

THE EFFECT OF FINANCE SYSTEM
ON EXPORT PERFORMANCE OF FIRMS

by

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Abstract

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Financial system assists in accumulating funds and supports them for commercial activity. Financial constraints as a characteristic of financial development level pertain to the profitability and therefore, can be an important determinant of firm's export performance. The paper provides the investigation about effects of the country's financial system development on firm's percent of export sales with respect to the industry's financial vulnerability. Using firm level survey covered 49 developing countries it detects the pronounced effect of the financial sector development taking into account the different levels of collateralizable assets across industries. The results are distinct for countries from different income groups.

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GLOSSARY

Financial dependence. The estimator of industry's technological demand for external financing counted as the investment share that cannot be covered by internal funds in total capital expenditures.

Tangible assets. A part of net property, plant and equipment in total book-value assets.

Chapter 1

INTRODUCTION

The better financial sector gets out entrepreneurs from the drudgery of accumulating funds internally, the bigger is the probability of profitable investment opportunities, which moves the growth. The progress level is not the same across countries. Svaleryd and Vlachos (2005) point out that even if there are more or less equalized real interest rates due to capital mobility, informational asymmetries and established system of relationship between creditors and debtors in the financial sector remain a source of comparative advantage. Therefore, due to the more developed financial sector some countries may be more competitive than others and financial system as the characteristic of the institutional environment may be a source of specialization similar in size to relative factor endowment. Manova (2006) finds that financial constraints affect the bilateral trade flows, product variety and number of partners.

This paper investigates the effect of the financial system development level on the firm's export performance controlling for both country and industry heterogeneity. The hypothesis is that enterprises in countries with well-developed financial sector across industries have higher percent of export than those in countries with low financial development. This is more pronounced in financially higher dependent and with fewer collateralized assets industries. The more available loans are, the more likely the business activity, including export, is especially for industries demanding high external investment and having low rate of tangible assets.

Investigating of the link between financial development and international trade is relevant in accordance with the following reasons. When identifying the financial development impact on the export performance the importance of the financial system and the necessity of policy reforms in the financial sector confirm. Besides, the influence of trade reforms on the export level may depend on the financial development level and its predetermined, ex post level can be a good predictor of growth and trade outcomes over the next years or even decades. The research may contribute to the interpretation of cross-country differences in factor accumulation, composition of economic activity, total factor productivity, and technology adoption. Thus, it is expected that the thesis results will confirm the importance of financial development for the economic progress. This work will add to the existing literature by focusing on the micro level evidence.

In the empirical framework it makes use of the data from the World Bank's Enterprise Surveys. The surveys include a wide set of developing countries from the different world regions. The inquiry was held in 2006-2009. Respondents could be classified by the industries (food, textile, chemicals, machinery and equipment and so forth). Surveys contain information about the business environment from the individual firms' view point as well as various constraints for firm operations and growth. It is planned to use the industry measures of the dependence on external finance and the asset tangibility. The countries' financial development is measured in three ways: as a ratio of deposit money bank domestic assets to GDP, a ratio of liquid liabilities to GDP and a ratio of claims on the private sector to GDP which can be obtained from the International Financial Statistics of IMF. A ratio of export in total sales is chosen as the dependent variable. For profound investigation of the hypothesis the interaction terms of the country's financial development with the industry's financial dependence and tangibility are added to the model.

There are several methodological problems in the estimation. The propensity of households to save as a common omitted variable can explain both financial advance and growth. Whereas endogenous savings determine the long-run growth rate of the economy, it is possible for growth and initial financial development to be correlated. Further, if the financial development is estimated by the size of the stock market and the level of credit, the financial sector could be a good indicator since financial institutions invest more as long as they expect sectors to grow. It is also possible for the well-developed financial system to be a consequence of high demand for financial services. This means that causality runs in the opposite direction: the industry structure determines and affects the financial services demand and correspondingly the financial development level. Besides this, the issues of the non-linearity of the dependent variable and selection into export are present. Therefore, the results are checked for robustness and Tobit and two-step selection models are applied.

The paper includes the following parts. Chapter 2 provides an overview of the literature related to the past and recent studies of the relationship between financial development and growth and international trade, chapters 3 and 4 describe the methodology of investigation and the data, chapter 5 contains estimation procedures and results discussion, and the last part is the conclusion.

Chapter 2

LITERATURE REVIEW

This chapter discusses the literature on the link between the financial development and economic growth and export. Following the historical changes the stages and attainments in developing this topic is considered.

The main topic of investigations, both theoretical and empirical, for a long time has been the impact of financial development on economic growth. Until this century the works are mostly theoretical or based on the macroeconomic comparisons. King and Levine (1993) test the growth-finance relationship empirically, using data for 80 countries from 1960 to 1989. They conclude that the developed financial system creates incentives for economic growth through raising the rate of capital accumulation and improving in the efficiency of capital allocation. The authors also claim that the predetermined parts of financial development indicators foretell subsequent values of the growth indicators. To estimate the effect they present four indicators of the financial sector development level that are widely used in further works: the ratio of liquid liabilities (M3) to GDP, the ratio of deposit money bank domestic assets to deposit money bank domestic assets plus central bank domestic assets, the ratio of loans to the nonfinancial private sector to total domestic credit and the ratio of claims on the private sector to GDP.

In later works researchers examine the financial development impact on the economy, both positive and negative, the inflation-finance-growth nexus. Rousseau and Wachtel (2009) revise the core cross-country panel result (over 1960-2003) and state that the influence of financial deepening defined as too rapid growth of credit on growth is not as strong

using more recent data as it is in the original King and Levine (1993) study. The dependence, significant during the first 30-year period, lessens in the last 15 years. Possible explanations suggested by the economists refer to the rapid and excessive financial deepening. It emerges as a credit boom or from the widespread liberalization of financial markets. This can be hazardous even for the most developed markets since it may both weaken the banking system and bring inflationary pressures.

Investigation of the financial system and firm growth nexus based on micro data are presented in the papers of Demirgüç-Kunt and Maksimovic (1998), Ayyagari et al. (2008). The first paper is based on the Global Vantage database and it shows that the cost of external financing is higher and the proportion of firms that grow quicker than the predicted maximum constrained rate is lower in case of less developed financial intermediaries. Using data from the World Business Environment Survey for 80 countries Ayyagari et al. (2008) verify which features of the business environment across countries influence the firm's growth. According to the estimation of a set of ten different environment obstacles, it is the Finance that is one of potential binding constraints.

