# Exporting and Company Performance in Slovenia: Self-Selection and/or Learning by Exporting?

*Anže BURGER – Andreja JAKLIČ\* – Matija ROJEC\*\**

## Abstract

*The paper analyses the direction and intensity of causal relationship between exporting and performance of Slovenian firms. Based on individual company data for the entire population of Slovenian firms in 1994 – 2004, the analysis confirms the existence of self-selection into exporting. Using propensity score matching methodology, we also estimate the effects of exporting on the evolution of productivity, total sales, employment, and average wages in new exporters. With respect to growth rate premia, the improvements in productivity and other performance measures are far form permanent and tend to dissipate in a couple of years after export entry. On the other hand, evidence suggests that exporting significantly improves performance of new exporters in terms of levels and that the acquired premium over non-exporters persists over medium term.*

## Introduction

Two issues dominate the analysis of the relationship between exporting and firm performance. First, are exporting firms more productive and, in general, better performing than firms selling only in the domestic market? Is it true that only better performing firms begin to export and one can speak of a certain self--selection of firms in exporting? Second, does the vice versa relationship holds as well; i.e. does exporting as such help increase firm performance and one can speak of learning-by-exporting? Answers to the above questions are not relevant

* Anže BURGER – Andreja JAKLIČ, University of Ljubljana, Faculty of Social Sciences, Kardeljeva ploščad 5, 1000 Ljubljana, Slovenia; e-mail: anze.burger@fdv.uni-lj.si; andreja.jaklic@fdv.uni-lj.si

\*\* Matija ROJEC, University of Ljubljana, Faculty of Social Sciences, Kardeljeva ploščad 5, 1000 Ljubljana, Slovenia; Institute of Macroeconomic Analysis and Development, Gregorčičeva 27, 1000 Ljubljana, Slovenia; e-mail: matija.rojec@gov.si

only for firms but for economic policy as well. If learning-by-exporting effect exists, this is an important additional argument in favour of export-promoting policy measures, especially to stimulate firms, which operate in domestic market only, to enter foreign markets. This is even more so for firms from small economies, such as Slovenia, where firms on average realise much higher fraction of their sales in foreign markets.

The paper analyzes the direction and intensity of causal relationship between exporting and performance of Slovenian firms. More precisely, we make an attempt to answer the following questions: (i) do exporters, on general, perform better than non-exporters already before they begin exporting, i.e. is it predominantly better performing firms that start exporting and there is a kind of self-selection of better performing firms to become new exporters; (ii) do exports promote firms' growth and performance, i.e. is there a learning-by-exporting effect; (iii) are both effects, self-selection and learning-by-exporting, at work and if yes, which of them is stronger.

The paper is composed of three parts. The first part reviews the existing literature on the relationship between exporting, and firm growth and performance. The second part analyzes the main characteristics and the pace of appearance of Slovenian exporters. In the third part, we calculate the premium realised by exporters over non-exporters. We check if exporters are significantly more successful than non-exporters already before the beginning of exporting, and what are the differences in performance after the beginning of exporting. Further on, using propensity score matching methodology, we estimate to what extent the differences between new exporters and non-exporters are due specifically to exporting and not due to some other firm characteristics. By chaining of both methods, we analyse the effects of exporting on productivity (total factor productivity and value added per employee) and growth of sales, employment, and average wages in Slovenian firms. We examine to what extent export activity arises from firm performance, and to what extent exporting contributes to firm performance. The last section concludes.

## 1. Literature Review

Empirical studies on the relationship between exports and firm performance clearly confirm that exporting firms are more productive and, in general, better performing than firms oriented only to domestic markets. More productive, better performing firms, thus, exhibit higher tendency to exporting. Bernard and Jensen (1995, 1997a, 1997b, 1999a, 1999b) analyse U.S. firms using different data sets, analytical methods and different time periods and conclude that it is

mostly better performing firms that switch to exporting: in the time before export initiation, growth rates and levels of various performance indicators are higher for future exporters than for other firms. U.S. exporters also exhibit higher survival rates and faster employment growth than non-exporters (Bernard et al., 2005). Findings of other authors for other countries – Bernard and Wagner (1997) for Germany, Aw and Hwang (1995), Aw, Chen and Roberts (1997, 1998) for Taiwan and Republic of Korea, Clerides, Lach and Tybout (1998) for Columbia, Mexico and Morrocco, Hahn (2004) for Republic of Korea, Van Biesebroeck (2003) for nine African countries, Hallward-Driemeier, Iarossi and Sokoloff (2002) for five East Asian countries, Criscuolo, Haskel and Slaughter (2005) for UK, Head and Ries (2003) for Japan, Handoussa, Nishimizu and Page (1986) for Egypt, De Loecker (2005), Damijan and Kostevc (2006), Burger and Ferjančič (2006) for Slovenia – are similar. In short, the existing literature shows that exporting firms are larger, more capital and technologically intensive, more innovative, exhibit higher growth of employment, sales and productivity, have higher survival rates, pay higher wages and invest more in tangible assets.

Differences in company performance in relation to different modes of servicing foreign markets are also confirmed by Helpman, Melitz and Yeaple (2003), who find that the least productive firms tend to sell on the local market, that only more productive firms decide to sell abroad, and that only the most productive among the latter decide to service foreign markets through foreign direct investment (FDI). According to Hallward-Driemeier et al. (2002), the very decision of a firm to start exporting brings such reorganization in the firm that leads to productivity increase. Therefore, it is not simply that more productive firms self-select themselves for exporting but more than that. Firms that explicitly target export markets, consistently adopt different decisions about investing, training, technology and input selection and in this way increase productivity.

If there is a consensus in the literature about the self-selection of better performing firms to exporting, this is not the case as far as learning-by-exporting is concerned. Through which channels are exports contributing to faster growth and better performance of exporters? International competition is supposed to force companies to produce closer to their production possibility frontier and to push the frontier outward in a faster way. Via their international contacts, exporters acquire knowledge on new production methods, inputs, management, and marketing, which results in higher productivity compared to more isolated firms producing only for domestic market[1] (Aw et al., 1998). Also, the case study literature documents instances in which technologically sophisticated buyers

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[1] Hallward-Driemeier, Iarossi and Sokoloff (2002) find that productivity gap between exporters and non-exporters is higher the less developed the domestic market.

transmit blueprints and proprietary knowledge to the exporting firms (Tybout, 2006). In general, more intensive competition and additional knowledge sources in export markets stimulate exporters to strengthen their growth and performance. What exactly do empirical studies say on the subject?

Several authors have looked at the learning-by-exporting effect by studying temporal changes in firms' performance in relation to export market participation.[2] Bernard and Jensen (1999a, 1999b) are rather sceptical about the learning-by-exporting effect for U.S. firms. Once firms become exporters, their employment growth and survival probability are higher, but productivity growth is not higher, especially not on a longer period.[3] They see the reason for relatively weak long-term effect in considerable dynamism of export markets, which results in higher share of annual entries and exits of firms. An entry is a time of growth and increased efficiency while firms which discontinue exporting exhibit poor performance indicators. Findings of Clerides et al. (1998) for Morocco, Mexico and Colombia,[4] of Bernard et al. (1997) for German firms, and Aw et al. (1998) for South Korean firms are similar.

