

EXPORT AND MANUFACTURING PRODUCTIVITY GROWTH EFFECT ON MACROECONOMIC SITUATION IN LATVIA

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Abstract. This paper examines the methodology to investigate differences in productivity between exporters and non-exporters. After that, calculation methods` pros and cons, used in this study, are presented. Analysing the relationship between export status and productivity growth, Latvian manufacturing companies` data for the period 2000-2009 are used as an example. We expect that companies export activities are decent for labor productivity growth. The main hypothesis point is concerned about more productive firms involved into export markets. In the present research, using company-level data from Latvian manufacturing industry, we attempt to provide new information into the modern research on export-productivity correlation in the Latvian manufacturing industry. In the post-recession period Latvian government policy have shown solid interest in the export-led growth through various export promotions policies. In the empirical investigation data from local production branch, from cross sectional data collected in regular surveys by the Central Statistical Bureau is used.

Keywords: productivity, manufacturing, GDP, export, labour

Introduction

Manufacturing in Latvia suffered dramatically from the global financial crisis. Compared to 2008 manufacturing has decreased in 2009, although it has been growing since the 2nd quarter of 2009 due to global demand starting to recover. In the majority of sectors, most of the output is being exported; therefore the growth of individual sectors largely depends on the expansion of export opportunities. The leading growth industries in this sector are wood, metal, food and beverages industries (Figures 3; 4).

Many experts had noticed low productivity trends against real wages¹



Figure 1. The gap between wages and productivity
Source: The Bank of Latvia survey

¹The Bank of Latvia The gap between wages and productivity is narrowing rapidly [Accessed: 16 December 2009].
<http://www.bank.lv/eng/main/all/sapinfo/commentary/gap_between/>

The gap between wages and productivity is narrowing rapidly. As a result of cost cutting measures, the real effective exchange rate of the lats, which characterizes price and cost changes vis-à-vis the price and cost dynamics of the main trading partners, continued to drop. The gradual resumption of manufacturing allows for a fuller exploitation of the manufacturing capacities: the assessment of the employment of processing industry capacities in the third quarter improved by five percentage points quarter-on-quarter.

In 2010, the exports of Latvian goods grew 23.3% year-on-year and imports 22.0%². As a result of growing competitiveness and gradual recovery of the foreign markets, the nominal exports of Latvian goods in the first half of 2010 grew 22.9% year-on-year, with imports growing at a slower rate (8.3%). A month-to-month growth was observed also for the exports of food products, wood pulp and its products, means of transportation as well as mechanisms and mechanical equipment exports, which together accounted for 49.9% of the goods exports.

