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Macro and microeconomic determinants of the EU firms' export-market participation

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Abstract

Rapidly expanding literature on the new strand in the new trade theory and empirical research in this area indicate factors which can positively influence export participation of firms. The analysis presented in this study concentrates on verifying which barriers met by the European firms are significant constraints to their exports with an aim of ascertaining if problems identified at the microeconomic level may have their roots in macroeconomic situation. Estimation results indicate that the probability of exporting depends on a combination of a wide set of firms' characteristics. Country-level macroeconomic and institutional conditions are responsible for a considerable part of country specific determinants of firms' export and significantly influence participation in the international trade. The level of economic development, economic freedom and financial market regulations are important determinants of export decisions. The constraints perceived by the European entrepreneurs have rather limited direct impact on a probability of being exporter, however they influence negatively firms' main competitiveness factor − TFP. Moreover, the analysis suggests that government policy going beyond creating friendly business environment and supporting the development of financial institutions is not effective. Any kind of public support, even directed to particular firms, does not increase their international competitiveness.

Keywords: new trade theory, Melitz model, exports, firms
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1. Introduction

The importance of the concept of competitiveness is now firmly embedded within policy-making in Europe and put by governments at the top of their agenda. One of the key elements of successful growth strategies is integration with the global markets, and higher and sustained economic growth is associated with export growth. Widely considered as an important expression of competitiveness of an economy is its export performance.

Against the background of some disparity between countries' export performance, the central question has always been: what can and should be done to boost export growth and enhance competitiveness in the international markets. Comprehensive answer to this question cannot be provided without explaining determinants of export at the firm level, which is an area of interest of the new strand in the new trade theory.

Analysis presented in this study concentrates on verifying which barriers met by the European firms are significant constraints to their exporting activities with an aim of ascertaining if problems identified at the microeconomic level may have their roots in macroeconomic situation. Particular attention is devoted to the impact of institutional, financial and labour type of constraints.

The structure of this paper is as follows. Next section reviews the relevant literature, section 3 discusses the dataset and the empirical methodology. In section 4 empirical results are presented. Section 5 summarizes and concludes with directions for further studies.

2. Literature review

2.1. Trade theories

For several centuries the prevailing intellectual consensus on how to accelerate export was heavily influenced by a traditional approach rooted in the principle of comparative advantage. Ricardo, Heckscher, Ohlin, Samuelson and Vanek models, developed between 1800 and 1970, treated differences across countries as a primary driving force behind international trade. In this approach countries traded only because they were different in terms of technology or their relative supply of factors of production.

The traditional trade theory assumed away intra-industry trade, but emerging empirical evidence has revealed incrementally that much of world trade was exactly of the assumed-away kind. The existence of an intra-industry trade was first acknowledged by Ohlin in 1933. However, it was not seriously studied until the mid-1960s, when economists begun to assess the impact of the formation of European Economic Community on trade patterns of the member countries.

The important landmark in the history of intra-industry trade theory was Grubel and Lloyd's research. Their work incorporated a great deal of documentary evidence and attempted to provide a theoretical basis for the existence of the intra-industry trade. They suggested that it is prevalent in a labour intensive reconstitution of goods from large to small consignments, seasonal trade and trade of goods with higher transport costs. It could be also a result of government policies and legal constraints (Grubel and Lloyd 1975). Their explanations were compatible with Heckscher-Ohlin comparative advantage model, in which intra-industry trade in homogenous goods could arise from differences in comparative costs.

However, along with the thorough documentation of the growing importance of the intra-industry trade flows, attempts to both find theoretical explanations and to test the validity of these explanations have also grown apace. This motivated economists to go beyond the comparative advantage model framework. For example, Linder showed that trade in vertically differentiated products stemmed from the fact that demand for quality increased as income rose (Linder 1961). Simultaneously, it quickly became apparent (Norman 1976; Krugman 1979; Lancaster 1980) that one could use monopolistic competition models to offer a picture of international trade that completely bypassed conventional arguments based on a comparative advantage. In this picture, countries that were identical in resources and technology would nonetheless specialize in producing different products, giving rise to trade as consumers sought variety. And this shift in attitude among trade theorists, represented for example by Helpman (1981) and Dixit-Norman (1980), incorporating increasing returns to scale and differentiated products, offered an intellectually satisfying explanation of trade between countries that were similar in their factor supplies and technological level (Krugman 2008).

Nevertheless, the modeling choices made by new trade theorists disregarded differences among firms. Recent empirical evidence, however, showed that firms' differences within sector were more pronounced than differences between sector averages, and most firms – even in traded-goods sectors – did not export at all (Bernard and Jensen 1999). These facts were crucial for understanding an international trade and its determinants.

Together with a development of firm level databases at the beginning of XXI century a theoretical approach was revolutionized. While new trade theory put emphasis on a growing trend of intermediate goods, new strand of the new trade theory emphasized a role of firm level differences in the same industry of the same country. The main theoretical papers in this rapidly expanding literature were: Bernard *et al.* 2003; Melitz 2003 − who constructed baseline new-new trade theory model − and Helpman, Melitz and Yeaple 2004 (entitled: "Export Versus FDI with Heterogeneous Firms") − who expanded the Melitz model into one with firms engaged in local production overseas (FDI).

