University of Warsaw
Faculty of Economic Sciences
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Central European Economic Journal

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The Determinants of Export Performance of Firms in Selected MENA Countries: Comparison with CEE Countries, Israel and Turkey

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 https://doi.org/10.1515/ceej-2017-0009

Abstract: In this paper, we study the export performance determinants of firms in selected MENA countries, both jointly and separately, as well as compare them with the performance of firms from countries in Central and Eastern Europe (CEE). The analysis is based on information about individual firms found in the European Bank for Reconstruction and Development (EBRD) and World Bank Business Environment and Enterprise Performance Survey (BEEPS) V database, covering the period 2011-2014. We estimate the probability of exports, while controlling for country- and sector-specific effects, using the probit model. We find that, in both groups of countries, similar variables affect firm export performance. Our empirical results obtained for Middle East and North Africa (MENA) and CEE countries indicate that the probability of exporting is positively related to the level of productivity, firm size, spending on research and development (R&D), the share of university graduates in productive employment and the internationalization of firms. State ownership and the perception of corruption by firms are mostly not statistically significant. The results obtained for the two groups of countries are statistically not very different, but enough to have some policy implications, while results for particular countries and subgroups of countries reveal a large degree of heterogeneity.

Keywords: export performance, MENA, CEE, probit.

JEL Codes: F12, F14, D22

Acknowledgements

The authors would like to thank Mrs. Beata Itin-Shwartz, who participated in the FEM 41/12 project, for her assistance in the empirical work used in the paper. We also wish to thank the participants of the FEMISE 2016 Annual Meeting in Athens and the Warsaw International Economic Meeting 2017, as well as the two anonymous reviewers, for their constructive comments, suggestions and discussions on the previous version of this paper.

The text is based on the report for the FEMISE FEM 41/12 project entitled, "The determinants of export performance of firms in MENA countries: comparison with CEE countries and Turkey", in return for a financial contribution in the context of Commission-FEMISE Contract no. ENPI/2014/354-494. The views expressed in this report are those of the authors and do not necessarily reflect the opinions of the European Union (EU) or FEMISE.

1 Introduction

The level of globalization in the world economy has been steadily increasing. Is it really a common phenomenon, in which all economic sectors and companies in a country participate? Is the opening-up of economies, seen from a microeconomic perspective, characterized by similar mechanisms in different countries? Do firms from MENA countries, where trade liberalization has taken place relatively recently, behave as expected, according to existing trade theories? Do they behave like firms in OECD countries (including Turkey and Israel)? To this end, in this paper, we would like to verify several theoretical hypotheses, based on empirical testing, using microeconomic techniques to analyse firm-level data.

The main objective of this paper is to verify whether or not the transition of firms in the selected MENA countries in order to meet the requirements of globalized market economies has been completed. In particular, we analyse and compare the export behaviour of firms from the selected MENA countries with that of firms from CEE, Israel and Turkey. We want to treat firms from CEE, Israel and Turkey as the benchmark, since there are many similarities, in terms of transition, between the countries selected (MENA and CEE countries, Turkey and Israel). Moreover, recent reports (e.g., IMF 2014) demonstrate that the transition process in CEE countries has already been completed successfully. The export performance of CEE firms in various regions has already been analysed, compared to the behaviour of firms in the EU-15 countries, by academics who are part of this project (e.g., Cieślik, Michałek and Michałek 2014; Cieślik et al. 2015).

In particular, the main goal of the present study is the empirical verification of the main hypotheses resulting from the Melitz (2003) model, which represents a positive relationship between the productivity of companies and their involvement in export activities using firm-level data for the selected MENA countries. In the course of the study, we will endogenize the productivity of companies, among others, by referring to their spending on R&D, human capital, new technologies and their size. We will also control for ownership characteristics and the significance of corruption. This analysis will enable the identification of key factors influencing the export competitiveness of individual firms, as well as shed some light on the entire economies of MENA countries. Finally, we will try to determine to what extent the determinants of export behaviour of companies in this region are similar to specific firms operating in the group of more developed CEE countries, as well as Turkey and Israel.

This will allow for the empirical verification of key relationships, as described in the theoretical model of Melitz (2003), for companies in MENA countries. The aggregated analysis will cover the following eight MENA countries: Egypt, Israel, Jordan, Lebanon, Morocco and Tunisia, Turkey, and the West Bank and Gaza. We will study the behaviour of firms in selected larger MENA countries, for which the number of observations was sufficient for the econometric analysis. Special attention will be devoted to Egypt, for which we have the largest number of observations. We will also separately analyse the behaviour of firms in Israel and Turkey, which are the most developed countries among the analysed countries.

In the paper, we will undertake the following research questions, resulting directly from the theory:

1. Does the selection mechanism operate as described in the Melitz (2003) model, i.e., is it true that only the most productive companies are able to export their products and that less productive firms only sell them in the domestic market?
2. To what extent is productivity determined by innovation activities (including expenditure on R&D), and to what extent by other factors?
3. Do economies of scale, as measured by the number of employees, have a significantly positive impact on the exports of the analysed companies?
4. What is the impact of the quality of human capital (skilled workers, university graduates) available to companies on their export competitiveness?
5. Does the internationalization of firms facilitate export performance (relationships with licensors, parent companies, foreign investment)?
6. Is the set of factors relevant to the export development for firms of MENA countries different from the factors affecting the competitiveness of companies from Turkey, Israel, CEE and other EU countries?
7. Do firms in the MENA region have different propensities towards exports?
8. What should be the role of government in raising the export competitiveness and internationalization of domestic enterprises?

The empirical study will enable us to obtain comparable results on the potential role of various firm characteristics in the selected MENA countries and for particular countries, as well as formulate conclusions concerning policy recommendations aimed at increasing the export

competitiveness of economies and the creation of an appropriate institutional environment. The originality of our recommendations comes from the fact that no direct export promotion is needed, provided that the appropriate structural policies are adopted. The recommendations resulting from the analysis can be treated as an indirect way of promoting exports.

This paper is organized as follows. In Section 1, we survey the relevant literature on the determinants of export performance. In Section 2, we describe the research methodology and the data set. In Section 3, we report our empirical results. Finally, the last section summarizes and concludes the paper with policy guidelines and directions for future research.

2 Literature review

The empirical literature on firm heterogeneity commenced with the work of Bernard, Jensen and Lawrence (1995), for the US, and Clerides *et al.* (1998) for Colombia, Mexico and Morocco. Other studies concerned Germany (Wagner 2002), Spain (Delgado, Fariñas and Ruano 2002; Fariñas and Martin-Marco 2007), Italy (Castellani 2002), the UK (Girma *et al.* 2003, 2004; Greenaway and Kneller 2008), Canada (Baldwin and Gu 2003), Sweden (Hansson and Lundin 2004; Greenaway *et al.* 2005; Greenaway and Kneller 2007) and Chile (Alvarez and Lopez 2005).

