Guest Editorial

THE RELATIONSHIP BETWEEN GROWTH OF COMPANIES AND LABOUR PRODUCTIVITY IN PORTUGUESE SMES: A DYNAMIC PANEL DATA APPROACH

[1]Paulo Macas Nunes
Department of Management and Economics
University of Beira Interior
Polo IV, Estrada do Sineiro Covilhã, 6200 – 209
Portugal
Tel.: +351275319600
Fax: +351275319601
E-mail: macas@ubi.pt

[2]Zelia Serrasqueiro
Department of Management and Economics
University of Beira Interior
Polo IV, Estrada do Sineiro Covilhã, 6200 – 209
Portugal
Tel.: +351275319600
Fax: +351275319601
E-mail: zelia@ubi.pt

[3]Antonio Nunes
Department of Management and Economics
University of Beira Interior
Polo IV, Estrada do Sineiro Covilhã, 6200 – 209
Portugal
Tel.: +351275319600
Fax: +351275319601
E-mail: anunes@ubi.pt

[4] Luis Mendes
Department of Management and Economics
University of Beira Interior
Polo IV, Estrada do Sineiro Covilhã, 6200 – 209
Portugal
Tel.: +351275319600
Fax: +351275319601
E-mail: lmendes@ubi.pt

[1]Paulo Macas Nunes, PhD in Economics, Assistant Professor at the Department of Management and Economics of Beira Interior University and Researcher in CEFAGE Research Center at Évora University. Prof. Paulo Macas Nunes is graduate of Economics in 1995 at Évora University; also received Master in Economics in 1999 at Beira Interior University and Economics PhD in 2002 at Beira Interior University.

[2]Zelia Serrasqueiro, PhD in Management, Assistant Professor at the Department of Management and Economics to Beira Interior University and Researcher in CEFAGE Research Center at Évora University. Profª Zelia Serrasqueiro is graduate in Management in 1988 at Superior Institute of Economics and Management, Lisbon; Postgraduate in European Doctoral Programme in Small Business and Entrepreneurship, 1995-1996, Spain/Sweden and Management PhD in 2001 at Beira Interior University.

[3]Antonio Nunes, PhD in Management, Assistant Professor at the Department of Management and Economics of Beira Interior University and Researcher at NECE Research Center of Beira Interior University. Prof. Antonio Nunes is graduate in Management in 1993 at Catholic University at Viseu; and received PhD in Management at Beira Interior University in 2007.

Guest Editorial

[4]Luis Mendes, PhD in Management, Assistant Professor at the Department of Management and Economics at Beira Interior University and Researcher at NECE Research Center of Beira Interior University. Prof. Luis Mendes is graduate in Management in 1991 at Beira Interior University; received Master in Management at Beira Interior University in 1996 and acquired PhD in Management at Beira Interior University in 2005.

ABSTRACT. In this study, applying various dynamic panel estimators and considering three measures of company growth, we find that there is a positive relationship between growth and labour productivity in small and medium-sized Portuguese companies. Based on the results obtained, we can conclude that labour productivity is persistent over time and Portuguese small and medium-sized companies with higher levels of debt and liquidity and lower levels of tangible assets have greater labour productivity values. The results suggest greater relevance of motivation, efficiency and giving employees responsibility, when faced with the possible breakdown of informal labour relationships as a consequence of increased company growth.

KEYWORDS: companies growth, dynamic panel data, labor productivity, SME.

JEL classification: C13, G32, J24.

Introduction

The study of Greiner (1972) indicates that the relationship between growth and productivity companies can be positive or negative, depending on the effect they can have on growth business organization. On the one hand, the motivation of employees can be a determining factor for the growth of SMEs would result in increased labour productivity. On the other hand, the possibility of breaking the informal relationships that exist especially in smaller firms, may contribute to the growth of SMEs, with the consequent breakdown of informal relationships among workers, contributing to the decrease in their productivity levels (Greiner, 1972).

The major formality in labour relationships, as a consequence to greater size, contributes negatively to labour productivity (Rollag, 2001). According Rollag (2001) is necessary owners/managers motivate the employees in order to avoid that larger size do not contribute to reduction of labour productivity, as a consequence to greater formality of labour relationships.

Labour factor are a greater relevance in SMEs context (Heskel, 1999). In Portugal, SMEs are represented 99.5% of total companies, contributed to greater employment and to economic growth (Instituto Nacional de Estatística, 2004). The empirical studies about growth influence on company performance do not consider the labour productivity as measure of company performance. For example, the studies by Adams, Buckle (2003) and Goddard *et al.* (2005) consider financial profitability, measured by the ratio between operational results and total assets, as a measure of company performance. Considering that growth and labour

productivity are particular relevance in SMEs context, this paper aims to fill this gap in the empirical literature, analyzing the influence of growth in labour productivity. For this purpose, we use a sample of 51 SMEs, and to estimate the results we use the GMM system (1998) and LSDVC (2005) dynamic estimators. Dependent variable is labour productivity, measured by the ratio between gross value added and number of employees. To measure growth we consider three variables, generally used in the literature, i.e.:

    1) assets growth;
    2) sales growth;
    3) employees growth.

Initially we only test the relationship between growth and labour productivity, the principal aims of this study, using three measures of growth to test the robustness of the relationship between growth and labour productivity, i.e. checking if that relationship is independent of the growth measurement used. In order to test the robustness of the relationship between growth and labour productivity previously estimated, and enriching the analysis of paper, we consider other possible independent variables of labour productivity. The remaining independent variables considered in the paper are:

    1) labour productivity in the previous period;
    2) debt;
    3) liquidity;
    4) assets tangibility;
    5) ownership control by foreigners.

After the present introduction this study is organised as follows,: in section 2 we present a review of the literature, highlighting the relationship between growth and labour productivity in SMEs, and we establish the hypotheses for investigation; in section 3 we introduce the database used in this study and the methodology; in section 4 we display the results obtained; in section 5 we discuss the results obtained, checking validity of the investigation hypotheses previously set out in section 2; and finally, in section 6 we offer the main conclusions of this study.

1. Review of the Literature and Research Hypotheses

This section begins with a review of literature and proceeds to present the hypotheses for investigation, concerning the relationship between labour productivity and its possible explanatory variables, highlighting the relationship between company growth and labour productivity in SMEs.

1.1 Growth

Various authors (Low, MacMillan, 1988; Storey, 1994; Baum *et al.*, 2001) conclude that the business success is a consequence of company growth.

The higher levels of vertical integration and diversifying activities and higher diversifying of the product as a consequence of high rates of company growth (Delmar *et al.*, 2003). On this subject, Rogers (2004) conclude that the greater performance is consequence the possibility of higher investments in innovation, consequence of greater size of companies.

As from certain level of scale, the marginal increase in performance of companies is becoming smaller as the size increases (Russeeuw, 1997). In this respect, concludes Yoon

(2004) that considerable increases in growth may result in the decreased performance of the companies, if this growth contributes to firm size exceeds its optimal size.

On the one hand, managers and owners expect additional economic gains as a consequence of companies growth. On the other hand, the greater growth can lead to uncertainty, consequence to the possibility of control ownership by outsider owners, which may lead to decrease labour productivity (Davidsson, 1989; Delmar *et al.*, 2003; Wiklund *et al.*, 2003).