The fact that only small fraction of firms is able to export stems from the fact that participation in the international trade is connected with superior firms' characteristics. Therefore, in the new-new trade theory models, which add firm heterogeneity to the Krugman's model, entrepreneur starts a firm, produces and sells only if his/her technology is efficient enough to generate non-negative profits in equilibrium. Firms only export if their profits in the foreign market, net of the fixed exporting costs, are non-negative. There is an equilibrium cutoff productivity level for exporting such that all exporting firms will have sufficient profits to cover the fixed costs of participation in international trade. Equilibrium cutoff productivity level for FDIs is higher than for exporters (Helpman, Melitz and Yeaple 2004).

These "Melitz-type models" constitute theoretical foundations for empirical research based in particular on firm-level data. The empirical results prove the significance of firm heterogeneity implementation into new trade theory models. Since the number of studies referring to firm heterogeneity in general has grown rapidly in recent years, summarizing this extensive literature is beyond the scope of this paper. The extensive summary of recent empirical evidence on export determinants mainly in developed countries is offered, for example, by Wagner (2007; 2012). The detailed research by Cieślik, Michałek and Michałek (2012; 2014) provide similar results for the transition economies, including Poland. Stylized facts stemming from the new empirical analyses are the following (Rubini *et al.* 2012):

- There are big differences in the firms' characteristics within sectors and countries.
- Only a small fraction of firms accounts for the majority of exports and most firms do not export.
- Exporting firms are more productive.
- Large firms tend to export more.
- Exporters tend to innovate more.
- Older firms are usually more likely to export.

The fact that larger, more productive and innovative firms export more suggests that countries which face constraints to firm development provide fewer opportunities for businesses to become exporters. Consequently, identified in the literature bottlenecks to internationalization stem from small firms' size and innovation expenditure, limited access to financial markets or low-skill, inflexible labour force.

Obstacles to internationalization can be of different kinds – they can originate in technology, product, labour and financial markets. Binding constraints may be different from one country to another. As evidenced within the EFIGE project, how to tear down barriers to growth is a country specific question. Therefore, there is no one-size-fits-all recipe to export, rather each government must identify its own domestic roadblocks (Altomonte and Ottaviano 2014).

2.2. Role of constraints perceived by the firms

Earlier literature has shown that more productive firms appear to be in a better financial condition and rely less on outside financing. What is more, when highly productive firms apply for bank financing they are more likely to get it (Altomonte, Aquilante and Ottaviano 2012). As such we would expect more productive firms to be less financially constrained. Economists only recently have started to incorporate these arguments in theoretical models of heterogeneous firms and to test the implications of these models econometrically with firm-level data. Starting with the pioneering study by Greenaway, Guiriglia and Kneller 2007, a growing number of empirical papers have been looking at the linkages between export activities and financial constraints using data at the level of the firm. The big picture presented in this literature can be summarized as follows: exporting firms are usually less financially constrained than non-exporters, but exporting does not improve financial health of the firms. Economists argue that the existing empirical results at hand should not be considered as stylized facts that can guide policymakers and suggest a strategy to further improve our knowledge in this area (Wagner 2014). Moreover, Manova (2013), shows that domestic country-level credit supply conditions and the quality of the financial sector indeed matter for firms' productivity and growth, although appear to play a much smaller direct role in affecting exporting decisions.

The literature concerning significance of labour and institutional constraints for exporting is scarce and limited mainly to investigating the interrelation between country-level institutional constraints and country exports. The notable exception is the study by Commander and Svejnar (2007) who using BEEPs database show that constraints perceived at the firm level are not significant factors influencing the decision concerning exporting when country fixed effects are introduced. Indeed, country fixed effects largely absorb the explanatory power of the constraints faced by the individual firms. Above-mentioned analysis brings into question an important part of the conventional wisdom in this area and indicates that differences in the business environment observed across firms does not matter for firm performance, but country level business climate (e.g. labour and institutional constraints) do. This also suggests that ability to identify the effect of business environment on firm performance is more limited than has been assumed to date.

Therefore, a further research in the area of export constraints would be interesting not only from the point of view of the theorists of the new strand in the new trade theory, but also from the perspective of policymakers, for whom empirical evidence can provide a sufficient guidance.

The main goal of this paper is the attempt to identify if and how economic policy (institutional, financial, labour constraints and overall macroeconomic environment) influences competitiveness in the European countries. The analysis is performed on the EFIGE database and, contrary to the dominating strand in the empirical literature, it concentrates not only on firm level export determinants, but

focuses also on micro and macro level factors that may additionally be detrimental to export performance.

This analysis focuses on a direct measurement of the impact of economic policy on firms' export probability and tries to find a connection between economic environment, firms' subjective assessment of business climate and export decisions.

