International Journal of Research in Business Studies and Management
Volume 5, Issue 10, 2018, PP 30-47
ISSN 2394-5923 (Print) & ISSN 2394-5931 (Online)

An Econometric Model for Small and Medium Sized Enterprises Growth in India

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ABSTRACT

The purpose of this paper is to explore the main determinants of growth in small and medium sized enterprises (SMEs) in India. 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 India. Using a panel dataset of 560 fast growing small and medium enterprises from India we find evidence that firm size and age can explain to a large extend the growth in SMEs in India. Firm specific characteristics such as 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 factors such as inflation and corporate income tax rate (but not gross domestic product) seem to have a significant effect on SMEs growth in India

Keywords: *Small and Medium Enterprise, Growth, Panel Data Analysis.*

INTRODUCTION

This paper explores the main determinants of growth in small and medium sized enterprises (SMEs) in India. The important role of SMEs for the economic development of India 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 India. For India, 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 Indian governments pay increased attention to small businesses and try to create an environment that will be beneficial for their development.

According to the Indian definition, small enterprises are those who have less than fifty employees and annual turnover less than 10,000,000 Rupees. Medium enterprises are defined as ones having less than 250 employees and a turnover less than 50,000,000 Rupees. By annual turnover the Indian Commission (IC) 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. 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 India. Using a panel data analysis for a set of 560 fast growing SMEs in India, 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. For example, 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 summarise 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.

LITERATURE REVIEW

In India, small and medium sized enterprises account for over 99 per cent 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 the growth and size of firms. For example, Evans (2007) 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 (2007) find that firm 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 (2012) document the effect of external finance on firm growth in the Italian manufacturing industry, apart from the traditional determinates of age and size. Elston (2012) 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 morelikely to experience positive growth; moreover, turnover growth is positively associated with firms' size, processinnovation, product innovation and organisational changes. In contrast, marketing innovation does not considerablyaffect Italian SMEs growth.

In the conventional framework of firm growthanalysis, financing of growthis investigated through the growth-size-profitability relationships. A considerable body of literature deals with thisquestion, 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.* (2008) 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 (2012) assert that financial constraints may be more severe as firm size decreases.

In a more recent study, Wagenvoort (2003) uses financial data for more than 200,000 European manufacturingand construction firms, and finds that European SMEs' suffer froma 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 lesssevere for medium-sized enterprises. Other empirical studies (e.g., Becchetti, & Trovato, 2012; Carpenter, & Petersen, 2012) 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.

It is often argued that SMEs are, in contrast to large firms, informationalmore opaque, have on average higher growth rates, are financiallymore constrained, and are more dependent on bank loans when outside financingis needed. For a bank, the limited information available about the SME increasesthe risk associated with providing financing, which induces the bank to reduce loanmaturity and increase the interest rate. To optimize loan conditions, SMEs havean incentive to build a relationship with their bank(s) in order to minimize theinformation asymmetry.The association between bank debt maturity and relationshiplending 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 controllingfor firm-specific characteristics such as size, age, debt and financial situation,close firm-bank relationships increase the likelihood of obtaining longer-termbank 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 maturityfor 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 logicalconsequence of innovative, pro-active and risk-taking behavior on the part of the firm, asthese are the dimensions which define an entrepreneurial orientation (EO).The relationshipbetween the EO of the firm and its performance has been thoroughly investigatedfrom both a conceptual (see Lumpkin,& Dess, 2016) and an empiricalpoint of view (Lumpkin,& Dess, 2011; 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 theirrelationship is complex. They assert that the propensity for innovation is the dimension of EO thatexercises the greatest influence on the type of expansion strategy used by the firm, encouraging the development of new products-technologies relationship through a strategicbehavior; these strategic behaviors are the principal driving force behind growth. Along with them, the conditions of the environment (highly dynamic and not veryhostile) and the availability of resources favor the rapid growth of the firm.Freel, & Robson (2004) employa large-sample of SMEs, located inScotland and in Northern England, and find apositive relationship between novel product innovation and growth inemployment and, for manufacturing firms, at least in the short term, a negativerelationship between product innovation (both incremental and novel) andgrowth in sales or productivity. By contrast, growing sales and productivity appearpositively associated with incremental process introductions in service firms.

A large group of studies has focused on the main determinants of SME's 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.*, 2006 for UK, and Sogorb-Mira, 2005 for Spain). Thornhill *et al.* (2004) find a strong correlationbetween capital structure and knowledge intensity. In contrast, growth histories are notobvious determinants of financial structure. Results also suggest that leverage strategies aremore apparent in low-knowledge industries, in firms with higher expectations of futureperformance, and in businesses with more balanced financial structures.

Some empirical studies associate growth in SMEs with the personal characteristics of their owners and the environment in which they operate. For example, an early study of Miller (2018) 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 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 a 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 empiricalanalysis emerge from the preceding discussion. First, 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 determiningfactors (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.Second, CEE countries are far from being homogeneous and both the level of development and growth of SMEs differacross 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.

