Are Young SMEs' Investment Determinants Different? Empirical Evidence Using Panel Data

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Abstract

Using panel data models, this study investigates the possible differences in the investment determinants of young SMEs and old SMEs. The empirical evidence allows us to conclude that: i) cash flow, age, growth opportunities, and economic growth are of greater importance for stimulating the investment in young SMEs than in old SMEs; ii) sales are of greater importance in stimulating the investment in old SMEs, compared to the case of young SMEs; and iii) debt and interest rate are of greater importance in decelerating the investment in young SMEs, compared to the case of old SMEs. The persistence of investment over time is greater in young SMEs than in old SMEs. In addition, investment has a positive stronger effect for survival in young SMEs than in

old SMEs. These findings suggest that investment is, particularly, important in the activity of young SMEs.

1. Introduction

For the neoclassical theory of investment (Modigliani and Miller, 1958; Jorgenson and Siebert, 1968), internal financing and external financing are perfect substitutes. However, in the managerial theory of investment (Baumol, 1967; Marris, 1963, 1964; Grablowski and Mueller, 1972), managers prefer internal funds due to their easier access, and to the greater flexibility that they proportionate in funding the firm´s investments. Also, the marginal cost of capital is significantly lower for internal financing compared to external financing (Grablowski and Mueller, 1972). Fazzari et al. (1988), who have tested the asymmetric information hypothesis of Myers and Majluf (1984), identified a positive relationship between cash flow and investment, and showed that the sensitivity of the investment to cash flow variations is greater for firms that are more financially constrained. In accordance with Devereux and Schiantarelli (1990), internal financing and external financing are not perfect substitutes, given the existence of problems of asymmetric information that makes external financing more expensive than internal financing.

In the context of the agency theory, the potential agency problems that may occur, on the one hand, between managers and shareholders and, on the other hand, between

shareholders/managers and creditors, are strongly related to the problems of asymmetric information, given that the external investors do not have enough information regarding the firm´s future investments. The external investors transfer these agency problems for the firms by increasing the cost of the capital, and in the presence of asymmetric information, by fixing limits to the amount of capital to grant (Stiglitz and Weiss, 1981).

The specific characteristics of SMEs, namely their smaller size, greater likelihood of bankruptcy, greater operational flexibility making easier the substitution of assets, and the more opacity of information that aggravates the problems of asymmetric information, explain why the creditors consider too risky their investment in smaller firms (Ang, 1991). Consequently, SMEs are subject to problems of adverse selection and credit rationing (Stiglitz and Weiss, 1981) that are more severe for young SMEs that have not yet acquired reputation (Diamond, 1989).

In this study, based on two samples of Portuguese SMEs, one of them with 495 young SMEs, and the other composed by 1350 old SMEs, and considering endogenous and exogenous determinants of investment, we analyse the possible differences in the investment determinants of young SMEs and old SMEs, for the period between 1999 and 2006. Seeking to solve the problem of possible result bias, arising from the survival issue, we use the two-step estimation method proposed by Heckman (1979).

This paper makes the following contributions to the literature. Firstly, the study is pioneering in using the two-step estimation method to test for possible differences in the investment determinants of young SMEs and old SMEs. Secondly, it is pioneering in identifying significant differences in the investment determinants of young SMEs and old SMEs. The results show, in particular, that cash flow, growth opportunities, age and Growth National Product (GNP) are of greater importance in stimulating the investment in young SMEs; debt and interest rate have greater importance for decelerating the

investment in young SMEs than in old SMEs. Sales are of greater importance for stimulating the investment in old SMEs compared to the case of young SMEs. Thirdly, the empirical evidence suggests that both exogenous and endogenous factors are investment determinants of young and old SMEs. Fourthly, the use of the two-step estimation method to strongly suggests that the survival determinants of young SMEs are considerably different from those of old SMEs.

After this introduction, the paper is divided as follows. Section 2 presents the investigation hypotheses. Section 3 presents the methodology, namely the database used, variables and estimation method. Section 4 presents the results obtained. Section 5 discusses the results. Finally, in section 6 we conclude and present some implications of the study.

2. Determinants of Firm´s Investment

In the neoclassical theory of investment, the studies of Modigliani and Miller (1958) and Jorgenson and Siebert (1968) show that internal financing and external financing are perfect substitutes. According to Grablowski and Mueller (1972), the assumption that the cost of capital is independent from the financing source implies that the investment may be financed with any composition of retained earnings, debt, and external equity.

However, in accordance to the managerial theory of investment (e.g. Baumol 1959, 1967; Marris, 1963, 1964; Grablowski and Mueller, 1972) managers prefer to use internal funds, which proportionate greater flexibility for managers to use them in the firm´s investments. Additionally, the marginal cost of capital is significantly lower for internal financing compared to external financing and, therefore, not equal to the shareholder's opportunity cost of capital (Grablowski and Mueller, 1972).

Meyer and Kuh (1957), and Donaldson (1961) conclude that cash flow is an important determinant of firm´s investment, and that the importance of the cash flow is a consequence of the managers' preferences for financing sources. The authors, state that managers prefer internal financing due to the asymmetry of information with external investors. According to Myers and Majluf (1984) the firms prefer internal financing, because the asymmetric information between firms and the capital market increases the cost of external financing. Devereux and Schiantarelli (1990) argue that internal financing and external financing are not perfect substitutes, given the existence of problems of asymmetric information, making external financing more expensive than internal financing. Consequently, internal financing and the existence of collaterizable assets influence the firm´s investment decisions.

In the framework of the agency theory (Jensen and Meckling, 1976), there are potential conflicts between shareholders/managers that may raise the agency costs of debt. The managers/shareholders have incentive to implement risky investment projects that increase the firm´s probability of bankruptcy. In the case of success of the risky investment project, the earnings go to the shareholders, but in the case of their failure the creditors bear the cost (Jensen and Meckling, 1976). The agency problems between managers and shareholders, in the presence of free cash flows may generate the overinvestment problems as showed by Jensen (1986). However, and according to Myers (1977), a firm indebted may have problems of underinvestment, given that managers may reject investment projects with a positive present value, avoiding to contract new debt, being a more frequent problem for firms without collaterizable assets.

The external investors transfer the agency problems as well as the asymmetric information problems by increasing the cost of capital, and fixing maximums the amount of financing available to firms (Stiglitz and Weiss, 1981). The presence of

asymmetric information may imply that financial variables can have an impact on real variables, such as the level of investment and the real interest rate, as well as can intensify the effects of exogenous shocks in the economy (Love and Zicchino, 2006).

Just after this brief introduction, we present and discuss the financial variables and the non-financial variables as potential determinants of the SME investments. As financial variables we consider as potential determinants of SME investments: cash flow is the financial variable corresponding to internal financing that contributes for SMEs to implement their investments as well as to overcome financial restrictions; debt is the financial variable that corresponds to the main external source of financing for unquoted SMEs to finance their investments, when internal finance is exhausted; interest rate is a financial variable that affects firms´ investment directly by varying the rate at which the expected returns of investment are discounted, and indirectly by its effects on the demand in the economy in general. The non-financial variables that we consider as potential determinants of SME investments are: sales that reflect current demand pressures; age is a specific characteristic of the firm that allows to check the degree of asymmetric information faced by firms in capital markets; growth opportunities represent the future investment opportunities, therefore influencing the firms´ financing needs associated with their investments; growth national product (GNP) that as a macroeconomic variable may be important in predicting corporate investment decisions, given that a predictable macroeconomic environment contributes for greater investments opportunities for SMEs.

2.1. Sales

Hall and Jorgenson (1967), Jorgenson (1971), and Chirinko (1993) showed that the coefficient of the variable sales is central and statistically relevant in explaining large

firms' investments. This result is in accordance with the arguments of Modigliani and Miller (1958), in the sense that investment decisions are not dependent on the firms' capital structure decisions. The studies by Eisner (1963), and Chirinko (1993) conclude that the variable sales is statistically more robust than any other explicative variable of firms' level of investment.