The next wave of research concentrates on defining more direct channels and mechanisms by which financial sector impacts economic growth. Indicators of financial vulnerability – financial dependence and asset tangibility - are exposed. Rajan and Zingales (1998) present a new methodology to identify whether the financial system development has the impact on industrial growth through the disproportional industries' dependence on external finance. From data on the U.S. firms they construct the estimator of industry's technological demand for external financing (dependence) as a difference between investments and cash generated from operations for the median U.S. firm in each industry. They claim that as this measure captures an essential technological

component, which is inherent to a sector, it is an appropriate estimator for ranking industries in other countries. Authors test the hypothesis that more dependent on external financing industries grow comparatively at higher level in more financially developed countries. It checks and demonstrates properly that results are consistent and they are not affected by reverse causality, other factors of growth, investment intensity of a particular industry.

Braun (2003) continues the framework for the estimation of financial sector effects on the industry's economic growth. The author pays attention to the degree of financial contractibility and the measure of tangible assets. The first factor characterizes the financier-entrepreneur interrelation, which is defined as a capacity of the environment to back external finance relationships. Tangible assets are determined as net property, plant, and equipment over total assets. External financing requires a higher share of tangible assets if the financial contractibility is poor. In contrast with high-tangibility industries low tangible industries would make higher share of manufacturing value added and grow faster facing with the developed financial system opposite to the poorly developed one. In comparison with Rajan and Zingales (1998) research there are some extensions. Along with the ratio of credit to the private sector in order to test the hypothesis the author brings liquid liabilities, stock market capitalization, stock market value traded as another measures of the financial development. Also it uses more control variables characterizing industry, country and industry-country differences (physical capital, human capital, natural resources, and raw labor). The hypothesis is not rejected by the data with different financial development measures.

A number of papers written after Rajan and Zingales (1998) and Braun (2003) add new issues for investigating and improving the methodology

and specification of models with both economic growth and export as a dependent variable. For this purpose financial dependence and asset tangibility estimators are in use.

It is natural to expect for trading and specialization patterns to be influenced by the financial system too. First papers concerning the nexus of financial institutions and international trade were generally theoretical. Kletzer and Bardhan (1987) deduce that given identical technology and other endowments between countries, the variation in their domestic institutions of credit contract enforcement stimulates inequality in a comparative advantage. Baldwin (1989) suggests that financial progress should impact firms' output decisions and trade patterns.

Beck (2002) investigates a possible impact of the financial development on the trade balance structure. This study develops and proves a theoretical model in which the level of external financing across industries determines the trade balance. For empirical analysis a 30-year panel on 65 countries is used. The results show that the higher countries' level of financial development is, the higher shares of manufactured exports in both total merchandise exports and GDP are and the higher trade balance in manufactured goods is.

Investigating OECD countries Svaleryd and Vlachos (2005) find that countries endowed with well-functioning financial sectors tend to specialize in industries relatively intensive in using services provided by the financial sector. They claim that differences in the financial development have even more substantial influence on the specialization pattern between OECD countries than heterogeneity in human capital. To check the hypothesis the authors test the significance of interactions between financial intensity (dependence) and financial development indicators.

Manova (2006) constructs a model with credit-constrained heterogeneous firms, at different levels of the financial progress countries and various financially vulnerable sectors. She suggests that the more financially developed an exporter is, to more countries it sells and the smaller is the minimum GDP among its country-partners. These effects are stronger in financially sensitive sectors. The author claims a number of propositions, which are similar to Rajan and Zingales (1998) and reflect the importance of the financial sector development for the export performance. The estimation results confirm that financially advanced countries export relatively higher volumes in sectors that depend more on the outside finance and in sectors with few collateralizable (few tangible) assets, and it is relatively a wider range of products.

Similar to the previous works Mostova (2009) demonstrates the significant positive link between the financial development and the international trade structure for ten countries with transition economies. Besides, she shows that high inflation level influences negatively on the share of financially dependent industries in the international trade performance.

In papers with firm level data the micro financial factors are included in the estimation: individual firm's liquidity, coverage, cash ratios, leverage as a financial constraints and other firm's characteristics (e.g., size, age, productivity). This does not allow to assess the country's financial system effect directly. Controlling for the past export status (which defines whether a firm should pay sunk costs in the current period) Stiebale (2008) estimates the financial position effect on the export status (trade or not) and on the export share in total sales of French firms. Greenaway et al. (2007) verify the dependence of the UK manufacturing firms' decision concerning export market participation on the financial conditions (liquidity, leverage). They pay attention to the factors such as the size of a

firm, the ex post and ex ante financial health, whether a firm is a continuous exporter or starter.

For the estimation of the financial system effect the World Bank firm-level survey database is not used. But it is helpful for this research to consider the framework with such kind of data. Ma et al. (2009) exploit the impact of the institutional effects such as variation in institutions and contract enforcement on the firm's export performance. The measures of the firm's perception of the judicial quality are calculated for both country and industry levels based on the rate indicating the severity of legal obstacles (a range from 0 to 4) from the survey question. These variables are included in the main equation of export, which is assessed through the Tobit model. Sharma (2007) examines the relationship between financial development and R&D spending. He finds that within industries the probability of R&D spending and its size in small firms have a positive dependence on somewhat country level of the financial development. As regressors which determine the financial development he chooses the country ratio of private credit to GDP, deposit accounts and the interest rate spread. The author also takes into consideration the Rajan and Zingales (1998) measure of the industry dependence on the external finance. Similar approaches can be applied in investigating financial constraints.

A potential issue in detecting the nexus of the financial sector development and export performance is the possibility of reverse causality. In this case, economic growth, industrial structure, which are intensive in use of external financing, define the performance of financial sector. Endogeneity is a considerable concern in the trade and finance literature. Researchers argue both logically, based on the nature of variables and by instrumenting for the financial sector development. Braun (2003) considers that the manufacturing sector has a small fraction

in the economy and, thus, the reverse causality problem is limited. Also including various measures of the financial development and tangibility he produces results robustly consistent with the basic hypothesis. He takes the industry technological volatility, political pressures, income elasticity of demand for goods produced by each sector, large market size, per capita income to control for omitted variables. The study shows that the estimators are robust and sufficient. Svaleryd and Vlachos (2005) use two instruments as important determinants of financial progress: index of the strength of norms in civic cooperation and country's legal origin.

The purpose of this thesis is to extend this literature by connecting financial system with export performance by using firm level data and recent econometric techniques in order to determine the relationships. Different measures of the country's financial development are used in the estimation. The framework captures industries characteristics such as financial dependence on external funds and tangibility of assets.