The majority of empirical studies support the theoretical prediction of the Melitz model, i.e., that more productive firms self-select themselves into foreign markets. A survey on early empirical evidence on the relationship between firm productivity and exporting was provided by Tybout (2003), while extensive summaries of more recent empirical evidence for this relationship in particular countries were offered by Wagner (2007; 2012). According to the first survey by Wagner (2007), a large number of studies using data from different countries shows that exporters and importers are more productive than non-exporters and non-importers. In particular, his review provides clear-cut evidence in favour of the self-selection hypothesis, while arguing that future exporters tend to be more productive than future non-exporters in the years before they enter the export market and often have higher *ex ante* productivity growth rates. On the other hand, Wagner (2007) shows that the evidence pertaining to the learning-by-exporting hypothesis, i.e., the possibility of reverse causality, is somewhat mixed. In particular, the empirical results for post-entry differences in performance between exporters and non-exporters point to faster productivity growth for the former group, but only in certain studies.

This picture was largely confirmed in a more recent survey by Wagner (2012); i.e., his review provides extensive evidence in favour of the self-selection hypothesis. It has also been suggested that the empirical results, which result from the learning-by-exporting hypothesis, may not be robust with respect to the specific methodologies and data sets. In particular, the learning-by-exporting hypothesis was confirmed for some countries in early studies, such as those by Isgut (2001) for Colombia, Blalock and Gertler (2004) for Indonesia, and Alvarez and Lopez (2005) for Chile. However, more recent firm-level evidence fails to support this hypothesis. In particular, a lack of evidence for the learning-by-exporting hypothesis has been reported by Arnold and Hussinger (2005) for Germany, Damijan and Kostevc (2006) for Slovenia, Pisu (2008) for Belgium, and Smeets and Warzynski (2010) for Denmark.

More recent studies focus on the role of product mix in exporting. Examples include Bernard, Redding and Schott (2011), Eckel and Neary (2010) and Mayer, Melitz and Ottaviano (2014). Bernard, Redding and Schott (2011), argue that product switching for US firms is correlated with both firm and firm-product attributes, and that product adding and dropping induce large changes in firm scope. Eckel and Neary (2010) examine how globalization affects the scale and scope of multi-product firms. Their model identifies a new source of gains from trade: productivity increases as firms concentrate on their core competence. Finally, Mayer, Melitz and Ottaviano (2014) theoretically and empirically show that, for French firms, tougher competition in an export market induces a firm to skew its export sales toward its best performing products.

Empirical evidence for the relationship between productivity and exporting, based on multi-country firm-level data sets, is still rather scarce. In the literature, the number of empirical studies devoted to the verification of hypotheses derived from the Melitz model for the broader group of MENA and CEE countries is limited. According to Wagner (2012, 261): "Any attempt to extract information on the size of the effects − the economic relevance, not the statistical significance − is hindered by the absence of a reasonably high degree of comparability across the studies. This lack of comparability is due to differences in the unit of analysis (establishment vs. enterprise), the sampling frame (all firms vs. firms with a number of employees above a certain threshold only),

the specification of the empirical models estimated and the econometric methods applied."

One of the first multi-country studies was the European Firms in the Global Economy (EFIGE) report (2010), which was the outcome of an international research project based on comparable firm-level data from several EU countries. The results of this project confirmed the importance of firms' productivity in exporting. In this report, it was demonstrated that firms' export performance in seven EU countries was dependent on labour productivity, as well as other firm characteristics. The study showed that, in all countries, exporting firms were, on average, more productive and bigger than non-exporters. Moreover, the study showed that the probability of exporting increased with firm age, the share of university graduates in total employment, R&D spending, and foreign ownership.

The analysis of differences in firm productivity in the selected MENA countries has been studied in the recent FEMISE report (2015). There is also a recent study of export performance of firms in the MENA region (Fakih and Ghazalian 2014). The authors analysed the significance of some firm characteristics, such as size, age, share of skilled workers and type of ownership, in relation to their export performance.

In our study, we focus on testing the hypothesis concerning the impact of productivity differences on the probability of exporting in MENA countries. In addition, we will try to take into account other firm characteristics that may affect export performance, such as R&D spending, foreign technology licences and foreign ownership of firms.

In contrast to the majority of previous studies conducted for selected countries, which were carried out using national data from national statistical offices, our study will be based on a comparable database collected as part of a joint project between the EBRD and World Bank BEEPS (2013), which includes the selected MENA countries (Algeria, Egypt, Jordan, Lebanon, Morocco and Tunisia), all countries of CEE, as well as Israel and Turkey. The BEEPS data offer information on various characteristics of firms. This allows us to analyse the role of the variables described by the Melitz (2003) model, as well as other characteristics of firms describing their innovation, the use of various forms of human capital and the use of new technologies that may affect their productivity and thus export activity.

The results of our empirical study should allow us to formulate policy recommendations, aimed at increasing the export competitiveness of firms and whole economies, and the creation of an appropriate institutional environment promoting international trade. In particular, it should highlight the most important firm-level characteristics affecting exports in the analysed countries and which policies can help to stimulate those exports.

3 Research methodology and data set

In this paper, we empirically investigate the determinants of export activity of firms in selected MENA countries. The analysis is conducted in the light of a new strand in the theory of international trade, originating mainly from the theoretical Melitz (2003) model. The empirical study is based on micro-econometric modelling. First, to estimate the relationship between the characteristics of firms and the probability of exports, we use a probit regression. In the case of probit regressions, our dependent variable, which describes the export activities of the company in a given year, is a binary variable taking the value of 1 in the case of positive exports for the company in a given year, and 0 in the absence of exports for the company in a given year.

In our model, the probability of exports in the *i-th* firm in a given year is a function of its characteristics, industry characteristics and the characteristics of the country in this year. The key explanatory variable is the productivity of the company. Our main definition of productivity is labour productivity, which is directly in line with the Melitz (2003) model. In addition to productivity, we study the impact of other variables on exports. such as firm size, resources, physical and human capital, the level of internationalization of companies, and other variables resulting from the Melitz (2003) model, as well as from previous empirical research based on the extension of this model.