As far as SME are concerned, the importance of sales is expected to be less than in the case of large firms. Sales are more volatile in small firms, which in turn will lead these firms to maintain an appropriate level of liquid assets, avoiding unfavourable debt (Devereux and Schiantarelli, 1990).

As to the influence of age on the relationship between sales and investment, sales are expected to be an incentive for older firms in order to increase the level of investment, as a way to expand their market share. When firms are young, the objective of surviving, in their operating markets, has a greater importance than the objective to achieve a larger market share. In addition, in the beginning of the SME life-cycle, the cost of debt is expected to be particularly high due to the restrictions that these firms are subject to. Therefore, sales are mainly used to pay debt and interests, and less channelled to investment by young SMEs.

Also it is important to point out to the neoclassical theory, sales have, in general, the greatest explanatory power regarding the large firms' investments, in accordance with the concept of the representative firm. In this context, and given that, in general, older firms are larger than younger ones, we can expect that sales are more important for the investment decisions of old SMEs than for young SMEs

Based on the arguments presented, we formulate the following research hypothesis:

H1: Sales are of greater importance for stimulating the investment in old SMEs than in young SMEs.

2.2. Cash flow

According to Fazzari et al. (1988) there is a need to substitute the concept of representative firm for the concept of financial hierarchy. These authors argue that the concept of financial hierarchy is extremely important in the presence of asymmetric information that occurs in the credit and capital markets, as opposed to the "perfect world" of Modigliani and Miller (1958) with markets of perfect competition, and with symmetric information. Therefore, the neoclassical equation of investment, tested with the introduction of financial variables, should reveal a very different sensitivity between financial variables and investment according to different groups of firms. Based on this argument, and on the assumption of information asymmetry, the free cash flow theory was proposed, bearing in mind that firm´s internal factors, especially cash flow, become pertinent in explaining firms' investment.

Fazzari et al. (1988) and Andersén (2011) show that firms' investment is dependent on cash flow, finding a positive relationship between firms' level of cash flows and investment. The authors also show that the sensitivity of investment to variations in the cash flows is greater for firms that are more susceptible to credit rationing due to the information asymmetry in the relationship between shareholders/managers and creditors.

Fazzari et al. (1988), Hoshi et al. (1991), Fazzari and Peterson (1993), Kaplan and Zingales (1997, 2000), Cleary (1999), Vermeulen (2002), Bond and Van Reenen (2007), Junlu et al. (2009), and Sun and Nobuyoshi (2009) verify a positive relationship between cash flow and firms' investment. Hoshi et al. (1991) found evidence that investment is less sensitive to cash flow variations in firms with frequent relationships with creditors, than in firms with weak relationships with creditors. Fazzari et al. (1988) and Brinckmann et al. (2011) also found evidence that small firms face greater

restrictions in accessing external financing than do larger firms and, so the former become more dependent on their internal funds to finance their investments.

Peterson and Rajan (1995) and Vermeulen (2002) also argue that cash flow is a particularly relevant variable in explaining SME investment, given the restriction in obtaining credit, as a consequence of the SME lesser capacity to provide collateral and greater likelihood of bankruptcy.

A positive relationship between cash flow and investment tends to be stronger in SMEs (Lee and Ratti, 2008), particularly for younger firms that are more likely financially constrained, given their lack of experience, and reputation in the capital market that force them to be strongly dependent on cash flow (Evans and Jovanovic, 1989; Beck et al., 2006; Brown et al., 2009). Additionally, Alti (2003) argues that cash flow, as a financing source also minimize the risk and uncertainty for younger firms.

Based on the arguments presented, we formulate the following research hypothesis:

H2: Cash flow is of greater importance for stimulating the investment in young SMEs than in old SMEs.

2.3. Debt

Given that firm´s ownership and management often overlap, with the same people, for the majority of the SMEs the agency problems, between shareholders and managers, are almost irrelevant. However, in the context of SMEs, agency problems between shareholders/managers and creditors are particularly important.

Jensen and Meckling (1976) argue that owners/managers may invest in high-risk projects seeking to increase the value of equity rather than the value of the debt, given that if the project succeeds, owners receive most of the profits, whereas if the project is not successful, creditors bear most of the costs. Consequently, creditors restrict the level

of credit granted to firms or increase the cost of borrowing (Jensen and Meckling, 1976; Stliglitz and Weiss, 1981).

Myers (1977), Jensen (1986), Stulz (1990), McConnell and Servaes (1995), Lang et al. (1996), Aivazian et al. (2005), Ahn et al. (2006), Firth et al. (2008) and Lee and Ratti (2008) observe a negative relationship between debt and investment. A high level of debt implies that a substantial part of cash flow is used to pay back the debt and its interests, and it will be difficult for firms to fulfil their commitments with creditors. Therefore, it is expected a negative relationship between debt and investment, and consequently, a greater sensitivity of the investment to the firm's financial situation, when the level of debt is high (Mills et al., 1994). In addition, Lee and Ratti (2008) observe a stronger negative relationship between debt and investment for smaller firms. According to the agency theory, investors are unwilling to invest in younger and more rapidly growing firms, due to the absence of immediate distribution of dividends (Honjo and Harada, 2006). The creditors increase the cost of capital as a way of minimizing the risk of their investment in these firms (Diamond, 1989). Young SMEs lack of know-how and reputation, and they have greater likelihood of bankruptcy, which increases the risk for potential lenders (Pettit and Singer, 1985). In addition, for older SMEs it is easier to obtain debt that contributes for a higher level of indebtedness, signalling a greater firm´s vitality and credibility for the market.

Based on the arguments presented, we formulate the following hypothesis:

H3: Debt has a greater negative impact on the investment for young SMEs than for investment in old SMEs.

2.4. Age

Moyen (2004) argue that investment of younger and smaller firms tend to be more dependent on cash flow. Beck et al. (2006) also argue that young firms face more financing restrictions to fund their investments. Given that, as firms get older, they reinforce the capacity to retain profits, Beck et al. (2006) also state that the financing restrictions diminish as firms get through the first years of their life.

Fazzari et al. (1988) argue that younger and smaller firms invest less due to their liquidity restrictions. Fagiolo and Luzzi (2006) corroborate this argument, concluding that the liquidity restrictions have a negative effect on firm growth, with the smallest firms growing more when they control these restrictions.

Devereux and Schiantarelli (1990) conclude that investment in young firms is more sensitive to cash flow, suggesting that these firms have more obstacles in obtaining external financing. Therefore, adding one more year of age can be expected to have a marginally greater effect on investment in young SMEs, compared to the case of old SMEs.

Based on the arguments presented, we formulate the following hypothesis:

H4: Age is of greater importance for stimulating the investment in young SMEs than in old SMEs.

2.5. Growth Opportunities

Fazzari et al. (1988), Ascioglu et al. (2008), Carpenter and Guariglia (2008), Junlu et al. (2009) and Sun and Nobuyoshi (2009) identify a positive relationship between investment and growth opportunities. According to Carpenter and Guariglia (2008) and Shepherd and Patzelt (2011), the explanatory power of this variable seems to have

greater significance in the SME context, as these firms suffer most from financial constraints.

Considering that, in the initial stage of the life cycle, the younger and smaller firms have more growth opportunities than older firms (that have already reached the stage of maturity), where investment projects seem to be scarcer and less profitable, we can expect a closer relationship between growth opportunities and investment in younger firms. According to Fagiolo and Luzzi (2006), younger and smaller firms should benefit from greater growth opportunities and need higher levels of investment to meet the multiple growth opportunities that arise.