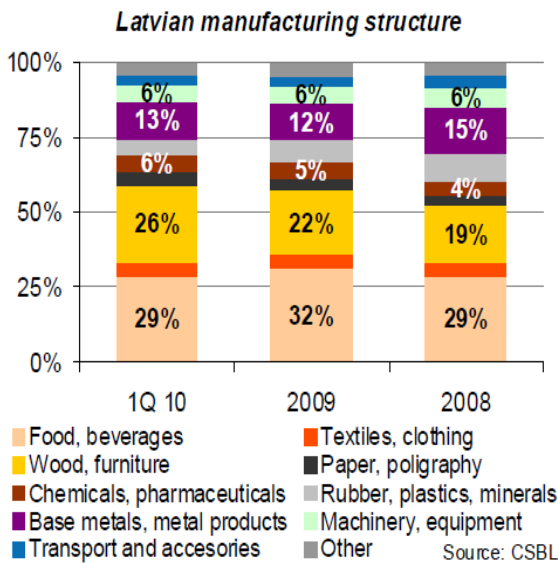


Figure 3. Latvian manufacturing structure

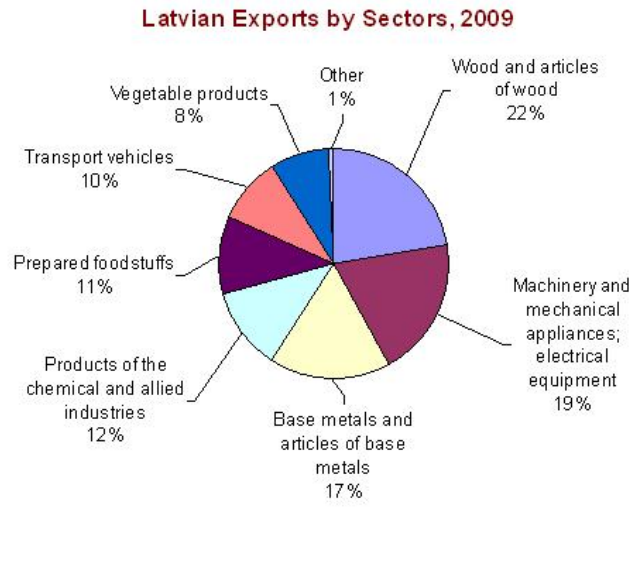


Figure 4. Latvian exports by Sectors, 2009

Source: Latvian Export Import Directory

Over the course of the year exports have grown for the majority of the most important groups of goods, except mineral products. Several indicators characterizing competitiveness continue to improve.

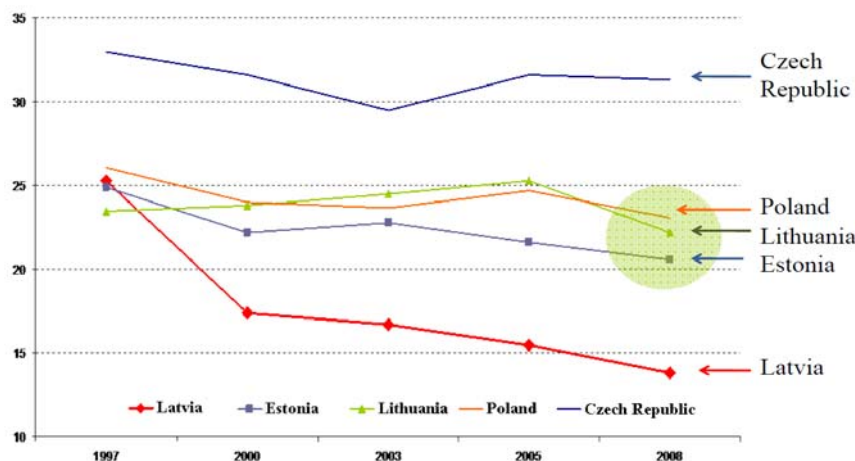


Figure 5. Manufacturing share in Economy (% of GDP)

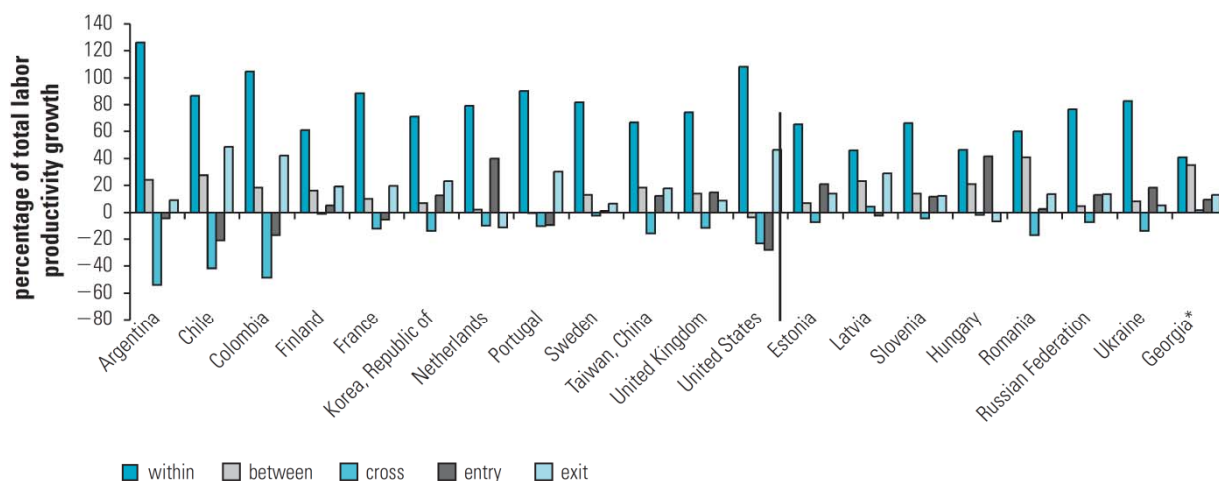
Source: SEB Bank Eastern European Outlook Economic Research – October 2010

