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Differences in Export Behavior of Services and Manufacturing Firms in Slovenia

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Abstract

We provide new comprehensive evidence on similarities and differences in export Behavior of Slovenian manufacturing and services firms by using detailed firm-level panel data for Slovenia. Main findings show that export Behavior in these two types of firms is similar and in line with the big picture that is by now familiar from the literature. Slovenian exporting services firms are more productive than non-exporting firms when observed and unobserved heterogeneity are controlled for. Export premia of services firms is even larger than for exporting manufacturing firms. Similarly, pre-entry premia over non-exporters is even larger than for manufacturing firms. We find some evidence of significant learning-by-exporting effects for services firms, but only when using the Levinsohn and Petrin measure of total factor productivity.

Keywords: Trade in Services, Firm heterogeneity, Self-selection, Learning by exporting
JEL Classification:

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1 Introduction

Services sector is the fastest growing component of the global economy and represents a growing proportion of the gross domestic product (GDP) and employment of both developed and developing countries. The rapidly expanding services sector is contributing to a greater economic growth and job creation than any other sector. The services sector is accounting for some three-quarters of the GDP in developed countries and on average about 50% of the GDP in the developing countries. The importance of services as a share of overall output and employment increases with growth and development (EC DG Trade, 2007). A number of forces including final demand factors and basic structural changes in production linked to development are driving this expansion in the services-intensity of economies (Francois and Hoekman, 2010).

Recent advances in information and communication technologies have broadened the possibilities to trade in services, making their production increasingly subject to the international division of labor (UNCTAD, 2004). International trade and foreign direct investments in services are an increasingly important part of global commerce, with the share of services in international trade growing constantly (Matoo, Stern and Zanini, 2008). Services have been among the fastest growing components of world trade, growing by 15 per cent per annum since 1980. Services trade, estimated from balance of payments statistics, was around 3.8 billion in 2008, representing about 20 % of world trade in goods and services (World Bank, 2010). The importance of services is also increasingly reflected in the policy agenda, ranging from liberalization to regulation at national and international levels. The initial research efforts have shown that countries may have a great interest to liberalize trade in services. The benefits may be much larger than those of the trade liberalization in goods, as the current levels of protection of services sector are much higher than of goods and liberalization could also lead to spillover benefits to other sectors (Matoo et al., 2008).

Discussions of the role of exports in promoting growth and productivity in particular, have been ongoing for many years now. The pioneering papers of Bernard and Jensen (see Bernard and Jensen, 1995, 1999, 2004) started a new strand of economic literature where researchers use rich large-scale firm-level datasets collected by their statistical offices to study the causal linkage between firm characteristics and their involvement in foreign markets (Damijan and Kostevc, 2006). The extent, causes and consequences of productivity differential between exporters and their domestic counterparts is one of the core topics addressed in this empirical literature (Wagner, 2007). Research studies have confirmed several empirical regularities. Exporting firms seem to be superior in comparison with non-exporting firms in terms of productivity, capital intensity, wages and size. The empirical evidence is abundant in favour of self-selection of more productive firms into exporting, while the evidence on reverse causality, learning-by-exporting, is rather scarce (Damijan, Kostevc and Polanec, 2010). The productivity premium of exporting firms compared to non-exporters has received much attention world-wide, but the research has been focused primarily on firms producing goods (see surveys of empirical studies by Greenaway and Kneller, 2007, Wagner, 2007). Research studies of exporting behavior have also been published for Slovenian manufacturing firms (Damijan, Polanec & Prašnikar, 2004; Kostevc, 2005; Damijan & Kostevc, 2006; De Loecker, 2007; Wagner et al. – ISGEP, 2007)

Despite the increasing importance of trade in services, the empirical literature at the firm-level in particular is relatively scarce and has been a subject of empirical investigation on a larger scale only in recent years (Francois and Hoekman, 2010). This paper contributes to this small but growing literature on trade in services recently surveyed by Francois and Hoekman (2010) by providing firm-level

evidence on services exporters in Slovenia. The work is related to similar studies which have also analyzed firm level export Behavior of services firms in other countries such as Love and Mansury (2009); Eickelpasch and Vogel (2009); Breinlich and Criscuolo (2010); Kelle and Kleinert (2010); Conti, La Turco and Maggioni (2010); Walter and Dell'Mour (2010); Ariu (2011) and Federico and Tosti (2011). The main goal of the paper is to provide firm-level evidence on trade in services of Slovenian services exporters, on the basis of comprehensive panel dataset from 1994 to 2002, the causes and consequences of export Behavior in the context of what is today known as the standard methodology used in analyzing the export Behavior of manufacturing firms. In addition the results for services firms are compared to the results of the export Behavior of Slovenian manufacturing firms using the same methodology which increases the comparability of results. We are therefore able to provide comparable results not only qualitatively but also the magnitude of the estimated effects between these two types of trade. We find some striking empirical resemblance between the findings and confirm that many of the stylized facts in the goods trade literature hold also for trade in services, which suggests, as Breinlich and Criscuolo (2010) have already pointed out, that existing goods trade models might be suitable for firm-level services trade as well. The results show that Slovenian exporting services firms are more productive than non-exporting firms when observed and unobserved heterogeneity are controlled for. More productive services firms self-select into export markets, the magnitude of future exporters' pre-entry productivity premia compared to non-exporters' is even larger than for manufacturing firms. In terms of learning-by-exporting effects we find no conclusive results. When using labor productivity as a measure of productivity in regression models, we do not find statistically significant evidence of post-entry differences in productivity growth between export starters and non-exporters neither for services nor for manufacturing exporters. On the other hand, when using the Levinsohn - Petrin (LP) measure of total factor productivity learning-by-exporting effects become clearly statistically significant for services firms exporters, which still appears to be relatively small in magnitude, in contrast to no conclusive evidence for manufacturing exporters using the same measure of productivity.

The rest of the paper is organized as follows. Section 2 provides a short description of related literature concerning the focus and methodology used in the empirical analysis and a short literature review of some existing empirical studies of trade in services. Section 3 contains a description of the database and main descriptive statistics. Methodology used and econometric issues are described in Section 4. Section 5 presents the empirical models. Section 6 reports the main findings and results of the empirical analysis, while Section 7 concludes.

2 Literature Review

Empirical research on the link and causality between exports and productivity on manufacturing firms are therefore extensive and have already provided a set of stylized facts (for a comprehensive survey of empirical studies see Greenaway and Kneller, 2007; and Wagner, 2007), on the other hand the studies of the same linkage and causality between these two dimensions on services firms are much more scarce and have been the subject of research on a larger scale only in recent years. An overview of some selected existing empirical studies researching this relationship is briefly discussed in following.

Love and Mansury (2009) observed a link between exporting and productivity on a sample of US business services firms in the year 2004. Their results showed that larger and more productive firms are more likely to become export oriented which confirms the previous findings of the literature on self-selection effects of more successful firms into exporting. Although when a firm is already an

exporter, productivity does not necessarily influence the extent of exporting. The authors have also tested the effects of exporting on productivity and found that productivity is inextricably linked to exports and to increased exposure to international markets, although with slightly weaker relationship. Therefore also for business services firms with relatively higher knowledge intensity which should be an advantage to easier overcome internationalization and export barriers, there is a significant effect of self-selection. The results confirm similar findings to other studies on relationship between export and productivity mainly for manufacturing firms. Authors used only cross-sectional data in their analysis and thus could not investigate whether the productivity increases before or after the firm starts to export or whether the decision to start exporting leads to productivity gains.

Eickelpasch and Vogel (2009) analyzed the impact of various firm-specific characteristics such as size, productivity, human capital and experience on the national market in Germany and others on firm's exporting performance by using a panel dataset of firms from the business services sector (transport, storage and communication, real estate, renting and business activities) for the years from 2003 to 2005. The results show that when there is no control for the firm fixed effects, the results coincide with the previous findings of other studies mainly on manufacturing firms. When the unobserved heterogeneity is controlled for, the positive effects of productivity and human capital disappear, indicating that these variables are not per se positively related to export performance, but more to time-constant characteristics which are not observed. Size and product diversification still remain to have a positive and significant effect.