Based on the arguments presented, we formulate the following research hypothesis: H5: Growth opportunities are of greater importance for stimulating the investment in young SMEs than in old SMEs.

2.6. Interest Rate

The interest rate, as a variable defining the cost of capital, was already considered by the neoclassical theory as a determinant of firm´s investment. Bernanke and Gertler (1995), and Gilchrist et al. (2005) defend an inter-connection between monetary policy and investment, considering that this policy has effects on the cost of capital, therefore influencing firms' investment. One effect of the monetary policy may be an increase of the interest rate that implies a fall in the level of the investment, which will cause a propagation of shocks through the credit cycles. Gilchrist et al. (2005) identify a negative relationship between interest rate and investment. Changes in monetary policy, namely in terms of interest rate, influence the firm´s investments and debt capacity, through its effect on firms' cash flow. Indeed, the cash flow of highly indebted firms

will be more sensitive to changes in the interest rate than that of the firms with a minimum level of debt (Mills et al., 1994).

Ghosh and Ghosh (2006), within the context of the agency theory, support the existence of an inverse relationship between interest rate and investment. According to these authors, due to the information asymmetry, the creditors increase the rate of interest, which raises the cost of capital that influences negatively the firm´s level of investment. These results are also corroborated in the studies by Bernanke and Gertler (1995), who conclude that an increase in the interest rate causes a decrease in the level of firm´s investment.

We can expect that the effect of interest rate to be more pronounced in smaller firms´ investment, since these firms will be more sensitive to alterations in the cost of debt, compared to the case of larger firms. Ghosh and Ghosh (2006) also state that investments of younger SMEs are more vulnerable to monetary recessions. It is expected that the relationship between the interest rate and investment may be more negative for younger firms than for older SMEs, given that the former face more problems of information asymmetry with creditors, contributing to an increase in the cost of debt.

Base on the arguments presented, we formulate the following research hypothesis:

H6: The negative influence of the interest rate in investment is greater for younger SMEs than for older SMEs.

2.7. Gross National Product

Bernanke and Gertler (1989), Bernanke and Gertler (1996), Vermeulen (2002) and Kunc and Bandahari (2011) argue that firms with greater financing restrictions, and

operating in imperfect markets, as is the case of SMEs, are more affected by periods of economic recession, which contribute to aggravate their financing restrictions.

In periods of economic recession, we can expect that credit markets are more restrictive and, therefore, affect negatively the firm´s investment, particularly SME investments. In these situations, SMEs will be forced to finance themselves with their cash flow, which may diminish due to the recessive behaviour of the market (Kaufmann and Valderrama, 2008). In periods of economic growth, SMEs will have easier access to debt, and a higher level of cash flow, which may stimulate their investments. The uncertainty prevailing in periods of economic recession also influences negatively the investment, given that SMEs, and particularly the younger ones, choose to postpone their investments (Fuss and Vermeulen, 2004). In the presence of economic growth, the younger firms with greater growth opportunities can take advantage of these opportunities by investing in profitable projects, resorting to cash flow and to debt (Atanasova, 2011).

Based on the arguments presented, we formulate the following hypothesis:

H7: Gross National Product (GNP) is of greater importance for stimulating the investment in young SMEs than in old SMEs.

3. Research Methodology

3.1. Database

This study uses the SABI (Iberian Balance-Sheet Analysis System) database supplied by Bureau van Dijks for the period 1999-2006.

As our subject of analysis are SMEs, we select unquoted firms based on the European Union's recommendation L124/36, (2003/361/CE). According to this recommendation, a firm is considered to be an SME when it meets two of the following three criteria: 1) fewer than 250 employees; 2) annual total assets under 43 million euros; and 3) business turnover under 50 million euros.

In order to solve the problem of possible result bias due to the survival issue, and also seeking to obtain a more representative sample of the Portuguese SMEs, we consider three types of SMEs: 1) SMEs belonging to the market for the whole period of analysis (1999-2006); 2) SMEs that leave the market during the period of analysis (1999-2006); and 3) SMEs that enter the market during the period of analysis (1999-2006).

Arellano and Bond (1991) conclude that use of dynamic panel models implies that the units of analysis are included in the sample, for at least, four consecutive years. This is the case, due to the need to include all units of analysis in the second order autocorrelation test, which is essential to validate the results obtained with the dynamic estimators. Given that we use dynamic panel estimators, and considering that the sample used must be uniform for all of the analyses made, in the final sample we only consider SMEs that verify two of the three criteria established by the European Union recommendation L124/36, (2003/361/CE) and which, at the same time, are included in the sample for four consecutive years during the period 1999-2006.

As our main objective is to investigate the possible differences in the investment determinants of young SMEs and old SMEs, we divide the total sample of Portuguese SMEs into young and old SMEs. Just as Hyytinen and Pajarinen (2004), Oliveira and Fortunato (2006), Ferrando et al. (2007) and La Rocca et al. (2011) we consider as young SMEs those up to 10 years of age, considering as old SMEs those over 10 years

of age[1]. Based on this criterion, we select 495 young SMEs, corresponding to 2961 observations, of which: 1) 223 belong to the market during the whole period of analysis (1999-2006), corresponding to 1561 observations; 2) 236 enter the market during the period of analysis (1999-2006) corresponding to 1228 observations; and 3) 36 leave the market during the period of analysis (1999-2006), corresponding to 172 observations. Regarding the old SMEs, we select 1350 firms, corresponding to 9092 observations, of which: 1) 1188 SMEs belong to the market for the whole period of analysis (1999-2006), corresponding to 8316 observations; and 2) 162 SMEs leave the market during the period of analysis (1999-2006), corresponding to 776 observations.

The final sample composition is presented in the following table.

(Insert Table 1 About Here)

3.2. Variables

The independent variables used in this study are the following[2]: sales, cash flow, debt, age, growth opportunities, interest rate and gross national product.

As we use dynamic panel estimators, namely the GMM system (1998) estimator, we estimate the relationship between investment in the previous period and investment in

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[1] According to the alternative criterion, which it was also used, we consider, as young SMEs, those of up to 7 years of age, considering as old SMEs those over 7 years of age. Robb and Robinson (2009) consider young SMEs up to a maximum of 5 years of age. In this study, use of dynamic estimators, with the consequent need for SMEs to be in the sample for a minimum of four consecutive years so as to validate the second order autocorrelation tests, recommends use of an alternative criterion with a higher maximum age to be classified as young SMEs. However, our alternative criterion is similar to the one used by Robb and Robinson (2009) since, by considering as young SMEs those entering the market in the period 1999-2006, their maximum age is 7. The alternative criterion used in this study is also quite similar to that used by Steffens et al. (2009), who classify, as young SMEs, those up to 8 years of age, and old SMEs those over 8 years old. The results obtained are almost the same as those obtained when using the main criterion for classifying young and old SMEs, and do not lead to any significant different conclusions of this study. The results of applying the alternative criterion for classifying young and old SMEs can be supplied by the authors, upon request.

[2] The independent variables used in this study, both in the current period and the previous period, were used in various studies about firms' investment determinants, such as in: Fazzari et al. (1988); Fazzari and Peterson (1993); Degryse and Jong (2001), Aivazian et al. (2005), Lang et al., 1996; DeMarzo and Fishman (2007), Ascioglu et al. (2008), Brown et al. (2009). Also, they were presented and discussed in the section dedicated to the literature review.

the current period. Therefore, we have an additional explanatory variable, investment in the previous period. Use of investment in the previous period as another explanatory variable allows us to test whether the persistence of investment is identical for young SMEs and old SMEs.

The variables will be introduced in the explanatory model of investment in the order mentioned above.