METHODOLOGY

A variety of theoretical models describing the decision making conditions to enter the market, including foreign market, can be used to illustrate the effect of credit market imperfections on patterns of international trade. The simplest model consists of two open economies, populated by the landowners and a continuum of identical entrepreneurs, a single good produced with constant return to scale technology and using physical capital and land (Boyd and Smith 1997, Matsuyama 2005). Any entrepreneur endowed with some number of input units in order to run the project needs to borrow deficient number of input units at a certain interest rate from those who do not start the project. Profitability and borrowing constraints identify the circumstances under which an entrepreneur chooses to run the project. This framework shows that the credit market imperfections predetermine patterns of international trade and can be a source of absolute advantage for an economy.

Beck (2002) considers a simple economy of agents who live for two periods. This model analyzes the inter- and intra-temporal consumer problem, producer decisions and financial intermediation in both sectors. The equilibrium in the open economies is derived.

More complicated model embodies firm heterogeneity and demonstrates why some firms within industries participate in the international trade whereas others do not (Melitz, 2003). The framework aggregates demand and production, yields revenue, price and profit, which depend on productivity level. It presents a zero cutoff profit condition and

equilibrium analysis. It shows that only firms with high productivity, which is affected by trade costs can become exporters. Manova (2006) extends Melitz's modeling incorporating credit constraints. The model proposes that firms need to attract outside capital for covering the trade costs. For receiving external finance firms pledge material tangible assets as collateral. A measure of the opportunity to obtain external finance (financial contractibility) differs across countries. It demonstrates that financial constraints increase the level of productivity cut-off for exporting. Based on implemented framework Manova suggests that in financially developed economies the productivity cut-off is lower. Besides, within each country, this magnitude is higher in the industries with a greater dependence on external finance and fewer tangible assets.

The main idea of this research is to determine the impact of the countries' financial development on the firms' export performance. For the investigation of the theoretical hypothesis the following dependence should be identified:

$$\mathbf{Ex} = f(\text{country's financial development subject to industry's financial dependence and tangibility; individual control variables; year, industry, country}),$$

where Ex – ratio of export in total sales; control variables: age of a firm, number of employees. It is worth to include other controls such as productivity (generally, the measure of output per number of employees), rate of growth, profitability, expenditures for R&D. These activities define directly the decision to export, but within the Survey it is impossible to obtain their values.

The dependent variable is the indicator of export performance expressed in terms of the ratio of export in the whole sales. Explanatory variables can be combined in several groups: financial endowment and financial

intensity variables; qualitative by nature dummy variables, control variables (industry endowments). Since the industry's tangibility and dependence on external finance influence are of interest, the interactions of these terms with financial development of the country are added to the model. Following this information, the estimated equation can be written down in the following form:

$$Ex_{jcit} = \beta_1 + \beta_2 Y_j + \beta_3 C_j + \beta_4 I_j + \beta_5(\text{FinDev}_{ct} * \text{Dep}_i) + \beta_6 (\text{FinDev}_{ct} * \text{Tang}_i) + \beta_7 X_{jcit} + u_{jcit}, \quad (1)$$

where j is a firm index, c is a country index, i is an industry index, t is time index, Y_j , C_j , I_j , is the dummy set (year, country, industry respectively), X_{jcit} is the set of control variables mentioned before.

The theoretical models propose a number of the empirical predictions concerning the influence of the financial development on the export performance. It surmises that the financial development has positive effect on the dependent variable as well as the financial dependence and the tangibility. Interactions in the equation are similar to second derivatives and are added to assess the marginal effects of financial development subject to the levels of the financial dependence and the tangibility of an industry. The expected sign of the interaction between financial development and dependence is positive. This means that a share of export in financially developed countries is higher in sectors with large input requirements of external finance. The interaction coefficient between financial development and tangibility has a negative sign, e.g. the higher the financial development level is, the higher is the share of industries with low tangible assets which export relative to industries with high tangible ones. In empirical part of the work the model will be run without single variables, since the only effects of variables that change both cross countries and cross industries can be

detected. Robust estimation of covariance matrix is used to meet heteroscedasticity problem.

In order to amend the specification (1) and corroborate the hypothesis the indicator of access to financing is included in the equation. This variable is determined from responses to the Survey question K.30 (Appendix A). An entrepreneur is suggested to evaluate the access to financing which integrates the availability and the cost (interest rates, fees and collateral requirements) with the value between 0 to 4 (no obstacle, a minor obstacle, a major obstacle, or a very severe obstacle to the current operations of this establishment). The main goal is to check whether the estimators of financial indicators are still significant and, therefore, the variables influence on the export indeed.

The equation (1) will be first estimated by OLS as a basis for comparison with the results obtained with other techniques. OLS estimators are consistent only under a zero conditional mean assumption. At the same time the OLS procedure does not allow for the nature of the dependent variable such as fracture which takes values from zero to one. Predicted by OLS values can lie outside the unit interval since one unit increase in a regressor affects in the same way the estimated variable. In addition, the potential firm-level unobserved effect is ignored which leads to the inconsistent estimation due to omitted variable bias.

The dependent variable, the ratio of export in total sales, is related to limited dependent variables, since it is roughly continuous over strict positive values and lies in the interval from zero to one. Under the assumptions of normality and homoscedasticity a Tobit model can be estimated. The procedure implies the assessment of two expectations which derivatives show the partial effects of change in x . First $E(y|y>0,x)$ evaluates and then through inverse Mills ratio $E(y|x)$ estimates (y and x are dependent and explanatory variables respectively).

The share of export is the variable observed only for a subset of the whole sample. Near 26% of all questioned firms export whereas others sell only domestically or export indirectly marketing to party that exports and, hence, have zero share of export. It is possible with above mentioned techniques to examine export performance of firms which sell to other countries, but why firms which trade only on the own market do not export is not observed completely. In other words, the reason whether or not to export can be different from the reason how much to export, having decided to trade outside the county.