Empirical Analysis and Results

This study aims to fill in the gap in the current debate on the determinants of growth in SMEs in India. Our analysis is based on cross-sectional, panel data analysis of a set of small and medium sized companies from India. In this paper we explore whether and to what extend 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 India is associated with the traditional firm characteristics of size and age.

Hypothesis 2: A number of other firm specific characteristics related to SMEs in India such as leverage, capital structure, internal finance and productivity efficiency should also play a major role in explaining the growth in these firms.

Hypothesis3: 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 India.

Data Set

In this research we have adopted the Indian Commission's SME definition. The sample of SMEs considered in our study has been extracted from The Federation of Indian Chambers of Commerce and Industry (FICCI) database and includes 5,000 companies from India. Specifically, we have selected companies that meet the following criteria: (i) an annual growth rate in revenues (or assets) of at least 10 per cent averaged over the sample period (2014 – 2018); (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 accountingdata or missing values for some of the variables over the sample period, were eliminated. Thus, the dataset has beenrestricted to the observations that embody all theessential variables available, and to those variables that have a complete record over the period ofexamination. 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 2014 – 2018, 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 per cent of all firms in the sample are small enterprises and 88.8 per cent

are medium enterprises. With regard to the age structure of our sample, we observe that nearly 15 per cent of all SMEs are younger enterprises (with 5 to 10 years of existence), while 10.7 per cent 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 firmsare representative of SMEs from Indiaand theireconomic sectors.As the data in Table 1 show, manufacturing, wholesale and retail trade, and construction prevail over otherindustries (40.5 per cent, 21.6 per cent and 9.6 per cent, 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. Thus, a selection bias problem may exist in our panel data set.

Table1. *Distribution of sample firms by size, age and sector*

	Total
Size	
Micro (< 10 employees)	n/a
Small (< 50 employees)	63
Medium (< 250 employees)	497
Total:	**560**
Age	
< 5 years	n/a
5 -10 years	84
10 - 20 years	416
> 20 years	60
Total:	**560**
Sector	
Agriculture, Fishing& Mining	45
Construction	54
Financial Intermediation	2
Hotels and Restaurants	6
Manufacturing	227
Public Administration, Education, Health and Social Work	7
Real Estate, Renting and Business Activities	41
Transport, Storage and Communication	23
Utilities	19
Wholesale and Retail Trade	121
Other	15
Total:	**560**

Dependent Variable

There is little agreement in the existing literature onhow to measure growth, and scholars have used avariety of different measures. These measuresinclude, for example, growth of sales, employees, assets, profit, equity, and others (seeDavidsson, & Wiklund, 2010). Moreover, the time span, over which growth isanalyzed in the literature, varies considerably, andranges from one to several years. Also, growth hasbeen measured in absolute or relative terms. Perhaps the most common means of operationalizing firm growth isthrough relatively objective and measurable characteristics – such as growth insales turnover, total assets and employment growth. These measures are relatively uncontroversial(methodologically) and data tend to be easily available, increasing thescope for cross-study comparability(Freel, & Robson, 2004). In this study we use three growth 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.

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.*, 2010 and 2006; Garcıa-Teruel, & Martınez - Solano, 2008, Beck *et al.*, 2015) suggests are important growth determinants.Table 2 shows summarized description of the dependent 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 significantinflation effect will be observed to reflect the fact that firm growth in sales and assets is measured innominal 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.*, 2015). To investigate whether or not some of these obstacles affect the firm growth we introduce in our analysis 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, leverage, production efficiency, future growth opportunities, age and size, may help explain 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, 2014)firms prefer to fund themselves with resources generated internally before resortingto 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.

Table2. *Dependent and explanatory variables*

Variable	Definition	Explanation	Expected Sign
Dependant Variables			
Op_Reven	Change in Operating Revenues, proxy for growth (in Rupees, thousands)	Difference between the logarithms of firm's revenues in periods *t* and *t - 1*	
Tot_Assets	Change inTotal Assets, proxy for growth (in Rupees, thousands)	Difference between the logarithms of firm's total assets in periods *t* and *t - 1*	
Explanatory Variables			
A. Macroeconomic Variables			
Rgdp_G	Real GDP per capita, proxy for the level of economic activity (in per cent)	Growth rate of real GDP per capita in period *t*	+
Infl	Inflation, proxy forthe level of future real activity(in per cent)	Log difference of the consumerprice indexin period *t*	+
Tax_Rate	Statutory tax rate, proxy for tax burden on business(in per cent)	Statutory corporate income tax ratein period *t*	-
B. Firm-Specific Variables			
Tot_Assets	Total Assets, proxy for firm size(in Rupees, 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 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*	+
Employe	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.	-

In addition, capital structure is different among SMEs, and leverage may be related to firm growth. In fact, Leung, & Yu (2016) found 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, a firm capability to sustain short-term liquidity is 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 size. 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 operations and its growth potential. We expect that these two variables may have different effects on growth in small and in medium-sized firms.

