans*. It corresponds to an alternative to short-term bank loans and recognizes that they reduce short term financing costs in comparison with bank loan (Nippani and Pennathur, 2004) and it has been a perfect solution to reduce transactional costs relating to those have chosen prompt payment (Emery, 1987, Ferris, 1981; Nadiri, 1969). It is possible to argue that financial development contributes to the reduction of the transaction costs of payments and will benefit firms with high transaction costs *(*Fishman and Love, 2003*)* and the trade credit financing has been a mean to effective a price discrimination on the goods markets by a firm, allowing (getting) a prompt payment discount (Petersen and Rajan, 1997, 1994; Mian and Smith, 1992; Brennan et al., 1988; Schwartz and Whitcomb, 1979). Some detailed information on the cost of inter-firm credit was provided by the investigation from the italian manufacturing sector and the empirical evidence supports the argument that italian case is different from the one usually considered as *"normal"*, instead of being acknowledge to be confined to other developed countries, as United States or Germany, with a cost hierarchy between trade credit and the cheaper bank credit (Marotta, 2000*).*

Low percentage of suppliers offering *discounts* for quicker payments, long period agreements, low incidence of penalties for late payments must be considered the main justifications to those italian specificities and no evidence was met to confirm a cost hierarchy (even in an international comparison) in obtaining bank credit firm's context (Marotta, 2005, 2000). It is recognized that *discounts* offered (obtained) have the expected effect on the reduction of payment delays mostly for customers located *abroad* where customary credit periods are shorter and creditors' rights protection is more effective and this way of funding is more expensive than loans. In addiction, this result is consistent with the poor explanatory power of discounts for the trade debt period of domestic firms (Marotta, 2005). Firms experiencing both growth sales and profits demand trade credit and the relationship is positive (Pike et al., 2005; Soufani and Poutziouris, 2004). In turn, accounts payable are an interest free form of short term financing and many companies use them to the last day possible before payment is due *(*Soufani and Poutziouris, 2004*)*, trade debt is the largest source of short term financing for american corporations (Wilner, 2000; Petersen and Rajan, 1997) and the bilateral or multiple relationships between companies is made proof that can be beneficial for both or all involved (Petersen and Rajan, 1997, 1995, 1994*)*.

But profitability may be involved in a corporate short term strategy to support a financing complement to the days to pay accounts payable, improves firm *creditworthiness* (Antov and Atanasova, 2007; Frank and Maksimovic, 2005) and confidence between sellers and buyers in the market and, finally, a higher volume of trade credit obtained from suppliers. Taking into account previous arguments we may present the following hypothesis:

Hypothesis 3: A *positive relationship* is expected between the days to pay accounts payable and return on assets.

2.4 – Trade Credit and Debt

Debt ratio has been considered as a significant alternative for trade credit, specially as a long term-debt granted by linked firms. In this way, the volume of trade credit taken plays an important role on the corporate financing policy (Deloof and Jegers, 1999; Petersen and Rajan, 1997*)*. Nilsen (1999) found that firms increase trade credit as a substitute of bank credit, indicating for both small and large firms and trade credit may play a significant role in short term corporate finance, confirming that the amount of trade credit a buyer takes is determined by the amount of capital he needs and by the internally generated cash, confirming the *"pecking order"* theory (Mayer and Sussman, 2004).

But the use of trade credit is propitious since unlike commercial paper it is widely used by the small firms suffering the loan decline and the main alternative to trade credit is the long term bank financing (Deloof and Jegers, 1999). When

firms are financially constrained (such as the case of start-ups) they use more trade credit, after being measured by their internal cash production and the price of their bank debt as a transaction cost concern, as well (Huyghebaert, 2006*)*. Firms borrow from banks when they anticipate needing money for relatively long periods and do not substantially change the amount of their loans in response to changes in their financial status but change the amount of their trade credit in response (Miwa and Ramseyer, 2005*)*. The use of trade credit creates better conditions to obtain institutional loans and also contribute to lower total borrowing costs (Antov and Atasanova, 2007) accordingly to the findings that firms substitute bank credit with trade credit during money tightening (Meltzer hypothesis) (Blasio, 2005). A trade partner knows his borrower's industry first hand (he is in the industry) while bankers may know how to run a heavily regulated financial intermediary, they know far less about the industries in which their borrowers compete and don't have a special or comparative advantage in monitoring, then banks only lend if firms can offer either third-party guarantees or security interests in property (Miwa and Ramseyer, 2005).

Nonetheless, bank loans and trade credit must not be treated as financial sources interchangeably and disproportionately they borrow from banks when previous decisions determine money needs for relatively long periods and turn to trade credit when they have to face short-term money needs not expected (Miwa and Ramseyer, 2005). A negative loan decision by financial intermediaries might increase the level of accounts payable and a close relationship with the lending bank allows a firm to take advantage of the trade credit discounts offered or obtained (Niskanen and Niskanen, 2006*)*. Both bank and trade credits operate side by side and trade credit have stronger effects than bank credit (Guariglia and Mateut, 2006*)*. At last, analysing the trade credit in *corporate groups*, it was found that long term financial debt is a significant alternative for trade credit, specially long term debt granted by linked firms (Deloof and Jegers, 1999*)* and specially when firms present negative working capital which is usually a firm's long term financing asset. Facing to previous arguments it is possible to formulate the following hypothesis:

Hypothesis 4a: Debt ratio has a negative effect on the days to pay accounts payable, in line with the substitution effect.

Hypothesis 4b: Debt ratio has a positive effect on the days to pay accounts payable, in line with the substitution effect.

2.5 – Trade Credit and Sales Growth

It has been shown that industries with higher dependence on trade credit financing have higher rates of growth in countries with weaker financial institutions, besides the preference of firms for increasing more and more the

internal generation of funds (Ranjan and Zingales, 1998). The same findings suggest that their results imply that trade credit is used as a source of *"financing of last resort"* by very constrained firms (Petersen and Rajan, 1997), growth of sales have a positive relationship with trade credit (receivables) confirmed in all size firms *(*Soufani and Poutziouris, 2004*)* and demonstrated that there is a positive and autonomous effect of the relative level of purchases on the share of trade credit in total assets as well (Deloof and Jegers, 1999*)*. In a country with an economic developing environment, it is important to understand the trade credit role on young and mature firms (trade credit as a long term relationship with a larger trade credit volume (McMillan and Woodruff, 1999).

The conclusions are very important on convincing that for younger firms trade credit is lesser accessible source of substitute financing than mature firms, because they have not yet had a chance to proof a clear firm's reputation for creditworthiness. In terms of interaction between accounts payable and external financing, the results of the same study confirms the significance of growth of sales and trade credit terms remains unchangeable but suggesting that the trade credit financing provides a positive effect on growth. Trade credit financing affects growth in the average size of firms rather than the growth in the number of firms or, about the interaction between accounts payable and external financing, the results suggest that trade credit financing provides a positive effect on growth independent of the external financing one (Fishman and Love, 2003*)*. Firms experiencing both growth in sales and profits demand trade credit and the relationship is positive (Pike et al., 2005; Soufani and Poutziouris, 2004). It was found that an important driving force behind the decision to provide (demand) trade credit is the urge to be competitive on both establishing a solid market power and reputation. Firms' head quarters are located in countries with an underdeveloped banking sector with effective growth expectations (Van Horen, 2005) and when financing access is granted by banking institutions the days to pay accounts payable are *lesser dependent* from the impact of sales or income growing (Soufani and Poutziouris, 2004).

As growth is proposed to be measured by the evolution of sales over time and stating that the days to pay accounts payable are lesser dependent from the growth of sales, we are in position to formulate the following hypothesys:

Hypothesis 5: It is expected a *negative relationship* between growth *ratio* and the days to pay accounts payables.