In the literature it proposes the procedure in which first the decision equation is estimated and then using the selected sample the regression with main explanatory variables runs (Heckman model). The specification of the model is the following:

$$\begin{aligned} \text{Ex_stat}_{jcit} = & \gamma_1 + \gamma_2 Y_j + \gamma_3 C_j + \gamma_4 I_j + \gamma_5(\text{FinDev}_{ct} * \text{Dep}_i) + \\ & + \gamma_6 (\text{FinDev}_{ct} * \text{Tang}_i) + \gamma_7 X_{jcit} + \gamma_8 \text{Cert}_{jcit} + v_{jcit}, \end{aligned} \quad (2)$$

$$\begin{aligned} \text{Ex}_{jcit} = & \beta_1 + \beta_2 Y_j + \beta_3 C_j + \beta_4 I_j + \beta_5(\text{FinDev}_{ct} * \text{Dep}_i) + \\ & + \beta_6 (\text{FinDev}_{ct} * \text{Tang}_i) + \beta_7 X_{jcit} + u_{jcit}, \text{ when } \text{Ex_stat}_{jcit}=1 \end{aligned} \quad (3)$$

The model (2) is a selection equation. Ex_stat is a latent binary variable equal to 1 if a firm exports and 0 otherwise. According to this approach the set of explanatory variables X in (3) is a subset of variables W in (2). It assumes that u is independent of W and X and v is of W . The both sets of residuals are normally distributed with mean zero. $E(u|v) = \theta v$ for some parameter θ and $E(v|W, \text{Ex_stat}=1) = \lambda(W\alpha)$, where $\lambda(W\alpha)$ is the inverse Mills ratio. Assuming this the equation (2) could be rewritten as:

$$\begin{aligned} E(\text{Ex}|W, \text{Ex_stat}=1) = & \beta_1 + \beta_2 Y_j + \beta_3 C_j + \beta_4 I_j + \beta_5(\text{FinDev}_{ct} * \text{Dep}_i) + \\ & + \beta_6 (\text{FinDev}_{ct} * \text{Tang}_i) + \beta_7 X_{jcit} + \theta \lambda(W\alpha) \end{aligned} \quad (4)$$

If θ is not equal zero which means u and v are correlated, then $\lambda(W\alpha)$ is effective omitted variable which improves the estimation. The results are more efficient if W contains quite more variables than X , otherwise the presence of multicollinearity between X and λ worsen the estimation. The technique consists of two steps estimation. First, using all sample, α is obtained by the Probit estimation. Then the set of $\lambda(W\alpha)$ is computed. Using selected sample the model (4) estimates with OLS to get a set of parameters β . In case of statistically significance of λ the two-step selection model identifies two decisions both on whether to export and how much to export.

The variables from the model (1) are put in the equations, as well as a new regressor (Cert) is added. This variable denotes the presence of internationally recognized quality certification which is collected from the Survey. The intuition to include this factor is the following. A certificate allows to enter new markets easier and to be more competitive. A firm makes a decision on whether to trade outside or not based on the trade profitability level. Fixed and variable costs of exporting affect directly the profitability. The obtainment of an internationally recognized certificate can be considered as one-time fixed charge (fixed costs) and its cost determines the decision to export. Hence, it is worthwhile to incorporate this variable at the first stage, not at the second one.

Chapter 4

DATA DESCRIPTION

The main source of data is the World Bank's Enterprise Surveys. They collect data from key manufacturing and service sectors in every region of the world. Surveys contain information about the business environment from the individual firms' view point as well as various constraints for firm operations and growth.

The Surveys use standardized survey instruments and a uniform sampling methodology to minimize measurement error and to yield data that are comparable across world's economies. It generates large enough sample sizes for chosen industries to implement statistically robust analyses with levels of precision at a minimum 7.5% precision for 90% confidence intervals. On average 1200-1800 interviews are conducted in larger economies, 360 interviews are conducted in medium-sized economies and for smaller economies 150 interviews take place. The survey sample frame is based on the eligible firms universe, which provides by the country's statistical office. The industry classification corresponds to the ISIC codes (Appendix B). The Enterprise Surveys provide pooled data set.

The Surveys are answered by business owners and top managers and covers the establishments with five or more employees. A wide set of developing countries from different regions of the world (Africa, East Asia & Pacific, Europe & Central Asia, Latin America & Caribbean, Appendix B) is included. The Surveys were held in 2005-2009.

Firm's export performance is measured as a fraction of direct exports in total sales in a fiscal year (question D.3 of the Survey, Appendix A). Adding the share of indirect exports (sold domestically to a third party that exports products) within this paper is not quite correct, since in this case other entrepreneur carries trade costs and meets financial constraints. For the estimation of model (2) binary variables are created: export status (1 if export is more than zero, otherwise 0), the presence of internationally recognized quality certification. In the regressions other factors, control variables are put: age of a firm, number of employees, access to financing. The age of a firm is computed by subtracting the year of the establishment from the year of the interview. The number of employees is measured in hundreds. Summary statistics is presented in Table 1.

Table 1. Summary statistics for main variables from the Survey

Variable	Obs.	Mean	Std. Dev.
Number of employees, hundred	14309	1.01	3.45
Age, year	14309	19.30	18.10
Ratio of export	14309	0.105	0.25
Access to finance	14309	1.63	1.38
Certificate	14309	0.24	0.42
credit*dependence	14309	0.12	0.12
credit*tangibility	14309	0.09	0.05
liabilities*dependence	14309	0.13	0.13
liabilities*tangibility	14309	0.10	0.01
deposits*dependence	14309	0.12	0.14
deposits*tangibility	14309	0.09	0.07
Number of countries			49
Number of industries			9
Years			2006-2009
Number of exporter			3797

The total number of observations of manufacturing sector before any restrictions is 19410. The greatest number of observations is dropped since the number of countries is cut down due to the absence of the financial statistics for 2009 and in some cases for other years. There are 14309 observations after missing information clearing. The set covers the

responses from 9 industries and 49 countries over 4 years. The average number of employees is 101 and average age is 19.3 years. 26.5 percent of respondents export, the average share of export in total sales is 10.5 percent. On average 24 percent of entrepreneurs have internationally recognized quality certificates. Comparing with the descriptive statistics before the restrictions (Appendix C) the values of the mean and standard deviations almost coincide despite of reduced number of countries. The interactions with the industry's financial dependence and tangibility are almost at the same level, but with varying standard deviations.

The literature offers different measures of financial development: (i) the ratio of deposit money bank domestic assets to deposit money bank domestic assets plus central bank domestic assets, (ii) the ratio of liquid liabilities (M3) to GDP, (iii) the ratio of loans to the nonfinancial private sector to total domestic credit and (iv) the ratio of claims on the private sector to GDP (King and Levine 1993). For the purpose of this thesis the ratios of deposit money bank domestic assets, liquid liabilities and claims on the private sector to GDP are in use. The source of this data is the International Financial Statistics from the International Monetary Fund and the dataset from Beck et.al. (2000, updated in January, 2009).

