Exports and Firm Performance:

Case of Hungarian Manufacturing

by

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Submitted to

Central European University

Department of Economics

In partial fulfillment of the requirements for the degree of Master of Arts

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Budapest, Hungary

2010

Abstract

The aim of my thesis is to analyze the relationship between firm performance and participation in exporting activity. The superior characteristics of exporters compared to non-exporters are widely discussed in the literature. However, it is still important to study the causal links between exporting and firm performance. In my research I focus on testing self-selection and learning by exporting hypotheses on a dataset of Hungarian manufacturing firms for the period of 1986-2005. I analyze exporting effect for different types of ownerships. I find evidence of self-selection into exporting market and evidence of learning by doing effect in the long run. I find that state owned and foreign owned firms benefit from exporting less than domestically owned firms.

Keywords: Export, Learning-by-doing, Self-selection, Hungarian Manufacturing

Acknowledgements

I would like to express deep gratitude to my supervisor, prof. Álmos Telegdy, whose support, valuable advice and time and attention dedicated to my work, helped me through my thesis writing. I also want to give special thanks to Labor Project for kindly providing data, which made my research possible.

I want to express my gratitude to family whose support was priceless during my studies at CEU. I want to give many thanks to my classmates who were always supportive and whose friendship made last two years a lifetime experience. I want to give special thanks to Natalia Laptieva for her useful advices.

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Introduction

The effect of involvement into exporting activities on firm performance has always created interest among researchers and policy makers. Since comparison of exporters to non exoprters is crucial, there is extensive literature examining the causal relationships between high performance of a firm and its exporter status. Much has been written in the field by now and most of the studies reveal that exporters have higher firm characteristics: they are larger and pay higher wages than non-exporters (Bernard and Wagner, 1996; Mayer and Ottaviano, 2008; Sofronis, Lach, Tybout, 1998). Although the superiority of exporters can be considered as an established fact, a question of causal links between firm performance and export market participation is still vivid and critical for researchers. Involvement in export and performance relationship and causality establishment are important tasks for policy makers: if exporting increases performance then exporting should be encouraged.

There have been a number of studies concentrating on establishing the causal links between exporting and firm performance. Bernard and Wagner (1996) confrim that exporters exporters are larger in size and more productive. They also test self-selection hypothesis and find evidence that more productive firms beocome exporters. However they do not find any strong evidence that exporting enhances firm performance. It is worth to note that Bernard and Wagner (1996) study was done for Germany, which is a an economy with well developed export markets and the effect of exporting might be country specific. The self-selection hypothesis is confirmed by almost all of studies, however, some of them also report increasing performance after entering export market (Alvarez, López 2005).

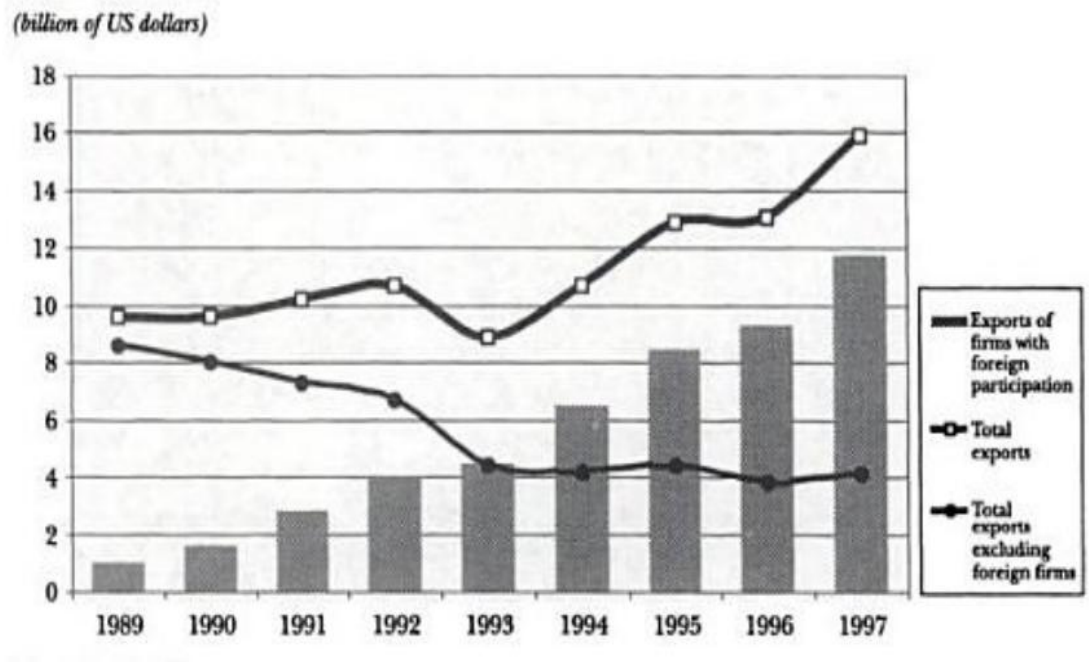
This paper aims to investigate the causal links between exporting and performance for Hungarian manufacturing industries. I try to find whether there is a direct relationship between the output of the firm and being involved in exporting activities and bring some insights to the relations of firm performance and exports in the case of Hungary. I will test two well-known hypotheses on the relationship of output and exporting activity: learning by exporting and *self*-selection into exporting activity.