Wiklund *et al.* (2003) conclude that the labour informal relations are particularly relevant in the context of smaller firms. According to the authors, the growth increase may become unviable this informal labour relationships, and such contribute to the reduction in labour productivity. In this context, Rogers (2004) concluded that the greater rigidity of labour relations in the context of larger companies may contribute to reduction of labour productivity; therefore, not necessarily growth contributes to the increase of labour productivity. Also according to Rogers (2004) the smallest organizational rigidity that characterizes smaller companies can contribute to this type of companies are more efficiently enjoy good investment opportunities, associated with innovation process, contributing to increased labour productivity.

According to Greiner (1972) the effects of growth on labour productivity may be positive or negative. If growth is associated with an increased motivation of employees due to the expectation of higher future earnings, and informal relationships between employees is not substantially affected, then growth can contribute into increased labour productivity. If growth contributes into a less efficient control of the action of employees by owners/managers, and also a relevant breaking of informal labour relationships, then growth may contribute to lower labour productivity.

The conclusions of Greiner (1972) are corroborated by Rollag (2001). The author refers that when SMEs growth is substantial, resulting in significant organizational changes, the owners/managers of SMEs should motivate and assign responsibilities to employees, contributing to such that there are no decline in labour productivity.

The empirical evidence about the growth influence on performance in SMEs context, although considering operational results as measure of performance, indicates a positive, or a not statistically, relationship between growth and performance. Chandler, Jensen (1992), Wiklund (1999), Mendelson (2000) and Cowling (2004), obtain a positive relationship between growth and performance. Already, Roper (1999) and Markman, Gartner (2002), find a not statistically relationship between growth and performance.

Considering the theoretical arguments in favour of the positive relationship between growth and performance as relevant, and most of the existing empirical evidence which mostly indicates the existence of a positive relationship between growth and performance in SMEs, although not considering labour productivity as a measure of performance, the following hypothesis has been established:

H1: There is a positive relationship between growth and labour productivity in SMEs.

1.2 Other Variables

Relationship between Labour Productivity in previous and current periods. Dilling – Hansen (2005) defines that SMEs have less continuity of performance between previous and current periods, in comparison with continuity of performance in large companies. According to the author, company scale is crucial to successfully cope with possible alterations in the

economic and competitive environment. The greater ability of large companies to cope with those changes, compared to the ability of small companies, means greater continuity of performance.

Nevertheless, Hawawini *et al.* (2003) and Schumacher, Boland (2005) claim that continuity of company performance relates to the fact of companies trying to find a level of performance that is adapted to specific characteristics of each individual company and of the market it belongs to. The authors conclude that size and the sector companies belong to will not be particularly relevant aspects in explaining different levels of performance.

Results about the study of continuity of performance have completely neglected labour productivity, considering profitability of a company as a measure of performance. Fu *et al.* (2002) find continuity of performance in a sample of small Thai companies. Goddard *et al.* (2005), although not specifically speaking about SMEs, also find continuity of performance in a sample of Belgian, French, Italian, Spanish and British firms. Finally, Gschwandtner (2005) finds continuity of performance in firms in the United States.

Although the theoretical arguments and empirical evidence do not specifically relate to labour productivity as a measure of performance, the following hypothesis has been formulated:

H2: There is persistence of labour productivity in SMEs.

Debt. Jensen (1986), Berger *et al.* (1995), Wells *et al.* (1995) and Adams (1996) argue that greater level of company debt contributes to increased efficiency in allocating resources. According to the authors, a higher level of debt originates a reduction in available funds, because of the obligation to pay off the debt and respective financial costs, forcing managers to allocate resources more efficiently.

Jensen (1986) concludes that a higher level of company debt can contribute to increase in labour productivity. According to the author, increased use of debt augments the possibility of company bankruptcy. Realizing this, managers will be more efficient in monitoring employees, as in case of bankruptcy they stand to lose more than owners. In this respect Geroski *et al.* (2005) claims that increased debt means greater financial discipline, this being an incentive for increased productivity.

Greiner (1972) argues that when SMEs face financial restrictions, there tends to be more employee collaboration and commitment, and that greater collaboration and commitment contributes to increased labour productivity.

While not specifically about SMEs, the studies by Schiantarelli, Sembenelli (1997), of British and Italian companies, and by Smith *et al.* (2004) of Danish companies, show a positive relationship between debt and labour productivity, although this relationship is not very significant in the latter study.

On the basis of theoretical arguments and empirical results, the following hypothesis has been formulated:

H3: There is a positive relationship between debt and labour productivity in SMEs.

Liquidity. SMEs being more subject to a greater level of business risk, compared to large companies, demonstrate that a greater level of liquidity can be quite relevant in meeting short-term commitments.

Although it does not only refer to SMEs, empirical results show a positive relationship between liquidity and productivity. Firstly, considering the total productivity of production factors as a measure of performance, Geroski *et al.* (2005), for British companies, obtain a positive relationship between company liquidity and productivity. Secondly, Schiantarelli, Sembenelli (1997), for British and Italian companies, and Smith *et al.* (2004), for Danish

companies, considering specifically labour productivity as a measure of performance, also obtain a positive relationship between liquidity and productivity.

Considering the empirical evidence, although not specifically regarding SMEs, the following hypothesis has been formulated:

H4: There is a positive relationship between liquidity and labour productivity in SMEs.

Asset Structure. Company asset structure is a relevant variable in explaining performance values. Relying on the conclusions of Nucci *et al.* (2005), companies with a higher percentage of intangible assets are the ones most prone to innovating activities. The authors claim that expenses on innovation can be fundamental for improving company performance values.

Cressy, Olofsson (1996) argue that SMEs normally have lower levels of fixed assets, compared to the level of fixed assets of large companies.

Although it does not relate to SMEs only, Schiantarelli, Sembenelli (1997) for British and Italian firms and Smith *et al.* (2004) for Danish firms, considering labour productivity as a measure of performance, obtain a negative relationship between the level of tangible assets and productivity.

When considering the total productivity of production factors, as a measure of company performance, the results are various. Nucci *et al.* (2005) obtain a positive relationship between the level of intangible assets and total productivity of production factors, considering a sample of Italian firms. However, Geroski *et al.* (2005), considering a sample of British firms, obtain a statistically insignificant relationship between innovation activities, measuring innovation activities by the number of patents, and total productivity of production factors.

Considering the theoretical arguments set out above and empirical evidence of the relationship between the level of tangible assets and labour productivity, the following hypothesis has been formulated:

H5: There is a negative relationship between the level of tangible assets and labour productivity in SMEs.

Ownership of Capital. Various authors consider foreign investment in companies to be relevant, as a means to encourage growth and increase efficiency in the allocation of resources. In this respect, Berger *et al.* (1992) define that firms with a significant percentage of foreign capital tend to invest more efficiently since they are more able to diversify investments and have more experience in obtaining high levels of performance. According to Goedhuys *et al.* (2006) firms with foreign ownership can establish linkages that stimulate the transfer of production or organisational capabilities and generate higher levels of productivity.

