EMPLOYMENT EFFECTS OF EXPORTS IN MANUFACTURING INDUSTRIES IN UKRAINE

by

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ABSTRACT

With appearance of the long-term panel data increasing number of studies have been done to reveal the effects of trade liberalization and exports on characteristics of domestic firms. Collapse of USSR and sudden trade liberalization of former socialist countries creates a wide area for research of the trade effects on the national economy. In this research I would like to focus on the possible employment effects experienced by Ukrainian manufacturing enterprises - exporters in 1998-2006. After estimating various models' specifications I find consistent evidence on the positive impact of exports on the employment level of enterprise. I draw conclusion that as firm becomes more involved into exporting activity, it eventually shifts to more intensive production scheme.

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CONTENTS

1. INTRODUCTION

Exporters are usually regarded as a distinct category of enterprises as they are considerably larger and more productive than the local ones. They have higher revenues, better survival chances and employ nonproportionally large part of country's labor force as compared to their number.

There exist a wide literature focusing on possible consequences of the trade reforms on firm's productivity but just a small part of it concentrates on the firm-level employment effects of exporting. Collapse of USSR in 1991 and sudden openness of former socialist republics to international trade provides useful example of the natural experiment which may shed the light on the possible effects of exporting activity on firms characteristics.

Among the former socialist republics Ukraine is the one providing vivid example of large industrial economy moving from trade isolation to export orientation. Thank to its natural potential, during USSR Ukraine served as a major supplier of agricultural, mining, chemical, steel and machine-related products. Following the system collapse, Ukraine had possessed the production powers significantly exceeding the domestic demand which, combined with cheap qualified labor force, created favorable conditions for export development. However, due to political and economical factors these opportunities was realized much later. In the beginning of the 90-s Ukraine sank into deep recession, with companies drastically decreasing production, shedding employment or going bankrupt (see Graph 1). This situation was even worsened by slow privatization and so called "property redistribution" process (Atanas Christev and Lehmann (2005)). Despite formal openness of borders, foreign trade was still stagnant (see Graph 2 for dynamics of Ukrainian exports and imports until 2000).

Evaluation of the employment effects of exports is potentially very rich and important field for research since the results may be employed in a number of government policies such as encouraging firms to become exporters in order to reduce unemployment.

Current research focuses on the employment effects of exporting in Ukrainian manufacturing sector during 1998-2006. The large firm-level panel data includes almost all

manufacturing industries in Ukraine during the given time period and is expected to provide very precise firm-level and industry-level results. The period from 1998 to 2006 is particularly suitable for the analysis as it omits immediate shocks and recession period after USSR breakdown that has had systematically different conditions as compared to the post-1998 years. And, last but not the least, manufacturing sectors are the ones contributing to the exports volumes of Ukraine most (DerzhComStat).

This research is pioneering since despite significant role of exports in Ukrainian economy only one study has investigated its employment effects so far. The structure of this thesis is as follows. The first section consists of discussion of theoretical background and literature review. In the second section I describe Ukrainian historic and economic specifics which influenced its development as an exporter country, and national employment restructuring. Fourth section is devoted to the data summary and description of the used variables. In the fifth section I describe potential estimation problems, give justification of the methodology used and select models for estimation. In the final section I provide the results of regression analysis and discuss them.

2. THEORY DISCUSSION AND LITERATURE REVIEW

The advantages of exporting which can motivate firm to become exporter are multiple and diverse. The most obvious are expansion of the consumer base and increase in profits which follows from successful entrance on the market of other countries. In return, increase of output is likely to further scale effect and reduce marginal costs of production. This, as well as the technical and labor resources which become available on the foreign market may lead to shift towards more efficient production. There also exists possibility of so called "learning-by-exporting" or spillovers which are said to appear from observing actions of other multinationals and emerge in a form of new technologies, workers training strategies of other multinationals. Though their real existence is still the topic of many debates, spillovers are assumed to lead to innovations and productivity increase in the enterprise. Higher demands and competitive pressure are the other reasons for firm to impose its performance, which overlap with increasing competitiveness of exporter on its domestic market. Another, more elicit reason is risk diversification of company's sales and sources of revenue which increase survival chances of firm during market shocks.

One of benchmark theories in trade economics by Melitz (2003) predicts that firm starts to export after achieving the output and efficiency level sufficient to pay fixed costs of entrance on the foreign market and maintaining minimum profit condition. Thus, in order to become exporter firm has to be large and productive. All previous studies done exploring this question are univocal in finding employment, productivity, innovations and other premia of exporters as compared to local firms. Moreover, Bernard and Jensen (1999) in their analysis of US firms prove that size of future exporters is significantly higher already a few years before the start of exporting. Bernard and Jensen (1999) define this as the evidence of firm's self-selection into exporters. Similar evidence was found by Kramarz (2004) for France, Bernard and Wagner (1996) for Germany, Ibsen et al. (2009) for Netherlands, Anze Burger and Rojec (2008) for Slovenia, Onaran (2007) for eight CEE countries, and others. Hallward-Driemeier et al. (2002) analyzing firm-level data from five Asian countries state that advantages of future exporter are formed this is

firm's decision to start exporting which reflects on its strategies concerning production, investment and quality of work force.

However, if size, growth and other premia of future exporters are considered almost as axiom, the dynamics of employment change after firm actually becomes an exporter are not so straightforward. When firm enters international market its employment can react in the following ways. On one hand, firm may continue following extensive way of increasing output by increasing employment. On the other hand, competition with other multinationals, possible spillovers and demands of the foreign markets may shift firm towards more intensive production by applying new, more efficient technologies of production or training employees to achieve greater value added. In this case the total employment of firm is likely to shrink or at least remain unchanged since the production of same amount of the output will require fewer employees and, having more qualified workers, firm may shed part of the current labor force. Finally, there is also possibility that output volume and quality of the product are sufficient to recover fixed costs of exporting and meet competition pressure, so employment will grow just at the economy growth rate.

Since effects of exporting may change over time, dynamic analysis gains exceptional importance. Analyzing data for German manufacturing sector, Bernard and Wagner (1996) find small employment growth premium prior to and no significant premium after start of exporting neither in short nor in long run. Contrary to that, Bernard and Jensen (1999) in their extensive analysis of US manufacturing firms verify that exporters employ significantly more workers both before and after exporting start, though the growth rate of employment starts to decline after the first year of exporting, still remaining positive. Anze Burger and Rojec (2008) find similar growth patterns for Slovenia and conclude that "exporting is an important generator of new employment and a catalyst for redeploying labor from less to more efficient firms". The latter argument coincides with the trade theory predictions.

Analysis of employment in former socialist countries requires additional consideration of the fact that these economies experienced sudden shift from autarky to open market. Hecksher-Ohlin theory predicts that in this case country will specialize in the exports of the product, production of which requires intensive usage of country's abundant factor. conditions the sizes of some industries will change according to the factor the country

is abundant with. For instance, if country is labor abundant, it will have international advantage in the labor-intensive sectors because of lower price of labor. The price advantage will promote the labor-intensive sectors and depress capital-intensive sectors with workers shifting from the latter to former. If country is capital-abundant, it is going to export more capital-intensive goods and the direction of workers flow will be opposite to the previous case. However, though being rather plausible and logical, this theory works only occasionally due to its assumptions of identical production technology, constant return to scale, labor, capital immobility between countries, and perfect competition on the domestic market.

Michaely et al.(1991) investigate numerous cases of trade liberalization in the developing countries and conclude that its employment effects are always positive or neutral. More recent research on the developing countries (World Bank Report (2004)) confirms that capital-intensive and state protected industries in the economies which have little other resources except for labor, are vulnerable to trade liberalization. Ernst (2005) in his research on the employment effects of trade liberalization in Latin America, concludes that it caused increase of unemployment in low and medium labor-abundant Argentina and Brazil. Unlike them, Mexico has enjoyed employment rise since its export was produced mostly from imported raw materials.

Existing literature on employment effects of exporting in Ukraine is very scarce. Atanas Christev and Lehmann (2005) look on the of trade liberalization in 1993 from job creation and destruction point of view. They analyze three-digit industrial sectors and show that job destruction consistently exceeds job creation. However, as Ukraine becomes more open to the international markets, job creation and reallocation increases. Disaggregation the effect by geographical direction of exports, they conclude that sectors exporting to CIS have declining job destruction trend, while trade with EU countries leads to more job destruction and reallocation, which may be the consequence of competition pressure.

