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Abstract

The paper quantifies the role of factors associated with the growth (or decline) of micro and small businesses in European economies. The growth is related to the levels of employment and value added in enterprises, as well as, ten institutional variables. We test the data for consistency of behavioural patterns in various countries and gradually remove outlying observations that can lead to erroneous conclusions when using the classic estimators; this is a quite unique approach in panel data analysis. In the first part of this paper we outline a highly robust method of estimation based on fixed effects and least trimmed squares (LTS). In its second part we apply this method on the panel data of 28 countries in 2002–2008 testing for the hypothesis that micro and small businesses in Europe use different strategies for their growth. We run a series of econometric tests where we regress employment and total net production in micro and small businesses on three economic factors: gross capital returns, labour cost gaps in small relative to large enterprises and GDP *per capita*. In addition, we test the role of 10 institutional factors in the growth of family businesses.

Keywords: family business, robust estimator, LTS, fixed effects

JEL Classification: C01, C23, C51, C82, F21, F40

1. Introduction

As a consequence of the worldwide financial and economic crisis, there is a renewed rising interest in the performance of small and family businesses which for many researchers and politicians present a crucial vehicle that drives upward movements in both employment and competition levels throughout the world's economies. This research is a follow-up to the analysis of Benáček, Michalíková (2010), in which we assessed the role of economic and institutional factors on the rise and decline of family businesses and applied them to an analysis of data concerning micro- and small businesses in 28 countries of Europe by means of panel data for the years 2002–2008. We discovered that this specific data on micro- and small businesses in so many different countries did not demonstrate a homogenous pattern of behaviour in firms that differ not only in sizes, but also as regards the various institutional setups that also change over time. In this research

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we have tested the potential for such a heterogeneity in the behaviour of small family businesses in various countries that may be demonstrated by separating the original panel data into two subpopulations. Hence, we have concentrated our analysis on the techniques of robust estimation.

In this paper, we apply a robust version of the classic within-group estimator on data of two groups of family businesses. In Section 2, we describe and apply a robust version of the classic within-group estimator on data of the two groups of family businesses. In Section 3, we describe the role of family businesses at the present time. In Section 4, we apply a robust version of the within-group estimator on economic data relating to family businesses and we examine how employment and net production in family businesses depend on two relative indicators representing benefits and costs in small (or micro) and large enterprises. Additional explanatory variables include the GDP *per capita* and ten institutional variables. Section 5 summarizes our findings.

2. Robust Estimators and Robust Estimation of Panel Data Models

Classic methods of estimation rely heavily on assumptions, which are often not met in practice. Unfortunately, some values of variables often happen to fall far away from other observations in the sample. These discrepant values might be the result of reporting errors, different methodologies used by the reporters or idiosyncracities in the behaviour of observed agents. The risk of incidence of all these disturbances is quite high in panel data in which the time and the geographic discontinuity may lead to data inconsistency. Observations of the latter sort are referred to as *outliers*. They are often derived by errors and omissions in the data collection process. However, outliers can also be generated when reporters mix up two or more subpopulations of data that represent agents, whose behaviour is mutually inconsistent. An example of this occurrence is the case when the analysts presume that micro businesses (such as self-employed persons) and businesses up to 50 employees follow identical strategies for their growth in all studied countries, irrespective of the varying institutional arrangements.

These kinds of inconsistencies which occur when carrying out observations are our main concern. Small family businesses are subject to specific circumstances that increase the uncertainty and inconsistency of their reported data. Their accountancy need not always be done by professionals and thus more open to errors and omissions. Their true production, employment and costs can be rigged due to much easier tax evasion. Reporting to statistical offices is irregular, relying on random (often non-representative) samples and the feedback on its accuracy is limited as well, varying by countries. Thus, a robust technique of their estimation is a necessary and adequate approach in order to avoid the traps and pitfalls that result from using biased data.

Since robust estimation has not been the standard technique of analysis in this kind of panel data, we will first describe our approach to data processing in which the central issue focuses on outliers. The term *robust estimator* denotes an estimator that is not strongly affected by outliers. It means that the main aim is to fit a regression to the dominant interrelations in the data and then discover the outliers for future treatment. As a measure of robustness we should consider the existence of the *breakdown point* of estimators. Generally speaking, the breakdown point of an estimator is defined as the smallest fraction of an outlying observation that causes a breakdown of the estimator (Rousseeuw, Leroy, 1987).