In contrast, a set of studies using different econometrical strategies, confirms positive impact of exporting on productivity. Hahn (2004) confirms productivity growth of South Korean exporters,[5] Kraay (2006) for Chinese firms, Aw et al. (1998) for Taiwanese firms, Bigsten et al. (1999) and Van Biesebroeck (2003) for African firms (in various African countries), Criscuolo et al. (2005) for UK firms. Exporting provides firms with more learning opportunities from foreign sources and with a broader pool of information. This definitely speaks in favour of the learning-by-exporting effect.

Existing analysis on Slovenian manufacturing sector using the propensity score matching method find that new exporters increase productivity. De Loecker finds 10% productivity increase for new exporters, but lacks proofs of

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[2] These studies amount to Granger causality tests based on variants of the autoregressive specification (Tybout, 2006).

[3] Bernard and Jensen (1999b), however, claim that within individual industries exporters grow faster than non-exporters. Exporting is linked to the reallocation of resources from less to more efficient firms. The effects of this reallocation account for as much as 40% of total factor productivity (TFP) growth in the manufacturing sector. Thus, even if exporting does not contribute to higher growth and performance on individual firm level, the fact that on the level of manufacturing sector as a whole one can see the reallocation of resources from worse-performing non-exporters to better-performing exporters contributes to the growth of the manufacturing sector TFP. By analysing effects of exporting on a firm level one, therefore, probably ignores the biggest part of the positive impact of exporting on the whole economy.

[4] With a different econometric strategy, they find that exporting does not contribute to a faster growth of firms from these countries.

[5] According to him, positive and robust cross-section correlation between exporting and TFP can be explained by self-selection, as well as by learning-by-exporting, both effects being more emphasized around the time of firm's entry or exit from export market.

statistically significant increase of TFP growth of new exporters as compared to the control group of firms in the period after the beginning of exporting.[6] Damijan and Kostevc (2006) find that TFP growth of new exporters is significantly higher than in the case of non-exporters only in the first year of exporting, while in later years the difference vanishes. The present study expands the set of industries, time period and performance indicators and analyses the process of self selection, learning-by-exporting effects and timing and intensity of these effects on the sample of Slovenian firms.

## 2. Pace of Appearance and Main Features of Slovenian Exporters[7]

Exporters are a vital part of Slovenian economy, responsible for most of the employment and value added. Fraction of exporters in total number of Slovenian firms exceeds 20% and gradually increases. In spite of a constant increase of total exports and of the number of exporters, the exports to sales ratio of Slovenian exporters has been, on average, gradually decreasing since 1998. This seems to be due to increasing involvement of micro and small firms in exporting.[8] The appearance of new exporters is one of the main indicators of the export dynamism of corporate sector. Annual number of new exporters, their share in total number of firms and the capability of creating new exporters is relatively stable (Table 1). In the period since 1996: (i) annual number of new exporters ranges between 1 600 and 1 900; (ii) shares of new exporters in total number of firms range between 4.3% and 5.3%; (iii) shares of new exporters in total

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[6] TFP growth of new exporters is significantly higher than in the case of non-exporters only in the first year of exporting, while in later years the difference vanishes.

[7] The meaning of the terms used in the analysis are the following: (i) *exporter:* firm with positive exports in the analyzed period; (ii) *new exporter:* firm, which is exporter in the analyzed year, and non-exporter in the year before; (iii) *non-exporter:* firm, which has not exported at all in the analyzed period; (iv) *permanent exporter:* firm, which has been exporter in every single year of the analyzed period (1994 – 2004); (v) *non-permanent exporter:* firm, which has been exporter in at least one year, and non-exporter in at least one year of the analyzed period; (vi) *exporter with increasing (decreasing) exports:* exporter with positive (negative) average of chain growth rates of exports in the analyzed period.

[8] Majority of exporters still realize most of their sale in domestic market. In 2004, as much as 38% of exporters exported less than one tenth of their total sales, while 42% of exporters exported more than half of their total sales. In 1994 – 2004, new exporters were increasing their exports to sales ratio by almost 10% annually. The majority of Slovenian exporters are non-permanent ones; in 2004, the proportion between permanent and non-permanent exporters was one to four. Interesting pattern also emerges from newly established firms, since significant share (about 10%) in these new entrants comprises of born-exporters. Average export-to-sales ratio in this group of incipient firms ranges between 48% and 60% in the period 1996 – 2005. Anecdotal evidence from business press suggests that many Slovenian exporters use spin-off firms to channel some of the exporting business from the parent company to a newly established daughter company.

number of existing exporters range between 17.6% and 22.7%; and (iv) the capability of creating new exporters, measured by the ratio of new exporters to potential new exporters (i.e. non-exporters) ranges between 5.5% and 6.8%. Two other features should be mentioned in the analyzed period. First, the number of new exporters is, as a rule, much higher than the number of firms that cease exporting.[9] Second, once firms begin to export they remain exporters in most cases; the share of new exporters, which remain exporters, ranges between 58% and 66% and is pretty constant in the recent years.

*Size structure of exporters.* According to the size structure of the whole population of Slovenian firms, it is micro enterprises which dominate in the population of exporters (Table 2). In 2004, micro firms account for 77.6% of the total number of Slovenian exporters, followed by small firms with 15.3%, medium firms with 5.4% and large firms with 1.6%. Another relevant aspect relates to the size structure of exporters is fraction of exporters in total number of firms within individual size cluster. As expected, the fraction increases with the size of firms. In 2004, vast majority (95.8%) of large firms exported, while there were only 35.6% exporters among micro firms.

*Trends in employment of exporters.* In 2004, as much as 71% of all employees in Slovenian corporate sector were employed in exporting firms. New exporters increased the number of employees from 50,200 in 1994 to 109,600 in 2004. Table 3 shows that, in 1995 – 2004, exporters overall decreased the number of employees by 17,589, while non-exporters increased it by 10,081.[10] The decrease of exporters' employment is due to the decrease within the group of exporters with decreasing exports by 90,529 in 1995 – 2004. At the same time, the employment of exporters with increasing exports increased by 73,137. Increasing exports have thus a positive influence on employment growth (non--permanent exporters) or at least reduce pressures for employment reduction (permanent exporters). New exporters played a crucial role in the employment growth after the transition shock at the beginning of the 1990s. On the other hand, the above trends also indicate that Slovenian exporters face strong pressures to rationalize and retain the cost competitiveness. Namely, Slovenian exports are largely dominated by products whose export competitiveness is based on (labour) cost factors, and cost competitiveness of Slovenian exports is decreasing as compared to other new EU member states (see, e.g. Strojan Kastelec, 2001; Rojec et al., 2004).

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[9] The rate of entry of new exporters is also higher than the rate of growth of the number of firms, which operate in domestic market only.

[10] It seems that non-exporters, mostly in the service and non-tradable sectors, are much less under the competitive pressures than exporters. Plus, the growth of service sector is higher than of the manufacturing, which is the main exporting sector.

