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## Export vs. FDI Behavior of Heterogenous Firms in Heterogenous Markets: Evidence from Sovenia

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# Export vs. FDI Behavior of Heterogenous Firms in Heterogenous Markets: Evidence from Slovenia

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## Abstract

This paper adds a new dimension to the recent literature on relationship between firm's heterogeneity in terms of total factor productivity and its dynamic exports vs. FDI decision, namely the heterogeneity of export markets. We show that higher productivity of investing firms relative to just exporters is not inevitably uniform. Exploiting a complete set of Slovenian exporting firms in the period 1994 - 2002, we confirm the tendency of higher productivity firms to engage in FDI only for FDI conducted in high wage countries. In addition, we find no evidence in favor of either market-seeking (horizontal) or factor-seeking (vertical) motive for FDI. While survey results suggest trade-promotion motive to be just as important, we find little evidence in favor of efficiency of this strategy.

*JEL Classifications:* D24, F14

*Key Words:* Foreign Direct Investment, Exports, Firm Heterogeneity, Multinational Firm

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# 1 Introduction

Theoretical literature on multinational firm identifies three different motives for outward foreign direct investment (FDI): market-seeking, resource-seeking and efficiency-seeking motives (see World Investment Report 1998 for a broader survey). Market-seeking FDI are determined by consumer-proximity and high trade costs, such as transport costs, tariffs, etc. Resource-seeking FDI are triggered by differences in resources and relative factor endowments, while efficiency-seeking FDI aim at exploiting scale economies and maximizing efficiency of multinational firms. These motives can be combined with either horizontal or vertical multinational production structure. Horizontal multinational production refers to firms which "produce roughly the same product or service in multiple locations", while vertical production refers to firms which "geographically fragment the production process by stages" (Markusen, 1998). In principle, market-seeking motive is associated with horizontal multinational production structure, while vertical multinational production is related to resource-seeking and efficiency-seeking motives for FDI (Ekholm, Forslid and Markusen, 2003). Of course, individual FDI can have elements of both.

World flows of FDI are dominated by advanced countries, since they provide a source of more than 90 percent of world total FDI outflows and receive roughly 70 per cent of world total FDI inflows (World Investment Report 2003). Hence, it is not surprising that empirical evidence favors horizontal motive, i.e., FDI flows between countries with low factor endowment differentials. Brainard (1997), Markusen (2002), Helpman, Melitz and Yeaple (2003), Head and Ries (2003) found that trade created by FDI is increasing in transport costs and tariffs but decreasing in relative factor endowments differences and plant scale economies. Evidence overwhelmingly confirms that (horizontal) FDI substitutes for trade. There is little evidence in favor of vertical FDI with significant portion of affiliates' sales back to the home country (compare Brainard, 1997; World Investment Report 1998). Using the bilateral trade and FDI data for US with 25 partner countries, however, Amiti, Greenaway and Wakelin (2000) seem to find some support for the general theory. They find evidence that horizontal FDI and thus trade substitution is more likely to dominate when countries are similar in terms of relative skill endowments and size, and trade costs are moderate to high, while vertical FDI and thus trade expansion will likely to occur when countries differ significantly and trade costs are small.

What about developing and transition countries? Data reveals that these groups of countries are net receivers of world FDI flows with their shares in total world FDI inflows and outflows in 2002 of about 30 percent and 6 percent, respectively (World Investment Report 2003). As these countries are relatively more labor abundant, vertical multinational production structure should be promoted resulting in increased exports of these countries. Data indeed confirm that inward FDI complements (enhances) trade in most of the developing (e.g. China) as well

as transition countries in 1990s.<sup>1</sup> On the other hand, there is scarce evidence on outward FDI by developing and transition countries. There is some evidence for Slovenia (Damijan, 2001; Jaklič and Svetličič, 2001, 2003; Prašnikar et al., 2001) and some recent evidence for few other transition countries Svetličič and Rojec (2003). The evidence is pointing towards horizontal (market-seeking) motives as well as specific direct-sales-promotion motives for outward FDI (OFDI).

