

### Firm Competitiveness Determinants: Results of a Panel Data Analysis (very preliminary results)

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### **Motivation/Starting Points**

- Several studies indicate that leading Slovak companies are competitive (highly profitable), but we do not know much about why it is so
- Very limited number of quantitative studies on competitiveness factors of Slovak companies (almost solely as a part of cross-country studies)
- Available literature concentrates mainly on the influence of macro factors (cross-country differences) and not on (qualitative) company factors
- Availability of questionnaire survey results (with some potential & so far limited use) and individual yearly data
- No consensus on a common competitiveness measure (almost every study uses different dependent variable)
- Relatively large number of possible dependent and explanatory variables
- => We know it should be a dynamic process based on productivity, profitability, export performance and market share



### **Model Specification**

• Linear dynamic panel model with individual effects

$$y_{it} = \gamma y_{i,t-1} + (x'_{it}\beta_1) + (z'_{i}\beta_2) + a_i + \varepsilon_{it}$$
Available performance/  
competitiveness  
variables  
(profitability, productivity  
export and market share  
data)
$$y_{it} = \gamma y_{i,t-1} + (x'_{it}\beta_1) + (z'_{i}\beta_2) + a_i + \varepsilon_{it}$$
Basic and survey  
based qualitative  
(dummy) variables  
(sheet, production and  
export data)
$$(y_{it}) = \gamma y_{i,t-1} + (x'_{it}\beta_1) + (z'_{i}\beta_2) + a_i + \varepsilon_{it}$$
Basic and survey  
based qualitative  
(dummy) variables  
(sector, management,  
foreign influence + other  
company and  
environment data)

\* Dependent, lagged dependent and quantitative explanatory variables expressed in logs



### Data

- Financial data on the 90 top Slovak companies (that participated in our survey) from Trend Top 200 Database for years 1993 -2009 (with high number of observations for 2001 - 2009)
  - + basic qualitative company data from the same database
- Additional qualitative data from the Slovak Business Register
- Results (mainly qualitative data) from our aforementioned questionnaire survey
- Some data (total export, value added and turnover) about non-financial companies from the Statistical Office of the SR



### Dependent Variables

- labour productivity (labprod) = company gross revenue
   / number of employees
- return on assets (roa) = company gross profit / total company assets
- **export performance (exp)** = value of company export
- market share (m\_share) = company revenue / total revenue of non-financial companies in SK
- other variables: return on equity (roe), profit margin (ror), productivity based on value added (va\_emp), capital productivity (capital\_emp), export share (exp\_share), total revenue (rev), amortisation adjusted value added (va\_emp\_n) + roe, ror, roa based on after tax profit
  - -> not significant lagged dependent variable



## **Explanatory Variables - Quantitative**

- Value added (va)
- Revenue (rev)
- Value of export (exp)
- Investments (inv)
- Long-term assets (capital)
- Fixed assets (assets\_f)
- Amortisation (amort)
- No. of employees (emp)
- Personal costs (cost\_prs)
- Loans (loan)
- Company age (est\_m)
- Export from SK (exp\_sk)
- GDP in SK (gdp\_sk)

Source: Trend

SO SR

+ derived variables:

- Market share (m\_share)
- Labour costs (ulc)
- Leverage (lever)
- Investment productivity (invprod)
- Capital intensity (capital\_int)
- Investment intensity (inv\_prf)
- Export performance (exp\_prf)
- Export share (exp\_share)
- + all dependent variables



## **Explanatory Variables - Qualitative**

Source: Trend

**Business Register** 

#### **Basic company factors:**

- Industry dummy (industry)
- Network industry (network)
- Accounting year (acc\_year)
- Foreign capital (fc09)
- Name change (name\_ch)
- Foreign manager (boss\_f)
- Manager with domestic education (boss\_ing)

+ Top15 Competitiveness factors:

- Efficiency of company leadership (upf01)
- Concentration on cost reduction (upf07)
- Professionalism of management (upf02)
- Quality of company management (upf05)
- Extent of utilization of comm. technology (upf20)
- Existence of developed supply industries (uof04)
- Buyer sophistication (uof05)
- Nature of competitive advantage (uof09)
- Availability of experienced managers (uof15)
- Availability of adeq. educated labor force (uof16)
- Exchange rate stability (umf06)
- Energy costs (umf22)
- EU membership (umf10)
- Perspective of euro adoption (umf11)
- Quality of transport infrastructure (umf21)

Source: Lalinský (2008)



### Questionnaire Survey – Basic Facts

- Target group: top 200 Slovak companies (93 responds)
- Content: List of 73 potential factors influencing company competitiveness
  - 31 company factors
  - 17 sectoral factors
  - 25 macro-level factors
- For every factor respondents were asked to evaluate:
  - Current state
  - Effect on present competitiveness
  - Effect on future competitiveness

Source: Lalinsky (2008)

WP 3/2008: Competitiveness Factors of Slovak Companies

**Ouestionnaire** Factors of company competitiveness Company name: Company address: Future Present Level Significance Significance 1 2 3 1 2 3 1 Company factors 00000 0000 000 00000 00000 2 Efficiency of company leadership 000 00000 3 Professionalism of management 4 Ouality of company infrastructure  $\cap$ 5 Quality of company planning 6 Quality of company management 1000.0  $\cap \cap \cap$ 000 7 Quality of company control 8 Orientation on cost reduction (cost of production) 9 Orientation on differentiation from competition 000 10 Corporate relationship with other companies in the sector 000 11 Corporate relationship with suppliers or consumers 000 12 Innovativeness of the company 13 R&D investment (% of total investments) 14 Investment in production modernisation (% of total investments) 15 Investment in production expansion (% of total investments) 16 Share of imports in costs (% of total production costs) 00 17 Technological level of the production process 000 000 00000 0.0 18 Utilisation of foreign technological licences 00000 000 19 Extent of information systems utilisation 00000 20 Quality of company information systems 21 Extent of communication technology utilisation in the company 000 00000 22 Quality of company communication technologies 000 0 23 Good employee-employer relations 000 24 Level of education of employees 25 Willingness to delegate authority 000 00 000 000 0.0 26 Extent of utilisation of motivational rewards 000 00000 27 Extent of orientation on customers 000 00<u>000</u> 28 Extent to which marketing is utilised 29 Share of exports in sales (in %) 30 Share of non-EU exports in total exports (in %) 31 Degree of control over international distribution 000 000 32 Significance of after-sale services 000  $\cap \cap \cap$  $\cap \cap$ 0  $\cap$  $\cap$ 00 33 000 00000 34



### Methodology

- OLS, FE and RE are biased because lagged dependent variable is correlated with error term => we need IV/GMM estimator (xtabond2)
- Identification of key models with lagged dependent variable and quantitative explanatory variables (1 for profitability, 1 for productivity, 1 for export performance and 1 for market share)
- Extended regressions including all 15 competitiveness factors (top 5 company, sectoral and macro factors) – very limited results
- 3) Gradual extension of the 4 key models including both basic company and competitiveness factors

# Main Results A) Profitability

Return on assets as a function of lagged dependent variable and company market share

Significant effect of several competitiveness factors

Dominance of macro factors (energy costs, EU membership & ER stability)

Only one top 5 sectoral (developed consumer sectors) in combination with an additional factor

Company communication tech. utilisation with price/cost reduction at the company level