The variables used in this study were measured as follows:

- $I_{i,t}$ is net investment, given by the ratio of fixed assets variation less amortizations and depreciations in the current period to fixed assets in the previous period;

- $I_{i,t-1}$ is the lagged net investment;

- $SALES_{i,t-1}$ are sales in the previous period, given by the logarithm of business turnover in the previous period;

- $CF_{i,t}$ is cash flow in the current period, given by the ratio of operational profits before taxes plus amortizations and depreciations divided by total assets in the current period;

- $LEV_{i,t-1}$ is debt in the previous period, given by the ratio of total debt in the previous period to total assets in the previous period;

- $Age_{i,t-1}$ is firm age in the previous period, given by the logarithm of the number of years firms have been in existence;

- $GO_{i,t-1}$ are growth opportunities in the previous period, given by the ratio between intangible assets to total assets in the previous period;

- IR_t is the market interest rate in the current period, corresponding to the 3-month Euribor rate;

- GNP_t is Gross National Product in the current period, given by the logarithm of Gross National Product.

All the monetary variables were deflated through a deflator constructed based on the GNP deflator for each year. The year base considered for deflation of the monetary variables is 2006.

It should be noted that all estimations include annual dummy variables in order to measure effects of the economic situation other than the interest rate and Gross National Product on variations in SME investment. In addition, in all the estimations carried out, we also consider sector dummy variables so as to measure the impact of potential different relationships between determinants and investment, according to SMEs belonging to different economic sub-sectors. As Blanco-Mazagatos et al. (2007), we consider the following sector dummy variables: 1) agriculture; 2) forestry and fishing; 3) construction; 4) manufacturing industry; 5) wholesale and retail; and 6) services.

3.3.   Survival analysis with probit model

We can expect that the relationships between determinants and investment are different for survival and non-survival firms. Not considering firms that leave the market in the sample could lead to bias in the relationships formed between determinants and investment. According to Heckman (1979), Calvo (2006), and Lotti et al. (2009), one way to eliminate this problem of selection of firms is to use the two-step estimation method. In a first step, we estimate a model of the probability of firm survival, based on the probit regression analysis, considering the total sample, i.e., both firms that remain in the market and those that leave it.

The dependent variable takes the value of 1, when the firm survives, and the value of 0 when it leaves the market. Just as Calvo (2006), we will consider the determinants used in the second step of estimation as explanatory variables in the probit regression.

The regressions to estimate can be presented as follows:

$$\Pr(\delta_{i,t} = 1) = \alpha_0 + \phi INV_{i,t-1} + \gamma_1 SALES_{i,t-1} + \gamma_2 CF_{i,t} + \gamma_3 LEV_{i,t-1} + \gamma_4 AGE_{i,t-1} + \gamma_5 GO_{i,t-1} + \gamma_6 IR_t + \gamma_7 GNP_t + S_S + d_t + z_{i,t} \quad ,$$

(1)

where: $I_{i,t-1}$ is investment in the previous period; $SALES_{i,t-1}$ is sales in the previous period; $CF_{i,t}$ is cash flow in the current period; $LEV_{i,t-1}$ is debt in the previous period; $AGE_{i,t-1}$ is age in the previous period; $GO_{i,t-1}$ are growth opportunities in the previous period; IR_t is the interest rate in the current period; GNP_t is Gross National Product in the current period; S_s are sector dummy variables; d_t are annual dummy variables; and $z_{i,t}$ is the error.

Based on the probit regressions, estimated in the first step, we calculate the inverse Mill's ratio[3], and use it as an additional explanatory variable of investment in the second step when estimating the relationships between determinants and investment using dynamic panel estimators.

3.4. Dynamic Panel Estimators

Given that the dynamic nature of investment decisions (DeMarzo and Fishman, 2007), the use of dynamic estimators is more suitable than other methods of estimation such as random or fixed effect panel models or OLS regressions. To estimate the relationships

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[3] To see in detail the formula for calculating the inverse Mill's ratio, consult Heckman (1979).

between determinants and investment in young SMEs and old SMEs, we use dynamic panel estimators[4], namely the GMM system (1998) dynamic estimator.

Blundell and Bond (1998) conclude that when the dependent variable is persistent, therefore being high correlation between its values in the present and previous periods, and the number of periods is not very high, the GMM (1991) estimator is inefficient, because asides from the estimator creating weak instruments, its use may lead to bias of the estimated parameters. Considering that investment can have high persistency[5], in this study we choose the GMM system (1998) estimator.

Using the GMM system (1998) estimator, the relationships between determinants and investment in young SMEs and old SMEs can be presented as follows:

$$INV_{i,t} = \beta_0 + \kappa INV_{i,t-1} + \beta_1 SALES_{i,t-1} + \beta_2 CF_{i,t} + \beta_3 LEV_{i,t-1} + \beta_4 AGE_{i,t-1} + \beta_5 GO_{i,t-1} + \beta_6 IR_t + \beta_7 GNP_t + \varphi\lambda_{i,t} + S_S + d_t + v_i + e_{i,t}$$

(2)

where: $\lambda_{i,t}$ is the inverse Mill's ratio; v_i are non-observable individual effects; and $e_{i,t}$ is the error.

According to Arellano and Bond (1991) use of dynamic estimators has the following advantages over static panel models: 1) greater control of endogeneity; 2) greater control of the collinearity of explanatory variables; and 3) greater efficiency in controlling the effects of the absence of important variables in explaining the dependent variable. Besides, use of dynamic estimators has the additional advantage of estimating correctly the relationship between the dependent variable in the current and previous periods.

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[4] Other authors, such as Bond et al. (2003), Lee and Ratti (2008) and Brown and Petersen (2009), also used dynamic panel estimators to estimate relationships between determinants and firm investment.
[5] As can be observed from the correlation matrixes, both for young SMEs and old SMEs, the correlation between investment in the previous period and investment in the present period is positive and statistically significant. Therefore, irrespective of taking young SMEs or old SMEs as the subject of analysis, investment is found to be persistent, and so it is more appropriate to use the GMM system (1998) estimator than the GMM (1991) estimator.

Estimating the relationships between determinants and investment using static panel models (random and fixed effect models, or OLS regressions) would lead to bias in the estimated parameters due to the correlation between v_i and $INV_{i,t-1}$, and between $e_{i,t}$ and $INV_{i,t-1}$. With dynamic panel estimators, as a consequence of estimating equation (2) in first differences, we eliminate the correlation between v_i and $INV_{i,t-1}$. Use of lags of investment and of the explanatory variables of investment creates orthogonal conditions between $e_{i,t}$ and $INV_{i,t-1}$, eliminating the correlation between these variables.

However, the results obtained with the GMM system (1998) estimator can only be considered valid on the following conditions: 1) if the restrictions, as a consequence of using the instruments, are valid; and 2) there is no second order autocorrelation. To test the validity of the restrictions we use the Hansen test. The null hypothesis indicates that the restrictions, imposed by use of the instruments, are valid. Rejecting the null hypothesis, we conclude that the restrictions are not valid, and so the results obtained cannot be considered robust. We test for first and second order autocorrelation. The null hypothesis is absence of autocorrelation. Rejecting the null hypothesis of absence of second-order autocorrelation, we conclude the results obtained cannot be considered robust. Summarizing, for the results to be considered valid, and consequently open to interpretation, the restrictions imposed by use of the instruments must be valid and there can be no second-order autocorrelation.

Seeking to test possible differences between determinants and investment in young SMEs and old SMEs[6], we resort to the Chow test. We test for possible equality in the relationships for young SMEs and old SMEs, for each determinant, and for the determinants as a whole, considered in each of the regressions. The null hypothesis is

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[6] We also test for possible differences between the survival determinants of young SMEs and old SMEs, resorting to the Chow test.

that of equality of the parameters estimated between determinants and investment in young SMEs and old SMEs, the alternative hypothesis being inequality of the parameters estimated between determinants and investment in young SMEs and old SMEs.