Many statisticians believe that outliers can be identified simply by eye through the use of graphs. However, it is difficult to diagnose outliers by eye, especially in the case of panel data because large panels of countries, companies, or other agents may contain atypical observations or gross errors subject to a multitude of exogenous variables. Unfortunately, econometrics is limited to a scant amount of literature describing robust methods for panel data¹. We will try to find a robust alternative to the within-group estimator² which can be affected by the presence of outlying observations. The breakdown point is the measure of robustness and the least trimmed squares is the estimator with high breakdown point. We will focus on the second applicable 50% breakdown point estimator – the least trimmed squares – LTS (Rousseeuw, 1983). We will describe a high breakdown point estimator for the fixed effects panel data model based on LTS as an estimation procedure, which is less sensitive to the presence of aberrant observations.

We consider the following form of the fixed effects linear panel data model:

$$y_{it} = \alpha_i + x_{it}'\beta + \varepsilon_{it}, \quad i = 1, \dots, N; \quad t = 1, \dots, T \quad (1)$$

where i denotes the cross-section dimension (number of countries) and t denotes the time-series dimension (number of years). x_{it} is a column vector of explanatory variables with dimension $K \times 1$ while β is a $K \times 1$ vector of regression parameters. α_i is the unobservable time-invariant individual fixed effects and ε_{it} is the error terms or disturbance terms, uncorrelated through time and through cross-sections.

The classical within-group estimators for fixed effect panel data models is based on centering within every time-series:

$$\hat{y}_{it} = y_{it} - \frac{1}{T} \sum_{t=1}^T y_{it}, \quad \hat{x}_{it} = x_{it} - \frac{1}{T} \sum_{t=1}^T x_{it},$$

and then the basic form of the fixed effects panel data models, described in (1), can be expressed as:

$$\hat{y}_{it} = \hat{x}_{it}'\beta + \hat{\varepsilon}_{it}, \quad i = 1, \dots, N; \quad t = 1, \dots, T \quad (2)$$

where $\hat{\varepsilon}_{it} = \varepsilon_{it} - \frac{1}{T} \sum_{t=1}^T \varepsilon_{it}$, and the fixed effects α_i have disappeared from the model (2) by the centering operation. Then we can regress \hat{y}_{it} on \hat{x}_{it} by OLS and we will get within-group estimator denoted by $\hat{\beta}_{WG}$. Of course, fixed effects parameters can be estimated as well (Baltagi, 1998). Centering has a crucial advantage because it enormously reduces the number of parameters.

In order to get a *robust* version of this estimator we have to center the time series *robustly* and then a robust regression will be applied to the centered data. The time-series must be centered by removing the median instead of mean because the mean is largely distorted by outliers since the median is known to be min-max robust (Huber, 1981). We will get:

$$\tilde{y}_{it} = y_{it} - \text{med}_t(y_{it}), \quad \tilde{x}_{it}^{(j)} = x_{it}^{(j)} - \text{med}_t(x_{it}^{(j)})$$

where $i = 1, \dots, N; \quad t = 1, \dots, T$ and $j = 1, \dots, K$. $x_{it}^{(j)}$ denotes the j -th explanatory variable measured at time t in the i -th time-series. The number of parameters is reduced as in the

1 Kalina (2012) described robust version of instrumental variables with application to economic data.

2 Since our panel contain all countries of interest, the fixed effects model is more appropriate than a random effects models for our dataset.

case of de-meaning. This implies that computation time for robust regression algorithm remains feasible (Bramati and Croux, 2004). Therefore, we can run a robust estimator (and regress \tilde{y}_{it} on \tilde{x}_{it} to identify the outliers). For this purpose we will apply the LTS estimator on centered data. LTS estimator is defined as $\hat{\beta}_{LTS}$ which minimizes the sum of the smallest h squared residuals:

$$\hat{\beta}_{LTS} = \arg \min_{\beta} \sum_{k=1}^h (\tilde{y}_k - \tilde{x}_k' \beta)_{(i)}^2$$

where

$$(\tilde{y}_k - \tilde{x}_k' \beta)_{(1)}^2 \leq (\tilde{y}_k - \tilde{x}_k' \beta)_{(2)}^2 \leq \dots \leq (\tilde{y}_k - \tilde{x}_k' \beta)_{(k)}^2 \leq \dots \leq (\tilde{y}_k - \tilde{x}_k' \beta)_{(NT)}^2$$