		Model 1	Model 2	Model 3	
			return on assets	return on assets	return on assets
	return on assets (-1)	coef.	.21459308*	.23622856*	.2266776*
		s.e.	0.0769	0.0710	0.0696
	market share	coef.	1.3358976***	1.3874475**	1.2939345***
		s.e.	0.0056	0.0107	0.0096
pany tors	com. tech. utilisation (high)	coef.	.30280156**		
		s.e.	0.0162		
	price/cost reduction (med)	coef.	1831653*		
acia		s.e.	0.0503		
S +	price/cost reduction (high)	coef.	1304316		
		s.e.	0.2107		
	quality dom. suppliers (med)	coef.		.42632368**	
S		s.e.		0.0138	
cto	quality dom. suppliers (high)	coef.		.02765561	
fa		s.e.		0.8995	
oral	developed consumers (med)	coef.		36171919**	
cto		s.e.		0.0230	
se	developed consumers (high)	coef.		25507973	
		s.e.		0.1551	
	energy costs (med)	coef.			45254527***
		s.e.			0.0002
	energy costs (high)	coef.			39253917**
S		s.e.			0.0135
ţ	exch. rate stability (med)	coef.			.06318917
fac		s.e.			0.5331
i S	exch. rate stability (high)	coef.			.35573383*
Jac		s.e.			0.0659
E	EU membership (med)	coef.			.38824496**
		s.e.			0.0130
	EU membership (high)	coef.			.38802436***
		s.e.			0.0076
	Number of observations		529	502	532
	Number of groups		75	72	75
	Number of instruments		28	29	31
	Arellano-Bond test for AR(1)		-1.8804398	-1.853095	-1.9062458
	Prob (Arellano-Bond test for AR(1))		.06004816	.06386874	.05661832
	Arellano-Bond test for AR(2)		1.2139271	1.2465694	1.2070482
	Prob (Arellano-Bond test for AR(2))		.22477555	.21255545	.22741359
	Hansen test for over-id. restrictions		29.231656	27.742075	28.797805
	Prob (Hansen test for over-id. restr.)		.17275171	.22569253	.18710722

legend: \* p<.1; \*\* p<.05; \*\*\* p<.01

Note: : Dependent variables, lagged dependent variables and quantitative explanatory variables in logarithm. Dummy variables for competitiveness factors. Two-step difference GMM estimation using xtabond02 module for Stata. Asymptotic robust standard errors are reported. Lagged dependent and differenced explanatory variables used as instruments.



### Main Results B) Labour productivity

Labour productivity as a function of lagged value of productivity and labour costs

Statistically significant, but relatively small effect of foreign management & at least one company, sectoral and macro factor

EU membership at the macro level

Competitive advantage based on efficiency at the sectoral level

Medium and high quality company management at the company level

			Model 1	Model 2	Model 3
			labour	labour	labour
			productivity	productivity	productivity
	labour productivity (-1)	coef.	.31258446*	.46188461***	.33780202*
		s.e.	0.0670	0.0037	0.0670
	labour costs	coef.	88784009***	86816931***	86746521***
		s.e.	0.0000	0.0000	0.0000
basic char.	foreign management	coef.	.02846555**	.03283458*	.03912645***
		s.e.	0.0191	0.0641	0.0088
company factors	quality management (med)	coef.	.03750564**		
		s.e.	0.0201		
	quality management (high)	coef.	.03228002*		
		s.e.	0.0733		
<u> </u>	nature of comp. adv. (med)	coef.		.02838201*	
ors ors		s.e.		0.0785	
act	nature of comp. adv. (high)	coef.		.02001763	
s 7		s.e.		0.3475	
o (0	EU membership (med)	coef.			.03897243***
C D D D		s.e.			0.0053
aci	EU membership (high)	coef.			.02377837
- +		s.e.			0.2931
	Number of observations		290	260	273
	Number of groups		76	69	72
	Number of instruments		14	14	16
	Arellano-Bond test for AR(1)		-1.175932	-1.0771242	-1.1473413
	Prob (Arellano-Bond test for AR(1))		.23962206	.28142479	.25124058
	Arellano-Bond test for AR(2)		.61876559	.57062377	.59211835
	Prob (Arellano-Bond test for AR(2))		.53607079	.56825471	.55377134
	Hansen test for over-id. restrictions		17.530688	10.843331	17.454239
	Prob (Hansen test for over-id. restr.)		.04102569	.2866009	.09513897

legend: \* p<.1; \*\* p<.05; \*\*\* p<.01

Note: Dependent variables, lagged dependent variables and quantitative explanatory variables in logarithm. Dummy variables for competitiveness factors. Two-step difference GMM estimation using xtabond02 module for Stata. Asymptotic robust standard errors are reported. Lagged dependent and differenced explanatory variables used as instruments.