¹ Monthly newsletter from Swedbank's Economic Research Department by Lija Strašuna Nr.3 July 2010

The data available from Latvia's main trading partners allow us to evaluate our market shares in April and May, indicating that the Latvian export shares have grown rapidly in the imports of such important trading partners as Denmark, Germany, Lithuania, the Netherlands, Poland, Finland, and the United Kingdom.

Latvia is characterized as low industrialization trend country (Figure 5).

As the global economy recovers from the crisis and the influence of various support mechanisms diminishes in manufacturing and export as well as the positive impact of price and cost drops on the competitiveness of Latvian exports dwindles, the Latvian export volumes will be increasingly affected by the degree to which productivity rises (Swedbank, 2011)³.



Source: Bartelsman, Haltiwanger, and Scarpetta 2004 for comparator countries. Brown and Earle 2007 for Hungary, Romania, Russian Federation, Ukraine, and Georgia. Bartelsman and Scarpetta 2007 for Estonia, Latvia, and Slovenia.

Note: Data show the sum of the contributions from new firms and exiting firms to total labor productivity in manufacturing. Data cover different periods. Data for Georgia are for 2001–04, rather than a five-year window. Because a shorter period tends to underestimate the contribution of new firms to total productivity growth, the data are not strictly comparable.

Figure 6. Sources of productivity growth in Developed, Transition and Developing Countries

Background of the study

Productivity levels and its continuous growth trends over time are viewed as important factors that characterize competitiveness in international trade. In the theoretical field, there is a common opinion that international trade in general and export in particular enhances country's economic growth and improves the productivity of involved companies⁴. There are different methods how to calculate company's productivity.

Economic policies under export-led growth strategy have been widely supported on the argument that exposure to international market through export helps to increase the productivity of exporters. Similarly, advocates of endogenous growth theory believe that export plays a crucial role by improving productivity through innovation.⁵

Literature review

Discussions of the significance of exports in promoting growth in general, and productivity in particular, have been discussed for many years. Recently there were some empirical studies in this field used data at the country or industry level to test whether exports stimulates productivity growth or vice versa⁶.

In 1995 Bernard and Jensen published the first of series of papers that changed this research trends⁷. They used large comprehensive long-term data from surveys performed regularly by official statistics in the U. S. to look at differences between exporters and non-exporters in various dimensions of company's performance, including productivity. During the ten years following the publication of Bernard and Jensen's

² *Eastern European Outlook* - March 2010. SEB, Economic Research

[Accessed: 08 January 2011] <<http://www.seb.lv/lv/private/research/analytic-info/SEBreviews/EEoutlook/2005/apskati/march/>>

⁴ Beckerman, Wilfred (1962): "Projecting Europe's growth", *Economic Journal*, Vol 72, 912-925; Kaldor, Nicholas (1970):

"The case for regional policies", *Scottish Journal of Political Economy*, Vol 17 (3): 337-448.

⁵ Rivera-Batiz, Luis A and Paul M. Romer (1991): "Economic integration and endogenous growth", *Quarterly Journal of Economics*, Vol 106 (1): 531-555.

⁶ Baldwin, Robert. 2000. "Trade and Growth: Still Disagreement about the Relationships." Organisation for Economic Co-operation and Development, Economics Department Working Paper EC0/WKP(2000)37, October.