Businesses of different size and age may exhibit different organizational and environmental characteristics, which in turn may influence performance. Thesame is true for firms indifferent industries. Therefore, additional firm specific characteristics are included as explanatory variables in our analysis to capture these effects.A dummy variable (OWNER) to proxy for the ownership (that is, publicly-traded vs. privately-held) allows us 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 correlationmatrix 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 can see that the sample is made up of small and medium firmswith average assets of Rs-7.97 million and average sales revenues of Rs- 9.61million. They exhibit low degree of leverage, with debt of 0.19times 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 (Rs-1 invested in tangible assets generates Rs- 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 Rs-1 invested in total assets generates only Rs-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 per cent growth in GDP per capita and 2.68 per cent inflation, on average). The corporate income tax rate is relatively high in India (a median of 28 per cent) and still represents a significant burden on SMEs growth.

Table3. *Correlation matrix of the model variables1*

	Op_ Reven	**Tot_ Assets**	**Lever**	**Cur_ Ratio**	**Inta_ Assets**	**Cap_ Prod**	**Lab_ Prod**	**Cf_ Ratio**	**Emplo_ Ye**	**Age**	**Infl**	**Rgd p_ 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					
Employe	-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

- 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 correlation matrix.
- All variables are taken as ratios or in per cent, except for Total Assets and Operating Revenues (in Rupees, thousands), and Number of employees.

Table4. *Summary statistics (total sample)*

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

- 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.

Econometric Model and Empirical Results

The structure of our data set allows us to usea panel data methodology for our empiricalresearch. This type of analysis can control firmheterogeneity, and reduce collinearity among thevariables that are contemplated (Arellano, &Bover, 2018). Likewise, this technique enables usto eliminate the potential biases in the resultingestimates due to correlation between unobservableindividual effects and the explanatory variablesincluded in the model. Our panel datamodel may be represented as follows:

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

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 $Infl_t$, $RGDP_t$ and 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 the fixed effects estimator. To test the hypothesis regarding the absence of correlation between the unobservable specific effects and the explanatory variables, and thereby, to consider the individual effects as random or fixed, we useHausman's (2018) specification test. Its outcome enables us to reject the hypothesis regardingthe absence of correlation between theunobservable effects and the explanatory variablesand, thereby, we consider the individualeffects as fixed.

In addition tothe fixed and random effects models we employ identical specifications using Generalized Method of Moments (GMM) proposed by Arellano, &Bond (2011).The results for panel regressions are presented in Tables 5 through 8. We run the benchmark model (1) for several different specifications (see Table 5). Both TOT_ASSETS and EMPLOYE variables are used as proxy for firm size. A variable that is highly correlated with the rest of the explanatory variables is LAB_PROD. To mitigate the problem with possible multicollinearity this variable is excluded from

the rest of our model specifications (see Models 4 through 7). The explanatory power of our model is very high (the within R^2 is between 47 and 67 per cent for all model specifications) taking into account the fact that we use panel data. The results in Table 5 show that, in line with previous empirical studies, the impact of firm size (as measured by the absolute value of total assets, TOT_ASSETS) on growth, is positive and statistically significant at 1 per cent, for all model specifications. We also support the Wiklund, & Shepherd (2005) finding that firm size as proxied by the number of employees (EMPLOYE) has also a strong explanatory power (see Models 1 through 7).

Surprisingly, the estimated coefficient of liquidity variable (CUR_RATIO) is statistically insignificant for all model specifications, except for Model 4. Thus, we have to reject the hypothesis that firms with more growth opportunities will keep higherliquidity levelsand thus will face less severe financing constraints. Contrary to our expectations the degree of leverage (as measured by the ratio of total debt to total assets) a firm uses has no significant effect on its growth in sales, 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). The empirical results in Table 5 show that the larger the investments in R&D, patents and copyrights, the smaller the growth in sales revenues; the estimated coefficients of growth opportunities variable (INTA_ASSETS) are negative and strongly significant at 1 and 5 per cent, except for model specification 2. This result is difficult to explain but we may assume that although SMEs invest in R&D and other intangible assets, their impact on current growth is negative as these are investments with no immediate but long term payoffs.

The two variables that proxy for a firm's productive efficiency (CAP_PROD and LAB_PROD) show strong explanatory power in all model specifications; the estimated coefficients are both positive and statistically significant at 1 per cent (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). In relation to a firm's capability to generate internally capital Audretsch, &Elston (2002) finds 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. In our study we find evidence for a relatively strong and positive relation between a firm's cash flow and its sales growth (see Models 1, 2 and 4). When LAB_PROD variable drops from our analysis, the estimated coefficients of CF_RATIO variable remain strongly significant at 1 per cent level of significance. This result provides further evidence in support of the hypothesis that internal finance has strong influence on sales growth, particularly of younger SMEs, that are more financially constrained. If it is true, more funds and support are required for the growth of younger firms (Honjo, &Haranda, 2006).