The choice of the country of study is very specific. Hungary in the last two decades has been a great example of fast trade liberalization process. It experienced a successful privatization process compared to other transition countries. Since early 1990-s Hungarian trade volumes have been constantly incresing. The direction of trade also started changing with the change of the communist regime in 1990. In the previous periods the main trade partners of Hungary were CMEA member countries. Today Hungary trades with many countries, particularly with EU states, Russia and US. After 1990's due to vast FDI, foreign trade went up significantly. The orientation of trade has also changed towards Western Europe. Hungary has a high level of openness and its manufacturing in turn had a rapid catching up process with the western countries (Tóth, 2010). For Hungary, collapse of communism was followed by emergence of EU, which supposedly facilitated Hungary's export market integration. This is why it is interesting to study the influence of exporting activities on a firm performance in an open to trade environment country and see if the relationships found confirm the findings of the previous studies.

Another interesting question concerns FDI and exporting. Mayer and Ottaviano (2008) show that in Hungary, where foreign ownership is very common, exporters are still four times more likely to be foreign owned. It is also established that foreign direct investment facilitates

export activities, especially in early transition periods (Kaminski, Riboud 2000). From Figure 1 we see the dynamics of how export of firms with foreign participation was increasing by time. Since there is obvious link between FDI and exporting, I will also analyze firm performance depending on foreign ownership, which can be considered as a proxy for FDI. In general, it might be the case that foreign owned firms have higher level of productivity and are much more technologically advanced. Since they are also more probable to be exporters (Mayer, Ottaviano 2008), if we do not control for foreign ownership, then exporting effect might be overestimated.

Figure 1: Exports of firms with foreign participation. Source: Kaminski, Riboud (2000)



Since exporting might have different effect on companies with different ownership structure I will also separate the average effect of exporting and the effect of exporting conditional on a firm being foreign or state owned (the definition of foreign owned firms is given later). I will use domestic owned firms as a base in my estimations.

First, I will establish whether exporters have exceptional firm characteristics and whether there is exporting premia. Then I proceed with testing self-selection hypothesis. I compare exporters before they start exporting to non-exporters. In order to test learning by exporting hypothesis I look at the performance of the firm after it starts exporting. If the hypothesis happens to be accepted then firm performance should go up after entering export market. It is, however, even more interesting to see what the trend of firm performance looks like. It could be the case that firms enter export markets and then experience sudden or smooth increase in performance. It could as well be the case when the firm already was experiencing upward slope in performance and then it is important to know what happens after entering the export market: whether it stabilizes, grows more or even obtains a negative slope. Because the firm could be more productive before entering the export market, it is fundamental to test both of self-selection and learning by doing at the same time.

I will structure my thesis in the following way: in the first chapter, I will discuss the relevant literature and theoretical background to the topic. In the second chapter, I will provide description of the variables and summary statistics for the data. In the third chapter, I propose a method and describe the estimating procedures in details. The fourth chapter provides the results. In the last chapter of my paper I will provide conclusions.

Theoretical Background and Literature Review

Causal relations of export and firm performance were investigated even prior to firm level data availability. Kunst and Marin (1989) conduct macro-level analysis and explore the causal relationship between productivity and export volumes on Austrian data. The research finds evidence of high productivity leading to exports, but no inverse relation. Later, with the availability of firm-level data it became more feasible to investigate the causal links and it is again in the center of attention for researchers.

With the availability of firm level data there is growing number firm-level analyses which. By a number of studies it has been established that exporters are larger, more productive, more skill- and capital-intensive, and pay higher wages than non-exporters. (Bernard, Jensen, Redding, Schott 2007). Exporting itself is a rare activity, however the premia is shown to be high. Based on Bernard, Jensen, Redding, Schott (2007) in U.S., only 18% of manufacturing firms export. But their output is 4.4 times as large as non-exporters'. Exporting firms are more productive and pay higher wages.

Exporting participation can have positive impact on firm performance through many factors. Exporters as a rule face much tougher product competition. Higher competition in turn leads to lower consumer prices and higher quality. On the other hand, exporting expands firm's market. This way firms can benefit from economies of scale. Technological improvement is another positive aspect of exporting. Aw, Roberts and Xu (2008) analyze the relations between exporting and R&D investment. They find that the probability of investing in R&D increases depending on the previous export status of the firm.

Productivity boost can as well be a result of exporting activity through learning-by exporting. This means that firms face tighter competition, import foreign technology. There are ongoing debates on the mentioned hypotheses, the relation of firm performance and involvement in export activities and on establishing causality links.

Bernard and Jensen (1999) found that indeed there is self-selection into export markets: prior to starting export activities future exporters experience rapid growth compared to non-exporters. However, evidence of learning by exporting is indirect. There is no evidence on higher performance after switching to exporter status. The study, however, provides evidence on higher plant survival. Bernard and Wagner (1996) analyzed German manufacturing industries and found that there are significant performance advantages of exporting firms. The study proves that there is high export premia for future exporters, but almost no improvement after start of the exporting activity.