T a b l e 1

**Slovenian Exporters, 1995 – 2004**

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 |
|---|---|---|---|---|---|---|---|---|---|---|
| Number of exporters | 7,513 | 7,793 | 7,952 | 7,970 | 8,174 | 8,474 | 8,831 | 9,185 | 9,341 | 9,869 |
| Share of exporters in all firms (%) | 22.4 | 21.8 | 21.7 | 22.3 | 22.1 | 22.8 | 24.1 | 24.6 | 23.8 | 23.5 |
| Growth of the number of exporters (%) | 12.8 | 3.4 | 2.0 | 6.7 | –1.7 | 3.6 | 4.1 | 4.5 | 1.2 | 3.5 |
| Exports-to-sales ratio for all exporters (%) | 36.5 | 36.4 | 36.9 | 36.6 | 34.9 | 35.2 | 34.8 | 32.9 | 32.2 | 31.1 |
| Number of new exporters | 2,303 | 1,767 | 1,734 | 1,589 | 1,758 | 1,800 | 1,766 | 1,912 | 1,640 | 1,880 |
| Number of firms that ceased exporting | 1,401 | 1,670 | 1,665 | 1,643 | 1,604 | 1,592 | 1,483 | 1,696 | 1,572 | 1,527 |
| Share of new exporters in total number of firms (%) | 6.8 | 5.3 | 4.8 | 4.3 | 4.6 | 4.8 | 4.7 | 5.1 | 4.3 | 4.7 |
| Share of new exporters in all exporters (%) | 30.7 | 22.7 | 21.8 | 19.9 | 21.5 | 21.2 | 20.0 | 20.8 | 17.6 | 19.0 |
| Ratio between new exporters and non-exporters (%) | 8.5 | 6.8 | 6.2 | 5.5 | 5.9 | 6.1 | 6.1 | 6.7 | 5.7 | 6.2 |
| Permanent new exporters (%) | 65.7 | 64.8 | 60.8 | 58.6 | 58.6 | 60.3 | 59.4 | 62.4 | 65.2 | 62.7 |
| New exporters that temporarily stop exporting once (%) | 26.1 | 27.0 | 30.9 | 31.7 | 32.1 | 31.6 | 31.5 | 29.0 | 26.2 | 27.6 |
| New exporters that stop exporting twice or more (%) | 8.3 | 8.2 | 8.2 | 9.7 | 9.3 | 8.1 | 9.0 | 8.6 | 8.6 | 9.7 |

*Source:* Own calculations.

T a b l e 2

**Size Structure of Slovenian Exporters, 1994 and 2004 (in %)**

| Size cluster | Distribution of the number of exporters according to size clusters | | Fraction of exporters in all firms within individual size cluster | |
|---|---|---|---|---|
| Year | 1994 | 2004 | 1994 | 2004 |
| Micro | 83.2 | 77.6 | 42.1 | 35.6 |
| Small | 8.2 | 15.3 | 64.3 | 67.2 |
| Medium | 5.9 | 5.4 | 77.1 | 79.6 |
| Large | 2.7 | 1.6 | 94.4 | 95.8 |
| Total | 100.0 | 100.0 | 45.2 | 40.1 |

*Note:* Micro, small, medium and large firms employ 0 – 9, 10 – 49, 50 – 249 and more than 250 employees.

*Source:* Own calculations.

T a b l e  3

**Annual Changes in Number of Employees by Type of Exporters, 1995 – 2002**

| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 1995 – 2004 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Exporters – total | 1,312 | –16,843 | –11,198 | –7,356 | 2,814 | 4,633 | 6,804 | 370 | 2,244 | –369 | –17,589 |
| Permanent exporters – increasing export | 3,004 | 370 | –2,276 | –1,063 | –1,598 | –1,459 | 2,206 | –779 | –1,259 | –4,019 | –6,873 |
| Permanent exporters – decreasing export | –9,963 | –18,862 | –7,538 | –7,124 | –2,137 | –3,173 | –2,469 | –4,151 | –3,586 | –1,683 | –60,686 |
| Non-permanent exporters – increasing exports | 18,225 | 9,772 | 11,124 | 7,126 | 8,376 | 10,701 | 7,318 | 181 | 2,789 | 4,398 | 80,010 |
| Non-permanent exporters – decreasing exports | –3,438 | –5,129 | –8,062 | –2,061 | –2,557 | –460 | –3,025 | –2,273 | –1,909 | –929 | –29,843 |
| New exporters | 13,413 | 3,411 | 3,495 | 5,953 | 5,199 | 8,594 | 4,807 | 2,040 | 5,586 | 6,900 | 59,398 |
| Non-exporters | 7,978 | –545 | 4,459 | 5,984 | 1,573 | 563 | –2,034 | –8,290 | –3,390 | 3,783 | 10,081 |
| All firms – total | 9,290 | –17,388 | –6,739 | –1,372 | 4,387 | 5,196 | 4,770 | –7,920 | –1,146 | 3,414 | –7,508 |

*Source:* Own calculations.

### 3. Performance of Exporters as Compared to Non-Exporters and Relevance of Exports for Performance

Performance of exporters can be estimated by comparing them to other (non-exporting) firms. In accordance to theoretical predictions and existing empirical results for other countries, the data for Slovenia confirm better performance of exporters as compared to non-exporters; on average, exporters are larger, more capital and technologically intensive, and more productive (measured by value added per employee), have higher profits and are faster in introduction of new information technology (see Damijan et al., 2007; Jaklič and Svetličič, 2003; Jaklič, 2004; Stare et al., 2005; Stare, 2006). Also, the share of innovative firms is higher among exporters (25% in 1999 – 2000) than among firms, operating only in domestic market (10%) (Jaklič, 2004).

The differences between exporters and non-exporters, indicated by descriptive statistics, however, do not say much about the reasons for differences. More exactly, they do not tell whether, and to what extent the differences between exporters and non-exporters are a consequence of exporting, and not of some other predetermined firm characteristics. In the following sections, we will try to answer two questions: (i) do exporters perform better than non-exporters, in statistically significant terms, and what are the differences in performance before and after the beginning of exporting; (ii) is better performance of exporters due to the fact that they export. We will use the chaining of two econometric methods, method of calculating the exporter premium and the propensity score matching method. We analyse the impact of exporting on productivity (TFP and value added per employee) and growth of sales, employment, and average wages of new exporters. The data set includes financial and accounting information on the whole population of Slovenian enterprises in the period 1994 – 2004 and stems from the AJPES[11] Database. All data related to sales and value added were deflated by the producer price index on a NACE 2-digit level, while the rest of the data were deflated with the consumer price index.

#### 3.1. Exporter Premia and Their Trends after the Beginning of Exporting

One of the methods for estimating the performance of exporters is calculation of exporter premium, i.e. premium realized by exporters over non-exporters in various performance indicators (more on the method see in Bernard and Jensen, 1999a, pp. 4 – 6). Exporter premium for individual variable shows average difference in percent of exporters over the non-exporters in the same industry. Premium in a selected variable ($X$) is estimated in the following way:

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[11] Agency of the Republic Slovenia for Public Legal Records and Related Services.

$$\ln X_{it} = \alpha + \beta EX_{it} + \gamma Industry_{it} + \lambda \ln L_{it} + \varepsilon_{it}$$

where

*EX*       – a dummy for current export status,
*Industry* – a dummy for three digit NACE industry,
*lnL*      – the logarithm of the number of employees.[12]

Performance variables *X* in our case are TFP, value added per employee, employment, and total sales. Parameter *ß*, gives information about the export premium ($100*e^{\beta} - 100$), which shows the average percentage difference between exportters and non-exporters in the same industry.[13]

Table 4 shows that exporters realize high exporter premium over non-exporters in the whole analyzed period, in all the size clusters of firms and in all the analyzed performance variables. In all the variables, the highest premium is realized by micro firms. In general, the larger the size of a firm the lower the exporter premium. High exporter premium realized by micro and small firms suggests the targeting of economic policy measures to these categories of firms.