The data in Table 5 show that both INFL and TAX_RATE variables are statistically significant at 1 per cent and with the expected signs, whereas RGDP_G variable has no effect on firm growth. A significantinflation effect most likely reflects the fact that firm sales growth is given innominal terms. The negative effect of TAX_RATE indicates that high levels of corporate income tax rate in India are perceived as a significant obstacle for SMEs growth. As GDP variable is not significant, the taxrate may be capturing other specific characteristics. When we drop the macroeconomic variables from model (1) the data in Table 5 show that all of the firm-specific variables (except LEVER) are statistically significant at 1 per cent and with the expected signs (see Model 4). As expected, the estimated coefficients of AGE variable are negative and statistically significant at the usual levels (see Models 1 through 4). The two dummies used as proxies for ownership and the sector a firm operates drop from the fixed effect specifications but appear to be statistically insignificant in other (random effects) specifications. Thus, we cannot provide evidence in support of the hypothesis that growth in manufacturing and service SMEs in India is strongly associated with firm specific characteristics such as ownership and industry sector.

Table5. *Operating revenues panel regressions (2014 – 2018), Total Sample*

Explanatory variables	Model 1	Model 2	Model 3	Model 3a	Model 4	Model 5	Model 6	Model 7
	Fixed effects	Fixed effects	Fixed effects	Random effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
TOT_ASSETS	0.524***	0.376***			0.740***			
	(0.000)	(0.000)			(0.000)			
LEVER	0.050	0.005	-0.016	-0.100	0.083	0.014		
	(0.540)	(0.942)	(0.839)	(0.542)	(0.355)	(0.875)		
CUR_RATIO	0.009	0.001	-0.011	0.229***	0.019*	-0.010	-0.010	
	(0.318)	(0.983)	(0.184)	(0.000)	(0.054)	(0.287)	(0.287)	
INTA_ASSETS	-0.779***	-0.292	-0.415*	-3.582***	-1.306***	-0.673**	-0.676**	-0.716**
	(0.004)	(0.249)	(0.100)	(0.000)	(0.000)	(0.025)	(0.024)	(0.016)
CAP_PROD	0.002***	0.002***	0.001**	0.003***	0.005***	0.005***	0.005***	0.005***
	(0.001)	(0.005)	(0.026)	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)
LAB_PROD	0.001***	0.001***	0.001***	0.002***				
	(0.000)	(0.000)	(0.000)	(0.000)				
CF_RATIO	0.040**	0.035**	0.011	0.050***	0.069***	0.032**	0.033**	0.030**
	(0.023)	(0.030)	(0.502)	(0.000)	(0.002)	(0.039)	(0.046)	(0.048)
EMPLOYE	0.564***	0.432***	0.456***	0.389***	0.324***	0.181***	0.181***	0.178***
	(0.000)	(0.000)	(0.0000	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
AGE	-0.042	-0.053*	-0.048	-0.005**	-0.226***	-0.049	-0.048	-0.050
	(0.262)	(0.074)	(0.127)	(0.032)	(0.000)	(0.161)	(0.168)	(0.156)
INFL		0.106***	0.125***	0.110***		0.132***	0.132***	0.133***
		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
RGDP_G	-0.017							
	(0.311)							
TAX_RATE	-0.102***	-0.064***	-0.080***	-0.083***		-0.075***	-0.075***	-0.076***
	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
SECTOR	(dropped)		(dropped)		(dropped)			
OWNER	(dropped)		(dropped)		(dropped)			
R-squared (within)	0.625	0.673	0.655	0.491	0.471	0.538	0.537	0.542
Number of observations	1440	1440	1440	1999	1440	1440	1440	1440
P-value for Hausman test[5]				0.000				

Notes

- Model 1 - excluding INFL variable; Model 2 – excluding RGDP_G variable; Model 3 – excluding TOT_ASSETS and RGDP_G variables; Model 4 – excluding all macroeconomic variables; Model 5 – excluding TOT_ASSETS, LAB_PRODand RGDP_G variables; Model 6 –excluding LEVER variable; Model 7 – excluding CUR_RATIO variable, and 3a – Random effects.
- All variables except dummies and ratios are in logs.
- *, **, and *** represent significance at 10, 5, and 1 percent, respectively. All regressions include source country dummies to control for source country effects.
- *P*-values in brackets.
- The null hypothesis for the Hausman test is that the difference in coefficients between fixed effects and random effects specifications is not systematic. Thus a small p-value (<0.05) suggests the rejection of the random effects specification.

