The Factors of Growth of Small Family Businesses. A Robust Estimation of the Behavioral Consistency in the Panel Data Models

Eva Michalíková[1]   Vladimír Benáček[2]

[1]Ústav Informatiky, Fakulta podnikatelská
Vysoké učení technické v Brně

[2]Institut ekonomických studií, Fakulta sociálních věd
Univerzita Karlova v Praze

Robust 2012
September 2012, Němčičky

Outline

Motivation
- economic

Family business: member of one or more families is its controlling owner

- Micro family business: 1-9 employees
- Small family business: 10-50 employees

Family-led enterprising: after fall of the Communist empire expectation of new boost x problem of globalisation $\Rightarrow$ small family businesses often squeezed out of the space for rapid developing by surviving enterprises

both developed and post-communist countries - lasting recesion

discrimination of small and medium family businesses (rising taxes, favor towards large businesses, ...)

the tournaround in the present recesion should come from an increase in domestic aggregate spending and employment in SME family businesses

Motivation
- economic

Family business: direct accountability, wage flexibility, ...
Micro and Small family businesses:

- 98% of all EU enterprises
- 50% of MBs are self-employed

$\Rightarrow$ Importance of MBs and SBs as a source of employment and competition
$\Rightarrow$ MBs and SBs as a proxies of family businesses
What are factors influencing employment and net output in MBs and SBs?
Behaviour among countries probably not homogenous !!

- irregular reporting to statistical offices
- simple accountancy - risk of errors
- differenct behavior among countries
- ...

Regression model

- 28 European countries between 2002 – 2008
- Two different dependent variables:
  - employment
  - net output
- Explanatory variables
  - capital returns per values added
  - relative labor costs
  - GDP per capita
  - 10 institutional variables

$\Rightarrow$ 4 models: two dep. variables, separately for Micro and Small FB:

$$L_{it}^{micro/small} = \alpha_1 \frac{KR}{VA} + \alpha_2 \frac{LC_{it}^{micro/small}}{LC_{it}^{large}} + \alpha_3 \frac{GDP}{PCA} + \beta_{1-10}inst + \varepsilon_{it}$$

$$VA_{it}^{micro/small} = \alpha_1 \frac{KR}{VA} + \alpha_2 \frac{LC_{it}^{micro/small}}{LC_{it}^{large}} + \alpha_3 \frac{GDP}{PCA} + \beta_{1-10}inst + \varepsilon_{it}$$

Panel data

Economic data

- panel structure
- two dimensions of data: time x group (country, industry...)

Panel data:

- assessment of differenct changes in time
- mor individuals - more heterogeneity
- to reveal dynamics difficult to dettect with cross-sectional data
- larger number of observations

- atypical observations
- gross errors

Rousseeuw P., Leroy A. (1987): Robust Regression and Outlier Detection
Bramati M.C., Croux C. (2007): Robust Estimators for the Fixed Effects Panel Data Model

Panel data

Methods of estimation suitable for panel data

- Traditional: fixed (LSDV, Within Group) or random effects, instrumental variables, DIFF and SYS GMM,. . .
    - Suitable for panel data
    - Sensitive to outliers, bad observation can damage the estimator
- Robust: M-, R-, L- estimators,. . .
    - Reduce or remove the influence of outliers, well described nowadays
    - Poor evidence and software implementation for panel data

LTS estimator:

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

$$(_k - \tilde{x}'\beta_k)^2_1 \le \ldots \le [(\tilde{y}_k - \tilde{x}'\beta_k)^2]_i \ldots \le [(\tilde{y}_k - \tilde{x}'\beta_k)^2]_{NT}$$

Method

Standart approach:

- Within Group estimator - not robust!!

Robust version of Within Group - 2 steps:

- Centering of data by median instead of mean (more robust):

$$\tilde{y}_{it} = y_{it} - med_t(y_{it}), \tilde{x}_{it} = x_{it} - med_t(x_{it})$$

- Estimation by LTS instead of OLS (high breakdown point, good properties, software support)

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

- Basic model with all observations
- + models with h observations deleted (h=5%,15%,25%)

4 models for each dep. variable and each FBs 16 regressions

Regression I (1st dep. variable)