3. UKRAINIAN SPECIFICS

As part of USSR, Ukraine was considered the second largest producer of industrial and agricultural products. A number of powerful mining, chemical, metallurgical and machine-building enterprises have been established in Ukraine since 1930-s to utilize its rich mineral resources, making the country important part in industrial production chain of USSR. Industrial centers in Ukraine, concentrated mostly in its Eastern part, were complimented by corresponding research, technical and educational institutions. On the other hand, as typical for USSR, industrial development was carried by extensive means resulting in high labor and energy intensity. Light industries and service sectors were weakly developed. Enterprises were state-owned and there existed full employment policy similar to other socialist countries.

Since Ukrainian economy had heavily depended on its industrial powers, industrial crisis became the backbone of Ukrainian recession in 1991. Separation of USSR into individual countries broke the existing full cycle production system between them and shifted the given relationships to the exports-imports field. Production powers in metallurgical, chemical, machine-building and agricultural spheres exceeded Ukrainian domestic demand several times, however, the exporting potential of these industries remained undeveloped during the first half of 90-s. Sharp increase of energy prices amplified by inflation was another reason for drop in production in energy-intensive enterprises of the mentioned industries. Outdated legislation on the foreign trade, firm and land ownership, undeveloped market mechanism also slowed down the openness of economy to the foreign trade. Since the quality and certification of Ukrainian exports did not correspond to the required international standards, Ukraine could not first compete on the world markets, while CIS countries decreased their demand because of the similar economical downturn they were experiencing.

Growth of unemployment after transition was natural after termination of full employment policy. The manufacturing industries were subjects to heavy subsidizations during Soviet times, so when both government financial support and market demand declined, it

caused dramatic drop of the output and large labor layoffs on enterprises. There were also many cases of firms going bankrupt which led to unemployment of all workers. Replacement of lost manufacturing jobs was especially difficult in the small cities situated close to large industrial objects which employed most of the city's population (the examples of such cities are Energodar near Zaporozhskaya nuclear plant or Nikopol near Nikopol Ferrous Alloy). Other reasons of manufacturing employment decline, specific for Ukraine as transition country, were shift of workers to service sectors or self-employment which started to develop only at 90-s.

Manufacturing employment has declined significantly from 5,75 million people (1991) to 3,35 mln (1996) with average yearly growth rate -8.5% and from 3,07 mln (1998) to 2,33 mln (2006) with average yearly growth rate -3.8% (see Graph 1, however, it does not include agricultural employment). Nevertheless, it may be argued that if critical drop during first years of transition was caused by structural unemployment, shedding excess employment, typical during transition, the gradual downward trend afterwards was because of the technical upgrades and increasing efficiency of production. Graph 3 depicts that since 1998 capital investments have been consistently higher than those from the previous year. Though these statistics correspond to the whole economy, it may also be considered true for manufacturing sector, as the focus of Ukraine's exports has been gradually shifting from CIS countries to EU, each of them accounting for 35% share of Ukrainian exports (see Graph 2) which signaled upgrade in the quality of exporting production. After manufacturing employment stabilized in 2000 (see Graph 1), it continuously stayed on level of approximately 17% of total employment(ILO).

In the end of 90-s - beginning of 2000-s after a set of economic reforms Ukrainian manufacturing industries began to revive. One of most significant government stimulation plans called "economic experiment" was implemented in 1999-2002. This 1.5-year-long program was aimed at the largest enterprises of metallurgical and mining industries. Temporary reduction of corporate taxes by 70%, writing off old debts, reduced energy prices and other indirect subsidies provided by the government created immediate surge of output and exports (details on the program and its results may be found in the Yearly Reports of National Treasury of Ukraine 2000, 2001). By 2000 60% of pre-transition output was restored (Atanas Christev and Lehmann (2005)). Even after the experiment ended in 2001, metallurgy and other exporting industries still have been continuously subsidized

by state which made Ukraine one of the top 20 targets of anti-dumping investigations during 1995-2008 by the number initiations (AntidumpingPublishing.com).

Following re-animation of industrial production and national currency devaluation after Russian crisis in 1998, international trade activated as well, with its share in GDP reaching 45% (see Graph 4). Alleviation of the state control of exports (such as recommended export prices) (Atanas Christev and Lehmann (2005)), improved legal environment, adjustment of national standardization to the international one and formed market rules led to increasing integration of Ukrainian enterprises into international trade. The end of 90-s - beginning of 2000-s was marked by almost completed privatization, which attracted both domestic and international investors. Since Ukrainian legislation foresaw taxation of any foreign investment except for direct ones involving purchase of the stock of Ukrainian company, many international investment into Ukraine were made in form of purchasing the part or the whole stock of Ukrainian companies. In their turn, foreign investors were investing relatively more into innovations and restoration of productive base of Ukrainian enterprises. Foreign stakeholder also held competitive advantage since they already were multinationals and had distributional net abroad. These factors made foreign owned firms pore productive and increased their chances to become exporters. On the other hand, Ukrainian government was implicitly supporting privatization of the big objects by the ownership structure. Viktor Zatochilin and Zagorskaya (2006)

Since the beginning of 2000-s Ukraine has established itself on the world market as one of the leading large scale producers and exporter of agricultural products, ferrous metals, chemicals and energy with its most important trade partners been EU and Russia (Bank (2004)). Later in 2000-s Ukrainian firms found their exports increasingly constrained by implementation of the exports quotas in EU15 and new EU countries which previously were free to trade with. Following these and other various trade and legislative barriers for the exports to reach the destination, some of the largest Ukrainian companies started to transfer part of it production abroad, by purchasing the production powers in EU Viktor Zatochilin and Zagorskaya (2006). Obviously, it had a downward effect on the domestic employment. Currently Ukrainian economy is still very dependent on exports, with exports annual volume been equal to 45% of Ukraine's GDP.

4. DATA DESCRIPTION AND SUMMARY

The data set used in this research contains annual firm-level data for 67135 Ukrainian firms during years 1998-2006. The information was originally obtained from DerzhKomStat (State Statistics Committee of Ukraine) and includes firms operating in the manufacturing industries coded NACE 15-36, with exception for 16, 23, 30.

Initial variable set contains the following variables: total output in thousands of hryvnas, exports volumes with and without custom duties in USD, capital measured as firm's capital assets in thousands of hryvnas in the beginning and end of the year, ownership structure (domestic private and foreign private with state ownership as the base), total wage bill in thousands of hryvnas, and industry code. The data set is unbalanced panel, with each firm having on average 6 annual observations. The given data set is originally very carefully cleaned in order to track the firms during their life and eliminate technical measurement errors and outliers [1].

Choice of the variables for analysis and construction of the additional ones requires special attention. First of all, since most of the monetary variables are documented in hryvnas, I convert the volume of exports without customs duties from US dollars into hryvnas using annual average exchange rate (IMF). Preference of the exports volume without customs duties over the export volume with them is based on the impossibility to control for the multitude of custom duties specific for the different products and been exported by one enterprise. Since the duties may drastically differ due to international agreements or anti-dumping import taxes, exports volume prior to customs provides less noisy and more consistent data. Usage of annual average exchange rate gives raw guidance about the real hryvna value of traded volumes during the year as it does not account for fluctuations of exchange rate. It may also create some measurement errors when compared to the output volumes. Unfortunately, given data does not provide information which would allow more precise conversion. However, if we assume that exports volume

[1] Detailed description of the procedures used for cleaning of the initial data set can be found in Brown et al. (2008).

is expected to increase with hryvna denomination, the direction and magnitude of bias depends on the relative growth of dollar to hryvna and exports volumes. If growth rate of exchange rate is higher than the growth rate of exports, bias is going to be downward; if growth rate of exports exceeds the growth rate of exchange rate, bias will be upward. However, closer examination of the monthly exchange rate reveals that the bias should be small during 2002 - first half 2005 and non-existent during the second half of 2005 to 2006, correspondingly. The reason for this are as follows: during first period fluctuations of the exchange rate did not exceed 1% of the period average, and during the second period dollar to hryvna exchange rate was fixed.

