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# **New Determinants of Growth in Small and Medium Sized Enterprises in Central and Eastern Europe: A Panel Data Analysis**

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## **ABSTRACT**

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The purpose of this paper is to explore the main determinants of growth in small and medium sized enterprises (SMEs) in Central and Eastern Europe. The empirical research has suggested that firm growth is determined not only by the traditional characteristics of size and age but also by other firm-specific factors such as indebtedness, internal financing, future growth opportunities, process and product innovation, and organisational changes. No empirical evidence has been provided so far on which of these determining factors are associated with SMEs growth and performance in transition economies. Using a panel dataset of 560 fast growing small and medium enterprises from six transition economies we find evidence that firm size and age can explain to a large extend the growth in SMEs in these countries. Firm-specific characteristics such as short-term liquidity, internally generated funds, and factor productivity are found to be important factors in determining a firm's growth and performance. Economy-wide factors such as inflation and corporate income tax rate (but not gross domestic product) seem to have a significant role in explaining SMEs' growth in transition economies.

**Keywords:** transition economy, small and medium enterprise, growth, panel data analysis

**JEL classification:** L25, L26, C23

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## **1. Introduction**

This paper explores the main determinants of growth in small and medium sized enterprises (SMEs) in Central and Eastern Europe. The important role of SMEs for the economic development of Central and Eastern European (CEE) countries has recently been attracting the attention of academics and policymakers. For example, some recent studies (see Markovics, 2005 and Lesáková, 2009) emphasize the role of innovation as a factor of increased competitiveness of small and medium enterprises in transition economies on the European market. For most CEE countries, SMEs represent a substantial part of their economy, are a major contributor to the growth of GDP through the creation of new businesses and jobs; this is why most countries' governments pay increased attention to small businesses and try to create an environment that will be beneficial for their development.<sup>1</sup>

According to the European Union definition<sup>2</sup>, small enterprises are those who have less than fifty employees and annual turnover less than 10,000,000 EUR. Medium enterprises are defined as ones having less than 250 employees and a turnover less than 50,000,000 EUR. By annual turnover the European Commission (EC) means income from sales and services without VAT and other indirect taxes. SMEs contribute significantly to the economic growth of both developed and developing countries and insight into how they prosper is worthy of investigation. Small and medium firms have been the primary source of employment creation worldwide over the last two decades.<sup>3</sup> At the same time access to financing continues to be one of the most significant challenges for the creation, survival and growth of SMEs. Thus, increased attention has been paid to the key factors determining SMEs' growth and success. While a significant amount of research has been done on the determinants of growth in large firms, much less is known in regard to SMEs, especially manufacturing SMEs, given that their growth and prosperity are potentially subjected to different constraints and contingencies related to their specificity as business organizations (Raymond et al., 2005). The specific characteristics that fundamentally distinguish SMEs from large enterprises relate

to their environment, structure, strategy and decision making process; but also relate to their flexibility, proximity to markets, and quickness to react and reorient themselves.

This paper investigates the impact of economy-wide factors (gross domestic product, inflation and tax rate) and firm specific characteristics (age, size, internal finance, capital structure, growth opportunities, liquidity, and factor productivity) on the growth of small and medium sized enterprises in transition economies. Using a panel data analysis for a set of 560 fast growing SMEs in Central and Eastern Europe, we find that firm growth is related not only to the traditional determinants of age and size but also to other specific characteristics associated with its financial structure and productivity. In particular, short-term liquidity, future growth opportunities, internally generated funds, and factor productivity are found to be important factors in determining a firm's growth and performance. Economy-wide variables such as inflation and corporate income tax rate also seem to be relevant determinants of SMEs growth.

The rest of the paper is organized as follows: the next section outlines our conceptual framework and summarises the findings of the research literature on the determinants of SME growth. The econometric model and the data panel analysis are presented in section 3. Here we also discuss the econometric results from the panel regressions. Some concluding remarks are offered in the final section.

## **2. Literature Review**

In the European Union, small and medium sized enterprises account for over 99 percent of all enterprises. Furthermore, 91 percent of these enterprises are micro-firms with less than 10 workers (OECD, 2009). Given their importance in all economies, SMEs' growth is essential for economic recovery and development.

Many different theories have attempted to identify the main factors underlying firm growth. They can be divided into two main schools: the first addresses the influence of firm size and age on

growth, while the second deals with the influence of variables such as strategy, organization and the characteristics of the firm's owners/managers. In fact, a huge number of studies have been devoted to examining the relationship between firm size and growth.<sup>4</sup> For example, Evans (1987) examines the effects of firm size and age on growth using data on manufacturing firms in the United States. Although several previous studies had supported Gibrat's law that hypothesizes that growth is independent of size, Evans (1987) find that growth decreases with firm size and age. However, the empirical literature has suggested that firm growth is determined not only by the traditional characteristics of size and age but also by other firm-specific characteristics. For example, Heshmati (2001) finds that the degree of indebtedness positively affects sales growth using data on Swedish micro and small firms, while Becchetti, & Trovato (2002) document the effect of external finance on firm growth in the Italian manufacturing industry, apart from the traditional determinates of age and size. Elston (2002) provides evidence that cash flow has an impact on the growth of firms listed in the Neuer Market of Germany, even when controlling for firm size and age. In a recent study Morone, & Testa (2008) investigate a sample of 2,600 Italian SMEs to find that, on average, young firms are more likely to experience positive growth; moreover, turnover growth is positively associated with firms' size, process innovation, product innovation and organisational changes. In contrast, marketing innovation does not considerably affect Italian SMEs growth.

In the conventional framework of firm growth analysis, financing of growth is investigated through the growth-size-profitability relationships. A considerable body of literature deals with this question, analysing the relationship between the growth and the financial structure of the firm. If all firms had complete access to capital markets, external funds would provide a perfect substitute for internal capital, which implies that a firm's financial structure is irrelevant to investment and growth. It is often argued, however, that firms face difficulties in financing from external sources due to asymmetric information problems in capital markets. In fact, a number of studies on capital market imperfections have examined the impact of financial constraints on investment decisions and firm

growth. For example, Fazzari et al. (1988) argue that financial constraints in capital markets affect investment, and emphasized that the link between financial constraints and investment varies by type of firm. Audretsch, & Elston (2002) assert that financial constraints may be more severe as firm size decreases.<sup>5</sup>

In a more recent study, Wagenvoort (2003) uses financial data for more than 200,000 European manufacturing and construction firms, and finds that European SMEs suffer from a structural finance problem that hinders their growth. In particular, it is observed that financial constraints tend to hamper the growth of small and very small firms and to be less severe for medium sized enterprises. Other empirical studies (see e.g., Becchetti, & Trovato, 2002; Carpenter, & Petersen, 2002) have confirmed that the constrained availability of finance affects small firm growth. Even though smaller firms seek to achieve minimum efficient scale, they are more likely to be unable to obtain sufficient capital from external sources in order to expand their businesses. In particular, under the present dismal economic conditions, internal finance may have a greater impact on the growth of SMEs.<sup>6</sup>

It is often argued that SMEs are, in contrast to large firms, informationally more opaque, have on average higher growth rates, are financially more constrained, and are more dependent on bank loans when outside financing is needed. For a bank, the limited information available about the SME increases the risk associated with providing financing, which induces the bank to reduce loan maturity and increase the interest rate. To optimize loan conditions, SMEs have an incentive to build a relationship with their bank(s) in order to minimize the information asymmetry. The association between bank debt maturity and relationship lending is widely investigated (see Ortiz-Molina, & Penas, 2004 for US firms, and Hernández-Cánovas, & Koëter-Kant, 2008 for EU firms). For example, Hernández-Cánovas, & Koëter-Kant (2008) find that, after controlling for firm-specific characteristics such as size, age, debt and financial situation, close firm-bank relationships increase the likelihood of obtaining longer-term bank loans. However, once they allow cross-country

heterogeneity to influence the results, the empirical evidence shows that bank relationship lending and its effect on bank loan maturity for European SMEs is impacted by country-specific factors.