Not concentrating on SMEs only, and considering profitability as a measure of performance, empirical results show a positive relationship between control and performance of foreign ownership, as, for example, in the studies by Berger *et al.* (1992) regarding companies in the United States, Joseph, Hewins (1997) considering companies in the United Kingdom, and Adams, Buckle (2003) for companies in Bermuda.

Based on theoretical arguments and empirical results, although not relying on SMEs only, and considering profitability rather than labour productivity as a measure of performance, the following hypothesis has been formulated:

H6: There is a positive relationship between control of foreign ownership and labour productivity in SMEs.

2. Database and Methodology

2.1 Database

In this study we use the database from the Exame Journal, a Portuguese branch of Dun & Bradstreet Consultants, concerning the 500 best Portuguese companies. The companies making up the database are initially selected annually considering volume of sales. After an initial selection, companies are selected according to a set of criteria, including growth of sales, growth of net results, sales profitability determined by current results, gross added value per sales, solvency and other economic and financial indicators.

The time period of the study covers the years between 1999 and 2003, due to the absence of information of previous years regarding capital and asset structure of companies. Given the need to use dynamic estimators to test the robustness of results and analyse the influence of the dynamism of explanatory variables on SMEs labour productivity, a uniform panel has been chosen.

Consideration of a non-uniform panel could make it impossible for certain companies that were not present in every year to analyse inter-temporal effects. As Arellano, Bond (1991) claim, for the total number of companies in a given sample to be considered under the econometric analysis and second-order autocorrelation tests, which are essential to validate the robustness of results, their presence in the database is necessary over a determined number of consecutive years, otherwise those companies would be eliminated from the econometric analysis, so we could be interpreting data for a certain number of companies and that number would necessarily be lower as a consequence of the possibility of not all being present over a determined number of consecutive years.

At a first stage the companies that belong to the database made up of the 500 best companies selected by the Exame Review have been chosen. So we obtain a panel made up of 162 companies, which are firms remaining on the database of the 500 best firms in the Exame Review carried out annually in the period between 1999 and 2003.

At a second stage small and medium-sized companies from the 162 companies initially selected have been chosen. For this selection we consider the criteria established by the European Commission in 1996: 1) assets should not above 27 million Euros; 2) volume of sales or business should not exceed 40 million Euros; and finally 3) there cannot be more than 250 employees. After combining these three criteria we select 51 SMEs that are on the database for the whole period under analysis. The total number of observations is 255.

The main aim of this study is to analyse the impact of growth of SMEs on labour productivity. For this objective to be achieved, we use three measures of growth usually presented in the literature: 1) asset growth; 2) sales growth; and 3) increase in number of employees. Therefore, we can find out if the relationship between growth and labour productivity is dependent or not on the measure of growth used.

In this study, we also use control variables in order: 1) to analyse the robustness of the results obtained previously concerning the relationship between growth and labour productivity, seeing if there are no significant changes in the magnitude and significance of the estimated parameters; 2) to enhance the analysis by introducing other variables that could explain labour productivity.

Table 1. Measurement of variables

Variables	Measurement
Dependent variables	
Labour Productivity ($L.PRO_{i,t}$)	Ratio between VAG and Number of Employees
Independent variables	
Company Growth1($GRO1_{i,t}$)	Growth of Total Assets
Company Growth2 ($GRO2_{i,t}$)	Growth of Sales
Company Growth3 ($GRO3_{i,t}$)	Growth of Number of Employees
Debt ($LEV_{i,t}$)	Ratio between Total Liabilities and Total Assets
Liquidity ($LIQ_{i,t}$)	Ratio between Current Assets and Short-Term Liabilities
Asset Structure ($TANG_{i,t}$)	Ratio between Fixed Assets and Total Assets
Shareholder Control ($OWN_{i,t}$)	*Dummy Variable that assumes the value of 1 if shareholder control belongs to foreigners and value 0 otherwise*

Source: Table created by authors.

We consider possible explanatory variables for labour productivity, as well as three measures of growth and labour productivity used for the previous period. Hence, these all refer to 1) size; 2) level of debt; 3) liquidity; 4) asset structure; and 5) ownership control. Used variables and corresponding measurement are presented in *Table 1*.

2.2 Methodology

In this study, not only the impact of growth of the firm and other variables on the labour productivity of Portuguese SMEs is considered; it is also expected to find out if that labour productivity persists over time.

For the aim to be achieved, the most suitable methodology relates to dynamic panel estimators, rather than using static panel models which could lead to bias of the estimated parameters.

Firstly, considering three previously mentioned measures of growth we present the relationship between SMEs growth and labour productivity. Then we add previously considered remaining variables as having a possible influence on labour productivity.

Therefore, we have:

Model I

$$L.PRO_{i,t} = \beta_0 + \delta L.PRO_{i,t-1} + \beta_1 GRO*_{i,t} + d_t + u_{i,t} + e_{i,t} ; \qquad (1)$$

Model II

$$L.PRO_{i,t} = \beta_0 + \delta L.PRO_{i,t-1} + \beta_1 GRO*_{i,t} + \beta_2 LEV_{i,t} + \beta_3 LIQ_{i,t} +$$
$$\beta_4 TANG_{i,t} + \beta_5 OWN_{i,t} + d_t + u_{i,t} + e_{i,t} \qquad , \qquad (2)$$

in which: $L.PRO_{i,t}$ is labour productivity of the current period; $L.PRO_{i,t-1}$ is labour productivity of the previous period; $GRO*_{i,t}$ is company growth during the current period; $LEV_{i,t}$ is debt of the current period; $LIQ_{i,t}$ is liquidity of the current period; $TANG_{i,t}$ is asset structure of the current period; $OWN_{i,t}$ is a dummy variable measuring ownership control of the current period; d_t are the dummy variables measuring the effects of possible

macroeconomic changes on labour productivity; $u_{i,t}$ are non-observable individual effects; and $e_{i,t}$ is the random error which is assumed to have normal distribution.

If we estimated equations (1) and (2) using static panel models, admitting or not correlation between non-observable individual effects and the determinants of labour productivity, given the correlation existing between $u_{i,t}$ and $L.PROD_{i,t-1}$ and between $e_{i,t}$ and $L.PROD_{i,t-1}$, we would obtain biased and inconsistent estimates of the estimated parameters, since correlation of non-observable individual effects and the error in labour productivity of the previous period can lead to bias of the estimated parameters.

For one thing, the use of dynamic estimators, given the use of the dependent and independent variable lags as instruments, allows us to eliminate companies' unobservable individual effects, eliminating in this way the correlation existing between $u_{i,t}$ and $L.PROD_{i,t-1}$. For another, use of lagged dependent and independent variables also allows for the creation of orthogonal conditions, eliminating the correlation between $e_{i,t}$ and $L.PROD_{i,t-1}$.

According to Arellano, Bond (1991), the use of dynamic estimators, given the use of lagged explanatory variables as instruments, has the added advantage of controlling possible endogeneity between explanatory variables in comparison with static panel models.

Arellano, Bond (1991) proposes equations (1) and (2) to be considered taking the first-difference estimator, and using the lagged dependent and independent variables in levels as instruments. This estimator became known as GMM (1991).