2.6 – Trade Credit and Size

Large firms increase trade credit, a more complex decision since they are typically assumed to have wide access to other (bank) financing, and the reasons are related to financial specificities in nature. Those without a bond rating tend to

increase trade credit and it was found that small firms increase trade credit as a substitute of bank credit (Nilsen, 1999*)*. Firms after borrowing from banks and turn to trade partners when they face short-term exigencies they did not expect and both large and small firms use trade credit to raise substantial funds (Miwa and Ramseyer, 2005*)*. Larger and older firms with strong internal financing or cash flow are less likely to use trade credit but financially constrained firms use more trade credit as an alternative source of funding and that bank relationship increases loan availability to firms (Niskanen and Niskanen, 2006*)*. More over some considerations about firm's ability to access finance, their profit and growth or price discrimination, the decision to demand trade credit can also, to a large extent, be determined by firm size *(*Soufani and Poutziouris, 2004*)*.

It is important to know if the *"size effect"* may be considered as a or the only specific element on its relationship with the days to pay accounts (Fishman and Love, 2003*)*. This is to confirm if the days to pay accounts are or not significantly influenced by that *"size effect"* (Deloof and Jegers, 1999*)*. On the other hand, to certify that *"size effect"* allow companies get more trade credit from firms (a more extended time to settle accounts payable) better positioned in the financial markets, This is because it has successively mentioned by prior investigations on this issue even knowing that smaller firms have the majority of trade credit allowed by suppliers (Emery, 1984; Schwartz, 1974). Substantial findings were met under the *agency theory* perspective, emphasizing the strongly support that smaller firms, those with a smaller proportion of fixed assets and those that are less profitable extend more trade credit perhaps to growth faster. In turn, firms with a high proportion of variable costs and high percentage of bad debts extend less *(*Bastos and Pindado, 2007*)*. Although, it was also found evidence that the decision to demand trade credit can, to a large extent, be determined by the firm size *(*Soufani and Poutziouris, 2004*)*. It also has been obtained evidence that corporate finance practice appears to be influenced mostly by firm size than shareholder orientation or national influences, but fundamental differences between large and small firms were found as well, among other factors *(*Brounen et al., 2004*)*.

Taking into account the previous arguments we are in position to formulate the following hypothesis:

Hypothesis 6: A *positive impact* is expected between size and the days to pay accounts payable.

2.7 – Trade Credit and Lagged Dependent Variable

In prior section related to trade credit demanded and extended (*section 2.2*) it was mentioned that the amount of credit extended to a more creditworthy buyer is an increasing function of seller creditworthiness. This is true in conjunction with the special nature of the explained variable and to an unchangeability of credit

terms time measure by firm's trade credit contracts stability over time (Blasio, 2005). This is important for a relatively stability of firm's trade credit policy well running management. This is also important for the well running of corporate core business and for an acceptable management of firm's working capital to achieve a desirable balance between the days to pay accounts payable and the days sales outstanding.

Taking into account the previous arguments we presente the following hypothesys:

Hypothesis 7: It is expected a positive impact of one year lagged dependent variable on the days to pay accounts payable.

3. The Model and Variables

3.1 – Model Design

This section presents the model and variables that can help to identify the determinants of the days to pay accounts payable. It is not a formal analysis of working capital management but a way to graduate the importance of corporate short and long term determinants of trade debt starting from the main purpose of this work: finance motives and within the finance substitution effect. The model here presented may be composed by two firm's decision sets: $DPA_{it}=f(\theta;\omega)$, where θ represents the *firm's short term decisions set* and ω the *firm's long term decisions set.* What is proposed in the *basic model* is to built a six hypothesis model analysis to explain the days to pay accounts (DPA_{it}) in Western Europe's countries and to know the most important corporate determinants able to explain its behaviour.

The basic model design is presented as follow:

$$DPA_{it} = \beta_0 + \underbrace{\beta_1(DPA)_{i,t-1} + \beta_2(BFL)_{it} + \beta_3(DSO)_{it} + \beta_4(ROA)_{it}}_{\textit{Short Term Decisions Set}} + \underbrace{\beta_5(DLT)_{it} + \beta_6(GRO)_{it} + \beta_7(SZE)_{it}}_{\textit{Long Term Decisions Set}} + \varepsilon_{it} \qquad (1)$$

where the explanatory variables of the model are as follows: $DPA_{i,t-1}$ denotes the lagged explained variable for which it is expected a positive relationship with the days to pay accounts explained variable (DPA_{it}), accordingly to the special nature of this explanatory variable and to an unchangeability of credit terms over time and in line with firm's trade credit contracts stability over time (*Blasio, 2005*); BFL_{it} stands for short term bank financing in the period t, DSO_{it} stands for the days sales outstanding in the period t, ROA_{it} stands for return on assets in the period t, DLT_{it} denotes the debt ratio in the period t, GRO_{it} stands for turnover growing ratio in the period t and SZE_{it} denotes the firm size ratio in the period t (see *Appendix I and II*) and ε_i stands for a random variable.

The *extended model* is intended to give consistency to the basic model and reinforce the influence of (abroad) profitability on the days to pay accounts payables. For this purpose it is proposed an interacted variable relating a country dummy ($DUCO_{it}$) variable in interaction to firm's return on sales (ROS_{it}), represented by ($DROS_{it}$) and firm's return on assets ($DROA_{it}$). Both to follow better expectations about corporate discipline on trade credit coming from abroad operations. As referred before it is recognized that *discounts* offered (obtained) have the expected effect on the reduction of payment delays mostly for customers located *abroad* where customary credit periods are shorter and creditors' rights protection is more effective. This way of funding is more expensive than loans (Marotta, 2005) where customary credit periods are shorter and creditors' rights protection is more effective. Despite relation with a comproved improvement on creditworthiness (Frank and Maksimovic, 2005*)* and beneficial for both or all involved (Petersen and Rajan, 1997,1995,1994). More over due to the fact that inter-country firm relationships brings to a grater discipline in current financial operations represented by a supply contractual respect of the days to pay accounts payables to foster a better systemic position on a more, competitive, international and global markets. Because of all argumentss aligned for profitability explanatory variable, it is proposed the following hypothesis:

Hypothesis 8: There is a negative impact of country to return on sales interacted variable on the days to pay accounts payable.

Hypothesis 9: There is a negative impact of country to return on assets interacted variable on the days to pay accounts payable.

The one interacted variable extended model will be then described as follows:

$$DPA_{it} = \beta_0 + \beta_1(DPA)_{i,t-1} + \beta_2(BFL)_{it} + \beta_3(DSO)_{it} + \beta_4(ROA)_{it} + \beta_5(DLT)_{it} + \beta_6(GRO)_{it} + \beta_7(SZE)_{it} + \gamma_1(DROS)_{it} + \varepsilon_{it} \quad (2)$$

followed by the two interacted variables extended model:

$$DPA_{it} = \beta_0 + \beta_1(DPA)_{i,t-1} + \beta_2(BFL)_{it} + \beta_3(DSO)_{it} + \beta_4(ROA)_{it} + \beta_5(DLT)_{it} + \beta_6(GRO)_{it} + \beta_7(SZE)_{it} + \gamma_1(DROS)_{it} +$$
$$+ \gamma_2(DROA)_{it} + \varepsilon_{it} \quad (3)$$

Accordingly to our model the main firm decisions related to the influence on the days to pay accounts payable are presumed to be from short term ones. But without any exclusive determination and all basic model hypothesis expected to be strongly confirmed by the *firm characteristics* model referred below. In complement to the above extended model, it is proposed the use of single and both fixed assets and working capital levels, as two other important role of certain firm characteristics which may support the strength of our model results, in complement of the three long term explanatory variables included in the basic model.