3. Data description and methodology

3.1. Data description

The EU-EFIGE firm-level dataset of representative samples of manufacturing firms (with a lower threshold of 10 employees) includes data from seven European countries, mostly from the year 2008. While some publicly available micro-based datasets developed at the European level (e.g. the Community Innovation Statistics, European Union Labour Force Survey or the European Community Household Panel) focus on one specific dimension of economic activity, EFIGE is focused on international operations, but also contains a broad range of variables (around 150) on different sets of firms' activities. It gathers both qualitative and quantitative information from six different areas: proprietary structure of the firm and governance, structure of the workforce, investment, technological innovation and R&D, internationalization, finance, market and pricing.

Appropriate weighting procedures to reproduce representative statistics from the sample, where large firms were over-weighted, have been designed. Database includes 3,000 firms for Germany, France, Italy and Spain, more than 2,200 firms for the UK, and 500 firms for Austria and Hungary. The data have been integrated with balance sheets drawn from the Amadeus database. Merging with balance sheet data makes possible the validation in terms of comparability between some measures of firm performance aggregated from the EFIGE representative samples at the country level vs. official statistics provided by EUROSTAT.

Thanks to the link between survey and balance sheet data, it is possible to assess the correlation patterns between the degree of involvement in international activities and firm 'competitiveness' with the latter measured by total factor productivity (TFP). Following standard practice in the literature of using the procedure by Levinsohn and Petrin (2003), TFP is computable for around 50% of the firms present in the dataset. The resulting restricted sample (limited to those firms for which it was possible to retrieve TFP) does not show any particular bias in terms of representation by category of firms.

3.2. Empirical methodology

The study concentrates on the interrelation between entrepreneurs' business climate perception and probability of export having controlled for firms' and country characteristics. It is based on statistical analysis and the probit models. The analysis was performed for the whole dataset as well as for particular countries. Additionally, analogously to standard practice of showing selection in internationalization activities, the kernel density estimates of the productivity distribution for firms facing different business conditions and constraints were compared with the estimates for firms which do not experience any barriers.

In the estimated probit model variable were as follows:

$$Y_i = \theta X_i + \varepsilon_i \tag{1}$$

where Y is a binary variable − firms are considered exporters if they reply "yes, directly from the home country" to a question asking whether the firm has sold abroad some or all of its own products/services in 2008, X is a vector of firm characteristics affecting probability of being exporter and θ is the vector of parameters of these characteristics that needs to be estimated, while ε is an error term which is assumed to be normally distributed with a zero mean.

Instead of observing the volume of exports, we observe only a binary variable indicated as a sign of

$$Y\_i = \begin{cases} 1 & for\ exporters \\ 0 & for\ nonexporters \end{cases} \tag{2}$$

The probability that a firm exports as a function of firm, industry and country characteristics can be written as:

$$\Pr(Y = 1|X) = \varphi(\theta X) \tag{3}$$

The variables were selected based on the general to specific approach. In comparison to the existing literature, wide set of series that potentially (according to economic theory) may have impact on export performance were considered. However, due to the data limitations, particularly the low number of responses to some survey questions (especially concerning constraints perceived by the firms) and taking into account collinearity between them, chances for constructing complex model explaining all possible determinants of export were limited. The list of finally implemented variables was based on the statistical criteria: t-Student statistics and model information criteria. Since the estimated model was not linear, the marginal effects were reported in the Table 1 enabling their interpretation as elasticities. Model EXP includes all statistically significant variables, country and sector specific dummies. In model EXP_MACRO country specific dummies were replaced by macroeconomic and institutional variables, which enabled the author to show that interrelation between macroeconomic environment and firms export

performance exists. Additionally, regressions explaining TFP by the variables excluded from the export probability equations were presented in order to show potential indirect impact of those factors on export participation through TFP channel. Detailed description of variables included in the selected models is presented in the appendix. In all models robust standard errors were used, in the models with macroeconomic variables they were additionally clustered.

4. Empirical results

The comparison of firms' characteristics between exporters and non-exporters shows that firms' total factor productivity (calculated as Solow residual of a Cobb-Douglas production function following the semi-parametric algorithm proposed by Levinsohn and Petrin [2003]), size, age, involvement in other forms of international activity, innovativeness and quality of human capital are, on average, higher for exporters than for non-exporters. Above-mentioned tendencies are observed in all countries from the EFIGE database.

The results obtained for particular countries reveal some degree of heterogeneity. In all countries openness and participation in international markets as well as innovativeness increase probability of export activity. Although generally human capital is the crucial factor of competitiveness, the level of education is an important determinant of export participation only in France and Spain. Moreover, institutional barriers are significant factors lowering propensity to export only for German entrepreneurs.

Estimation results obtained for the whole sample including all countries indicate that the probability of exporting increases with: firms' total factor productivity, size, age, involvement in other forms of international activity, innovativeness and quality of human capital. All herein export market participation determinants are jointly significant and although productivity seems to be the single best predictor of export participation, it is far from explaining and determining export performance of the EU firms without controlling for other firm characteristics. The conclusions are consistent with results presented in the literature proving the fact that competitiveness is created at the firm level.