Alvarez and Lopez (2005) test the same two hypotheses on a sample of Chilean plants. They also add another theory that self-selection is actually a conscious process. This is when firm's productivity level is question to its decision to export: a firm is encouraged to increase its productivity before entering export market. The study finds evidence on self-selection and also proves that self-selection can be a conscious process, an attempt of the firm to "fulfill" exporter requirements: to be able to pay fixed costs. Contrary to the previously mentioned studies Alvarez and Lopez (2005) find evidence on learning by exporting. However, it is important to note that productivity gains are in the short run.

In many cases the existing literature suggests very small or even absence of learning by doing. An example of this would be the research by Clerides, Lach and Tybout (1996) on the data from Columbia, Mexico and Morocco.

Wagner (2002) conducted another research in this field. The study used a matched sample of UK manufacturing firms. Even though exporters are superior to non-exporters and they perform better prior to export, it is difficult to say what would have happened if the exporters for some reason did not start exporting. Wagner (2002) by constructing matching sample tries to see what would have happened if the firm reached the "required" performance level but did not start exporting. The study reveals positive effects on growth of employment and wages, however effect on labor productivity is weak. The evidence from Slovenian manufactuiring enterprises also fails to find proof of leraning-by-exporting (Damijan, Kostevc 2006) . Another test of the learning by exporting was conducted on the sample of African SMEs (Boermans 2010). The study showed strong evidence on learning by exporting. However, we have to account for the fact that the sample of firms used for this study is considerably different from the previously discussed papers.

Baldwin and Gu (2003) explore the linkages between export market participation and productivity performance in Canadian manufacturing plants. They find evidence that export participation is associated with improved productivity. They also analyze the effect of foreign ownership and conclude that effect of exporting is much stronger for domestic firms.

Although there is extensive literature on the question of causal relations of exporting and performance there is no stylized fact on it. In sum, most of the studies find evidence on self

selection hypothesis. Evidence on learning-by-exporting is rather ambigious. However, it is important to keep in mind that these findings are most likely country-specific.

The contributuion of this research is to directly test the learning by doing and self-selection hypothesis on Hungarian manufacturing firms data, separating ownership effect from the effect of exporting.

Data Description

The data used for this study are a micro-level data on Hungarian manufacturing firms covering period of 1992-2005. It includes manufacturing industries NACE 15-36. The dataset is originally obtained from Hungarian Tax Authority (APEH). The data contain total net revenue sales, net nominal export sales, firm's tangible assets and material costs, number of registered employees, ownership status: foreign, domestic and state, and industry codes. The dataset is unbalanced panel.

As a measure of output I use total net revenue from sales. For capital, I use the value of tangible assets taken as average between two evaluations: current and the year before. Employment variable is yearly average statistical number of employees including workers on temporary leave. For sales, tangible assets and costs of materials and material services I use GDP implicit price deflator and convert all the variables to 2005 forints. I also create a labor productivity variable, defines as sales divided by employment, and capital per worker.

The data have been cleaned to remove inconsistencies and broken linkages[1]. Only firms which have complete observations for the output variable are kept in the dataset. In order to clean the data from firms that stayed in business for very short period and then went out of it I have dropped firms that don't stay more than two years. I also try to identify firms from the sample that have obvious mistakes in the observations like negative values or shares, which are

[1] For detailed discussion see Brown, Earle and Telegdy (2006)

more than one. The sample contains 163,147 observations and 29,544 firms out of which 5,278 have at least once been identified as an exporter (see the definition of an exporter later). In order to get rid of firms that do not stay in market for long I delete firms that stay in the business less than two years.

Although the data have been cleaned it might still possibly suffer from measurement errors. For instance, firms might underreport the number of employees due to the fact that some were not legally registered. It could as well suffer from other under or over reported values. However, due to the size and time span of the sample I believe those errors are irrelevant.

I generate ownership dummies for every firm. I define a firm as state owned if the number of shares owned by the state is more than private, private being sum of domestic and foreign shares together. If private ownership exceeds state, then I set the dummy for state ownership to be zero and compare domestic and foreign. If a firm is privately owned, then it is defined as foreign owned if foreign shares are more than domestic. The firm is defined as domestically owned if domestic shares exceed foreign.

The main variable of interest, a dummy indicating if a firm is considered an exporter in the given year, is not that straightforward, and requires special attention. I define this threshold for exporters as total exports of more than 5% of the firm's total sales. In order to avoid giving exporter status to fast quitters I also impose additional restrictions on the definition of exporter. A firm is considered an exporter in the given year if it exports more than 5% of its output for two consecutive years. Since the majority of the In this case the variable exporter equals 1 and otherwise it is 0. I also set a firm an exporter in the given year even if it did not export but

exported in the previous and following years. This is done in order to control for the cases when a firm is basically an exporter but had an exporting gap due to some external shocks.

Descriptive Statistics

Descriptive statistics are presented in the Appendix A in Table A1 – Table A6. Table A1 contains summary statistics for selected years for output, employment, capital, material costs, cost efficiency and labor productivity. From this table one can note consistent declining employment level.

Table A2 provides mean comparisons of exporters to non-exporters for main variables of interest. It confirms that exporters have higher firm characteristics than non-exporters. Exporters have much larger output, and size, have higher labor productivity and cost efficiency. They are also more capital-intensive.