T a b l e  4
**Exporter premia by size clusters of firms, 1994, 1999 and 2004 (in %)**

|  |  | Micro | Small | Medium | Large | All firms |
|---|---|---|---|---|---|---|
| **1994** | Number of employees | 54.4 | 13.3 | 23.4 | 7.0 | 211.1 |
|  | Sales | 435.6 | 109.2 | 40.9 | 138.7 | 377.9 |
|  | Value added per employee | 182.3 | 50.7 | 12.9 | 64.7 | 161.6 |
| **1999** | Number of employees | 58.1 | 7.9 | 20.6 | 28.6 | 180.4 |
|  | Sales | 330.3 | 88.9 | 60.6 | 109.8 | 283.4 |
|  | Value added per employee | 119.8 | 34.0 | 19.1 | 25.5 | 104.9 |
| **2004** | Number of employees | 74.5 | 12.7 | 12.0 | 20.1 | 201.6 |
|  | Sales | 312.1 | 107.4 | 64.9 | 51.5 | 313.1 |
|  | Value added per employee | 89.4 | 38.5 | 29.7 | 9.1 | 93.0 |

*Note*: Numbers in the table tell by how many percent the value of individual variable is higher for exporters than for non-exporters. Values for sales and value added per employee are controlled for the number of employees.
*Source:* Own calculations.

Further on, we analyze the premium realized by new exporters over the non-exporters in the period before and after the launching of exporting. This shows whether the beginning of exporting leads to increase or decrease of the premium

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[12] This variable is omitted when the dependent variable *X* is number of employees.

[13] In the interpretation of premium, it is important to take into account considerable overestimation of the parameter as it includes the effect of self-selection into exporting and potential learning effects. Namely, the status of exporter is positively correlated with company size and other omitted variables that influence the chosen performance measures. The purpose of premium calculation, however, is to estimate the crude differences between exporters and non-exporters, so its explanatory power is solely descriptive.

in comparison to the (non-exporting) situation before, and indicates whether, by exporting, firms become more successful and whether exports bring them some additional efficiency. In all the analyzed variables (TFP, value added per employee, employment and total sales) new exporters achieve premium already before they begin to export – obviously, they perform above average already before – but exporting, as a rule, considerably increases the premium. The highest new exporter premium is realized in sales, followed by value added per employee and TFP, while the lowest premium is in the number of employees. Trends in premium are shown in Figure 1.

Figure 1
**Ex ante and ex-post Premia in Different Performance Measures of New Exporters over the Non-exporters, 1995 – 2004 (in %)**
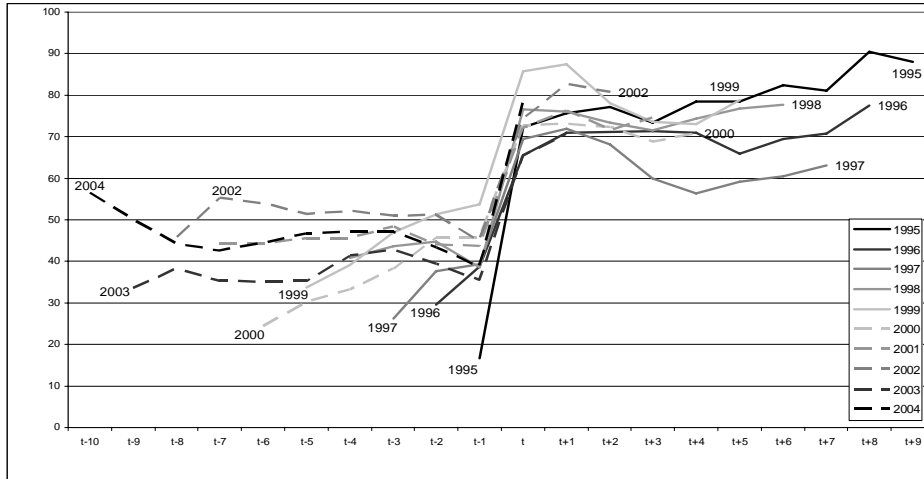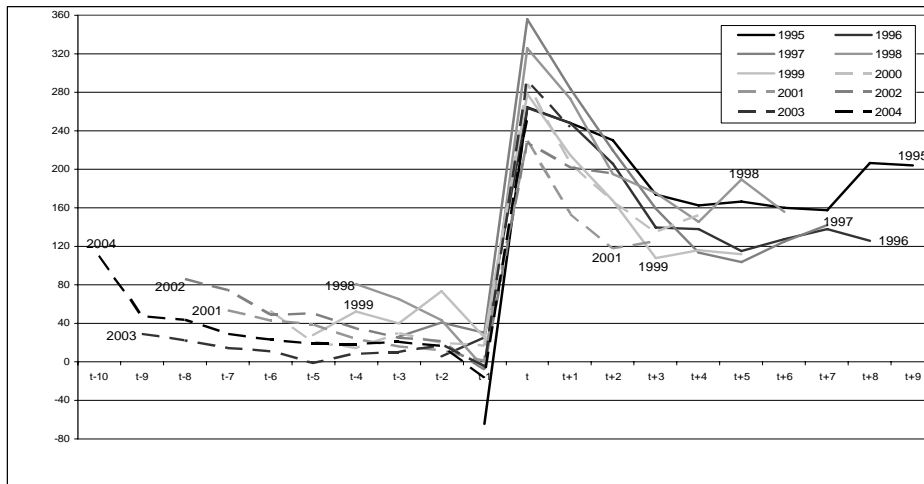
**A. Total Factor Productivity (TFP)**
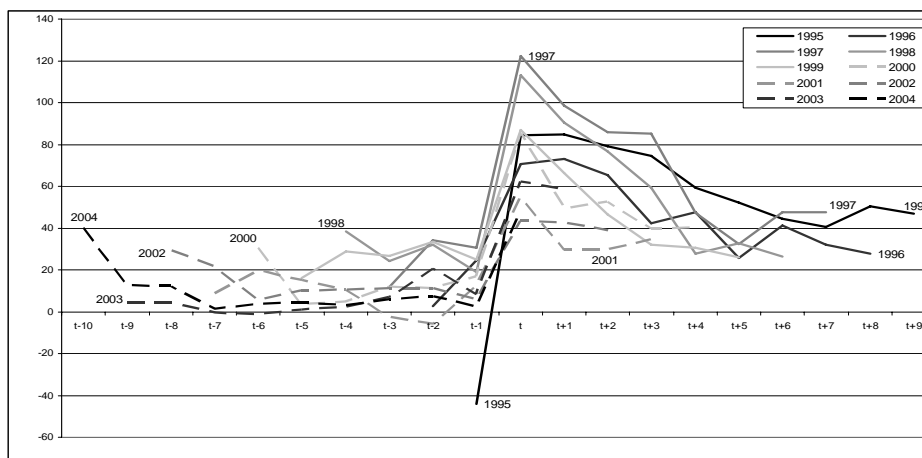