Table 1. Estimation results

Variable	EXP	EXP_MACRO	TFP	TFP_MACRO
EXPORTER				
TFP	.09763456**	.10001154**		
L_SIZE	.04041519*			
AGE	.18821137***	.18325086***		
IMPORTER M~S	.55914231***	.53025719***		
IMPORTER S~S	.46866735***	.46261118***		
OUTSOURCER	1.7455734***	1.6867828***		
FOREIGN_GR	.37624189***	.40469711***		
R_D	.29781493***	.32265658***		
PRODUCT_IN~V	.21629268***	.21911403***		
HIGH_TECH	.29028441***	.27794937**		
SPECIALIZE~D	.26786658***	.26198159***		
ECONOMIES_~E	-.09046174**	-.10175753***		
TRADITIONAL	(omitted)	(omitted)		
SPAIN	-.18058154***			
GERMANY	-.10963915			
FRANCE	-.64961038***			
AUSTRIA	.291510531			
HUNGARY	.12902129			
UK	-.25488101***			
ITALY	(omitted)			
EDUCATION	.1011057***	.0818245*		
LABOUR_FLEX	.15392897***	.24430704***		
1_numberof~s	.17921108***	.27024948***		
1_GDP		-.33024731***		
1_GDP_percap		.29786526***		
1_freedom		4.3505837**		
_cons	-1.3012613***	-8.6303726**		
_				
FIN_CONSTR~T			-.11315618***	-.12449867***
derivate			.22913032***	.22010225***
HIGH_TECH			(omitted)	(omitted)
SPECIALIZE~D			-.14821204***	-.13983501*
ECONOMIES_~E			-.10608583**	-.10564958
TRADITIONAL			-.25089296***	-.25949314***
SPAIN			-.37028692***	

Variable	EXP	EXP_MACRO	TFP	TFP_MACRO
GERMANY			(omitted)	
FRANCE			-.18784042***	
AUSTRIA			.02189253	
HUNGARY			.0676611	
UK			-.13888232***	
ITALY			-.28555123***	
1_GDP				-.07210179**
1_GDP_percap				.02920662
1_freedom				2.0595566
_cons			.31720567***	-3.2266533
Statistic				
N	9726	9726	3810	3810
aic	7702.2371	7735.2354	3786.3356	3890.2881
bic	7860.2534	7778.3307	3861.2803	3927.7604

* p<.1; ** p<.05; *** p<.01

Source: own calculations.

Firms' performance influences directly country export competitiveness. However, it cannot be disregarded that it emerges from complex patterns of interactions between several stakeholders including: government, private sector and other institutions and complexity of these interrelations should be taken into account in a broad analysis of international competitiveness.

The comparison of the estimation results of the models with and without macro level variables shows that the combination of macroeconomic and institutional conditions captures a considerable part of country specific effects. Macroeconomic and institutional conditions are potentially important determinants of firm export performance. The country size reduces probability of exporting and the high GDP per capita increases it. These results are the same as those obtained in the standard gravity macro-level models and support intuitive guess that the level of country's development is non--negligible factor positively influencing firms' export probability, while higher internal demand in bigger countries decreases it. Friendly economic environment has, as it was expected, positive impact on the firms' participation in the international markets.

In this context, the research should go further to answer the crucial question − which country level factors observed by the firms have particular impact on their export.

The analysis shows that exporters have higher financing needs and therefore usually use banks more than other firms and are more demanding in terms of financing instruments' (e.g. derivatives) accessibility. At the same time, considerable

proportion of firms (51.6%) claim that they experienced financial constraints, while among non-exporters the rate of firms not satisfied with financial conditions was 37.5%. Exporters, on average, see more institutional constraints (28.7% vs. 20.3% for non-exporters), but perceive labour market as less constrained than non-exporters (43.0% vs. 53.1%). The exporting firms are slightly more likely to receive government support (9.4% of exporters indicate that they received public support and 6.3% of them benefited from tax incentives, among non-exporting firms those rates are lower – 7.8% and 4.7%, accordingly). However, there are differences across countries, e.g. in Germany, Italy, Austria exporting firms receive lower tax incentives or public support than non-exporters, which may spring from EU regulations; the fact that they performed better and did not qualify for support or governments focused on attracting foreign firms not necessarily export oriented ones.

The only factor from above-mentioned that significantly influences probability of export is the number of banks used by the firm, in some sense indicating the needs for high level financial sector's services. The significance of the remaining variables representing the perception of a business climate and its constraints is not proved. The results based on the survey may be biased by the subjective interpretation of the level of constraints, contrary to the quantitative answers concerning banks based on the objective fact. Nevertheless, the symptoms of the indirect impact of some considered indicators are observed.

Access to external financing is essential for enterprises to invest, innovate and grow. Consequently financial market imperfections may limit enterprises' investment and growth prospects. Similarly, labour market rigidities, low level of human capital and institutional barriers can reduce probability of firms' exports.

Evidence based on theory and empirical research indicates that 'financing gaps' as well as labour market and institutional imperfections are likely to be more binding for certain types of enterprises including start-ups, young innovative, small-scale enterprises and more technologically advanced industries. Data limitations, stemming from low level of responses to questions concerning constraints' perception in the EFIGE database, do not allow to make complete evaluation of particular sectors' vulnerability to market constraints.