In the present paper, we explore a rich firm-level dataset for Slovenia, a semi-developed small transition economy, in order to uncover the motives and consequences of recent huge outward FDI. The paper takes advantage of recent theoretical work (Montagna, 2001) and evidence (Clerides, Lach and Tybout, 1997; Pavcnik, 2002; Tybout, 2002) that introduces heterogeneity of firms into standard monopolistic competition models. Furthermore, we build on recent papers by Helpman, Melitz and Yeaple (HMY, 2003), Head and Ries (2003), and Kostevc (2004) showing that it is heterogenous total factor productivity of firms within industries that explains why some firms - given equal trade and investment opportunities within sectors - serve only the domestic markets, some firms export, some engage in FDI and some do both.

The aim of our paper is to test how two main hypotheses stemming from the model of horizontal foreign direct investment developed in HMY (2003) apply to a semi-developed transition country. First hypothesis is that firms with higher productivity are more likely to bear fixed costs of foreign direct investment than low productivity firms. Second hypothesis is that as a consequence of FDI, firms substitute domestic production with foreign production. In addition, we extend above empirical implications by allowing not only for productive investments abroad but also for pure trade-promoting investments (direct-sales-promotion via trade affiliates). The latter can be an important motive for FDI when foreign country is a low-cost production location with high-risk economic environment.

Empirical investigation in our paper gains several important insights. First, in contrast to evidence provided in HMY (2003), we do not find a general tendency that firms with higher total factor productivity are more likely to invest in foreign affiliate. Instead, this is true only for firms investing in high wage countries. In addition, we find firms with higher capital intensity, that also drives labor productivity, and larger firms are more likely to engage in outward FDI. Second, outward FDI of Slovene firms are heavily concentrated in countries of former Yugoslavia. Third, we do not find strong support for low-wages to trigger FDI in former Yugoslavia. Fourth, we find that high previous export shares into a target country increases the likelihood of FDI. Fifth, we find neither market-seeking nor factor-seeking motives to be of predominant importance for FDI. In case of dominant market seeking motives we should observe decreasing exports

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<sup>1</sup>Elteto (2000) and Hunya (2002) show that multinational firms located in Hungary create about 70 per cent of Hungarian manufacturing exports. In Slovenia this share is about one third (Bank of Slovenia, 2003).

to the target country, while in case of factors-seeking motives we should observe increasing imports of intermediates from a target country. We find neither of the two. Instead, trade promotion may be a key motive for FDI in countries of former Yugoslavia, where uncertainty related to exports payments is high. But surprisingly, we don't find any impact of increasing trend of FDI on expansion of exports, which challenges the efficiency of the trade-promotion strategy.

This paper contributes to the literature in the sense that it adds additional dimension to firm's exports vs. FDI decision, namely the heterogeneity of export markets. Firms make a decision to serve foreign markets either via exports or FDI also according to specific characteristics of the target markets, such as distance, differences in relative factors costs as well as specific market conditions (instability, uncertainty of payments). Another contribution of the paper is to show that higher productivity of investing firms relative to just exporters is not inevitably uniform. We find this is true only for firms investing in high wage countries. In general, however, firms in a small open country are more inclined to serve foreign markets in whichever way notwithstanding their relative productivity. This is in line with the recent findings by Greenaway, Gullstrand and Kneller (2003) showing that the performance characteristics of Swedish exporters and non-exporters are remarkably similar.

The paper is organized as follows. In the next section, we shortly review related empirical literature, studying motives for outward FDI, in particular the issue of substitution vs. complementarity issue between trade and FDI. In the third section, we describe basic features of the dataset we use in empirical exercise and major trends in Slovene foreign trade and foreign direct investments. In the fourth section we examine the relationship between heterogeneity of firms in terms of productivity and firm's decision to serve foreign markets either through exports or FDI. We also study other determinants of Slovene outward FDI, such as capital intensity, size and characteristics of host countries. In the fifth section, we provide some empirical tests whether outward FDI by Slovene firms tend to replace or enhance their exports and imports in respective markets. Final section concludes.

## 2 Related empirical studies

Starting with Mundell's (1957) seminal paper, there is a long tradition of theoretical considerations about complementarity - substitution relationship between trade and FDI. Different theories - from traditional Heckscher-Ohlin (HO) to recent new trade theories - try to explain above relationship in a different theoretical setup. These approaches can be summarized as: horizontal multinational production structure is most likely to be established between countries with low differences in relative factor endowments (similar GDP per capita levels) due to market-seeking motive, while vertical multinational production is going to be

established due to resource-seeking and efficiency-seeking motives for FDI when cross-country differences in relative factor endowments are large. Horizontal FDI are likely to substitute for previous bilateral trade when trade barriers between countries are high. Horizontal FDI, however, can also produce significant intra-industry trade flows if multinational company (MNC) divides its production of components among several countries (e.g. automotive industry in Europe is a typical example). On the other side, vertical FDI are likely to create new trade flows when rich country outsources its production of standardized goods into relatively low real wage countries.