In order for firm to establish itself as exporter, it has to export on the constant basis and statistically significant amount of its output, so change of its portion would affect changes in output, technology and inputs. Having exports volume and total output, I create the variable measuring percentage share of exports in the output of firm. I also carefully clean the obtained series from ratios higher than 100% with regard to the their time dynamics, availability of the neighboring observations and the number of consequent periods with outliers. To avoid possible measurement errors I define exporter a firm which exports more than 5% of its output during at least two consequential years. This definition of exporter is used throughout the rest of the research. Thus, binary variable *Exporter* equals 1 if firm is defined as an exporter in the current year (including initial year of exporting), and 0 - otherwise.

It is important to keep in mind that in the further sections different model specification will use various modification of the *Exporter* series. In particular, binary variable *PreExport* is constructed so that for exporters it equals to 1 during all years prior to export, first year of exporting including, and is discontinued afterwards; while for non-exporters it equals to 0 over the whole sample period. The second binary series derived from *Exporter* is *ExpStart* which equals to 1 in the initial year of exporting activity of firm that previously have never exported and 0 in all other years. During estimations involving these variables, a lower bound of more than 5 workers in the firm is employed.

Graph 5 shows the number of years company spends exporting, having once started (1-year observations correspond to the firms that have exported for two years, during one of which they employed less than 5 workers). According to the statistics, majority of the exporters export during two years and half of them export during the whole 9-year period.

Thus, if firm fulfills the requirements to be defined as an exporter, it has equal chance to continue or quit exporting.

Variable *Employment* shows the average number the registered employees in productional division of firm during year, part-time employees included proportionally to their working time (Brown et al. (2008)). To clean the data and exclude very small enterprises which employ only part-time, I exclude the firms with the number of employees being less than one. As a variable representing firms capital I choose capital assets in the beginning of the year, since they show part of production preconditions of the firm during that year. Based on these two variables I create a *Labor intensity* variable as a ratio of employment to capital.

Similarly, I create *Average Wage* variable as a wage bill to employment ratio, in thousands of hryvnas per person. There is possible measurement error in the wage bill variable, or, more precisely, downward bias, since the part of the wage may be systematically underreported by the enterprises to avoid taxation.

Moreover, in order to avoid measurement error I use only those firms that employ more than five workers. Table 8.1 provides comparison of means values of exporters and non-exporters firm characteristics. Even brief comparison proves exceptionality of exporters. Though exporters account only for 5% of the total number of manufacturing firms, they possess output and capital several times exceeding the averages of non-exporters. They are also more productive, pay higher wages and have higher probability to be owned by foreign investors.

Table 8.2 presents the industry-level summary of employment, productivity and ownership status across the whole sample and exporters-to-the-total comparisons. This table clearly shows the industry exports specialization and variation of exporters significance in the total industry-level output and employment. Exporters employ unproportionately high share of total manufacturing workers as compared to their number. As seen from the industry shares in the total manufacturing exports, Ukrainian exports specialize mostly on the basic metals, chemical, agricultural, machine-building and other equipment - building industries, with their shares in the total exports ranging from 4% to 50%. These primary exporting industries are relatively less labor intensive and have larger enterprises (as shown by the average number of workers) which is most likely to be the because because the nature of the heavy industries demanding scale of production. Share of most

other industries in the total manufacturing exports is less than 1%. At the same time, share of exports in the firm output is similar for all industries, being approximately 37.5%. All industries have firms with positive exporting in all years. Surprisingly, the number of state owned enterprises exceeds the number of foreign ones. This dominance is especially pronounced in the five export-intensive industries mentioned above.

Basic metals industry is very special even among other export-oriented industries with the average employment seven times exceeding a cross-industrial average , with more than 90% of industry employment concentrated in exporting enterprises, and industrial exports accounting for the half of total manufacturing exports.

It is also interesting that despite labor abundance of Ukraine, its main exports relate to more capital-abundant industries, rejecting the conclusion of Hecksher-Ohlin theorem. However, taking into account abundance of the certain natural resources, productive powers inherited from USSR and the fact that Ukrainian capital-abundant industries are still labor-abundant if compared to production in other countries, it is easy to see the reasons why Ukraine export mostly the given category of products.

Finally, Table 8.3 presents yearly changes in the total manufacturing employment and exporters. The missing values for "Number of new exporters" in 1998 and 2006 and "Number of firms stopped exporting" in 1998 and 1999 are due to the exporter variable construction and reference year usage. Number of exporters and their share in the total number of firms grows steadily during 1998-2004. Total manufacturing employment increases as well during the whole 1998-2006 period. Share of exports in the output of exporters increases insignificantly by 0.7% by 2004. Number of new exporters consistently exceeds the number of firms ceasing exporting during 1998-2004, and while the former shows continuous upward trend, the direction of change of the latter fluctuates over time.

Unlike positive dynamics of 1998-2004, years 2005-2006 mark a drop both in the share of exporters in manufacturing industries and the share of exports in the total output of exporters. Number of firms stopping exporting also exceeded the number of new exporters during this period. Industry-level examination reveals that this effect is mainly due to the drop in the exports of basic metals, machinery and other transport equipment. For the main exports supplier of Ukraine, basic metals industry, 2005-2006 were challenging because of implementation of export quotas to the new EU countries, emergence of China as competitor in the same market niche, series of antibusing investigations, cuts in the

governmental indirect subsidization as demanded for accession to WTO, and start of production on the foreign plant as mentioned in the previous section. (Viktor Zatochilin and Zagorskaya (2006)).

5. ECONOMETRIC APPROACH AND MODEL DISCUSSION

Existing research on the employment effects of exports in the panel data framework employs a number of various estimation techniques, the most popular of them being Fixed Effects and GMM. Comparing the benefits and disadvantages of both methods, GMM seems to be more convenient in terms of endogeneity nullification, but also more demanding to the number of time periods. On the other hand, FE method is applicable for any number of time periods, though it has limited capability to removing endogeneity. Given a large cross-sectional base and variety of variables which can be used for additional controls I choose FE as primary estimation method, along with pooled OLS which serves for comparison purposes.

Dealing with endogeneity is the main concern of estimation strategy with panel data, since, if not been accounted for, it leads to inconsistency of the results. Firm-level nature of the data set makes firm's export-related indicators and employment subjects to both macro and micro level shocks. Macro level includes global, national and regional factors such as international agreements, foreign market conditions and government policies. Micro level is related to the conditions specific for each firm. On the time dimension side of data set, unaccounted time trend may result in spurious regression. On the top of that, additional complications arise if individual shocks occur in more than one dimension, such industry and year specific. One of the examples of such industry-year shocks are "economic experiment" of 1999-2002, exporting quotas and anti-dumping restrictions which are valid just for a limited period of time and effect only a few certain industries.

All together, these factors create numerous sources for endogeneity and cause inconsistency in the pooled OLS estimation. FE partially fixes this problem by including firm-level fixed effects and removing constant component from cross-sectional dimensions. As long as the explanatory variables are correlated only with fixed components of unobservables, obtained estimators are consistent. I also include industry-year interactions to control both for time fixed effects and the industry-year specific shocks, and test them for the joint significance to determine their relevancy to the equation.

Second problem, self-selection, is embedded into estimation of effects of exporting by the nature of exporters themselves, because firms explicitly decide on becoming exporters and then work out to improve their performance in advance (see discussion in Section 1). Table 8.1 shows that average characteristics of exporters are very different from those of non-exporters, which suggest that exporters are systematically different from non-exporters. However, assuming that the main factors based on which enterprises select themselves into exporters are output, capital, productivity, we can control for them in the regression analysis. Moreover, since FE estimation operates with demeaned values and shows the effect of changes over the time period, self-selection bias is reduced.

Another potential problem stems from the attrition bias caused by the unbalanced structure of data. Though it avoids survivorship bias distinctive for balanced panel, there is still possibility of measurement errors regarding firm's exit from the sample, as it may be due to the firm's shutdown, or being divided in a few new firms, etc. (Brown et al. (2008)). FE also partially accounts for the time-invariant attrition bias, assuming that the inner factors that influenced firm's exit has been present since its entrance to the sample.