Main Results C) Export performance

 export as a function of lagged value of export and labour costs

Statistically significant, but relatively small effect of foreign management & at least one company, sectoral and macro factor

Euro adoption at the macro level

Developed consumer sectors at the sectoral level

Highly efficient leadership at the company level (only with additional macro factor)

			Model 1	Model 2	Model 3	Model 4		
			value of	value of	value of	value of		
			export	export	export	export		
	value of export (-1)	coef.	.76827472***	.36527309**	.29846731*	.40796615**		
		s.e.	0.0000	0.0263	0.0598	0.0207		
	labour costs	coef.	-1.1328577***	-1.3468663***	-1.0271134***	-1.3049847***		
		s.e.	0.0000	0.0000	0.0000	0.0000		
basi c	foreign management	coef.	.05907848**					
		s.e.	0.0119					
~ ڏ	efficient leadership (med)	coef.		.04671683				
ors		s.e.		0.1959				
act	efficient leadership (high)	coef.		.06571195*				
8 –		s.e.		0.0803				
<u></u> "	developed consumers (med)	coef.			.07749444*			
		s.e.			0.0946			
actect	developed consumers (high)	coef.			.01612667			
s –		s.e.			0.6318			
	euro adoption (med)	coef.				.0968835***		
Ś		s.e.				0.0098		
tor	euro adoption (high)	coef.				.04974751		
fac		s.e.				0.2606		
2	telecom. infrastructure (med)	coef.		.03477191**				
ас		s.e.		0.0325				
E	telecom. infrastructure (high)	coef.		00047581				
		s.e.		0.9933				
	Number of observations		201	201	186	201		
	Number of groups		51	51	48	51		
	Number of instruments		12	15	13	13		
	Arellano-Bond test for AR(1)		-1.6715445	-1.574652	-1.2507832	-1.6011308		
	Prob (Arellano-Bond test for AR(1))		.09461419	.11533679	.21101359	.10934794		
	Arellano-Bond test for AR(2)		.53904164	.48369607	.9194568	.50188676		
	Prob (Arellano-Bond test for AR(2))		.58985812	.62860158	.35785669	.61574718		
	Hansen test for over-id. restrictions		10.147894	13.191653	17.189027	14.502445		
	Prob (Hansen test for over-id. res	str.)	.33864565	.1541242	.04583682	.10554126		
				lagand: * n = 1: ** n = 05: *** n = 01				

legend: \* p<.1; \*\* p<.05; \*\*\* p<.01

Note: Dependent variables, lagged dependent variables and quantitative explanatory variables in logarithm. Dummy variables for competitiveness factors. Two-step difference GMM estimation using xtabond2 module for Stata. Asymptotic robust standard errors are reported. Lagged dependent and differenced explanatory variables used as instruments.



### Main Results

D) Market share

Market share as a function of lagged value of market share and export share

Statistically significant, but relatively small effect of one sectoral and one macro factor (but relatively low pvalue for Hansen test)