4. Results

4.1.   Descriptive Statistics and Correlation Matrixes

The descriptive statistics of the variables used in this study, for young SMEs and old SMEs, are presented in the following table.

(Insert Table 2 About Here)

Volatility of investment, cash flow and growth opportunities is higher in young SMEs than in old SMEs. We also verify that on average, young SMEs have a higher level of investment, greater debt, and greater growth opportunities than old SMEs, the opposite being true in the case of average sales and cash flow. The volatilities of the interest rate and GNP are not particularly high, since the standard deviations of those variables are considerably under the respective means.

Tables 3 and 4 present the correlation matrixes between the variables used in this study, for young SMEs and old SMEs respectively.

(Insert Table 3 About Here)

(Insert Table 4 About Here)

Aivazian et al. (2005) conclude that the problem of collinearity between explanatory variables could be particularly important, when correlation coefficients are above 30%. The correlation coefficients of the independent variables are not too high, despite those between cash flow and investment in the previous period, and between the interest rate and investment in the previous period being above 30%. In general, the correlation coefficients indicate that the problem of collinearity between explanatory variables may not be particularly important in this study.

4.2. Survival Analysis

Table 5 presents the results obtained for the survival analysis in the context of the young SME sub-sample.

(Insert Table 5 About Here)

We can conclude that investment in the previous period, cash flow, sales, debt, age, growth opportunities and GNP are determinants promoting the survival of young SMEs. However, the interest rate is a restrictive determinant of survival of young SMEs.

Table 6 presents the results of the survival analysis for old SMEs.

(Insert Table 6 About Here)

According to the results presented in Table 6, we can conclude that investment in the previous period, debt, age and GNP are determinants promoting the survival of old SMEs, whereas the interest rate is a restrictive determinant of their survival. In the case of old SMEs, we also verify that cash flow, sales and growth opportunities are neither restrictive nor positive determinants of survival in this type of SME.

Table 7 presents the results of the Chow test of possible differences between the parameters measuring the relationships between determinants and survival in young SMEs and old SMEs.

(Insert Table 7 About Here)

We observe that, whatever the regressions estimated, for each determinant considered, we reject the null hypothesis of equality of the estimated parameters measuring the relationships between determinants and survival. For each of the regressions estimated, the global results of differences in estimated parameters confirm the rejection of the null hypothesis of equality of the estimated parameters.

4.3. Determinants of Firm´s Investment

Next, Tables 8 and 9 present, for young SMEs and old SMEs respectively, the results obtained concerning relationships between determinants and investment when using the GMM system (1998) estimator.

(Insert Table 8 About Here)

(Insert Table 9 About Here)

Whether considering young SMEs or old SMEs as our subject of analysis, the results of the Hansen test indicate that we cannot reject the null hypothesis of the lack of validity of the instruments used. In addition, the results of the second-order autocorrelation tests indicate that we cannot reject the null hypothesis of absence of second-order autocorrelation. Based on these results, regardless of analysing young SMEs or old SMEs, the results obtained can be considered valid, and consequently open to interpretation.

For young SMEs, the results show that: i) investment in the previous period, cash flow, age, growth opportunities and GNP are determinants stimulating the firms´ investment; ii) debt and the interest rate are determinants restricting the firms´ investment; and iii) sales cannot be considered as a determinant that stimulates or restricts the firms´ investment.

In the context of old SMEs, the results suggest that: i) investment in the previous period, sales, cash flow and GNP are determinants stimulating SME investment; ii) age and the interest rate are determinants restricting investment; and iii) debt and growth opportunities are neither positive nor restrictive factors of investment.

Whatever the regression estimated, the relationship between the inverse Mill´s ratio and investment is negative and statistically significant for young SMEs and old SMEs. This result indicates that the two-step estimation method was effective in solving the possible bias problem due to the firms' survival issue. Not using the inverse Mill´s ratio in the regressions would lead to overestimating the parameters measuring relationships between determinants and investment.

We now present the results of the Chow test, seeking to test for possible differences in the relationships between determinants and investment in young SMEs and old SMEs.

(Insert Table 10 About Here)

Whatever the regression estimated, the null hypothesis of equality between the determinants and investment in young and old SMEs is always rejected. Also, regardless of the regression estimated, the results of the overall Chow test show that there are differences in the relationships between the determinants and investment in young SMEs and old SMEs.

5. Discussion of the Results

Sales are a determinant stimulating investment in old SMEs, but are neither a positive nor a restrictive determinant of investment in young SMEs. Therefore, sales are of greater importance for stimulating the investment in old SMEs than in young SMEs, and so we can accept the previously formulated hypothesis H1.

For young SMEs, survival in the market is more important than to acquire market share, therefore sales may not be a determinant factor of investment for these firms. The fact that sales in old SMEs are positively related to their level of investment, which does not occur in young SMEs, indicates that the assumptions of neoclassical theory are more applicable in the context of SMEs that have already reached the more advanced stages of their life-cycle.

Although sales do not mean increased investment in young SMEs, they contribute to an increased likelihood of their survival. This pertinent empirical evidence suggests that young SMEs depend on sales to ensure their survival, but the presence of financial restrictions caused by the problems of information asymmetry they are exposed to, seems to prevent those firms from adjusting investment as a function of sales.

Cash flow is found to be a determinant stimulating investment in both young and old SMEs. However, cash flow is of greater importance for stimulating the investment in young SMEs than in old SMEs, and so we can accept the previously formulated hypothesis H2.

Young SMEs depend more on cash flow to finance their investment than the old SMEs do. It is confirmed that the young SMEs are more affected by financial restrictions, which force these firms to finance their investment through cash flow, corroborating the results of Evans and Jovanovic (1989), Beck et al. (2006), and Brown et al. (2009). This result shows the importance of internal funds for young SMEs to fund

their investment, as a possible consequence of obstacles in obtaining debt, due to problems of information asymmetry with creditors, corroborating the arguments of Peterson and Rajan (1995). Additionally, the dependence on cash flow corroborates the argument of Alti (2003) that the use of cash flow to fund investment allows young SMEs to reduce the problem of uncertainty, and contributes for firm´s survival in the market. The importance of cash flow for young SME activity is reinforced by the result regarding the contribution of cash flow to increase their probability of survival that does not is verified by old SMEs.

Debt is a restrictive determinant of investment in young SMEs, but neither stimulates nor restricts investment in old SMEs. The results indicate that debt is of greater importance for decelerating the investment in young SMEs than in old SMEs, and so we can accept the previously formulated hypothesis H3.

Debt reduces the level of investment of young SMEs, suggesting that the young SMEs rely on internal financing sources for funding their investment. The young SMEs do not disclose information to the market, therefore potential investors do not know the true value of these firms, and the firm´s owner-manager may adopt an opportunistic behaviour. Consequently, creditors increase the cost of capital and/or require collaterals to grant debt to young SMEs.

Besides the above, debt is found to be of greater importance for increased the probability of survival in young SMEs than for survival in old SMEs. This result suggests that when internal financing is insufficient, access to debt may be fundamental for SMEs to be able to finance the multiple growth opportunities arising in the start of their life-cycle.

Greater age contributes to stimulate the investment in young SMEs, but to decelerate the investment in old SMEs. Therefore, age is of greater importance for stimulating the

investment in young SMEs than in old SMEs, and so we can accept the previously formulated hypothesis H4.

Diamond (1989) concludes that greater age is a fundamental aspect for increased capacity to retain profits over time, and simultaneously to increase the reputation of SMEs for creditors. The empirical evidence shows that the marginal importance of one more year of age is greater for young SMEs than for old SMEs. This being so, for the young SMEs, the difficulties in obtaining finance lessens as they get older, allowing them to fund highly profitable investment projects. The old SMEs, although subject to fewer financial constraints, do not carry out major investments, probably as a consequence of less growth opportunities. The importance of age in the activity of young SMEs is also evidenced by its greater importance for increased likelihood of survival of young SMEs, compared to the case of old SMEs.