My further estimation strategy is as follows. First I estimate pooled OLS with industry dummies, then FE with firm and year controls and, finally, FE with firm ansi industry-year effects. Comparison of results will provide us with idea of magnitude and direction of bias, and dimension of its origin. Before proceeding with actual model estimation I would like to examine relative premia of exporters in their basic firm's characteristics such as capital, labor, average wage and others, compared to non-exporters prior to exporting and after leaving exporting.

I use following formal test to estimate future exporter's premia:

$$\ln X_{it} = \alpha + \beta PreExport_{it} + \Gamma NY_{it} + \epsilon_{it}, \tag{5.1}$$

where X is a firm's i characteristic in year t; *PreExport* is a binary variable which divides the sample into ever exporting firms and never exporting firms, and NY are the industry-year dummy interactions. Coefficient $\beta_{PreExport}$ represents the percentage difference in firm's characteristics between future exporters and firms that never export as an exporter premium in firm characteristic X.

On the other hand, it is also interesting to determine the changes in performance of

the past exporters after their exit from exporting. For this purpose I follow the procedure described by Bernard and Wagner (1996) and estimate

$$\ln X_{it} = \alpha + \beta_1 Enter_{iT} + \beta_2 Continue_{iT} + \beta_3 Leave_{iT} + \Lambda D_{i0} + \Gamma NY_{it} + \epsilon_{iT}, \qquad (5.2)$$

where *Enter*, *Continue* and *Leave* define new exporters, continuing exporters and firms that ceased exporting, correspondingly. As binary variables, they are generated by the identities:

$Enter_{iT} = 1$ if $Exporter_{i0} = 0$ and $Exporter_{iT} = 1$,

$Continue_{iT} = 1$ if $Exporter_{i0} = 1$ and $Exporter_{iT} = 1$,

$Leave_{iT} = 1$ if $Exporter_{i0} = 1$ and $Exporter_{iT} = 0$. (Bernard and Wagner (1996))

The time difference between 0 and T year is one year. The coefficient of interest is β_3 which shows changes in the firm's characteristics after exit from exporting as compared to non-exporters.

In order to determine the effects of exporting activity on employment, I use two main models: static and dynamic. While the first one shows aggregated effect of exports on employment in the contemporaneous setting, the latter one decomposes effects along the time period into the ones prior and after the start of exporting, thus, separating employment effects created by possible preparations of firms to export from the ones influenced by the actual exporting activity.

Basic static model looks the following way:

$$\ln Employment_{it} = \alpha_{it} + \beta Exporter_{it} + \Lambda D_{it} + \Gamma NY_{it} + \epsilon_{it}, \qquad (5.3)$$

where D is a set of control variables representing lagged ownership status of a firm and labor intensity of production. $\beta_{Exporter}$ shows the percentage difference in employment of exporters comparing to non-exporters. Variable *Ownership status* is chosen as an imperfect control for FDI in case of foreign ownership, and control for reorganization following the privatization in the both cases. I use their lagged values in order to let the effects of the ownership change to appear. *Labor intensity* provides control for the technology and changes in efficiency. By its construction (ratio of employment over capital of enterprise) it also indirectly controls for output and capital.

As an extension of the static model I estimate marginal effects of increase in share of

exports in the output on firm's employment.

$$\ln Employment_{it} = \alpha_{it} + \beta_1 ExpShare_{it} + \beta_2 (ExpShare_{it}{}^2 + \beta_3 ExpShare_{it}{}^3) + \Lambda D_{it} + \Gamma NY_{it} + \epsilon_{it}, \quad (5.4)$$

where *ExpShare* is the percentage share of the exports in the total output. I also test for the possible non-linearities in this effect by adding quadratic and cubic terms of *ExpShare* to the regression.

Though being simple, static model has important disadvantage of being unable to separate the effects of firms preparations prior to export start from the direct effects of exporting. With this purpose I use dynamic specification:

$$\ln Employment_{it} = \alpha_{it} + \beta_1 ExpStart_{it-5+} + \beta_2 ExpStart_{it-4} + ... + \beta_5 ExpStart_{it-1} + \beta_6 ExpStart_{it+1} + ... + \beta_{10} ExpStart_{it+5+} + \Lambda D_{it} + \Gamma NY_{it} + \epsilon_{it} \quad (5.5)$$

where subscripts of *ExpStart* show the number of lags or leads compared the initial year of exporting, which serves as the base period of the model. Subscripts $(t-5+1)$ and $(t+5+1)$ define series with all observations further than 5 lags or 5 leads, correspondingly. The contemporaneous value of *ExpStart* is the reference group.

Finally, in order to see economic forces behind the total employment effect of exports, I decompose employment level into extensive margin, or output increase, and intensive margin (productivity increase). It is expected that output has positive employment impact, since achieving higher levels output requires more workers, ceteris paribus, while productivity effects total employment negatively, due to possibility to produce the same amount of output with less workers. For the estimation I use decomposition procedure suggested by Brown et al. (2008), and define productivity as amount of output per production worker or, in logarithmic setting: $\ln Productivity = \ln Output - \ln Employment$. Therefore, $\ln Employment = \ln Output - \ln Productivity$. (5.6)

The decomposition of the employment effect of exporting is done by estimating the model identical to (5.3) with *Output* and *Productivity* on the LHS on the common sample, and comparing *Exporter* coefficients in their equations.

$$\ln Employment_{it} = \alpha_{it} + \beta Exporter_{it} + \Lambda D_{it} + \Gamma NY_{it} + \epsilon_{it},$$

$$\ln Output_{it} = \alpha_{2it} + \gamma Exporter_{it} + \Lambda D_{it} + \Gamma NY_{it} + \epsilon_{it},$$

$$\ln Productivity_{it} = \alpha_{3it} + \delta Exporter_{it} + \Lambda D_{it} + \Gamma NY_{it} + \epsilon_{it},$$

Assuming that we can nor estimate β directly there is possibility to calculate it as the difference of output and productivity effects: $\beta = \gamma - \delta$. Coefficients γ and δ show exactly the decomposed effects of output and production on employment, correspondingly, so the final sign of employment effect is going to depend on the magnitude of those two effects. If the model is correct, obtained employment effect must be equal to the $\beta_{Exporter}$ from regression (5.3).

6. RESULTS

Before starting results interpretation I would first to discuss the effectiveness of the estimation methods. Clearly, due to the theoretical reasons highlighted in Section 4, estimates of pooled OLS are biased and inconsistent, even with the industry dummies providing different intersection points for the each industry. However, adding firm and year FE provides much more reasonable results as well as the expected signs on the control variables. I run Maximum Likelihood test to determine whether inclusion of industry-year dummies gives better fit to the model and receive positive results. Based on that, I decide on the firm FE with industry-year control as the final model for the static estimations. Nevertheless, the numeric values of the firm FE estimates do not differ significantly, providing evidence of the result robustness.

The tables 6.1 and 8.4 provide estimated exporters premia prior to the exporting start and after ceasing exports. In the years preceding to the exporting, employment of future exporters is almost 140% higher than the one of non-exporters, as well as their productivity (72%), capital intensity (62%) and average wages (43%). These estimations confirm the hypothesis that future exporters possess better characteristics even prior to their first entrance to the exporting activity. On the contrary, estimates of the model 5.2 demonstrate that performance of the firms ceasing exporting is relatively worse than the one of new or continuing exporters, but still better compared to never exporting firms. The higher labor intensity at the time of exit may serve as an evidence of effects of the learning-by-exporting.

Regression outcomes of the static model 5.3 are presented in Tables (8.5), (8.7) and (8.6). OLS estimations have very high marginal effect of the effect of exporting, while FE report much more modest magnitudes. Depending on the specification they predicts employment of exporters to be 30% higher than non-exporters. Inclusion of control variables besides industry-year interactions reduces the estimated effect slightly to 25%. The difference in the OLS and FE estimators cab be regarded as the evidence of significant endgeneity bias in OLS. Though the effects of exporting are positive for both estimation

Tab. 6.1: Future exporter premia

	β_{Start}
Log Employment	1.39***
	73.28
Log Productivity	0.72***
	42.67
Log Intensity	-0.62***
	-26.3
Log Average Wage	0.43***
	42.29

methods, control variables have opposite signs. Negative sign of the *Log Intensity* which by construction is positively correlated with the employment level declares OLS estimation as completely erroneous. I follow the results provided by FE and conclude that both forms of the private ownership have positive effect on employment. It should be noticed that F statistics of industry-year interactions in these and following regressions reveals joint significance of the fixed effects from zero, justifying their inclusion into regression.