The research on firm growth finds that high growth tends to be associated with a firm's entrepreneurial behavior. Thus, growth tends to be considered a logical consequence of innovative, pro-active and risk-taking behavior on the part of the firm, as these are the dimensions which define an entrepreneurial orientation (EO). The relationship between the EO of the firm and its performance has been thoroughly investigated from both a conceptual (Lumpkin, & Dess, 1996) and an empirical point of view (Lumpkin, & Dess, 2001; Wiklund, & Shepherd, 2005). A recent study by Wiklund et al. (2009) claims that entrepreneurial orientation of a company is essential for the flexibility and quick decision making of a small company. They believe that the general tendency in today's business environment is the shortening of product and business model life cycles. Consequently, the future profit streams from existing operations are uncertain and businesses need to constantly seek out new opportunities. Therefore, they may benefit from adopting an 'entrepreneurial strategic orientation'.

Moreno, & Casillas (2008) find that EO and growth are positively related, although their relationship is complex. They assert that the propensity for innovation is the dimension of EO that exercises the greatest influence on the type of expansion strategy used by the firm, encouraging the development of new products-technologies relationship through a strategic behavior; these strategic behaviors are the principal driving force behind growth. Along with them, the conditions of the environment (highly dynamic and not very hostile) and the availability of resources favor the rapid growth of the firm. Freel, & Robson (2004) employ a large sample of SMEs, located in Scotland and in Northern England, and find a positive relationship between novel product innovation and growth in employment and, for manufacturing firms, at least in the short term, a negative relationship between product innovation (both incremental and novel) and growth in sales or productivity. By

contrast, growing sales and productivity appear positively associated with incremental process introductions in service firms.

A large group of studies has focused on the main determinants of SMEs' capital structure and the extent to which variations in capital structure between industries are due to industry effects or variations in the determinants of capital structure from industry to industry (see Hall et al., 2000 for UK, and Sogorb-Mira, 2005 for Spain). Thornhill et al. (2004) find a strong correlation between capital structure and knowledge intensity. In contrast, growth histories are not obvious determinants of financial structure. Results also suggest that leverage strategies are more apparent in low-knowledge industries, in firms with higher expectations of future performance, and in businesses with more balanced financial structures.<sup>7</sup>

Some empirical studies associate growth in SMEs with the personal characteristics of their owners and the environment in which they operate.<sup>8</sup> For example, an early study of Miller (1988) focuses on the effect of the environment in which a company operates on the company's strategy. He affirms that different external environments require different strategies matched with complementary internal environments and structures in order to promote success. For example, the strategy of innovative differentiation is most likely to be pursued in uncertain environments and correlates with the use of technocrats and liaison devices. The strategy of cost leadership is associated with stable and predictable environments and is correlated with the use of control. The right choice of both strategy and environment in which to implement the strategy predetermines firm growth. A study by Reuber, & Fischer (1997) examines the effects of the management team's international experience on the international growth of an SME. They find that it is not for how long a firm has been selling in foreign markets, but rather, for how long the firm delayed before selling in foreign markets. SMEs that are managed by internationally experienced teams are likely to delay less. Experience with, and knowledge of foreign markets make it more likely that decision-makers will consider mechanisms to



sell outside the domestic market early on and less likely that they will set up routines based on a purely domestic perspective.

Two main conclusions for the choice of explanatory variables to be used in the empirical analysis emerge from the preceding discussion. Firstly, in order to better understand the determinants of SMEs' growth in transition economies, it is crucial to specify an empirical model that allows for a combination of traditional firm characteristics (such as size and age) and more specific determining factors (e.g., total assets, leverage, internally generated funds, future growth opportunities, and factor productivity). All of these variables are closely related to the theoretical models that explain growth in SMEs. Secondly, CEE countries are far from being homogeneous and both the level of development and growth of SMEs differ across transition economies. Hence, another key question relates the macroeconomic conditions in the CEE countries with firm growth, and searches for economy-wide factors (e.g., gross domestic product, interest rates, inflation, and tax rates) that may explain SMEs growth in these countries. In order to address these questions we develop a set of hypotheses and employ both the Generalized Method of Moments (GMM) and the fixed effects specifications to test them.

### **3. Empirical Analysis and Results**

This study aims to fill in the gap in the current debate on the determinants of growth in SMEs in Central and Eastern Europe. Our analysis is based on cross-sectional, panel data analysis of a set of small and medium-sized companies from six transition economies (Bulgaria, Croatia, Czech Republic, Poland, Romania and Serbia). In this paper we explore whether and to what extent the main finding of the research literature - that growth in SMEs can be explained by both traditional and specific firm characteristics – holds also for transition economies. To answer this question we develop the following research hypotheses:

*Hypothesis 1:* In line with previous research, we argue that the growth in manufacturing and service SMEs in transition economies is associated with the traditional firm characteristics of size and age.

*Hypothesis 2:* A number of other firm specific characteristics related to SMEs in transition economies such as liquidity, capital structure, internal finance and factor productivity should also play an important role in explaining the growth in these firms.

*Hypothesis 3:* Small and medium sized enterprises grow faster in an economy with greater growth opportunities. So, macroeconomic factors such as gross domestic product, inflation and corporate income tax rate will have a significant effect on SMEs growth in transition economies.

### **3.1 Data Set**

In this research we have adopted the European Commission's SME definition. The sample of SMEs considered in our study has been extracted from AMADEUS database<sup>9</sup> and includes 5,000 companies from six Central and Eastern European (CEE) countries<sup>10</sup>. Specifically, we have selected companies that meet the following criteria: (i) an annual growth rate in revenues (or assets) of at least 10 percent averaged over the sample period (2001 – 2005); (ii) number of employees not less than 10, that is, micro enterprises are excluded from the sample; (iii) at least 5 years of existence as a business entity, (iv) positive net worth and/or positive net income in at least 3 years of the observation period; and (v) not included in a bankruptcy process. The information obtained was carefully screened, refined and cases with errors in the accounting data or missing values for some of the variables in the model, were eliminated. Thus, the dataset has been restricted to the observations that embody all the essential variables available, and to those variables that have a complete record for the period of examination. As a result, the definitive number of firms that makes up our sample amounts to 560 for which we have full accounting data over the period 2001 – 2005, resulting in 2,800 observations balanced panel data.