In terms of proportion from total assets, we compute FAS_{it} as the firm fixed assets/total assets ratio reflecting asymmetric problems related to the conflict of interests between buyers and sellers where the high value of fixed assets the high asymmetric information. It is expected a *negative effect on* the days to pay accounts payable due to the more fixed assets level the less trade credit obtained from suppliers. One of the most important corporate characteristics is the working capital included in the model as a *dummy* variable ($DWCA_{it}$) and representing the *working capital effect*, subjected to the following conditions:

$$DWCA_{it} \begin{cases} = 1, & \text{if } WCA_{it} < 0 \\ = 0, & \text{if } WCA_{it} \geq 0 \end{cases}$$

For the working capital variable is expected a significant and *positive impact* in the explanation of the days to pay accounts payable due to the simultaneous rising role of short term and long bank financing and consequent additional financial costs. This increase in bank financing and corresponding costs may involve signs of future unbalanced capital structure and signs of financial distress, specially in the case of persistent and negative working capital when entered into the basic model. As far as it is known, this phenomena has not been investigated before, alone or together with firm fixed assets level. The introduction of these firm characteristics also represents an *innovative approach* to better explain the previous firm's days to pay accounts payable basic model. The two interacted variable extended model to certain firm characteristics as a influencing role of the days to pay accounts payable explanation is presented as follow:

$$DPA_{it} = \beta_0 + \beta_1(DPA)_{i,t-1} + \beta_2(BFL)_{it} + \beta_3(DSO)_{it} + \beta_4(ROA)_{it} + \beta_5(DLT)_{it} + \beta_6(GRO)_{it} + \beta_7(SZE)_{it} + \gamma_1(DROS)_{it} +$$

$$+ \gamma_2(DROA)_{it} + \beta_8(FAS)_{it} + \beta_9(DWCA)_{it} + \varepsilon_{it} \qquad (4)$$

3.2 – Variables

3.2.1 – Dependent Variable

Prior studies have developed substantial research on the trade credit determinants and low companies' relationship levels with banks confirm high trade credit volume *(Petersen and Rajan, 1995; Deloof and Jegers, 1997)* and an excessive trade credit theories contrasts with a very reduced number of empirical and test studies in small and middle companies with very difficult conditions to access capital markets *(Petersen and Rajan, 1997)*. Trade credit may be considered a source of funding of non financial companies and a mechanism to reduce asymmetric information problems between sellers and buyers companies *(Cos and*

Hernando, 1999) and not directly between banks and borrowers firms. Trade credit also represents a long term relationship with a larger trade credit volume *(McMillan and Woodruff, 1999)* with its influence on economic growth in poorly developed financial markets and shows that industries with higher dependence on trade credit financing exhibit higher rates of growth *(Fishman & Love, 2003)*. Perhaps one or the only paper that considers the accounts payables as an explained variable using significant elements of belgian firms balance sheet structure as explanatory variables in corporate groups developed a model where is attributed a significant role to growth and size as explanatory variables *(Deloof and Jegers, 1999)*[2]. The days to pay accounts payables and the days sales outstanding are the most important tool to establish a relationship between economic (purchases, sales) and financial operations (payments, collections) respectively. That relationship may be represented by the days to pay accounts payable (DPA_{it}) which so far it is known there have been a very reduced number of empirical investigation and plays an important and dynamic role in corporate trade credit policy.

3.2.2 – Independent Variables

After the dependent lagged variable ($DPA_{i,t-1}$) for which it is expected a relevant and stable explanatory power, the first explanatory variable is the *ratio* (BFL_{it}) (degree of importance of short term bank financing in current assets) as a financing alternative or complement to trade debt in the whole short-term corporate financing. The following explanatory variable is the days sales outstanding, (DSO_{it}) knowing that the short-term corporate financing balance is usually dependent on the way and intensity the company establishes actively the receipt of product sales and less directly or actively the payment terms. In terms of profitability (ROA_{it}) the grater profitability, here represented by return on assets, usually corresponds to the *first step* to achieve grater cash-flow margins essential to allow a better performance from the days to pay accounts payable on its enlargement and acting (or not) over the days sales outstanding firm's policy. The debt ratio (DLT_{it}) besides the most important and numerous studies developed until now debt determinants are the main objective to characterize the firm's capital structure. As referred before and following our hypothesis, long term bank financing also remains as important as necessary to finance the accounts payable under stable debt firm conditions and knowing that it is important to keep a good on-going relationships within or/and between the companies. No corporate strategy ignores the long term conditions of activity growth, measured by the time

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[2] According to the National Bank of Belgium, in 1995 accounts receivable formed *16%* of total assets of belgian non-financial firms and accounts payable *12%* of total liabilities *(Deloof and Jegers, 1999)*.

evolution of companies turnover measured by the variable (GRO_{it}) considered the most appropriated because it is *generally* possible to insure activity growth without additional exploitation investment in assets and measures a real *"growth effect"*. At last, size never must be subestimated under the financial point of view, measured by the variable (SZE_{it}) which corresponds to the "*size effect*", even in the short-term corporate financing synthesis represented by the days to pay accounts payable; integrated in the firm characteristics to moderate the model, FAS_{it} is an explanatory variable related to the firm fixed assets ratio and $DWCA_{it}$ is a *dummy* variable related to the firm's working capital.

4.   Data and Methodology

4.1 – Data and Sample Description

Another key issue is related to the fact that, for instance, leading theories of capital structure can explain some but not all aspects of the data and no single theory is an adequate description on its own. This is because reality is more and more complicated than even the most-sophisticated and up-to-date theories or econometric methods may suggest. We agree with the statement that the most developed empirical methodologies will provide in the future the development of new more sophisticated theories in finance, in general and also in trade credit, in particular *(*Mayer and Sussman, 2004*)*.

As stated further, the sample will include observations, on the years from 1990 to 2002 of different types of public, non-public and non-financial companies belonged to nine Western European countries. It also includes *13.054* observations, *1.322* companies related to nine European countries from an unbalanced panel data related to 1990-2002 period which is required as a necessary condition since one-year data is lost in the construction of turnover growth variable (see ***Appendix II***) and another year-data is lost because of the estimation of the model in first differences and four year consecutive information is required in order to test the second-order serial correlation, as pointed out by Arellano and Bond (1991*)*. Finally, the second-order serial correlation is due because the *GMM* estimation method is based on this assumption. The countries involved in this investigation are as follows: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Portugal and Spain. Some lack or insufficient data information was responsible for the exclusion of 3 european countries: Italy, Denmark and Norway and one year: 2003. For each of them it was constructed an unbalanced panel of non-financial companies. Its selection was ranked accordingly a criteria of relative importance in the european economy and data availability able to provide a density level of information and sample size enough to ensure a better explanation from the main determinants of the days to pay accounts payable in Western European countries.

Summary statistics denotes a *DPA ratio* around 60 days and a *DSO ratio* higher than 100 days, both in average. The source of information was based on the *Worldscope Datastream* of public and non public firms of the mentioned nine western European countries. *Table 1* shows the distribution by each european country of our sample, represented by number and percentage of observations and companies. The *Table 2* provides the expected signal of the coefficients of all explanatory variables and summary statistics for the variables used in our investigation are presented in *Table 3*; finally, the results of the basic and extended models are in *Table 4* and, finally, the results of firm influencing characteristics variables are showed in *Tables 5* and 6.