Growth opportunities are a determinant promoting the investment in young SMEs, but neither promotes nor restricts the investment in old SMEs. These results allows us conclude that growth opportunities are of greater importance for stimulating the investment in young SMEs than in old SMEs, and so we can accept the previously formulated hypothesis H5.

Fazzari et al. (1988), Ascioglu et al. (2008), Carpenter and Guariglia (2008), Junlu et al. (2009), and Sun and Nobuyoshi (2009) identify a positive relationship between growth opportunities and firm investment, as is identified in this study when analysing young SMEs. The conclusions of Carpenter and Guariglia (2008), and Shepherd and Patzelt (2011) that growth opportunities are particularly important for SME investment, appear to be particularly relevant in the case of young SMEs, since these firms face greater financing constraints, namely in obtaining debt on advantageous terms.

As mentioned by Fagiolo and Luzzi (2006), young and small firms should have greater growth opportunities, since they are still in the beginning of their life-cycle, needing to implement their investment projects to take advantage of the multiple growth opportunities that arise. The absence of a relationship between growth opportunities and investment in old SMEs can be explained by the less profitable growth opportunities that old SMEs may have. Furthermore, growth opportunities are found to be of greater importance for increased probability of survival in young SMEs, compared to old SMEs, which also suggests that growth opportunities have greater importance for the activity of young SMEs.

A higher interest rate contributes for restricting the investment in both young and old SMEs. However, the estimated parameters measuring the relationship between interest rate and investment are of a greater magnitude for young SMEs than for old SMEs. These results allow us to accept the previously formulated hypothesis H6, since the interest rate is of greater importance for decelerating the investment in young SMEs than in old SMEs.

Increased interest rate that implies an increase in the capital cost, forces SMEs, and particularly the young ones, to use their cash flow to pay debt and interests, which in turn reduces the firm´s liquidity that could be channelled to investment. This empirical evidence agrees with the study by Ghosh and Ghosh (2006) that conclude that small and young SMEs are more vulnerable to the effects of a restrictive monetary policy. It is also of note that the interest rate contributes more significantly to diminish the probability of survival in young SMEs than is the case in old SMEs, which illustrates that young SMEs are more vulnerable to an increase in the interest rate than old SMEs.

Higher values of GNP seem to contribute to stimulate the investment in both young and old SMEs. However, the parameters measuring the relationships between GNP and

investment are of a greater magnitude in young SMEs than in old SMEs. Economic growth, measured by GNP, is of greater importance for stimulating the investment in young SMEs than in old SMEs, and so we can accept the previously formulated hypothesis H7. Both young and old SMEs are found to adjust their level of investment as a function of economic cycles, corroborating the conclusions of Bernanke and Gertler (1989), Bernanke and Gertler (1996), Vermeulen (2002), and Kunc and Bandahari (2011) that SMEs are more susceptible to economic cycles, namely to periods of recession.

It is important to mention that the empirical evidence obtained in this study indicates that the investment of young SMEs is more sensitive to oscillations in GNP. On the one hand, this result corroborates the conclusions of Fuss and Vermeulen (2004), regarding young SMEs that can take advantage of favourable situations of economic expansion to increase investment, given their greater level of growth opportunities. On the other hand, periods of recession, particularly adverse market conditions, may contribute to creditors hindering the granting of credit to firms, which combined with the difficulty of SMEs in retaining earnings (Kaufmann and Valderrama, 2008), can imply diminished investment. The greater relevance of GNP for young SME activity is also found in the greater importance of GNP for the probability of survival in young SMEs, compared to the case of old SMEs.

Given the use of dynamic panel estimators, we determine the relationships between investment in the previous period and investment in the current period for young and old SMEs. In both cases, we identify positive and statistically significant relationships between investment in the previous and current periods. However, that relationship is of a greater magnitude in young SMEs, which indicates a greater investment that young SMEs perform over time, compared to old SMEs. We also verify that investment in the

previous period is of greater importance for increased probability of survival in young SMEs than for survival in old SMEs. These findings suggest that investment is particularly important in the first stages of the SME life-cycle, when growth opportunities can be especially relevant.

6. Conclusion and Implications

Based on two sub-samples of Portuguese SMEs: i) 495 young SMEs; and ii) 1350 old SMEs, and using the two-step estimation method, we test the existence of possible differences in the investment determinants of young SMEs and old SMEs for the period between 1999 and 2006. The empirical evidence obtained in this study indicates that there are significant differences in the investment determinants of young and old SMEs.

Firstly, we verify that sales are a determinant stimulating the investment in old SMEs, but are neither a restrictive nor a positive determinant of investment in young SMEs. This result appears to indicate that the assumption of neoclassical theory, that firms adjust investment as a function of exogenous factors, is more applicable in explaining investment in young SMEs than in old ones. This conclusion is reinforced by the fact that sales are of greater importance for the survival of old SMEs than that of young SMEs. While young SMEs may be more concerned with survival in the initial stages of their life-cycle, old SMEs strategically alter their investment as a function of the possibility of increasing their market share, probably on the basis of the diversification of their activities.

Secondly, alterations in the economic climate, namely changes in the interest rate and GNP, have effects on the investment of both young and old SMEs. It is important to highlight that exogenous factors, such as the interest rate and GNP, are more important in explaining the investment in young SMEs than in old SMEs. The interest rate and

GNP are also found to be of greater importance in explaining the survival of young SMEs than in explaining that of old SMEs. On the one hand, a higher interest rate implies a reduction of the investment in young and old SMEs. On the other hand, a higher GNP implies an increase of the investment in young and old SMEs. However, the magnitude of the effects is greater in young SMEs than in old SMEs. Unlike what occurs with the sales determinant, the determinants regarding the interest rate and the GNP suggest that the assumptions of neoclassical theory, regarding the importance of exogenous factors are more applicable in explaining investment in young SMEs than in old SMEs.

Thirdly, internal financing and external financing are more significant in explaining investment in young SMEs than in old SMEs. Cash flow is an important determinant in explaining investment in both young and old SMEs, but has greater importance in the case of the former. This result shows that internal financing is relevant in explaining SME investment, particularly in the case of young SMEs, corroborating the assumptions of agency theory, and asymmetric information problems regarding the restrictions that these firms face in obtaining debt. Debt is a restrictive determinant of investment in young SMEs, but is neither a restrictive nor a positive determinant of investment in old SMEs.

The greater importance of cash flow for investment in young SMEs, and debt as a restrictive determinant of investment in this type of firm, but not in the case of old SMEs, indicates that problems of information asymmetry are particularly relevant for young SMEs to obtain debt. This conclusion is reinforced by the greater importance of cash flow and debt for increased survival of young SMEs compared to the case of old SMEs.

Fourthly, age contributes to increased investment in young SMEs, but to diminished investment in old SMEs. This result shows that the marginal effect of age on investment in young SMEs is particularly relevant, probably due to the effect of age on reputation, contributing to diminish the problems of information asymmetry with creditors. The greater importance of age for the survival of young SMEs strengthens the idea of the greater importance of age in the context of young SMEs' activity, compared to that of old SMEs. Also, growth opportunities are a positive determinant of investment in young SMEs, but are neither a positive nor restrictive determinant of investment in old SMEs. Growth opportunities also contribute to the survival of young SMEs that is not verified by old SMEs. These findings suggest that young SMEs with good growth opportunities increase investment, given that these firms need to grow in the first years of their life-cycle, so as to reach more quickly a minimum scale of efficiency that ensures their survival. It is important to mention the fact that growth opportunities, measured by intangible assets, are positively related to investment in young SMEs. This evidence indicates that growth opportunities are an important determinant to promote the growth of young SMEs.