The key explanatory variable stressed by the Melitz (2003) model is labour productivity, which is expressed as the total amount of annual sales per full-time employee (*lprod*). Other factors that may affect export activity include the level of innovation proxied by R&D spending (*R_D*) and the stock of human capital proxied by the percentage of employees with university degrees (*univ*). In addition, we control for foreign ownership (*fo*), the use of foreign technology (*folicences*), the age of the firm (*age*) and the size of the firm (*size*). In addition, we control for the role of state ownership (*share_gov*) and the perception of corruption (*corruption*) at the firm

Tab. 1. Description of variables used in the empirical study

Variable	Description
export (export status)	Dependent binary variable, which takes the value of 1 if the establishment is exporting (directly or indirectly) at least 1% of its sales, and 0 otherwise
lprod (level of productivity)	Logarithm of productivity expressed as the total amount of annual sales per full-time employee
age (age of firm)	Number of years since the start of operation
R_D (R&D status)	Binary variable, which takes value of 1 if the establishment was spending money on R&D in the last three years, and 0 otherwise
luni (% of university graduates)	Logarithm for the percentage of employees at the end of the fiscal year with a university degree
lsize (number of employees)	Logarithm for the number of permanent, full-time employees in this firm at the end of the last fiscal year
fo (foreign ownership status)	Binary variable, which takes the value of 1 if its shares are owned by private foreign individuals, companies or organizations, and 0 otherwise
folicences (foreign ownership status)	Binary variable, which takes the value of 1 if the establishment uses technology licensed from a foreign-owned company, and 0 otherwise
multi[1] (multi-products measure)	100 minus the share of the main product in total sales. This variable measures whether the firm is producing many (multiple) products (0 means that the main product represents 100% of supply)
share_gov (percent of state ownership)	The percentage of a firm owned by the state/government
corruption (perception of corruption)	Corruption: its perception as an obstacle to current operations of the establishment (0 stands for no obstacles and 4 for a very serious obstacle)

Source: BEEPS data set.

level. The last two variables should reflect the legacy of a state-controlled economy in CEE and some MENA countries. Precise definitions of firm characteristics used in our study are presented in Tab. 1.

We use the probit model to study the relationship between labour productivity and exporting, having controlled for other firm characteristics. Building on the previous theoretical literature, we develop an empirical model to investigate the effects of various firm characteristics on their export performance. Our variable follows:

$$Y^{i*} = X_i\theta + \varepsilon_i \tag{1}$$

where X_i is the vector of firm characteristics affecting the tendency to export, θ is the vector of parameters for those characteristics that need to be estimated, and ε_i is an error term, which is assumed to be normally distributed with a zero mean and a variance of one.

Instead of observing the volume of exports, we only observe a binary variable indicated by the sign of Y^{i*}.

$$Y^i = \begin{cases} 1 & if\ Y_i^* > 0 \\ 0 & if\ Y_i^* < 0 \end{cases} \tag{2}$$

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

$$\Pr(Y_i = 1 X_i) = \Phi(X_i\,\theta) \tag{3}$$

Our study is based on the BEEPS V data collected by the EBRD and the World Bank in post-communist countries located mainly in Europe and Central Asia (ECA) and MENA countries. The main objective of the BEEPS survey was to obtain feedback from enterprises in the aforementioned countries on the state of the private sector. The survey examined the quality of the business environment. The survey questions concerned the identification of firms, sectors of activity, legal and economic status, characteristics of managers, firms' size, the infrastructure of services in the analysed countries, the eco-

1 The role of product mix for exporters is analysed by Mayer, Melitz and Ottaviano (2014). This variable is only used in the robustness test in the Appendix.

Tab. 2. Summary statistics for variables used in the empirical study for the whole sample of 22,449 observations

Variable	Observations	Mean	Std. dev.	Min.	Max.
age	22,220	16.261	13.591	0	190
R_D	22,260	0.109	0.312	0	1
uni	21,271	32.908	30.903	0	100
size	22,274	76.287	338.188	1	21,000
fo	22,449	0.085	0.279	0	1
folicences	22,220	0.131	0.337	0	1
share_gov	22,181	0.766	7.115	0	99
corruption	21,588	1.456	1.508	0	4

Source: BEEPS data set.

nomic performance and key characteristics of reviewed firms, and stakeholders.

The sample includes data covering the period 2011−2014. Almost 60% of surveys of firms in every country were conducted in 2013.[2] This means that all the data should be treated as a cross-sectional sample and that the application of panel data analysis is not possible.[3] Similarly, due to data limitations, it is also not possible to fully address the potential problem of endogeneity for some of our explanatory variables.[4]

The variables expressed in local currencies (e.g., sales) were converted into a common currency (US dollars). The BEEPS surveys covered both manufacturing and services sectors and are representative of the variety of firms according to sector and location within each country. The number of firms operating in the service sector was relatively small compared to the manufacturing sector. Therefore, it was not possible to perform estimations separately for the manufacturing and service sectors. Moreover, particular industries within each sector can differ with respect to their capital intensity and export performance. Therefore, to control for heterogeneity across industries in our estimations, we used industry-specific effects in addition to individual firm characteristics.

In all countries where a reliable sample frame was available, the sample was selected using stratified random sampling. Therefore, we used the standard probit procedure for the pooled cross-sectional data set without controlling for individual firm effects. However, we controlled for country-specific and sector-specific effects. The list of countries in our sample is presented in Tab. A in the Appendix. In the majority of cases, the data include about 250-350 observations per country. The largest samples of firms are available for Russia (4,220), Egypt (2,897), Turkey (1,334) and Ukraine (1,002). The summary statistics for variables used in our empirical study are presented in Tab. 2.

4 Estimation results

In this section, we present three sets of our estimation results. First, in Tab. 3, we report the results obtained for the joint sample of both CEE and MENA countries included in the BEEPS V database, then for the whole group of eight MENA countries and compare them with the estimation results obtained for the whole group of CEE countries. Then, in Tab. 4, we report the estimation results obtained for various subgroups of CEE countries, in particular, in terms of the split of the group into two subgroups: EU members and non-EU members. We also present the estimation for six MENA countries (excluding Turkey and Israel). Finally, in Tab. 5, we report the estimation results obtained separately for the individual MENA countries.

Our estimation results for the entire sample of countries, including both CEE and MENA countries, are presented in Columns (1–3). In Column (1), we present

2 The numbers of observations (surveys) per year were as follows: 2,884 in 2011, 1,833 in 2012, 13,435 in 2013 and 4,287 in 2014. The total number of observations was 22,449.

3 The only exception was Albania. The details concerning the sampling methodology are explained in the Sampling Manual available at http://www.enterprisesurveys.org/Methodology/.

4 For example, Stiebale (2011) argues that there is a potential problem of endogeneity between the measure of export performance and financial variables. However, in our estimation equations, we do not include the measures of financial constraints.