are ordered squared residuals (Rousseeuw, 1983). The value $1 \leq h \leq NT$ is a trimming value. As mentioned before, this estimator has a breakdown point attaining 50%. A default choice can be $h = \lceil 3NT/4 \rceil$ or $h = \lceil 4NT/5 \rceil$, making it possible to cope with up to 25% of outliers (or 20%, respectively) or we can select h sufficiently small to reach an acceptable coefficient of determination of the model. The advantages of the LTS estimator are its properties: the LTS estimator in its basic version is regression, scale, and affine equivariant (Rousseeuw, 1983). However, due to the nonlinearity of the centering transformation by the median β_{LTS} is only scale equivariant (Bramati and Croux, 2004). We can use this algorithm directly: centering the data by median, using least trimmed squares and discovering the outliers. Then we can work with the rest of the data and regress dependent variable on other regressors (Benáček, Víšek, 2000; Verardi, Wagner, 2010). However, it can also be employed in a different way by using outliers only as a diagnostic tool to recognize “suspicious” behaviour of an agent. In other words, we can drop out whole groups of agents (firms, countries, *etc.*) where most of the observations are earmarked as outliers and work with the rest of observations (Michalíková, Galeotti, 2010). In this paper we will identify the outliers in a centered model, separate them, and then use the LTS on the rest of data.

This technique makes it possible to recognize outliers which are not able to be detected by eye or by means of traditional regression diagnostics. Once, we have separated the observations (considered to be outliers), we can monitor if this subpopulation of data is subject to certain systemic regularity. We may, for example, be primarily interested if a group of countries behave in an idiosyncratic way. Secondly, we may be watching if the removal of outliers brings some improvement in the estimated regression model. For example, we may monitor the decrease in the residual sum of squares or the increase in the coefficient of determination. Furthermore we may monitor the stability of estimated regression coefficients in the case of increasing h . Last, but not least, we wonder if p-values of estimated regressors are improving as the outliers are dropped out from the model.

3. The Factors of Growth of Family Businesses

3.1 Family business and small and medium-sized enterprises

In the early 1990s, family-led enterprises were supposed to get a new boost as pro-market forces triumphed. This was an error in judgement. Authentic small-scale family businesses were often squeezed out of the market arena by the rapid development by surviving, former state-owned enterprises which were converted to corporations owned formally by thousands of minor stock-owners and a narrow class of insiders with dominant stakes

(Benáček, 2006). The paralleled opening-up of regional and international markets due to globalisation offered new windows of opportunity to large enterprises dominated by managers. In the late 1990s, the floodgates of expansionary monetary policies opened up and government debt grew. Simultaneously, entrepreneurship in the majority of advanced capitalist countries led by large financial institutions turned either to assets, whose prices could rise in a vicious circle of supply and demand, or to an alignment with public administrators, in which achieving social efficiency was an objective that could be sacrificed, which was a move similar to the development in post-Communist countries. Both bubbles finally burst, and subsequently drove the economies in both developed and post-Communist countries into a lasting recession (Lawson, Zimková, 2009). Rising taxes, as a consequence of interventions, discriminated against small family businesses. The expectation is that a turnaround from the present recession should come from an increase in domestic aggregate spending and employment in small and medium-sized enterprises (SME) dominated by family businesses, which in almost every country have been the main source of employment and job creation, but not the engine of spending dynamics. The main objective of this paper is to address the question: which economic and institutional factors are associated with the development and growth of family businesses?

A firm is considered to be a family business if a member of one or more families is its controlling owner; thus, implying a managerial commitment toward the businesses' overall performance. It was generally believed that even though SME could provide the majority of jobs, their role in the progress of economies was only of subsidiary importance (Schumpeter, 1942). For a long time, the dominant presumption was that employment in small businesses was negatively related to GDP *per capita*, causing a bias toward larger enterprises (Lucas, 1978; Acs *et al.*, 1994). We think that these presumptions should be re-considered because they are not consistent with empirical observations. Acs, Audretsch (1988) reached the conclusion that innovations were negatively related to concentration and that innovation increased with the research and development (R&D) expenditures at a less than proportional rate. Symeonidis (1996) concluded his extensive survey of empirical literature on the alleged advantages of large over small firms with the finding that "literature survey suggests that there seems to be little empirical support for the view that large firm size or high concentration are factors generally conducive to a higher level of innovative activity" (p. 33). The outbreak of the world financial and economic crisis in 2008 brought a new wave of attention to facts refuting the validity of the so-called Schumpeterian hypothesis regarding the demise of small entrepreneurship (Schumpeter, 1942: pp.134–143).