Tables 8.8, 8.10 and 8.6 report estimation results for 5.4. As in the previous case, the difference in the OLS and FE results is very large and signs of the control variables estimators are opposite. FE estimated results demonstrate small but statistically significant positive effect of exports share in the output on employment. One-percent increase of exports share in output is predicted to increase firm's by 0.004% in linear specification and by 0.01-0.03% in the quadratic one. Both square and cubic terms are small but significant at 1% level, however the effect of cubic term is so close to zero, that I choose to ignore it in the other model specifications. Squared exports share estimator is negative, showing reverse U-shape of exports share and employment relationship. This observation matches the possibility that increasing exports share of the output first leads to employment growth and later to it reduction. The point of inflexion is easy to calculate by taking the FOC of 5.4 with respect to ExpShare and solving $\beta_{ExpShare} - 2 * \beta_{ExpShare^2} ExpShare = 0$, for ExpShare. The result of this calculation is 50%: so until exports volume reaches 50% of total output, effect on the employment level is positive, but after this threshold it is negative. However, it is worth noticing that in this setting increase in exports does not reduce the number of workers below their initial level.

Next application of this model I am interested in is estimation of the average effect of ExpShare. For comparison I take the linear and quadratic models with full set of control variables and calculate the values of ExpShare effect as $\beta_{ExpShare} * AverageExpShare$ and

$\beta_{ExpShare} * AverageExpShare + \beta_{ExpShare^2} * ExpShare^2$. This estimation also serves as the robustness check of the results of the previous static model, since the estimation are done on the mean levels of variables and should produce approximately the same results. An average estimated employment effect of the mean *ExpShare* in linear setting is 0.135, and in quadratic form 0.244, which is very similar to the results of FE regression on $Exporter$. These results suggest the existence of non-linearity in the exports share and employment relationship.

Estimates of the dynamic model 5.5 in Tables 8.11, 8.12 and 8.13 confirm the rapid employment growth of the future exporters prior to start of exporting and show the growth trend continuing afterwards, proving the hypothesis of positive effects of exporting on employment in the firm. It should be noticed that employment seems to grow much quicker prior to exporting (by 17% in three years) and first two years of exporting (by 11% in one year). Afterwards, the growth rate slows down, though it is still positive. Insignificance of the $Start(t+5+)$ coefficient says that in that time period employment of exporters is already indistinguishable from non-exporters, but since the number of the observations in that period is rather low (246), precision of this estimate should be treated with caution.

Patterns of employment effects obtained both from static and dynamic models corresponds to the theory discussed in Section 1, which predicts firm to accumulate maximum amount of labor prior to the start of exporting until it will adjust to the market conditions, and then, in case when increase of output is needed, create it at the expense of higher productivity, or intensive margin.

Finally, I examine decomposition of employment effect of exports (see eq. 5.6) provided in Table 6.2. Here, as predicted, output has very strong positive effect on employment, while, the negative effect of productivity constitute only half of the output's magnitude, their sum resulting in the positive net employment growth. Checking the obtained labor effect coefficient coincides with the coefficient from 8.6.

Tab. 6.2: Employment effect decomposition

	Coefficient
Output (γ)	0.2233
Productivity (δ)	0.1210
Employment (β)	0.2322

7. CONCLUSION

This research is dedicated to finding a causal relationship between firm becoming exporter and its employment level. Employing FE on the extensive panel data from Ukrainian Manufacturing sector I estimate a number of static and dynamic specifications. The obtained results show significant employment premium of future exporters prior to their entrance on the international market. Exporter is predicted to employ on average 25% more of the workforce than non-exporter and its precise effect also depends on the share of the exports volume in the total output of the firm. I find that with the exports share larger than 50% employment been affected negatively by further increase in the ratio. Dynamic estimation shows that highest employment effect is achieved during the first two years of exporting, after which the growth rate of employment slows down. Decomposition of the employment effect reveals that the positive growth of employment is driven by the strong influence of scale effect, while productivity effect accounts only for the half of that size. Resuming all these findings I conclude that exporting activity really have positive influence on the number of workers, mainly through increase in output volumes, however, the longer firms and/or more firm exports the more it is inclined to increase output through higher productivity rather than number of employees.

Future research should focus on the influence of Ukrainian exports destinations, since exporting on the CIS and EU markets are likely to have different effects. If there is a data available, it is also advisable to trace the effects of exporting on the change of the workforce quality.

8. APPENDIX

Note: Standard errors are heteroscedasticity-robust White standard errors.

*** - denotes statistical significance on 1%, ** - 5%, and * - 10%.

Tab. 8.1: Mean comparison of exporters and non-exporters

Variable	**Non-exporters**		**Exporters**	
Number of firms	67026		3282	
	Firm-years	**Mean**	**Firm-years**	**Mean**
Employment (people)	225894	55	14783	709
Output (mln UAH)	292678	2651.349	15981	60758.390
Capital (mln UAH)	308268	2168.002	15508	60186.940
Average productivity (thous. UAH/per)	216369	97.46	14783	105.64
Average wage (thous. UAH/per)	218386	4.09	14773	6.33
Domestic ownership	372542	0.91	15878	0.82
Foreign ownership	372542	0.02	15878	0.08