Nevertheless, in cases where we find continuity of the dependent variable with high correlation between the dependent variable of the current and previous periods, and the number of cross-sections is not very high; according to Blundell, Bond (1998) the GMM (1991) estimator may not be very efficient. Considering a system of stepped variables and first-differences Blundell, Bond (1998) proposes a new estimator. The dynamic estimator proposed by Blundell, Bond (1998), became known as GMM system (1998).

With the aim to test validity of the restrictions in the case of the GMM (1991) dynamic estimator the Sargan test is used, , and, in the case of the GMM system (1998) dynamic estimator, considering one and two stages when using the GMM system (1998) dynamic estimator, the Hansen test is applied.

In this study, we test for the existence of the first-order and the second-order autocorrelation. The null hypothesis is non-existence of autocorrelation, against the alternative hypothesis of existence of autocorrelation. In the case of rejecting the null hypothesis of non-existence of the second-order autocorrelation, we conclude that the results of the dynamic estimators cannot be considered valid.

Taking advantage of recent developments concerning dynamic estimators, we introduce the LSDVC (Least Square Dummy Variable Corrected) dynamic estimator, proposed by Bruno (2005). Bruno (2005) defines that in cases where the number of observations is not very high, use of the GMM (1991) and dynamic estimators of the GMM system (1998), given the high number of instruments generated when compared to the number of observations, can lead to biased estimates of the parameters. Because of a rather low number of observations in this study, we present the results of the LSDVC (2005) estimator, so as to test the robustness of the results obtained using the GMM (1991) and dynamic estimators of the GMM system (1998).

3. Results

3.1 Descriptive Statistics

Results concerning descriptive statistics of the variables used in this study are presented in *Table 2*.

Table 2. Descriptive Statistics

VAR.	OBSER.	MEAN	S.D.	MIN.	MAX.
$L.PROD_{it}$	255	60.838	68.657	1.6521	324.69
$GRO1_{it}$	255	0.6390	0.9807	-0.6227	2.3199
$GRO2_{it}$	255	0.8669	1.7220	-0.5863	2.1516
$GRO3_{it}$	255	0.1471	0.1851	-1.5339	1.4263
LEV_{it}	255	0.5482	0.2127	0.0848	1.0743
LIQ_{it}	255	1.7619	1.3331	0.2846	11.646
$TANG_{it}$	255	0.3887	0.2410	0.0062	0.9004
OWN_{it}	255	0.2941	0.4565	0	1

Source: Table created by authors.

Observing the results of the descriptive statistics, we see that labour productivity shows some volatility, since standard deviation of the variable is above average, the difference between the minimum and maximum value being pronounced. Three measures of company growth, i.e. 1) asset growth; 2) sales growth; and 3) increase in number of employees, also show some volatility, since standard deviations are also above the respective average, and there is also a pronounced difference between minimum and maximum values. Concerning the control variables used in this study, we can conclude that they do not show high volatility, since standard deviations are under the respective average, with the exception of the variable measuring ownership control, the volatility in this specific case resulting from the fact it is a binary variable.

3.2 Results of the Dynamic Panel Estimators

Initially, we present the results considering only the relationship between the various measures of growth and labour productivity. Afterwards, we present the results of the relationship between the various measures of growth and labour productivity but adding control variables.

Results of Model I: In the *Table 3, Table 4, Table 5* we present the results of the relationship between the various measures of growth and labour productivity used in this study.

Table 3. Dynamic Estimators ($GRO1$)- Model I

Independent Variables	GMM (1991)	GMM System (1998)	GMM System (1998) two-step	LSDVC (2005) Initial (AB)	LSDVC (2005) Initial (BB)
			Dependent Variable: $L.PRO_{i,t}$		
$L.PRO._{i,t-1}$	0.38076*	0.88172***	0.91338***	0.87855***	0.94627***
	(0.21995)	(0.04945)	(0.01341)	(0.07913)	(0.04703)
$GRO1_{i,t}$	17.0172***	22.0031***	23.3497***	21.2873***	23.5077***
	(3.8932)	(3.08839)	(1.45160)	(3.04270)	(3.04381)
$CONS$	16.3706***	12.8179***	6.94183***		
	(5.74333)	(4.51508)	(1.42423)		
Instruments	GMM	GMM System	GMM System		
Observations	153	204	204		
Wald	21.46***				
F		161.53***	2318.57***		
Sargan	1.87				
	(0.8672)				
Hansen		26.36	24.12		
		(0.154)	(0.186)		
m1	-2.78***	-2.92***	-2.75		
	(0.0054)	(0.004)	(0.006)		
m2	0.59	0.98	0.99		
	(0.5529)	(0.329)	(0.324)		

Notes: 1. Year dummies are included. 2. Heteroscedasticity consistent and asymptotic robust standard deviations are reported in brackets. 3. ***indicates significance at the 1% level and *indicates significance at the 10% level.

Source: Table created by authors.

Table 4. Dynamic Estimators ($GRO2$)- Model I

Independent Variables	GMM (1991)	GMM System (1998)	GMM System (1998) two-step	LSDVC (2005) Initial (AB)	LSDVC (2005) Initial (BB)
			Dependent Variable: $L.PRO_{i,t}$		
$L.PRO._{i,t-1}$	0.44943**	0.92073***	0.94482***	0.91563***	0.96466***
	(0.22045)	(0.07358)	(0.01065)	(0.07515)	(0.04559)
$GRO2_{i,t}$	10.7431***	13.7928***	13.2899***	13.3386***	14.2454***
	(2.10203)	(2.29833)	(0.67265)	(1.54994)	(2.46749)
$CONS$	14.7527***	8.23962*	5.30298***		
	(5.69337)	(4.93834)	(0.90019)		
Instruments	GMM	GMM System	GMM System		
Observations	153	204	204		
Wald	31.97***				
	(0.000)				
F		81.80***	3940.64***		
		(0.0000)	(0.0000)		
Sargan	2.32				
	(0.8036)				
Hansen		24.12	22.14		
		(0.189)	(0.217)		
m1	-3.01***	2.85***	-2.67***		
	(0.0027)	(0.004)	(0.008)		
m2	0.81	0.81	0.80		
	(0.4175)	(0.416)	(0.423)		

Notes: 1. Year dummies are included. 2. Heteroscedasticity consistent and asymptotic robust standard deviations are reported in brackets. 3. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Source: Table created by authors.

Table 5. Dynamic Estimators ($GRO3$)- Model I

Independent Variables	GMM (1991)	GMM System (1998)	GMM System (1998) two-step	LSDVC (2005) Initial (AB)	LSDVC (2005) Initial (BB)
$L.PRO._{i,t-1}$	-0.01600 (0.171683)	0.78042*** (0.05209)	0.80612*** (0.02844)	0.71427*** (0.08969)	0.68344*** (0.05276)
$GRO3_{i,t}$	61.0374*** (17.6889)	59.9377*** (18.0530)	55.04599*** (3.23411)	64.2099*** (13.3473)	63.4171*** (6.5482)
$CONS$	23.8239*** (4.92143)	30.1421*** (4.17869)	23.2466*** (2.69375)		
Instruments	GMM	GMM System	GMM System		
Observations	153	204	204		
Wald	13.50*** (0.0000)				
F		117.02*** (0.0000)	1545.25*** (0.0000)		
Sargan	2.12 (0.829)				
Hansen		11.41 (0.478)	10.79 (0.508)		
m1	-0.89 (0.3755)	-6.61*** (0.000)	-3.31*** (0.001)		
m2	-0.76 (0.4474)	1.14 (0.256)	1.42 (0.156)		

Notes: 1. Year dummies are included. 2. Heteroscedasticity consistent and asymptotic robust standard deviations are reported in brackets. 3. *** indicates significance at the 1% level.