Geographical distribution of sample firms by age, size and sector is shown in Table 1. The data shows that 11.3 percent of all firms in the sample are small enterprises and 88.8 per cent are medium enterprises. The largest share of small enterprises is observed in Croatia (39 out of 63) while medium sized firms prevail in the Czech Republic (337 out of 497). In regard to the age structure of our sample, we observe that nearly 15 percent of all SMEs are younger enterprises (with 5 to 10 years of existence), while 10.7 percent can be classified as older firms (with more than 20 years of existence). The average number of years of existence for the whole sample is 16. It is worth noting that the selected firms are representative of SMEs from different transition economies and their economic sectors. As the data in Table 1 show, manufacturing, wholesale and retail trade, and construction, prevail over other industries (40.5 percent, 21.6 percent and 9.6 percent, respectively), whereas companies from services sector such as financial intermediation and hotels and restaurants, account for less than 1 per cent of the whole sample of small and medium firms. If we refer to the geographical location of the selected firms that match the criteria listed above, the data in Table 1 show that 63.8 per cent of all firms are located in Czech Republic, followed by Croatia (26.6 percent) and Bulgaria (4.5 percent), and only 0.5 percent – in Serbia. Thus, a selection bias problem may exist in our panel data set.<sup>11</sup>

[Insert Table 1 Here]

## **Dependent Variable**

There is little agreement in the existing literature on how to measure growth, and scholars have used a variety of different measures. These measures include, for example, growth of sales, employees, assets, profit, equity, and others (see Davidsson, & Wiklund, 2000). Moreover, the time span, over which growth is analyzed in the literature, varies considerably, and ranges from one to several years. Also, growth has been measured in absolute or relative terms. Perhaps the most common means of operationalizing firm growth is through relatively objective and measurable characteristics – such as growth in sales revenues, total assets and employment. These measures are

relatively uncontroversial (methodologically) and data tend to be easily available, increasing the scope for cross-study comparability (Freel, & Robson, 2004). In this study we use three models to examine more accurately the effect of the explanatory variables on a firm's growth and performance – growth in sales revenues, employment and total assets.<sup>12</sup>

## **Explanatory Variables**

In this study we have selected several variables that the empirical literature (see Honjo, & Haranda, 2006; Wiboonchutikula, 2002; Wiklund et al., 2009; Sogorb-Mira, 2005; Hall et al., 2000 and 2006; Garcia-Teruel, & Martinez-Solano, 2008, Beck et al., 2005) suggests are important growth determinants. Table 2 shows summarized description of the dependant and explanatory variables used in the empirical analysis and their expected impact on firm growth.

In general, a positive and predictable macroeconomic environment will create greater growth opportunities for SMEs. Thus, we expect growth in real GDP per capita (RGDP\_G) used as proxy for the level of economic activity to be positively correlated with a firm's growth. Similarly, a significant inflation effect will be observed to reflect the fact that firm growth in sales and assets is measured in nominal terms. Thus, a positive correlation between this variable (INFL) and firm growth is expected. Many SMEs in transition economies report that the existing economy-wide financing and institutional obstacles such as high interest rates, limited access to export finance and long-term loans, high income tax rates, heavy bureaucracy and corruption, constrain their growth (Beck et al., 2005). To investigate whether some of these obstacles do affect the firm growth we use in our analysis the statutory tax rate as a proxy for tax burden on businesses in these countries. We expect a negative correlation between this variable (TAX\_RATE) and a firm's potential for growth.

As explained in Section 2, a number of firm-specific characteristics such as internal finance, capital structure, liquidity, production efficiency, future growth opportunities, age and size, may have a strong impact on the growth in small and medium sized enterprises. Our approach in this paper is to

relate firm growth not only with the traditional determinants of *age and size* but also to other determinants associated with a firm's financial, organizational and managerial characteristics. As already discussed, it is difficult for SMEs to access capital markets, and financial constraints are more binding for SMEs. Therefore, *internal finance* plays an important role in achieving the growth of SMEs by overcoming financial constraints. In order to capture the influence of internally generated capital on firm growth a variable (CASH FLOW) is constructed. According to hierarchy theory (Myers, & Majluf, 1984) firms prefer to fund themselves with resources generated internally before resorting to the market. In these circumstances, firms with large cash flows will grow faster, and thus a positive correlation between cash flow and firm growth is expected.

[Insert Table 2 Here]

In addition, capital structure is different among SMEs, and *leverage* may be related to firm growth. In fact, Leung, & Yu (1996) find that there is a negative relationship between growth and leverage. In our study the variable that proxies for a firm's capital structure (LEVERAGE) is taken as the ratio of total debt to total assets and the expected relation to growth is negative. Since small firms usually have a higher proportion of current liabilities in their capital structure compared to large firms, the firm capability to sustain short-term *liquidity* would be another relevant determinant of its growth. In order to capture this relation a variable (CUR\_RATIO) is constructed by taking the ratio of current assets to current liabilities. It might be expected that firms that are able to maintain higher liquidity levels will face less severe financing constraints. So, we expect current liquidity to be positively associated with growth.

Following Hall et al. (2006) a variable that captures the effect of future *growth opportunities* (INT\_ASSETS) is constructed by taking the ratio of intangible assets to total assets. Intangible assets include research and development expenditure, trademarks, patents and copyrights. As these are

investments with long-term payoffs one may expect that the greater the share of intangible assets in a firm's total assets, the smaller the growth in its operating revenues. So, the expected relation between these two variables should be negative. Two well known determinants – the absolute value of *total assets* (TOT\_ASSETS) and *number of employees* (EMPLOYE) – are included as *size* variables in order to test for scale effects in the relation to growth and firm performance. The empirical evidence shows that the larger the firm (in terms of assets or number of employees) the greater its potential to grow (Wiklund, & Shepherd, 2005). Thus, we expect the firm's size to be positively correlated with its performance. Following Wiboonchutikula (2002) we estimate growth in SMEs using different *productivity factors* as incremental explanatory variables - the capital productivity (output/capital) and the labor productivity (output/labor). These two variables (CAP\_PRODUCT and LAB\_PRODUCT) not only present the basic operational structure of a firm but also allow us to examine the association between the efficiency of a firm's operations and its growth potential. We expect that these two variables may have different effects on growth in small and medium sized firms<sup>13</sup>.

Businesses of different size and age may exhibit different organizational and environmental characteristics, which in turn may influence performance. The same is true for firms in different industries. Therefore, additional firm specific characteristics are included as explanatory variables in our analysis to capture these effects. A dummy variable (OWNER) is used as a proxy for the *ownership* (that is, publicly-traded vs. privately-held) in order to examine the effect of ownership on SME's performance. It is argued that publicly-traded firms can more easily access external funds than privately-held firms. Therefore, firm growth may be different between publicly-traded and privately-held firms. *Age* is defined as the number of years a firm has been operating in the market (since the date of incorporation) and is expected to have a negative relation with firm growth. Thus, we suggest that younger firms are likely to grow faster than older ones. Finally, in order to represent the *business environment* in which a firm operates – manufacturing or services sector in our case - a

dummy variable (SECTOR) that takes on value of 1 for firms from services sector or 0 otherwise is employed. We expect firms operating in services sector to have larger growth potential than those in the manufacturing sector.