Financial industry's dependence and tangibility are defined and calculated in Rajan and Zingales (1998) and Braun (2003) papers respectively. The indicator of a sector's reliance on external finance is described as a share of capital expenditures not covered by firm's cash flow from operations. Rajan and Zingales (1998) use the data on publicly traded U.S.-based companies from the Compustat collected over 1980's. They aggregate the ratios over times and across companies and then use industry median smoothing the effects of outliers and temporal fluctuations. The researchers claim that measures of financial dependence for the U.S. industries are good proxies for the estimation of the demand on external

finance in other countries. The main reason is that the requirement of outside funds is likely to appear as a result of technological shocks which are specific to an industry rather than a country. Besides, the United States are characterized as a country with advanced financial system. So, it is acceptable to incorporate this calculated indicator to the models (1)-(3). At the same time Manova (2008) notices that the coefficient on the intercept might be underestimated if some industries, which are strongly financially dependent in the U.S., use more internal funds in the poor credit markets countries.

Asset tangibility defined by Braun (2003) reckons up based on the Compustat's annual industrial files as averages for the 1986-1995 period. Measures turn out quite stable over time when are compared to indices for 1976-1985 or 1966-1975. It is appropriate to use these average industry indices in this paper for the reasons stated above.

The measure of access to financing is a dummy variable and determined individually by a firm. The better external financial support associates with a lower value of the measure. Access to finance combines the estimation both the availability of finance and the cost of finance where the availability measures the difficulty to obtain a loan; cost of finance is evaluated as the loan price, the transaction costs to fulfill the application and disbursement process (interest rates, fees, collateral premiums).

EMPIRICAL ESTIMATION

The empirical exploration is divided into several parts subject to variables which are used to detect the relationship between the financial system's development and firms' export performance. First, the estimating equation includes the interactions of the county's financial development with the industry's financial dependence and asset tangibility. Their significance will demonstrate the presence of the nexus with export volumes. Thereafter, the variable from the Survey's dataset will be put in the model. For OLS and Tobit regressions robust standard errors are computed¹.

The three indicators of the financial development are used. They are the ratio of deposit money bank domestic assets to GDP, the ratio of liquid liabilities (M3) to GDP, the ratio of claims on the private sector to GDP. Since country-specific effects and industry-specific effects are controlled for in the models, the only effects of variables that change both cross countries and cross industries can be detected. Therefore, the model comprises only the interactions (the product of financial development ratios and external financial dependence or tangibility, 6 possible variables). Being separately the financial development, dependence and tangibility are dropped because of collinearity. The estimation bears based on the individual level data for the whole period. In the equation the individual variables (age and number of employees) are also included.

¹ The bootstrap produces the similar results for OLS and Tobit procedures, but it cannot be implemented for the Heckman model.

Industry, country and year fixed effects are controlled for. That may define the partners of specialization.

When using different estimation methods (OLS, Tobit, Heckman procedures) for specification (1) the results are significant at the 0,1% confident level for only the interactions with the tangibility indicators (Tables 2, 3). They have negative signs as expected. The coefficients for the interactions with the financial dependence are insignificant. The lowest estimation coefficients are obtained from OLS regressions, Tobit estimators are more than twice bigger in comparison with OLS. In the two-step selection model at the first step the indicator of internationally recognized quality certification is added. The new variable as well as Mills lambda are significant. Therefore, we cannot reject the presence of the sample selection problem and the model amends the results. This estimation produces values closed to Tobit.

The substantial differences in magnitudes indicate the inapplicability of the OLS method. There are several weaknesses in OLS using: linear estimation and omitted variable bias. Using Heckman methodology the estimators are significant and, therefore, this estimation procedure is the most appropriate, since it helps explaining both decisions whether to export and how much to export.

The results show that the asset tangibility contributes in explaining the decision to export and the magnitude of export. The sign of the interaction characterizes the effect of the change in the financial development on the export share in tangible relative to intangible industries. The estimated coefficients for the interactions of the financial development with the tangibility indicator suggest that the export share in highly tangible industries relatively to poorly tangible sectors is larger in low financially developed countries. In countries with developed financial systems the situation is opposite. It is necessary to point out that

Table 2. Financial development, access to financing and export performance, OLS and Tobit, robust

	OLS			Tobit					
<i>Regression with the ratio of deposit money bank domestic assets to GDP</i>									
deposits*dependence	-0.043			0.028			0.027		
	(-0.89)			(0.18)			(0.17)		
deposits*tangibility	-0.794***			-1.662**			-1.658***		
	(-5.29)			(-3.03)			(-3.38)		
<i>Regression with the ratio of liquid liabilities (M3) to GDP</i>									
liabilities*dependence		-0.083			-0.133			-0.135	
		(-1.86)			(-0.77)			(-0.87)	
liabilities*tangibility		-0.923***			-1.991***			-1.983***	
		(-5.59)			(-4.61)			(-4.16)	
<i>Regression with the ratio of claims on the private sector to GDP</i>									
credit*dependence			-0.038			-0.045			-0.048
			(-1.07)			(-0.35)			(-0.46)
credit*tangibility			-0.419***			-0.911**			-0.899**
			(-3.89)			(-2.79)			(-2.67)
Age	0.000	0.000	0.000	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	(0.35)	(0.28)	(0.33)	(6.80)	(7.19)	(5.58)	(7.44)	(6.98)	(5.87)
number of employees	0.013***	0.013***	0.013***	0.030***	0.030***	0.030***	0.030***	0.030***	0.030***
	(5.30)	(4.99)	(5.20)	(5.30)	(5.21)	(4.99)	(4.65)	(5.04)	(4.09)
access to finance							-0.013*	-0.013**	-0.013*
							(-2.38)	(-2.82)	(-2.43)
Constant	0.064***	0.079***	0.221***	-0.676***	-0.553***	-0.693***	-0.660***	-0.557***	-0.751***
	(5.28)	(6.46)	(5.83)	(-5.07)	(-4.01)	(-5.21)	(-4.95)	(-4.06)	(-5.94)
Adjusted R ²	0.124	0.125	0.123						
Sigma				0.589***	0.589***	0.590***	0.589***	0.589***	0.589***
Constant				(79.67)	(79.65)	(79.72)	(79.73)	(79.70)	(79.78)

N = 14309; *t* statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; Note: Dependent variable: export ratio = export share in total sales/100

Table 3. Financial development, access to financing and export performance, sample selection