Source: Table created by authors.

Observing the results of the Sargan, Hansen tests, in all estimations, we can conclude that we cannot reject the null hypotheses suggesting that the restrictions, generated by use of the instruments, are valid.

The results of the second-order autocorrelation tests, in all estimations, indicate that we cannot reject the null hypotheses of absence of the second-order autocorrelation.

Therefore, considering the results of the Sargan, Hansen tests, as well as the results of the second-order autocorrelation tests, we can conclude that application of the GMM (1991) and dynamic estimators of the GMM system (1998) in one stage, and dynamic estimator of the GMM system (1998) in two stages, lead us to results which can be interpreted due to their validity.

The results obtained from application of the LSDVC (2005) dynamic estimator corroborate those obtained using the GMM (1991) and dynamic estimators of the GMM system (1998) in one stage and dynamic estimator of the GMM system (1998) in two stages. The exception concerns use of the GMM (1991) dynamic estimator, where: the relationship between labour productivity of the previous period and labour productivity of the current period is not statistically significant, when we consider the increase in the number of employees; it relates to 10% statistical significance with reference to asset growth; and it is statistically significant at 5% significance when considering growth of sales. As Blundell and Bond (1998) claim, these results are obtained possibly due to the high persistence of the dependent variable. Calculating the correlation coefficient between labour productivity of the previous period and labour productivity of the current period, we obtain a value of 0.7614. Given a rather low number of periods and high continuity of the dependent variable, there will be some bias of the estimated parameter that measures the relationship between labour productivity in the previous and current periods. We should note that when we apply the

LSDVC (2005) dynamic estimator, correcting the results of the GMM (1991) dynamic estimator, the estimated parameters are close to those obtained using the GMM system (1998) dynamic estimator in terms of their magnitude and statistical significance.

Results of Model II: The results obtained by adding the remaining variables used in this study are presented in the *Table 6, Table 7, Table 8*.

Table 6. Dynamic Estimators ($GRO1$)- Model II

Dependent Variable: $L.PRO_{i,t}$					
Independent Variables	GMM (1991)	GMM System (1998)	GMM System (1998) two-step	LSDVC (2005) Initial (AB)	LSDVC (2005) Initial (BB)
$L.PRO_{i,t-1}$	0.28828 (0.23694)	0.762957*** (0.08961)	0.773025*** (0.02853)	0.70296*** (0.10613)	0.806490*** (0.05874)
$GRO1_{i,t}$	9.04937 (7.0034)	20.1385*** (4.32813)	19.77607*** (1.46905)	17.1964*** (3.61371)	19.9254*** (3.36841)
$LEV_{i,t}$	76.0486** (35.3360)	68.4952*** (26.2602)	57.81226*** (9.09566)	73.5474*** (27.3370)	74.2307*** (28.3192)
$LIQ_{i,t}$	13.3757*** (4.69600)	12.72468*** (3.47423)	11.77648*** (1.00931)	10.90971*** (2.73149)	11.3649*** (2.84815)
$TANG_{i,t}$	-63.1658** (27.4201)	-45.06161*** (16.9532)	-48.60614*** (2.63414)	-69.1731*** (20.0801)	-65.1397*** (20.6686)
$OWN_{i,t}$	0.55906 (46.2889)	27.86838** (12.9075)	26.31384*** (1.75692)	-20.6098 (40.7654)	-29.1968 (36.2639)
$CONS$	6.399066 (6.48842)	-31.12415 (73.2621)	-34.8948*** (8.02839)		
Instruments	GMM	GMM System	GMM System		
Observations	153		204		
Wald	45.21*** (0.000)				
F		43.04*** (0.0000)	9711.52*** (0.0000)		
Sargan	6.86 (0.2309)				
Hansen		43.06 (0.195)	45.65 (0.362)		
m1	-2.07*** (0.0381)	-2.35*** (0.019)	-2.65*** (0.008)		
m2	0.98 (0.3263)	0.78 (0.434)	0.86 (0.392)		

Notes: 1. Year dummies are included. 2. Heteroscedasticity consistent and asymptotic robust standard deviations are reported in brackets. 3. *** indicates significance at the 1% level and ** indicates significance at the 5% level.

Source: Table created by authors.

Table 7. Dynamic Estimators ($GRO2$)- Model II

Dependent Variable: $L.PRO_{i,t}$					
Independent Variables	GMM (1991)	GMM System (1998)	GMM System (1998) two-step	LSDVC (2005) Initial (AB)	LSDVC (2005) Initial (BB)
$L.PRO_{i,t-1}$	0.37107 (0.25585)	0.837827*** (0.08447)	0.83735*** (0.017471)	0.775057*** (0.103465)	0.86765*** (0.05426)
$GRO2_{i,t}$	8.65362** (3.83997)	11.43532*** (2.067711)	11.17506*** (0.53936)	11.1372*** (1.86060)	12.73269*** (1.62768)
$LEV_{i,t}$	51.6114 (36.3203)	68.7486*** (25.45934)	58.5056*** (6.96507)	44.87401*** (5.42712)	40.5478*** (5.28140)
$LIQ_{i,t}$	12.5443*** (4.32624)	11.18309*** (3.42168)	10.1369*** (0.71705)	9.4969*** (2.6446)	9.58718*** (2.72096)
$TANG_{i,t}$	-25.6672 (35.1045)	-31.4981* (16.2993)	-25.8560*** (1.80798)	-38.2953*** (6.49718)	29.2145*** (6.7702)

Table 7 (continue). Dynamic Estimators ($GRO2$)- Model II

$OWN_{i,t}$	-4.36447	35.46338**	31.5336***	-26.14081	-30.70765
	(45.8451)	(14.5177)	(3.08801)	(38.0017)	(34.1878)
$CONS$	10.7221*	-3.12867	-17.3216**		
	(6.35594)	(63.8652)	(7.44756)		
Instruments	GMM	GMM System	GMM System		
Observations	153	204	204		
Wald	45.99***				
	(0.000)				
F		52.59***	31403.58***		
		(0.000)	(0.000)		
Sargan	5.28				
	(0.3824)				
Hansen		41.95	45.28		
		(0.228)	(0.377)		
m1	-2.31**	-5.56***	-2.68***		
	(0.0211)	(0.0000)	(0.007)		
m2	1.31	0.88	0.76		
	(0.1903)	(0.379)	(0.450)		

Notes: 1. Year dummies are included. 2. Heteroscedasticity consistent and asymptotic robust standard deviations are reported in brackets. 3. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Source: Table created by authors.