Despite the statistical insignificance of constraints in predicting export market participation, their negative impact on export performance cannot be disregarded. Barriers experienced by managers may decrease their chance of being exporters, since they are detrimental to the main competitiveness determinant – TFP. Among those factors are the financial market conditions influencing export participation through TFP channel. The higher the derivatives accessibility and lower financial constraints, the higher is TFP.

Other factors taken into account in the analysis are not statistically significant, which suggests that government policy supporting particular firms or sectors and tax incentives are not the crucial competitiveness factors.

5. Conclusions

Estimation results are consistent with theory rooted in Melitz (2003) model and stylized facts concerning firm-level export determinants. They confirm that the probability of exporting depends positively on a combination of a wide set of firms' characteristics, particularly: total factor productivity, size, age, involvement in other forms of international activity, innovativeness and quality of human capital employed.

Country-level macroeconomic and institutional conditions are responsible for a considerable part of country specific determinants of firms' export and generally significantly influence participation in the international trade. The level of economic development and economic freedom positively influence probability of firms' export. What is more, financial market regulations and instruments' accessibility are important determinants of export decisions.

The constraints perceived by the European entrepreneurs have rather limited direct impact on probability of being an exporter, however, their role should not be neglected, because they reduce firms' competitiveness by a negative impact on TFP. This is visible particularly in the case of financial constraints.

Furthermore, the analysis suggests that government policy going beyond creating friendly business environment and supporting the development of financial institutions is not effective. Any kind of public support, even directed at particular firms, does not increase their international competitiveness.

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APPENDICES

A. List of variables

TFP – total factor productivity; Solow residual of a Cobb-Douglas production function following the semi-parametric algorithm proposed by Levinsohn and Petrin at the firm level

LN_K_L – capital intensity: ln of capital to labour ratio

L_SIZE – ln of the number of workers

AGE – a categorical variable for the year of establishment (<6 years; 6−20 years; >20 years)

IMPORTER_MATERIALS – dummy for importer of intermediate goods in 2008 or earlier

IMPORTER_SERVICES – dummy for importer of services in 2008 or before

OUTSOURCER – dummy for the firm that has production activity contracts and agreements abroad or sold some produced-to-order goods to foreign clients

Sector dummies: HIGH_TECH, SPECIALIZED_IND, ECONOMIES_OF_SCALE, RADITIONAL

Country dummies: SPAIN, GERMANY, FRANCE, AUSTRIA, HUNGARY, UK, ITALY

Dummies for existence of constraints: FIN_CONSTRAINT, LABOUR_CONSTRAINT INST_CONSTR R_D

PRODUCT_INNOV – dummy for firms that carried out any product innovation in years 2007−2009

R_D – firm employs more than 0 employees to R&D activities

LABOUR_FLEX – firm uses part time employment or fixed term contracts

EDUCATION – firm has a higher share of graduate employees with respect to the national average share of graduates

– tax_incentives – dummy for firms that received tax incentives

– public_support − dummy for firms that received public support

– numberofbanks – number of banks used by the firm

– derivatives − dummy for firms using derivatives

B. Correlations between exporting and firms' characteristics

	EX-POR-TER	TFP	L_ SIZE	AGE	IM-PORT.	IM-POR ~ES	OUT-SOU~R	FORE-IGN~R	R_D	PRO-DUC ~V	LA-BOUR ~X	EDU-CAT ~N	FIN_ CO~T	LA-BOUR ~T	INST _~TR	tax
EXPORTER	1.0000															
TFP	0.1317	1.0000														
L_SIZE	0.1589	0.4324	1.0000													
AGE	0.1007	0.0424	0.1446	1.0000												
IMPORTER M~S	0.3462	0.0860	0.2316	0.0960	1.0000											
IMPORTER_S~S	0.3076	0.1522	0.2754	0.0245	0.3724	1.0000										
OUT-SOURCER	0.5283	0.0401	0.1703	0.1101	0.3091	0.2769	1.0000									
FOREIGN_GR	0.0971	0.1575	0.2981	-0.0303	0.0880	0.1875	0.1216	1.0000								
R_D	0.2397	0.661	0.2262	0.1037	0.2160	0.1837	0.2072	0.0710	1.0000							
PRODUCT_IN	0.1927	0.0597	0.1467	0.0918	0.2012	0.1847	0.1546	0.0581	0.4226	1.0000						
LABOUR_FLEX	0.0278	0.0353	0.1894	0.0440	0.0417	0.0465	-0.0014	-0.0062	0.1302	0.0355	1.0000					
EDUCATION	0.1281	-0.0477	-0.1527	-0.0028	0.1356	0.0758	0.0892	-0.0144	0.1505	0.0904	-0.0326	1.0000				
FIN_CONSTR~T	0.0178	-0.1504	-0.1686	-0.0196	-0.0009	-0.0368	0.0514	-0.0840	0.0531	0.0750	-0.0106	0.0505	1.0000			
LABOUR_ CON~T	-0.0578	-0.0310	-0.0070	0.0745	-0.0700	0.0284	-0.0245	0.0189	-0.0429	-0.0832	-0.0551	-0.0496	-0.0587	1.0000		
INST_ CONSTR	0.0521	-0.1204	-0.0830	0.1335	0.0561	0.0430	0.1132	-0.0812	0.0291	0.027	-0.0492	0.0234	0.1909	0.0258	1.0000	
tax_incent~s	0.0457	0.0030	0.4010	-0.0287	0.0870	0.0919	0.1338	0.0074	0.1404	0.1246	0.0407	0.0577	0.0983	0.1007	0.0853	1
public_sup~t	0.0207	0.0068	-0.0170	-0.0075	0.0483	0.0703	0.0930	-0.0380	0.0459	0.0993	0.0354	0.1126	0.0856	-0.0116	0.1100	0
numberofba~s	0.1110	0.1040	0.2509	0.1614	0.1292	0.1014	0.0481	-0.0082	0.1393	0.0925	0.1032	-0.0421	-0.0180	0.0735	0.0033	-0
derivates	0.1119	0.2565	0.3117	0.0401	0.1095	0.1622	0.0917	0.0925	0.1157	0.1390	0.0609	-0.0371	-0.0733	-0.0338	-0.0836	0