Tab. 3. Results of probit estimations for the entire sample of countries, MENA countries and all CEE countries

	All countries			**MENA-8**			**All CEE**		
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**
lprod	-0.012***	0.0414***	0.070***	0.049***	0.044***	0.053	-0.025***	0.039***	0.091***
	(0.004)	(0.009)	(0.020)	(0.007)	(0.013)	(0.037)	(0.006)	(0.012)	(0.021)
age	0.007***	0.002**	0.002	0.002	0.002	0.003	0.008***	0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
R_D	0.599***	0.492***	0.439***	0.631***	0.502***	0.509***	0.620***	0.508***	0.415***
	(0.033)	(0.035)	(0.057)	(0.058)	(0.060)	(0.147)	(0.042)	(0.045)	(0.049)
luni	-0.027***	0.021***	0.031***	-0.006	0.024***	0.032***	-0.044***	0.017**	0.030***
	(0.005)	(0.005)	(0.006)	(0.007)	(0.008)	(0.009)	(0.006)	(0.007)	(0.009)
lsize	0.253***	0.286***	0.265***	0.308***	0.333***	0.306***	0.203***	0.255***	0.242***
	(0.009)	(0.010)	(0.025)	(0.015)	(0.016)	(0.040)	(0.013)	(0.014)	(0.025)
fo	0.596***	0.495***	0.469***	0.452***	0.487***	0.476***	0.707***	0.509***	0.466***
	(0.040)	(0.043)	(0.065)	(0.070)	(0.074)	(0.150)	(0.051)	(0.054)	(0.057)
folicences	0.330***	0.267***	0.250***	0.431***	0.245***	0.244	0.316***	0.285***	0.258***
	(0.033)	(0.035)	(0.062)	(0.060)	(0.063)	(0.161)	(0.041)	(0.043)	(0.057)
share_gov	-0.007***	-0.005**	-0.004**	-0.006	-0.005	-0.004	-0.005**	-0.004*	-0.003
	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)
corruption	-0.008	0.012	0.018*	-0.043***	0.019	0.016	-0.005	0.010	0.021
	(0.008)	(0.009)	(0.011)	(0.012)	(0.014)	(0.010)	(0.011)	(0.012)	(0.016)
Constant	-1.582***	-2.270***	-2.474***	-2.217***	-2.451***	-2.419***	-1.333***	-2.483***	-2.593***
	(0.066)	(0.133)	(0.279)	(0.108)	(0.185)	(0.561)	(0.088)	(0.203)	(0.238)
Country effects	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Sectoral effects	No	No	Yes	No	No	Yes	No	No	Yes
Observations	16,113	16,113	16,113	5,453	5,453	5,453	10,237	10,237	10,237
Log likelihood	-7846	-7078	-6730	-2925	-2682	-2617	-4605	-4223	-3924
Pseudo R^2	0.126	0.211	0.250	0.151	0.221	0.240	0.115	0.189	0.246

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

the results obtained without controlling for individual country and sector-specific effects; in Column (2), we control for country-specific effects; and, in Column (3), we control for both country- and sector-specific effects. We treat these estimations as the benchmark results for all other comparisons in this section. Tab. 4 and 5 apply the same format of presentations for other country aggregates.

The estimation in Column (1) reveals that the estimated parameter for the measure of productivity displays an unexpected negative sign and is statistically significant at the 1% level. However, this surprising result disappears when we control for country- and sector-specific effects (Columns (2) and (3), respectively). The change in the sign of the estimated parameter for the measure of productivity probably reflects large differences in labour productivity among the analysed countries in the full sample.

The positive sign of the estimated parameter for the productivity variable reported in Columns (2) and (3),

which is statistically significant at the 1% level, means that a higher level of productivity is positively related to the probability of exporting. This result is in line with the main prediction of the Melitz (2003) model concerning the positive nexus between productivity and the probability of exporting.

Another slightly surprising result appears in the case of the variable *age*, for which the estimated parameter is statistically not significant in the majority of our specifications. This result is in contrast with the findings of many empirical studies (e.g., EFIGE 2010) on developed countries, in which older firms are usually more efficient at producing and exporting goods and services. However, studies for CEE countries reveal that the age variable is often not statistically significant, since the history of transition is relatively short, while older firms, which were under state control in the past, are frequently not very efficient and less export-oriented.[5]

The majority of our control variables are statistically significant at the 1% level. The estimated signs of parameters for standard explanatory variables are in line with the expectations and results of other studies discussed in the literature review section. The estimated parameters for the human capital variable (*luni*) and R&D *(R_D)* display positive signs and are statistically significant at the 1% level.[6] This means that R&D activities and the share of workers with university degrees in total employment are positively related to the probability of exporting.

The firm size variable also displays an expected positive sign, at a 1% level of statistical significance, indicating the importance of economies of scale for exporting. The variables measuring foreign ownership (*fo*) and the use of foreign technology (*folicences*) display the expected positive signs and are statistically significant at the 1% level, which means that the probability of exporting increases with the internationalization of the firm.

Finally, the additional variables describing the role of state ownership and the level of corruption reveal some amount of pre-transition legacy. In particular, the variable *share_gov* displays a negative sign and is statistically significant at the 5% level in all three specifications. Thus, the involvement of the state/government in firms decreases their probability of exporting. The estimates for the corruption variable generally turn out to be insignificant. Only in the third specification (Column (3)) does a surprising, although weakly significant, positive sign appear. This unexpected result is not confirmed by other estimations for smaller country aggregates.

In Columns (4–6), we estimate the same model for the aggregate of eight MENA countries (Egypt, Jordan, Lebanon, Morocco, Tunisia, the West Bank and Gaza, Israel and Turkey). The estimation results for MENA countries reveal certain similarities to the results for all countries in terms of signs and the statistical significance of estimated parameters, but only for some control variables. In particular, the estimated parameters for the variables *age*, *R_D*, *luni*, *lsize* and *fo* have the same statistical significance and similar values for parameters.

However, there are also significant differences. In particular, the estimated parameter for the key variable in the Melitz model (2003), *lprod*, is positive and statistically significant at the 1% level in the case of estimations with no country- and sector-specific effects and with country-specific effects. However, it becomes statistically insignificant in the specification with both country- and sector-specific effects (Column (6)). This puzzling result probably reveals large sectoral differences among firms in the analysed countries.

Another important difference exists in the case of the *folicences* variable. The estimated parameter for this variable is statistically insignificant for MENA countries, when we control for country- and sector-specific effects, while, for the combined sample (Column (3)), it was statistically significant.

The other significant difference appears in the case of the *share_gov* variable. The value of the estimated parameter for this variable is statistically not significant in the case of MENA countries, while, for the combined sample, it was statistically significant. This result may suggest that the role of the state is more limited in the case of MENA countries in comparison with CEE countries. Finally, the parameter of the variable *corruption* is not statistically significant for MENA, while it is weakly significant in the case of all countries.