Table 8. Dynamic Estimators ($GRO3$)- Model II

	Dependent Variable: $L.PRO_{i,t}$				
Independent Variables	GMM (1991)	GMM System (1998)	GMM System (1998) two-step	LSDVC (2005) Initial (AB)	LSDVC (2005) Initial (BB)
$L.PRO_{i,t-1}$	0.021108	0.652039***	0.704197***	0.554022***	0.585418***
	(0.16025)	(0.057117)	(0.03197)	(0.07646)	(0.01929)
$GRO3_{i,t}$	63.6494***	48.14799***	53.42798***	58.73597***	60.9915***
	(17.4110)	(17.74955)	(15.0127)	(14.0879)	(10.41217)
$LEV_{i,t}$	68.2734**	58.7948***	56.71297***	68.4166***	62.47912***
	(31.4134)	(22.8129)	(20.8179)	(17.918)	(17.7179)
$LIQ_{i,t}$	2.96182	5.53997*	6.23149***	4.13054***	4.46806***
	(4.15747)	(3.02199)	(1.04179)	(0.82417)	(0.42682)
$TANG_{i,t}$	-45.6833***	-40.1401***	-42.4298***	-40.6607***	-36.4971***
	(14.0101)	(13.0648)	(10.7989)	(5.45944)	(6.719872)
$OWN_{i,t}$	31.4007	22.2282*	27.42971**	26.0863	17.19223
	(39.3254)	(12.2017)	(11.4712)	(38.3677)	(41.41278)
$CONS$	7.70505	-168.019***	-185.693***		
	(6.13636)	(50.8379)	(6.96749)		
Instruments	GMM	GMM System	GMM System		
Observations	153	204	204		
Wald	65.85***				
	(0.000)				
F		62.14***	5357.75***		
		(0.000)	(0.000)		
Sargan	4.13				
	(0.519)				
Hansen		48.38	45.44		
		(0.118)	(0.256)		
m1	-0.85	-2.98***	-2.78***		
	(0.3971)	(0.003)	(0.005)		
m2	0.56	1.30	1.31		
	(0.5733)	(0.193)	(0.192)		

Notes: 1. Year dummies are included. 2. Heteroscedasticity consistent and asymptotic robust standard deviations are reported in brackets. 3. *** indicates significance at the 1% level, ** indicates significance at the 5% level, and * indicates significance at the 10% level.

Source: Table created by authors.

The results of the Sargan, Hansen tests, in all estimations carried out, when introducing the remaining variables that could influence labour productivity, allow us to come to a conclusion, as before, that we can reject the null hypotheses that the restrictions generated by the instruments are valid.

The second-order autocorrelation tests, in all estimations carried out, allow us to conclude that we cannot reject the null hypotheses regarding absence of the second-order autocorrelation.

The results of the Sargan, Hansen and the second-order autocorrelation tests, when adding the remaining variables over and above the measures of growth, allow us to argue that the results of the GMM (1991) and GMM system (1998) dynamic estimators in one stage and the GMM system (1998) dynamic estimator in two stages can be considered valid and can therefore be interpreted.

It should be noted that inclusion of control variables did not mean a substantial change in the previously estimated results, concerning magnitude and statistical significance of the estimated parameters that measure the relationship between the various measures of growth and labour productivity.

Based on the results obtained from models I and II, we can draw the following conclusions: 1) we find a positive and statistically significant relationship between growth and labour productivity in Portuguese SMEs; 2) we find a positive and statistically significant relationship between labour productivity of the previous period and labour productivity of the current period in Portuguese SMEs; 3) we find a positive and statistically significant relationship between the level of debt and labour productivity in Portuguese SMEs; 4) we find a positive and statistically significant relationship between the level of liquidity and labour productivity in Portuguese SMEs; 5) we find a negative and statistically significant relationship between asset tangibility and labour productivity in Portuguese SMEs; and 6) we do not find a statistically significant relationship between the dummy variable that measures control of foreign ownership, and labour productivity in Portuguese SMEs.

4. Discussion of the Results

The empirical evidence, considering three measure of growth, indicates a positive relationship between growth and labour productivity in Portuguese SMEs context. This result to validate the hypothesis H1.

This result obtained in Portuguese SMEs context are according the conclusions of Delmar *et al.* (2003) and Rogers (2004) that growth to contribute, respectively, to gains resulting to diversification of activities and product, and to high investment in innovation activities.

The relationship obtained in Portuguese SMEs context do not corroborate the conclusions of Davidsson (1989), Delmar *et al.* (2003) and Wiklund *et al.* (2003), that high growth may cause higher uncertainty, can contribute to less labour productivity.

The conclusions of Wiklund *et al.* (2003) and Rogers (2004) are uncorroborated by the empirical evidence obtained in Portuguese SMEs context. Effectively, more possible formal relationships between employees, i.e. the breaking of that most informal employees relations are accustomed in smaller companies, result of the high growth, do not contribute do less labour productivity. On the contrary, the greater motivation resulting of the high growth seems to assume particular relevance in Portuguese SMEs context, overcoming the possible

negative effects of growth resulting of high employee's formality relationships, contributed to high labour productivity.

Empirical evidence of this study allows us to come to a conclusion that there is continuity of labour productivity in Portuguese SMEs, since we find a positive and significant relationship between labour productivity of the previous and current periods, and so we can validate hypothesis H2 of this study.

The results obtained allow us to conclude that labour productivity in Portuguese SMEs is not haphazard, but rather assumes a continuous process. The values for labour productivity persistence are quite significant, clearly above 0.5 in most estimations, with the exception of the results obtained using the GMM (1991) estimator. Obtained persistency values indicate that labour productivity in Portuguese SMEs remains relatively constant over time.

Empirical evidence of high persistency of labour productivity in Portuguese SMEs does not corroborate the arguments of Dilling – Hansen (2005) that significant persistence of performance is essentially a characteristic of large companies. It corroborates rather the arguments of Hawawini *et al.* (2003) and Schumacher and Boland (2005) that persistence of performance is not significantly influenced by size.

A positive relationship between the level of debt and labour productivity in Portuguese SMEs allows us to accept hypothesis H3 of this study as valid.

A positive relationship between the level of debt and labour productivity in Portuguese SMEs allows us to corroborate the arguments of Jensen (1986) and Geroski (2005), that recourse to debt can contribute to increased employee efficiency, since they realize a greater possibility of bankruptcy and consequently the greater need for rigour, greater employee collaboration and commitment, permitting increased productivity and corroborating the arguments of Greiner (1972).

The result of the relationship between the level of debt of Portuguese SMEs and labour productivity confirms the results obtained by Schiantarelli, Sembenelli (1997) and Smith *et al.* (2004), although these studies do not concern specifically SMEs.

A positive relationship between the liquidity of Portuguese SMEs and labour productivity allows us to accept hypothesis H4 of this study as valid.

The liquidity of Portuguese SMEs assumes relevance in increased labour productivity, corroborating the arguments of Deloof (2003) and Faggiolo, Luzzi (2006) that greater liquidity allows SMEs to cope with possible changes in their environment, take advantage of good business opportunities, consequently permitting increased performance.

The relationship obtained in this study between the liquidity of Portuguese SMEs and labour productivity supports the results obtained by Schiantarelli, Sembenelli (1997) and Smith *et al.* (2004), although the authors' studies do not specifically deal with SMEs.