	number~s	deriva~s
numberofba~s	1.0000	
derivates	0.2248	1.0000

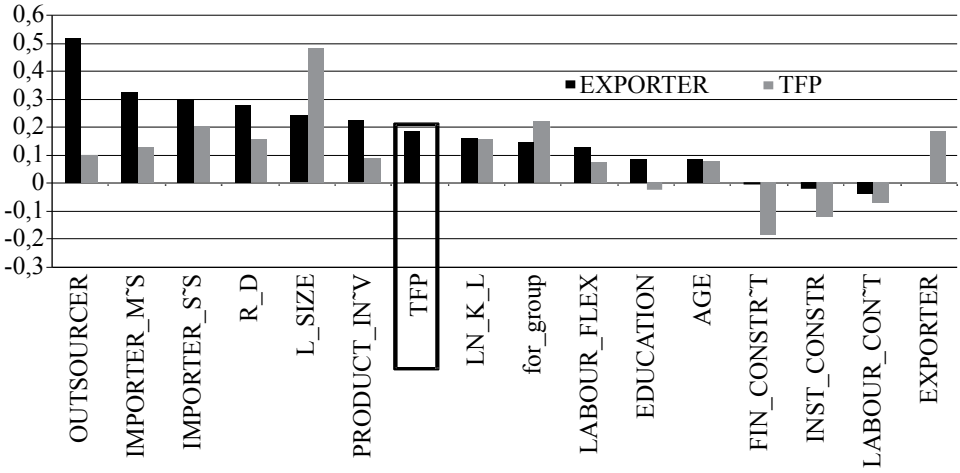
C. Mean characteristics' comparison: exporters and non-exporters

Variable	Exporters	Non_expo~s
TFP	-.05789151	-.19495742
L_SIZE	3.8824263	3.746103
AGE	2.5515695	2.484375
IMPORTER M~S	.67264574	.25
IMPORTER_S~S	.39013453	.078125
OUTSOURCER	.69058296	.0625
FOREIGN_GR	.06278027	.031250
HIGH_TECH	.04932735	.046875
SPECIALIZE~D	.29147982	.140625
ECONOMIES_~E	.25112108	.265625
TRADITIONAL	.40807175	.546875
R_D	.71748879	.453125
FIN_CONSTR~T	51569507	.375
LABOUR_CON~T	.43049327	.53125
INST_CONSTR	.28699552	.203125
PRODUCT_IN~V	.60986547	.25
EDUCATION	.34529148	.234375
numberofba~s	3.8340807	3.75
derivates	.09865471	.09375
tax_incent~s	.06278027	.046875
public_sup~t	.0941704	.078125
credit_den~d	.17488789	.1875
Variable	**FR_Expor~s**	**FR_Non_E~s**
TFP	-.90661904	-.24373081
L_SIZE	3.8330468	3.9009068
AGE	2.686747	2.9
IMPORTER M~S	.77108434	.3
IMPORTER_S~S	.44578313	.1
OUTSOURCER	.74698795	.15
FOREIGN_GR	.07228916	.05
HIGH_TECH	.07228916	0
SPECIALIZE~D	.22891566	.2
ECONOMIES_~E	.22891566	.25
TRADITIONAL	.46987952	.55
R_D	.71084337	.5
FIN_CONSTR~T	.60240964	.4
LABOUR_CON~T	.54216867	.75
INST_CONSTR	.48192771	.15
PRODUCT_IN~V	.65060241	.3
EDUCATION	.39759036	.35
numberofba~s	3.3975904	2.9
derivates	.07228916	0
tax_incent~s	.12048193	0
public_sup~t	.14457831	.1
credit_den~d	.12048193	.15