Due to unavailability of data there is little empirical research done in this field. Most important studies were done by Brainard (1993, 1997), Helpman, Melitz and Yeaple (2003) and Head and Ries (2003). Their evidence confirms horizontal motive as the dominant empirical motive for direct investment.

**Brainard (1993)** develops a factor-proportions model of trade, which is a slightly modified HO model with differentiated goods and differences in technology between countries. Basic prediction of the model is that a rich country outsources its production of standardized goods into low labor cost country, which in turn exports back these goods. Brainard tests the model using the data on regular U.S. trade flows and intra-MNC trade flows created by parent companies and affiliates of U.S. MNCs abroad and foreign MNCs in U.S. She finds surprisingly high similarity of U.S. regular trade flows and intra-MNC trade flows. Furthermore, regular trade and intra-MNC trade seem to have the same pattern, i.e. they are most likely motivated by similarities and not differences in relative factor prices (GDPpc) among countries. Factor-proportions model of trade, hence, cannot explain trade and FDI pattern between rich countries which clearly dominates over the trade and FDI with developing countries.

In her second attempt, **Brainard (1997)** builds a simple model of horizontal trade with differentiated goods, which enables her to explore the trade-off between achieving proximity to customers and concentrating production on one site to achieve scale economies. Using the data for U.S., she finds that overseas production by MNCs increases relative to exports higher are transport and trade barriers and lower are investment barriers and scale economies at the plant level relative to the corporate level. Using cross-section data on inter-affiliates trade flows for 1989, she finds that foreign affiliates in U.S. export back home only 2 per cent of their U.S. production and sell 92 per cent of it in the U.S. market, while U.S. affiliates abroad sell back home only 13 per cent of their production abroad and 64 per cent of it sell on local markets. The evidence, hence, clearly demonstrates that horizontal FDI substitutes for trade.

**Helpman, Melitz and Yeaple (HMY, 2003)** develop a model on the firm's choice between exports and horizontal FDI. They are the first to consider the heterogeneity in productivity (after controlling for capital intensity) as a key factor in firm's decision whether to supply only domestic market or to supply also foreign market either through exports or FDI. Firms decide for these three options

depending on their productivity. Least productive firms may choose to exit, more productive firms serve only domestic market, relatively more productive serve domestic market through local production and foreign market through exports and the most productive firms engage in FDI.

They provide a simple evidence of this pattern, regressing labor productivity  $y$  (value added per employee) on industry dummies  $S_k$ , capital intensity  $k$  (capital per employee), total capital  $K$  and its square  $K^2$ , and on dummies variables  $D_{EXP}$  and  $D_{OFDI}$  that assume 1 if a firm is exporter and has a foreign affiliate, respectively, and 0 otherwise

$$\ln y_i = \alpha_0 + \alpha_1 \ln k_i + \sum_k \alpha_{2k} S_k + \alpha_3 \ln K + \alpha_4 \ln K^2 + \alpha_5 D_{EXP} + \alpha_6 D_{OFDI}. \quad (1)$$

The results clearly indicate that  $0 < \alpha_5 < \alpha_6$ , which implies the predicted productivity ranking. They estimate this equation using the firm-level data including 4-digit industry fixed effects. They find 15% higher productivity of firms that have FDI as opposed to exporters. Next they test the standard hypotheses: proximity-concentration trade off and confirm the results of Brainard (1997), i.e. horizontal FDI substitute for trade.

**Head and Ries (HR, 2003)**, do not examine the substitution - complementarity issue among trade and FDI. Their paper, however, is important due to their extension of the HMY model. HR allow for additional factor, such as differences in wages (average productivity of economy) between countries, which may also be important in explaining the vertical FDI and is in line with differences in factor endowments (Mundell, 1957). Using data on 1070 large Japanese firms in 1989 they show that when host country offers no cost advantage the investors abroad are more productive than exporters. Allowing for low-cost foreign production reverses this pattern as low productivity firms are most attracted to relocate production to low-cost foreign country.