**B. Value Added per Employee**
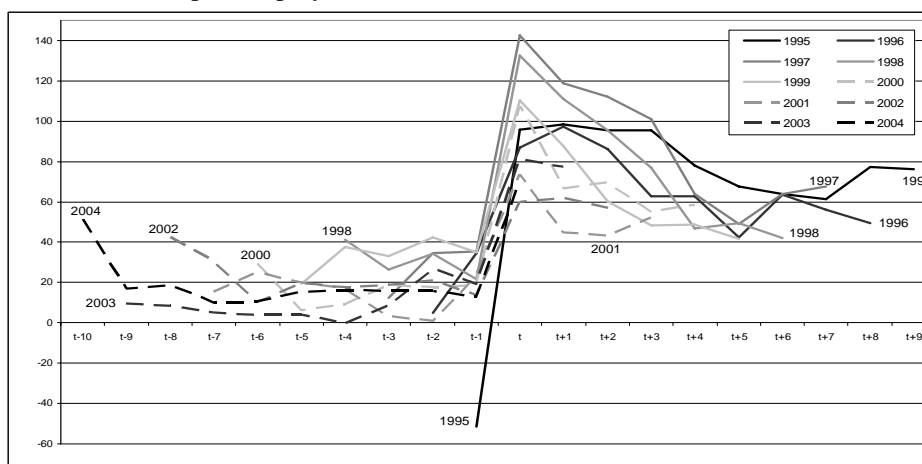
## C. Number of Employees



## D. Sales



*Note*: Values in the figure show by how many percent a given variable is higher in new exporters compared to firms which are non-exporters throughout the analysed period. Except for (C), estimations control for company size (ln*L*). The period of beginning of exporting is denoted by *t* and the labels on lines denote the year in which a subset of new exporters started exporting.

*Source:* Own calculations.

Difference between TFP (Figure 1, A) of future new exporters and non-exporters is non-significant in most of the years before the beginning of exporting. The only exception is the year before the beginning of exporting, when in five out of ten years, the future new exporters exhibit statistically significant, 16% to 30% higher productivity levels than non-exporters. In the first year of exporting, the exporter premium becomes statistically significant, and in all years positive in the interval 40% to 120%. This represents an increase 40 – 95 percentage

points as compared to pre-exporting situation. In the later periods after the beginning of exporting, the premium gradually decreases but remains statistically significant at the value around 40%. Productivity of new exporters, in terms of value added per employee show pretty much the same picture (Figure 1, B). It is statistically significant and higher than of non-exporters in all the years after the beginning of exporting, as well as some years before that. Premium in the year of export initiation increases by 45 to 110 percentage points as compared to the year before. In the following years the premium gradually decreases but never below the pre-exporting level. The productivity of new exporters seems to experience a one-off increase at the beginning of exporting but the effect dissipates shortly after the year of exports initiation. Nevertheless, relative productivity level remains permanently higher than before exporting.

In the year before the export initiation, number of employees (Figure 1, C) in new exporters is by 17 – 54% higher than in non-exporters. In the earlier years, the difference is somewhat lower. This indicates that preparations for exporting go on for some years before the beginning of exporting (see Hallward-Driemeier, Iarossi and Sokoloff, 2002). In the first year of exporting, one can see a noticeable widening of the gap between new exporters and non exporters in the range between 27 and 57 percentage points. Exporter premium in the number of employees of around 70% to 80% remains at approximately the same level in the following years. This means that the beginning of exporting is accompanied by a one-off increase in the number of employees. Export premium is far the highest in terms of sales (Figure 1, D). A year before exports begin, difference in the value of sales between new exporters and non-exporters is in the range of 16% to 30% and is, as a rule, lower than in the preceding years. In the year when exports start, the premium of new exporters increases to as much as 230 – 350%, and in the following year remains at rather high 150 – 280%. In the next years, premium further decrease somewhat to stabilize at the level of 150%.

### 4.2. Analysis of Learning-by-exporting Effect by Propensity Score Matching Methodology

In the previous section, exporter premia provided an informative assessment of ex-ante and ex-post performance of new exporters relative to non-exporting firms. These results, however, are plagued with many methodological issues, such as the endogeneity of the decision to start exporting, the endogeneity of exit decision and the problem of firm entry. To control for these issues, the second method used for estimating the effects of exporting on firm performance is propensity score matching (see Heckman et. al, 1998; and Rosenbaum and Rubin, 1983). The goal is to find out whether and to what extent exporters' performance

depends exclusively on the exporting status. In other words, we would like to net out the effect of self-selection, according to which only more productive firms are able to forego costs that accrue to exporting. Namely, a significant part of the ex post premium is simply the consequence of ex ante advantages of exporters over non-exporters. With matching, we can net out all the accompanying factors that influence the decision to export and isolate the causal effect of exporting on firm's subsequent performance.

The probability of starting to export is estimated by random effects panel logit model with a dependent variable ($D_{i,t}$) equal to 1 if firm $i$ starts to export in year $t$ and zero otherwise.[14] The specification can be represented as follows:

$$\Pr\left(D_{i,t}=1\right)=\Lambda\left[\left(rTFP\right)_{i,t-1},rL_{i,t-1},\left(r\frac{K}{L}\right)_{i,t-1},iFDI_{i,t-1},Dt,Dind\right] \text{ (random effects)}$$

Regressors prefixed with $r$ are expressed in relative terms, corresponding to the average of 3-digit industry in a given year. This helps to control for industry characteristic in both cross-section and time dimensions. The following variables appear among regressors: relative total factor productivity ($rTFP$), relative number of employed ($rL$), relative capital-labour ratio ($rK/L$), foreign ownership dummy ($iFDI$), time dummies ($Dt$), and 2-digit industry dummies ($Dind$). All regressors except time and industry dummies enter the model with one year time lag.

Next, every new exporter is matched with a similar non-exporting firm. For matching to be valid, we have to be able to predict the export/non-export decision with vector of regressors $X$ in such a way that the outcome variables ($Y^T$, $Y^C$), are conditionally independent after controlling for $\Pr(X)$: ($Y^T$, $Y^C$)$\perp D|$ $\Pr(X)$. In order to test whether the conditional independence condition is indeed fulfilled, we performed the balancing hypothesis test. For a given propensity score, the exporting/non-exporting choice is random and therefore exporters and non-exporters should be observationally identical. We excluded a couple of 2-digit industries in which the hypothesis was not valid. Matching is implemented with caliper one-to-one matching (1-to-1)[15] and Gaussian kernel-based matching (kernel).[16]

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[14] Because our interest lies only in the probability of switching from non-exporting to exporting status, we exclude all the firms that exported throughout the entire sample period. We also exclude firms that started exporting more than once, since for them exporting represents only occasional business activity. Finally, we exclude the observations of new exporters in the periods after the switching point, since their inclusion in the estimations would bias our results. In the end, only non-exporters and observations of genuine new exporters up to the period of status switching are included in the logit estimations.

On the level of industries, we exclude primary and public sectors. Some industries are additionally excluded along the estimation process due to demanding data requirements of matching techniques and subsequent balancing hypothesis test. The following 2-digit NACE industries remain in our analysis: 15, 17 – 22, 24 – 36, 40, 41, 45, 50 – 52, 55, 60, 63, 65, 67, 70, and 72 – 74.