Kelle and Kleinert (2010) provide firm-level evidence of four key determinants of international trade in services of German firms on the basis of two merged panel micro-level datasets from Deutsche Bundesbank, containing nearly the whole population of German services importers and exporters from 1989 to 2007. Transactions in the database include GATS modes 1, 2 and 4. First, they discover that not only services firms but also firms from other industries export and import services. Secondly, their results show that trade flows of services firms are similar to those in trade in goods. It is notable that services trade takes place mainly through a few large firms operating in many countries, selling a number of services and often export and import services. Therefore, the analysis shows that only a small number of German services firms are involved in international trade, and those firms participating in trade in services vary widely in terms of traded value, with large firms dominating this international participation. The third important finding of the study is that there is a strong concentration of firms on one core market and services traded, and finally, the results show that the patterns for services exports and imports are very similar.

Conti, La Turco and Maggioni (2010) examined the determinants of export performance of Italian firms in business services sector on the basis of cross-sectional data of NACE Rev. 1 Sections G, I and C (Retail and wholesale trade, Transport and communication and renting, IT, R&D and other business activities) for the year 2003. Empirical analysis of determinants of export status and intensity shows that the success of services firms in foreign markets is specifically related to their experience on national markets, their affiliation to the national and international networks and to their relationship with large industrial firms. Higher productivity and higher skill intensity seem to matter only when exporting to more distant markets. Their study is based on the observed activities of services firms available only for year 2003, which are only cross-sectional data that do not permit the analysis of causal link between exports and productivity. As a weakness of their study, the authors also emphasize a small number of observed services firms in their sample that could distort the results of the analysis.

Walter and Dell'Mour (2010) analyzed a sample of Austrian firms that export services, import services or do both based on a combined dataset from structural business survey and the Austrian National

Bank for the year 2006. The study shows that only a small number of Austrian firms exclusively export or exclusively import services and that there is a strong correlation between trade in goods and trade in services. The analysis also provides evidence that the supply of services to Austria and the demand for services from abroad is unevenly distributed and concentrated on a small number of firms. Firms with inward or outward FDI account for more than a half of Austria's trade in services. With the identification of various regional specializations in Austria's services trade the findings show that trade relations are still influenced by proximity. Firm size seems to be related to the strong concentration of trade in services on a small number of firms as most exports of services are a function of the number of employees. On the other hand, external trade in knowledge based services is concentrated with the small and medium-sized firms (SMEs). Firm structure therefore appears to be a key criterion for the degree of technical sophistication of services exports and for the country's positive or negative competitive position. The study is based only on a cross-sectional data and therefore the authors were not able to investigate any kind of causal relationship between export orientation of firms and the productivity improvements.

Breinlich and Criscuolo (2010) studied firms engaging in international trade in services, using a panel firm-level dataset on exports and imports on United Kingdom (UK) firms in the period from 2000 to 2005. The results show that trade in services is characterized by strong heterogeneity at the firm level, with significant differences between exporting and non-exporting firms and also among traders in services. Only a small fraction of firms in UK is involved in international trade in services, that participation in trade varies widely across different industries, and that firms engaging in trade in services are different from firms operating only on domestic market in terms of size, productivity and other firm characteristics. The study also provides detailed evidence on patterns of international trade in services for exporters and importers of services, such as the number of markets served, the value of exports and imports per market and the share of individual market in overall sales. The results show that firm-level heterogeneity is a key feature of trade in services and that there are some special features of trade in services compared to trade in goods. Services exporters are much smaller compared to exporters of goods and services importers, have higher levels of productivity and are more skill-intensive. In contrast to literature on trade in goods, intensive margins matter on firm-level adjustments, while aggregated trade flows are driven almost entirely by changes in the extensive margins. The results also show many similarities between trade in services and trade in goods, based on which authors conclude that existing heterogeneous models for goods trade seem to be a good starting point also for the interpretation of trade in services.

Currently there are still no stylized facts about the export activity and the relation to productivity of services firms, the amount of research is still relatively small, research methods differ (which disables the possibility of direct comparison of the results of different studies), and the results show scattered evidence of various facts. However it is possible to draw some common conclusions: exporting services firms are larger than non-exporters, more capital intensive, have higher degree of skill intensity, higher amounts of sales and investments and are more productive. Research results thus show firm level heterogeneity is a key feature of international trade in services as well. Many previous studies have explored the export Behavior of services firms only on cross-section data, and therefore failed to explore the causal link between exports and productivity (see papers by Love and Mansury, 2009; Conti et al., 2010; and Walter and Dell'Mour, 2010). For those having panel data, the results showed similar finding to trade in goods, and confirmed self-selection of more productive services firms to export, while the evidence supporting the learning-by-exporting hypothesis proved to be similarly scarce (Eickelpasch and Vogel, 2009; Kelle and Kleinert, 2010; Breinlich and Criscuolo, 2010). The main motivation of our paper is to contribute to the understanding of export Behavior of

service firms and to what extent their Behavior is in line with the existing heterogeneous firm models designed to analyse trade in goods. Such empirical findings may further serve as a good starting point for suggestions and setting related policies at the national level.

3 Data Description

1. Description of the dataset and sources

The data used in the empirical analysis is a constructed firm-level panel data on Slovenian services and manufacturing firms in the period between 1994 and 2002. The dataset is based on the original accounting data for whole population of active firms in Slovenia provided by AJPES (Agency of the Republic of Slovenia for Public Legal Records and Related Services) and has been combined with the addition of trade and FDI data from the Statistical Office of the Republic of Slovenia for the same period (Damijan and Kostevc, 2006). The dataset contains detailed accounting information, such as assets, capital, sales, costs and profits of various firms, as well as fairly complete set of data on external trade and capital flows of individual firms, such as exports, imports, outward and inward direct investments etc. All data are in Slovenian tolars and have been deflated using the consumer price index (for data relating to capital stock) and a producer price index (at the 2-digit NACE industry level) for data relating to sales and added value. Our rich panel dataset has the benefit of allowing us to study the causality between exports and productivity in contrast to some existing empirical studies that use only cross-section data (Love and Mansury, 2009; Conti et al., 2010; and Walter and Dell'Mour, 2010) which narrows the scope of their analysis.

In our empirical analysis we use data only for active firms. Our definition of activity requires that firms employ at least one worker, engage positive amount of physical capital and generate positive value added. This definition restricts the sample of firms to those for which we can calculate all relevant measures of productivity and capital intensity. Further, a firm is an exporter if it supplies products to at least one foreign market according to the customs office data. A new exporter is a firm that exports to at least one foreign market for the first time. Firms that start exporting in the same year that they appear in the accounting data for the first time are treated as established exporters, since these are likely to be firms that changed their organizational form and are not true first time exporters (Damijan, Kostevc and Polanec, 2008a).

Accounting information collected at the AJPES allow for calculation of labor productivity and to estimate total factor productivity by Levinsohn and Petrin method for all firms obliged to submit annual reports to AJPES. These data also allow for the distinction between new and permanent exporters and distinction between services and manufacturing firms which is the basis of our empirical analysis of heterogeneous exporting firms. The panel data for this period is unfortunately the latest available dataset containing all the information needed for our analysis. On the other hand this period is of particular interest to study as it was the period of transition from planned post-socialist to capitalist economy. Slovenia has been one of the most successful transition economies reaching a level of GDP per capita over 65% of the EU average in 2000 which makes it particularly interesting for studying the causal relationship between exporting and productivity improvements at the firm-level.