Energy costs at the macro level

Customer demandingness at the sectoral level

 None of the top 5 company level factors, only additional

 corporate relationships
 with other companies – was
 statistically significant

market share         market share         market share         market share         market share         market share         share           market share (-1)         coef.         .32945553**         .28947073*         .25185153***           export share         coef.         .13332103*         .14836742**         .14800113**           corporate relations (med)         coef.         0.0015         0.0262         0.0253           corporate relations (med)         coef.         .00026464**             corporate relations (high)         coef.         .0026464**             corporate relations (high)         coef.         .002244             corporate relations (high)         coef.         .002244             corporate relations (high)         coef.         .002144             customer demandingness (med)         coef.         .00221              customer demandingness (high)         coef.         .02419362*          .04260075***           customer demandingness (high)         coef.         .02419362*          .02164415*           customer demandingness (high)         coef.         .0283884***				Model 1	Model 2	Model 3
market share         market share         share           market share (-1)         coef.         .32945553**         .28947073*         .25185153**           export share         coef.         .13332103*         .14836742**         .14800113**           export share         coef.         .00367         0.0262         0.0253           corporate relations (med)         coef.         0.00197313         -         -           corporate relations (high)         coef.         0.0924646**         -         -           corporate relations (high)         coef.         0.00111         -         -           coustomer demandingness (med)         coef.         -0.024646**         -         -           customer demandingness (med)         coef.         -0.02460075***         -         -           customer demandingness (high)         coef.        024260075***         -         -           customer demandingness (high)         coef.        02419362*         -         -           customer demandingness (high)         coef.        02419362*         -        0402226**           energy costs (med)         coef.        02583884***        0402226**         -           mumber of observations         s.e.						market
market share (-1)         coef.         .32945553**         .28947073*         .25185153***           export share         coef.         .13332103*         .14836742**         .14800113**           export share         coef.         .13332103*         .14836742**         .14800113**           corporate relations (med)         coef.         0.00197313				market share	market share	share
s.e.         0.0367         0.0531         0.0015           export share         coef.         .13332103*         .14836742**         .14800113**           Gorporate relations (med)         coef.         0.00197313         0.0253           corporate relations (med)         coef.         0.00197313         0.0262           corporate relations (high)         coef.         0.92444         0.001           corporate relations (high)         coef.         .09026464**         0.011           corporate relations (high)         coef.         .00111         0.0014           customer demandingness (med)         coef.        04260075***         0.0014           customer demandingness (high)         coef.        03270222**         0.0014           customer demandingness (high)         coef.        02419362*        02164415*           energy costs (med)         coef.        02419362*        0402226**           energy costs (high)         coef.        02419362*        0402226**           energy costs (high)         coef.        0419362*        0402226**           energy costs (high)         coef.        02419362*         .00078           energy costs (high)         coef.        02583884***         .040222		market share (-1)	coef.	.32945553**	.28947073*	.25185153***
export share         coef.         .13332103*         .14836742**         .14800113**           See         0.065         0.0262         0.0253           corporate relations (med)         coef.         0.00197313			s.e.	0.0367	0.0531	0.0015
Image: section of the sectio		export share	coef.	.13332103*	.14836742**	.14800113**
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Image         S.e.         0.9244         Image           corporate relations (high)         coef.         .09026464**         Image           corporate relations (high)         coef.         .000111         Image           customer demandingness (med)         coef.        04260075***         Image           customer demandingness (med)         coef.        04260075***         Image           customer demandingness (high)         coef.        03270222**         Image           customer demandingness (high)         coef.        02419362*         Image           energy costs (med)         coef.        02419362*         Image           energy costs (med)         coef.        02419362*         Image           energy costs (high)         coef.        02419362*         Image           mumber of observations         s.e.         0.0641         0.0793           energy costs (high)         coef.        0583884***         Image           Number of observations         452         397         470           Number of groups         64         64         66           Number of instruments         26         21         24           Arellano-Bond test for AR(1)         0.6157865	کر ہ	corporate relations (med)	coef.	0.00197313		