A negative correlation between the asset tangibility of Portuguese SMEs and labour productivity allows us to validate hypothesis H5 of this study.

The obtained result allows us to conclude that the possibility of a higher level of intangible assets can lead to Portuguese SMEs reaching better rates of performance, namely concerning labour productivity, given the greater tendency towards innovating activities, compared with companies with a higher level of tangible assets, corroborating the conclusions of Nucci *et al.* (2005).

A negative relationship between the level of tangible assets of Portuguese SMEs and labour productivity follows the results of Schiantarelli, Sembenelli (1997) and Smith *et al.* (2004), although these studies do not deal specifically with SMEs.

A statistically insignificant relationship between the dummy variable measuring control of foreign ownership of Portuguese SMEs and labour productivity does not allow us to validate hypothesis H6 of this study.

Foreign ownership control of Portuguese SMEs does not mean increased labour productivity. Firstly, the obtained result does not confirm the arguments of Berger *et al.* (1992) and Joseph, Hewins (1997) that control of foreign ownership allows a greater possibility of diversification of activities and product and for obtaining lower levels of risk, contributing to improved performance. Secondly, it does not corroborate the arguments of Markusen, Venables (1999) and Becchetti, Trovato (2002) that foreign ownership control of SMEs can make new growth dynamics and greater export capacity possible, these aspects meaning improved performance.

The result obtained in this study, concerning the absence of a relationship between foreign ownership control of SMEs and labour productivity relates to the result Goedhuys *et al.* (2006).

Conclusions

Considering three measures of growth: 1) asset growth, 2) sales growth, and 3) employees growth, and using GMM system (1998) and LSDVC (2005) dynamic estimators, in this paper we tested the relationship between growth and labour productivity in SMEs context. The empirical evidence indicates the positive, and statistically significant, relationship between growth and labour productivity.

The positive influence of growth on labour productivity of SMEs is indicative that positive effects of growth, namely the greatest expertise and motivation of employees, as well as efficiency gains as a result of larger scale of firms, is more relevant than the negative effects of breakdown of informal relationships between owners/managers and employees.

We also consider other possible explanatory variables of labour productivity of SMEs, i.e. 1) labour productivity in previous period; 2) debt; 3) liquidity; 4) assets tangibility; and 5) ownership control by foreigners. The results indicate that debt and liquidity positively influence labour productivity of SMEs, while the assets tangibility influences negatively labour productivity of SMEs. In addition, the labour productivity is persistent, i.e. labour productivity of the previous period positively affects labour productivity in the current period. Finally, the ownership control by foreigners has no influence on the labour productivity of SMEs.

The persistence of labour productivity is indicative that higher levels of labour productivity not occur occasionally, but are the result of continuity over time. In addition, the positive influence of debt and of the liquidity on labour productivity is indicative that, on one hand, the debt contributes to greater discipline and cooperation among employees and, on the other hand, the liquidity contribute to reducing the "stress" in the management of financial resources allowing enjoy good investment opportunities. The negative influence of assets tangibility on labour productivity of SMEs reveals that the lower propensy of innovative activities of SMEs, consequence of greater assets tangibility, contributes to lower levels of labour productivity. Finally, the ownership control by foreigners does not contribute to increased labour productivity of SMEs, so we cannot conclude that the possibility of greater diversification of activities result of operation in other markets does not contribute to the increase in labour productivity of SMEs.

Given the great importance of SMEs in the Portuguese economy context, empirical evidence support the suggestions for policy makers, as well as suggestions for owners/managers of SMEs. For policy makers: 1) given the relevance of debt to increased the labour productivity of SMEs, and considering the particular difficulties of SMEs in accessing debt, we suggest the creation of special credit lines to support SMEs to reveals good investment projects but difficulties in access to debt in favourable terms; and 2) we suggest financial support for SMEs with greater propensity innovative, since the greater innovation propensity contribute to higher level of labour productivity of SMEs. For owners/managers of SMEs: 1) we suggest seek to increased their levels of liquidity by increasing the payment terms of its debt, so that it would result in an increase labour productivity; and 2) we suggest for owners/managers of SMEs with higher assets tangibility seek to monitor the employees action, so that the lower innovative propensity of this type of SMEs does not result in a decrease in labour productivity.

References

Adams, M. (1996), "Investment Earnings and the Characteristics of Life Insurance Firms: New Zealand Evidence", *Australian Journal of Management*, Vol. 21, No 1, pp.41-55.

Adams, M., Buckle, M. (2003), "The Determinants of Corporate Financial Performance in the Bermuda Insurance Market", *Applied Financial Economics*, Vol. 13, No 2, pp.133-143.

Arellano, M., Bond, S. (1991), "Some Tests of Specification for Panel Data: Monte Carlo Evidence and Application to Employment Equations", *Review of Economic Studies*, Vol. 58, No 2, pp.277-297.

Baum, J., Locke, E., Smith, K. (2001), "A Multidimensional Model of Venture Growth", *Academy of Management Journal*, Vol. 44, No 2, pp.292-303.

Becchetti, L., Trovato, G. (2002), "The Determinants of Growth for Small and Medium Sized Firms", *Small Business Economics*, Vol. 19, No 4, pp.291-306.

Berger, A., Cummins, J., Tennyson, S. (1992), "Reinsurance and the Liability Crisis", *Journal of Risk and Uncertainty*, Vol. 5, No 3, pp.253-272.

Berger, A., Herring, R., Szego, G. (1995), "The Role of Capital in Financial Institutions", *Journal of Banking and Finance*, Vol. 19, No 3-4, pp.393-430.

Blundell, M., Bond, S. (1998), "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models", *Journal of Econometrics*, Vol. 87, No 1, pp.115-143.

Bruno, G. (2005), "Approximating the Bias of LSDV Estimator for Dynamic Unbalanced Panel Data Models", *Economic Letters*, Vol. 87, No 3, pp.361-366.

Chandler, G., Jensen, E. (1992), "The Founder's Self-Assessed Competence and Venture Performance", *Journal of Business Venturing*, Vol. 7, No 3, pp.223-236.

Cowling, M. (2004), "The Growth-Profit Nexus", *Small Business Economics*, Vol. 22, No 1, pp.1-9.

Cressy, R., Olofsson, C. (1996), "The Financial Conditions for Swedish SMEs: Survey and Research Agenda", *Small Business Economics*, Vol. 9, No 2, pp.179-194.

Davidsson, P. (1989), "Entrepreneurship-and After? A Study of Growth Willingness in Small Firms", *Journal of Business Venturing*, Vol. 4, No 3, pp.211-226.

Delmar, F., Davidsson, P., Gartner, W. (2003), "Arriving at the High-Growth Firm", *Journal of Business Venturing*, Vol. 18, No 2, pp.189-216.

Deloof, M. (2003), "Does Working Capital Management Affect Profitability of Belgian Firms", *Journal of Business Finance and Accounting*, Vol. 30, No 3-4, pp.573-588.

Dilling-Hansen, M. (2005), "Small Firms Performance and Ownership Structure", *Working Paper of the School of Economics and Management*, University of Aarhus, Denmark.

Fagiolo, G., Luzzi, A. (2006), "Do Liquidity Constrains Matter in Explaining Firm Size and Growth? Some Evidence from the Italian Manufacturing Industry", *Industrial and Corporate Change*, Vol. 15, No 4, pp.1-39.