From Table A3 provides yearly statistics on the total number of firms, exporters and non-exporters. Table 4 analyzes yearly data on the number of foreign owned exporting firms. Overall there are 2929 foreign owned firms out of which 1815 are exporters. This means that 61% of all foreign owned firms are involved into exporting activity. Since there are so many foreign owned firms among exporters, it becomes very important to analyze the relation of it to output and exporting activity. Both number of foreign firms and number of foreign firms that export increase with time, which is evidence of trade liberalization.

Table A5 provides industry-level statistics of total number of firms and share of exporting firms in them. It also draws parallel between employment levels for exporter and non-exporters. From this table it is clear that exporters employ much higher number of people than non-exporters, have higher sales and productivity. The table reports that Hungarian exports are concentrated mostly around manufacturing of motor vehicles, trailers and semi-trailers, manufacturing of chemicals and chemical products, and basic metals.

Table A6 provides industry level statistics by ownership type. The industries that have a high number of foreign owned firms are those, which concentrate the largest number of exporters in them. This clearly shows that there is relation between foreign ownership and involvement into exporting activity.

Empirical Methodology

I will use Pooled OLS and Fixed Effects estimation methods. One of the main problems in capturing effect of being and exporter is selection bias. Since main characteristics of exporters and non-exporters differ substantially, it is important to account for selection bias. OLS does not control for selection into exporting I use Fixed Effects method, which will reduce selection bias. Firm performance can be highly responsive to different kinds of policies, economics shocks. This causes endogeneity problem. Therefore, I include a set of industry-year interactions to control for time fixed effects and industry-year shocks.

My first estimation procedure consists of establishing exporter premia. Following Bernard and Wagner (1996) in order to find exporter premia, I regress firm characteristics on exporter status dummy with industry-year interactions controlling for firm size.

$$\log(X_{it}) = \alpha_t + \beta_1 Export_{it} + \beta_2 \log(labor_{it}) + \mu IY_{it} + U_{it} \quad (1)$$

Where X is a characteristic of firm *i* for year *t*, μIY_{it} are industry-year interactions, $Export_{it}$ is a dummy for exporter status of firm *i* in year *t* this.

Due to established exceptional exporter characteristics, it is now important to find if prior to export start exporters and non-exporters differed substantially. Since I use longitudinal data that contain more than several years of pre-export data I can test the self-selection hypothesis comparing never exporting firms to the "non-exporting" years of the exporting firms. I construct a new sample of exporting firms. The sample contains firm-years before the exporter actually

enters export markets. I compare this sample of future exporters to never exporters. I estimate OLS with industry-year interactions.

$$\log(X_{it}) = \alpha_t + \beta_1 Fut\_Exporter_{it} + \mu IY_{it} + U_{it} \quad (2)$$

Where X is a characteristic of firm *i* for year *t*, *Fut_Exporter* is a dummy variable indicating whether a firm is a future exporter or no. The coefficient on *Fut_Exporter* will determine the level of self-selection.

All of the equations are based on Cobb Douglas production function estimation. I augment the production function with ownership statuses of the firm and my variable of interest, a dummy indicating whether a firm is an exporter in the given year. I include industry year interactions to control for time varying industry effects in all of my regressions.

$$\begin{aligned}\log(X_{it}) = \alpha_t + \beta_1 Export_{it} + \beta_2 \log(labor_{it}) + \beta_3 \log(capital_{it}) + \\ + \delta_5 Foreign\_own_{it} + \delta_6 State\_Own_{it} + \mu IY_{it} + U_{it}\end{aligned} \quad (3)$$

Where X_{it} is the firm characteristic in time t (output measured by sales), $Export_{it}$ is a dummy for whether the firm is defined as an exporter this particular year.

The same model I estimate adding material costs to the production function.

$$\begin{aligned}\log(X_{it}) = \alpha_t + \beta_1 Export_{it} + \beta_2 \log(labor_{it}) + \beta_3 \log(capital_{it}) + \beta_4 (Material\_Costs) \\ + \delta_5 Foreign\_own_{it} + \delta_6 State\_Own_{it} + \mu IY_{it} + U_{it}\end{aligned} \quad (4)$$

In order to see the dynamics of firm behavior prior to and after entering export markets and possibly see self-selection and learning by doing effect in the sample, I use a model with dynamic specification. This will allow us to see in one regression self-selection and learning by

exporting effects, whereas in the static model it was not possible to see. Pre export dynamics will provide information whether firms were improving prior to export start or not. Post Export dynamics will show if firm performance improves after export start. The magnitudes of dummy variables' coefficients will show us performance dynamics of the firm prior to and after starting exporting. I follow the method in used in by Brown, Earle, Telegdy (2006). I augment production function by dummies for 5 years prior and 5 years after export start. I use Pooled OLS and Fixed Effects with industry-year interactions.

$$\log(X_{it}) = \alpha_t + \beta_1 Export_{it} + \beta_2 \log(labor_{it}) + \beta_3 \log(capital_{it}) + \beta_4 (Material\_Costs) + \delta_1 Foreign\_own_{it} + \delta_2 State\_Own_{it} + \gamma_1 Fut\_Exp_{it-5} + ... + \gamma_5 Exporter_{it} + ... + \gamma_{10} Fut\_Exp_{it+10} + \mu IY_{it} + U_{it} \quad (5)$$

The dummies that use in the dynamic specification are set in the following way: Exporter (t-5…) equals one if the firm will start to export in 5 or more years, Exporter (t-4…) equals 1 if the firm will start exporting in 4 years…, Exporter (t) equals 1 if the given year is start year for the firm. I add these variables until Exporter (t+5…) = 1 if the firm has started 5 or more years ago. The enhancement of the model with these dummies makes it possible to see self-selection and learning by exporting at the same time.