2. *Descriptive statistics*

In this section we provide some main descriptive statistics of the firms included in our sample separately for services and manufacturing firms and also separately for new exporters, old exporters

and non-exporters. The sample includes services firms from NACE Rev. 2 sections G, H, I, J, K, L, M, N, O, P, Q, R and S, and manufacturing firms from C, D, E and F sections. The classification and description of services and manufacturing activities is presented in Annexes 1 and 2. AJPES database for the period from 1994 to 2002 contains 214,637 observations for services and manufacturing firms, which means that the sample includes about 23,850 firms per year. Salient features of the sample data, such as the number of observed firms, the evolution of the value added and value added per employee throughout the period, firm size in terms of employment, average capital, average export intensity of the exporting firms, number of exporters and the export participation rate separately for services and manufacturing firms are reported in Table 1.

Table 1: *Breakdown of firms in the sample with respect to firm type (services firms and manufacturing firms) by average productivity, size, number of firms and export intensity, period 1994-2002*

		Year									
		1994	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**Average**
Services firms	Observations	15,508	17,693	18,878	18,872	19,691	20,025	20,277	19,432	19,325	18,856
	Average value added (EUR)	23,379	25,680	29,004	33,304	35,422	39,476	43,058	50,396	55,002	37,697
	Average value added per emp. (EUR)	1,635	1,976	2,255	2,587	2,838	3,325	3,290	3,860	4,105	2,908
	Average No. of employees	12.3	11.4	11.1	11.0	10.8	10.8	10.9	11.3	11.1	11.2
	Average capital (EUR)	81,568	94,580	100,815	108,655	121,010	142,077	163,665	195,811	206,914	127,233
	Average export intensity for new exporters		0.10	0.52	0.39	0.37	0.28	0.19	0.16	0.10	0.26
	Average export intensity for old exporters	0.23	0.21	0.50	0.55	0.50	0.48	0.29	0.20	0.19	0.36
	Number of exporters		2,936	3,492	3,544	3,669	3,642	3,591	3,561	3,574	3,191
	Export participation rate		0.17	0.19	0.19	0.19	0.18	0.18	0.18	0.19	0.18
Manufac. firms	Observations	3,745	4,175	4,486	4,676	4,917	5,018	5,144	5,002	5,175	4,704
	Average value added (EUR)	114,348	119,027	124,492	144,056	148,456	163,564	174,444	203,827	217,179	159,418
	Average value added per emp. (EUR)	1,791	2,072	2,367	2,827	2,981	3,464	3,565	4,079	4,306	3,125
	Average No. of employees	64.9	58.8	51.8	47.3	45.3	44.0	43.1	43.8	43.1	48.4
	Average capital (EUR)	398,051	407,269	362,959	459,041	445,183	510,916	504,406	556,883	515,306	466,964
	Average export intensity for new exporters		0.15	0.17	0.20	0.18	0.15	0.17	0.23	0.19	0.18
	Average export intensity for old exporters	0,47	0.49	0.48	0.50	0.51	0.45	0.46	0.47	0.47	0.48
	Number of exporters		1,980	2,028	2,382	2,247	2,291	2,381	2,395	2,445	2,095
	Export participation rate		0.47	0.45	0.51	0.46	0.46	0.46	0.48	0.47	0.45

Source: AJPES (Agency of the Republic of Slovenia for Public Legal Records and Related Services) database for the period 1994–2002 and authors' own calculations.

The data shows some pronounced differences between these two types of firms and the evolution of observed characteristics of firms throughout the period. First there is a visible prevailing representativeness of services firms in the sample compared to manufacturing firms, as the number of observations for services firms is four times higher than for manufacturing. Services firms are on average four times smaller than manufacturing firms as they employ on average only 11 employees, while manufacturing firms employ on average 48 employees. It is also worth noting that the average firm size in terms of number of employees is decreasing for manufacturing firms which is in line with the expectations given that the observed period largely coincides with the period of transition in the Slovenian manufacturing sector (Damijan and Kostevc, 2006), while average firms size for services firms remains quite constant throughout the whole period. The evolution of value added throughout the observed period (approximately a one-time increase from 1994 to 2002) is visible for both types of firms, but the average value added for services firms is about four times lower than for manufacturing firms. Also the average capital intensity is about four times smaller for services firms as compared to manufacturing. Comparing these two types of firms by value added per employee, it is notable that the difference is much smaller, with services firms having a slightly lower value added per employee (on average 2,908 EUR for services firms and 3,125 EUR on average for manufacturing firms). The data show a visible one and a half time increase in the value added per employee throughout the observed period for both types of firms. While productivity gains for manufacturing firms are in part due to the downsizing in number of employees, for services firms these productivity improvements show an increase in efficiency of operations, as throughout the period the average firm size remains constantly low at around 11 employees. The average export intensity of exporting firms varies throughout the period, and is lower for new exporters for both types of firms compared to old exporters. Comparing old exporters, services firms have much lower average export intensity (36% on average) than manufacturing firms (48 % on average), but the intensity has a high variation throughout the period with a significant increase in the midterm years 1996-1998 of our sample than falling back to about half of the value of the increase period,[3] while manufacturing export intensity for old exporters remains quite constant around average throughout the whole period. On the other hand looking at the new exporters reveals higher average export intensity for new services exporters (on average 26%) compared to manufacturing (18 % on average). This is again mostly due to the same overall increase of export intensity in the mentioned period for old and new services exporters. The overall export participation rate is much higher for manufacturing firms (on average 45 %) than for services firms (on average 18 %) and remains quite constant throughout the period for both types of firms.

Further Table 2 presents some relevant characteristics of firms in the sample separately for new exporters, old exporters and non-exporters. The data reveals that, in line with the existing literature, exporters differ significantly from non-exporters and are more productive, larger and more capital intensive that non-exporters. The dataset is dominated by the non-exporting firms as about 75 % of firms in our database are non-exporters, while old exporters represent about 17 % of observed firms and new exporters only about 8 %. Non-exporting firms are the smallest by the number of employees, as they engage only 8 employees on average, while new exporters have about 18 employees and the established exporters have on average 69 employees. Established exporters are also by far larger in terms of value added and capital employed compared to the other two types of firms, followed by new exporters and non-exporters. The average labor productivity measured by value added per employee reveals that non-exporters are far less productive than exporters as the average value added per employee is about 30 % lower throughout the period as compared to exporters. It is also interesting to

[3] This is mainly due to the variation in the sample caused by entry and exit dynamics.

note that new exporters have on average slightly higher labor productivity levels than established exporters.

Table 2: *Breakdown of firms in the sample with respect to export status (new exporters, old exporter and non-exporters) by average productivity, size, number of firms and export intensity, period 1994-2002*

		Year									
		1994	1995	1996	1997	1998	1999	2000	2001	2002	Average
New exporters	Observations		858	1,293	1,609	1,909	2,010	2,166	2,362	2,577	1,848
	Average value added (EUR)		37,129	36,222	36,910	52,044	65,140	82,917	93,663	105,444	70,415
	Average value added per emp. (EUR)		2,631	2,922	3,493	3,805	4,362	4,781	5,048	5,400	4,055
	Average No. of employees		14.8	13.0	12.0	15.8	16.8	19.8	20.2	21.3	17.5
	Average capital (EUR)		138,680	171,419	62,824	113,485	172,718	248,491	316,586	288,821	205,533
	Average export intensity		0.11	0.46	0.35	0.33	0.24	0.19	0.18	0.12	0.24
	Participation rate		0.04	0.05	0.07	0.08	0.08	0.08	0.10	0.10	0.08
Old exporters	Observations	4,560	4,129	4,293	4,076	4,072	3,990	3,912	3,697	3,548	4,031
	Average value added (EUR)	129,990	157,689	171,481	211,845	224,189	255,819	286,363	339,689	376,577	234,016
	Average value added per emp. (EUR)	2,142	2,513	2,942	3,375	3,592	4,215	4,567	5,156	5,635	3,793
	Average No. of employees	69.4	73.5	68.7	67.3	65.4	66.2	67.5	69.8	70.8	68.7
	Average capital (EUR)	386,257	442,792	432,623	531,653	587,277	659,099	734,601	881,792	878,998	603,791
	Average export intensity	0.32	0.33	0.49	0.53	0.50	0.46	0.37	0.33	0.32	0.41
	Participation rate		0.19	0.18	0.17	0.16	0.16	0.15	0.15	0.14	0.17
Non-exporters	Observations	14,896	17,120	18,033	18,126	18,902	19,327	19,717	18,732	18,730	18,175
	Average value added (EUR)	14,477	16,824	19,058	22,165	23,253	25,027	25,540	29,801	32,958	23,548
	Average value added per emp. (EUR)	1,512	1,833	2,065	2,385	2,606	2,966	2,933	3,499	3,665	2,647
	Average No. of employees	8.5	8.2	7.8	7.9	7.8	7.7	7.5	7.7	7.6	7.8
	Average capital (EUR)	69,510	86,222	83,353	109,827	106,679	128,791	131,097	142,719	156,650	114,452
	Participation rate		0.77	0.76	0.76	0.76	0.76	0.76	0.76	0.75	0.76

Source: AJPES (Agency of the Republic of Slovenia for Public Legal Records and Related Services) database for the period 1994–2002 and authors' own calculations.