	(1)	(2)	(3)	(4)	(5)	(6)
<i>2nd stage</i>						
deposits*dependence	0.068 (0.52)			0.068 (0.52)		
deposits*tangibility	-1.345*** (-3.51)			-1.345*** (-3.51)		
liabilities*dependence		0.081 (0.65)			0.081 (0.65)	
liabilities*tangibility		-1.656*** (-4.53)			-1.657*** (-4.53)	
credit*dependence			0.005 (0.06)			0.006 (0.07)
credit*tangibility			-0.835*** (-3.31)			-0.836*** (-3.32)
access to finance				0.001 (0.27)	0.001 (0.32)	0.001 (0.29)
age	-0.003*** (-9.24)	-0.003*** (-9.39)	-0.003*** (-9.14)	-0.003*** (-9.24)	-0.003*** (-9.39)	-0.003*** (-9.14)
number of employees	0.001 (1.27)	0.001 (1.23)	0.001 (1.29)	0.001 (1.27)	0.001 (1.23)	0.001 (1.29)
Constant	0.439*** (3.64)	0.527*** (4.26)	0.396*** (3.38)	0.832*** (6.12)	0.987*** (6.77)	0.677*** (5.86)
<i>1st stage</i>						
deposits*dependence	0.052 (0.16)			0.052 (0.17)		
deposits*tangibility	-3.250*** (-3.58)			-3.245*** (-3.58)		
liabilities*dependence		-0.264 (-0.89)			-0.265 (-0.89)	
liabilities*tangibility		-3.733*** (-4.30)			-3.727*** (-4.30)	
credit*dependence			-0.108 (-0.50)			-0.109 (-0.51)
credit*tangibility			-1.801** (-2.91)			-1.793** (-2.90)
certificate	0.704*** (23.62)	0.706*** (23.69)	0.702*** (23.58)	0.703*** (23.56)	0.705*** (23.62)	0.701*** (23.52)
age	0.006*** (8.24)	0.006*** (8.15)	0.006*** (8.23)	0.006*** (8.23)	0.006*** (8.14)	0.006*** (8.22)
number of employees	0.104*** (18.79)	0.104*** (18.83)	0.104*** (18.81)	0.104*** (18.76)	0.104*** (18.80)	0.104*** (18.78)
access to finance				-0.007 (-0.71)	-0.007 (-0.69)	-0.007 (-0.68)
Constant	-0.156 (-0.52)	0.009 (0.03)	-0.281 (-0.97)	-0.143 (-0.48)	0.022 (0.07)	-0.269 (-0.92)
<i>mills</i>						
lambda	-0.115*** (-5.93)	-0.117*** (-6.07)	-0.113*** (-5.86)	-0.115*** (-5.90)	-0.118*** (-6.05)	-0.114*** (-5.84)
rho	-0.358	-0.365	-0.354	-0.359	-0.366	-0.355
sigma	0.321	0.321	0.321	0.321	0.321	0.321
N	14305	14305	14305	14305	14305	14305

t statistics in parentheses: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Dependent variable: 2nd stage - export share in total sales/100; 1st stage binary variable = 1 if export ratio > 0, 0 otherwise

values at the first stage estimation clearing are larger than at the second step. So, the financial development influences greater on the decision to export rather than how much to export.

The way to get a sense of the received magnitudes is to compute the effect of changes in the financial development as well as in the asset tangibility (Appendix D). For this matter the difference between high and low values of the intercepts (75th and 25th percentile) is multiplied by the estimated coefficients. The most significant effect from the estimated coefficients has the ratio of liquid liabilities to GDP as the measure of the financial system depth. In this case the differential in the export ratio shows the percent of deceleration (0.13-0.16%) in industries at the 75th percentile level of the asset tangibility with respect to industries at the 25th percentile level when they are placed in countries at the 75th percentile of financial development rather than in those at the 25th percentile.

The control variables, age and number of employees, are significant and have a positive effect on the export share in the Tobit model. However, when estimating by the two-step selection methodology, at the final stage age influences negative and number of employees is insignificant, whereas at the first step the results are similar to Tobit model. The reasonable explanation of such outcome can follow from the purpose of the selection model. First, it identifies whether to export. Age and number of employees affect the decision positively. Then when the decision how much to export makes, number of employees does not matter and age has a negative effect.

The insignificance of the coefficients for interaction with financial dependence may be caused by a range of reasons. The Survey does not cover all population and for this sample the variable can be not important for the export performance. Besides, there is not involved a whole set of

industries in the Survey (just 9) what may worsen estimation results. The authors mentioned in the literature review include separately more than 20 industries for which values of the financial dependence are calculated. In some industries the computed indicator has a negative sign (Footwear, Leather products, Pottery, Tobacco), but these sectors were not segregated in the Survey. It is possible that due to some factors just for a part of observations this effect holds.

At the next step the estimator of the access to financing is added to the model for the attempt to amend the results. In the Tobit model the influence of the access is significant at the 0,1% level and it has a negative sign. It means that the difficulties in availability to finance influences negatively on the export sales. The interactions values do not change greatly. Sample selection estimations show the insignificance of this variable at both stages.

Suppose that there are different effects in countries from different income groups. When using the World Bank countries' income classification, countries are divided into two groups: lower (low, lower middle) and higher income (upper middle, high income: OECD and nonOECD). Two data subsets have 6754 and 7555 numbers of observations respectively. Estimations register interesting results (Tables 4-5).

Using Tobit the coefficients for the intercepts with the tangibility are significant for both groups of countries and have negative predicted effect, although for lower income group of countries the effect of change is twice larger (Appendix D). In both regressions the control variables, age and number of employees, are significant and have positive signs. For lower middle income countries the ratio of deposit money bank domestic assets to GDP has the largest effect (from -0.46% to -0.25%).

The interactions with the industry's financial dependence are insignificant. For higher middle income group of countries the interactions both with the financial dependence and the tangibility are statistically significant at different confident levels. Looking at the interactions with the tangibility the largest effect has coefficient for the ratio of liquid liabilities to GDP (-0.14-(-0.12)%). Instead of the predicted positive effect, the interactions with the external financial dependence indicators have negative signs. It can be explained that for this subsample of exporters the hypothesis does not corroborate.