Fig. 8.1: Source: ILO

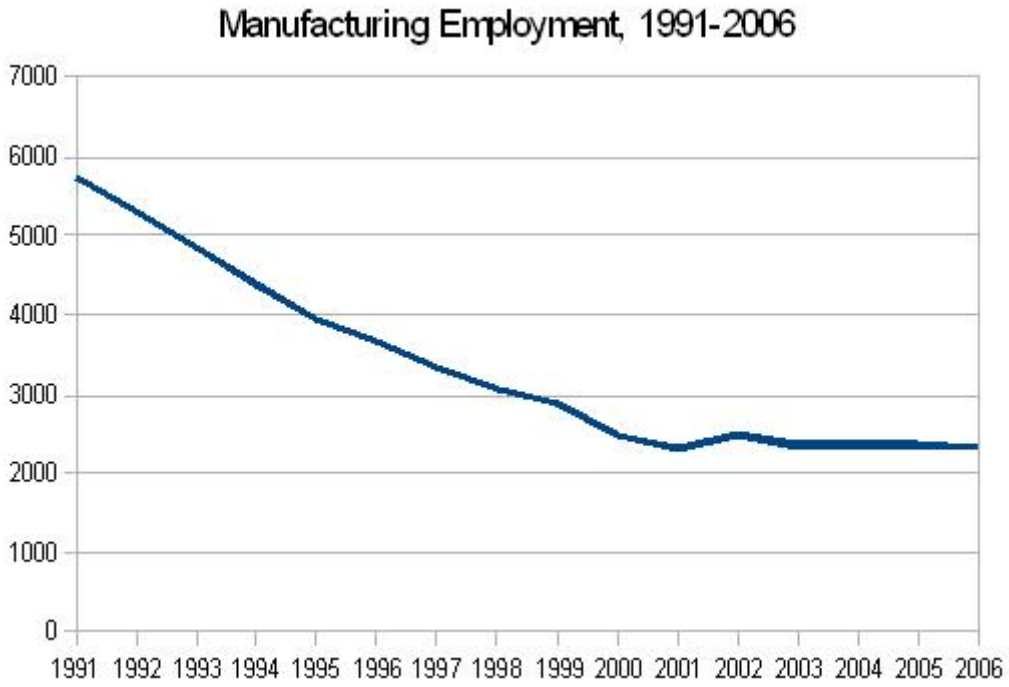


Fig. 8.2: Source: State Statistics Committee of Ukraine

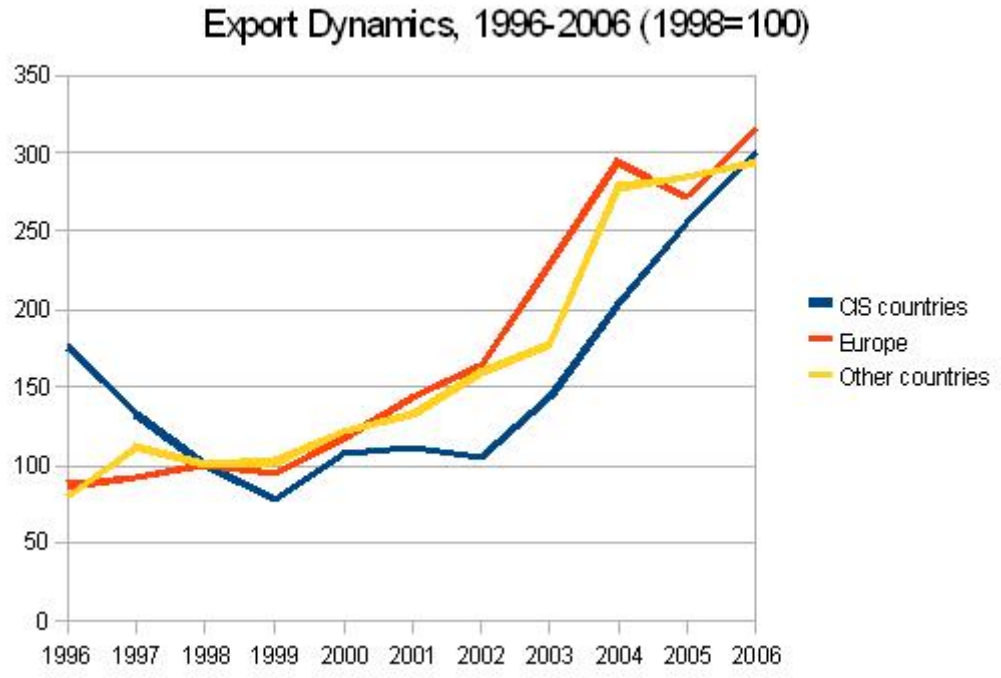


Fig. 8.3: Source: State Statistics Committee of Ukraine

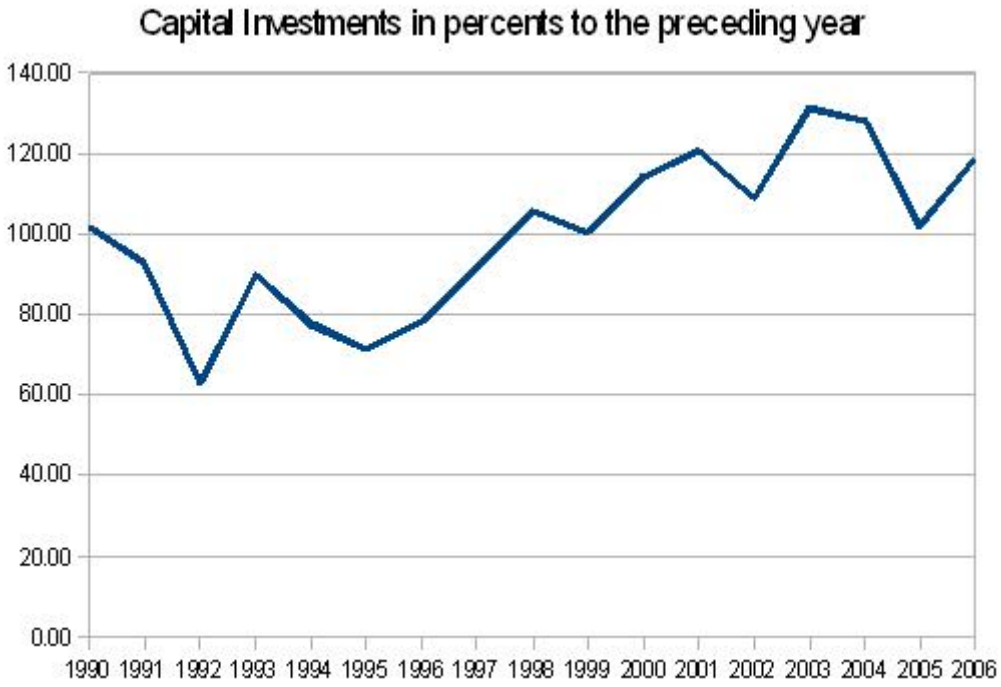


Fig. 8.4: Source: State Statistics Committee of Ukraine

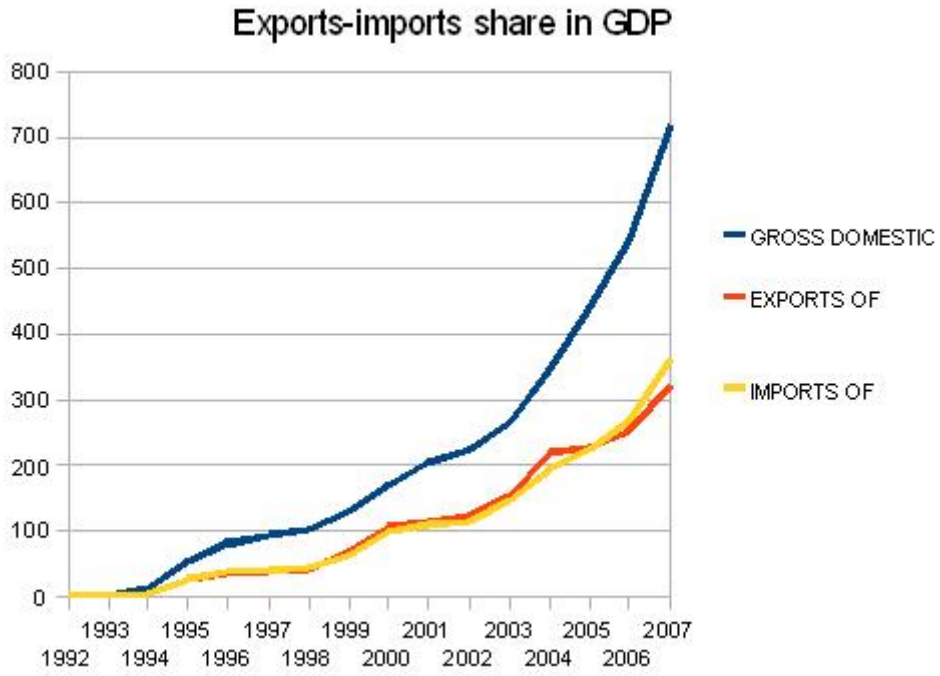
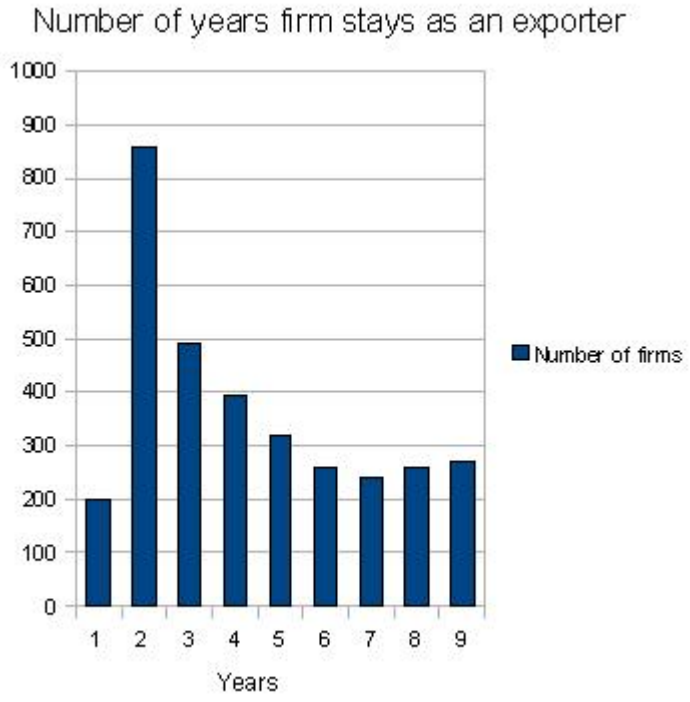