Table6. *Total assets panel regressions (2014 – 2018), Total Sample*

Explanatory variables	Model 1	Model 2	Model 3	Model 3a	Model 4	Model 5	Model 6	Model 7
	Fixed effects	Fixed effects	Fixed effects	Random effects	Fixed effects	Fixed effects	Fixed effects	Fixed effects
OP_REVEN	0.212***	0.176***			0.233***			
	(0.000)	(0.000)			(0.000)			
LEVER	0.045	0.026	0.058	-0.189***	0.049	0.058	0.057	0.060
	(0.352)	(0.589)	(0.222)	(0.002)	(0.313)	(0.232)	(0.238)	(0.216)
CUR_RATIO	-0.030***	-0.031***	-0.033***	0.072***	-0.029***	-0.033***	-0.033***	-0.034***

	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
INTA_ASSETS	-0.310*	-0.214	-0.170	-1.089***	-0.411**	-0.215	-0.214	
	(0.105)	(0.254)	(0.400)	(0.000)	(0.032)	(0.290)	(0.294)	
CAP_PROD	-0.001***	-0.001***	-0.001***	0.001***	-0.001***	-0.001*	-0.001*	-0.001*
	(0.010)	(0.007)	(0.000)	(0.002)	(0.002)	(0.076)	(0.075)	(0.079)
LAB_PROD	-0.000	0.000	0.001***	0.001***				
	(0.970)	(0.536)	(0.000)	(0.000)				
CF_RATIO	0.075***	0.071***	0.100***	0.070***	0.084***	0.095***	0.095***	0.094***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EMPLOYE	0.002	-0.013	0.044	0.164***	0.001	-0.017		
	(0.929)	(0.653)	(0.126)	(0.000)	(0.971)	(0.535)		
AGE	-0.051***	-0.034**	-0.032*	-0.002***	0.023**	-0.030*	-0.029*	-0.033*
	(0.010)	(0.047)	(0.071)	(0.002)	(0.014)	(0.100)	(0.101)	(0.067)
INFL		0.022***	0.043***	0.035***		0.046***	0.044***	0.046***
		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
RGDP_G	0.014							
	(0.124)							
TAX_RATE	-0.025***	-0.021***	-0.028***	-0.015***		-0.029***	-0.029***	-0.031***
	(0.000)	(0.001)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
SECTOR	(dropped)		(dropped)		(dropped)		(dropped)	
OWNER	(dropped)		(dropped)		(dropped)		(dropped)	
R-squared (overall)	0.310	0.330	0.317	0.565	0.332	0.299	0.2967	0.299
Number of observations	1440	1440	1500	2059	1440	1500	1500	1505
P-value for Hausman test[5]				0.000				

Notes

- Model 1 - excluding INFL variable; Model 2 – excluding RGDP_G variable; Model 3 – excluding OP_REVEN and RGDP_G variables; Model 4 – excluding all macroeconomic variables; Model 5 – excluding OP_REVEN, LAB_PROD and RGDP_G variables; Model 6 – excluding EMPLOYE variable; Model 7 – excluding INTA_ASSETS variable, and 3a – Random effects.
- All variables except dummies and ratios are in logs.
- *, **, and *** represent significance at 10, 5, and 1 percent, respectively. All regressions include source country dummies to control for source country effects.
- *P*-values in brackets.
- The null hypothesis for the Hausman test is that the difference in coefficients between fixed effects and random effects specifications is not systematic. Thus a small p-value (<0.05) suggests the rejection of the random effects specification.

To account for unobservable specific effects in our model we run also random effects specification (see Model 3a). The random effects specificationwould allow us to estimate the impact of time-invariant variables on growth and actually provide moreefficient estimates if the specific effects are not correlated with the other explanatoryvariables. The Hausman test shows that we have to reject the random effects specifications (*p*-value is less than 0.05). Thereby, we consider the individualeffects 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.

Next, we run our model specifications using growth in firm's total assets as dependant variable and sales revenues as explanatory variable. The results are shown in Table 6. Whereas it is not found that size variable (EMPLOYE) is significantly related to firm growth, it is obvious that firm capability to generate internally capital (as measured by its cash flow) plays an important role in explaining the growth in its assets. The estimated coefficients of CF_RATIO variable are with positive signs; thus we may propose that growth in tangible assets is predominantly financed with internally generated funds rather than through external sources (LEVER variable is statistically insignificant in all model specifications). The effect of short-term liquidity (CUR_RATIO) on firm growth is very

strong and negative, for all model specifications. This finding suggests that firms with better investment opportunities will choose to maintain lower liquidity in order to support their current growth. 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 marginally statistically significant (see Models 4 through 7).

The other two variables (OP_REVEN and INTA_ASSETS) have the expected signs and are statistically significant at the usual levels of 1 and 10 per cent; when OP_REVEN variable is excluded from our analysis, the effect of future growth opportunities become statistically insignificant (see Models 5 and 6). The variable that proxies for AGE is negative and statistically significant for all model specifications, which further supports our hypothesis that younger firms are more likely to grow faster than older ones. As expected, macroeconomic variables (except for RGDP_G) show a significant effect on firm growth. The Hausmantest (see Model 3a) shows that we have to reject the random effects specifications (*p*-value is less than 0.05 in both cases). Thereby, we consider the individualeffects as fixed.