Table 4. Financial development and export performance, Tobit, lower and higher middle income countries, robust

	low income, lower middle income			upper middle income, high income		
deposits*dependence	-0.275 (-0.71)			-0.413* (-2.07)		
deposits*tangibility	-5.785*** (-5.33)			-1.204* (-1.97)		
liabilities*dependence	-0.246 (-0.73)			-0.545** (-2.83)		
liabilities*tangibility	-4.189*** (-4.66)			-1.777** (-2.91)		
credit*dependence	0.262 (0.85)			-0.289* (-2.35)		
credit*tangibility	-2.316** (-3.20)			-0.823* (-2.18)		
age	0.003*** (4.65)	0.003*** (4.57)	0.003*** (4.73)	0.002*** (4.94)	0.002*** (4.86)	0.002*** (4.94)
number of employees	0.069*** (8.40)	0.069*** (8.44)	0.069*** (8.50)	0.020*** (4.03)	0.020*** (4.02)	0.020*** (4.02)
Constant	-0.748** (-5.04)	-0.543*** (-3.33)	-0.847*** (-5.72)	-0.259** (-2.96)	-0.189* (-2.15)	-0.337*** (-4.39)
sigma	0.646*** (50.69)			0.539*** (64.37)		
Constant	0.647*** (50.84)	0.649*** (51.12)	0.540*** (64.37)	0.539*** (64.37)	0.540*** (64.28)	0.540*** (64.28)
Observations	6754	6754	6754	7555	7555	7555

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Dependent variable: export ratio = export share in total sales/100

Table 5. Financial development and export performance, sample selection, lower and higher middle income countries

	low income, lower middle income			upper middle income, high income		
2 nd stage						
deposits*dependence	0.085 (0.26)			-0.185 (-1.09)		
deposits*tangibility	-3.123*** (-3.70)			-1.133* (-2.22)		
liabilities*dependence		0.099 (0.34)			-0.152 (-0.97)	
liabilities*tangibility		-2.980*** (-4.25)			-1.467** (-2.93)	
credit*dependence			0.198 (0.78)			-0.107 (-1.08)
credit*tangibility			-1.332* (-2.16)			-0.838** (-2.82)
age	-0.003*** (-6.04)	-0.003*** (-6.17)	-0.003*** (-5.79)	-0.002*** (-6.79)	-0.002*** (-6.90)	-0.002*** (-6.78)
number of employees	0.007* (2.28)	0.007* (2.26)	0.007* (2.37)	0.001 (0.57)	0.001 (0.53)	0.001 (0.55)
Constant	0.832*** (5.83)	0.856*** (5.84)	0.816*** (5.53)	0.639*** (6.09)	0.608*** (7.26)	0.609*** (7.32)
1 st stage						
deposits*dependence	-0.032 (-0.05)			-0.670 (-1.60)		
deposits*tangibility	-9.188*** (-4.83)			-2.909* (-2.27)		
liabilities*dependence		-0.133 (-0.23)			-0.980* (-2.49)	
liabilities*tangibility		-6.706*** (-4.28)			-3.915** (-3.11)	
credit*dependence			0.608 (1.24)			-0.535* (-2.07)
credit*tangibility			-3.957** (-3.13)			-1.874* (-2.35)
age	0.006*** (5.15)	0.006*** (5.08)	0.006*** (5.23)	0.005*** (6.17)	0.005*** (6.09)	0.005*** (6.17)
number of employees	0.192*** (16.76)	0.193*** (16.81)	0.192*** (16.70)	0.078*** (12.30)	0.078*** (12.29)	0.079*** (12.33)
certificate	0.638*** (12.64)	0.638*** (12.63)	0.629*** (12.47)	0.725*** (19.50)	0.730*** (19.60)	0.727*** (19.53)
Constant	-0.331 (-0.96)	-0.271 (-0.73)	-0.896** (-2.67)	0.046 (0.13)	0.534 (1.36)	-0.193 (-0.69)
mills						
lambda	-0.101** (-3.11)	-0.105** (-3.22)	-0.096** (-2.91)	-0.092*** (-3.76)	-0.094*** (-3.86)	-0.094*** (-3.84)
rho	-0.318	-0.330	-0.303	-0.294	-0.301	-0.300
sigma	0.318	0.318	0.318	0.313	0.313	0.313
N	6750	6750	6750	7555	7555	7555

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Dependent variable: 2nd stage - export share in total sales/100; 1st stage binary variable = 1 if export ratio > 0, 0 otherwise

Implying the two-step selection procedure for estimation of both groups of countries Mills ratio, the interactions with tangibility, control variables at the first stage are significant, whereas at the final stage the coefficients worsen and not for all ratios are significant. This can indicate that the financial development influences first of all on the decision to export and it is not so important for the determination how much to export, especially for higher middle group of countries.

The issue with omitting relevant individual variables such as productivity, rate of production growth and profitability and so forth can take place. The aggregation of the dependent variable values to the industry level may allow lessening this problem. As a control variable the sum of employees in the industry is calculated. Table 6 shows that the results are almost all insignificant, therefore, this approach is inappropriate.

Table 6. Financial development and aggregated export performance, Tobit

	(1)	(2)	(3)
deposits*dependence	0.007 (0.05)		
deposits*tangibility	-0.256 (-0.46)		
liabilities*dependence		-0.014 (-0.10)	
liabilities*tangibility		-0.731 (-1.41)	
credit*dependence			-0.032 (-0.34)
credit*tangibility			-0.252 (-0.71)
number of employees	0.000 (1.64)	0.000 (1.67)	0.000 (1.64)
Constant	-0.052 (-0.60)	-0.007 (-0.08)	-0.052 (-0.61)
sigma Constant	0.147*** (24.09)	0.147*** (24.08)	0.147*** (24.08)

$N=351$;

t statistics in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Dependent variable: export ratio = export share in total sales/100, aggregated by industry

Based on the different estimations, the effect of financial development subject to the industry's tangibility detects. It means that an increase in the level of financial development is correlated with a drop of export share in tangible industries relative to intangible. The two-step Heckman procedure identifies the higher effect when the decision to export makes. For lower middle income group of countries the effect is more than twice larger than for higher income group.

CONCLUSIONS

This paper has attempted to find out the effect of the financial sector development on the firms' export performance taking into account the industry's financial dependence on external finance and the asset tangibility.

The theoretical model follows from the Melitz (2003) model of international trade with heterogeneous firms. It suggests that financial constraints affect the decision whether to export based on the productivity cut-off level and financial constraints increase the level. Hence, in financially developed economies the productivity cut-off is lower. Besides, within each country, the effect is higher in the industries with a greater dependence on external finance and fewer tangible assets.

To verify this statement the firm level micro survey is used. It contains entrepreneurs' responses from 49 developing countries from different regions of the world. The survey generates large enough sample sizes for chosen industries to implement statistically robust analyses.