The estimations of the model for all CEE countries are shown in Columns (7–9) of Tab. 4. In the majority of cases, the values of parameters and their statistical significance is very similar to the results obtained for all countries listed in Columns (1–3). In particular, the values of the parameters for variables *lprod*, *R_D*, *luni*, *lsize*, *fo* and *folicences* display similar values and the expected positive signs, and are statistically significant

5 See, e.g., Cieślik *et al.* (2015). In some estimations the sign of the age variable displays negative signs. For further discussion on the role of state control in the past, see the comments on the variable *share_gov*.

6 The sign of the *uni* variable displays a negative sign when we control neither for country- nor for sector-specific effects, while a positive one is displayed if we control for those two effects (Columns (2) and (3)).

Tab. 4. Results of probit estimations for CEE members of the EU, CEE non-members of the EU and for six MENA countries (Turkey and Israel excluded)

	CEE EU members			CEE non-EU members			Six MENA countries		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
lprod	0.009	0.027	0.088***	-0.004	0.045***	0.089***	0.074***	0.055***	0.074*
	(0.013)	(0.021)	(0.027)	(0.007)	(0.015)	(0.028)	(0.008)	(0.017)	(0.044)
age	-0.002	-0.003	-0.004	0.009***	0.003*	0.002*	0.001	0.000	0.001
	(0.002)	(0.003)	(0.004)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
R_D	0.607***	0.561***	0.444***	0.588***	0.484***	0.406***	0.601***	0.456***	0.450***
	(0.078)	(0.080)	(0.113)	(0.051)	(0.054)	(0.060)	(0.068)	(0.071)	(0.070)
luni	0.011	0.020*	0.034***	-0.052***	0.017*	0.030**	0.002	0.012	0.026**
	(0.010)	(0.010)	(0.010)	(0.008)	(0.010)	(0.014)	(0.009)	(0.010)	(0.013)
lsize	0.237***	0.248***	0.234***	0.204***	0.258***	0.247***	0.304***	0.342***	0.321***
	(0.024)	(0.025)	(0.027)	(0.015)	(0.016)	(0.034)	(0.017)	(0.018)	(0.043)
fo	0.579***	0.550***	0.512***	0.640***	0.482***	0.445***	0.435***	0.378***	0.347***
	(0.087)	(0.088)	(0.074)	(0.064)	(0.068)	(0.079)	(0.076)	(0.079)	(0.128)
folicences	0.173**	0.180**	0.116	0.359***	0.325***	0.303***	0.363***	0.380***	0.411***
	(0.076)	(0.078)	(0.081)	(0.049)	(0.052)	(0.073)	(0.078)	(0.079)	(0.159)
share_gov	-0.016**	-0.014**	-0.016**	-0.003	-0.002	-0.002	-0.007	-0.007	-0.006***
	(0.007)	(0.007)	(0.007)	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)	(0.002)
corruption	-0.054***	-0.022	-0.012	0.020	0.022	0.032*	-0.028*	0.010	0.013
	(0.020)	(0.022)	(0.016)	(0.013)	(0.014)	(0.019)	(0.015)	(0.016)	(0.013)
Constant	-1.354***	-1.851***	-2.160***	-1.753***	-2.610***	-2.648***	-2.625***	-2.533***	-2.695***
	(0.169)	(0.277)	(0.307)	(0.110)	(0.241)	(0.325)	(0.124)	(0.222)	(0.727)
Country effects	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Sectoral effects	No	No	Yes	No	No	Yes	No	No	Yes
Observations	2,472	2,472	2,472	7,765	7,765	7,765	4,277	4,277	4,277
Log likelihood	-1404	-1371	-1161	-3083	-2845	-2721	-2171	-2033	-1974
Pseudo R^2	0.107	0.128	0.261	0.116	0.184	0.220	0.153	0.206	0.230

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

at the 1% level of significance when we control for both country- and sector-specific effects (Column (9)).

There are only differences in the case of additional variables describing the engagement of state ownership and the level of corruption. Both variables, i.e., *share_gov* and *corruption*, are statistically not significant when we control for both country- and sector-specific effects. Thus, the involvement of the state/government in firms has no statistically significant impact on the probability of exporting in the case of all CEE countries, while only a certain minor statistical impact was observable in the case of estimations for all states.

The estimation results for the 11 CEE countries, which are currently members of the EU, are presented in Columns (1−3) of Tab. 4. The same scheme as in Tab. 5 is used, i.e., in Column (1), we do not control for country- and sector-specific effects, in Column (2), we control for country-specific effects and, in Column (3), we control for both country- and sector-specific effects. The results for these countries are very similar in terms of statistical

significance, signs and values for estimated parameters to those obtained for all countries.

In particular, the parameter for the variable *lprod* becomes positive and statistically significant at the 1% level, but only when we control for both country- and sector-specific effects, while the variable *age* is not statistically significant in all specifications. The values of parameters for the variables *lprod*, *R_D*, *luni*, *lsize*, *fo* and *folicences* display similar values and the expected positive signs, and are statistically significant at the 1% level when we control for both country- and sector-specific effects (Column (3)).

A minor difference only appears in the case of two variables. The variable *share_gov* also displays a negative sign and is statistically significant at the 1% level in all three specifications, while the level of significance was lower in the estimation for all countries. Thus, the involvement of the state/government in firms significantly decreases their probability of exporting. On the other hand, the *corruption* variable is not statistically significant for CEE countries that are EU members.

The results for the other CEE countries, which are non-members of the EU, are presented in Columns (4−6) of Tab. 4. Many of those countries are former republics of the Soviet Union. The results for these countries are very similar in terms of statistical significance, signs and values of estimated parameters to those obtained for all countries. Minor differences appear in the following cases.

First, the variable *age* becomes positive and statistically significant, but only at the 10% level when we control for country- and sector-specific effects. Second, the variable *luni* is significant at the 5% level, which is slightly lower (for both country- and sector-specific effects) in comparison to the 1% significance in the combined sample. Third, somewhat surprisingly, the variable *share_gov* is not statistically significant. In addition, it is worth mentioning that the *corruption* variable is statistically significant at the 10% level and displays a surprisingly positive sign, but only in this group of non-EU member countries.[7]

The results for the six MENA countries are presented in Columns (7−9) of Tab. 5. These estimations were performed for six out of the eight countries (as in Tab. 4), i.e., with the exception of Israel and Turkey, which are the most advanced of MENA countries in the process of economic development.