Fifthly, we verify that the persistence of investment over time is greater in young SMEs than in old SMEs. In addition, investment is of greater importance for survival in young SMEs than in old SMEs. These findings suggest that investment is particularly important in the activity of young SMEs, probably as a consequence of these firms' investment needs in the initial stages of their life-cycle.

Summarizing, the empirical evidence suggest that problems of information asymmetry between SME owners/managers and creditors are particularly important in the context of young SME activity. This being so, as guidelines for economic policy, we suggest effective support through the creation of specific beneficial lines of credit. In

this context, when internal financing is insufficient, young SMEs can take advantage of the growth opportunities funded by credit obtained on advantageous terms, namely the amount of debt and rate of interest, allowing young SMEs to make efficient use of those growth opportunities.

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Table 1: Sample Structure

	Total SMEs		Young SMEs		Old SMEs	
	Firms	Observations	Firms	Observations	Firms	Observations
Incumbent firms in all period 1999 – 2006	1411	9877	223	1561	1188	8316
Firms entering in the period 1999 –2006	236	1228	236	1228	0	0
Firms exiting in the period 1999-2006	198	948	36	172	162	776
Total Number of Firms	1845		495		1350	
Total Number of Observations		12053		2961		9092

Table 2: Descriptive Statistics

	Young SMEs					Old SMEs				
Variables	N	Mean	St. Desv.	Minimum	Maximum	N	Mean	St. Desv.	Mínimum	Maximum
$INV_{i,t}$	2961	0.05371	0.19182	-0.37222	1.43872	9092	0.04424	0.15889	-0.47821	1.32129
$SALES_{i,t}$	2961	14.4291	0.27013	10.4311	17.4101	9092	15.3499	0.29001	10.6988	17.6811
$CF_{i,t}$	2961	0.06111	0.15617	-1.7171	0.62717	9092	0.06414	0.16643	-1.2334	0.58919
$LEV_{i,t}$	2961	0.72361	0.20919	0.04865	0.99471	9092	0.65023	0.25991	0.00017	0.99829
$AGE_{i,t}$	2961	1.67492	0.31669	0	2.30258	9092	3.10792	0.52409	1.79175	5.09621
$GO_{i,t}$	2961	0.01744	0.05515	0	0.89612	9092	0.01726	0.05354	0	0.76818

	Macroeconomic Variables				
	N	Mean	St. Desv.	Minimum	Maximum
IR_t	7	3.08571	0.97518	2.1	4.9
GNP_t	7	11.9314	0.78981	11.9133	11.9540

Table 3: Correlation Matrix- Young SMEs

	$INV_{i,t}$	$INV_{i,t-1}$	$SALES_{i,t-1}$	$CF_{i,t}$	$LEV_{i,t-1}$	$AGE_{i,t-1}$	$GO_{i,t-1}$	IR_t	GNP_t
$INV_{i,t}$	1								
$INV_{i,t-1}$	0.421***	1							
$SALES_{i,t-1}$	0.025	0.012	1						
$CF_{i,t}$	0.478***	0.451***	0.119***	1					
$LEV_{i,t-1}$	-0.069**	-0.058**	0.055**	-0.293***	1				
$AGE_{i,t-1}$	0.341***	0.322***	0.281***	0.154***	0.156***	1			
$GO_{i,t-1}$	0.128***	0.096***	0.268***	0.178***	-0.204***	-0.114***	1		
IR_t	-0.491***	-0.464***	0.008	0.042*	-0.389***	0.054**	0.036*	1	
GNP_t	0.374***	0.340***	0.181***	0.061**	0.158***	0.023	0.256***	-0.123***	1

Notes: 1. *** Statistical significant at 1% level; ** Statistical Significant at 5% level; * Statistical significant at 10 % level.

Table 4: Correlation Matrix – Old SMEs

	$INV_{i,t}$	$INV_{i,t-1}$	$SALES_{i,t-1}$	$CF_{i,t}$	$LEV_{i,t-1}$	$AGE_{i,t-1}$	$GO_{i,t-1}$	IR_t	GNP_t
$INV_{i,t}$	1								
$INV_{i,t-1}$	0.115***	1							
$SALES_{i,t-1}$	0.211***	0.192***	1						
$CF_{i,t}$	0.389***	0.345***	0.041*	1					
$LEV_{i,t-1}$	-0.138***	-0.127***	-0.058**	-0.104***	1				
$AGE_{i,t-1}$	-0.243***	-0.218***	-0.004	0.051**	0.124***	1			
$GO_{i,t-1}$	0.014	-0.005	0.007	-0.124***	0.048**	0.012	1		
IR_t	-0.272***	-0.244***	0.012	0.222***	-0.301***	0.048**	0.098***	1	
GNP_t	0.250***	0.227***	0.129***	-0.043*	0.098***	0.033*	0.047**	-0.123***	1

Notes: 1. *** Statistical significant at 1% level; ** Statistical Significant at 5% level; * Statistical significant at 10 % level.

Table 5: Survival Analysis – Young SMEs

Dependent Variable: $\Pr(\delta_{i,t} = 1)$

Independent Variables	I	II	III	IV	V
$I_{i,t-1}$	0.0778***	0.0749***	0.0704***	0.0814***	0.0760***
	(0.0134)	(0.0156)	(0.0103)	(0.0186)	(0.0125)
$SALES_{i,t-1}$	0.1560***		0.1303***	0.1387***	0.1744***
	(0.0443)		(0.0297)	(0.0318)	(0.0391)
$CF_{i,t}$		0.4781***	0.4618***	0.4908***	0.4802***
		(0.1034)	(0.0945)	(0.1144)	(0.1233)
$LEV_{i,t-1}$				0.1761***	0.1892***
				(0.0389)	(0.0411)
$AGE_{i,t-1}$				0.1378***	0.1249***
				(0.0212)	(0.0254)
$GO_{i,t-1}$				0.9172***	0.9761***
				(0.1289)	(0.1441)
IR_t					-0.2288***
					(0.0643)
GNP_t					0.0282***
					(0.0064)
CONS	0.0416***	0.0501***	0.03212***	0.0144	0.0117
	(0.0121)	(0.0143)	(0.01021)	(0.0436)	(0.0344)
R^2	0.3611	0.3705	0.4277	0.4390	0.5224
Log Likelihood	-775.13	-776.90	-772.76	-785.62	-821.44
Firms	495	495	495	495	495
Observations	2961	2961	2961	2961	2961

Notes: 1. Standard deviations in parenthesis. 2. *** Statistical significant at 1% level. 3. The estimates include sectoral *dummy* variables, but not show. 4. The estimates include time *dummy* variables but not show.

Table 6: Survival Analysis – Old SMEs

Dependent Variable: $\Pr(\delta_{i,t} = 1)$

Independent Variables	I	II	III	IV	V
$I_{i,t-1}$	0.0241**	0.0289**	0.0213**	0.0341***	0.0387***
	(0.0119)	(0.0142)	(0.00104)	(0.0105)	(0.0123)
$SALES_{i,t-1}$	0.0205		0.0189	0.0239	0.0229
	(0.0768)		(0.0611)	(0.0745)	(0.0677)
$CF_{i,t}$		0.0891	0.1145*	0.0966	0.1009
		(0.0756)	(0.0589)	(0.1254)	(0.1298)
$LEV_{i,t-1}$				0.0891**	0.1166***
				(0.0422)	(0.0388)
$AGE_{i,t-1}$				0.0532***	0.0671***
				(0.0112)	(0.0120)
$GO_{i,t-1}$				0.20192	0.18918
				(0.30192)	(0.25461)
IR_t					-0.0804**
					(0.0378)
GNP_t					0.0161**
					(0.0078)
CONS	0.0611***	0.0534***	0.0655***	0.0145	0.0101
	(0.0178)	(0.0129)	(0.0134)	(0.0178)	(0.0165)
R^2	0.2634	0.2871	0.2568	0.3781	0.4891
Log Likelihood	-745.91	-732.80	-726.05	-774.90	-790.07
Firms	1350	1350	1350	1350	1350
Observations	9092	9092	9092	9092	9092

Notes: 1. Standard deviations in parenthesis. 2. *** Statistical significant at 1% level; ** Statistical significant at 5% level; * Statistical significant at 10% level. 3. The estimates include sectoral *dummy* variables, but not show. 4. The estimates include time *dummy* variables but not show.