In previous models we have observed and corrected for a correlation between residuals of order one. Yet, this does not exclude the possibility for a correlation of higher order, which would be an evidence of some dynamic relationship between the variables in the model. For that purpose, we need a linear dynamic panel-data model that includes lag of the dependent variable as explanatory variable and that contains unobserved panel-level effects, fixed or random. The Generalized Method of Moments (GMM) is a suitable choice for that kind of models, which yields consistent estimators. GMM is a generalization of the classical Method of Moments.

The results are presented in Tables 7 and 8. As expected the time-lagged value of dependant variable (OP_REVEN) is negative and statistically significant for the most of the model specifications. The data in Table 7 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 LEVER variable are positive and statistically insignificant for all model specifications). Thus, we may argue that for SMEs in India external finance has less influence than internally generated funds on a firm's potential to grow. This finding is empirically supported by the fact that a firm's capability to generate internally capital (as measured by its cash flow) is positively correlated with its growth in sales (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 per cent). As mentioned earlier, this finding suggests that firms with better investment opportunities will choose to maintain lowerliquidity in order to support their potential for growth.

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 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). As expected, the two macroeconomic variables (TAX_RATE and INFL) show a statistically significant effect on firm growth. The results of the Arellano-Bond and Sargan tests (shown at the bottom of the table) confirm that all models are well specified.

When total assets are used as dependent variable in our regression analysis we obtain similar results to those in Table 6. Firm specific variables such as OP_REVEN, CAP_PROD, LAB_PROD, and CF_RATIO are statistically significant at 1 per cent 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 per cent and positive), which result is almost consistent with our hypothesis that SMEs in India use predominantly internal

sources to support their growth in assets. When we analyze the effect of short-term liquidity on firm growth, the results reported in Table 8 show that SMEs in India need to keep lower liquidity levels in order to support their growth in assets. The data in Table 8 support the notion that a firm's capability to generate capital internally (as measured by its cash flow) 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 funds and support are required for the growth of younger firms. The data in Table 8 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 India is strongly associated with the traditional firm characteristics of size and age. Again, themacro economic variables (except for RGDP_G) show a significant effect on firm growth. As expected, 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.

Table7. *Operating revenues GMM panel regressions (2014 – 2018), Total Sample*

Explanatory variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
OP_REVEN (lagged)	-0.016***	-0.009	-0.010*	-0.017***	-0.011	-0.011	-0.011*
	(0.004)	(0.120)	(0.086)	(0.008)	(0.140)	(0.134)	(0.100)
TOT_ASSETS	0.283***	0.270***		0.430***			
	(0.000)	(0.000)		(0.000)			
LEVER	0.025	0.014	-0.034	0.008	-0.027		
	(0.681)	(0.818)	(0.591)	(0.909)	(0.717)		
CUR_RATIO	-0.012*	-0.013**	-0.022***	-0.008	-0.023***	-0.023***	-0.023***
	(0.067)	(0.056)	(0.001)	(0.319)	(0.004)	(0.005)	(0.005)
INTA_ASSETS	0.352	0.405	0.422	0.447	0.543	0.542	
	(0.250)	(0.185)	(0.178)	(0.210)	(0.145)	(0.146)	
CAP_PROD	0.001**	0.001**	0.001*	0.003***	0.003***	0.003***	0.003***
	(0.014)	(0.021)	(0.078)	(0.000)	(0.000)	(0.000)	(0.000)
LAB_PROD	0.001***	0.001***	0.001***				
	(0.000)	(0.000)	(0.000)				
CF_RATIO	0.903***	0.881***	0.828***	1.142***	1.067***	1.070***	1.052***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EMPLOYE	0.405***	0.381***	0.397***	0.189***	0.162***	0.162***	0.161***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
AGE	-0.022	-0.013	-0.021	-0.001	-0.028*	-0.029*	-0.032*
	(0.116)	(0.326)	(0.140)	(0.957)	(0.101)	(0.091)	(0.058)
INFL		0.022***	0.028***		0.033***	0.033***	0.032***
		(0.007)	(0.001)		(0.001)	(0.001)	(0.001)
RGDP_G	0.003						
	(0.762)						
TAX_RATE	-0.012*	-0.006	-0.010*		0.001*	-0.011*	-0.012*
	(0.058)	(0.273)	(0.080)		(0.099)	(0.100)	(0.074)
SECTOR	(dropped)		(dropped)		(dropped)		(dropped)
OWNER	(dropped)		(dropped)		(dropped)		(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>χ^2		0.6483	0.5171	0.5479	0.5588	0.5813	0.5296

Notes

- Model 1 - excluding INFL variable; Model 2 – excluding RGDP_G variable; Model 3 – excluding TOT_ASSETS and RGDP_G variables; Model 4 – excluding all macroeconomic variables; Model 5 – excluding TOT_ASSETS, LAB_PROD and RGDP_G variables; Model 6 – excluding LEVER variable; and Model 7 – excluding INTA_ASSETS variable.
- All variables except dummies and ratios are in logs.
- *, **, and *** represent significance at 10, 5, and 1 percent, respectively. All regressions include source country dummies to control for source country effects.