The results for these six countries are somewhat similar in terms of statistical significance, signs and values of estimated parameters to those previously obtained for all MENA countries. The major differences can be summarized as follows. First, the sign of estimator for the *lprod* variable displays a positive sign, when we control for both country- and sector-specific effects, albeit only at the 10% level. Second, the role of human capital (*uni*) is slightly lower in the case of the six MENA countries when we control for both country- and sector-specific effects, since the statistical significance drops to only 5%. Third, the variable *share_gov* reveals a negative sign and is statistically significant at the 1% level when we control for both country- and sector-specific effects. Thus, the involvement of the state/government in firms located in the six MENA countries decreases their probability of exporting. Finally, we should note that the results for the six MENA countries are driven mostly by Egypt, since about 50% of firms analysed in this group of countries are located in Egypt.

The robustness of the estimates obtained for aggregate country groups has been tested using an alternative estimation method, i.e., the fractional logit model. The results of these estimations are presented in Tab. A2 in the Appendix. These results are somewhat different in comparison to those obtained by the probit model in the benchmark results presented in Tab. 4. In particular, the variables *lprod*, *luni*, *share_gov* and *corruption* lose their statistical significance in the estimation for all countries when controlling for sectoral and country effects, while the other variables (*R_D*, *lsize*, *fo*, *folicences*) reveal the same sign and statistical significance at the 1% level. The fractional logit specifications for MENA and all CEE countries also show that the number of statistically significant variables decreases as well, in comparison to probit estimations.

We also tried to analyse the role of product concentration and multi-product firms in exporting. The results of these estimations, including the additional variable *multi*, are presented in Tab. C in the Appendix. We found that there are differences between MENA and CEE countries. In particular, multi-product firms in MENA countries are more likely to export, while this characteristic (*multi*) is statistically not significant in the case of exports of firms from CEE countries. This is why we performed additional estimations for MENA countries.

In the subsequent part of this section, we present the results of the estimations for individual MENA coun-

7 In principle, we should interpret this as implying that a more corrupted environment facilitates exports. For a more detailed interpretation of the role of corruption in the economic activities of firms in CEE, see Cieślik and Goczek (2015).

Tab. 5. Results of probit estimations for individual MENA countries

	Egypt		Turkey		Israel		Tunisia		Morocco	
VARIABLES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
lprod	0.144***	0.158***	0.021	0.0212	0.140	0.139	-0.089*	-0.009	-0.090	-0.059
	(0.026)	(0.027)	(0.025)	(0.0254)	(0.088)	(0.091)	(0.049)	(0.055)	(0.055)	(0.058)
age	0.003	0.006**	0.013***	0.0104**	0.013***	0.014***	-0.009**	-0.008**	-0.003	-0.000
	(0.002)	(0.002)	(0.004)	(0.00454)	(0.004)	(0.005)	(0.004)	(0.004)	(0.005)	(0.005)
R_D	0.512***	0.539***	0.037	0.0205	1.793***	1.807***	0.699***	0.653***	0.023	0.135
	(0.131)	(0.138)	(0.144)	(0.145)	(0.241)	(0.251)	(0.161)	(0.163)	(0.221)	(0.233)
luni	0.020	0.042**	0.025	0.0265	0.051*	0.051*	-0.008	-0.003	-0.021	0.001
	(0.018)	(0.020)	(0.020)	(0.0202)	(0.027)	(0.028)	(0.031)	(0.032)	(0.036)	(0.039)
lsize	0.389***	0.392***	0.369***	0.342***	0.161**	0.165**	0.311***	0.261***	0.344***	0.315***
	(0.027)	(0.028)	(0.047)	(0.0499)	(0.063)	(0.066)	(0.048)	(0.050)	(0.067)	(0.071)
fo	0.254**	0.212*	Omitted		0.891**	0.920**	0.752***	0.746***	0.300	0.300
	(0.120)	(0.123)			(0.390)	(0.400)	(0.181)	(0.185)	(0.230)	(0.237)
folicences	0.680***	0.713***	0.077	0.0163	-0.325	-0.376	0.145	0.215	0.117	0.209
	(0.126)	(0.130)	(0.116)	(0.118)	(0.322)	(0.327)	(0.245)	(0.252)	(0.217)	(0.231)
share_gov	-0.009*	-0.009*	Omitted		Omitted	Omitted	-0.003	-0.002	0.043	0.053
	(0.005)	(0.005)					(0.009)	(0.009)	(0.070)	(0.069)
corruption	0.043*	0.043*	0.078*	0.0490	0.050	0.063	-0.010	0.001	-0.015	0.028
	(0.025)	(0.026)	(0.041)	(0.0428)	(0.113)	(0.119)	(0.042)	(0.042)	(0.052)	(0.057)
Constant	-4.335***	-4.697***	-1.708***	-2.095***	-3.704***	-3.698***	-0.068	-0.902	-0.636	-1.501*
	(0.333)	(0.353)	(0.351)	(0.453)	(1.222)	(1.285)	(0.576)	(0.638)	(0.755)	(0.808)
Sectoral effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,177	2,177	719	719	410	410	576	576	319	319
Log likelihood	-805.1	-770.3	-425.6	-413.0	-172.2	-164.7	-330.4	-318.1	-167.5	-151.7
Pseudo R^2	0.232	0.266	0.142	0.167	0.300	0.331	0.172	0.203	0.113	0.197

tries (see Tab. 5). For each country, we first present estimation results without controlling for sectoral effects, followed by the results obtained when controlling for sectoral effects. We only performed the estimations for countries for which the number of observations was larger than 300. However, a large number of observations (exceeding 700 firms) was only available for Egypt and Turkey. Therefore, the results for other countries should be treated with caution. We will treat the results for all eight MENA countries as the benchmark for comparison.

The estimation results for Egypt are presented in Columns (1) and (2) of Tab. 5. The number of observations is relatively large (2,177), while the results are similar to those obtained for the group of eight MENA countries. The parameters for *lprod* and *age* are positive and statistically significant at the 1% level, which is in line with standard expectations, although the *age* parameter was not significant in the case of estimations for all MENA countries. The other control variables are also in line with expectations, although statistical significance of the foreign ownership variable (*fo*) is only achieved at the 10% level. A major difference exists in the case of the

share_gov variable, which displays a negative sign and is statistically significant at the 10% level in both specifications. Another specific, but puzzling, result appears in the case of the *corruption* variable, which displays a positive sign and is statistically significant at the 10% level.

The estimation results for Turkey are presented in Columns (3) and (4) of Tab. 5. The number of observations is relatively large (719), but the results are different to those obtained for the group of eight MENA countries. Only two parameters for the variables *age* and *lsize* are statistically significant at the 5% and 1% levels, respectively, and display the expected positive signs. The variable describing foreign ownership (*fo*) is omitted since it perfectly predicts the probability of exporting.[8] We should add that the productivity variable (*lprod*) is not statistically significant in both specifications.