Dep.var.	L_{it}^{micro}				L_{it}^{small}			
h%	–	95%	85%	75%	–	95%	85%	75%
KR / VA	-0.080*	-0.329***	-0.210***	0.009	-0.164***	-0.157***	-0.166***	-0.005
	(0.043)	(0.053)	(0.047)	(0.017)	(0.021)	(0.015)	(0.010)	(0.051)
$LC^{FB/LB}$	-0.346***	-0.398***	-0.318***	-0.157***	-0.330***	-0.167**	-0.016***	0.016
	(0.062)	(0.051)	(0.039)	(0.025)	(0.091)	(0.074)	(0.054)	(0.049)
GDP/PC_{it}	0.509***	0.419***	0.405***	0.377***	0.541***	0.496***	0.407***	0.423***
	(0.039)	(0.029)	(0.021)	(0.018)	(0.035)	(0.026)	(0.003)	(0.017)
MONET	0.003**	0.0003	-0.001*	-0.003***				
	(0.001)	(0.001)	(0.001)	(0.001)				
FINANC	0.001**	0.002***	0.0006**	0.0004**	0.001**	0.001**	0.001**	0.001
	(0.001)	(0.001)	(0.0003)	(0.002)	(0.001)	(0.0004)	(0.0003)	(0.001)
LABOR					-0.001	-0.001	-0.002**	-0.001***
					(0.001)	(0.001)	(0.001)	(0.0004)
No of obs.	196	187	167	147	196	187	167	147
Adj. R^2	0.525	0.603	0.700	0.772	0.634	0.748	0.751	0.837

Regression II (2nd dep. variable)

Dep.var.	VA_{it}^{micro}				VA_{it}^{small}			
h%	–	95%	85%	75%	–	95%	85%	75%
KR / VA	0.301***	0.299***	0.277***	0.503***	-0.105***	0.052	0.456***	0.452***
	(0.072)	(0.064)	(0.044)	(0.073)	(0.032)	(0.148)	(0.128)	(0.098)
LC^{FB}/LB	0.448***	0.376***	0.388***	0.575***	0.631***	0.408***	0.410***	0.478***
	(0.103)	(0.087)	(0.061)	(0.063)	(0.138)	(0.129)	(0.108)	(0.083)
GDP / PC	1.736***	1.552***	1.404***	1.528***	1.737***	1.576***	1.507***	1.386***
	(0.067)	(0.060)	(0.045)	(0.036)	(0.054)	(0.045)	(0.038)	(0.033)
MONET	0.004**	-0.001	-0.002	-0.003**				
CORRUPT	0.005***	0.003**	0.001	0.001				
GOVERNMENT					0.002*	0.002**	0.001	-0.0001
INVEST					0.001	0.001	0.0003	0.0007**
No. of obs.	196	187	167	147	196	187	167	147
Adj. R^2	0.823	0.825	0.880	0.938	0.866	0.877	0.909	0.934

The value for h% denotes how many observations were included into data set.

Conclusion of regressions

3 economic explanatory variables highly statistically significant

- lower pretention to capital returns and wage requirements = higher job creation
- higher capital returns and higher relative labor costs = higher net output
- GDP per capita enhances both employment and value added

Institutional variables – only a marginal role

- Employment – inflation, eficient banking
- Growth of output – corruption

Estimation of basic model (without LTS):

- R2 moves around 60% / 80%
- Economic variables mostly significant

Estimation with LTS:

- R2 increases and moves around 80% / 93%
- Parameters more significant
- Estimated coefficients stable

Excluded countries

Mostly excluded:

- Albania
- Croatia
- Greece
- Latvia
- Romania
- Slovakia

- They mostly belong to emerging post-Communist Europe
- Job creation and growth faster compared to other countries
- Of course, heterogeneity in data can be caused by different method of measurement

Regression with excluded countries

Dep.variables	L_{it}^{micro}	L_{it}^{small}	VA_{it}^{micro}	VA_{it}^{small}
KR/VA	-0.231**	-0.024	0.645***	0.379**
	(0.097)	(0.107)	(0.182)	(0.168)
LC^{FB}/LB	-0.421***	-0.280***	0.634***	0.635***
	(0.069)	(0.095)	(0.133)	(0.144)
GDP/PC_{it}	0.480***	0.502***	1.521***	1.533***
	(0.037)	(0.037)	(0.072)	(0.056)
MONET	-0.001		-0.003	
FINANC	0.001	0.001		
LABOUR		-0.002*		
CORRUPT			0.001	
GOVERNMENT				0.001
INVEST				0.001
No. of obs.	42	42	42	42
Adj. R^2	0.547	0.545	0.804	0.838

Conclusion and future work

family businesses play an irreplaceable role in the provision of employment in national economies: creators of new jobs, main absorbers of unemployment

two alternative indicators of development: growth in employment and net production

the role of:

- profitability: - / + correlated with employment / value added
- cost advantage: - / + correlated with employment / value added
- GDP per capita: + correlated with employment / value added
- institutional variables - marginal role only

rising number of excluded observations: improving significance of parameters, increasing explanatory power of model

future work: WGM (Within generalized M–estimator), WMS (Within MS–estimator) - based on LTS / S–estimator not implemented standardly

Thank for your attention!