4.2 – Methodology

Given the aim of this research, the western european countries data panel analysis seems to be the methodology most accurate to determine the main factors that influence the days to pay accounts payable on a given period of time and got from a diversified and enlarged data sample. In order to test the hypothesis related to our days to pay accounts payable determinants model, unlike cross-sectional analysis, a panel data methodology is used because it allows to control for individual heterogeneity and avoid biased results (Moulton, 1987, 1986). The mentioned basic and extended models have been estimated by using the data panel methodology, since there is two main reasons to justify our methodological choice: (1) Panel data methodology allows the research to control for individual heterogeneity and (2) The endogeneity problem. From the first reason, some items must be referred since individual heterogeneity in our study is very important because the accounts payable's payments is also very closed or associated to each country. The control for such heterogeneity is by modelling it as an individual effect η_i which is then eliminated by taking first differences of the variables. In consequence, the error term, ε_{it}, has been split into three components: (a) The above mentioned individual effect (η_i), (b) The time-specific effect by the corresponding time dummy variables (d_t) essential for controlling the macroeconomic effects variables on the days to pay accounts payable and (c) Finally, the random disturbance (v_{it}). Related to the second reason (endogeneity), the problem can be dealt by using the panel data methodology, in which the dependent variable may also explain some of the explanatory variables. The mentioned models have been estimated by using a two-step system *GMM* panel-data methodology with instruments, specifically for the right-hand-side model variables, lagging from *(t-1)* to *(t-4)* as instruments. The potential misspecifications of the model were checked by using the *Hansen statistic* of over-identifying restrictions in order to test the absence of correlation between the instruments and the error term and *Tables 4, 5* and *6* shows that the instruments used are valid.

Then, m_i statistic developed by Arellano and Bond (1991) was used to test the lack of second-order of serial correlation in the first-difference residual as *Table 4, 5* and *6* confirm no problem of second-order serial correlation in our models. Finally, the results mentioned in the same *Tables* provide good results for the three *Wald tests*, where z_1 is the joint significance test of the reported coefficients, z_2 is the joint significance test of country dummy variable and, at last, z_3 is the joint significance test of the time dummies.

5. Results

5.1 – Results of The Basic and Extended Models

The results of the *GMM* estimation of the *basic model (1)* presented before correspond to coefficients of the explanatory variables statistically significant at 1% level and are provided in the *Column I* of *Table 4*. The specification tests could help us to compare the models presented and the *F-statistic:* [(*19,1321) = 40.562,39*] of the basic *model (1)* shows that the null hypothesis that all explanatory variables are jointly equal to zero cannot be rejected.

The results are consistent with *Hypothesis 1a* where short term bank financing affects negative and very significantly the firm's days to pay accounts payable: the more bank financing taken the less trade credit obtained from suppliers, in the form of the days to pay account payables. On the other hand, our results confirm *partially* recent research applying to be in presence of institutional finance as a substitute for trade credit not subjected to financial limitations (Guariglia & Mateut, 2006*)* and of the substitution effect partly associated to *Meltzer* hypothesis, according to which firms substitute bank credit (trade credit) with trade credit (bank credit) in money tightening periods. Short term bank financing may also be associated to implement a reduction transaction costs strategy by obtaining payment discounts under a price discrimination strategy (Ferris, 1981). *Hypothesis 1b* is clearly rejected and short term bank financing is not complemente of trade debt, contrary to Demirguc-Kunt and Maksimovic, (2001) findings.

In agreement with our *Hypothesis 2a* and contrary to Preve (2003*)*'s findings, our results don't show that an enlargement of the days sales outstanding implies an enlargement on the days to pay accounts payable and confirm a negative but very slight relationship between them. And its irrelevant coefficient represents an unchangeability of credit terms over time and in line with firm's trade credit contracts stability over time (Blasio, 2005). This kind of relationship and stability also recognizes that bilateral or multiple relationships between firms may be beneficial for both or all involved (Petersen and Rajan, 1997, 1995, 1994). It also confirms trade credit theory which accounts that firms simultaneously taking and extending credit to other firms have similar understanding of creditworthiness

(Frank and Maksimovic, 2005) and jointly play a rising influence on trade credit channel (Guariglia and Mateut, 2006), but without weaking the substitution effect. Finally, results confirm a very slight and negative relationship between the days sales outstanding and the days to pay accounts payable as mentioned by Bastos and Pindado (2007). *Hypothesis 2b* must be therefore rejected.

The positive relationship between firms' profitability and its days to pay accounts payable predicted in *Hypothesis 3* is confirmed by our results which are also and in line with an enlargement of the days to pay accounts payable due to a better performance of firm's profitability in order to obtain more trade credit from suppliers (Deloof and Jeggers, 1999). In our sample, firms experiencing profitability increase their trade credit obtained from suppliers, improve the conditions of its creditworthiness (Antov and Atanasova, 2007*; Frank and Maksimovic, 2005*) and reduce adverse selection. Complementarity from firm internal funding with the days to pay accounts payable was met as predicted in this hypothesis and it is recognized that more profitability corresponds to more credit obtained from suppliers and confirms an enlargement also predicted by Deloof and Jegers, 1999.

Financial leverage represented by the debt ratio is in line with prior researches that confirm long term bank financing as another important but not the main alternative source of external financing to trade credit (Deloof and Jeggers, 1999; Petersen and Rajan, 1997). It complements the conclusion the amount of trade credit a buyer takes can also be determined by the amount of capital he needs and by the internal generated cash but our results don't allow to confirm the "*pecking order*" referred before by Cosh and Hughes (1994), Ang, (1991), Holmes and Kent (1991). But allows to state that it works quite well only in short term run as predicted by Mayer and Sussman (2004) besides a complementary role from long term bank financing as a second financing substitute of trade credit obtained from suppliers. On the other hand, our results seem to confirm that, when firms anticipate needing money, for relatively long periods, do not substantially change the amount of their loans in response to changes in their financial status. They borrow from banks but change the amount of their trade credit (debt) in response (Miwa & Ramseyer, 2005). All of these confirm what is predicted in our *Hypothesis 4a* pursuing firm purposes to reduce the trade credit obtained from suppliers and transaction costs by also obtaining payments discounts (Antov and Atanasova, 2007; Niskanen and Niskanen, 2006) to implement a more consistent reduction transaction costs strategy *(Ferris, 1981)*. It may be in presence of a cost hierarchy between trade credit and bank credit favourable to profitability increase (Marotta, 2005, 2000). At last, confirm prior results obtained from *corporate groups* that long term debt is another alternative for trade credit (Deloof and Jegers, 1999) on reinforcing the substitution effect associated to *Meltzer* hypothesis

(Huyghebaert, 2006; Blasio, 2005). Our *hypothesis 4b* is undoubtly rejected by results.

The results of our sample analysis correspond to what was stated in our *Hypothesis 5* on confirming the days to pay accounts payable ratio is *lesser* dependent from the impact of sales growing when financing access is granted by banking institutions (Soufani and Poutziouris, 2004). The relationship is negative instead of the positive receivables' case (Pike et al.,2005; Soufani and Poutziouris, 2004*)*. In consequence, lower days to pay accounts payable are also essential to continue proofing a clear reputation for creditworthiness, a solid market power and competition also without the obligation to locate firm's head quarters in countries with an underdeveloped banking sector with effective growth expectations as predicted by prior research (Van Horen, 2005*)*.

As predicted by our *Hypothesis 6*, the results confirm that the decision to demand trade credit is positively related to firm size besides some considerations about firm's ability to access finance, their profit and growth or price discrimination confirmed in all small, medium and large firms by findings of Soufani and Poutziouris (2004). Firm's size finishs to influence the use of more trade credit with a relative stability even knowing is propitious since unlike commercial paper it is widely used by the small firms more suffering the loan decline (Nilsen, 1999). The results confirm that the "*size effect*" significantly allow companies, in general, get more trade credit from suppliers as successively mentioned by prior investigations on this issue (Emery, 1984; Schwartz, 1974). Accordingly to our *Hypothesis 7*, the findings of Blasio, (2005) are here confirmed by the results of our research and can sign the stability of contract firms related to trade credit demanded from suppliers over time which is important for a more stability of short term financial management of a firm.