Comparing new and established exporters by the export intensity, the data shows that established exporters on average sell about 41% of their products on foreign markets, which is about one time higher export intensity as compared to new exporters. The data reveals that the number of export starters largely increases in the early years of our sample, increasing by 20 to 30 per cent year-by-year in the early years and then slowing down to about 7 % increases in number in the latter period. On the other side, the number of established exporters declines by a few percents every observed year, indicating that some established exporters cease exporting. On the other hand the exit rate of new exporters is quite high with about 16 % of new exporters ceasing to export after the first year and only

about half of new exporters retain the export status after three years of exporting. However, on overall, the net gain in number of exporters increases throughout the observed period.

Descriptive statistics presented above indicate the importance of heterogeneity of firms with respect to firm export status. As expected, exporting firms are more productive and larger than non-exporting firms, raising the issue of causality between productivity and export status. In what follows, we empirically account for differences in productivity levels and growth between exporters and non-exporters. We aim at providing empirical evidence on differences and similarities in export Behavior between Slovenian services and manufacturing by focusing on the issues of self-selection and learning-by exporting of these two types of firms.

4 Methodology and Econometric Issues

In our empirical analysis, three main research hypotheses are set following the methodology introduced by Bernard and Jensen (1995, 1999). To verify the validity of hypotheses different measures of productivity of firms and a variety of standard econometric methods are used.

Productivity[4] is measured in literature in several ways, including average labor productivity, measured as the firm value added per worker, total value of shipments per worker or output per hour worked, or an average of different variants of total factor productivity. Total factor productivity (TFP) refers to the productivity of all inputs taken together and is a measure of global efficiency of a firm and can be estimated by a number of econometric techniques (Arnold, 2005). In terms of productivity measures in our regressions we opt to use both measures, labor productivity defined as value added per worker and total factor productivity. In order to estimate TFP in a coherent and comparable way for manufacturing and services firms, we use the method proposed by Levinsohn and Petrin (2003). This will allow us an additional test of the robustness of the outcomes obtained.

Labor productivity is only a measure of productivity of workers and by that neglects the contribution of other factors such as physical capital. For this reason we also use the TFP measure of productivity which can be estimated by several alternative methods. These assume that production at a firm level can be expressed as a function of Cobb-Douglas (1928) specification, defined as follows:

$$Y_{it} = A_{it} K_{it}^{\alpha} L_{it}^{\beta} M_{it}^{\gamma} \quad (1)$$

where A_{it} is the TFP of a firm i at time t, calculated as the residual of the estimated production function. K_{it} and L_{it} are its stocks of physical capital and employment respectively, and M_{it} denotes materials used. The parameters α, β and γ correspond to the shares of each factor input into the production process and have to be estimated (Mayer and Ottaviano, 2007).

Logarithm of LP and logarithm of firm-specific TFP (estimated as the residual of Cobb-Douglas specification of production function transformed into logarithms) can be estimated using the Ordinary Least Square (OLS) method assuming a consistent exogeneity of inputs and the error term. If all the relevant characteristics of individual firms are controlled for, there should be no relevant unobserved characteristics. In that case a pooled OLS regression may be used to fit the model, treating all the

[4] Productivity of an input is the amount of output generated per unit of input used and is in this respect a measure of efficiency in the use of that input (Mayer and Ottaviano, 2007).

observations for all of the time periods as a single sample (Dougherthy, 2007) and was also used in our regression analysis.

However, the OLS method may lead to biased estimates. First, firm level productivity may evolve over time. As second, the OLS estimator does not account for simultaneity bias – that a firm may have some private information on how its productivity will evolve over time and may adjust its factor demand accordingly, which violates the OLS assumption of strict exogeneity of inputs and the error term. Vast literature discusses that using OLS approach to estimate firm's productivity may be inappropriate, as inputs are probably determined simultaneously by the firm's past productivity which leads to a potential correlation between input levels and the unobserved firm-specific shocks. This endogeneity in OLS estimates usually shows up as a persistent serial correlation, and yield biased parameter estimates. Levinsohn and Petrin demonstrate that in the case where capital and labor are positively correlated, and both are also correlated with the productivity shock, the parameter for labor input will tend to be overestimated, while the parameter for capital will tend to be underestimated. As the quality of firm level datasets is not usually on the highest level, this may often be the case (Damijan, Rojec, Majcen and Knell, 2008b). Thirdly OLS estimator may also be a subject of a selection bias, if observations in a sample are not randomly selected, which can be a relevant concern when firms are observed in national samples only if their performance is above a certain threshold (Mayer and Ottaviano, 2007).

Hence, after the presentation of potential weaknesses of the OLS estimates there is a need to find more suitable methods to deal with this simultaneity problem and account for this correlation between inputs and the error term. Any such method, however, will prove to be inefficient as long as there are serious measurement problems in the stock of capital (Griliches and Mairesse, 1995). The simplest way is to use the fixed effects method, which wipes out the firm's specific unobserved effects. To control for unobserved plant heterogeneity due to time invariant firm characteristics which might be correlated with the variables included in the empirical models and might lead to biased estimates, we estimate the exporter productivity premia also by including firm fixed effects, for LP and TFP measure of productivity. Fixed effects method assumes that both LP and TFP productivity for each firm are constant through the observation period and presents a fixed effect of a firm. In this case, the inclusion of dummy variables for firms in the fixed effects panel regression should solve the problem caused by the fixed effect of firm Behavior (Arnold, 2005).

However the fixed effects method also has its drawbacks. As first, a large proportion of information in the data is left unused. A fixed-effect estimator uses only the across time variation, which tend to be much lower than the cross-section one. Second, it requires that the component of productivity shocks is constant over time, making the whole procedure invalid and leaving little hope that we have dealt with the problem efficiently. Therefore more sophisticated methods applied to estimating a production function in a dynamic panel datasets were recently developed that claim to solve the problem of endogeneity between input levels and the unobserved firm-specific shocks in a satisfactory way.

When data on investments and physical capital is available it is frequent to use the technique proposed by Olley and Pakes (1996). This estimator solves the simultaneity problem in a satisfactory way by using firm's investment decisions to proxy for unobservable technological shocks. Method proposed by Olley and Pakes is able to generate consistent estimates for the assessment of the production function if few conditions are satisfied. One of those conditions is that there should be a strict monotonous relationship between investments and output, which means that each observation where the investment value is zero is dropped from the observed data for the correction to be valid. Given that data on investments is often characterized by frequent zero values, this may indicate that the

number of observations available for the implementation of this technique can be vastly reduced, as many firms do not have positive investment values every year (Mayer and Ottaviano, 2007).