Out of 10,651 new exporters in the period 1995 – 2004, matching procedures created 8,931 pairs, of which 7,472 were micro firms, 1,134 small firms, 270 medium sized firms, and 55 large companies. Only firms with at least 5 employees were included in further analysis since the data on smaller firms are less reliable. Following Blundell and Costa Dias (2000), matching approach is combined with difference-in-differences method (diff-in-diffs), which turned out as an effecttive combination in many empirical studies. In addition to improved robustness, the main advantage of this method is that it eliminates firm-specific effects and the effects of shocks, common to exporters and non-exporters. For each pair we calculate difference in differences (*DID*) of a chosen outcome variable and compute a simple arithmetic mean, namely:

$$\alpha_t = \frac{1}{N_t} \sum_{i \in \{i:D_t=1\}} \left[ \left( y_{it}^{ex} - y_{it-1}^{ex} \right) - \left( y_{jt}^{C} - y_{jt-1}^{C} \right) \right] \equiv \frac{1}{N_t} \sum_{i \in \{i:D_t=1\}} DID_{it} \quad \text{for t} = -2, -1, \ldots, 3$$

$N_t$ is the number of new exporters in year $t$ whereas superscripts *ex* and *C* denote new exporters and control firm (group of firms in case of kernel matching), respectively. The diff-in-diffs estimator measures the excess outcome growth for new exporters compared with non-exporters, $\alpha_t$ is then a measure of the average effect of becoming an exporter.

The significance of average treatment effect is further tested with a regression analysis according to Blundell and Costa Dias (2000) and Smith and Todd (2001).

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[15] In this approach, we pair each new exporter (*i*) with a non-exporting firm (j) with the closest propensity score within a predefined range (caliper): $j : \delta > \left| \text{Pr}_{it} - \text{Pr}_{jt} \right| = \min_{k \in \{D=0\}} \left\{ \left| \text{Pr}_{it} - \text{Pr}_{kt} \right| \right\}$

where
- $j$ – the matched non-exporting firm,
- $\delta$ – caliper of our choice (set to 1%),
- $Pr$ – propensity score,
- $k$ – a pool of potential control firms.

If no non-exporting firm is within the caliper range, no pair is formed. Matching is performed individually for each year, each 2-digit industry and separately for each firm size cohort (micro, small, medium, and large firms). In other words, we make pairs of firms from the same industry and of similar size in each consecutive year. By doing so, we also control for time-specific effects, industry characteristics, and firm size.

[16] In Gaussian kernel matching, every new exporter is paired to a group of comparable non-exporting firms and the weighted outcome of its *j* neighbours in the comparison group is formed according to the following rule:

$$\hat{y}_j^C = \sum_{j \in C^0(\text{Pr}_i)} w_{ij} y_j = \frac{\sum_{j \in C^0(\text{Pr}_i)} K\left( \frac{\text{Pr}_i - \text{Pr}_j}{h} \right) y_j}{\sum_{j \in C^0(\text{Pr}_i)} K\left( \frac{\text{Pr}_i - \text{Pr}_j}{h} \right)}$$, where Gaussian kernel is defined as $K(u) \sim e^{-\frac{u^2}{2}}$, $w_{ij}$ is

weight associated with firm *j*, *h* is sensitivity parameter (set to 0,06), and $C^0(Pr_i)$ is a set of control firms for new exporter *i* within the common support.

The coefficients reveal whether diff-in-diffs in the periods at and after the entry year are statistically significantly larger than diff-in-diffs prior to the year of exports initiation even after controlling for common time-specific shocks, lagged diff-in-diffs, and FDI status.

The following specification was run:

$$DID_{it} = \beta_0 + \beta_1 DID_{it-1} + \sum_{t=1996}^{2004} \beta_2 D_t + \sum_{\tau=0}^{3} \beta_3^{\tau} D_{\tau}^{ex} + \beta_4 iFDI_{it} + \beta_5 oFDI_{it} + \varepsilon_{it}$$

where $DID$ denotes diff-in-diffs, $D_t$ are time dummies, $iFDI$ is indicator for foreign ownership, $oFDI$ is indicator for outward FDI performed by firm $i$, and $D_{\tau}^{ex}$ are dummy variables with value 1 if a firm started exporting $\tau$ years ago, and zero otherwise. Standard errors are obtained by bootstrapping with 1000 replications. Specification without the lagged dependent variable was also used, but results hardly changed the value and significance of $D_{\tau}^{ex}$ variables.

Apart from year-on-year differences, we also calculate the cumulative effect of exporting $T$ years after the switching year:

$$A_T = \frac{1}{N_T} \sum_{i \in \{i:D_t=1\}} \left[ \sum_{\tau=0}^{T} \left( y_{i\tau}^{ex} - y_{i\tau-1}^{ex} \right) - \sum_{\tau=0}^{T} \left( y_{j\tau}^{C} - y_{j\tau-1}^{C} \right) \right]$$

which gives us the estimate of how much a chosen outcome increased more in the group of new exporters compared to the non-exporting control group $T$ years after the start of exporting.

### Effects of Exporting on TFP[17] Growth, Value Added on Employee, Sales, Employment and Wages

The estimated "net effects" of exporting on the performance of new exporters, based on propensity score matching, confirmed positive impact and thus learning-by-exporting effects regardless of the methodology used (Table 5). The effects are the strongest in the year of entry and dissolve in the following years, but still keep the cumulative effect significantly positive.

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[17] Total factor productivity was calculated with Olley and Pakes (1996) method. The values are in logarithms, so the difference between two time periods is actually percentage growth rate of productivity, while the diff-in-diffs gives the percentage points difference between two growth rates. There are, however, several important methodological limitations. First, assumption of perfect competition in Olley and Pakes (1996) underestimates productivity measure of more productive firms in monopolistically competitive industry. Secondly, the method assumes identical demand elasticities on home and foreign market, which again leads to underestimation of exporters' productivity levels. The estimates in this section thus represent the lower bound for true effects of exporting on productivity.

T a b l e 5

**Effects of Exporting on Different Performance Measures in New Exporters Relative to Matched Non-exporting Firms (*t* is the first year of exporting)**