The estimation results for Israel are presented in Columns (5) and (6) of Tab. 5. The number of observations is quite small (410), but the results are somewhat similar to those obtained for the group of eight MENA countries. A major difference is that the productivity variable (*lprod*) is not statistically significant in both specifications. Nevertheless, the majority of other standard control variables are statistically significant and display the expected positive signs. These variables are *age, R_D, luni, lsize* and *fo*, while the variable *folicences* is not statistically significant. It is worth mentioning that the value of the estimated parameter for the *R_D* variable (1.807 in Column 6) is about three times higher than the value of the same parameter for MENA and all groups of countries. This result probably reflects the important role of domestic R&D and innovations in stimulating exports for Israeli firms.[9]

The estimation results for Tunisia are presented in Columns (7) and (8) of Tab. 5. The number of observations is not high (576) and the results are slightly different from those obtained for the group of eight MENA countries. Three control variables are statistically significant at the 1% or 5% levels when we control for sectoral effects, as well as reveal the expected positive signs (*R_D*, *lsize* and *fo*). The variable reflecting the age of firms is statistically significant at the 5% level, but has a negative sign. This means that younger firms in Tunisia are more export-oriented. All other variables, including *lprod*, are statistically not significant.

The estimation results for Morocco are presented in Columns (9) and (10) of Tab. 5. The number of observations is small (319) and the results are very different from those obtained for the group of eight MENA countries. Only one parameter *lsize* is statistically significant at the 1% level and displays the expected positive signs. All other variables, including *lprod*, are statistically not significant. These statistically poor results are probably due, in part, to the small size of the sample for Morocco.

In conclusion, we can state that the determinants of export performance are heterogeneous among firms from individual MENA countries. Only one variable describing the size of company employment (*lsize*) is always statistically significant. In the majority of cases, the variables reflecting foreign ownership and spending on R&D are also statistically significant. The other variables, including labour productivity, are statistically significant and reveal the expected sign only for individual MENA countries. These highly differentiated results of estimations are probably due to a limited number of observations in some countries (especially Morocco).

5 Conclusions

In this paper, we attempted to address some important questions by relying on a comparison of different country experiences, which carry relevant implications for policy recommendations. In other words, we tried to analyse to what extent the determinants of export behaviour of companies in the MENA region are similar to those of companies operating in CEE countries, which have been discussed in previous studies on these countries. We draw our conclusions on the basis of probit estimations, given our awareness that fractional logit estimations do not fully support these recommendations.

Our research confirmed that the productivity of labour, in accordance with the Melitz model (2003), affects firms' propensity to export in MENA and CEE countries if we control for country- and sector-specific effects, but this key variable of the model does not seem to work in the case of the MENA when taken as a whole. Moreover, we confirmed that other variables, such as i) the size of the company, ii) the use of human capital and iii) the level of firms' internationalization measured by foreign ownership and the use of foreign licences, contributed to an increase in the propensity to export among

8 The *share_gov* variable is also omitted because only two observations were made.

9 The role of domestic research (*R_D*) is very high, but the *folicences* variable is not statistically significant. Perhaps this reflects the relative strength of the domestic R&D sector in comparison to the foreign one. The parameter for *luni* is also quite high, but only statistically significant at the 10% level.

firms in the analysed CEE countries, although less so in MENA countries.

Clearly, there are some important differences between these two groups of countries as well. Labour productivity is a statistically significant variable in CEE countries but not in MENA countries. The use of foreign technology (foreign licences) is also statistically significant in the case of CEE countries, but not in all eight MENA countries, if we control for country- and sector-specific effects. The age of the company is not significant in CEE countries, but is significant in a majority of MENA countries (usually, older companies are more export-oriented). Finally, the measures reflecting a non-market economy legacy, i.e., the engagement of state ownership and corruption, are statistically significant in some groups of CEE countries, but very rarely in the case of individual MENA countries.

What are the preliminary policy implications of the above? Oddly, if the aim of MENA governments is to improve export performance, fighting corruption does not seem to be particularly helpful. It seems that a policy of privatizing firms, such as the one practised after 1989 in CEE, is not going to help much in improving export performance (maybe with the exception of Egypt). The fact that firms' age is a significant variable in the case of the MENA means that, over time, export performance should improve as a result of accumulated experience.

Given that many firm-level determinants of exports are sometimes dissimilar in CEE and MENA countries, it also follows that the export competitiveness of the analysed MENA countries can be improved by the development of modern education systems and the facilitation of the accumulation of human capital. Financial support for R&D and innovation should have a positive impact on export performance. MENA countries should also seek to attract export-oriented foreign direct investments. On the other hand, transfers of technology via licences does not seem to work as well in CEE countries (with the exception of Egypt).

The specificities of MENA countries, with respect to product concentration, should also be taken into consideration. Multi-product firms in MENA countries are more likely to export, while this characteristic is statistically not significant for exports in the case of CEE firms. This could mean that firms from the MENA do not concentrate their exports on products that correspond to where they are most efficient. It would be desirable to carry out an in-depth investigation into this phenomenon.

To sum it up, according to our estimations, it appears that corruption and state ownership do not result in serious barriers to exports at present for either group of countries. However, the situation is differentiated among individual MENA countries, as discussed in the context of individual country results presented in Tab. 6. More in-depth studies, based on broader databases, and research on the additional determinants of exports are needed in the future. It would also be desirable to study the direction of causality between exporting and productivity using firm-level panel data, which are not available from BEEPS V.

More attention should also be given to the role of innovations, given that, thus far, we have focused on the input side of innovation. Therefore, in future studies, it would be useful to study the output side of innovation as well. In particular, it would be desirable to separately investigate the role of various types of innovation, such as product or process innovations.

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Appendix

Tab. A. Number of observations (firms) in the BEEPS V database

Country	No. of observations
Albania	360
Armenia	360
Azerbaijan	390
Belarus	360
Bosnia-Herzegovina	360
Bulgaria	293
Croatia	360
Czech Republic	254
Djibouti	266
Egypt	2,897
Estonia	273
FYR Macedonia	360
Georgia	360
Hungary	310
Israel	483
Jordan	573
Kazakhstan	600
Kosovo	202
Kyrgyzstan	270
Latvia	336
Lebanon	561
Lithuania	270
Moldova	360
Mongolia	360
Montenegro	150
Morocco	407
Poland	542
Romania	540
Russia	4,220
Serbia	360
Slovak Republic	268
Slovenia	270
Tajikistan	359
Tunisia	592
Turkey	1,344
Ukraine	1,002
Uzbekistan	390
West Bank and Gaza	434
Yemen	353
Total	**22,449**

Tab. B. Sensitivity analysis: fractional logit estimations for aggregate groups of countries