Due to the weaknesses described for using the Olley and Pakes technique, an alternative estimation procedure devised by Levinsohn and Petrin (2003) is often in use, and was also implemented in estimating TFP in our empirical analysis. The logic is similar to that of Olley and Pakes (2003), but it relies on intermediate inputs such as materials to control for simultaneity. The method of Levinsohn and Petrin therefore proposes the use of materials (energy consumption or material costs) for assessing the unobserved technological shocks (Arnold, 2005). Many datasets usually contain significantly less zero-observations in materials in firm-level investments. Levinsohn and Petrin method also offers several specification tests to check the appropriateness of the proxy used. The optimal choice of proxy is highly dependent on the nature and limitations of the data at hand (for a detailed discussion of the selection of the proxy see Levinsohn and Petrin, 2003).[5]

In certain cases the Levinsohn and Petrin procedure may also create unusual results. When using the output version of the procedure (as opposed to the value added), it may happen that there is not enough variation in the data for separate identification of all coefficients. In this case there is no other choice than to amend the specification and to use the value added form. It is also possible that the material coefficients are estimated by the procedure to be exactly one. This is due to an imposed upper limit in the estimation algorithm, thus this kind of results should also be discarded. Although Levinsohn and Petrin method presents a good alternative to Olley and Pakes algorithm, with taking into account material costs instead of investments in the first step of the estimation procedure, it is quite difficult to use it in some cases due to the lack of data regarding the use of specific materials such as energy consumption. Instead, often only data on aggregated expenditure on materials is available. Except in the cases describes above, the procedure is a promising and easy way to implement a consistent estimator. While there are many econometric methods to deal with simultaneity problem this paper uses the Levinsohn and Petrin approach. Services firms have far less investments in physical capital than manufacturing firms which makes the Olley and Pakes method unreasonable to use, therefore Levinsohn and Petrin method represents the most promising solution for measuring the total factor productivity of services firms.

5 Empirical Models

This section describes the empirical models used in assessing the differences between exporters and non-exporters in terms of productivity and the direction of causality of productivity improvements. We apply a similar methodology presented by Bernard and Jensen (1995 and 1999), explained in Wagner (2007) and used in the international study ISGEP (Wagner et al., 2007).

First, we start by observing the differences in average LP (defined as value added per worker) and TFP estimated by Levinsohn and Petrin method between exporters and non-exporters. To investigate differences in productivity between exporters and non-exporters, the next step is the estimation of so called exporter productivity premia, defined as the *ceteris paribus* percentage difference of productivity between exporters and non-exporters. The exporter premia are estimated from a regression of log LP or TFP on the current export status dummy and a set of control variables (Wagner, 2007). The model is written as follows:

[5] The procedure which implements the production function estimation is also available as the STATA extension command (further description of the use of the command is described in Levinsohn, Petrin and Poi, 2003).

$$ln\ LP_{it} = \alpha + \beta\ Export_{it} + c\ Control_{it} + e_{it}\,, \quad (2)$$

where *i* is the index of the firm, *t* is the index of the year, *LP* denotes labor productivity or *TFP*, *Export* is a dummy variable for current export status (1 if the firm exports in year *t*, 0 else). *Control* stands for a vector of control variables which includes the log of number of employees and its squared value to measure firm size, the log of wages and salaries per employee (in constant prices) to proxy for human capital, and a full set of interaction terms of 2-digit NACE industry-dummies and year dummies to control for industry-specific differences in capital intensity and shocks. Finally *e* is a white noise error term. The exporter productivity premium, computed from the estimated coefficient β as 100*(exp(β) – 1), shows the average percentage difference in productivity between exporters and non-exporters controlling for the characteristics included in the vector *Control*. To control for unobserved firm heterogeneity due to time-invariant firm characteristics, which might be correlated with the variables included in the empirical model and which might lead to a biased estimate of the exporter productivity premia, a variant of the equation above is estimated also by including fixed firm effects.

The next step is to identify differences in productivity growth between exporters and non-exporters based on the empirical model written as:

$$In\ LP_{it} - ln\ LP_{it-1} = \alpha + \beta_1\ Start_{it} + \beta_2\ Both_{it} + c\ Control_{it-1} + e_{it}\,, \quad (3)$$

where *Control* is a vector of firm characteristics in year 0, while dummies for export status are defined as follows:

$$Start_{it} = 1,\ if\ (Export_{it-1} = 0)\ and\ (Export_{it} = 1)$$
$$Both_{it} = 1,\ if\ \ (Export_{it-1} = 1)\ and\ (Export_{it} = 1)$$

where non-exporting in both years is the reference category. The regression coefficients β_1 and β_2 are estimates for the increase in growth rates of productivity for new exporters and exporters in both years relative to non-exporters in both years, controlling for firm characteristics included in the vector *Control*. In this stage, β_2 is observed for the comparison of exporters and non-exporters.

Concerning the direction of causality of correlation between productivity (LP or TFP) and exporting, there are two non-exclusive hypotheses mentioned previously. To assess the validity of self-selection hypothesis, the pre-entry differences in productivity levels between new exporters and non-exporters are investigated next. If better firms become exporters, then it is expected to find significant differences in productivity levels between future export starters and future non-starters several years before some of them begin to export. To test whether today's export starters were more productive than today's non-exporters several years back when none of them exported, we estimate the average difference in productivity in year $t - 3$ between those firms that start exporting in year *t* and those that do not. Formally we estimate the following empirical model:

$$ln\ LP_{it-3} = \alpha + \beta\ Export_{it} + c\ Control_{it-3} + e_{it} \quad (4)$$

where *i* is the index of the firm, *t* is the index of the year, *LP* is labor productivity or *TFP* in year $t - 3$, *Export* is a dummy variable for current export status (1 if the firm exports in year *t*, 0 else). *Control* is a vector of control variables that includes the log of the number of employees and its squared value to measure firm size, the log of wages and salaries per employee (in constant prices) to proxy human capital, and a set of 2-digit NACE industry-dummies to control for industry-specific

differences in capital intensity and industry specific shocks, and *e* is an error term. The pre-entry premium, computed from the estimated coefficient β as 100*(exp(β) – 1), shows the average percentage difference between today's exporters and today's non-exporters three years before starting to export, controlling for the characteristics included in the vector *Control*.

To investigate the related question whether the productivity increases more for the export starters in the years before starting to export compared to the firms that continue to supply only the domestic market, the following empirical model is used:

$$ln\ LP_{it-1} - ln\ LP_{it-3} = \alpha + \beta\ Export_{it} + c\ Control_{it-1} + e_{it} \quad (5)$$

The estimated regression coefficient β shows the extent by which future exporters outperformed the non-exporters in the years prior to entering the foreign markets.

To test the learning-by-exporting hypothesis, namely that exports promote productivity, the post-entry differences in productivity growth between export starters and non-exporters are investigated. This test is based on a comparison of firms that did not export in the period between $t - 3$ and $t - 1$, but do export in year t and in at least two years' period between $t + 1$ and $t + 3$, with firms from a control group that did not export in any years between $t - 3$ and $t + 3$ (non-exporters). The empirical model estimated is:

$$ln\ LP_{it+3} - ln\ LP_{it+1} = \alpha + \beta\ Export_{it} + c\ Control + e_{it}\ , \quad (6)$$

where *i* is the index of the firm, *t* is the index of the year, *LP* is labor productivity or *TFP*, *Export* is a dummy variable that takes the value 1 for export starters and the value 0 for the firms from the control group. *Control* is a vector of control variables that includes the log of number of employees and its squared value to measure firm size, the log of wages and salaries per employee (in constant prices) to proxy human capital, and a set of 2-digit NACE industry-dummies to control for industry-specific differences in capital intensity and industry specific shocks, and *e* is an error term. The post-entry premium, computed from the estimated coefficient β as 100*(exp(β) – 1), shows the average percentage difference in the growth of LP or TFP between the export starters and non-exporters over the three years after the start, controlling for the characteristics included in the vector *Control*.

6 Results and Findings

Econometric models and methods used in regression analysis to test the hypotheses set were discussed in the previous sections and represent the theoretical basis for the forthcoming empirical analysis. Our results present a new set of findings on differences in export Behavior of Slovenian services firms versus manufacturing firms, and on the extent and causes of differences in performance between exporters and non exporters in both groups of firms. For services firms the results of export Behavior are presented for business service sectors[6] only, which include sectors G, H, I J, M, R and S according to NACE Rev. 2 classification, as these sectors present tradable services and therefore the relevant results of export premia[7]. Regression analyses were also restricted only to the sample of firms, which

[6] In our sample there were no sufficient data for firms from sections L (Real estate activities), which also present tradable services, so firms from this sector are left out from our business services sample.