⁷ see Bernard and Jensen 1995, 1999, 2004a

Brookings paper researchers all over the world discovered the rich data sets collected by their statistical offices as a source to investigate the export activity of companies, and its causes and consequences.⁸ The extent and cause of productivity differentials between exporters and their counterparts which sell on the domestic market only is one of the core discussions.

The decent works of Bernard and Jensen⁹ and Bernard et al. (2003) have brought into focus the exceptional performance of exporting companies in terms of labour productivity and companies heterogeneity within sectors. And this initiated new discussions on the issue that whether exporting leads to productivity growth and are exporters more productive than non-exporters. Melitz made the debate more interesting and added a new dimension by showing that productive companies self-select into export market.¹⁰ And further Helpman, Melitz and Yeaple show that under the condition of within sectors equal trade and investment opportunity, the least productive companies operate only in domestic market and most productive serve international markets through export as well as foreign direct investment.¹¹ Some more careful studies, as by Aw and Hwang (1995) for Taiwan; Bernard and Jensen (1995, 1999) for US; Clerides, Lach and Tybout (1998) on Colombia, concluded that companies that export are more productive than non-exporters.¹² More precisely, the essence of this new transformed debate has been the learning-by-exporting and self-selection hypothesis. While many studies have reported evidences in favour of self-selection hypothesis some other studies have argued that companies become more productive when they participate in export market.¹³ On the other hand a growing body of literature has suggested that exporting confers little or no bonus in the form of faster productivity growth at the plant level.¹⁴ In most of the cases, the higher productivity of companies actually foredate their entry into export market. Despite a huge amount of literature on the export-productivity linkage the empirical evidences on whether exporting increases companies' productivity has been heavily varied so far.

Global experience

During the fifteen years following the publication of the mind-breaking paper by Bernard and Jensen researchers around the world used company level data to investigate the relationship between exporting and productivity in microeconomic studies. Among the countries covered are highly industrialized countries (e.g., U.S., UK, Canada, Germany); countries from Latin America, Asian countries; transition countries (Estonia, Slovenia, Slovakia); and least developed countries from Africa.¹⁵ To summarize findings on differences in levels and growth rates between exporters and non-exporters there is a promising result - exporters are found to have higher productivity, and often higher productivity growth.

After reviewing those results it makes clear that exporters are more productive than non-exporters, while exporting does not necessarily improve productivity. Cross-country comparisons, and even cross-study comparisons for just one country, are difficult and stochastic because the many studies differ in details of the approach used. Therefore, there are still many issues regarding the relationship between exporting and productivity.

Data and Methodology

In this part of the paper the author introduces to the methodology. First, general view of the econometric methods is introduced. After that, calculation methods' pros and cons, used in this study, are presented.

Standard method

A common approach to simply investigate differences in productivity between exporters and non-exporters is to follow the methodology introduced by Bernard and Jensen (1995, 1999).¹⁶ Studies of this type use long-term data for plants analysed differences in levels and growth rates of productivity between exporters and non-exporters in a first step. Here one starts by looking at differences in average labour productivity (usually total value of shipments per worker, or value added per worker) or average total factor productivity

⁸ Earlier research using longitudinal micro data from official statistics in Germany to investigate causes and consequences of exporting is summarised in Wagner (1995).

⁹ Bernard, Andrew B. and J. Bradford Jensen. 2004b. "Why some companies export." *Review of Economics and Statistics* 86, 561-569.

¹⁰ Melitz, Marc J. "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity." *Econometrica* 71, 1695-1725.

¹¹ see Helpman, Melitz and Yeaple (2004)

¹² see Aw and Hwang (1995) for Taiwan; Bernard and Jensen (1995, 1999) for US; Clerides, Lach and Tybout (1998) on

¹³ see the survey by Wagner, 2007

¹⁴ Clerides, Sofronis K., Saul Lach and James R. Tybout. 1998. "Is Learning by Exporting Important? Micro-dynamic Evidence from Colombia, Mexico, and Morocco." *Quarterly Journal of Economics* CXIII, 903-947

¹⁵ see Bernard and Jensen (1995)