Evidence provided in these studies is not general in the sense that so far only the pattern of production of MNCs from developed countries has been studied. It is obvious that among developed countries a horizontal type of FDI is most likely to occur. HMY emphasize some of the determinants of horizontal FDI (productivity differences, fixed costs, trade costs). Horizontal FDI can then either replace or induce bilateral trade. However, what are the implications for developing countries? HR do allow for differences in wages among countries, leading possibly to vertical FDI, but they don't study the implications for trade pattern. Our paper fills this gap in the sense that it studies behavior of firms in a semi-developed transition country using a unique dataset on all firms' international real transactions (trade and FDI). We have a panel of firm-level data for the period 1994-2002 enabling us to study short and long-run response of firms' exports to previous FDI. Since we can observe directly, how firms' exports and imports change over time after FDI took place, which allows us to study whether FDI substitutes trade and whether FDI is of horizontal or vertical type.



## 3 Data

### 3.1 Description of data

In our empirical exercise, we use firm-level panel data for all Slovene manufacturing and service firms for period from 1994 to 2002.<sup>2</sup> The dataset contains information on firm characteristics from financial statements (value added, employment, capital) and detailed information on firms' exports, imports and foreign direct investment to all countries. To the best of our knowledge, such detailed data have not yet been used so far in empirics of outward foreign direct investment. Specifically, detailed information on timing of investments allows us to test directly what are the motives driving firms into outward foreign direct investments and, in particular, test whether these firms were indeed more productive as suggested in HMY. While existing studies (e.g., HMY, HR) used cross-section data and could only compare the productivity of firms with and without foreign direct investment, we can exploit the panel structure of the data and tackle the omnipresent issue of endogeneity. Moreover, with exception of paper by HR, the majority of studies uses sectoral data instead of firm-level data.

The dataset we use contains complete information on trade and investment flows for all firms and countries for period from 1994 to 2002. The original database contains 32021 firms from different sectors. A large fraction of these firms had neither exports nor FDI, while 11155 exported in at least one year. Besides exports 883 firms in our sample had also at least one outward FDI. The database contains around 850 thousand entries as many firms have many observations, depending on number of countries with which firms' have either trading or investment relations. For the purpose of our analysis, we have selected firms that fulfil the following criteria: (i) they are exporters, (ii) firms are classified into NACE (ISIC) sectors 15-52 (manufacturing firms and firms in selected services), (iii) number of employees exceeded 10 in all years of available data. Thus, the database used in estimations contains information on 1626 firms (in 1994) and 1666 (in 2002). Total number of observations for all countries of exports and years contains 295 thousand entries, 23642 in 1994 and 40840 in 2002. Note though, missing values for some variables can reduce the database substantially.

From theoretical point of view it is useful to distinguish between manufacturing firms and services. We consider all manufacturing firms in sectors 15 to 37, while for services we include only construction and trade firms (NACE 40 to 52). While for service firms a clear horizontal market-seeking and trade substitution effect can be expected, this is not as straightforward for manufacturing firms.

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<sup>2</sup>We are grateful to the Bank of Slovenia for providing the data.

## **3.2 Summary statistics for Slovene trade and outward FDI**

### **3.2.1 Foreign trade**

Before we turn to hypotheses testing, it is useful to summarize basic features of Slovene trade and foreign direct investment. In Table 1, we show the structure of foreign trade by geographical location. First, note that developed countries, in particular those in the European Union, are the main trading partners for Slovene firms with 68 percent of total exports and 77 percent of total imports in 2001. Foreign trade on these markets, especially Germany, Austria and Italy, flourished in the period between 1992 and 2001 as both exports and imports almost doubled between 1992 and 2001 (measured in euros). Only in period after 1999, rapid growth in foreign trade with developing countries become the driving force of total foreign trade. These trends changed the structural shares of trade between developed and developing countries. There are two obvious reasons for these shifts: (i) the end of military conflicts on the ground of former Yugoslavia and (ii) declining international relative prices in key Slovene exporting industries to the markets of the European Union.

### **3.2.2 Outward foreign direct investments**

Next, we summarize some features of Slovene outward FDI. Total value of Slovene OFDI at the end of year 2002 was €1.4 billion (or 7 percent of GDP), 63 percent of which were ownership shares and the rest were net claims against foreign subsidiaries. In Table 2 we illustrate the dynamics of outward foreign direct investment over the period from 1994 to 2002. From 1994, when total stock of OFDI was only €289 million to 2002 it increased almost five-fold. Particularly strong growth of investment activity is characteristic for period from 1999 to 2002 when almost half of total stock in 2002 was invested. In spite of its accelerated growth in recent years, total stock of outward FDI is still relatively small when compared to inward FDI. Namely, in 2002 these amount to almost €4 billion (27 percent of GDP).