- *P*-values in brackets.
- 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.
- For Sargan test Ho is: over identifying restrictions are valid. If p-value >0.05, we confirm the null hypothesis that the over identifying restrictions are valid. Rejecting the null hypothesis implies that we need to reconsider our model or our instruments.

Table8. *Total assets GMM panel regressions (2014 – 2018), Total Sample*

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

Notes

- Model 1 - excluding INFL variable; Model 2 – excluding RGDP_G variable; Model 3 – excluding OP_REVEN and RGDP_G variables; Model 4 – excluding all macroeconomic variables; Model 5 – excluding OP_REVEN, LAB_PROD and RGDP_G variables; Model 6 – excluding EMPLOYE variable; Model 7 – excluding INTA_ASSETS variable, and Model 8 – excluding CAP_PROD variable.
- All variables except dummies and ratios are in logs.
- *, **, and *** represent significance at 10, 5, and 1 percent, respectively. All regressions include source country dummies to control for source country effects.
- *P*-values in brackets.
- 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.

- For Sargan test Ho is: over identifying restrictions are valid. If p-value >0.05, we confirm the null hypothesis that the over identifying restrictions are valid. Rejecting the null hypothesis implies that we need to reconsider our model or our instruments

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 India, 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 India 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 a negative impact on growth of small and medium-sized firms; this result is difficult to explain but we may assume that although SMEs invest in R&D and other intangible assets, their impact on current growth is negative as these are investments with no immediate but long term payoffs.

Another important finding is that SMEs in India rely heavily on internally generated funds to support their growth in sales but also need access to external capital to support their asset 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 India. The evidence shows that small and medium firms in India still rely on internally generated sources to support their growth and find it very difficult to obtainexternal finance. Thus,the governments in India need to pay an increased attention to the small and medium enterprises and try to create an environment that will be beneficial for SME 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 India improve their competitiveness 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. The analysis will benefit if more SMEs with full data record from different industries are included in the sample as macroeconomic factors and firmcharacteristics. 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 India needs to be further explored. This would be a step further in our research.

REFERENCES

[1] Arellano, M., & Bover, O.,2018. 'La econometrıra de datos de panel', Investigaciones Econormicas 14(1), 3-45.

[2] Arellano, M., & Bond, S., 2011. 'Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations', Review of EconomicStudies 58(2), 277-97.

[3] Audretsch, D. B., &Elston J. A., 2012. 'Does firm size matter? Evidence on the impact of liquidity constraints on firm investment behavior in Germany', International Journal of Industrial Organization 20(1), 1-17.

[4] Ayyagari, M., Beck, T., & Demirgüç-Kunt, A., 2017. 'Small and medium enterprises across the globe', Small Business Economics 29(4), 415-434.

[5] Becchetti, L., &Trovato, G.,2012.'The determinants of growth for small and medium sized firms: the role of the availability of external finance', Small Business Economics 19(4), 291-306.

[6] Beck, T., Demirgüç-Kunt, A., & Maksimovic, V., 2015. 'Financial and legal constraints to growth: does firm size matter?', The Journal of Finance Vol. 25(1), 137-177.

[7] Cagliano, R. K., & Spina, G., 2012. 'A comparison of practice-performance models between small Manufacturers and subcontractors', International Journal of Operations and Production Management 22(12), 1367–1388.

[8] Carpenter R. E., & Petersen B. C., 2012. 'Is the growth of small firms constrained by internal finance?', Review of Economics and Statistics 84(2), 298-309.

[9] Davidsson, P., & Wiklund, J., 2010. 'Conceptual and empirical challenges in the study of firm growth', in D. Sexton & H. Landström (ed.), The Blackwell handbook of entrepreneurship, Oxford, MA: Blackwell, 26–44.

[10] Elston, J. A., 2012. 'An examination of the relationship between firm size, growth and liquidity in the Neuer Market', Econometrica 38(2), 874–882.

[11] Evans D. S., 2007.'The relationship between firm growth, size and age: estimates for 100 manufacturing industries', The Journal of Industrial Economics 35(4), 567-581.

[12] Fazzari S. M., Hubbard R. G., & Petersen B. C.,2008. 'Financing constraints and corporate investment', Brookings Papers of Economic Activity 8(1), 141-195.

[13] Freel, M. S., & Robson, P. J.A., 2004. 'Small firm innovation, growth and performance', International Small Business Journal 22(6), 561–575.

[14] Hall, G., Hutchinson, P., & Michaelas, N., 2010. 'Industry Effects on the Determinants of Unquoted SMEs' Capital Structure', International Journal of the Economics of Business 7(3), 297- 312.

[15] Hall, G., Hutchinson, P., & Michaelas, N., 2006.'East and West: differences in SME capital structure between former Soviet-bloc and non Soviet-bloc European countries', Proceeding of a conference on the international comparisons in the financing of SMEs, Warwick Business School, The United Kingdom, 4-5 April, 268-275.

[16] Hausman, J. A., 2018. 'Specification tests in econometrics', Econometrica 46(1), 1251–1271.