Micro and small businesses (*i.e.* MB and SB) cover 98.7% of all EU enterprises. In addition, approximately 50% of MB in the EU are formed by the self-employed. Therefore, in the rest of this study we shall use micro and small businesses as a proxy category for family businesses. We will thus distinguish between two types of family businesses (denoted FB): those ranging in size from self-employed individuals to enterprises with 10 employees (*i.e.* MB) and enterprises with 10 to 50 employees (*i.e.* SB). It is necessary to note that we will work within the non-financial private sector only, thus we will analyse an incomplete part of the national economies of Europe.

The world economic crisis slashed the EU exports of goods and services from previous annual growth rates close to 6% to a mere 1.6% in 2008 and a decline of 14% in 2009 (Eurostat, 2010). This severely damaged the trust in the growth leadership of large businesses. Government deficit spending compensated partially for the missing exports,

but there was no other segment of economy capable of filling the looming gap in both aggregate demand and efficiency. With the exception of Poland, the private sector was not able to act as an agent of sustained growth. Nevertheless, SME have saved many European economies from drastic falls in employment.

The expected mild economic recovery of the GDP growth of 1.6% in the EU-27 in 2011, driven mainly by exports, will require that a complementary resource is started up to substitute for the fading and inefficient government deficit spending. We predict such a resource to exist due to the revival of authentic entrepreneurship that used to be represented by FB. That revival should actually be traced back to 1948–1965, when internally driven development in FB was still dominant and had not yet been crowded out by globalized businesses.

3.2 Factors favourable or adverse to family business development

We will try to test a hypothesis that the development of SB could have deeper microeconomic foundations. We traced them to wage and profit structures, and to the competition with large enterprises which pressed “fringe competitors” to respond with strategies idiosyncratic to smallness that allowed them to withstand the competitive race.

The following theoretical assumptions will be used as guidelines for hypotheses in our empirical tests:

a) The objective function of entrepreneurs is profit maximization. The maximization of gross capital returns *per* value added (KR/VA), where capital K is defined by reducing total labour compensation (W) from the net income of enterprises (VA)³, is still a plausible criterion because it represents a social efficiency of capital allocated among businesses of various scales. We could set up a hypothesis that countries with higher KR/VA in any group of FB could also see the stronger development of FB. If the space for $K=VA-W$ increases (*e.g.* as a result of innovation or lower transaction costs), it will induce the entrepreneurs to expand their employment in order to bolster the sales and net output. This will result in an increase of labour income W and a raise in the wage rates *per* labour W/L . Nevertheless, a very high KR/VA may also imply a shortage of capital (undercapitalization and/or too expensive capital). Because of this high capital returns could act as an impediment to FB growth, *i.e.* KR/VA could be negatively related to growth in employment.

b) FB development is not autonomous in isolation within their own SME categories because an FB’s relative performance *vis-a-vis* large businesses (LB) matters significantly. Small FB compete with LB for limited nationally available economic resources. We will test whether (lower) wages *per* worker in FB related to (higher) wages *per* worker in LB are associated with higher growth in FB. Thus, we can raise a hypothesis for empirical testing of FB development assuming that L_{FB} is a negative function of relative wage rates $(W_{FB}/L_{FB})/(W_{LB}/L_{LB})$. It is an outcome of an assumption that LB and FB differ in their microtechnologies, which are driven by different relative factor prices, *i.e.* different ratios of wage rates *per* capital rental rates. Thus the isoquants in FB tend to be capital-saving; while in LB they are labour-saving, which in the end makes the former net job creators.

c) Another hypothesis about the determining factors of growth in FB that we will test concerns the degree of general economic development represented by GDP *per capita*. We cannot then verify whether rising prosperity is a factor that enhances or restrains the development of FB.

3 Net income (*i.e.* the value added) of enterprises is defined as difference between sales S and material inputs M .

d) Contemporary economic thinking stresses the importance of institutions, as administrative bodies that define the “rules of the game” or incentives whose purpose is to reduce uncertainties and transaction costs in business interaction (Stiglitz, 1998). National institutions are important factors that may have both positive and negative impacts on businesses of different sizes.

Thus, three economic indicators related to the internal rates of gross capital returns (KR_{FB}/VA_{FB}), relative wages rates ($(W_{FB}/L_{FB})/(W_{LB}/L_{LB})$), and *GDP per capita*, plus ten institutional indicators have been selected as causal factors related to the growth of FB, *i.e.* the MB and SB.

4. Estimation of Regression Models

4.1 The review of variables and models for empirical testing

In this chapter we will empirically test the extent to which the growth in FB in 28 European countries was influenced during 2002–2008 by the three economic factors described above and by the risks or benefits associated with ten country-specific and time-specific socio-political institutions. Small Business Act Factsheets (Eurostat and DG Enterprises and Industry); GDP statistics of the World Bank; and Database on the Economic Freedoms (The Heritage Foundation) were used as the sources of the data. The robust version of the fixed effect panel data model will be used for the estimation of coefficients.