	All countries			MENA			CEE (all)		
VARIABLES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
lprod	-0.082***	-0.083***	0.011	-0.018	-0.031**	-0.017	-0.061***	-0.041**	0.131***
	(0.009)	(0.010)	(0.018)	(0.012)	(0.013)	(0.026)	(0.014)	(0.017)	(0.039)
age	0.008***	0.007***	-0.006***	-0.003	-0.001	-0.006***	0.006*	0.005	-0.006
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.004)	(0.005)
R_D	0.653***	0.680***	0.479***	0.692***	0.671***	0.588***	0.743***	0.712***	0.441***
	(0.074)	(0.081)	(0.059)	(0.097)	(0.102)	(0.089)	(0.115)	(0.132)	(0.161)
luni	-0.073***	-0.070***	0.003	-0.023**	-0.037***	0.029*	-0.120***	-0.088***	0.008
	(0.009)	(0.010)	(0.010)	(0.011)	(0.012)	(0.016)	(0.015)	(0.017)	(0.023)
lsize	0.270***	0.220***	0.361***	0.152***	0.228***	0.354***	0.361***	0.255***	0.359***
	(0.020)	(0.022)	(0.018)	(0.024)	(0.026)	(0.026)	(0.032)	(0.037)	(0.045)
fo	0.922***	0.905***	0.817***	0.589***	0.561***	0.841***	1.201***	1.170***	0.980***
	(0.089)	(0.098)	(0.067)	(0.116)	(0.122)	(0.101)	(0.139)	(0.159)	(0.195)
folicences	0.401***	0.495***	0.295***	0.458***	0.625***	0.255***	0.484***	0.567***	0.610***
	(0.071)	(0.079)	(0.060)	(0.099)	(0.105)	(0.096)	(0.108)	(0.123)	(0.151)
share_gov	-0.013***	-0.011***	-0.005	-0.012*	-0.011	-0.004	-0.009**	-0.008*	-0.004
	(0.003)	(0.003)	(0.003)	(0.006)	(0.007)	(0.006)	(0.004)	(0.005)	(0.006)
corruption	0.047***	0.020	-0.023	-0.022	-0.045**	-0.038	-0.036	-0.029	0.068*
	(0.015)	(0.017)	(0.017)	(0.020)	(0.021)	(0.024)	(0.025)	(0.029)	(0.037)
Constant	-2.053***	-1.285***	18.510***	-1.612***	-1.385***	18.070***	-2.899***	-2.530***	-4.364***
	(0.134)	(0.158)	(0.575)	(0.171)	(0.194)	(0.230)	(0.214)	(0.263)	(0.664)
Sectoral effects	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Country effect	No	No	Yes	No	No	Yes	No	No	Yes
Observations	16,192	16,192	16,192	5,482	5,482	5,482	10,274	10,274	10,274

*** p<0.01, ** p<0.05, * p<0.1

Tab. C. Sensitivity analysis: probit estimations with additional "multi" variable for aggregate groups of countries

	All			MENA			CEE (all)		
VARIABLES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
lprod	-0.013***	0.043***	0.073***	0.046***	0.044***	0.054	-0.025***	0.041***	0.095***
	(0.004)	(0.009)	(0.019)	(0.008)	(0.014)	(0.037)	(0.006)	(0.012)	(0.020)
age	0.007***	0.002*	0.001	0.002	0.002	0.002	0.008***	0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
R_D	0.597***	0.493***	0.437***	0.617***	0.485***	0.488***	0.604***	0.506***	0.410***
	(0.034)	(0.036)	(0.057)	(0.059)	(0.061)	(0.150)	(0.043)	(0.045)	(0.050)
luni	-0.028***	0.021***	0.031***	-0.006	0.023***	0.031***	-0.044***	0.018**	0.031***
	(0.005)	(0.005)	(0.006)	(0.007)	(0.008)	(0.009)	(0.006)	(0.007)	(0.009)
lsize	0.258***	0.291***	0.270***	0.314***	0.340***	0.312***	0.206***	0.260***	0.248***
	(0.009)	(0.010)	(0.025)	(0.015)	(0.016)	(0.037)	(0.013)	(0.013)	(0.025)
fo	0.586***	0.481***	0.455***	0.459***	0.487***	0.478***	0.692***	0.485***	0.441***
	(0.041)	(0.043)	(0.064)	(0.071)	(0.075)	(0.161)	(0.051)	(0.054)	(0.048)
folicences	0.321***	0.254***	0.237***	0.419***	0.236***	0.234	0.297***	0.260***	0.233***
	(0.033)	(0.035)	(0.059)	(0.060)	(0.064)	(0.157)	(0.042)	(0.044)	(0.049)
multi	0.001***	0.001	0.001	0.003***	0.004***	0.004***	0.002***	-0.001	-0.001
	(0.0005)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
share_gov	-0.008***	-0.005***	-0.004***	-0.006*	-0.005	-0.004	-0.005***	-0.004**	-0.003*
	(0.002)	(0.002)	(0.001)	(0.004)	(0.004)	(0.003)	(0.002)	(0.002)	(0.002)
corruption	-0.009	0.013	0.018*	-0.047***	0.016	0.012	-0.002	0.015	0.026**
	(0.008)	(0.009)	(0.009)	(0.012)	(0.015)	(0.013)	(0.011)	(0.012)	(0.013)
Constant	-1.592***	-2.317***	-2.543***	-2.218***	-2.536***	-2.526***	-1.360***	-2.524***	-2.612***
	(0.067)	(0.137)	(0.272)	(0.109)	(0.190)	(0.561)	(0.089)	(0.208)	(0.227)
Country effects	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Sectoral effects	No	No	Yes	No	No	Yes	No	No	Yes
Observations	15,741	15,741	15,741	5,373	5,373	5,373	10,001	10,001	10,001
Log likelihood	-7682	-6928	-6580	-2876	-2633	-2565	-4523	-4146	-3851
Pseudo R^2	0.126	0.212	0.252	0.153	0.224	0.244	0.115	0.188	0.246

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Tab. D. Correlation table for variables used in the empirical study for the whole sample of 22,449 observations

	age	*R_D*	*luni*	*lsize*	*fo*	*folice~s*	*share_~v*	*corrup~n*
age	1.000							
R_D	0.066	1.000						
luni	-0.062	0.062	1.000					
lsize	0.258	0.185	0.156	1.000				
fo	0.006	0.082	0.047	0.180	1.000			
folicences	0.021	0.150	0.046	0.164	0.128	1.000		
share_gov	0.089	0.007	0.019	0.114	0.018	0.006	1.000	
corruption	0.069	0.054	0.033	0.019	-0.001	-0.006	-0.048	1.000

Source: BEEPS data set.