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Number of observations         452         397         470           Number of groups         64         64         66           Number of instruments         26         21         24           Arellano-Bond test for AR(1)         -0.50183086         -1.0264606         -0.97642172           Prob (Arellano-Bond test for AR(2)         1.1005134         2.0280328         1.4082994           Prob (Arellano-Bond test for AR(2))         0.27110851         0.042569         0.15904245           Hansen test for over-id. restr.)         0.08050512         0.08015978         0.022		customer demandingness (med)	coef.		04260075***	
Open for the customer demandingness (high)         coef.        03270222**           Image: customer demandingness (high)         s.e.         0.022           Image: customer demandingness (high)         coef.        02419362*        02164415*           Image: customer demandingness (high)         coef.        02419362*        02164415*           Image: customer demandingness (high)         coef.        02419362*        02164415*           Image: customer demandingness (high)         coef.        02419362*         0.0793           Image: customer demandingness (high)         coef.        02419362*         0.0793           Image: customer demandingness (high)         coef.        0583884***        0402226**           Image: customer demandingness (high)         coef.        0583884***        040226**           Image: customer demandingness (high)         coef.        0583884***        040226**           Image: customer demandingness (high)         coef.        058388	io re		s.e.		0.0014	
ord         s.e.         0.022           energy costs (med)         coef.        02419362*        02164415*           energy costs (high)         s.e.         0.0641         0.0793           energy costs (high)         coef.        0583884***        0402226**           number of observations         s.e.         0.0078         0.0188           Number of observations         452         397         470           Number of groups         64         64         66           Number of instruments         26         21         24           Arellano-Bond test for AR(1)         -0.50183086         -1.0264606         -0.97642172           Prob (Arellano-Bond test for AR(2)         1.1005134         2.0280328         1.408294           Prob (Arellano-Bond test for AR(2))         0.27110851         0.0425569         0.15904245           Hansen test for over-id. restrictions         29.382024         25.697044         31.201589           Prob (Hansen test for over-id. restr.)         0.08050512         0.08015978         0.05258477	ect	customer demandingness (high)	coef.		03270222**	
energy costs (med)         coef.        02419362*        02164415*           inergy costs (high)         s.e.         0.0641         0.0793           energy costs (high)         coef.        0583884***        0402226**           inergy costs (high)         s.e.         0.0078         0.0188           inergy costs (high)         inergy costs (high)         0.0188         666           inergy costs (high)         inergy costs (high)         0.030467452         0.32885552           inergy cost (Arellano-Bond test for AR(2))         inergy cost (Ar	s f		s.e.		0.022	
Sec.         0.0641         0.0793           energy costs (high)         coef.        0583884***        0402226**           Number of observations         s.e.         0.0078         0.0188           Number of observations         452         397         470           Number of groups         64         64         66           Number of instruments         26         21         24           Arellano-Bond test for AR(1)         -0.50183086         -1.0264606         -0.97642172           Prob (Arellano-Bond test for AR(1))         0.6157865         0.30467452         0.32885552           Arellano-Bond test for AR(2)         1.1005134         2.0280328         1.4082994           Prob (Arellano-Bond test for AR(2))         0.27110851         0.0425569         0.15904245           Hansen test for over-id. restrictions         29.382024         25.697044         31.201589           Prob (Hansen test for over-id. restr.)         0.08050512         0.08015978         0.05258477	<b>~</b> "	energy costs (med)	coef.	02419362*		02164415*
energy costs (high)         coef.        0583884***        0402226**           S.e.         0.0078         0.0188           Number of observations         452         397         470           Number of groups         64         64         66           Number of instruments         26         21         24           Arellano-Bond test for AR(1)         -0.50183086         -1.0264606         -0.97642172           Prob (Arellano-Bond test for AR(2)         1.1005134         2.0280328         1.4082994           Prob (Arellano-Bond test for AR(2))         0.27110851         0.0425569         0.159042455           Hansen test for over-id. restrictions         29.382024         25.697044         31.201589           Prob (Hansen test for over-id. restr.)         0.08050512         0.08015978         0.05258477	tor		s.e.	0.0641		0.0793