Variable	**GE_Expor~s**	**GE_Non_E~s**
TFP	.15069791	.09155088
L_SIZE	4.6947246	4.463225
AGE	2.5609756	2.875
IMPORTER M~S	.6097561	.375
IMPORTER_S~S	.41463415	.25
OUTSOURCER	.63414634	0
FOREIGN_GR	.07317073	.125
HIGH_TECH	.04878	.25
SPECIALIZE~D	.41463415	.125
ECONOMIES_~E	.34146341	.125
TRADITIONAL	.19512195	.5
R_D	.90243902	.5
FIN_CONSTR~T	.31707317	.25
LABOUR_CON~T	.17073171	.25
INST_CONSTR	.07317073	.25
PRODUCT_IN~V	.63414634	.25
EDUCATION	.14634146	.125
numberofba~s	3.4878049	3
derivates	.14634146	.5
tax_incent~s	0	0
public_sup~t	.09756098	.125
credit_den~d	.07317073	0
Variable	**IT_Expor~s**	**IT_Non_E~s**
TFP	-.25044773	-.30895771
L_SIZE	3.4129693	3.4307816
AGE	2.5135135	2.2
IMPORTER M~S	.58108108	.13333333
IMPORTER_S~S	.32432432	.03333333
OUTSOURCER	.66216216	0
FOREIGN_GR	.02702703	0
HIGH_TECH	.0270273	.03333333
SPECIALIZE~D	.31081081	.1
ECONOMIES_~E	.16216216	.3
TRADITIONAL	.5	.56666667
R_D	.68918919	.43333333
FIN_CONSTR~T	.58108108	.46666667
LABOUR_CON~T	.540542054	.56666667
INST_CONSTR	.28378378	.26666667
PRODUCT_IN~V	.58108108	.13333333
EDUCATION	.44594595	.23333333
numberofba~s	5.1081081	4.7333333
derivates	.09459459	.03333333
tax_incent~s	.05405405	.06666667
public_sup~t	.05405405	.03333333
credit_den~d	.22972973	.26666667

Variable	HU_Expor~s	HU_Non_E~s
TFP	.30015478	-.13174402
L_SIZE	4.0789276	3.3777241
AGE	2.1666667	1.8
IMPORTER M~S	.70833333	.4
IMPORTER_S~S	.33333333	0
OUTSOURCER	.66666667	.2
FOREIGN_GR	.125	.2
HIGH_TECH	.04166667	0
SPECIALIZE~D	.25	.2
ECONOMIES_~E	.41666667	.2
TRADITIONAL	.29166667	.6
R_D	.5	.2
FIN_CONSTR~T	.375	0
LABOUR_CON~T	.16666667	0
INST_CONSTR	0	0
PRODUCT_IN~V	.5	.6
EDUCATION	.20833333	0
numberofba~s	2.0416667	1.2
derivates	.125	0
tax_incent~s	0	0
public_sup~t	0	0
credit_den~d	.375	.2
Variable	**AUS_Expor~s**	**AUS_Non_E~s**
TFP	.260377	1.592386
L_SIZE	4.7004805	6.2146082
AGE	3	3
IMPORTER M~S	1	1
IMPORTER_S~S	1	0
OUTSOURCER	1	0
FOREIGN_GR	0	0
HIGH_TECH	0	0
SPECIALIZE~D	0	0
ECONOMIES_~E	1	1
TRADITIONAL	0	0
R_D	1	1
FIN_CONSTR~T	0	0
LABOUR_CON~T	0	0
INST_CONSTR	0	0
PRODUCT_IN~V	1	1
EDUCATION	0	0
numberofba~s	3	10
derivates	0	1
tax_incent~s	0	1
public_sup~t	1	1
credit_den~d	0	0