| | Time | Matching technique | No. of obs. | Average effect | St. dev. | Min. | Max. | Diff-in--diffs | Cumulative effect |
|---|---|---|---|---|---|---|---|---|---|
| **Total factor productivity** | t − 2 | one-to-one | 1,433 | 0.073*** | 1.108 | −7.520 | 8.556 | 7.32% | |
| | | kernel | 1,448 | 0.033* | 0.845 | −6.006 | 8.452 | 3.31% | |
| | t − 1 | one-to-one | 1,856 | 0.007 | 1.117 | −6.901 | 7.900 | 0.73% | |
| | | kernel | 1,854 | 0.004 | 0.835 | −6.674 | 7.841 | 0.42% | |
| | t | one-to-one | 2,595 | 0.344*** | 1.615 | −6.873 | 11.274 | **34.4%** | 34.4%*** |
| | | kernel | 2,581 | 0.323*** | 1.649 | −6.593 | 11.211 | **32.3%** | 28.7%*** |
| | t + 1 | one-to-one | 2,387 | 0.020 | 1.005 | −8.422 | 6.854 | **2.04%** | 37.0%*** |
| | | kernel | 2,552 | −0.030*** | 0.626 | −4.740 | 5.897 | **−3.02%** | 28.3%*** |
| | t + 2 | one-to-one | 2,100 | −0.002 | 0.842 | −7.128 | 6.755 | **−0.18%** | 38.3%*** |
| | | kernel | 2,260 | −0.053*** | 0.510 | −5.175 | 3.651 | −5.30% | 28.7%*** |
| | t + 3 | one-to-one | 1,774 | −0.005 | 0.931 | −9.602 | 8.088 | −0.50% | 41.2%*** |
| | | kernel | 1,910 | −0.058*** | 0.546 | −7.518 | 6.012 | −5.75% | 25.2%*** |
| **Value added per employee [a]** | t − 2 | one-to-one | 1,304 | 115.2 | 4.405.4 | −16.194.4 | 19.796.2 | 115.2 | |
| | | kernel | 1,322 | 424.0*** | 3.350.9 | −11.941.0 | 14.180.5 | 424.0 | |
| | t − 1 | one-to-one | 1,710 | 0.4 | 4.126.6 | −13.346.4 | 17.982.9 | 0.4 | |
| | | kernel | 1,712 | 517.9*** | 3.386.0 | −11.701.3 | 10.914.4 | 517.9 | |
| | t | one-to-one | 2,301 | 419.4*** | 4.331.2 | −18.127.2 | 16.901.5 | **419.4** | 419.4*** |
| | | kernel | 2,331 | 578.8*** | 3.687.5 | −13.413.3 | 14.575.1 | 578.8 | 578.8*** |
| | t + 1 | one-to-one | 2,143 | −13.4 | 4.313.6 | −17.658.4 | 18.231.5 | −13.4 | 629.3*** |
| | | kernel | 2,292 | 255.8*** | 3.475.0 | −12.532.2 | 11.066.9 | 255.8 | 745.7*** |
| | t + 2 | one-to-one | 1,910 | −57.2 | 4.280.2 | −17.355.4 | 17.572.0 | −57.2 | 853.8*** |
| | | kernel | 2,058 | 221.2*** | 3.419.9 | −10.884.7 | 16.843.4 | 221.2 | 771.2*** |
| | t + 3 | one-to-one | 1,622 | −2.1 | 4.244.9 | −15.692.1 | 18.751.7 | −2.1 | 944.3*** |
| | | kernel | 1,730 | 168.2** | 3.415.2 | −10.399.3 | 15.557.5 | 168.2 | 894.7*** |
| **Total sales** | t − 2 | one-to-one | 1,461 | 48.8* | 1.192.0 | −12.313.4 | 12.072.5 | 48.8 | |
| | | kernel | 1,576 | 94.7*** | 1.518.9 | −32.491.1 | 35.667.5 | 94.7 | |
| | t − 1 | one-to-one | 1,895 | 50.5* | 1.531.3 | −27.299.5 | 18.969.0 | 50.5 | |
| | | kernel | 1,843 | 91.0*** | 948.0 | −11.135.4 | 19.598.9 | 91.0 | |
| | t | one-to-one | 2,627 | 309.6*** | 1.985.7 | −11.325.0 | 36.983.8 | **309.6** | 309.6*** |
| | | kernel | 2,544 | 279.6*** | 1.724.6 | −13.734.8 | 37.877.3 | **279.6** | 279.2*** |
| | t + 1 | one-to-one | 2,427 | 136.0*** | 1.383.6 | −17.645.0 | 36.658.8 | **136.0** | 408.1*** |
| | | kernel | 2,488 | 160.7*** | 1.395.9 | −18.813.6 | 37.265.9 | 160.7 | 368.5*** |
| | t + 2 | one-to-one | 2,135 | 125.6*** | 1.645.8 | −15.770.5 | 29.583.2 | 125.6 | 531.2*** |
| | | kernel | 2,252 | 102.7*** | 1.099.6 | −7.860.6 | 21.826.8 | 102.7 | 420.2*** |
| | t + 3 | one-to-one | 1,795 | 68.4*** | 1.126.5 | −11.569.3 | 15.056.2 | 68.4 | 593.4*** |
| | | kernel | 1,964 | 79.7*** | 1.197.8 | −25.207.0 | 15.213.0 | 79.7 | 511.2*** |
| **Employment** | t − 2 | one-to-one | 1,472 | 1.332*** | 20.837 | −479.91 | 262.08 | 1.3 | |
| | | kernel | 1,576 | 1.412*** | 18.191 | −478.32 | 263.80 | 1.4 | |
| | t − 1 | one-to-one | 1,904 | 1.471*** | 25.813 | −518.00 | 422.00 | 1.5 | |
| | | kernel | 1,842 | 2.151*** | 14.170 | −111.98 | 324.07 | 2.2 | |
| | t | one-to-one | 2,636 | 7.136*** | 42.816 | −245.01 | 771.09 | **7.1** | 7.1*** |
| | | kernel | 2,544 | 6.863*** | 35.157 | −248.06 | 695.80 | **6.9** | 6.9*** |
| | t + 1 | one-to-one | 2,436 | 2.140*** | 36.763 | −761.03 | 859.02 | 2.1 | 8.6*** |
| | | kernel | 2,488 | 2.678*** | 16.866 | −217.21 | 386.29 | **2.7** | 8.3*** |
| | t + 2 | one-to-one | 2,142 | 2.531*** | 26.620 | −231.53 | 452.05 | **2.5** | 10.7*** |
| | | kernel | 2,252 | 1.543*** | 18.186 | −207.31 | 458.09 | 1.5 | 9.6*** |
| | t + 3 | one-to-one | 1,800 | 1.783*** | 24.028 | −548.10 | 388.47 | 1.8 | 11.7*** |
| | | kernel | 1,962 | 1.636*** | 15.213 | −101.18 | 407.24 | 1.6 | 10.8*** |

T a b l e  5 – Continue

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Average wages [b] | t − 2 | one-to-one | 1.296 | 65.4*** | 915.2 | −3.440.1 | 3.634.8 | 65.4 | |
| | | kernel | 1.314 | 54.2*** | 708.0 | −2.425.6 | 1.965.5 | 54.2 | |
| | t − 1 | one-to-one | 1.633 | 19.8 | 936.7 | −3.514.6 | 3.469.0 | 19.8 | |
| | | kernel | 1.674 | 57.7*** | 730.8 | −2.408.0 | 2.073.7 | 57.7 | |
| | t | one-to-one | 2.116 | 107.7*** | 968.2 | −4.028.3 | 3.661.2 | **107.7** | 107.7*** |
| | | kernel | 2.172 | 80.4*** | 743.0 | −2.883.2 | 2.109.0 | **80.4** | 80.4*** |
| | t + 1 | one-to-one | 2.133 | 106.7*** | 930.0 | −3.134.9 | 3.628.0 | **106.7** | 208.0*** |
| | | kernel | 2.285 | 75.5*** | 706.8 | −2.248.1 | 2.001.6 | 75.5 | 191.3*** |
| | t + 2 | one-to-one | 1.927 | 103.8*** | 875.8 | −2.852.4 | 3.062.6 | **103.8** | 265.2*** |
| | | kernel | 2.066 | 40.0*** | 691.2 | −2.316.0 | 2.022.2 | 40.0 | 220.4*** |
| | t + 3 | one-to-one | 1.627 | 82.2*** | 886.4 | −3.678.1 | 3.083.6 | 82.2 | 336.3*** |
| | | kernel | 1.735 | 8.8 | 699.5 | −2.925.5 | 2.064.1 | 8.8 | 309.1*** |

*Note*: *, ** and *** denote statistical significance of one-sided test at 10%, 5%, and 1% significance level, respectively. Bolded values in the diff-in-diffs column denote 5% significance of a corresponding dummy variable in the regression analysis. Standard errors of coefficients are obtained by bootstrapping with 1 000 replications. [a] Observations where time difference of either exporter or control firm exceeded EUR 20,000 per employee were treated as outliers and thus excluded from calculations. [b] Observations where time difference of either exporter or control firm exceeded EUR 2,000 per employee were treated as outliers and thus excluded from calculations.