¹⁶ see Bernard and Jensen (1995, 1999)

between exporters and non-exporters. The result is an unconditional productivity differential. The next step is the computation of so-called exporter benefits, defined as the remaining percentage difference of labour productivity between exporters and non-exporters. These benefits are computed from a regression of log labour productivity on the current export status dummy and a set of control variables (usually including industry, region, company size measured by the number of employees, and year):

$$\ln LP_{it} = \alpha + \beta \text{Export}_{it} + \epsilon \text{Control}_{it} + \epsilon_{it} \quad (1)$$

where i is the index of the company, t is the index of the year, LP is labour productivity, Export is a dummy variable for current export status (1 if the company exports in year t , 0 else), Control is a vector of control variables (like four-digit industry dummies, dummies for regions, company size, and year dummies), and ϵ is an error term.

The export benefits, calculated from the formula, shows the average percentage difference between exporters and non-exporters controlling for the characteristics included in the vector Control . If good companies become exporters then we should expect to find significant differences in performance measures between future export starters and future non-starters several years before some of them begin to export.

While most of the empirical studies that use variants of standard approach described in this section compare exporters and non-exporters across all manufacturing industries, some studies focus on companies from selected industries only and document interesting similarities and differences (see e.g. Alvarez and Lopez (2004), Blalock and Gertler (2004), De Loecker (2004), and Greenaway and Kneller (2004b)). Furthermore, Damijan, Polanec and Prasnikar (2004) recently looked at differences by foreign markets served and found that it matters whether companies exported to advanced countries or developing countries.¹⁷

Pros and Cons

The standard approach has its weaknesses and problems. Paper analyses some recent developments that are used in dozen empirical investigations, namely the comparison of productivity between matched companies, and differences in the distribution of productivity as a whole between exporters and non-exporters.

However, we cannot observe whether they would really do so because they do start to export today; we simply have no data for the counterfactual situation. The use of a matching approach to search for causal effects of starting or stopping to export on productivity (and other dimensions of company performance) has been performed by Wagner (2002) and Girma, Greenaway and Kneller (2003, 2004), and it has been used in a growing number of empirical studies ever since (including De Loecker (2004), Arnold and Hussinger (2004), and Alvarez and Lopez (2004)).¹⁸

The comparison of productivity (or productivity growth) between exporters and non-exporters usually represents mere productivity distribution. It is very difficult to deny stochastic dominance of the productivity distribution for exporters over the productivity distribution for non-exporters.

Recent studies on this relationship are another standard approach used in the investigation of the relationship between exports and productivity with the application of quantile regression, introduced to this field of analysis by Yasar, Nelson and Rejesus (2003) and Roger Koenker, Kevin F. Hallock, (2001).¹⁹

This method examines the productivity effect of exporting at different points of the conditional output distribution. To describe it differently, quantile regression allows to test for differences in the effects of exporting on company's productivity as one moves from the lower to the upper tail of the conditional productivity distribution, and to identify the regions where these effects are especially weak, or strong, or not significantly different from zero at all.

Quantile regression can be illustrated as follows²⁰

$$\ln y_{it} = x_{it}'\beta_{\theta} + u_{it} \text{ with } Q_{\theta}(\ln \frac{y_{it}}{x_{it}}) = x_{it}'\beta_{\theta} \quad (2)$$

where $\ln y$ is the vector of log output, x is a vector of all the regressors in (1), β is the vector of parameters to be estimated, and u is a vector of residuals.

¹⁷ see e.g. Alvarez and Lopez (2004), Blalock and Gertler (2004), De Loecker (2004), and Greenaway and Kneller (2004b)). Furthermore, Damijan, Polanec and Prasnikar (2004)

¹⁸ see Wagner (2002) and Girma, Greenaway and Kneller (2003, 2004), and it has been used in a growing number of empirical studies ever since (including De Loecker (2004), Arnold and Hussinger (2004), and Alvarez and Lopez (2004)).

¹⁹ see Yasar, Nelson and Rejesus (2003) and Roger Koenker, Kevin F. Hallock, (2001).