D. Export participation and TFP vs. export determinants – correlations

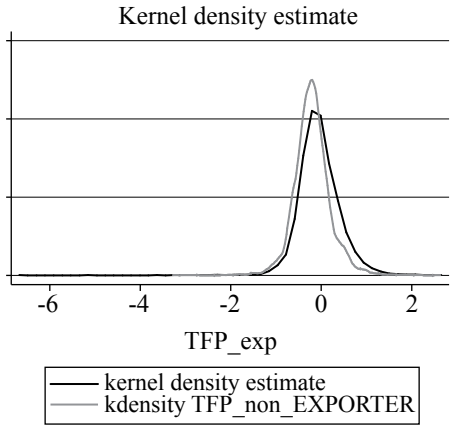


E. Estimation results

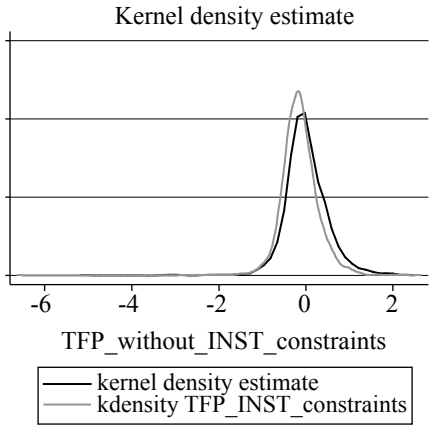
Variable	Germany	France	Italy	UK	Spain	Austria	Hungary
TFP	-.0038808	.1670095*	-.06882223	-.06352008	.20826136**	6.7505365	.08887622
L_SIZE	-.15358208*	.07024538	.06536186	.05905229	.00410682	8.1410841	.22527637**
AGE	.14008643	.1587341***	.14719923***	.0625581	.28511193***	16.175644	.21887579
IMPORTER M~S	.30687439**	.48816145***	.5303855***	.490099***	.70968612***	9.9898627	.5088578***
IMPORTER_S~S	.64327222***	.37192417***	.9058869***	-.31631101*	.46470952***	(omitted)	.52274725**
OUTSOURCER	1.3413853***	1.7287152***	2.2537421***	1.3533173***	1.688897***	(omitted)	1.6991988***
FOREIGN_GR	.36269333*	.4361171***	.25800637	.72853313***	.3603192**	8.1232227	-.35709562
HIGH_TECH	.47316448	.55673467***	-.16184025	.59217491	.30326207*	(omitted)	.23260101
SPECIALIZE~D	.28138116*	.18953134*	.247220108**	.3059677	.46539223***	-2.6210584	.00738368
ECONOMIES_~E	.16089947	-.03412761	-.21127893***	.04129174	-.15811849**	4.3720825	-.01766062
TRADITIONAL	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
R_D	.4196417**	.25755278***	.41376075***	.32705128**	.23791875***	13.236971	.30299681
PRODUCT_IN~V	.46034455***	.11837321	.29015458***	.22080183	.18157951***	8.4889571	.06986224
R_D	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
PRODUCT_IN~V	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
LABOUR_FLEX	.47039231**	.1883819**	.08851442	-.01489825	-.11568182	28.04029	.17364471
EDUCATION	-.1749286	.16634513**	-.00194136	.15663727	.16072674**	30.745532	.04334969
LABOUR_FLEX	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
EDUCATION	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)	(omitted)
l_numberof~s	.51552441***	.06115309	.16554084***	.01652278	.28491123***	-19.40095	.04640355
_cons	-1.102663**	-1.8164944***	-1.3224006***	-1.0023801**	-1.4665791***	-109.56161	-1.6332708***
N	681	2403	2848	620	2673	27	440
aic	502.59875	1853.1813	1954.8017	483.37275	2456.8783	0	402.79265
bic	574.97574	1954.7329	2050.0717	554.24826	2551.1336	0	468.18105

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

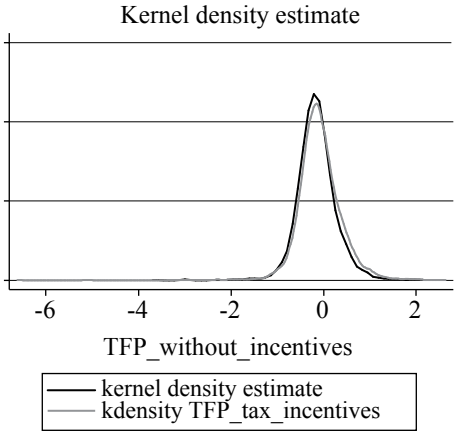
F. Kernel density estimates



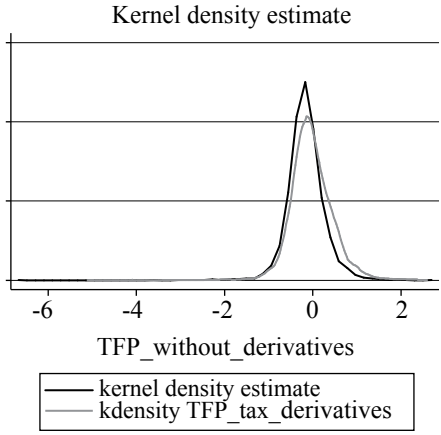
kernel = epanechnikov, bandwidth = 0.0580



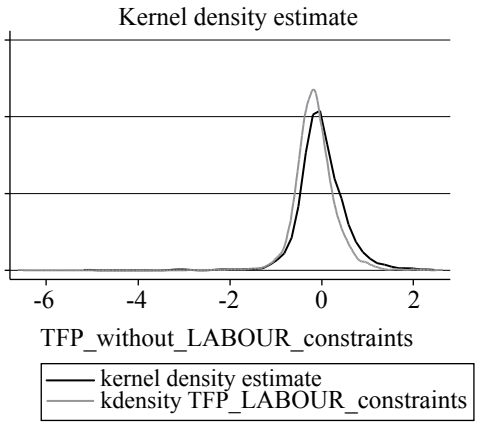
kernel = epanechnikov, bandwidth = 0.0714



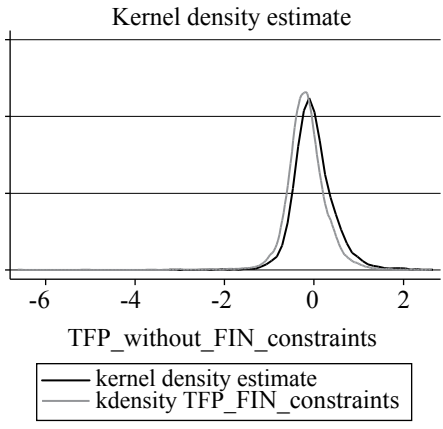
kernel = epanechnikov, bandwidth = 0.0652



kernel = epanechnikov, bandwidth = 0.0535



kernel = epanechnikov, bandwidth = 0.0714



kernel = epanechnikov, bandwidth = 0.0610