The correlation matrix of dependent and explanatory variables is presented in Table 3 and is used to examine the possible degree of collinearity among variables. The table shows that the two most highly correlated variables are operating revenues and labor productivity (a coefficient of 0.7328). As we observe in Table 3, the correlation coefficients are not sufficiently large to cause collinearity problems in the regressions and are statistically significant at the usual levels of significance. To mitigate the problem with possible multicollinearity we gradually exclude the variables that are expected to be highly correlated with the rest (in this case, TOT\_ASSETS, LAB\_PROD and TAX\_RATE). Table 4 presents summary statistics for the whole sample of 560 firms. We see that the sample is made up of small and medium firms with average assets of €7.97 million and average sales revenues of €9.61 million. They exhibit low degree of leverage, with debt of 0.19 times their total assets. Short-term liquidity as proxied by the current ratio (a median of 1.41) is relatively high and shows that the average firm in our sample has no problem with meeting its current obligations. In addition, the firm operating efficiency as measured by capital productivity ratio, is relatively high (€1 invested in tangible assets generates €9.21 in sales revenues on average). Labor productivity in fast growing SMEs is also high (a median of 43.31). At the same time the future growth opportunities (as measured by the share of intangible assets in total assets) associated with these firms are relatively low (a median of 0.0011). The reason may be that small and medium firms invest fewer funds in R&D, patents and copyrights compared to large firms. The statistics for internally generated capital by the firms in our sample shows that €1 invested in total assets generates only €0.46 in free cash flow on average. The data in Table 4 provide evidence of a positive economic environment for most of the countries included in our sample (4.04 percent growth in GDP per capita and 2.68 per cent inflation, on average). The corporate income tax rate is relatively high in the

transition economies (a median of 28 percent) and still represents a significant burden on SMEs growth.

[Insert Table 3 Here]

[Insert Table 4 Here]

### 3.2 Econometric Model and Empirical Results

The structure of our dataset allows us to use a panel data methodology for our empirical research. This type of analysis can control firm heterogeneity, and reduce collinearity among the variables that are contemplated (Arellano, & Bover, 1990). Likewise, this technique enables us to eliminate the potential biases in the resulting estimates due to correlation between unobservable individual effects and the explanatory variables, included in the model. Our panel data model may be represented as follows:

$$\begin{aligned}
 Growth_{it} = & \alpha_0 + \beta_1(Tot\_Assets_{it}) + \beta_2(Lever_{it}) + \beta_3(Cur\_Ratio_{it}) + \beta_4(Inta\_Assets_{it}) \\
 & + \beta_5(Cap\_Prod_{it}) + \beta_6(Lab\_Prod_{it}) + \beta_7(CF\_Ratio_{it}) + \beta_8(Employe_{it}) \\
 & + \beta_9(Age_{it}) + \beta_{10}(Infl_t) + \beta_{11}(RGDP_t) + \beta_{12}(Tax\_Rate_t) \\
 & + \beta_{13}(Dummy_i) + \varepsilon_{it}
 \end{aligned}
 \tag{1}$$

where  $Growth_{it}$  is defined as the difference between the logarithms of firm  $i$ 's sales revenues in periods  $t$  and  $t-1$  (see Honjo, & Haranda, 2006). The other two measures of growth used in the regression model (1) are the percentage change in total assets and in number of employees. Variables  $Tot\_Assets_{it}$ ,  $CF\_Ratio_{it}$  and  $Employe_{it}$  represent firm  $i$ 's size, cash flow (normalized by total assets) and number of employees in period  $t$ , respectively. Variables  $Lever_{it}$ ,  $Cur\_Ratio_{it}$ ,  $Inta\_Assets_{it}$ ,  $Cap\_Prod_{it}$  and  $Lab\_Prod_{it}$ , represent capital structure, short-term liquidity, future growth opportunities, and capital and labor productivity of firm  $i$  in period  $t$ , respectively. Variable  $Age_{it}$  is



the logarithm of the number of years of existence of firm  $i$  in period  $t$ . The variables  $\text{Infl}_t$ ,  $\text{RGDP}_t$  and  $\text{Tax\_rate}_t$  represent inflation rate, growth in real gross domestic product and income tax rate, respectively, in period  $t$ . Variables for ownership and sector are proxied by dummy variables that take on a value of 1 if the stated condition holds or 0 otherwise.

We estimate the parameters in equation (1) using both the fixed effects estimator and Generalized Method of Moments (GMM), proposed by Arellano, & Bond (1991). To test the hypothesis regarding the absence of correlation between the unobservable country-specific effects and the explanatory variables, and thereby, to consider the individual effects as random or fixed, we use Hausman's (1978) specification test. Its outcome enables us to reject the hypothesis regarding the absence of correlation between the unobservable effects and the explanatory variables and, thereby, we consider the individual effects as fixed.

The results for GMM panel regressions are presented in Tables 5 and 6. We run the benchmark model (1) for several different specifications (see Table 5). As expected the time-lagged value of dependant variable ( $\text{OP\_REVEN}$ ) is negative and statistically significant for the most of the model specifications. The data in Table 5 show that leverage (as measured by that ratio of total debt to total assets) has no significant effect on a firm's growth in sales (the estimated coefficients of  $\text{LEVER}$  variable are positive and statistically insignificant for all model specifications). This result doesn't support the findings of some recent empirical studies that SMEs rely on internally generated funds for assets growth but need access to external capital to support their growth in sales (see Honjo, & Haranda, 2006). In relation to a firm's capability to generate internal capital Audretsch, & Elston (2002) find that small and medium sized firms appear to be more financially constrained using data on German firms, while Honjo, & Haranda (2006) find no such evidence using a sample

of Japanese firms.<sup>14</sup> In our study we find evidence for a strong and positive relation between a firm's cash flow and its sales growth (see Models 1 through 7).

Contrary to our expectations, short-term liquidity is found to have a negative impact on growth in sales revenues (all estimated coefficients except for Model 4 are statistically significant at 1 percent). Thus, we have to reject the hypothesis that firms with more growth opportunities will keep higher liquidity levels and thus will face less severe financing constraints. Both TOT\_ASSETS and EMPLOYE variables show strong explanatory power in all model specifications. The estimated results are consistent with those of the recent empirical studies (see e.g., Wiklund, & Shepherd, 2005) that find a positive relation between firm growth and size (as measured by its total assets or number of employees). As expected, both productivity factors (CAP\_PROD and LAB\_PROD) show strong explanatory power in all model specifications; the estimated coefficients are positive and statistically significant at 1 and 5 percent (see Models 1 through 7). We have to read this result with caution as LAB\_PROD variable is significantly correlated with both sales revenues and capital productivity (see Table 3).

The only two variables that seem to have no significant effect on firm growth are intangible assets as proxy for future growth opportunities, and age (see Models 1 through 4). When LAB\_PROD variable is excluded from our analysis for reasons explained above the estimated coefficients of AGE variable become marginally statistically significant at 10 per cent (see Models 5 through 7). The data in Table 5 show that both inflation (INFL) and income tax rate (TAX\_RATE) are statistically significant and with the expected signs, whereas RGDP\_G variable has no effect on firm growth. A significant inflation effect most likely reflects the fact that firm growth in sales is given in nominal terms. The negative effect of TAX\_RATE indicates that high levels of corporate income tax rate in many transition economies are perceived as a significant obstacle for SMEs growth. As RGDP\_G variable is not significant, the tax rate may be capturing other country specific characteristics. When

we drop the macroeconomic variables from model (1) the data in Table 5 show that most of the firm-specific variables are statistically significant at 1 percent and with the expected signs (see Model 7).