*Source:* Own calculations.

### Effects of Exporting on TFP Growth

If exporting provided learning effects that would positively affect productivity growth, new exporters would experience productivity boost in several periods after the breakthrough year compared to their non-exporting counterparts. In other words, we should encounter a switch to a higher productivity growth and not only parallel upward shift of productivity trendline. The table below shows that in the first year of exporting, new exporters experience about 33 percentage points higher productivity growth than similar non-exporting firms. Productivity growth differences between the two groups vanish in subsequent years or become even slightly negative. Diff-in-diffs regression reveals similar results as only the starting and the second year of exporting shows significant productivity improvements of new exporters compared to non-exporters. We therefore cannot confirm any long-term learning-by-exporting effect, since the results imply only a significant rise in productivity level but no long-lasting rise in productivity growth. Similar results emerge in Damijan and Kostevc (2006) and De Loecker (2005) although they use shorter time period and only the data on Slovene manufacturing industry. According to caliper one-on-one matching, new exporters increased their productivity by 41 percentage points more than their control non-exporting matches in the four year period after the beginning of exporting. Medium-term effect on productivity according to kernel matching reveals a somewhat lower, although still highly significant cumulative effect of 25 percentage points.

### Effects of Exporting on Value Added per Employee

Firms with at least 5 employees that started exporting in the given period improved value added per employee already in the first year of foreign activity when the measure of labour productivity increased by EUR 417 or EUR 578. Kernel matching gives more robust year-on-year results because it uses a weighted average of control firms and is therefore less disturbed by particular outliers. Regression-based analysis confirmed statistical significance only in the first exporting year for caliper matching. Cumulative effects exhibit similar values for both matching techniques. Three years after the starting year of exporting new exporters accomplished the increase of value added per employee that is around EUR 920 higher than an increase of control firms in the same period. Relative to the industry average value added per employee, this extra growth represents around a 10% increase.

### Effects of Exporting on Total Sales

The largest effect of exporting appears in the first year of exporting when new exporters increase their total sales on a year before by EUR 290,000 more than their non-exporting matches. Regression analysis confirms significantly higher growth of total sales in the first and second year of exporting whereas in the third and fourth year the differences plummet to the levels prior to the breakthrough year. Like in the previous performances, caliper one-on-one matching behaves better in the years prior to exporting since the values of diff-in-diffs are less significant and closer to 0, as should be the case in theory. Kernel matching includes a broader range of firms, even those that show little resemblance to new exporter. This limitation is mitigated by putting less weight on more divergent firms and by lower variance of average treatment effect due to such smoothing. Cumulatively, export status on average brings about additional EUR 540,000 of total sales in the four-year period after exporting activities started. Cumulative effects remain highly significant despite rapid loss of observations and increasing variance.

### Effects of Exporting on Employment

Evidence presented so far suggests that exporting entails extra productivity growth and brings about an increase in total sales. Increased demand commands higher employment as well, which is evident from the Table 5. In the first year of exporting, new exporters employ on average 7 people more than their non-exporting competitors. In the following years the extra employment increase remains significant but diminishes to the levels prior to the first exporting year.

Regression analysis indicates significant employment effects in the first three years. Cumulative effects of exporting on employment are positive and significant in all four years after the start of exporting. From the year prior to exporting to the third year after that year, new exporters employ 11 people more than similar but non-exporting firms in the same industry and time period. In this sense, exporting is an important generator of new employment and a catalyst for redeploying labour from less to more effective firms.

*Effects of Exporting on Wages*

In this section we study whether productivity increase leads also to new exporters paying higher wages either due to improved labour productivity or employment of more skilled labour. In the first year of exporting, the difference in average wage increase on a year earlier between new exporters and control firms rises to around EUR 85. The premium persists throughout the second year of exporting and afterwards slowly narrows. Regression-based analysis confirms significance in the first year of exporting in both matching approaches and further in the second and third year for one-on-one matching. Three years after the year of exports initiation, an average employee receives approximately EUR 320 higher wages than his colleagues in non-exporting similar firms. In other words, were he employed in a control non-exporting firm, the increase (or decrease) of his yearly wage from the year prior to exporting point to the fourth year of exporting would be EUR 320 lower (higher) than in an average new exporting firm. Exporting thus not only fosters intra-industry reallocations and improves aggregate industry productivity, but also contributes to a welfare gain by raising average wages in new exporters and simultaneously increasing their market share.

## Conclusions

The paper analyses the direction and intensity of causal relationship between exporting and performance of Slovenian firms. The analysis is based on individual company data for the entire population of Slovenian firms in 1994 – 2004. By calculating the exporter premium (average difference in percent of exporters over the non-exporters), we assess the size and significance of differences between exporting and non-exporting firms in the period before and after the beginning of exporting. The variables analysed are total factor productivity, value added per employee, sales and employment. In all these performance measures, future new exporters achieve better results already before the beginning of exporting an increase it further in the periods after the initial entry in export markets.

The propensity score matching methodology delivers a more reliable estimate of the learning-by-exporting effect (the causality between exporting and company performance) because it enables to control for the impact of self-selection bias. Compared to similar but non-exporting firms, new exporters exhibit higher productivity growth rate but they start to lose their premium growth in the following years. Value added per employee, as an alternative productivity indicator, displays similar evolution in the periods following the first year of exporting. Exporting thus increases productivity premium, yet there is no robust evidence of long-term effects on productivity growth. Total sales, employment, and average wages display similar trend. Analysis of these aspects of firm performance revealed that in four years after exporting activities started, new exporters increase their productivity by 30 percentage points, employ 11 more people, pay on average EUR 320 higher wages per annum and bring in around EUR 540,000 additional total sales due to exporting.

Results robustly confirm the existence of the self-selection effect. Exporters are on average more productive, bigger and faster growing firms than non-exporters. New exporters achieve better results already before the beginning of exporting. By entering into foreign markets, they further increase their advantage over the non-exporters in terms of levels. With respect to growth rate premia, however, these improvements are far form permanent and tend to dissipate in a couple of years after export entry. On the other hand, evidence suggests that exporting significantly improves productivity and other performance measures of new exporters in terms of levels and that the gap persists over medium term. Despite the lack of enduring dynamic gains, strong evidence on static efficiency gains leads us to confirm the learning-by-exporting hypothesis. The fact remains that exports increase sales and employment possibilities of the most productive firms, leading to further aggregate productivity improvements through reallocation of resources between firms and industries. Preliminary evidence suggests that long-lasting learning-by-exporting effects may be veiled by continuous emergence of new exporters (born-globals) that develop above average export orientation and performance indicators right from their birth – an issue that remains a challenge for further research.

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