**Table 1: Structure and dynamics of Slovene foreign trade, 1992-2001**  
[in percent]

	Exports					Imports				
	92	99	01	$g_{99/92}$	$g_{01/99}$	92	99	01	$g_{99/92}$	$g_{01/99}$
Total	100	100	100	6.2	4.0	100	100	100	9.5	1.0
Developed	66	72	68	8.5	1.3	66	78	77	12.8	0.3
EU-15	61	66	62	9.0	1.0	60	69	68	13.2	0.2
Germany	21	31	26	12.1	-3.8	18	20	19	11.2	-1.4
Italy	13	14	12	7.0	-0.8	13	17	18	13.7	3.5
Austria	5	7	7	12.0	5.5	9	8	8	8.6	2.7
France	11	6	7	-2.7	13.1	9	11	11	12.7	-0.6
EFTA-4	2	1	1	1.1	3.5	3	2	2	4.6	-14.8
Other	5	5	5	4.8	4.9	6	7	8	12.5	5.2
Developing	34	28	32	1.6	11.0	34	22	23	1.8	3.3
CEFTA-6	4	7	8	17.4	9.1	5	9	10	18.1	7.0
Former Yu	23	15	17	-1.4	9.9	20	6	5	-9.4	-2.8
Croatia	14	8	9	-4.0	9.1	14	5	4	-7.7	-4.6
Other	8	6	7	-0.7	19.2	9	8	8	5.6	3.5

Source: Damijan and Majcen (2003).

Notes:  $g$  denotes average growth rate in euros.

**Table 2: Outward foreign direct investments of Slovene firms, 1994-2002 [mill. €]**

	1994	1995	1996	1997	1998	1999	2000	2001	2002
OFDI	289	382	370	416	543	625	825	1139	1417
$\Delta$ OFDI	-	94	-12	46	127	82	201	314	278
$g_{OFDI}$ [%]	-	32	-3	12	30	15	32	38	24

Source: Bank of Slovenia, Foreign Direct Investment Report, 2003.

Notes: Values correspond to end-of-year stocks.

Table 3 shows regional distribution of OFDI for a subsample of firms which is used in empirical analysis. Slovene firms mostly target countries founded on the ground of former Yugoslavia. Croatia is the major target for OFDI with 36 percent share, followed by Bosnia and Herzegovina with 15 percent share in total stock of OFDI in 2002 (for the subsample). Also important targets for Slovene firms are countries in the European Union (22 percent), especially Austria, Germany and Netherlands. Note that fast growth of OFDI observed in period 1999-2002 can be mainly attributed to growth of OFDI in countries of ex-Yugoslavia and partly to growth of OFDI in the European Union.

**Table 3: Regional distribution of outward FDI by Slovene firms  
[subsample], 1994-2002 [mill. €]**

	1994	1997	2000	2002	2002 [%]
EU-15	41	29	80	177	22
Ex - Yugoslavia (4)	138	148	274	478	59
EU Accession Countries (10)	5	8	28	68	8
Ex - Soviet Union	0.5	2	10	28	3
OECD without Europe	-0.2	-4	-6	6	1
Other	13	33	53	58	7
<b>Total</b>	<b>196</b>	<b>205</b>	<b>438</b>	<b>814</b>	<b>100</b>

Source: Bank of Slovenia, own calculations.

Notes: Values correspond to end-of-year stocks.

At last, in Table 4 we summarize sectoral distribution of Slovene OFDI. Interestingly, firms in services have majority share in total stock in the whole period, gradually declining from 65 percent in 1994 to 58 percent in 2002. Combining this piece of evidence with the fact that substitution between production in foreign affiliates and exports is not expected for services, substitution is less likely to be observed.

**Table 4: Outward foreign direct investment [subsample], 1994-2002  
[percent]**

	1994	1997	2000	2002
Manufacturing [%]	35	35	39	42
Services [%]	65	65	61	58
<b>Total no.</b>	<b>196</b>	<b>205</b>	<b>438</b>	<b>814</b>

Source: Bank of Slovenia, own calculations.