The specification tests could help us to compare the models presented and the *F-statistic:* [(*20,1321) = 50.449,21*] from this *first extended model (2)* show that the null hypothesis that all explanatory variables are jointly equal to zero cannot be rejected. The results of the *GMM* estimation of *extended model (2)* are presented in *Column II* of *Table 4*. As shown in this table, the signs related to our basic model hypothesis remain unchangeable and the coefficients of the explanatory variables included in this extended model continue statistically significant at 1% level, except for long term bank financing. As a matter of fact, once the interacted variable, $DROS_{it}$, entered the model, this interacted country to return on sales variable is responsible for a statistically significant and determinant role on explaining the reduction of the days to pay accounts payables. At the same time, contributes to *replace long term bank financing influence* and confirms signs and relative importance of remaining explanatory variables. But firm's return on assets reinforces its positive impact on the days to pay accounts payable which means

more credit obtained from suppliers (Deloof and Jeggers, 1999) and improvement of firm's creditworthiness (Antov and Atanasova, 2007; Frank and Maksimovic, 2005), parallel to reduction of adverse selection. This seems to be responsible for the well short term running model (Mayer and Sussman, 2004) but excluding long term bank financing as a second financing substitute. In this one interacted variable extended model, *hypothesis H1a, H2a, H3, H5, H6* and *H7* from the basic model are confirmed and/reinforced its role on explaining the days to pay accounts payable. Regarding the very strong and negative influence (reduction on obtaining trade credit from suppliers) of the first inter-country profitability variable, our *Hypothesis 8* is confirmed. Our innovative findings suggest that inter-country profitability relationship is a very influent variable to explain the reduction on trade credit obtained from suppliers, after short term bank financing influence, but it doesn't confirm pecking order theory against prior findings (Cosh and Hughes, 1994; Ang, 1991; Holmes and Kent, 1991).

The specification tests could help us to compare the models presented and the *F-statistic:* [(*21,1321) = 63.978,32*] from the *extended model* shows that the null hypothesis that all explanatory variables are jointly equal to zero cannot be rejected. The results of the *GMM* estimation of this *second extended model (2)* are presented in *Column III* of *Table 4*. As shown in this table, the signs related to our basic model hypothesis remain unchangeable and the coefficients of *all* the explanatory variables included in this extended model continue statistically significant at 1% level. Once the second interacted variable, $DROA_{it}$ entered the model jointly with $DROS_{it}$ are responsible in a very different scale (from: -46,3761 to –5,4345, respectively) for the more statistically significant and determinant role on reducing (*short term bank financing, days sales outstanding, long term bank financing, growth, interacted variables - mainly the intercountry firm return on assets*) or on enlarging (*firm's return on assets and size*) the days to pay accounts payable. Exception to long term bank financing all remaining explanatory variables increased its explanatory power to impact the days to pay accounts payable on obtaining more credit from suppliers (Deloof and Jeggers, 1999) and improving the firm's creditworthiness (Antov and Atanasova, 2007; Frank and Maksimovic, 2005). This is parallel to reduction of adverse selection or acting as financing substitute leaded by interacted firm's return and bank financing, responsible for a well short term running model (Mayer and Sussman, 2004). It also represents a complementary role of long term bank financing as the last financing substitute of trade credit obtained from suppliers. In this two joint interacted variable extended model, *hypothesis H1a, H2a, H3, H4a, H5, H6* and *H7* from the basic model are confirmed and/reinforced its role on explaining the days to pay accounts payable. Regarding the very strong and negative influence (reduction on obtaining trade credit from suppliers) of the two inter-country profitability variable, our

Hypothesis 9 is also confirmed and substantial ratifies all the hypothesis from the basic model.

5.2 – The Influencing Role of Firm Characteristics

Once the existence of a significant and stabilized inter-country negative effect on the days to pay accounts payable has been corroborated by the results, it was investigated whether or not certain firm characteristics moderate the previous effects on the firm's days to pay accounts payable using one and two interacted variables. Then we propose an evidence of the influencing role played by two features: *firm's proportion of fixed assets* and *working capital*. Signs of the coefficients related to our main hypothesis remain unchangeable and coefficients of the explanatory variables in the influencing extensions of our model continue statistically significant at 1%, but long term bank financing. The specification tests could help us to compare the models presented and the *F-statistic* of the firm characteristics' models also shows that the null hypothesis that all explanatory variables are jointly equal to zero cannot be rejected.

Column IV of *Table 5* reports the results of the *model (3)* including *only* the *fixed assets effect*. In this first *sub-model* [$F(21,1321) = 59.608,34$], its coefficient is negative, significant and confirms the more fixed assets proportion facilitates the reduction the trade credit obtained from suppliers but veneer by an increase of short bank financing. An increase in the positive influence of size are in line with prior investigations on size issue to facilitate the volume of trade credit obtained from suppliers (Emery, 1984; Schwartz, 1974). This also reinforces at the same time a higher contribution of short term bank financing to a reduction of the days to pay accounts payable parallel to costs reduction. These also seems to indicate that some fixed assets may be paid more by short term and less or not by long term bank financing.

The results of the influencing role of firm's *working capital effect alone* are presented in *Column V* of the same *Table 5,* also corresponding to single firm's characteristics *model (3)*. In this second *sub-model* [$F(21,1321) = 68.334,11$], all the coefficients continue statistically significant and it is clear from our sample that working capital (*working capital effect*) plays in this model an important role on the enlargement of the days to pay accounts payable (Guariglia & Mateut, 2006). It happens together with an increase of bank financing and confirming once more that short and long term bank financing are solid and relevant substitutes of trade credit taken from suppliers (Fishman & Love, 2003). The working capital implies a great influence of return on assets on obtaining more credit from suppliers and growth influence is slightly higher.

Finally, the *jointly contribution of both fixed assets and working capital effects* on the days to pay accounts payable was also investigated by estimating the model

presented in *Column VI* of *Table 5*. The results in this *model (4)* [*F(21,1321) = 75.826,42*] continue to present coefficients statistically significant. It is sustainable that *working capital* plays a consistent role on the enlargement of the days to pay accounts payable when confirmed definitively that short and long term bank financing are solid substitutes of trade credit taken from suppliers (Fishman & Love, 2003) under a reduction transaction costs strategy by obtaining payment discounts (*Ferris, 1981*). In its turn firm assets profitability reinforcement allows confidence to suppliers (Emery, 1984); Schwartz, 1974). The contribution of firm's *fixed assets* confirms its role to allow a higher reduction on the days to pay accounts payable and accept the considerations about firm's ability to access finance firms' size (Soufani & Poutziouris, 2004), confirmed by the highest level of short term bank financing. It also corresponds to a mechanism to transmit confidence to suppliers and allows firms to get more trade credit as mentioned by Emery (1984); Schwartz (1974). And creates better conditions to continue inducing a clear reputation for creditworthiness and solid market power or competition (Van Horen, 2005). This one interacted and two firm characteristic variables model works very well only in short term run as predicted by Mayer and Sussman (2004) with long term bank financing out of influencing the days to pay accounts payable. In this firms characteristics and one interacted variable extended model, *hypothesis H1a, H2a, H3, H4a, H5, H6* and *H7* from the *basic model* are confirmed and/reinforced its role on explaining the days to pay accounts payable.