The last model I estimate is in order to separate the effect of exporting conditional on ownership type. To the production function with ownership and export dummies, I add two interaction variables: exporter and foreign ownership interaction and exporter and state ownership interaction.

$$\log(X_{it}) = \alpha_t + \delta P + \beta_1 Exporter_{it} + \beta_2 State + \beta_3 Foreign + \beta_4 ForeignXExporter + \beta_5 StateXExporter + \mu IY_{it} + U_{it} \quad (6)$$

This model allows us to see how the effect of being an exporter differs with ownership types and whether firms with certain ownership benefit more. I will report the results in the next chapter.

Empirical Results

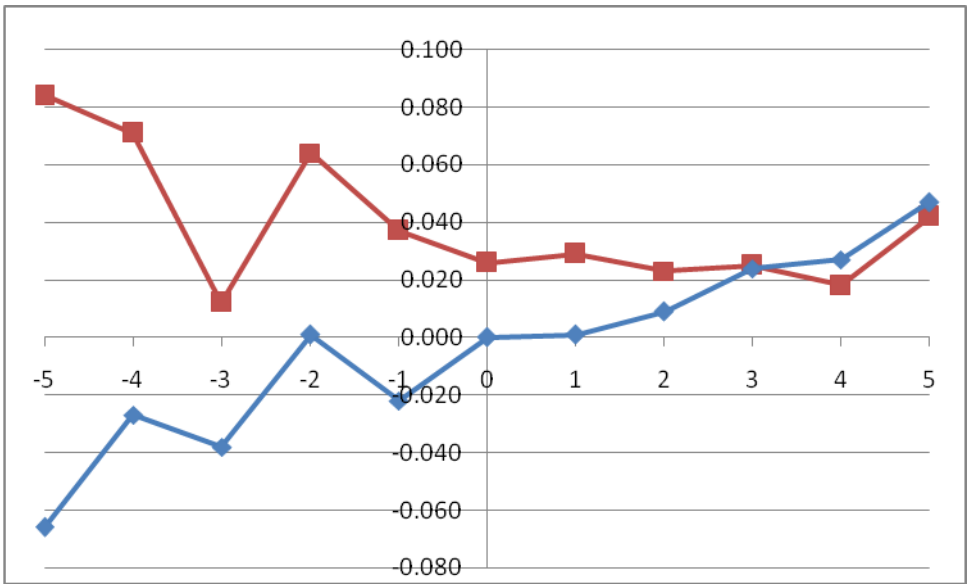
I provide the tables for the estimation results in the Appendix B. All regressions tables report heteroskedasticity-robust standard errors. First, I report estimates for export premia. Table B1 provides exporter premia for sales, employment, and capital, capital per a worker, material costs, and labor productivity. The results of the regression have positive coefficients, which are strongly significant at any conventional significance level. The regressions state that sales are on average 34 percent higher for exporters than for non-exporters. Exporters have 48 percent more tangible assets and 166 percent more employment. Labor Productivity is 43 percent higher for exporters. Part of the productivity premia, however, might due to increased capital intensity (Bernard, Wagner 1996). These values show that indeed exporters on average perform significantly better than non-exporters.

Although the existance of export premia proves the superior performance of exporters the causal links cannot be seen from the the regression of equation (1). Table B2 provides OLS regression for comparison of future exporters and never exporters. This allows us to see whether future exporters were superior to never exporting firms even before they enter export markets. The estimates for self-selection hypothesis are as follows. Future exporters have 88 percent higher sales revenues, and are 69 percent larger in tems of employment than never exporting firms. The coefficients suggets that exporters are 36 percent more capital intensive and 19 percent more productive. These coeffcients are strongly significant on any conventional significance level and provide incontestable evidence of self-selection into exporting markets.

Table B3 provides results for the basic production function with exporter status and ownership of the firm. Both OLS and Fixed Effects are reported with and without material costs. Adding material costs decreases coefficient for exporter status in both models. OLS estimation implies 3 percent positive exporter effect. Fixed Effects estimation suggests that exporter effect is 7 percent. All of the coefficients in the regressions are highly significant. However, these results cannot capture separate effect of benefiting from exporting after the entering export market or having higher level of performance prior to exporting. These effects are separated by the dynamic model.

Table B4 present estimates of the dynamic model. Figure 2 presents the plot of coefficients of the dynamic model for OLS and Fixed Effects. The level of estimated effects differs for OLS and FE methods, however there is some co-movement between them. Fixed effects estimation shows evidence of self-selection and learning by exporting at the same time. From the graph it is seen firms increase their performance prior to export market entrance and then there is still substantial increase after exporting start. This confirms positive impact of exporting on firms. Fixed Effects coefficients on dummies form (t+1) to (t+5…) establish evidence of learning by exporting effect in the long run. The coefficient on every next dummy gets bigger in the magnitude. The coefficients on the last 3 years of the dummies are significant at any conventional significant level. However (t+1) and (t+2) are insignificant. Contrary to previous studies (Alvarez, Lopez 2005), the estimation finds positive results of exporting for a longer time span.