Notes: Values correspond to end-of-year stocks.

## 4 Productivity and outward FDI

Empirical analysis is split in two parts. In the first part, which is presented in this section, we test the implication of HMY's model, which states that total factor productivity is important for firms in decision to invest in foreign affiliates, on Slovene data. This issue is particularly compelling as Slovenia belongs to a group of semi-developed transition country, for which standard theory may not be yet fully applicable. In addition, we amend the analysis by considering other factors that may also affect the decision for outward FDI. In the second part of analysis, presented in the Section 5, we test whether exports substitutes for foreign affiliate

production and further attempt to establish the motives underlying the OFDI decision.

#### 4.1 Does HMY model apply to Slovene outward FDI?

The main novelty of HMY model is its prediction that (everything else equal) firms with higher total factor productivity are more likely to invest in foreign subsidiaries and thus bear fixed costs of investments and by doing so earn higher marginal profits. Before presenting the results of regressions and probit analysis it is useful to compare the basic characteristics of firms with and without OFDI, as shown in Table 5. The notation is the same as that introduced in Section 2, where  $y$  denotes labor productivity measured by value added per employee,  $k$  denotes capital to labor ratio and  $l$  denotes total employment of firms.  $N$  denotes total number of firms in the dataset. Table 5 reports unweighted average values for each of these variables for every even year in the period from 1994 to 2002.

**Table 5: Average of productivity, capital intensity, size and number of firms [by year and type]**

Year	Firms without OFDI				Firms with OFDI			
	$y^*$	$k^*$	$l$	$N$	$y^*$	$k^*$	$l$	$N$
1994	2214	8227	130	1050	2587	21897	491	203
1995	2469	8893	123	1143	2703	20887	510	203
1996	2817	9952	118	1187	3352	19994	480	219
1997	3189	11195	111	1218	3893	24872	476	225
1998	3396	12131	111	1200	4108	24147	410	263
1999	3797	14151	112	1200	4631	27351	391	266
2000	4068	15717	113	1127	4780	31240	380	282
2001	4533	17160	116	1031	5352	32810	352	311
2002	5007	19390	110	1016	5865	35781	357	314

Source: Bank of Slovenia, own calculations.

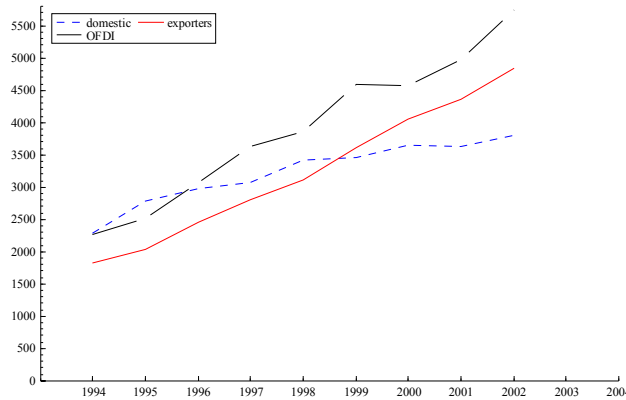
Notes: \* In thousands of Slovene tolar (SIT).

The data reveal three main features: (i) firms with OFDI are on average more productive (measured by labor productivity) than firms without OFDI in all years of observation; (ii) firms with OFDI are on average also far more capital intensive and (iii) these firms are much larger (measured in terms of employed workers). Note also that differences in these average values are statistically significantly different from zero. Anticipating results presented below, the main reason for differences in labor productivity may indeed be in differences in capital intensity and not in total factor productivity.

Figure 1, showing productivity differences among manufacturing firms only, reveals the HMY pattern of Slovene firms. Firms with OFDI are always more

productive than just exporters, while exporters became more productive than firms serving domestic market only after 1999. One explanation for this pattern might lie in the fact we call "*desperate exporting*". After loosing their once domestic markets in ex-Yugoslavia in 1991, a majority of Slovene firms has suffered huge output collapse driving down their productivity levels (see Damijan, 2001). In subsequent years many firms desperately searched for new markets in order to exploit their excess production capacities. Hence, many firms decided to serve foreign markets through exports nevertheless their initial lower productivity, which then improved significantly along with the output growth (at constant or even decreasing employment level). Firms serving only domestic markets never experienced such output collapse since they allways served only local Slovene market but not the markets of ex-Yugoslavia.