Dependent variables

L_{it}^{FB} : Employment in FB (*i.e.* MB or SB) quantified by the number of workers in country *i* and year *t*.

VA_{it}^{FB} : The value of net output (*i.e.* the value added) in MB or SB in country *i* and year *t*.

Economic explanatory variables

$KR_{it}^{FB}/VA_{it}^{FB}$: Gross capital returns in analysed businesses *per* value added

$LC_{it}^{FB}/LC_{it}^{LB}$: Relative rates of full labour costs ($LC=W/L$), *i.e.* total labour compensation *per* worker in FB divided by similar compensation in LB

GDP_{it}/PC_{it} : *GDP per capita* in purchasing power parity.

Institutional explanatory variables

$Regul_{it}$: Business freedom (regulation) index

$Trade_{it}$: Trade freedom (trade barriers) index

$Monet_{it}$: Monetary freedom (inflation and price control) index

$Govern_{it}$: Freedom from government (public spending) index

$Fiscal_{it}$: Fiscal freedom (taxation) index

$PropR_{it}$: Property rights index

$Invest_{it}$: Investment freedom (capital controls) index

$Financ_{it}$: Financial freedom (private banking security) index

$Corrupt_{it}$: Freedom from corruption (perception) index

$Labour_{it}$: Labour freedom index

N.B.: Institutional variables are the proxies of economic “freedoms” ranging in their values <0, 100>. The higher is the percentage index, the more liberal and pro-market the local institutional arrangement.

The selection of 28 countries of Europe is highly representative, covering nearly all of the EU and potential accession countries (see Table 1).

Table 1 | List of Countries Included in the Analysis

ALL	Advanced Europe (14) + Emerging Europe (14)
Advanced Europe (14)	Austria, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, the United Kingdom
Emerging Europe (14)	Albania, Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia

Source: Own classification

The first two explanatory variables are relevant for decision-making in enterprises. Gross capital returns are closely related to profits and profits form the basis for investments into physical capital and R&D. High profits also motivate FB owners to increase the scope of their production and take advantage of gains due to economies of scale, which should imply growth. The reasons for having a high share of gross capital returns on the value added can be: a) Increasing labour productivity without compensating workers at a proportionally higher wage rate would imply high profits; b) Decreasing the marginal product of labour by overstaffing that is reflected in disproportionately lower average wages in the enterprise would imply a high cost of capital that burdens the firm; c) Hiring and paying labour outside official contracts, which slashes total labour costs. For different reasons that drive KR/VA upward, we cannot be sure whether this variable is related to FB growth negatively or positively. The second variable LC^{FB}/LC^{LB} tests the relevance of low (reported) wages and of the gap in FB wage rates trailing behind LB. We can expect to observe a wide range of cross-country differences in this relationship. What matters is whether a higher labour cost gap in FB is a driving factor or a restraint upon FB growth. Once again we cannot be sure *a priori* about the nature of its sign. The third variable points to a general trend of development. Our only macroeconomic indicator is substantiated on the theoretical grounds that were elaborated by Lucas (1978), and followed by Acs *et al.* (1994) and Torrini (2005). We should expect its sign to be positive.

The central idea behind the choice of institutional variables is that institutions are man-conceived factors that have a two-pronged impact on businesses: as public goods or as public bads. The departure from largely macroeconomic to microeconomic explanatory variables representing incentives or policy instruments, has recently become a standard tool of econometric analysis (Blau 1987; Robson, Wren 1999; Davis, Henrekson 1999). All our institutional variables are based on their perceived qualities that allow market and entrepreneurial freedom, once the coefficient is positive. Even though we can assume that more liberal economies grow faster, some studies of SME have revealed that very small businesses are not positively related to all indicators of a free market economy (Torrini, 2005).