[7] For service firms the results of all three hypotheses were also estimated for the whole sample of services firms and are for the sake of brevity not presented in the paper. The sample of business service firms covers almost the whole sample of service firms in the database and therefore the results are almost the same as the results for the

have positive values for both measures of productivity (LP and TFP by Levinsohn and Petrin measure). This is done in order to make the samples identical for a direct comparison of the results.

6.1 Results of exporter productivity premia

For determining the differences in productivity between exporters and non-exporters, the exporter productivity premia is computed from the estimated coefficient β. Productivity is measured in our case as LP and as TFP by using the Levinsohn and Petrin method. Results for the estimated productivity premia from empirical model with and without fixed firm effects for services and manufacturing firms are reported in Table 3.

Table 3: *Estimates of exporter premia separately for Slovenian services and manufacturing firms, period 1994-2002*

		Variables	Services firms	Manufacturing firms
Labor productivity (LP)	Pooled OLS (LP)	xdt	0.230*** [0.000]	0.189*** [0.000]
		β	25.91	20.82
		Observations	145,215	39,711
	Fixed effects (LP_FE)	xdt	0.076*** [0.000]	0.070*** [0.000]
		β	7.860	7.275
		Observations	145,208	39,71
Total factor productivity (TFP)	Pooled OLS (TFP)	xdt	0.165*** [0.000]	0.093*** [0.000]
		β	17.90	9,757
		Observations	145,215	39,711
	Fixed effects (TFP_FE)	xdt	0.054*** [0.000]	0.041*** [0.000]
		β	5.510	4.234
		Observations	145,208	39,710

Notes: Table presents major results of interest only. Full results are available from authors upon request.

LP – Labor productivity; TFP – Total factor productivity; xdt – indicates a dummy variable for current export status; β – exporter productivity premia; Pooled OLS – Ordinary Least Square method; FE – Fixed effects method; ***, ** and * denote statistical significance at 1, 5 and 10 percents respectively; p-value is in parentheses.

Results in Table 3 show that estimated premia are always positive and statistically significant, no matter which econometric method is used in the estimation. For pooled data, the estimates of export premia are very large for both types of firms. Using the LP measure, the estimations by the OLS method show that exporting services firms are on average about 25 per cent more productive than non-exporting services firms, while exporting manufacturing firms are about 20 per cent more productive compared to non-exporters. When TFP measure is used, the estimates of exporter productivity premia

whole population of service firms. The estimated exporter premia for non-tradable services sectors (not presented in the paper) was, in line with the expectations, not statistically significant.

are somewhat lower compared to LP, and the difference in relative magnitude of estimated exporter productivity premia is even higher in favour of exporting services firms compared to manufacturing by OLS method. If fixed firms effects are added to control for unobserved heterogeneity, the estimated premia are still statistically significant for both types of firms but the point estimates are much smaller as compared to the results based on pooled data. For manufacturing firms, the results are consistent with the findings of previous research on Slovenian manufacturing firms (Damijan et al. 2004; De Loecker, 2004; Kostevc, 2005, Damijan & Kostevc, 2006, Wagner et al. - ISGEP, 2007).

The striking impression from the results, however, is that export premia is always larger for services firms as compared to manufacturing firms. The differential in export premia between the two groups of firms is in the range between 9 and 75 per cent, depending on the estimation method and the productivity measure used. These differences in estimated productivity premia between both groups of firms may indicate that participation rate in exporting is significantly lower for services firms (compare the descriptive statistics in Table 1) and that the required cut-off productivity level for engaging in exporting is larger for services than for manufacturing firms.

In Table 4, the results of exporter productivity premia for business services firms are presented also separately by NACE Rev. 2 sections, which gives a more detailed review of the services firms' characteristics.

Table 4: *Results of export productivity premia for Slovenian services firms by NACE Rev. 2 sections, period 1994-2002*

			NACE Rev. 2							
		Variab.	**G**	**I**	**H**	**J**	**M**	**N**	**R**	**S**
LP	Pooled OLS (LP)	xdt	0.204*** [0.000]	0.288*** [0.000]	0.242*** [0.000]	0.161*** [0.000]	0.200*** [0.000]	0.184** [0.018]	0.286*** [0.000]	0.363*** [0.000]
		β	**22.57**	**33.34**	**27.34**	**17.43**	**22.17**	**20.21**	**33.14**	**43.78**
		Observations	14,212	6,045	71,407	5,766	41,555	2,574	2,385	1,271
	Fixed effects (LP_ FE)	xdt	0.101*** [0.000]	0.145*** [0.003]	0.152*** [0.000]	0.056 [0.103]	0.117*** [0.000]	0.123* [0.084]	0.113* [0.051]	0.223** [0.035]
		β	**10.58**	**15.66**	**16.42**	**5.79**	**12.37**	**13.04**	**11.95**	**24.99**
		Observations	14,211	6,045	71,403	5,766	41,554	2,573	2,385	1,271
TFP	Pooled OLS (TFP)	xdt	0.073*** [0.000]	0.165*** [0.000]	0.183*** [0.000]	0.179*** [0.000]	0.103*** [0.000]	0.111 [0.116]	0.262*** [0.000]	0.237*** [0.001]
		β	**7.62**	**17.99**	**20.09**	**19.57**	**10.81**	**11.74**	**29.95**	**26.81**
		Observations	14,212	6,045	71,407	5,766	41,555	2,574	2,385	1,271
	Fixed effects (TFP_ FE)	xdt	0.040** [0.032]	0.110** [0.022]	0.119*** [0.000]	0.061* [0.079]	0.076*** [0.000]	0.095 [0.211]	0.090* [0.082]	0.173* [0.089]
		β	**4.05**	**11.57**	**12.60**	**6.29**	**7.89**	**10.01**	**9.43**	**18.92**
		Observations	14,211	6,045	71,403	5,766	41,554	2,573	2,385	1,271

Notes: Table presents major results of interest only. Full results are available from authors upon request.

LP – Labor productivity; TFP – Total factor productivity; xdt – indicates a dummy variable for current export status; β – exporter productivity premia; Pooled OLS – Ordinary Least Square method; FE – Fixed effects method; ***, ** and * denote statistical significance at 1, 5 and 10 percents respectively; p-value is in parentheses.

The number of observations reveals that most Slovenian services firms in our sample operate in sections H (Transport and storage), M (Professional, scientific and technical activities) and G (Wholesale and retail trade, repair of motor vehicles and motorcycles). Exporter productivity premia is highly statistically significant and high in relative magnitude for almost all the observed services firms' sections, except for section N (Administrative and support services), where results are inconclusive when applying different measures of productivity and different econometric method. Thus for this sector we cannot infer that exporting firms are more productive than non-exporters.

Results with the LP productivity measure again display the highest point estimated of exporter productivity premia, about one time higher compared to TFP. When fixed firm effects and added to the regression the relative magnitude of the estimated premia is further reduced, and is for some sections statistically significant (notably for J, R, and S) only at lower confidence levels. High exporter productivity premia are reflected primarily in the R, S, H, I and M sections, where the magnitude of estimated exporter premia compared to non-exporters is higher than 10 %, regardless of the productivity measure or econometric method used, thus for these sectors we undoubtedly find that exporters are more productive than non-exporters.

In the next step we investigate the export premia in terms of productivity growth separately for new exporters (β_1) and established exporters (β_2) compared to firms that operate only on domestic markets. Here, we account for differences in productivity growth between exporters and non-exporters between years *t* and *t-1* based on the empirical model (3) for services and manufacturing firms separately. Results in Table 5 present that both groups of exporters in the services and manufacturing sector experience statistically significant higher productivity growth than non-exporters.