Figure 2: Dynamics of exporter effect



Blue Line – Fixed Effects
Red Line - OLS

Exporting can possibly have different effects on different types of firms: some can benefit more, some less. This might be because some firms are already technologically advanced, they have enough market share already in the home country, and they already possess knowledge that they can possibly get from export start. By interacting export and ownership statuses of the firm I separate the effect of exporting on certain types of firms from average effect.

Table 9 shows the estimates of equation (6) by OLS and FE with industry-year interactions. The coefficient on the state dummy variable and exporter status interaction are negative and insignificant for both OLS and FE estimations. Negative sign shows that state

owned companies benefit less from exporting. If we take a look, at the summary statistics of the sample there only 521 state own exporter firms out of total 29544 firms.

OLS estimation provides that foreign owned firms on average benefit less than domestically owned firms. The coefficient is significant on any significance level. However, Fixed Effects estimation method provides very small and insignificant coefficient. Therefore, OLS and FE estimation methods state that foreign owned firms do not benefit more than domestic. Baldwin and Gu (2003) on the other hand, find very strong difference between effect for domestic and foreign owned firms: domestically owned firms benefit much more.

Conclusions

In this paper I established causality links between exporting and firm performance. For this reason I estimate average exporter premia. I have found quite substantial exporter premia. Exporters on average perform significantly better than non-exporters. In order to find the causal relationship between exports and performance I compare future exporters before export start to never-exporting firms. I find that future exporters show higher 19% productivity prior to export start. I find that future exporters have better characteristics in terms of sales, employment, capital, material costs and labor productivity. This serves as evidence of self-selection into export markets.

In order to test learning by exporting and self-selection I use dynamic specification of the model and control for year dummies five years prior to and after starting exporting activity. The model gives evidence of some selection prior to export and evidence on learning by doing hypothesis, which means that more productive firms self-select themselves and there is also increase in firm performance after starting exports.

I also separate exporting effect for firms with different types of ownership. OLS and FE estimations show that state owned firms benefit from exporting less than domestic firms. Foreign firms do not benefit more than domestic firms. This could be due to the fact that foreign firms already obtain the technology and knowledge that comes as a result of learning by exorting, and therefore, they benefit less than domestic firms.

Future research should focus on estimating the effect of exporting on a matching sample of firms. This way it is possible to find what would have happened to a firm did it not enter the export market.

Appendix A

Table A1: Summary statistics for production function variables for selected years

Firm characteristics/ Year	Output	Capital	Employment	Material Costs	Cost Efficiency	Labor productivity
94	989.3 (18026.9)	613.5 (16621.0)	78.3 (337.4)	508.1 (7127.7)	0.4 (0.3)	14.3 (52.3)
96	890.2 (17362.9)	363.0 (9438.5)	67.0 (292.0)	460.5 (6857.2)	0.5 (2.0)	13.7 (136.5)
98	817.3 (16561.3)	293.1 (8521.)	57.6 (262.5)	420.3 (6332.5)	0.5 (0.4)	11.7 (31.4)
2000	771.4 (13686.7)	247.4 (5137.3)	50.1 (255.8)	442.2 (7690.0)	0.5 (0.4)	12.4 (41.5)
2002	733.8 (19378.7)	242.3 (5736.1)	38.0 (183.2)	421.2 (7791.9)	0.5 (0.5)	12.8 (38.9)
2005	513.3 (13672.6)	156.8 (3148.2)	22.6 (151.3)	316.9 (8890.3)	0.6 (2.3)	10.9 (30.1)

Note: Output is measured in sales, capital is expressed in average of tangible assets, employment – average number of employers, costs – material costs. Output, capital and costs are measured in 2005 prices in mln HUF.

Table A2: Exporter and non-exporter average firm characteristics comparisons

	Exporters	Non-exporters
Output	2889	205
Capital	1041	65
Employment	155	19
Costs	1651	103
Cost Efficiency	0.5	0.57
Labor Productivity	14	12

Table A3: Number of exporting firms by year

Year	Non-exporters	Exporters	Total Number of Firms	% of exporters
92	4,189	1,242	5,431	23
93	4,876	1,696	6,572	26
94	5,257	1,825	7,082	26
95	5,521	1,977	7,498	26
96	6,035	1,977	8,213	24
97	6,806	2,336	9,142	26
98	7,363	2,470	9,833	25
99	7,797	2,544	10,341	25
100	8,577	2,617	11,194	23
101	10,160	2,731	12,891	21
102	11,427	2,770	14,197	20
103	12,724	2,743	15,467	18
104	20,258	2,774	23,032	12
105	19,866	2,388	22,254	11

Table A4: Number of exporting firms by foreign ownership

YEAR	Number of foreign owned firms	Number of foreign owned firms that export	% of exporters among foreign owned firms
92	863	437	51
93	1,034	565	55
94	1,100	638	58
95	1,187	726	61
96	1,257	807	64
97	1,304	845	65
98	1,352	883	65
99	1,395	916	66
2001	1,449	939	65
2001	1,493	967	65
2002	1,504	963	64
2003	1,446	943	65
2004	1,530	921	60
2005	1,428	818	57