The test consist of four models related to micro and small enterprises, whose spe-cifications are as follows:

$$L_{it}^{micro} = \alpha_1 KR/VA_{it}^{micro} + \alpha_2 LC_{it}^{micro}/LC_{it}^{large} + \alpha_3 GDP_{it}/PC_{it} + \alpha_x INSTITIT_{it}^{var} x + \varepsilon_{it}$$

$$L_{it}^{small} = \beta_1 KR/VA_{it}^{small} + \beta_2 LC_{it}^{small}/LC_{it}^{large} + \beta_3 GDP_{it}/PC_{it} + \beta_x INSTITIT_{it}^{var} x + \varepsilon_{it}$$

$$VA_{it}^{micro} = \gamma_1 KR/VA_{it}^{micro} + \gamma_2 LC_{it}^{micro}/LC_{it}^{large} + \gamma_3 GDP_{it}/PC_{it} + \gamma_x INSTITIT_{it}^{var} x + \varepsilon_{it}$$

$$VA_{it}^{small} = \delta_1 KR/VA_{it}^{small} + \delta_2 LC_{it}^{small}/LC_{it}^{large} + \delta_3 GDP_{it}/PC_{it} + \delta_x INSTITIT_{it}^{var} x + \varepsilon_{it}$$

where $i = 1, \dots, 28$ are countries, $t = 2002, \dots, 2008$ are the observed years, $x = \{4, 5, \dots, 13\}$ indicates the respective number of institutional variable 4 through 13.

4.2 Comments on the econometric results

In Tables 2 and 3 we report the results of four regressions as specified above⁴. In each regression, we included three economic explanatory variables, as well as, some relevant institutional explanatory variables. The non-significant institutional variables were dropped from the model. In the first column for each regression, we report results of classic fixed effects model. In the following columns, we report the results of LTS regression, applied on the data centered by median, with regard to a different choice of h .

Table 2 | Robust Fixed Effects Regressions - Models 1 and 2

Model	1				2			
Dependent Variables	L_{it}^{micro}				L_{it}^{small}			
h%	-	95%	85%	75%	-	95%	85%	75%
Economic								
KR/VA_{it}^{micro}	-0.080* (0.043)	-0.329*** (0.053)	-0.210*** (0.047)	0.009 (0.017)				
KR/VA_{it}^{small}					-0.164*** (0.021)	-0.157*** (0.015)	-0.166*** (0.010)	-0.005 (0.051)
$LC_{it}^{micro/large}$	-0.346*** (0.062)	-0.398*** (0.051)	-0.318*** (0.039)	-0.157*** (0.025)				
$LC_{it}^{small/large}$					-0.330*** (0.091)	-0.167** (0.074)	-0.016*** (0.054)	0.016 (0.049)
GDP/PC_{it}	0.509*** (0.039)	0.419*** (0.029)	0.405*** (0.021)	0.377*** (0.018)	0.541*** (0.035)	0.496*** (0.026)	0.407*** (0.003)	0.423*** (0.017)
Institutional								
<i>MONET</i>	0.003** (0.001)	0.0003 (0.001)	-0.001* (0.001)	-0.003*** (0.001)				
<i>FINANC</i>	0.001** (0.001)	0.002*** (0.001)	0.0006** (0.0003)	0.0004** (0.002)	0.001** (0.001)	0.001** (0.0004)	0.001** (0.0003)	0.001 (0.001)
<i>LABOUR</i>					-0.001 (0.001)	-0.001 (0.001)	-0.002** (0.001)	-0.001*** (0.0004)
Number of obs.	196	187	167	147	196	187	167	147
Adj. R²	0.525	0.603	0.700	0.772	0.634	0.748	0.751	0.837

Notes: The value for $h\%$ denotes how many observations were included into data set. * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are in brackets. Fixed effects are not reported. Variance inflation factor does not suggest any problems with collinearity in regressions. Dependent variables and GDP per capita are in logarithms. Breusch – Pagan / Cook Weisberg does not reject the hypothesis of homoscedasticity.

Source: Own calculation (Stata, Matlab)

4 All estimates were obtained by Stata and Matlab

In all four cases, the coefficient of determination (R-squared) has been increasing and thus the quality of model is improved. If we focus on the signs of parameters, only in one case in that of the coefficient of KR/VA in model 4 the sign is unstable. Such a counter-intuitive reversal in sign could hypothetically be a result of multicollinearity, but the variance inflation factor (VIF)⁵ refuted that possibility. Therefore, we can infer that among small businesses there was a small (but highly influential) subpopulation of agents whose output responded to capital returns in an inverse direction from the majority of firms, which is a paradox. In the rest of the regressions the values of the estimated parameters differ with a decreasing h only slightly and the majority of coefficients seem to be stable (relative to the threshold of tolerance). In the four models, we use a total of 11 different variables. All three economic variables prove their clear dominance. The role of institutional factors seems to be only subsidiary, which is an unexpected finding of high importance. It signals that small family businesses are deeply dependent on market performance and policies are not so important to influence and change their strategic behaviour.