Table 7: Survival Analysis – Young and Old SMEs – Chow Test

Independent Variables	I	II	II	III	V
$I_{i,t-1}$	15.65***	14.34***	15.01***	14.82***	13.99***
F(1,12053)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
$SALES_{i,t-1}$	24.89***		23.88***	24.08***	26.76***
F(1,12053)	(0.0000)		(0.0000)	(0.0000)	(0.0000)
$CF_{i,t}$		30.77***	29.91***	31.76***	31.14***
F(1,12053)		(0.0000)	(0.0000)	(0.0000)	(0.0000)
$LEV_{i,t-1}$				15.90***	14.04***
F(1,12053)				(0.0000)	(0.0000)
$AGE_{i,t-1}$				15.21***	13.11***
F(1,12053)				(0.0000)	(0.0000)
$GO_{i,t-1}$				24.54***	26.28***
F(1,12053)				(0.0000)	(0.0000)
IR_t					15.78***
F(1,12053)					(0.0000)
GNP_t					12.44***
F(1,12053)					(0.0000)
Global Difference					
F(2,12053)	23.89***	24.66***			
	(0.0000)	(0.0000)			
F(3,12053)			29.57***		
			(0.0000)		
F(6,12053)				31.54***	
				(0.0000)	
F(8,12053)					32.01***
					(0.0000)

Notes: 1. Probabilities in parenthesis. 2. *** Statistical significant at 1% level.

Table 8: Investment Determinants – Young SMEs

Independent Variables	I	II	III	IV	VII
	Dependent Variable: $I_{i,t}$				
$I_{i,t-1}$	0.2344***	0.2189***	0.1871***	0.2569***	0.2490***
	(0.0501)	(0.0614)	(0.0324)	(0.0632)	(0.0556)
$SALES_{i,t-1}$	0.0367		0.0322	0.0499	0.0412
	(0.1488)		(0.1857)	(0.2323)	(0.2514)
$CF_{i,t}$		1.6783***	1.5008***	1.6421***	1.5738***
		(0.3678)	(0.2490)	(0.3141)	(0.2682)
$LEV_{i,t-1}$				-0.0971***	-0.1177***
				(0.0266)	(0.0389)
$AGE_{i,t-1}$				0.0514***	0.0423**
				(0.0102)	(0.0206)
$GO_{i,t-1}$				0.50998***	0.54165***
				(0.0992)	(0.11928)
IR_t					-0.3344***
					(0.0876)
GNP_t					0.0443***
					(0.0089)
$\lambda_{i,t}$	-0.3144***	-0.2977***	-0.3399***	-0.3189***	-0.2751***
	(0.0845)	(0.0761)	(0.0965)	(0.0713)	(0.0678)
CONS	0.0488***	0.0267**	0.0344*	0.0089	0.0207
	(0.0134)	(0.0128)	(0.0163)	(0.0434)	(0.0861)
F(N(0,1))	68.33***	70.15***	71.05***	77.09***	87.31***
Hansen (χ^2)	107.10	105.67	113.22	115.30	120.044
$m_1(N(0,1))$	-5.23***	-4.90***	-6.35***	-6.05***	-5.58***
$m_2 N(0,1))$	0.13	0.23	0.41	0.10	0.29
Firms	459	459	459	459	459
Observations	2523	2523	2523	2523	2523

Notes: 1. Standard deviations in parenthesis. 2. *** Statistical significant at 1% level; ** Statistical significant at 5% level; * Statistical significant at 10% level. 3. The estimates include sectoral *dummy* variables, but not show. 4. The estimates include time *dummy* variables but not show.

Table 9: Investment Determinants – Old SMEs

Independent Variables	I	II	III	IV	V
	Dependent Variable: $I_{i,t}$				
$I_{i,t-1}$	0.0767*	0.0723**	0.0902***	0.1008***	0.1078***
	(0.0391)	(0.0352)	(0.0231)	(0.0276)	(0.0299)
$SALES_{i,t-1}$	0.1566***		0.1783***	0.1876***	0.1546***
	(0.0425)		(0.0542)	(0.0565)	(0.0460)
$CF_{i,t}$		1.0345***	1.0671***	1.0145***	1.0594***
		(0.2543)	(0.2150)	(0.2565)	(0.3173)
$LEV_{i,t-1}$				-0.0122	-0.0289
				(0.0459)	(0.0540)
$AGE_{i,t-1}$				-0.0377***	-0.0406***
				(0.0144)	(0.0107)
$GO_{i,t-1}$				0.0761	0.0871
				(0.1371)	(0.1562)
IR_t					-0.0752***
					(0.0278)
GNP_t					0.0216***
					(0.0048)
$\lambda_{i,t}$	-0.1844***	-0.1967***	-0.2293***	-0.2082***	-0.2190***
	(0.0478)	(0.0345)	(0.0463)	(0.05012)	(0.0517)
CONS	0.0444***	0.0219***	0.0145	0.0112	0.0081
	(0.0128)	(0.0055)	(0.0261)	(0.0560)	(0.0243)
F(N(0,1))	70.45***	68.99***	75.64***	73.10***	88.06***
Hansen (χ^2)	103.55	102.03	110.64	118.23	123.16
$m_1(N(0,1))$	-5.75***	-5.37***	-6.40***	-5.88***	-5.95***
$m_2 N(0,1))$	0.12	0.37	0.23	0.25	0.31
Firms	1188	1188	1188	1188	1188
Observations	7128	7128	7128	7128	7128

Notes: 1. Standard deviations in parenthesis. 2. *** Statistical significant at 1% level; ** Statistical significant at 5% level; * Statistical significant at 10% level. 3. The estimates include sectoral *dummy* variables, but not show. 4. The estimates include time *dummy* variables but not show.

Table 10: Investment Determinants – Young and Old SMEs – Chow Test

Independent Variables	I	II	III	IV	V
$I_{i,t-1}$	20.12***	19.23***	17.97***	19.45***	18.92***
F(1,9651)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
$SALES_{i,t-1}$	20.65***		22.44***	23.08***	20.36***
F(1,9651)	(0.0000)		(0.0000)	(0.0000)	(0.0000)
$CF_{i,t}$		13.18***	10.88***	12.81***	11.34***
F(1,9651)		(0.0000)	(0.0000)	(0.0000)	(0.0000)
$LEV_{i,t-1}$				18.02***	19.90***
F(1,9651)				(0.0000)	(0.0000)
$AGE_{i,t-1}$				32.90***	31.17***
F(1,9651)				(0.000)	(0.0000)
$GO_{i,t-1}$				21.23***	22.69***
F(1,9651)				(0.0000)	(0.0000)
IR_t					20.61***
F(1,9651)					(0.0000)
GNP_t					14.73***
F(1,9651)					(0.0000)
Global Difference					
F(2,9651)	21.01***	19.12***			
	(0.0000)	(0.0000)			
F(3,9651)			20.44***		
			(0.0000)		
F(6,9651)				30.90***	
				(0.0000)	
F(8,9651)					29.75***
					(0.0000)

Notes 1. Probabilities in parenthesis. 2. *** Statistical significant at 1% level.