Fig. 8.5: Source: Own calculations



Tab. 8.2: Industry-level statistics

NACE	Industry	Number of firms	Number of exporters	Total manufacturing employment	Exporters share in total manuf. employment (%)	Average firm employment (person)	Labor intensity (person per 1000 UAH)	Share of exports in firms output (%)	Share of exports in total manufac- (%) turing exports	Foreign ownership* (firms)	Domestic ownership (firms)	State ownership* (firms)
15	Manufacture of food products and beverages	14165	591	4671977	18	81.43	0.65	30.38	8.74	64	468	94
17	Manufacture of textiles	1582	87	578830	25	101.39	1.46	32.07	0.36	9	81	3
18	Manufacture of wearing apparel; dressing and dyeing of fur	3912	81	619541	17	66.50	2.64	37.53	0.30	6	74	5
19	Tanning and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	1132	46	308127	23	74.79	2.75	38.89	0.41	6	43	1
20	Manufacture of wood and of products of wood and cork, except furniture; manufac- ture of articles of straw and plaiting materials	5779	337	472908	22	23.49	1.12	55.43	0.45	66	294	5
21	Manufacture of pulp, paper and paper products	739	42	221192	40	80.56	0.72	33.88	1.19	10	38	2
22	Publishing, printing and reproduction of recorded media	7358	22	392470	4	17.81	0.65	27.09	0.16	2	19	2
24	Manufacture of chemicals and chemical products	2630	214	1723506	66	186.95	0.77	35.42	16.66	27	174	46
25	Manufacture of rubber and plastic products	2614	106	483404	30	47.35	0.88	36.05	1.16	24	93	3
26	Manufacture of other non-metallic mineral product	5065	236	1690661	28	84.46	0.90	32.29	1.70	14	219	10
27	Manufacture of basic metals	638	102	2831189	91	1284.46	0.91	44.86	50.38	7	93	17
28	Manufacture of fabricated metal products, except machinery and equipment	4444	195	815164	26	47.64	1.11	38.18	1.24	27	172	8
29	Manufacture of machinery and equipment n.e.c.	5990	548	3408510	66	188.17	1.12	37.11	7.71	29	499	62
31	Manufacture of electrical machinery and apparatus n.e.c.	2445	172	914273	55	128.91	1.29	34.23	2.29	14	152	21
32	Manufacture of radio, television and communication equipment and apparatus	1744	88	731767	48	132.89	1.17	37.49	0.66	3	69	18
33	Manufacture of medical, precision and optical instruments, watches and clocks	1648	118	522382	56	98.18	1.32	37.69	0.47	5	100	20
34	Manufacture of motor vehicles, trailers and semi-trailers	603	59	469606	0	246.28	0.66	41.57	1.09	5	57	8
35	Manufacture of other transport equipment	1007	100	1354764	65	420.01	0.97	40.21	4.60	7	63	30
36	Manufacture of furniture; manufacturing n.e.c.	3531	138	603111	17	48.18	1.30	40.06	0.42	22	124	7
	Sum / *average*	**67026**	**3282**	**22813382.3**	*40.21*	***176.81***	***1.18***	***37.39***	**100**	**347**	**2832**	**362**

Tab. 8.3: Annual statistics

	1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Number of exporters	1076	1341	1467	1606	1685.00	1867.00	1912.00	1991.00	1309
Number of firms	16230	15850	17615	18022	19103.00	18737.00	17638.00	22638.00	22946
Share of exporters among firms (%)	6.63	8.46	8.33	8.91	8.82	9.96	10.84	8.79	5.70
Average exports share in output (%)	3.73	3.45	3.43	3.70	3.19	4.10	4.43	3.61	3.25
Number of new exporters	0	238	315	328	368.00	409.00	322.00	225.00	0
Number of firms that stopped exporting	0	0	277	239	305.00	221.00	259.00	326.00	247
Total manufacturing employment (thousands)	1,880.2	2,308.2	2,350.5	2,469.5	2,530.5	2,629.2	2,768.3	2,849.9	3,027.3
Exporters share in total manufacturing employment (%)	0.33	0.48	0.49	0.50	0.50	0.48	0.46	0.45	0.43

Tab. 8.4: Effects of Start, Continuation and Stop of Exporting

	Ln Employment	**Ln Output**	**Ln Productivity**	**Ln Average Wage**	**Ln Capital**	**Ln Intensity**
Enter	1.16	1.78	0.65	-0.61	0.3	1.16
	33.62	*41.27*	*22.67*	*-14.29*	*18.18*	*29.3*
Continue	1.54	2.21	0.69	-0.97	0.37	1.61
	102.81	*115.08*	*56.55*	*-61.94*	*55.49*	*98.7*
Exit	0.84	1.09	0.27	-1.08	0.17	0.96
	22.76	*20.64*	*7.36*	*-25.08*	*9.13*	*23.85*

Tab. 8.5: Static models with exporter dummy; pooled OLS with industry dummies

Log Employment	**I**	**II**	**III**
Exporter (t)	1.73***	1.72***	1.48***
	126.48	*126.06*	*112.44*
Domestic ownership (t-1)		-0.304***	-0.68***
		-40.16	*-72.45*
Foreign ownership (t-1)		-0.03	-0.59***
		-1.51	*-29.39*
Log Intensity (t)			-0.18***
			-100.36
Number of obs	**168779**	**168779**	**139195**
R-squared	**0.20**	**0.21**	**0.31**
F-statistic for industry dummies	950.22	991.56	865.74

Tab. 8.6: Static models with exporter dummy; firm- and year- FE

Log Employment	**I**	**II**	**III**
Exporter (t)	0.29***	0.28***	0.24***
	17.68	*17.42*	*15.69*
Domestic (t-1)		0.238***	0.11***
		30.14	*9.16*
Foreign (t-1)		0.49***	0.33***
		19.82	*11.15*
Log Intensity (t)			0.2***
			34.97
Number of obs	**168779**	**168779**	**139195**
Number of groups	**40867**	**40867**	**34366**
Ave number of obs per group	**4.1**	**4.1**	**4.1**
R-squared (overall)	**0.1**	**0.07**	**0.04**
R-squared (within)	**0.05**	**0.07**	**0.07**
R-squared (between)	**0.09**	**0.06**	**0.18**
F-statistic for year dummies	**211.06**	**290.93**	**303.76**

Tab. 8.7: Static models with exporter dummy; FE with industry-year interactions

Log Employment	**I**	**II**	**III**
Exporter (t)	0.3***	0.29***	0.25***
	18.13	*17.85*	*16.2*
Domestic ownership (t-1)		0.249***	0.126***
		31.05	*10.22*
Foreign ownership (t-1)		0.49***	0.34***
		20.14	*11.71*
Log Intensity (t)			0.2***
			34.94
Number of obs	**168779**	**168779**	**139195**
Number of groups	**40867**	**40867**	**34366**
Avg number of obs per group	**4.1**	**4.1**	**4.1**
R-squared (overall)	**0.02**	**0.02**	**0.04**
R-squared (within)	**0.07**	**0.09**	**0.2**
R-squared (between)	**0.01**	**0.05**	**0.06**
F-statistic for industry-year intersections	211.06	290.93	303.76

Tab. 8.8: Static model with share of exports in output; pooled OLS with industry dummies

Log Employment	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
ExpShare(t)	0.028***	0.027***	0.024***	0.089***	0.089***	0.077***	0.153***
	79.01	*77.46*	*70.84*	*98.62*	*98.66*	*87.83*	*82.46*
$ExpShare^2$ (t)				-0.001***	-0.001***	-0.001***	-0.003***
				-69.92	*-70.44*	*-62.28*	*-50.31*
$ExpShare^2$ (t)							0.000***
							36.65
Domestic Ownership (t-1)		-0.280***	-0.668***		-0.284***	-0.660***	
		-36.100	*-69.380*		-37.520	-70.170	
Foreign Ownership (t-1)		0.019***	-0.575***		0.024***	-0.543***	
		0.950	*-27.710*		*1.24*	*-26.76*	
Log Intensity (t)			-0.193***			-0.181***	
			-103.99			*-99.60*	
Number of obs	**168779**	**168779**	**139195**	**168779**	**168779**	**139195**	**168779**
R-squared	**0.152**	**0.160**	**0.271**	**0.196**	**0.204**	**0.304**	**0.208**
F-statistic for industry dummies	**1022.68**	**1062.82**	**921.77**	**932.97**	**973.12**	**855.48**	**914.64**