The variables KR/VA and LC each have negative signs in models 1 and 2. This implies that job creation in small FB is conjoined with low pretensions to both capital returns and wage requirements. Thus, saving on machines and a prudent wage policy are traditional recipes for high employment in FB. There is also an important proviso to be added: a sustained or even widening gap in labour costs relative to large enterprises combined with lower capital endowments is a knife's-edge enterprise strategy for gaining competitiveness in the short term that calls for low costs and prudence in expenditures on the one hand. On the other hand, too much of both endangers the quality of investments and the availability of skilled workers that may cut productivity growth in the long term. Our results reveal a possibility for a paradox of development: measures for a high employment growth can conflict with high output growth. A crucial piece of information is added by the third economic variable: rising *GDP per capita* enhances the employment in both types of FB. We can see that FB were the leading catalysts of job creation throughout Europe during the observed period.

As far as institutional variables are concerned, their importance was found to be much weaker when compared to economic variables. The conditions for job expansion in micro business are also derived from a prudent monetary policy (that sustains low inflation) and the existence of efficient financial services. A similar conclusion can be drawn regarding easy access to financial intermediation in model 2 for small businesses. On the other hand, high labour market flexibility is not compatible with employment growth in the majority of SB.

The three most powerful findings occurred in models 3 and 4 (Table 3) explaining the mechanism of growth in net production in MB and SB. Firstly, our models point to the existence of a trade-off between employment and output expansion because the signs for the first two economic variables reversed from negative to positive. Secondly, the coefficients for *GDP per capita* increased approximately three-fold in their value, pointing to a high elasticity of FB output growth to aggregate demand. Thirdly, the results in Table 3 imply that value added VA is more sensitive to low labour costs LC (and with it to labour efficiency) than to high capital returns (capital efficiency). Therefore, by consolidating these results, we can draw an implication that the increasing aggregate demand is driving production (and therefore probably also the profits) in FB more than its employment level.

5 Variance inflation factor (VIF) is common way for detecting multicollinearity. VIF is computed from the covariance matrix of parameter estimates (O'Brien, 2007).

Table 3 | Robust Fixed Effects Regressions - Models 3 and 4

Model	3				4			
Dependent variables	VA^{micro}_{it}				VA^{small}_{it}			
<i>h%</i>	-	95%	85%	75%	-	95%	85%	75%
Economic								
KR/VA^{micro}_{it}	0.301*** (0.072)	0.299*** (0.064)	0.277*** (0.044)	0.503*** (0.073)				
KR/VA^{small}_{it}					-0.105*** (0.032)	0.052 (0.148)	0.456*** (0.128)	0.452*** (0.098)
$LC^{micro/large}_{it}$	0.448*** (0.103)	0.376*** (0.087)	0.388*** (0.061)	0.575*** (0.063)				
$LC^{small/large}_{it}$					0.631*** (0.138)	0.408*** (0.129)	0.410*** (0.108)	0.478*** (0.083)
GDP/PC_{it}	1.736*** (0.067)	1.552*** (0.060)	1.404*** (0.045)	1.528*** (0.036)	1.737*** (0.054)	1.576*** (0.045)	1.507*** (0.038)	1.386*-*** (0.033)
Institutional								
<i>MONET</i>	0.004** (0.002)	-0.001 (0.002)	-0.002 (0.002)	-0.003** (0.001)				
<i>CORRUPT</i>	0.005*** (0.001)	0.003** (0.001)	0.001 (0.001)	0.001 (0.001)				
<i>GOVERNMENT</i>					0.002* (0.001)	0.002** (0.001)	0.001 (0.001)	-0.0001 (0.001)
<i>INVEST</i>					0.001 (0.001)	0.001 (0.005)	0.0003 (0.0001)	0.0007** (0.0003)
Number of obs.	196	187	167	147	196	187	167	147
Adj. R²	0.823	0.825	0.880	0.938	0.866	0.877	0.909	0.934

Notes: The value for *h%* denotes how many observations were included into data set. * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors are in brackets. Fixed effects are not reported. Variance inflation factor does not suggest any problems with collinearity in regressions. Dependent variables and GDP *per capita* are in logarithms. Breusch – Pagan / Cook Weisberg does not reject the hypothesis of homoscedasticity.

Source: Own calculation (Stata, Matlab)

The growth in net output in FB is underpinned by high gross capital gains *per value* added, which should be complemented in the medium-run with upward wage concessions (*i.e.* pay-rises), thus forming a virtual circle of investments, output growth, high returns and rising wages. High GDP *per capita* is a crucial catalyst for such development accompanied by low corruption in the case of model 3. The constraints on monetary policy are not compatible with output growth in the 75% of micro business. Institutional variables are not significant with the single exception of high government spending. Thus, corruption or financial intermediation are not found to be a significant factor of FB development.