Column VII of *Table 6* reports the results of the *model (4)* including *only* the *fixed assets effect*. In this firm *characteristics model* [*F(21,1321) = 71.203,16*], its coefficient is negative, significant and confirms once more the more fixed assets proportion facilitates the reduction the trade credit obtained from suppliers but veneer by a slight increase of short bank financing. The firm's characteristics models results confirm our previous findings encountered for models (1), (2) and (3) and associated to our hypothesis 1 to 7 (basic model) and 8 to 9 (extended models). The results of the influencing role of firm's *working capital effect alone* are presented in *Column VIII* of the same *Table 6,* also corresponding to single firm's *characteristics model (4)*. In this fourth *sub-model* [*F(21,1321) = 83.752,65*], all the coefficients continue statistically significant and it is clear from our sample that working capital (*working capital effect*) plays an important role on the enlargement of the days to pay accounts payable (Guariglia & Mateut, 2006). This happens together with an increase of bank financing and confirming once more that short and long term bank financing are solid and relevant substitutes from trade credit taken from suppliers (Fishman & Love, 2003) together with a reinforcement of return on assets effect on the days to pay accounts payable. On the other hand working capital is very often supported by long term bank financing. All predictions related to a short term well running model (Mayer and

Sussman, 2004) are also confirmed and complemented by long term bank financing as a suitable financing substitute of trade credit obtained from suppliers besides its relative influence change on the explained variable.

Finally, the *jointly contribution of both fixed assets and working capital effects* on the days to pay accounts payable was also investigated by estimating the model presented in *Column IX* of *Table 6*. The results in this *model (4)* [*F(21,1321) = 92.333,55*] continue to present coefficients statistically significant and it is sustainable that working capital plays a consistent role on the enlargement of the days to pay accounts payable when confirmed definitively that short and long term bank financing are solid substitutes of trade credit taken from suppliers (Fishman & Love, 2003) and firm profitability allows a stronger confidence to suppliers (Emery, 1984); Schwartz, 1974). At last, in this firms characteristics and two interacted variable extended model, *hypothesis H1a, H2a, H3, H4a, H5, H6 and H7* from the basic model are also confirmed and/reinforced its role on explaining the days to pay accounts payable. The innovative country-profitability interacted variables contribute to impact negatively the days to pay accounts payable in order to introduce better discipline in firm's trade credit operations and firm's characteristics effects corroborate our main findings.

6.   Conclusions

This investigation is also a corollary of the lack of research on trade debt and measured by the days to pay accounts payable. The results presented are very relevant and correspond to a successive improvement of our basic model results under our point of view as shown mainly in *Tables 4, 5* and *6*. The results of prior papers if they are not contradictory are at least unsatisfactory to understand more completely or at least in a different way (in this research only using firm's book values or *ratios*) the role of the dependent variable to be explained by our model: *the days to pay accounts payable*. The relatively strong and positive coefficient and the statistical significance from the dependent lagged variable to explain the days to pay accounts payable, as expected, is an unmistakable contribution to confirm the trade credit contracts terms stability over-time (*Blasio, 2005*). More over, it is confirmed by our models the substitutive skills of external bank financing in relation to trade debt dependent variable represented by the days to pay account payables, with a confirmation of a kind of *abroad pecking order* conditions. This substitution role is parallel to firm's concerns in implementing a cost reduction strategy to increase profitability, to achieve a better firm's days to pay accounts payable performance without weaking all the factors related to market competition (Soufani and Potziouris, 2004), increment firm's reputation and price discrimination (Fishman and Love, 2003; Cunat, 2000). It is not confirmed any

interchangeably strong signs between the days to pay accounts payable and both short and long term bank financing (Miwa & Ramseyer, 2005) and the firm's inter-country relationships, based on return-on-sales and return-on-assets, are acting as consistent factors to increase reputation near suppliers, competitive position in the market and obtain transaction costs reduction (Van Horen, 2005). *Financing* and *pricing motives* are respectively responsible for contribution of the substitution effect of trade debt for bank financing associated to a reduction of transaction cots strategy of the firms integrated in our sample. Except for one interacted variable ($DROS_{it}$) alone included in the correspondent extended model and combined with fixed assets firm characteristic all the basic model hypothesis were confirmed in significance and sign nature. Except on the fixed assets firm's characteristic case, all predictions related to a short term well running model were confirmed (Mayer and Sussman, 2004), as well as in the basic model but with a confirmed change in its relative influence, where long term bank financing acts as a consistent and residual financing substitute of trade credit obtained from suppliers. In general terms, this research have achieved its purposes on confirming the bank financing and *abroad* profitability substitution effect but not stating periods of money tightening as predicted by *Meltzer* hypothesis, the raising of funds mentioned by Miwa and Ramseyer, 2005, strong contributions to creditworthiness also justified by profitability and financing risings (Antov and Atanasova, 2007; Frank and Mksimovic, 2005) and, at last, confirmation of pricing motives for promoting cost advantage and market power (Soufani and Potziouris, 2004*).* In terms of firm's decisions set influence, all the explanatory coefficients show the more importance of short term decisions face to long term decisions set only in the one interacted variable extended model (2), *Column II*, in the one interacted variable with firm's characteristics in model (3), *Column VI*, in the two interacted variables with fixed assets characteristic in model (4), *Column VII* and in the two interacted variables with working capital characteristic in model (4), *Column VIII,* from *Tables 4* to *6*. For further investigations it is recommended that each, another countries or geographic groups of countries must be investigated to confirm our results or denote any other explanation factors related to a specific country or groups of countries effect and confirming what was not possible to do with our investigation which doesn't allow to argue that trade credit exists because of inefficiencies in the financing market, that is, firms that have better access to finance may act as intermediaries for firm with less access to the credit market *(*Soufani and Poutziouris, 2004; Petersen and Rajan, 1997*).* A sector analysis will provide specific performances of the days to pay accounts to be compared with the conclusions of this research. Even taking into account the existence of a relative trade credit contracts stability it is recommended to analyze the *trade credit duration gap ratio* performance never analyzed before, so far as it is known. But

susceptible to complement or to obtain a useful synthesis of firm's trade credit policy and/or trade credit risk taking associated to it. This is important because trade credit problematic is neither the only analysis of trade credit extended to customers nor the trade credit obtained from suppliers but also the synthesis of both as an important issue related to corporate finance. As a consequence of our results it is important to take into account the confirmed and rising importance of short and long term bank financing facing to some firm characteristics and not only to crise factors. Another recommendation to further and useful investigation is related to their possible disturbances on capital structure and a rising financial distress situation. These disturbances may put in question the future firm's financial balance and increase its probability of bankruptcy. In special when exists high bilateral relationship dependence in which situation not only less financially stable firms do prefer trade credit but all firms agree to pay a higher interest rate for trade credit (*Wilner, 2000*). This higher interest rate of trade credit is not confirmed by *Antov and Atanasova, (*2007) in normal bilateral relationships.