The main findings of the paper are as follows. The asset tangibility contributes in explaining the decision whether to export and the magnitude of export. In total, low tangible industries make higher share of export sales facing with the developed financial system opposite to the poorly developed one. The level of the financial development has higher effect on the decision whether to export rather than how much to export. The indicator of financial development that measures the depth of financial system (liquid liabilities to GDP) has the highest effect on the trade performance. Using this ratio it estimates that in industries with high tangibility the export share grows slower by 0,13-0,16% than in low tangible industries when the level of the financial development raises.

To compare the effects the dataset was divided into two parts using the World Bank countries' income classification. For the lower middle income group of countries the financial sector development has more than twice larger effect than for higher middle group. For the last group the interactions both with financial dependence and tangibility are statistically significant at different confident levels. However, the intercepts of the financial development with the external dependence have a negative sign. It contradicts the prediction that for more dependent on external financing industries the share of export grows with higher level in more financially developed countries. It can be explained that for this subsample of exporters the hypothesis does not corroborate.

Focusing on the firm level data the research contributes to the interpretation of cross-country differences in the composition of economic activity and total factor productivity. The results go in line with the previous findings of the significant financial development effect in industries with the different level of the asset tangibility, whereas the effect through the external industry dependence does not hold generally. The empirical evidence demonstrates the importance of policy reforms in the financial sector for the international trade. The financial development can be used as a predictor of export performance.

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APPENDIX A

Questions from the Enterprise Survey used for the research purpose

A.4 Industry		Sampling sector a4a	Screener sector a4b
Manufacturing :Section D	Food	15	15
	Textiles	17	17
	Garments	18	18
	Chemicals	24	24
	Plastics & rubber	25	25
	Non metallic mineral products	26	26
	Basic metals	27	27
	Fabricated metal products	28	28
	Machinery and equipment	29	29
	Electronics (31 & 32)	31	31
Service	Retail	52	52
Other	Other manufacturing	2	2
	Wholesale	51	51
	IT	72	72
	Hotel and restaurants: section H	55	55
	Other services	50	50
	Construction Section F:	45	45
	Transport Section I: (60-64)	60	60

B.5	In what year did this establishment begin operations?
	Year
	Year establishment began operations
	b5

B.8	Does this establishment have an internationally-recognized quality certification?
INTERVIEWER: If there is need for clarification, some examples are: ISO 9000, 9002 or 14000.	

Yes	1
No	2
Still in process	-6
Don't know (spontaneous)	-9

b8

D.3	In fiscal year [insert last complete fiscal year], what percent of this establishment's sales were:
------------	---

	Percent	
National sales	d3a %	IF 100, GO TO QUESTION D.30
Indirect exports (sold domestically to third party that exports products)	d3b %	IF 100, GO TO QUESTION D.8
Direct exports	d3c %	IF 0, GO TO QUESTION D.8
	100%	

K.30	Is access to finance , which includes availability and cost, interest rates, fees and collateral requirements, No Obstacle, a Minor Obstacle, a Moderate Obstacle, a Major Obstacle, or a Very Severe Obstacle to the current operations of this establishment? SHOW CARD 19
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	No obstacle	Minor obstacle	Moderate obstacle	Major obstacle	Very Severe Obstacle	Do Not Know (spontaneous)	Does Not Apply (spontaneous)
Access to finance k30	0	1	2	3	4	-9	-7

L.1	At the end of fiscal year [insert last complete fiscal year], how many permanent, full-time employees did this establishment employ? Please include all employees and managers (INTERVIEWER: include interviewee if applicable).
------------	---

	Number
Permanent, full-time employees end of last fiscal year	11
Don't know (spontaneous)	-9

APPENDIX B

Counties and manufacturing industries covered in the World Bank's
Enterprise Survey and included in the investigation

Argentina2006	Mozambique2007
Bolivia2006	Belarus2008
Colombia2006	Georgia2008
Mexico2006	Turkey2008
Panama2006	Ukraine2008
Peru2006	Senegal2007
Paraguay2006	Russia2009
Uruguay2006	Poland2009
Chile2006	Romania2009
Ecuador2006	Kazakhstan2009
ElSalvador2006	Moldova2009
Honduras2006	Azerbaijan2009
Guatemala2006	Fyr Macedonia2009
Angola2006	Armenia2009
Botswana2006	Mongolia2009
Burundi2006	Estonia2009
DRC2006	Czech Republic2009
Gambia2006	Hungary2009
GuineaBissau2006	Latvia2009
Swaziland2006	Lithuania2009
Tanzania2006	Bulgaria2009
Uganda2006	Croatia2009
Bulgaria2007	Madagascar2009
Croatia2007	Albania2007
SouthAfrica2007	

ISIC code	Industry
15	Food
17	Textiles
18	Garments
24	Chemicals
25	Plastics & rubber
26	Non metallic mineral products
27	Basic metals
28	Fabricated metal products
29	Machinery and equipment
31	Electronics
2	Other manufacturing

APPENDIX C

Table 1C. Descriptive statistics for manufacturing sector before restrictions

Variable	Number of non-missing observations	Mean	Std. Dev.
Total number of observations of manufacturing sector	19,490		
Number of employees, hundred	19423	1.03	3.85
Age, years	19220	19.51	18.18
Ratio of export	19452	0.097	0.243
Access to finance	18642	1.71	1.40
Certificate	19251	0.22	0.42
Number of countries			74
Number of industries			10
Years			2005-2009
Number of exporter			25.2

APPENDIX D

Table D1. The differentials in the export ratio, percent

	OLS	Tobit	Heckman		Tobit		Heckman			
			1 st stage	2 nd stage	lower income	higher income	lower income		higher income	
							1 st stage	2 nd stage	1 st stage	2 nd stage
deposits*dependence	-	-	-	-	-	-0.06	-	-	-	-
deposits*tangibility	-0.06	-0.13	-0.26	-0.11	-0.46	-0.10	-0.73	-0.25	-0.23	-0.09
liabilities*dependence	-	-	-	-	-	-0.08	-	-	-0.15	-
liabilities*tangibility	-0.07	-0.16	-0.30	-0.13	-0.34	-0.14	-0.54	-0.24	-0.24	-0.12
credit*dependence	-	-	-	-	-	-0.04	-	-	-0.07	-
credit*tangibility	-0.04	-0.08	-0.16	-0.07	-0.20	0.07	-0.35	-0.12	-0.17	-0.07