Finally, Table 4 compares some outliers excluded from estimation by LTS. There are six countries that are generating the majority of outliers: Albania, Croatia, Greece,

Latvia, Romania and Slovakia. With the exception of Greece, they all belong to countries categorized as emerging post-Communist Europe that in the past had problems with macroeconomic stability and EU accession. These countries differ in their high growth of employment. Thus, job creation in FB during 2002–2008 was faster in these emerging countries compared to other countries. Such a growth can be explained by their lagging in FB development prior to 2002. In the case of value added, this growth was even more significant. Revealed heterogeneity in data can be caused by a different method of measurement of economic or institutional variables, or by a very different pattern of behavioural patterns of FB in the countries mentioned.

Table 4 | A Comparison of Certain Countries with Maximum and Minimum Number of Outliers

	I	II	III	IV	V
	<i>h</i> %=95	<i>h</i> %=85	<i>h</i> %=75	Maximum For all <i>h</i> %	Minimum For all <i>h</i> %
1	Romania (8)	Albania (15)	Albania (18)	Romania (41)	Italy (1)
2	Albania (6)	Romania (15)	Romania (18)	Albania (39)	Malta (1)
3	Norway (4)	Slovakia (12)	Latvia (14)	Slovakia (29)	UK (2)
4	Bulgaria (3)	Croatia (10)	Slovakia (13)	Croatia (24)	Hungary (3)
5	Ireland (3)	Greece (9)	Greece (13)	Greece (24)	Germany (5)
6	Slovakia (3)	Latvia (8)	Croatia (12)	Latvia (23)	Poland (5)

Note: The number in brackets denotes how many years in a given country have been dropped in all four models (1–4) together for selected *h*% in columns I, II and III. Column IV denotes countries with maximum number of outliers in all four models and all three choices of *h*. Column V denotes countries with minimum number of outliers in all four models and all three choices of *h*.

Source: Own calculation

5. Conclusion

In this paper we have analysed the factors that were instrumental for growth in two types of small firms in 28 European countries. It has been revealed that growth related to employment and to net production was conditioned by very different internal incentives. It has been demonstrated that schemes (or incentives) targeting high employment can conflict with schemes concentrating on the growth in value added.

We applied a robust method for fixed effect panel data models which allowed us to estimate a model in which the data was contaminated by outliers. Based on data for 28 European countries for the period of 2002–2008, we ran a series of econometric tests in which we analysed how two groups of businesses that employ up to 50 people by quantifying their growth in employment and net production. We regressed these two alternative indicators of development to a measure of gross capital returns *per* a unit of value added and to the relative gap between labour costs in small and large enterprises. We tested the role of GDP *per capita* in the development of family businesses and the significance of several institutional variables that represented government policies relevant to the viability of small entrepreneurship.

Our tests concluded with the finding that our three economic explanatory variables were statistically highly significant; with rising h results generally improving as the residual sum of squares decrease, the coefficients of determination rose. We can infer that job creation in micro and small family businesses depends on a low pretention on capital returns. However, narrowing the gap in labour costs in family businesses relative to large corporations is negatively correlated with employment. In sharp contrast with this finding, both these economic variables are positively connected with the value added within micro and small businesses. The higher the gross capital gains *per* value added and the higher the relative labour costs in FB derives a rise in the growth in net production.

Rising GDP *per capita* enhances both employment and value added in FB, even though the impact on the net output is markedly more intensive. We have discovered that some less developed post-Communist countries were subject to highly different behaviour of family businesses related to growth than the core of European family businesses. Institutional factors only play a marginal role.

As a final point for discussion, our results imply that in the end hard economic fundamentals are much more important for the development of small family businesses than soft institutional factors. This is in sharp contrast to the performance of large businesses, whose activities are found to be strongly influenced by policies and vertical transfers at the level of public administration; as was observed by Alfaro *et al.* (2008) or Benáček *et al.* (2011). Therefore, we can presume that the development of small businesses is handicapped *vis-a-vis* the corporate sector in countries where the government is active in exercising various policies of development and where the conditions for market competition, contestability and low transaction costs are infringed by market power and/or government capture. Therefore, lower exposure of entrepreneurs to industrial policies and to government “favours”, and less of government hyper-activity in fiscal transfers, constitute an environment that supports the growth of family businesses. However, once there is a social demand for policies supporting the creation of new jobs, the choice of policies should target the measures decreasing the transaction costs of family businesses for hiring labour and the costs of labour in general.

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