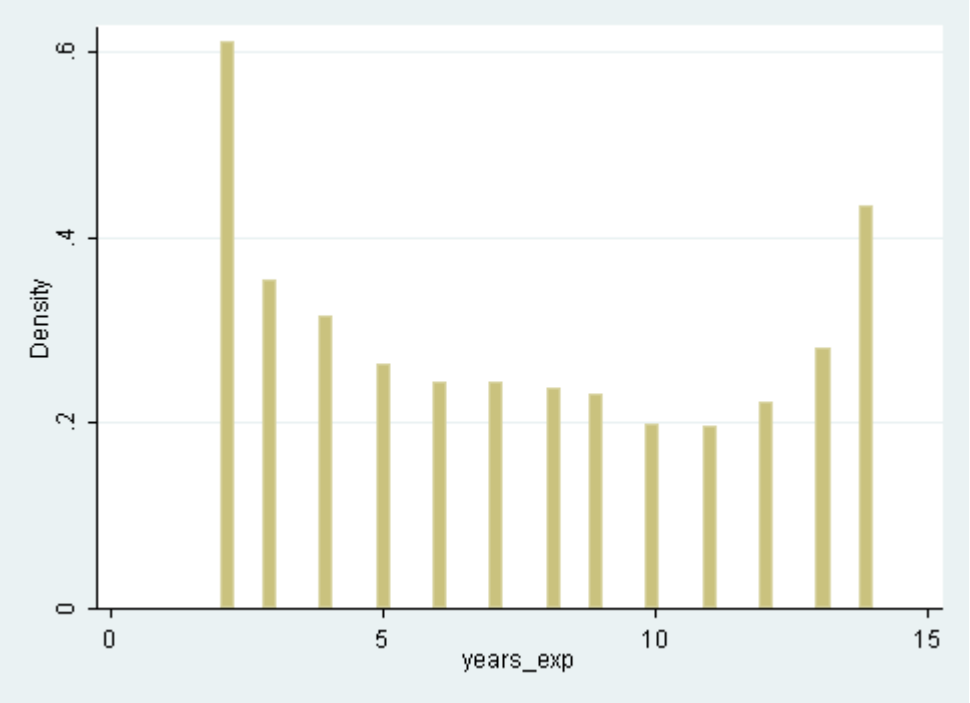
Table A5: Descriptive statistics by industry

Statistics by industry	Total number of firms	% of exporters	% share of export sales in total sales	Average emp. Non-exporters	Average emp. Exporters
15 Manufacture of food products and beverages	2994	16	6.5	41.7	246.8
16 Manufacture of tobacco products	5	80	10.0	432.6	193.4
17 Manufacture of textiles	1155	29	19.9	22.1	154.3
18 Manufacture of wearing apparel; dressing, dyeing of fur	1924	25	24.3	20.6	166.6
19 Tanning and dressing of leather; manufacture of luggage, handbags, saddlery and footwear	483	41	32.0	33.5	135.5
20 Manufacture of wood & wood products except furniture	2150	15	10.2	13.3	65.2
21 Manufacture of pulp, paper and paper products	400	21	7.3	39.3	185.3
22 Publishing, printing & reproduction of recorded media	4773	4	1.4	10.7	66.3
23 Manufacture of coke, refined petroleum products and nuclear fuel	11	27	6.5	240.1	7223.0
24 Manufacture of chemicals & chemical products	517	35	13.3	28.0	340.5
25 Manufacture of rubber & plastic products	1500	27	12.8	14.5	82.9
26 Manufacture of other non-metallic mineral products	1115	16	8.9	26.1	189.1
27 Manufacture of basic metals	294	46	27.9	31.9	231.5
28 Manufacture of fabricated metal products, exc. machinery	4831	21	12.8	13.4	70.8
29 Manufacture of machinery & equipment n.e.c	2999	22	12.4	15.1	114.0
30 Manufacture of office machinery and computers	223	13	8.9	8.7	516.5
31 Manufacture of electrical mach. & apparatus n.e.c.	949	21	15.4	18.6	396.6
32 Manufacture of radio, tv, communication equipment	728	23	17.9	17.6	207.2
33 Manufacture of medical, precision & optical instruments, Watches	1329	15	8.6	11.1	73.3
34 Manufacturing of motor vehicles, trailers and semi-trailers	271	44	31.0	25.1	241.6
35 Manufacture of other transport equipment	175	26	14.4	28.9	137.2
36 Manufacture of furniture	2272	14	10.1	11.6	87.9