Fu, T., Ke, M., Huang, Y. (2002), "Capital Growth, Financing Source and Profitability of Small Businesses: Evidance from Taiwan Small Enterprises", *Small Business Economics*, Vol. 18, No 4, pp.257-267.

Geroski, P., Kretschmer, T., Walters, C. (2005), "Corporate Productivity Growth: Leaders and Laggards", available at, www.lse.ac.uk/collections/IIM/pdf/Geroski_Kretschmer_Walters_Growth.pdf, referred on 15/14/2009.

Goddard, J., Tavakoli, M., Wilson, J. (2005), "Determinants of Profitability in European Manufacturing and Services: Evidence From a Dynamic Panel Data", *Applied Financial Economics*, Vol. 15, Issue 18, pp.1269-1282.

Goedhuys, M., Janz, N., Mohnen, P. (2006), "What Drives Productivity in Tanzanian Manufacturing Firms: Technology or Institutions?", *Working Paper United Nations University*, Maastricht Economic and Social Research and Training Centre on Innovation and Technology, UNU-MERIT Working Paper Series, No 037.

Greiner, L. (1972), "Evolutions and Revolutions as Organizations Grow", *Harvard Business Review*, Vol. 50, No 4, pp.37-46.

Gschwandtner, A. (2005), "Profit Persistence in the 'Very' Long Run: Evidence from Survivors and Exiters", *Applied Economics*, Vol. 37, No 7, pp.793-806.

Hawawini, G., Subramanian, V., Verdin, P. (2003), "Is Performance Driven by Industry or Firm-Specific Factors? A New Look at the Evidence", *Strategic Management Journal*, Vol. 24, No 1, pp.1-16.

Heskel, J. (1999), "Small Firms, Contracting-Out, Computers and Wage Inequality: Evidence from UK Manufacturing", *Economica*, Vol. 66, No 261, pp.1-21.

INE – Instituto Nacional de Estatística (2004), Lisboa, Portugal, available at, http:/www.ine.pt, referred on 25/05/2009, [INE – National Institute of Statistics, *in Portuguese*].

Jensen, M. (1986), "Agency Costs of Free Cash Flow, Corporate Finance and Takeover", *American Economic Review: Papers and Proceedings*, Vol. 76, No 2, pp.323-329.

Joseph, M., Hewins, R. (1997), "The Motives for Corporate Hedging among UK Multinationals", *International Journal of Finance and Economics*, Vol. 2, No 2, pp.151-171.

Low, M., MacMillan, I. (1988), "Entrepreneurship: Past Research and Future Challenges", *Journal of Management*, Vol. 14, No 2, pp.139-161.

Markman, G., Gartner, W. (2002), "Is Extraordinary Growth Profitable? A study of Inc. 500 High Growth Companies", *Entrepreneurship Theory and Practice*, Vol. 27, No 1, pp.65-75.

Mendelson, H. (2000), "Organizational Architechture and Successin the Information Technology Industry", *Management Science*, Vol. 46, No 4, pp.513-529.

Nucci, F., Pozzolo, A., Schivardi, F. (2005), "Is Firm's Productivity Related to its Financial Structure? Evidence From Microeconomic Data", *Working Paper, Banca d'Italia, Research Department*.

Markusen, J., Venables, A. (1999), "Foreign Direct Investment as a Catalyst for Industrial Development", *European Economic Review*, Vol. 43, No 2, pp.335-356.

Rogers, M. (2004), "Networks, Firm Size and Innovation", *Small Business Economics*, Vol. 22, No 2, pp.141-153.

Rollag, K. (2001), "How Fust Growth Promotes Rapid Socialization in Entrepreneurial Firms", in: W.D. Bygrave, E. Autio, C.G. Brush, P. Davidsson, P.G. Green, P.D. Reyonlds, H.J. Sapienza (eds.), *Frontiers of Entrepreneurship Research*, Wellesley, M.A., Babson College.

Roper, S. (1999), "Modelling Small Business Growth and Profitability", *Small Business Economics*, Vol. 13, No 3, pp.235-252.

Russeeuw, P. (1997), "Estimating the Determinants of Financial Performance of Very Small Service Firms", *Conference Proceedings of USASBE-United States Association for Small Business and Entrepreneurship*, San Francisco, California.

Schiantarelli, F., Sembenelli, A. (1997), "The Maturity Structure of Debt, Policy", *Research Working Paper 1699*, The world Bank Policy Research Department Finance and Private Sector Development Division.

Schumacher, S., Boland, M. (2005), "The Persistence of Profitability among Firms in the Food Economy", *American Journal of Agriculture Economics*, Vol. 87, No 1, pp.103-107.

Smith, V., Harsenm, M., Eriksson, T., Madsen, E. (2004), "R&D Productivity in Danish Firms: Some Empirical Evidence", *Applied Economics*, Vol. 36, No 16, pp.1797-1806.

Storey, D. (1994), *Understanding the Small Business Sector*, London, Routledge.

Wells, B., Cox, L., Garver, K. (1995), "Free Cash Flow in the Life Insurance Industry", *The Journal of Risk and Insurance*, Vol. 62, No 1, pp.50-66.

Wiklund, J. (1999), "The Sustainability of the Entrepreneurial Orientation – Performance Relationship", *Entrepreneurship Theory & Practice*, Vol. 24, No 1, pp.37-48.

Wiklund, J., Davidson, P., Delmar, F. (2003), "Expected Consequences of Growth and Their Effect on Growth Willingness in Different Samples of Small Firms", *Entrepreneurship Theory & Practice*, Vol. 27, No 3, pp.247-269.

Yoon, S. (2004), "A Note on the Market Structure and Performance in Korean Manufacturing Industries", *Journal of Policy Modelling*, Vol. 26, No 6, pp.733-746.

ĮMONĖS AUGIMO IR DARBO NAŠUMO RYŠYS PORTUGALIJOS MVĮ: DINAMINIS DUOMENŲ METODAS

Paulo Maçãs Nunes, Zélia Serrasqueiro, **António Nunes**, **Luis Mendes**

SANTRAUKA

Šiame straipsnyje, taikant įvairius dinaminės skalės statistinius įvertinimus ir atsižvelgiant į tris kompanijos plėtros rodiklius, įsitikinama, kad egzistuoja teigiamas santykis tarp augimo ir darbo našumo mažose ir vidutinėse Portugalijos įmonėse. Remiantis gautais rezultatais, prieinama prie išvados, kad darbo našumas išlieka pastovus, bėgant laikui, ir vidutinės įmonės, kurių įsiskolinimo ir likvidumo lygis aukštesnis, o materialaus turto – mažesnis, pasižymi didesniu darbo našumu. Rezultatai rodo, kad motyvacija, našumas ir didesnės atsakomybės darbuotojams suteikimas tampa vis svarbesni, kuomet dėl didėjančio įmonės augimo susiduriama su galimu neformalių darbo santykių nutrūkimu.

REIKŠMINIAI ŽODŽIAI: įmonės augimas, dinaminės skalės duomenys, darbo našumas, MVĮ (Mažos ir Vidutinės Įmonės).