The two dummies used as proxies for ownership and the sector a firm operates drop from all the model specifications and appear to be statistically insignificant variables in fixed effects specifications. Thus, we cannot provide evidence in support of the hypothesis that growth in manufacturing and service SMEs in transition economies is strongly associated with firm-specific characteristics such as ownership and industry. The results of the Arellano-Bond and Sargan tests (shown at the bottom of the table) confirm that all models are well specified.

[Insert Table 5 Here]

[Insert Table 6 Here]

When total assets are used as dependant variable in our regression analysis we obtain similar results to those in Table 5.<sup>15</sup> Most of the firm-specific variables are statistically significant at 1 percent and have the expected signs. The relation between a firm's degree of leverage and its growth is weak (all estimated coefficients are marginally statistically significant at 10 percent and positive), which result is almost consistent with our hypothesis that SMEs in transition economies use predominantly internal capital to support their growth in assets. When we analyze the effect of short-term liquidity on firm growth, the results reported in Table 6 suggest that firms with better investment opportunities will choose to maintain lower liquidity in order to support their current growth. The data in Table 6 support the finding that a firm's capability to generate capital internally (as measured by its cash flow ratio) plays an important role in explaining the growth in its assets, especially in younger firms, because asymmetric information problems are more

severe in this type of firms. If this is true, more internal funds and support are required for the growth of younger firms.

As expected LAB\_PROD variable shows a positive, statistically significant effect on growth (see Model 3); at the same time CAP\_PROD variable is negatively related to a firm's growth. When labor productivity variable is excluded from our analysis, the effect of capital productivity (output/capital) becomes statistically insignificant (see Models 5 through 8). The data in Table 6 show that both INTA\_ASSETS and EMPLOYE variables have no significant effect on a firm's growth in assets (see Models 1 through 5). In line with previous research AGE variable is found to have a strong, negative impact on firm growth, which supports our first hypothesis that growth in SMEs in transition economies is strongly associated with the traditional firm characteristics of size and age. As expected, macroeconomic variables (except RGDP\_G) have a significant effect on firm growth. The time-lagged value of dependant variable (TOT\_ASSETS) is negative and statistically significant for all model specifications. The results of the Arellano-Bond and Sargan tests (shown at the bottom of the table) confirm that all models are well specified.

To account for unobservable country-specific effects in our model we run also fixed and random effects specifications (not presented here). The random effects specification allow us to estimate the impact of time-invariant variables on growth and actually provide more efficient estimates if the country-specific effects are not correlated with the other explanatory variables. The Hausman test shows that we have to reject the random effects specifications ( $p$ -value is less than 0.05). Thereby, we consider the individual effects as fixed. In order to check the model variables for stationary we use Fisher test for panel unit root based on an augmented Dickey-Fuller test. The goal is to show that the variables in the model we use are time invariant, i.e. there is no dependence of their values on the time trend. The  $p$ -values of the Fisher tests show that all the variables are independent of time and we can conclude that the panel data is stationary.

#### 4. Conclusion

This paper investigates the impact of economy-wide factors (gross domestic product, inflation, and tax rate) and firm-specific characteristics (age, size, internal finance, capital structure, future growth opportunities, liquidity, and factor productivity) on the growth of small and medium sized enterprises. Using a panel data analysis for a set of 560 fast growing SMEs in Central and Eastern Europe, we find that firm growth is related not only to the traditional determinants of age and size but also to other specific characteristics associated with its financial structure and productivity. One may argue that small and medium sized enterprises grow faster in an economy with better growth opportunities. Although this is true in general, we don't find evidence for a strong correlation between growth in GDP per capita and firm growth. Maybe its effect is captured by other macroeconomic variables such as inflation and tax rate, which show strong explanatory power in our analysis. The negative effect of tax rate indicates that the existing high levels of corporate income tax rate in many transition economies are still an important obstacle for SMEs growth. In line with previous research, we find that firm size as measured by its total assets tend to increase sales revenues. At the same time, the growth in the number of employees in these firms has a marginal impact on their growth in assets. Further, we find that future growth opportunities have no impact on growth of small and medium sized firms; this result can be explained by the fact that SMEs invest in R&D and other intangible assets but their impact on current growth is negligible as these are investments with no immediate but long-term payoffs.

Another important finding is that SMEs in transition economies rely heavily on internally generated funds to support their growth in sales and, at least, to some extent, on external capital (e.g., bank loans) to support their assets growth. Thus, we may conclude that firms with large cash flows will grow faster. Contrary to our expectations, short-term liquidity is found to have a negative impact on growth in both sales revenues and assets. This finding suggests that firms with better investment

opportunities will choose to maintain lower liquidity in order to support their current growth. The empirical results show that both capital and labor productivity are strongly related to SMEs' growth (both in sales and assets). This means that improved factor productivity will generate larger growth in these firms. In line with previous empirical studies, age is found to be a relevant determinant of firm growth; thus we provide further evidence that younger firms are more likely to grow faster than older ones. Type of ownership (that is, whether a firm is publicly- or privately-held) and the sector a firm operates (in our case, manufacturing or services), are both found to have no significant impact on firm growth.

Our results are relevant for policy makers and firm managers of SMEs in transition economies. The evidence shows that small and medium firms in these countries still rely on internally generated funds to support their growth and find it very difficult to obtain external finance. Thus, the governments in transition economies need to pay an increased attention to the small and medium enterprises and try to create an environment that will be beneficial for SMEs development. Further, a better understanding of how firm-specific characteristics impact local firms' growth can help managers engage in more efficient investment decisions related to their capital structure in order to lower the cost of capital. Increasing capital and labor productivity and investing more funds in research and development (or making a more efficient use of them) will help SMEs in transition economies improve their competitiveness on the EU market and thus, enhance their growth potential.

Unfortunately, the research does have some limitations. The most notable one is related to the lack of complete data for some proxy variables (e.g., short- and long-term debt) or variables that provide information for the educational background and international experience of SME managers. These variables are not included in the analysis. In addition, the empirical results are derived from a sample of transition economies, which includes a limited number of countries from Central and Eastern Europe. The analysis will benefit if more SMEs with full data record from different CEE countries are included in the sample as macroeconomic factors and firm characteristics vary from country to

country. This will also require using a control group (e.g., slower growing or no growing firms) to compare with faster growing firms. Finally, the role of public policy and different legal and institutional obstacles in explaining SMEs growth in transition economies needs to be further explored. This would be a step further in our research.