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Appendix and Tables

Appendixes

List of Variables Abbreviations and Definitions - I

Abbreviation	Description	Definition
STD_{it}	Short term bank financing	Value of short term bank financing
CAT_{it}	Current Assets	Value of firm's current assets
ACP_{it}	Accounts Payable	Value of firm's accounts payable
ACR_{it}	Accounts Receivable	Value of firm's accounts receivable
CGS_{it}	Cost of Goods Sold	Value of cost of goods sold
TA_{it}	Total Assets	Value of total net assets
ARD_{it}	Accounts Receivable Days	Number of days, in average, to receive from a customer
INC_{it}	Net Income	Value of net income of a company
DPA_{it}	Days to pay accounts payables	Number of days to pay accounts payable, in average
ROS_{it}	Return on Sales	Firm's return on sales ratio
$DUCO$	Dummy Variable	European Country Dummy Variable
D_{it}	Long Term Liabilities	Value of long term liabilities of a company
$E_{it} = CSK_{it} + PSK_{it}$	Book value of equity	Book value of firm's equity
T_{it}	Turnover in the period **t**	Value of turnover in the period t
T_{it-1}	Turnover in the period **(t-1)**	Value of turnover in the period $t-1$

List of Model Dependent and Independent Variables - II

Variables	Description	Definition
$DPA_{it}\ (ACCP/CGS)_{it}*365$	Accounts payable days	Number of days to pay accounts
$BFL_{it} = STD_{it}/TA_{it}$	Short term bank financing	Short term bank financing to net total assets ratio
$DSO_{it} = ARD_{it}$	Days of sales outstanding	Accounts receivable days: datastream definition
$ROA_{it} = EBIT_{it}/TA_{it}$	Return on assets	Firm's return on assets ratio
$DLT_{it} = [D/(D+E)]_{it}$	Long term debt	Long term debt level or ratio
$GRO_{it} = (\Delta T_t/\ T_{t-1})_{it}$	Growth	Turnover growth rate, in a given period
$SZE_{it} = ln(TA_{it})$	Size	Firm size ratio
$DPA_{i,t-1}$	DPA_{it-1} lagged variable	Days to pay accounts previous year
$DROS_{it} = DUCO*ROS_{it}$	Interacted Variable	Inter country and return on sales variable
$DROA_{it} = DUCO*ROA_{it}$	Interacted Variable	Inter country and return on assets variable
$FAS_{it} = (TA-CAT)_{it}/TA_{it}$	Fixed Assets	Firm's fixed assets level
$WCA_{it} = [CAT-(ACP+STD)]_{it}/TA_{it}$	Working Capital Level	Firm's working capital level
$DWCA_{it} = [ACR_{it}-(ACP_{it}+STD_{it})] < 0$	Negative Working Capital	Working Capital Dummy Variable

Tables

Table 1 – Structure of the Samples by Country

Country	Annual Observations per company	Nº. of Companies	% of Companies	Nº. of Observations	% of Observations
Austria	9	54	4,07%	498	3,81%
Belgium	11	66	5,00%	715	5,49%
Finland	10	82	6,21%	848	6,51%
France	10	419	31,70%	4.131	31,64%
Germany	10	419	31,70%	4.174	31,97%
Greece	8	100	7,55%	838	6,41%
Ireland	11	45	3,41%	481	3,69%
Portugal	9	53	4,01%	487	3,73%
Spain	10	84	6,35%	882	6,75%
Total	10	1.322	100,00%	13.054	100,00%

Notes: Data of companies for which the information is available for at least 13 consecutive years between 1990 and 2002 were extracted. After removing the first year data and the last year because of insufficient data only used to construct several variables, the resultant samples comprises: 54 companies (498 observations) for Austria, 66 companies (715 observations) for Belgium, 82 companies (848 observations) for Finland, 419 companies (4.131 observations) for France, 419 companies (4.174 observations) for Germany, 100 companies (838 observations) for Greece, 45 companies (481 observations) for Ireland, 53 companies (487 observations) for Portugal and 84 companies (882 observations) for Spain.

Table 2 – Variables and Their Expected Sign

Phenomenon		Variables	Expected Sign
Short Term Decisions:			
- BankFinancing	(1a)	BFL_{it}	-
- Bank Financing	(1b)	BFL_{it}	+
- Days Sales Outstanding	(2a)	DSO_{it}	-
- Days Sales Outstanding	(2b)	DSO_{it}	+
- Profitability	(3)	ROA_{it}	+
Long Term Decisions:			
- Bank Financing	(4a)	DLT_{it}	-
- Bank Financing	(4b)	DLT_{it}	+
- Growth	(5)	GRO_{it}	-
- Size	(6)	SZE_{it}	+
- Interacted Variable 1	(8)	$DROS_{it}$	-
- Interacted Variable 2	(9)	$DROA_{it}$	-
Dependent Lagged Variable	(7)	$DPA_{i,t-1}$	+

Table 3 – Summary Statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
DPA_{it}	59,9605	102,399	0,0292	6.828,542
$DPA_{i,t-1}$	59,9625	102,403	0,0292	6.828,542
BFL_{it}	0,10915	0,10656	0,0000	2,767325
DSO_{it}	100,7704	867,2852	1,0000	97563,0000
ROA_{it}	0,0669861	0,1092491	-4,704083	1,999117
DLT_{it}	0,4816213	0,307055	0,0000	0,9943777
GRO_{it}	15,12454	1428,848	-0,9999657	163048,3
SZE_{it}	12,52708	1,888439	6,021023	19,13559
$DROS_{it}$	0,0142481	0,2447087	-16,36556	13,20075
$DROA_{it}$	0,0190078	0,0736639	-1,699278	1,999117

Notes: This table provides the mean, the standard deviation, the minimum, the maximum and the Pearson' correlations for 10.344 observations. DPA_{it} denotes the days to pay accounts payable, $DPA_{i,t-1}$ accounts for the dependent lagged variable, BFL_{it} is the level of financing current assets by short term banking, DSO_{it} is the days of sales outstanding ratio, ROA_{it} is the firm's return on assets, ROS_{it} is the firm's return on sales, DLT_{it} is the debt ratio, GRO_{it} is the flow measure of growth in turnover, SZE_{it} is the firm size level and $DROS_{it}$ (return on sales dummy) and $DROA_{it}$ (return on assets dummy) are intercountry and profitability dummy variables.

Table 4 – Results of the Basic and Extended Models (DROS$_{it}$; DROA$_{it}$)

Variable	I		II		III	
Constant	2,50976	(1,92678)	1,10040	(1,71205)	-1,10765	(1,31499)
BFL$_{it}$	-15,622***	(1,7293)	-14,6209***	(1,5042)	-16,3522***	(0,95461)
DSO$_{it}$	-0,00038***	(8,81e-06)	-0,00039***	(8,50e-06)	-0,000485***	(0,00001)
ROA$_{it}$	6,68066***	(1,3955)	15,0585***	(1,2853)	34,0952***	(2,29770)
DLT$_{it}$	-4,43687***	(0,6946)	-0,830428	(0,62518)	-2,26967***	(0,52598)
GRO$_{it}$	-0,36206***	(0,00298)	-0,36976***	(0,0026)	-0,36960***	(0,00228)
SZE$_{it}$	2,75789***	(0,15083)	2,68571***	(0,1357)	2,88849***	(0,10254)
DPA$_{i,t-1}$	0,37868***	(0,00046)	0,37903***	(0,00041)	0,380136***	(0,00036)
DROS$_{it}$	-		-8,4585***	(0,18461)	-5,43456***	(0,09424)
DROA$_{it}$	-		-		-46,3762***	(2,43455)
F (K;G-1)	40.562,39	(19;1321)	50.449,21	(20;1321)	63.978,32	(21;1321)
Prob > F	(0,0000)		(0,0000)		(0,0000)	
z$_1$	1,0e+05 (7)		1,1e+05 (8)		1,3e+05 (9)	
z$_2$	1.534,55 (1)		1.987,20 (1)		1.667,74 (1)	
z$_3$	182,27 (11)		226,82 (11)		261,18 (11)	
m$_1$	-2,79		-2,80		-2,81	
m$_2$	0,28		0,30		0,32	
Hansen	598 (364)		687,62 (415)		739,15 (466)	

Notes: The regressions are performed by using the panel described in *Table 1*. *DROS$_{it}$* is an interacted variable defined by a country dummy *DUCO* and *ROS$_{it}$* in column *II*; *DROA$_{it}$* is an interacted variable defined by a country dummy *DUCO* and *ROA$_{it}$* in column *III*. The rest of information needed to read this table is: 1) Heteroskedasticity consistent asymptotic standard error in parentheses; 2) Asteristic *, **, *** indicates significance at the 10%, 5% and 1% level; 3) z_1, z_2 and z_3 are Wald tests of the joint significance of the reported coefficients, of the country dummies and of the time *dummies*, respectively, asymptotically distributed as χ^2 under the null of no significance, degrees of freedom in parentheses; 4) m_i is a serial correlation test of order *i*, using residuals in first differences, asymptotically distributed as *N(0,1)* under the null of no serial correlation; 5) Hansen is a test of the over-identifying restrictions, asymptotically distributed as χ^2 under the null of no correlation between the instruments and the error term, degrees of freedom in parenthesis ; 6) This regressions include 11 time *dummies*, one for each year from 1992 to 2002.