Two striking issues emerge from the results. First, for services firms, exports starters are found to have higher point estimates of productivity growth premia compared to established exporters regardless of the measure of productivity or econometric method used. For manufacturing exporters, higher productivity growth premia of new exporters relative to established exporters is found only for the OLS specifications, and vice versa for the fixed effects specifications. This indicates that export starters have *dressed up* in terms of productivity in the year before starting to export and that this is quite a general feature for services firms.

Second, considering pooled OLS results, new and established exporters among services firms are found to have on average relatively higher exporter productivity growth premia measured by both LP and TFP as compared to manufacturing exporters. When taking into account firm fixed effects, however, this relationship is maintained only for the exporter starters, while the established manufacturing exporters are found to enjoy a higher premia than established services exporters. This points towards higher productivity growth of services exporters than of manufacturing exporters. An explanation for this might be that export activity is more concentrated among the services firms (i.e. lower export participation rates) and that only top performing services firms engage in exporting, while export participation is more dispersed among the manufacturing firms.

The main findings therefore show that services exporters behave similarly as manufacturing exporters in terms of exporter premia. Furthermore, services exporters are shown to enjoy higher productivity premia than manufacturing exporters.

Table 5: *Results of export productivity growth premia separately for new and established exporters, period 1994-2002*

		Variables	Services firms	Manufacturing firms
Labor productivity (LP)	Pooled OLS (LP)	x_start	0.243*** [0.000]	0.194*** [0.000]
		x_old	0.223*** [0.000]	0.187*** [0.000]
		β_1	27.46	21.36
		β_2	25.01	20,60
		Observations	145,215	39,711
	Fixed effects (LP_FE)	x_start	0.083*** [0.000]	0.056*** [0.000]
		x_old	0.063*** [0.000]	0.092*** [0.000]
		β_1	8.645	5.711
		β_2	6.480	9.624
		Observations	145,208	39,710
Total factor productivity (TFP)	Pooled OLS (TFP)	x_start	0.174*** [0.000]	0.111*** [0.000]
		x_old	0.159*** [0.000]	0.086*** [0,000]
		β_1	10.05	11.71
		β_2	17.23	9.002
		Observations	145,215	39,711
	Fixed effects (TFP_FE)	x_start	0.055*** [0.000]	0.032*** [0.005]
		x_old	0.050*** [0.000]	0.056*** [0.000]
		β_1	5.703	3.212
		β_2	5.167	5.760
		Observations	145,208	39,710

Notes: Table presents major results of interest only. Full results are available from authors upon request.

LP – Labor productivity; TFP – Total factor productivity; x_start – indicates a dummy variable for new exporters; x_old – indicates a dummy variable for established exporters; β_1 – exporter productivity premia for new exporters; β_2 – exporter productivity premia for established exporters; Pooled OLS – Ordinary Least Square method; FE – Fixed effects method; ***, ** and * denote statistical significance at 1, 5 and 10 percents respectively; p-value is in parentheses.

6.2 Results of self-selection

Empirical results reported and discussed in the previous section relate to the correlation between productivity and engagement in exports. Next two sections further investigate the direction of causality between these two dimensions of firm performance. First, we investigate the validity of self-

selection hypothesis. The *ex-ante* productivity premia, estimated by empirical model (4) and computed from the estimated coefficient β, shows the average percentage difference in productivity between today's exporters and today's non-exporters three years before starting to export, controlling for the characteristics included in the vector *Control*. Results of estimating the pre-entry premium separately for services and manufacturing export starters are reported in Table 6.

Table 6: *Results of ex-ante exporter productivity premia, period 1994-2002*

		Variables	Services firms	Manufacturing firms
Labor productivity (LP)	Pooled OLS (LP)	x_start	0.167*** [0.000]	0,121*** [0.000]
		β	18.22	12.86
		Observations	69,740	21,320
Total factor productivity (TFP)	Pooled OLS (TFP)	x_start	0.119*** [0.000]	0.072*** [0.000]
		β	12.67	7.495
		Observations	69,740	21,320

Notes: Table presents major results of interest only. Full results are available from authors upon request.

LP – Labor productivity; TFP – Total factor productivity; x_start – indicates a dummy variable for new exporters; β – *ex-ante* exporter productivity premia; Pooled OLS – Ordinary Least Square method; FE – Fixed effects method; ***, ** and * denote statistical significance at 1, 5 and 10 percents respectively; p-value is in parentheses.

Results show convincing evidence for positive and large pre-entry premium for services and manufacturing export starters regardless of the productivity measure used. Comparing the relative magnitudes of the *ex-ante* productivity premia, services export starters again have much higher point estimates than manufacturing firms by both productivity measures. These results clearly confirm self-selection of more productive firms into exporting.

For services export starters, we also estimate pre-entry premia separately by NACE sections. Results are reported in Table 7. The estimations show that with the LP productivity measure self-selection of more productive services exports starters is statistically significant and very high for the majority of observed services sectors, for some (notably for sectors J, N, R and S) at lower statistical significance. If productivity is measured by TFP, statistical significance of *ex-ante* premia disappears in some of the sectors (in sectors I, J, N and S), which may be due to the non-tradable character of these sectors and due to relatively small number of observations in these sectors in our sample. Particularly large magnitude of the estimated *ex-ante* premia is reported for services export starters in sections G (Wholesale and retail trade, repair of motor vehicles and motorcycles), H (Transportation and storage) and M (Professional, scientific and technical activities), which include most of the observed services export starters, regardless of the productivity measure used. Today's export starters were on average by at least 10 % more productive than today's non-exporters already three years before starting to export, measured by LP or TFP. Results thus confirm the self-selection hypothesis also for individual services sectors.

Table 7: *Results of ex-ante exporter productivity premia for Slovenian services firms by NACE Rev. 2 sections, period 1994-2002*

			NACE Rev. 2							
		Variables	**G**	**I**	**H**	**J**	**M**	**N**	**R**	**S**
LP	Pooled OLS (LP)	x_start	0.222*** [0.000]	0.175*** [0.002]	0.169*** [0.000]	0.112** [0.028]	0.138*** [0.000]	0.161* [0.065]	0.227** [0.015]	0.277** [0.026]
		β	**24.82**	**19.17**	**18.45**	**11.89**	**14.76**	**17.46**	**25.44**	**31.92**
		Observations	7,837	3,004	38,040	3,121	22,127	1,432	1,133	679
TFP	Pooled OLS (TFP)	x_start	0.143*** [0.000]	0.073 [0.153]	0.133*** [0.000]	0.053 [0.234]	0.061*** [0.000]	0.053 [0.571]	0.226*** [0.003]	0.123 [0.369]
		β	**15.41**	**7.610**	**14.26**	**5.486**	**6.269**	**5.392**	**25.38**	**13.09**
		Observations	7,157	2,780	33,620	2,865	20,295	1,354	1,037	632

Notes: Table presents major results of interest only. Full results are available from authors upon request.

LP – Labor productivity; TFP – Total factor productivity; x_start – indicates a dummy variable for new exporters; β – *ex-ante* exporter productivity premia; Pooled OLS – Ordinary Least Square method; FE – Fixed effects method; ***, ** and * denote statistical significance at 1, 5 and 10 percents respectively; p-value is in parentheses.

6.3 Results for learning-by-exporting

To test the other causality direction, namely that exporting fosters productivity growth – known in the literature as learning-by-exporting hypothesis, the post-entry differences in productivity growth between export starters and non-exporters are investigated. *Ex-post* productivity growth premia is estimated using the empirical model (6) and computed from the estimated coefficient β. The results of post-entry exporter productivity premia for new exporters separately for services and manufacturing firms three years after entering foreign markets are reported in Table 8.

Table 8: Results of ex-post exporter productivity growth premia, period 1994-2002

		Variables	**Services firms**	**Manufacturing firms**
Labor productivity (LP)	Pooled OLS (LP)	x_start	0.001 [0.158]	0.00001 [0.988]
		β	0.0999	0.00142
		Observations	70,844	20,127
Total factor productivity (TFP)	Pooled OLS (TFP)	x_start	0.002*** [0.003]	0.002 [0.124]
		β	0.249	0.193
		Observations	70,844	20,127

Notes: Table presents major results of interest only. Full results are available from authors upon request.