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**Table 1:** Geographical distribution of sample firms by size, age and sector

	<b>Bulgaria</b>	<b>Croatia</b>	<b>Czech Republic</b>	<b>Poland</b>	<b>Romania</b>	<b>Serbia</b>	<b>Total</b>
<i><b>Size</b></i>							
Micro (< 10 employees)	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Small (< 50 employees)	3	39	20	1	0	0	63
Medium (< 250 employees)	22	110	337	19	6	3	497
<b>Total:</b>	<b>25</b>	<b>149</b>	<b>357</b>	<b>20</b>	<b>6</b>	<b>3</b>	<b>560</b>
<i><b>Age</b></i>							
< 5 years	n/a	n/a	n/a	n/a	n/a	n/a	n/a
5 -10 years	7	30	45	0	2	0	84
10 - 20 years	13	92	297	8	4	2	416
> 20 years	5	27	15	12	0	1	60
<b>Total:</b>	<b>25</b>	<b>149</b>	<b>357</b>	<b>20</b>	<b>6</b>	<b>3</b>	<b>560</b>
<i><b>Sector</b></i>							
Agriculture, Fishing& Mining	0	1	43	0	1	0	45
Construction	2	26	24	1	0	1	54
Financial Intermediation	0	0	2	0	0	0	2
Hotels and Restaurants	0	4	1	0	1	0	6
Manufacturing	8	26	180	7	4	2	227
Public Administration, Education, Health and Social Work	0	1	6	0	0	0	7
Real Estate, Renting and Business Activities	3	11	17	10	0	0	41
Transport, Storage and Communication	2	8	13	0	0	0	23
Utilities	0	4	14	1	0	0	19
Wholesale and Retail Trade	7	65	48	1	0	0	121
Other	3	3	9	0	0	0	15
<b>Total:</b>	<b>25</b>	<b>149</b>	<b>357</b>	<b>20</b>	<b>6</b>	<b>3</b>	<b>560</b>

Source: AMADEUS database (2008). Authors calculations.

**Table 2:** Dependent and explanatory variables

Variable	Definition	Explanation	Expected Sign
<b>Dependant Variables</b>			
OP_REVEN	Change in Operating Revenues, proxy for growth (in Euro, thousands)	Difference between the logarithms of firm's revenues in periods $t$ and $t - 1$	
TOT_ASSETS	Change in Total Assets, proxy for growth (in Euro, thousands)	Difference between the logarithms of firm's total assets in periods $t$ and $t - 1$	
<b>Explanatory variables</b>			
<i>Macroeconomic variables</i>			
RGDP_G	Real GDP per capita, proxy for the level of economic activity (in percent)	Growth rate of real GDP per capita in period $t$	+
INFL	Inflation, proxy for the level of future real activity (in percent)	Log difference of the consumer price index in period $t$	+
TAX_RATE	Statutory tax rate, proxy for tax burden on business (in per cent)	Statutory corporate income tax rate in period $t$	-
<i>Firm-specific variables</i>			
TOT_ASSETS	Total Assets, proxy for firm size (in Euro, thousands)	Difference between the logarithms of firm's total assets in periods $t$ and $t - 1$	+
INTA_ASSETS	Intangible Assets/Total Assets, proxy for future growth opportunities	Difference between the ratio of intangible assets to total assets in periods $t$ and $t - 1$	-
CUR_RATIO	Current Ratio, proxy for short-term liquidity	Difference between the ratio of current assets to current liabilities in periods $t$ and $t - 1$	+
LEVER	Total Debt/Total Asset, proxy for a firm's degree of leverage	Difference between the ratio of total debt to total assets in periods $t$ and $t - 1$	-/+
CAP_PROD	Operating Revenues/Tangible Assets, proxy for capital productivity	Difference between the ratio of operating revenues to tangible assets in periods $t$ and $t - 1$	+/-
LAB_PROD	Operating Revenues/Number of Employees, proxy for labor productivity	Difference between the ratio of operating revenues to number of employees in periods $t$ and $t - 1$	+
CF_RATIO	(Pre-tax income + Depreciation)/Total Assets, proxy for internally generated capital	Difference between the firm's cash flow in periods $t$ and $t - 1$	+
EMPLOYEE	Number of employees, proxy for firm size	Difference between the logarithms of firm's size in periods $t$ and $t - 1$	+
AGE	Number of years of existence	Logarithm of firm's age (number of years of existence) in period $t$	-
OWNER	The type of the ownership of a firm – publicly-traded vs. privately-held	A dummy variable that takes on value of 1 for firms which are public entities or 0 otherwise.	+
SECTOR	The type of sector a firm operates in (manufacturing or services)	A dummy variable that takes on value of 1 for firms from services sector or 0 otherwise.	-

**Table 3:** Correlation matrix of the model variables<sup>1,2</sup>

	OP_REVEN	TOT_ASSETS	LEVER	CUR_RATIO	INTA_ASSETS	CAP_PROD	LAB_PROD	CF_RATIO	EMPLOYE	AGE	INFL	RGDP_G	TAX_RATE
OP_REVEN	1.0000												
TOT_ASSETS	0.5485*	1.0000											
LEVER	0.1256*	-0.1406*	1.0000										
CUR_RATIO	-0.0291	-0.0202	-0.0861*	1.0000									
INTA_ASSETS	-0.1365*	-0.1187*	-0.0831*	-0.0850*	1.0000								
CAP_PROD	0.2670*	0.0255	0.2134*	-0.0273	-0.0491**	1.0000							
LAB_PROD	0.7328*	0.4307*	0.1687*	-0.0367***	-0.0998*	0.3179*	1.0000						
CF_RATIO	-0.0729*	-0.0809*	0.1118*	-0.1029*	0.0668*	-0.0305	-0.0529*	1.0000					
EMPLOYEE	-0.0379*	0.0301	-0.2369*	0.0586*	-0.0010	-0.2038*	-0.3704*	-0.1103*	1.0000				
AGE	-0.0172	0.1714*	0.0104	-0.0046	-0.0377***	-0.0349***	-0.0438**	-0.0582*	0.1407*	1.0000			
INFL	-0.1174*	-0.0866*	0.0128	-0.1608*	0.2897**	-0.0434**	-0.0733*	0.0952*	0.0316***	0.0173	1.0000		
RGDP_G	0.1788*	0.0838*	0.1340*	0.1234*	-0.1918*	0.0725*	0.1438*	-0.1002*	0.0181	0.1142*	0.0787*	1.0000	
TAX_RATE	-0.1419*	-0.1257*	-0.3409*	0.0371**	0.1328*	-0.0933*	-0.1930*	0.0577*	0.1937*	-0.2841*	-0.2485*	-0.5725*	1.0000

\* indicates that correlation is significant at the 10 percent level

\*\* indicates that correlation is significant at the 5 percent level

\*\*\* indicates that correlation is significant at the 1 percent level

Notes:

- 1) The explanatory variables included in the model are: Total assets (TOT\_ASSETS), Leverage (LEVER), Current ratio (CUR\_RATIO), Growth opportunities (INTA\_ASSETS), Capital productivity (CAP\_PROD), Labor productivity (LAB\_PROD), Cash flow (CF\_RATIO), Number of employees (EMPLOYEE), Age (AGE), Growth in real GDP per capita (RGDP\_G), Inflation (INFL) and Tax rate (TAX)RATE). Dummy variables for ownerships and sector are not included in the correlation matrix.
- 2) All variables are taken as ratios or in percent, except Total Assets and Operating Revenues (in Euros, thousands), and Number of employees.