[17] Hernández-Cánovas, G., & Koëter-Kant, J., 2008. 'Debt maturity and relationship lending: an analysis of European SMEs', International Small Business Journal 26(5), 595-617.

[18] Heshmati, A., 2001. 'On the growth of micro and small firms: evidence from Sweden', Small Business Economics 17(3), 213-228.

[19] Honjo, Y., & Harada, N., 2006. 'SME policy, financial structure and firm growth: evidence from Japan', Small Business Economies 27(4), 289-300.

[20] Garcıa-Teruel, P. J., & Martınez-Solano, P., 2008. 'On the Determinants of SME cash holdings: evidence from Spain', Journal of Business Finance and Accounting 35(1)and (2), 127–149.

[21] Lesáková, L., 2009. 'Innovations in small and medium enterprises in Slovakia', Acta Polytechnica Hungarica 6(3), 23-34.

[22] Leung S. F., &Yu S., 2016. 'On the choice between sample selection and two-part models', Journal of Econometrics 72(1-2), 197-229.

[23] Lumpkin, G. T., & Dess, G. G.,2016. 'Clarifying the entrepreneurial orientation construct and linking it to performance', Academy of Management Review 21(1), 135–172.

[24] Lumpkin, G. T., & Dess, G. G., 2011. 'Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle', Journal of Business Venturing 16(5), 429-451.

[25] Markovics, K., 2005. 'Competitiveness of domestic small and medium enterprises in the European Union', European Integration Studies 1, 13-24.

[26] Miller, D., 2018. Relating Porter's business strategies to environment and structure: analysis and performance implications',

Academy of Management Journal 31(2), 280-308.

[27] Moreno, A. M., & Casillas J. C., 2008. 'Entrepreneurial orientation and growth of SMEs: a causal model', Entrepreneurship Theory and Practice 32(3), 507-528.

[28] Morone, P., & Testa, G., 2008. 'Firms growth, size and innovation – an investigation into the Italian manufacturing sector', Economics of Innovation and New Technology 17(4), 311–329.

[29] Myers, S. C., &Majluf, N. S.,2014. 'Corporate financing and investment decisions when firms have information that investors do not have', Journal of Financial Economics 13(2), 187-221.

[30] OECD, 2009. The impact of the global crisis on SME and entrepreneurship financing and policy responses. Centre for Entrepreneurship, SMEs and Local Development, OECD, Paris.

[31] Ortiz-Molina, H., & Penas, M. F., 2004. 'Lending to small businesses: the role of loan maturity in addressing information problems', Electronic Markets 8(1), 98–106.

[32] Ozkan, A., & Ozkan, N., 2004. 'Corporate cash holdings: an empirical investigation of UK companies', Journal of Banking and Finance 28(9), 2103–2134.

[33] Pelham, A. M., & Wilson, D. T., 2016.'A longitudinal study of the impact of market structure, firm structure, strategy, and market orientation culture on dimensions of smallfirm performance', Journal of the Academy of Marketing Science 24(1), 27-43.

[34] Raymond, L., Bergeron, F., & Blili, S., 2005. 'The assimilation of E-business in manufacturing SMEs: determinants and effects on growth and internationalization', Electronic Markets 15(2), 106–118.

[35] Reuber, R., & Fischer, E., 1997. 'The influence of the management team's international experience on the internationalization behaviors of SMEs', Journal of International Business Study 28(4), 807-825.

[36] Sarno, D., 2008. 'Capital structure and growth of the firms in the backward regions of the South Italy', Applied Financial Economics 18(10), 821-833.

[37] Sogorb-Mira, F., 2005. 'How SME uniqueness affects capital structure: evidence from a 1994–1998 Spanish data panel', Small Business Economics 25(5), 447–457.

[38] Storey, D., 1994. Understanding the small business sector. London: Routledge.

[39] Timmons, J.A., 1994. New venture creation: entrepreneurship for the 21st century. McGraw-Hill/Burr Ridge, Ill: Irwin.

[40] Thornhill, S., Gellatly, G., & Riding, A., 2004. 'Growth history, knowledge intensity and capital structure in small firms', Venture Capital 6(1), 73-89.

[41] Wagenvoort, R., 2003. 'Are finance constraints hindering the growth of SMEs in Europe?', Journal of Business Venturing 18(2), 51–91.

[42] Wiboonchutikula, P., 2002.'Small and medium enterprises in Thailand: recent trends', Small Business Economics 18(1-3), 213-226.

[43] Wiklund, J., & Shepherd, D. A., 2005. 'Entrepreneurial orientation and small business performance: a configurational approach', Journal of Business Venturing 20(1), 71–91.

[44] Wiklund, J., Holger, P., & Shepherd D. A., 2009. 'Building an integrative model of small business growth', Small Business Economics 32(4), 351–374.

Citation: *Dr. Manoj Kumar "An Econometric Model for Small and Medium Sized Enterprises Growth in India ". International Journal of Research in Business Studies and Management, vol 5, no. 10, 2018, pp. 30-47.*