s.e.         0.0078         0.0188           Number of observations         452         397         470           Number of groups         64         64         66           Number of instruments         26         21         24           Arellano-Bond test for AR(1)         -0.50183086         -1.0264606         -0.97642172           Prob (Arellano-Bond test for AR(1))         0.6157865         0.30467452         0.32885552           Arellano-Bond test for AR(2)         1.1005134         2.0280328         1.4082994           Prob (Arellano-Bond test for AR(2))         0.27110851         0.0425569         0.15904245           Hansen test for over-id. restrictions         29.382024         25.697044         31.201589           Prob (Hansen test for over-id. restr.)         0.08050512         0.08015978         0.05258477	ma fac	energy costs (high)	coef.	0583884***		0402226**
Number of observations         452         397         470           Number of groups         64         64         66           Number of instruments         26         21         24           Arellano-Bond test for AR(1)         -0.50183086         -1.0264606         -0.97642172           Prob (Arellano-Bond test for AR(1))         0.6157865         0.30467452         0.32885552           Arellano-Bond test for AR(2)         1.1005134         2.0280328         1.4082994           Prob (Arellano-Bond test for AR(2))         0.27110851         0.0425569         0.15904245           Hansen test for over-id. restrictions         29.382024         25.697044         31.201589           Prob (Hansen test for over-id. restr.)         0.08050512         0.08015978         0.05258477	-		s.e.	0.0078		0.0188
Number of groups         64         64         66           Number of instruments         26         21         24           Arellano-Bond test for AR(1)         -0.50183086         -1.0264606         -0.97642172           Prob (Arellano-Bond test for AR(1))         0.6157865         0.30467452         0.32885552           Arellano-Bond test for AR(2)         1.1005134         2.0280328         1.4082994           Prob (Arellano-Bond test for AR(2))         0.27110851         0.0425569         0.15904245           Hansen test for over-id. restrictions         29.382024         25.697044         31.201589           Prob (Hansen test for over-id. restr.)         0.08050512         0.08015978         0.05258477		Number of observations		452	397	470
Number of instruments         26         21         24           Arellano-Bond test for AR(1)         -0.50183086         -1.0264606         -0.97642172           Prob (Arellano-Bond test for AR(1))         0.6157865         0.30467452         0.32885552           Arellano-Bond test for AR(2)         1.1005134         2.0280328         1.4082994           Prob (Arellano-Bond test for AR(2))         0.27110851         0.0425569         0.15904245           Hansen test for over-id. restrictions         29.382024         25.697044         31.201589           Prob (Hansen test for over-id. restr.)         0.08050512         0.08015978         0.05258477		Number of groups		64	64	66
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Arellano-Bond test for AR(2)1.10051342.02803281.4082994Prob (Arellano-Bond test for AR(2))0.271108510.04255690.15904245Hansen test for over-id. restrictions29.38202425.69704431.201589Prob (Hansen test for over-id. restr.)0.080505120.080159780.05258477		Prob (Arellano-Bond test for AR(1))		0.6157865	0.30467452	0.32885552
Prob (Arellano-Bond test for AR(2))         0.27110851         0.0425569         0.15904245           Hansen test for over-id. restrictions         29.382024         25.697044         31.201589           Prob (Hansen test for over-id. restr.)         0.08050512         0.08015978         0.05258477		Arellano-Bond test for AR(2)		1.1005134	2.0280328	1.4082994
Hansen test for over-id. restrictions         29.382024         25.697044         31.201589           Prob (Hansen test for over-id. restr.)         0.08050512         0.08015978         0.05258477		Prob (Arellano-Bond test for AR(2))		0.27110851	0.0425569	0.15904245
Prob (Hansen test for over-id. restr.)         0.08050512         0.08015978         0.05258477		Hansen test for over-id. restrictions		29.382024	25.697044	31.201589
		Prob (Hansen test for over-id. restr.)		0.08050512	0.08015978	0.05258477

legend: \* p<.1; \*\* p<.05; \*\*\* p<.01

Note: : Dependent variables, lagged dependent variables and quantitative explanatory variables in logarithm. Dummy variables for competitiveness factors. Two-step difference GMM estimation using xtabond2 module for Stata. Asymptotic robust standard errors are reported. Lagged dependent and differenced explanatory variables used as instruments.



### Conclusion

- The regression analysis showed statistically significant impact of presence of foreign manager in the company on its competitiveness (but only based on productivity and export)
- Econometric analysis has confirmed statistically significant impact of most of the competitiveness factors (identified by a survey) on the analysed companies' competitiveness
- Their impact differs across considered competitiveness indicators, they seem to explain much larger part of profitability than productivity, export or market share
- There were only three variables statistically significant for at least 2 indicators (energy costs, EU membership and developed consumer sectors)
- Dominance of management and leadership related factors suggested by the survey was not confirmed