**Table 4:** Summary statistics (total sample)<sup>1</sup>

Variable	Obs.	Mean	Median	St. Dev.	Minimum	Maximum
OP_REVEN	2800	9,614.92	6,159.0	15,474.61	0	295,404
TOT_ASSETS	2800	7,969.02	4,716.5	11,310.25	32	133,779
LEVER	2800	0.1921	0.1509	0.1754	0	0.9635
CUR_RATIO	2800	1.8109	1.4076	1.5104	0	10.0
INTA_ASSETS	2656	0.0344	0.0011	0.1215	0	.9740
CAP_PROD	2651	9.21	3.4336	27.34	0	489.93
LAB_PROD	2800	121.88	43.312	265.11	0	6,713.73
CF_RATIO	2653	0.4632	0.1264	2.77	-0.315	106.01
EMPLOYE	2800	126.09	150	58.62	10	250
AGE	2800	13.82	11.0	11.20	1.8	99.1
RGDP_G	2800	4.04	4.2	1.44	1.2	9.3
INFL	2800	2.68	2.4	2.88	-0.1	41
TAXRATE	2800	26.29	28	4.72	10	31

Notes:

- 1) The explanatory variables included in the model are: Total assets (TOT\_ASSETS), Leverage (LEVER), Current ratio (CUR\_RATIO), Growth opportunities (INTA\_ASSETS), Capital productivity (CAP\_PROD), Labor productivity (LAB\_PROD), Cash flow (CF\_RATIO), Number of employees (EMPLOYE), Age (AGE), Growth in real GDP per capita (RGDP\_G), Inflation (INFL) and Tax rate (TAX\_RATE). Dummy variables for ownerships and sector are not included in the summary statistics.

**Table 5:** Operating revenues GMM panel regressions (2001 – 2005), Total Sample<sup>1, 2, 3, 4, 5, 6</sup>

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
OP_REVEN (lagged)	-0.016*** (0.004)	-0.009 (0.120)	-0.010* (0.086)	-0.017*** (0.008)	-0.011 (0.140)	-0.011 (0.134)	-0.011* (0.100)
TOT_ASSETS	0.283*** (0.000)	0.270*** (0.000)		0.430*** (0.000)			
LEVER	0.025 (0.681)	0.014 (0.818)	-0.034 (0.591)	0.008 (0.909)	-0.027 (0.717)		
CUR_RATIO	-0.012* (0.067)	-0.013** (0.056)	-0.022*** (0.001)	-0.008 (0.319)	-0.023*** (0.004)	-0.023*** (0.005)	-0.023*** (0.005)
INTA_ASSETS	0.352 (0.250)	0.405 (0.185)	0.422 (0.178)	0.447 (0.210)	0.543 (0.145)	0.542 (0.146)	
CAP_PROD	0.001** (0.014)	0.001** (0.021)	0.001* (0.078)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)
LAB_PROD	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)				
CF_RATIO	0.903*** (0.000)	0.881*** (0.000)	0.828*** (0.000)	1.142*** (0.000)	1.067*** (0.000)	1.070*** (0.000)	1.052*** (0.000)
EMPLOYE	0.405*** (0.000)	0.381*** (0.000)	0.397*** (0.000)	0.189*** (0.000)	0.162*** (0.000)	0.162*** (0.000)	0.161*** (0.000)
AGE	-0.022 (0.116)	-0.013 (0.326)	-0.021 (0.140)	-0.001 (0.957)	-0.028* (0.101)	-0.029* (0.091)	-0.032* (0.058)
INFL		0.022*** (0.007)	0.028*** (0.001)		0.033*** (0.001)	0.033*** (0.001)	0.032*** (0.001)
RGDP_G	0.003 (0.762)						
TAX_RATE	-0.012* (0.058)	-0.006 (0.273)	-0.010* (0.080)		0.001* (0.099)	-0.011* (0.100)	-0.012* (0.074)
SECTOR	(dropped)						
OWNER	(dropped)						
Number of observations	1011	1011	1011	1011	1011	1011	1014
Arellano-Bond test – Prob > z		0.0439	0.0348	0.0673	0.0783	0.0758	0.075



Sargan test - Prob > $\chi^2$		0.6483	0.5171	0.5479	0.5588	0.5813	0.5296
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Notes:

- 1) Model 1 - all variables; Model 2 – excluding RGDP\_G variable; Model 3 – excluding TOT\_ASSETS and RGDP\_G variables; Model 4 – excluding LAB\_PROD and RGDP\_G variables; Model 5 – excluding TOT\_ASSETS, LAB\_PROD and RGDP\_G variables; Model 6 – excluding TOT\_ASSETS, LEVER, LAB\_PROD, INFL, and RGDP\_G variables; and Model 7 – excluding TOT\_ASSETS, LEVER, INTA\_ASSETS, LAB\_PROD, INFL, RGDP\_G, and TAX\_RATE variables.
- 2) All variables except dummies and ratios are in logs.
- 3) \*, \*\*, and \*\*\* represent significance at 10, 5, and 1 percent, respectively. All regressions include source country dummies to control for source country effects.
- 4) *P*-values in brackets.
- 5) For Arellano-Bond test Ho is: no autocorrelation. Rejecting the null hypothesis (p-value <0.05) of no serial correlation at order one in the first-differenced errors does not imply that the model is misspecified. Rejecting the null hypothesis at higher orders implies that the moment conditions are not valid.
- 6) For Sargan test Ho is: overidentifying restrictions are valid. If p-value >0.05, we confirm the null hypothesis that the overidentifying restrictions are valid. Rejecting the null hypothesis implies that we need to reconsider our model or our instruments.

**Table 6:** Total assets GMM panel regressions (2001 – 2005), Total Sample<sup>1, 2, 3, 4, 5, 6</sup>

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
TOT_ASSETS (lagged)	-0.047*** (0.000)	-0.039*** (0.000)	-0.036*** (0.000)	-0.038*** (0.000)	-0.035*** (0.001)	-0.035*** (0.001)	-0.035*** (0.001)	-0.033*** (0.001)
OP_REVEN	0.186*** (0.000)	0.179*** (0.000)		0.222*** (0.000)				
LEVER	0.073 (0.131)	0.065 (0.173)	0.080* (0.104)	0.075 (0.120)	0.083* (0.096)	0.082* (0.101)	0.083* (0.098)	0.078* (0.101)
CUR_RATIO	-0.031*** (0.000)	-0.031*** (0.000)	-0.035*** (0.000)	-0.029*** (0.000)	-0.036*** (0.000)	-0.036*** (0.000)	-0.036*** (0.000)	-0.036*** (0.000)
INTA_ASSETS	-0.032 (0.901)	-0.016 (0.951)	0.056 (0.835)	-0.066 (0.802)	0.083 (0.762)	0.080 (0.770)		
CAP_PROD	-0.001*** (0.004)	-0.001*** (0.005)	-0.001*** (0.021)	-0.001*** (0.006)	-0.001 (0.410)	-0.001 (0.396)	-0.001 (0.416)	
LAB_PROD	0.001 (0.152)	0.001 (0.128)	0.001*** (0.000)					
CF_RATIO	0.325*** (0.000)	0.334*** (0.000)	0.194*** (0.006)	0.346*** (0.000)	0.129* (0.069)	0.128* (0.071)	0.134* (0.058)	0.139*** (0.049)
EMPLOYE	-0.016 (0.591)	-0.029 (0.331)	0.045 (0.118)	-0.030 (0.235)	-0.015 (0.569)			
AGE	-0.043*** (0.000)	-0.038*** (0.001)	-0.039*** (0.001)	0.004 (0.571)	-0.040*** (0.001)	-0.039*** (0.001)	0.043*** (0.000)	-0.042*** (0.000)
INFL		0.012*** (0.044)	0.018*** (0.004)		0.020*** (0.002)	0.019*** (0.003)	0.019*** (0.002)	0.019*** (0.002)
RGDP_G	0.002 (0.815)							
TAX_RATE	-0.021*** (0.000)	-0.016*** (0.001)	-0.018*** (0.000)		-0.019*** (0.000)	-0.019*** (0.000)	-0.020*** (0.000)	-0.020*** (0.000)
SECTOR	(dropped)							
OWNER	(dropped)							
Number of observations	1097	1097	1097	1097	1097	1097	1011	1011
Arellano-Bond test – Prob > z		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Sargan test - Prob > $\chi^2$		0.0378	0.0725	0.0567	0.0820	0.0980	0.1042	0.1145