Table 5 – Results of the Firm Characteristics (DROS$_{it}$)

Variable	IV	V	VI
Constant	-4,72348** (1,99273)	-2,96191* (1,7245)	-4,7490** (2,02016)
BFL$_{it}$	-17,2613*** (1,38885)	-23,6283*** (1,5576)	-26,6203*** (1,50605)
DSO$_{it}$	-0,00033***(8,17e-06)	-0,00038***(7,90e-06)	-0,00029***(8,00e-06)
ROA$_{it}$	12,6388*** (1,18420)	14,4086*** (1,1989)	12,1594*** (1,12762)
DLT$_{it}$	-0,501738 (0,60300)	-2,71369*** (0,58834)	-0,849118 (0,58051)
GRO$_{it}$	-0,36892*** (0,00246)	-0,38127*** (0,00242)	-0,37140*** (0,00224)
SZE$_{it}$	3,37825*** (0,13855)	3,13527*** (0,13642)	3,67409*** (0,14312)
DPA$_{i,t-1}$	0,38121*** (0,00037)	0,38047*** (0,00034)	0,38286*** (0,00032)
DROS$_{it}$	-8,79564*** (0,19209)	-8,4595*** (0,18382)	-8,49776*** (0,18005)
FAS$_{it}$	-6,41603*** (0,96813)	-	-13,072*** (0,96836)
DWCA$_{it}$	-	11,2876*** (0,77685)	13,4353*** (0,74476)
F (K;G-1)	59.608,34 (21;1321)	68.334,11 (21;1321)	75.826,42 (22;1321)
Prob > F	(0,0000)	(0,0000)	(0,0000)
z$_1$	1,2e+05 (9)	1,5e+05 (9)	1,5e+05 (10)
z$_2$	1.703,17 (1)	1.989,38 (1)	1.829,03 (1)
z$_3$	231,05 (11)	222,90 (11)	232,08 (11)
m$_1$	-2,80	-2,79	-2,80
m$_2$	0,29	0,31	0,29
Hansen	712,04 (466)	721,32 (466)	751,40 (517)

Notes: The regressions are performed by using the panel described in *Table 1*. *DROS$_{it}$* is an interacted variable defined by a country dummy *DUCO* and *ROS$_{it}$* in column *III*, *IV* and *V*; *DWCA$_{it}$* is a dummy variable that takes the following values: 1 if the working capital book value is negative and 0 otherwise in column *IV* and *V*. The rest of information needed to read this table is: 1) Heteroskedasticity consistent asymptotic standard error in parentheses; 2) Asteristic *, **, *** indicates significance at the 10%, 5% and 1% level; 3) z_1, z_2 and z_3 are Wald tests of the joint significance of the reported coefficients, of the country dummies and of the time *dummies*, respectively, asymptotically distributed as χ^2 under the null of no significance, degrees of freedom in parentheses; 4) m_i is a serial correlation test of order i, using residuals in first differences, asymptotically distributed as $N(0,1)$ under the null of no serial correlation; 5) Hansen is a test of the over-identifying restrictions, asymptotically distributed as χ^2 under the null of no correlation between the instruments and the error term, degrees of freedom in parenthesis ; 6) This regressions include 11 time *dummies*, one for each year from 1992 to 2002.

Table 6 – Results of the Firm Characteristics (DROS$_{it}$;DROA$_{it}$)

Variable	VII	VIII	IX
Constant	-5,5365*** (1,48612)	-4,7290*** (1,30789)	-4,7555*** (1,4508)
BFL$_{it}$	-18,1899*** (0,9315)	-22,8522*** (1,2053)	-26,0953*** (1,2162)
DSO$_{it}$	-0,0004*** (0,00001)	-0,0005*** (0,00001)	-0,0004*** (0,00001)
ROA$_{it}$	33,5464*** (2,0765)	34,3703*** (2,15265)	33,6006*** (1,9884)
DLT$_{it}$	-1,97265*** (0,5200)	-3,9736*** (0,4913)	-2,2167*** (0,4869)
GRO$_{it}$	-0,37233*** (0,0021)	-0,38094*** (0,0021)	-0,37497*** (0,0020)
SZE$_{it}$	3,46275*** (0,1061)	3,28043*** (0,1015)	3,69117*** (0,1066)
DPA$_{i,t-1}$	0,38192*** (0,0003)	0,38156*** (0,0003)	0,38364*** (0,00028)
DROS$_{it}$	-5,8723*** (0,11172)	-5,47252***(0,09292)	-5,5995*** (0,10764)
DROA$_{it}$	-47,5985*** (2,2149)	-47,4140*** (0,6645)	-48,0195***(2,13497)
FAS$_{it}$	-6,1341*** (0,82497)	-	-13,2081*** (0,8214)
DWCA$_{it}$	-	9,66163*** (0,66448)	12,4764*** (0,65691)
F (K;G-1)	71.203,16 (22;1321)	83,752,65 (22;1321)	92.333,55 (23;1321)
Prob > F	(0,0000)	(0,0000)	(0,0000)
z$_1$	1,4e+05 (10)	1,7e+05 (10)	1,7e+05 (11)
z$_2$	1.341,94 (1)	1.712,73 (1)	1.511,48 (1)
z$_3$	278,65 (11)	270,93 (11)	275,38 (11)
m$_1$	-2,81	-2,80	-2,81
m$_2$	0,31	0,32	0,31
Hansen	771,82 (517)	766,17 (517)	798,25 (568)

Notes: The regressions are performed by using the panel described in *Table 1*. *DROS$_{it}$* is an interacted variable defined by a country dummy *DUCO* and *ROS$_{it}$* in column *VIII, IX* and *X*; *DROA$_{it}$* is an interacted variable defined by a country dummy *DUCO* and *ROA$_{it}$* in column *VIII, IX* and *X*; *DWCA$_{it}$* is a dummy variable that takes the following values: 1 if the working capital book value is negative and 0 otherwise in column *IX* and *X*. The rest of information needed to read this table is: 1) Heteroskedasticity consistent asymptotic standard error in parentheses; 2) Asteristic *, **, *** indicates significance at the 10%, 5% and 1% level; 3) z_1, z_2 and z_3 are Wald tests of the joint significance of the reported coefficients, of the country dummies and of the time *dummies*, respectively, asymptotically distributed as χ^2 under the null of no significance, degrees of freedom in parentheses; 4) m_i is a serial correlation test of order *i*, using residuals in first differences, asymptotically distributed as *N(0,1)* under the null of no serial correlation; 5) Hansen is a test of the over-identifying restrictions, asymptotically distributed as χ^2 under the null of no correlation between the instruments and the error term, degrees of freedom in parenthesis; 6) This regressions include 11 time *dummies*, one for each year from 1992 to 2002.