Tab. 8.9: Static model with Exporter variable; firm- and year- FE

Log Employment	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
ExpShare (t)	0.004***	1.004***	2.004***	3.004***	4.004***	5.004***	6.004***
	12.300	*13.300*	*14.300*	*15.300*	*16.300*	*17.300*	*18.300*
$ExpShare^2$ (t)				0.000***	0.000***	0.000***	-0.001***
				18.95	*-16.42*	*-14.97*	*-17.390*
$ExpShare^3$ (t)							0.000***
							14.630
Domestic ownership (t-1)		0.242	0.116***		0.240***	0.114***	
		30.490	*9.460*		*30.280*	*9.340*	
Foreign ownership (t-1)		0.494***	0.340***		0.489***	0.336***	
		20.010	*11.280*		*19.890*	*11.200*	
Log Intensity (t)			0.201***			0.201***	
			34.850			*34.920*	
Number of obs	**168779**	**168779**	**139195**	**168779**	**168779**	**139195**	**168779**
Number of groups	**40867**	**40867**	**34366**	**40867**	**40867**	**34366**	**40867**
Avg number of obs per group	**4.100**	**4.100**	**4.100**	**4.100**	**4.100**	**4.100**	**4.100**
R-squared (overall)	**0.049**	**0.064**	**0.178**	**0.053**	**0.068**	**0.181**	**0.055**
R-squared (within)	**0.049**	**0.033**	**0.087**	**0.079**	**0.052**	**0.076**	**0.093**
R-squared (between)	**0.055**	**0.037**	**0.062**	**0.091**	**0.062**	**0.049**	**0.108**
F-statistic for year dummies	**156.040**	**178.960**	**183.930**	**201.770**	**285.860**	**187.050**	**201.940**

Tab. 8.10: Static models with exports share in output, cross-sectional FE with industry-year interactions

Log Employment	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
ExpShare (t)	0.004***	0.004***	0.003***	0.013***	0.012***	0.010***	0.026***
	12.300	*12.540*	*9.980*	*18.950*	*16.550*	*16.550*	*21.270*
$ExpShare^2$ (t)				-0.0001***	0.000***	0.000***	-0.001***
				18.95	*-16.42*	*-14.97*	*-17.390*
$ExpShare^3$ (t)							0.0000***
							14.630
Domestic Ownership (t-1)		0.242***	0.116***		0.240***	0.114***	
		30.490	*9.460*		*30.280*	*9.340*	
Foreign Ownership(t-1)		0.494***	0.340***		0.489***	0.336***	
		20.010	*11.280*		*19.890*	*11.200*	
Log Intensity (t)			0.201***			0.201***	
			34.850			*34.920*	
Number of obs	**168779**	**168779**	**139195**	**168779**	**168779**	**139195**	**168779**
Number of groups	**40867**	**40867**	**34366**	**40867**	**40867**	**34366**	**40867**
Avg number of obs per group	**4.100**	**4.100**	**4.100**	**4.100**	**4.100**	**4.100**	**4.100**
R-squared (overall)	**0.049**	**0.064**	**0.178**	**0.053**	**0.068**	**0.181**	**0.055**
R-squared (within)	**0.049**	**0.033**	**0.087**	**0.079**	**0.052**	**0.076**	**0.093**
R-squared (between)	**0.055**	**0.037**	**0.062**	**0.091**	**0.062**	**0.049**	**0.108**
F-statistic for year dummies	**156.040**	**178.960**	**183.930**	**201.770**	**285.860**	**187.050**	**201.940**

Tab. 8.11: Dynamic models; pooled OLS with industry dummies

Log Employment	**I**	**II**	**III**
ExpStart (t-5+)	1.543***	1.355***	1.188***
	21.350	*18.870*	*19.190*
ExpStart (t-4)	1.631***	1.526***	1.324***
	25.000	*23.590*	*23.250*
ExpStart (t-3)	1.585***	1.520***	1.374***
	28.660	*27.600*	*27.130*
ExpStart (t-2)	1.497***	1.436***	1.344***
	31.210	*29.860*	*29.590*
ExpStart (t-1)	1.348***	1.309***	1.263***
	31.990	*30.730*	*30.770*
ExpStart (t+1)	1.570***	1.587***	1.373***
	53.820	*54.810*	*49.700*
ExpStart (t+2)	1.573***	1.597***	1.373***
	52.430	*53.690*	*48.060*
ExpStart (t+3)	1.609***	1.633***	1.351***
	50.390	*51.510*	*44.010*
ExpStart (t+4)	1.618***	1.641***	0.000***
	46.490	*47.470*	*0.000*
ExpStart (t+5+)	1.605***	1.629	1.267***
	68.860	*70.400*	*55.440*
Domestic ownership		-0.341***	-0.718***
		-44.750	*-74.500*
Foreign ownership		-0.061***	-0.605***
		-3.140	*-29.820*
Log Intensity			-0.170***
			-93.550
Number of observations	**168779**	**168779**	**139472**
R-squared:	**0.20**	**0.22**	**0.31**
F-statistic for industry dummies	**892.63**	**935.75**	**833.16**

Tab. 8.12: Dynamic models; firm- an year- FE

Log Employment	**I**	**II**	**III**
ExpStart (t-5+)	-0.228***	-0.266***	-0.262***
	-4.220	*-5.000*	*-5.530*
ExpStart (-4)	-0.174***	-0.202***	-0.138***
	-4.210	*-4.920*	*-3.770*
ExpStart (-3)	-0.147***	-0.173***	-0.106***
	-4.580	*-5.410*	*-3.400*
ExpStart (-2)	-0.121***	-0.138***	-0.055***
	-4.680	*-5.400*	*-2.330*
ExpStart (-1)	-0.066***	-0.077***	0.002***
	-3.470	*-4.190*	*0.110*
ExpStart (+1)	0.091***	0.057***	0.096***
	10.220	*6.510*	*10.040*
ExpStart (+2)	0.107***	0.077***	0.131***
	8.260	*6.010*	*10.140*
ExpStart (+3)	0.107***	0.078***	0.145***
	6.450	*4.730*	*9.060*
ExpStart (+4)	0.090***	0.074***	0.137***
	4.630	*3.870*	*7.380*
ExpStart (5+)	-0.019	-0.022	0.034
	-0.740	*-0.870*	*1.410*
Domestic ownership		0.238***	0.108***
		29.950	*8.870*
Foreign ownership		0.486***	0.327***
		19.630	*10.800*
Log Intensity			0.202***
			34.850
Number of observations	**168779**	**168779**	**139472**
Number of groups	**40867**	**40867**	**34373**
R-squared:			
within	**0.05**	**0.06**	**0.18**
between	**0.02**	**0.02**	**0.09**
overall	**0.03**	**0.01**	**0.06**
F-statistic for year dummies	**195.98**	**273.95**	**191.52**

Tab. 8.13: Dynamic models, cross-sectional FE with industry-year interactions

Log Employment	**I**	**II**	**III**
ExpStart (t-5+)	-0.259***	-0.303***	-0.298***
	-4.93	*-5.83*	*-6.71*
ExpStart (t-4)	-0.201***	-0.231***	-0.168***
	-4.98	*-5.78*	*-4.76*
ExpStart (t-3)	-0.164***	-0.193***	-0.122***
	-5.13	*-6.05*	*-3.98*
ExpStart (t-2)	-0.130***	-0.148***	-0.066***
	-5.04	*-5.83*	*-2.81*
ExpStart (t-1)	-0.069***	-0.082***	0.002
	-3.67	*-4.48*	*0.100*
ExpStart (t+1)	0.097***	0.062***	0.113***
	10.66	*6.86*	*11.36*
ExpStart (t+2)	0.118***	0.087***	0.155***
	8.87	*6.67*	*11.54*
ExpStart (t+3)	0.122***	0.093***	0.171***
	7.22	*5.57*	*10.39*
ExpStart (t+4)	0.104***	0.091***	0.170***
	5.28	*4.67*	*8.85*
ExpStart (t+5+)	-0.002	-0.002	0.074***
	-0.080	*-0.060*	*2.99*
Domestic ownership		0.250***	0.122***
		30.94	*9.92*
Foreign ownership		0.486***	0.332***
		19.94	*11.24*
Log Intensity			0.200***
			34.84
Number of observations	**168779**	**168779**	**139472**
Number of groups	**40867**	**40867**	**34373**
R-squared:			
within	**0.066**	**0.082**	**0.201**
between	**0.008**	**0.025**	**0.069**
overall	**0.010**	**0.023**	**0.054**

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