Notes:

- 1) Model 1 - all variables; Model 2 – excluding RGDP\_G variable; Model 3 – excluding OP\_REVEN and RGDP\_G variables; Model 4 – excluding LAB\_PROD and RGDP\_G variables; Model 5 – excluding OP\_REVEN, LAB\_PROD and RGDP\_G variables; Model 6 – excluding OP\_REVEN, LAB\_PROD, EMPLOYE, and RGDP\_G variables; Model 7 – excluding OP\_REVEN, INTA\_ASSETS, LAB\_PROD, EMPLOYE, INFL, and RGDP\_G variables; and Model 8 – excluding OP\_REVEN, INTA\_ASSETS, CAP\_PROD, LAB\_PROD, EMPLOYE, INFL, RGDP\_G, and TAX\_RATE variables.
- 2) All variables except dummies and ratios are in logs.
- 3) \*, \*\*, and \*\*\* represent significance at 10, 5, and 1 percent, respectively. All regressions include source country dummies to control for source country effects.
- 4) *P*-values in brackets.
- 5) For Arellano-Bond test  $H_0$  is: no autocorrelation. Rejecting the null hypothesis (p-value  $<0.05$ ) of no serial correlation at order one in the first-differenced errors does not imply that the model is misspecified. Rejecting the null hypothesis at higher orders implies that the moment conditions are not valid.
- 6) For Sargan test  $H_0$  is: overidentifying restrictions are valid. If p-value  $>0.05$ , we confirm the null hypothesis that the overidentifying restrictions are valid. Rejecting the null hypothesis implies that we need to reconsider our model or our instruments.

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<sup>1</sup> Many small and medium sized enterprises (SMEs) presently evolve in a complex business environment, characterized by globalization, the internationalization of markets, and the need for greater efficiency, effectiveness and competitiveness based on innovation and knowledge. This has put increasing pressure upon the management of these firms, especially manufacturing SMEs that must now compete globally (Cagliano, & Spina, 2002).

<sup>2</sup> EU Commission Recommendation published in 2003 (OJ L 124 – 25 May 2003).

<sup>3</sup> According to data collected by Ayyagari et al. (2007) for 76 developed and developing countries, SMEs, on average, account for over 60% of manufacturing employment.

<sup>4</sup> Firms with growth ambitions require capital to fuel their growth. Regardless of size or age, access to capital is a matter of paramount importance. According to Timmons (1994) small, young firms tend to draw capital from internal sources, personal sources, and informal investment. As firms grow, they face additional capital requirements and must turn to external sources such as banks and public debt and equity markets. This is consistent with Myers, & Majluf's (1984) assertion that SMEs have a 'pecking order' of preferred capital sources in which retained earnings will be the first source accessed, followed by bank debt, private external equity and then public debt or equity.

<sup>5</sup> Beck et al. (2005) investigate a rich set of obstacles reported by small, medium and large firms and directly test whether any of these reported obstacles are significantly correlated with firm growth rates. The results indicate that the extent to which financial and legal underdevelopment and corruption constrain a firm's growth depends very much on the firm's size. It is the smallest firms that are consistently the most adversely affected by all obstacles. Financial and institutional development weakens the constraining effects of financial, legal, and corruption obstacles and it is again the small firms that benefit the most.

<sup>6</sup> The empirical research dealing with SME growth and its financing finds that growth processes are significantly affected by the availability of a cash flow to finance them. As Sarno (2008) shows in his study on Southern Italian SMEs, the reasons for the considerable sensitivity of growth to cash flow lie not only in the conditions of particular opacity in the firm's relationship with financial markets but also in property dilution effects which discourage the financing through the issue of equity.

<sup>7</sup> Garcia-Teruel, & Martinez-Solano (2008) find that firms usually pursue a target level for their cash holdings and their decisions are taken with the aim of achieving this. In addition, the evidence shows that the speed with which Spanish SMEs attempt to adjust their cash levels to the optimal level is higher than that found in previous studies for large firms. This can be explained by the fact that SMEs suffer more information asymmetries and more agency conflicts arising from debt than larger companies, and therefore may indicate that the cost of being far from the optimal level is higher for them.

<sup>8</sup> To address this issue, Pelham, & Wilson (1996), among others, suggest that it may be advantageous to describe the environment of small businesses by a number of dimensions reflecting subjective perceptions of small business owners. These dimensions of the small firm's task environment have been investigated including the environment's munificence, turbulence, heterogeneity, hostility, dynamics, customer structure, and competition.

<sup>9</sup> For more details see <http://www.bvdep.com/en/AMADEUS.html>. The AMADEUS database allows us to choose among a huge variety of public and private companies in 43 European countries. For the scope of our research we selected only small and medium sized companies.

<sup>10</sup> The original number of CEE countries included in the sample was 13: Bosnia and Herzegovina (BA), Bulgaria (BG), Croatia (HR), Czech Republic (CZ), Hungary (HU), Macedonia (FYROM) (MK), Montenegro (ME), Poland (PL), Romania (RO), Serbia (RS), Slovakia (SK), Slovenia (SI), and Ukraine (UA). In order to obtain non-spurious regression results we applied some filters to the data to remove companies with missing observations or lack of full data record; thus our sample was limited to companies from only six CEE countries.

<sup>11</sup> To address this problem we run all model specifications both for the entire sample and excluding the six countries one by one from our dataset. In either case we got very similar results; the magnitude of some of the estimated coefficients changes but not their signs.

<sup>12</sup> Storey (1994) posits three overlapping subsets of variables which he concludes to show 'consistent' evidence of an influence upon firm growth – broadly, characteristics of the entrepreneur, of the firm and of the firm's strategy. Unfortunately, the database used in our study provides no data on characteristics of the entrepreneur. As a result, the influence of factors such as educational background or entrepreneurial experience cannot be controlled for. In addition, certain 'characteristics of the firm', such as legal status are also beyond the scope of the data available.

<sup>13</sup> Wiboonchutikula (2002) finds that in a majority of industries, small firms in Thailand had the lowest capital intensity, lowest wage rate, lowest labor productivity, and highest capital productivity. Large firms had the opposite characteristics. However, although medium-sized firms had higher capital intensity, wage rate, and

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labor productivity, but lower capital productivity than small-sized firms, the differences were smaller than the differences between the medium-sized firms and the large firms.

<sup>14</sup> Whereas it is not found that cash flow is significantly related to firm growth in their model, Honjo, & Haranda (2006) argue that internal finance has less influence on firm growth, particularly of older SMEs that have already passed the early stages after establishment. Rather, internal finance may have more influence on the growth of younger SMEs.

<sup>15</sup> We run the same model specifications using growth in number of employees as dependant variable but the panel regressions yield unsatisfactory results – most of the variables in model (1) show no explanatory power in this case. Thus, we are unable to support or reject the findings of previous empirical studies that traditional firm characteristics may well explain firm growth when size is proxied by the number of firm employees.