Table A6: Descriptive statistics by industry and ownership

Industries/ownership types	Domestic	Foreign	State	%Foreign
15 Manufacture of food products and beverages	2790	324	210	11
16 Manufacture of tobacco products	3	4	-	-
17 Manufacture of textiles	1027	160	62	15
18 Manufacture of wearing apparel; dressing, dyeing of fur	1792	200	41	11
19 Tanning and dressing of leather; manufacture of luggage, handbags, saddlery and footwear	402	103	17	25
20 Manufacture of wood & wood products except furniture	2044	154	43	7
21 Manufacture of pulp, paper and paper products	359	52	18	14
22 Publishing, printing & reproduction of recorded media	4560	340	126	7
23 Manufacture of coke, refined petroleum products and nuclear fuel	10	3	2	25
24 Manufacture of chemicals & chemical products	450	92	49	18
25 Manufacture of rubber & plastic products	1344	238	43	17
26 Manufacture of other non-metallic mineral products	1019	136	71	12
27 Manufacture of basic metals	263	47	26	16
28 Manufacture of fabricated metal products, exc. Machinery	4552	399	116	9
29 Manufacture of machinery & equipment n.e.c	2760	294	130	10
30 Manufacture of office machinery and computers	205	20	3	10
31 Manufacture of electrical mach. & apparatus n.e.c.	835	131	27	15
32 Manufacture of radio, tv, communication equipment	648	103	25	15
33 Manufacture of medical, precision & optical instruments, Watches	1261	96	54	7
34 Manufacturing of motor vehicles, trailers and semi-trailers	212	63	15	28
35 Manufacture of other transport equipment	161	20	11	12
36 Manufacture of furniture	2165	154	27	7

Graph A1: The average number of years firms stay as exporters



Appendix B

Table B1: Exporter Premia for different firm characteristics

	Log Sales	Log Employment	Log Capital	Log Material Costs	Capital per worker	Log Labor Productivity
Exporter Status	0.343***	1.658***	0.475***	0.319***	0.475***	0.343***
	(0.016)	(0.027)	(0.022)	(0.019)	(0.022)	(0.016)
Observations	149,549	149,627	111,016	149,207	111,016	149,549
R-squared	0.729	0.311	0.648	0.683	0.118	0.144

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

Table B2: Testing self-selection

	Log Sales	Log Employment	Log Capital	Log Material Costs	Capital per worker	Log Labor Productivity
Future Exporter Dummy	0.883*** (-0.017)	0.690*** (-0.013)	0.989*** (-0.024)	1.008*** (-0.02)	0.364*** (0.033)	0.193*** (-0.011)
Observations	128,611	116,240	84,122	128,037	79,033	116,165
R-squared	0.171	0.192	0.176	0.146	0.089	0.118

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

Table B3: Static model OLS and FE with industry-year interactions

Log Sales	OLS	OLS	FE	FE
Log Employment	0.656***	0.235***	0.609***	0.298***
	(0.007)	(0. 005)	(0.001)	(0.008)
Log Capital	0.298***	0.108***	0.152***	0.074***
	(0.004)	(0. 003)	(0.005)	(0.004)
Log Material Costs		0.593***		0.483***
		(0. 004)		(0.007)
Exporter	0.071***	0.033***	0.129***	0.065***
	(0.015)	(0. 009)	(0.012)	(0.008)
Foreign Ownership	0.329***	0.218***	0.075***	0.046***
	(0.022)	(0. 014)	(0.021)	(0.018)
State Ownership	-0.321***	-0.189***	-0.171***	-0.097***
	(0.05)	(0. 027)	(0.03)	(0.022)
Observations	110,967	110,843	110,967	110,843
R-squared	0.792	0.898	0.401	0.632
Number of id			24,044	24,007

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

Table B4: Dynamic specification. Pooled OLS and FE with industry-year interactions

	OLS	FE
Exporter (t-5…)	0.084***	-0.066***
	(0.035)	(0.016)
Exporter (t-4)	0.071**	-0.027
	(0.028)	(0.019)
Exporter (t-3)	0.012	-0.038**
	(0.025)	(0.016)
Exporter (t-2)	0.064***	0.001
	(0.021)	(0.014)
Exporter (t-1)	0.037**	-0.022*
	(0.018)	(0.013)
Exporter (t)	0.026*	
	(0.015)	
Exporter (t+1)	0.029***	0.001
	(0.010)	(0.010)
Exporter (t+2)	0.023**	0.009
	(0.010)	(0.010)
Exporter (t+3)	0.025**	0.024**
	(0.011)	(0.010)
Exporter (t+4)	0.018	0.027**
	(0.011)	(0.011)
Exporter (t+5…)	0.042***	0.047***
	(0.006)	(0.010)
Log Employment	0.235***	0.300***
	(0.002)	(0.003)
Log Capital	0.107***	0.074***
	(0.002)	(0.002)
Log Material Costs	0.593***	0.483***
	(0.002)	(0.002)
Foreign Ownership	0.219***	0.050***
	(0.006)	(0.010)
State Ownership	-0.187***	-0.091***
	(0.017)	(0.015)
Observations	110,843	110,843
R-squared	0.898	0.632
Number of id		24,007

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

Table B5: Ownership vs. Exporter Effect Separated

Log Sales	OLS	FE
Log Employment	0.235***	0.298***
	(0.005)	(0.008)
Log Capital	0.108***	0.074***
	(0.003)	(0.004)
Log Material Costs	0.592***	0.483***
	(0.004)	(0.007)
Exporter	0.073***	0.066***
	(0.024)	(0.009)
Foreign Ownership	0.348***	0.046***
	(0.035)	(0.023)
State Ownership	-0.182***	-0.089***
	(0.026)	(0.031)
Foreign X Exporter[1]	-0.219***	-0.000
	(0.042)	(0.021)
State X Exporter[2]	-0.031	-0.017
	(0.032)	(0.037)
Observations	110,843	110,843
R-squared	0.898	0.632
Number of id		24,007

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

[1] Foreign ownership and exporter dummies interacted

[2] State ownership and exporter dummies interacted

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