²⁰ Koenker, R. and G. Bassett (1978). "Regression Quantiles." *Econometrics* 46: 33-50. And Buchinsky, M. (1998). "Recent Advances in Quantile Regression Models: A Practical Guide for Empirical Research." *Journal of Human Resources* 33(1): 88-126.

Labour Impact on Productivity Growth

The effects of shifts in sectorial shares on aggregate productivity growth can severely impact productivity and result. This factor is one of the most important involved in our research. It can be calculated using different techniques. In all cases, it is crucial to consider the shift of employment not only from sectors with low-productivity growth to sectors with high-productivity growth but also from sectors with low-productivity levels to those with high-productivity levels. The reason is that the positive contribution to aggregate productivity of the high-growth sectors may be offset by their lower-than-average productivity levels. Standard approach is to express the productivity for the economy as a whole as the sum of the productivity level of each sector weighted by the sectorial employment shares:

$$P_n = \frac{Y_m}{L_m} = \frac{\sum_{j=1}^n Y_j}{L_m} = \sum_{j=1}^n P_j * S_j \quad (3)$$

where Y is output, L is employment by sector ($j = 1 \dots n$) and the total economy (m), P is labour Productivity (Y/L), and S is the sectorial employment share.

Concluding remarks

Talking about conclusion that emerges after fifteen years of microeconomic research in the relationship between exporting and productivity is that exporters are more productive than non-exporters, while exporting does not necessarily improve productivity.

Nonetheless, there are some difficulties concerning comparison of the results from the vast numbers of studies in detail, it still seems to be early to speak of these findings as solid facts, and to discuss any policy conclusions to be based thereon. Furthermore, there are a number of important issues that have only been touched upon recently in some studies, and that deserve future research efforts that cover more countries:

Furthermore, there is a different area of future research that is driven by an emerging theoretical literature. A number of theoretical papers, including Bernard, Eaton, Jensen and Kortum (2003), Melitz (2003), Helpman, Melitz and Yeaple (2004), and Yeaple (2005), take the results from the empirical literature on companies and exports as a starting point and develop models of international trade with heterogeneous companies which focus on the relationship between productivity and exports.²¹

Conclusions

The research cover general data gathered Latvian manufacturing industries that employ at least 20 persons in the local production unit or in the company that owns the unit. Therefore, companies (small and microsmall) with less than 20 employees in total do not report to the surveys. In this paper annual data for 2000 to 2009, in order to minimize statistical error, are used.

The most anticipated result of year-specific estimations is the severe recession in labor productivity growth in 2009. The labor productivity growth rate at very high levels of the export-sales ratio is even smaller than the growth rate of non-exporting firms, although not significantly so.

In this research we analyzed the possible relationship between companies' labor productivity growth rates and their export orientation. We described that there is an effect of companies' export activities on labor productivity growth.

One possible reason for these results is that most previous studies are restricted to analysing the relationship between a companies' export status and the growth of its labour productivity, using the companies' export *status* as a primary treatment variable and comparing the performance of exporting and non-exporting companies. During our research we found that the relationship between labor productivity growth and the export sales ratio is not necessarily stable over time. This is a unanticipated result.

Our results, describes a time-varying relationship between labor productivity growth and the export-sales ratio. The reason for this result might be that companies also sell their products not necessarily in European Union, but also in more distant and technologically less advanced countries. This could increase the costs of coordination and control of exporting firms, but companies are less likely to benefit from this kind of exporting, if they export to a technologically less advanced country this means that innovation level of their product is also not so important as for advanced countries in EU.

²¹ See Bernard, Eaton, Jensen and Kortum (2003), Melitz (2003), Helpman, Melitz and Yeaple (2004), and Yeaple (2005),

As a first step of our research, there is not yet clear from our modelling is whether these exporting status effects will occur primarily through their indirect effects from post export returns, or directly from company's transformation powers. There is not yet fully approved direct correlation between these factors. As limitations in our data this research was unable to identify does exporting status is critical for high productivity, and therefore author is forced to use in future researches more information analysis presented by authority institutions.

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