LP – Labor productivity; TFP – Total factor productivity; x_start – indicates a dummy variable for new exporters; β – *ex-post* exporter productivity premia; Pooled OLS – Ordinary Least Square method; FE – Fixed effects method; ***, ** and * denote statistical significance at 1, 5 and 10 percents respectively; p-value is in parentheses.

Estimated coefficients for *ex-post* productivity premia differ by different measures of productivity used in the empirical model. By using the LP measure, we find no statistically significant learning-by-exporting effects neither for services exports starters nor for manufacturing firms. On the other hand, using the TFP measure of productivity gives contrasting results, whereby the results for services firms show significant positive post-entry premia, while for manufacturing firms this effect remains statistically insignificant. TFP unlike LP refers to the productivity of all inputs taken together and is a measure of global efficiency of a firm and therefore should be presumed as a better measure of productivity. Services export starters seem to experience higher productivity growth than non-exporters after entering foreign markets, but the *ex-post* productivity premia is rather small in magnitude (only about 0.25 %).

To verify which services sectors actually contribute the most to statistically significant results of learning-by exporting hypothesis, the results in Table 9 are shown separately for NACE Rev. 2 services sections.

Table 9: *Results of ex-post exporter productivity premia for Slovenian services firms by NACE Rev. 2 sections, period 1994-2002*

			NACE Rev. 2							
		Variables	**G**	**I**	**H**	**J**	**M**	**N**	**R**	**S**
LP	Pooled OLS (LP)	x_start	-0.001 [0.642]	0.003 [0.588]	0.001 [0.191]	-0.002 [0.632]	0.000 [0.835]	0.008 [0.354]	0.017* [0.083]	-0.001 [0.799]
		β	-0.124	0.285	0.109	-0.238	0.0353	0.810	1.670	-0.109
		Observations	6,811	2,777	34,227	2,883	21,028	1,382	1,072	664
TFP	Pooled OLS (TFP)	x_start	-0.000 [0.925]	0.004 [0.580]	0.002** [0.017]	-0.001 [0.831]	0.003 [0.175]	0.020*** [0.008]	0.017 [0.159]	0.006 [0.211]
		β	-0.0322	0.355	0.235	-0.116	0.281	2.064	1.674	0.596
		Observations	6,811	2,777	34,227	2,883	21,028	1,382	1,072	664

Notes: Table presents major results of interest only. Full results are available from authors upon request.

LP – Labor productivity; TFP – Total factor productivity; x_start – indicates a dummy variable for new exporters; β – *ex-post* exporter productivity premia; Pooled OLS – Ordinary Least Square method; FE – Fixed effects method; ***, ** and * denote statistical significance at 1, 5 and 10 percents respectively; p-value is in parentheses.

Results in Table 9 show, as was already revealed from the pooled results for services firms, that there are no statistical significant learning-by-exporting effects when LP measure is used. Statistically significant results are found for sector R only. Results for TFP measure of productivity reveal that it is mainly the new exporters in sector H (Transportation and storage), which include slightly more than a half of the observed services firms, that drive the results for services firms. In addition, significant positive learning-by-exporting effects are found also for new exporters in the sector N (Administrative and support services activities). However, this post-entry growth premia is very low in magnitude and equals to only about 0.24 % for sector H firms and to 2.06 % for sector N firms.

To summarize, results of testing the learning-by-exporting effects show mixed findings. Only by using the TFP measure we find some evidence of learning-by-exporting effects for two services sectors, while for manufacturing firms the hypothesis is still not confirmed. The results of testing the learning effects for Slovenian manufacturing firms are in line with the previous research findings (Kostevc, 2005; Damijan & Kostevc, 2006; Wagner et al. – ISGEP, 2007). Based on the results, we can conclude

that for services export starters there is some potential for learning-by-exporting effects in contrast to the prevailing insignificance of this effect in the literature on manufacturing firms.

7 Conclusions

The main aim of our paper was to analyze the export Behavior of Slovenian services firms using the panel database in the period 1994 - 2002 using the standard methodology. This kind of research has already offered a set of stylized facts for manufacturing firms, but very few have explored the exports Behavior and causality of export orientation of services firms. Our analysis therefore adds new set of findings to this emerging literature on services firms. We also have the privilege of comparing these findings to those for manufacturing firms using the same methodology and the same time period.

Findings of our empirical study are in line with the big picture, which is after fifteen years of microeconometric studies known in literature on manufacturing exporters – i.e. Slovenian service exporters are also found to be more productive than non-exporters (measured either by LP or TFP measure of productivity) when controlling for observed and unobserved firm heterogeneity. The striking finding is that the export premia is always larger for services firms as compared to manufacturing firms. The differential in export premia between the two groups of firms is in the range between 9 and 75 per cent, depending on the estimation method and the productivity measure used.

There is also strong evidence in favour of self-selection hypothesis of more productive firms into exporting, regardless of the productivity measure or econometric method used in regression analysis. The *ex-ante* premia for services exporter starters is higher compared to manufacturing export starters irrespective the productivity measure used. Potential explanation for this may lie in the fact that export activity is more concentrated among the services firms (i.e. lower export participation rates) and that only top performing services firms engage in exporting, while export participation is more dispersed among the manufacturing firms.

On the other hand the verification of learning-by-exporting hypothesis proves to be statistically significant only for services exporters when the TFP measure of productivity is used. The post-entry productivity premia, however, is rather low in magnitude. The results for manufacturing exporters are statistically insignificant regardless of the productivity measure used.

Possible reason for the lack of evidence of the learning effect, proposed by Blalock and Gertler (2004), is that there might not be enough difference in development levels between the importing country and exporters' home country for there to be an effective learning. This is in line with Damijan et al. (2004) who found that potential for learning effect of Slovenian manufacturing export starters is greater for those that start exporting to more demanding markets. Insufficient evidence may also be dependent on the specific methodology used for verifying the hypothesis of learning-by-exporting as many recent studies found positive effects of exports on productivity by using more sophisticated evaluation techniques with control for bias caused by self-selection of most productive firms into exporting (see van Biesebrock, 2005; Isgut & Fernandes, 2007; Lileeva & Trefled, 2007; De Loecker, 2007). So this area should be investigated further.

This paper contributes a new set of empirical based evidence that Slovenian services exporters behave similarly regarding the link between exports and productivity to what is known in the literature for manufacturing firms. The exporter productivity premia are even higher in relative magnitude compared to Slovenian manufacturing exporters, which implies that the policies and guidelines on

state level should be set up in the way to encourage and facilitate exporting activity also among services firms and by doing this to support faster growth and development of the whole economy.

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Annexes

Annex 1: Classification of services activities by NACE Rev. 2 and ISIC Rev. 4 sections

NACE Rev. 2 and ISIC Rev. 4		Divisions
Section	Description	
G	Wholesale and retail trade, repair of motor vehicles and motorcycles	45–47
H	Transportation and storage	49–53
I	Accommodation and food services activities	55–56
J	Information and communication activities	58–63
K	Financial and insurance activities	64–66
L	Real estate activities*	68
M	Professional, scientific and technical activities	69–75
N	Administrative and support services activities	77–82
O	Public administration and defence; compulsory social security	84
P	Education	85
Q	Human health and social work activities	86–88
R	Arts, entertainment and recreation	90–93
S	Other services	94–96

* including imputed rents of owner-occupied dwellings

Source: EUROSTAT, NACE Rev. 2, 2008

Annex 2: Classification of manufacturing activities by NACE Rev. 2 and ISIC Rev. 4 sections

NACE Rev. 2 and ISIC Rev. 4		Divisions
Section	Description	
C	Manufacturing activities	10–33
D	Electricity, gas, steam and air-conditioning supply	35
E	Water supply, sewerage, waste management and remediation	36–39
F	Construction	41–43

Source: EUROSTAT, NACE Rev. 2, 2008