**Figure 1: Average productivity of different types of firms**



In the previous section, we already pointed at high regional concentration of Slovene OFDI, predominantly in the markets of ex-Yugoslavia and EU. Since these groups of countries differ substantially in terms of GDP per capita (and wages), the prediction of HR model may apply: average productivities of firms investing in different markets might also be different. That is, firms investing to poorer countries should on average have lower productivity as they find low wages crucial for survival. Hence, it is useful to compare labor productivity, capital intensity and size of firms that invest in different countries. In Table 6 below, we group firms in five groups depending on target markets for OFDI. The most productive firms are those with OFDI both in the EU and ex-Yugoslav countries, followed by firms with FDI to countries of ex-Yugoslavia, other countries and firms with investment to EU.<sup>3</sup> Note that exactly the same pattern applies for

<sup>3</sup>The pattern of productivity differences changes over time. From 1994-99, firms with FDI in ex-Yugoslav countries were the most productive and only from 2000 onwards firms with FDI to both EU and ex-Yugoslav countries took the lead.

capital intensity which again points at capital intensity as a key factor underlying labor productivity differences. Since there are potentially important differences in terms of optimal scale of production in different sectors that could bias regional comparison of firms' characteristics, we calculate relative productivities (denoted  $ry$ ), which are defined as ratios between firms' labor productivities and average sectoral (2 digit NACE) productivities. The same transformation is used for relative capital intensity (denoted  $rk$ ). However, the main orderings are preserved also under these relative measures. The only shift in ordering is that firms investing in EU are relatively more productive than firms investing in ex-Yugoslav markets.

Relative productivity orderings, which are considered the most appropriate, are in line with prediction of the HR model, that firms investing in countries with lower wages should be on average less productive, although tests of differences of means are not significant due to small differences and limited sample for firms investing only to EU. Also, as we conclude in analysis below, differences in wages do not seem to be an important motive for investment in countries of ex-Yugoslavia. An important additional feature stems from Table 6. Firms investing in the European Union and ex-Yugoslavia simultaneously are the most productive and capital intensive according to all measures. Are firms that invest to many markets simultaneously also the most productive and capital intensive?

**Table 6: Firms' characteristics and location of OFDI in 2002**

Exporters	$ry$	$rk$	$rl$	$ex\_EU^\#$	$ex\_YU^\#$	$N$
without OFDI	0.97	0.87	0.68	0.54	0.36	1016
with OFDI in ex-Yu	1.05	1.22	1.48	0.41	0.49	212
with OFDI in EU	1.09	1.14	2.14	0.66	0.15	22
with OFDI in EU and ex-Yu	1.31	2.32	4.21	0.42	0.38	61
with OFDI in other countries	1.06	1.18	1.23	0.44	0.19	19

Source: Bank of Slovenia, own calculations.

Notes:  $ry$  is  $rVA/L$ ,  $rk$  is  $rK/L$ .  $\#$  share of exports to EU and ex\_Yugoslavia in total firm's exports, respectively.

Table 7 presents average firms' characteristics with different number of their OFDI locations.<sup>4</sup> Irrespective of the indicator used, the pattern shows that firms with investments in more countries are both more productive and capital intensive. Besides, firms with investments in more countries employ on average more workers. Theoretical models do not explicitly predict any relationship between number of affiliates abroad and productivity, but given different fixed entry costs

<sup>4</sup>Note that due to the data limitations we have to assume only one affiliate per firm in a single country.

in different markets could lead in a situation where some firms may be productive enough only to invest in one or even no foreign markets, while others may be productive enough to find it profitable to simultaneously invest in several markets. In addition, since the pattern also coincides with size of firms, larger firms may find it easier to finance fixed entry costs in many markets, especially if firms are credit constrained.<sup>5</sup> This argument may also explain, why firms investing only in ex-Yugoslav countries may be on average less productive - investments in ex-Yugoslav countries require lower fixed costs.

**Table 7: Firms' characteristics and number of country-locations for OFDI in 2002**

Number of locations (n)	$y^*$	$ry$	$k^*$	$rk$	$l$	$rl$	$N$
n = 0	5007	0.97	19390	0.87	110	0.68	1016
n = 1	5476	1.02	27243	1.12	210	1.31	183
2 < n < 5	6074	1.17	37167	1.59	436	2.37	106
n > 5	7823	1.41	92402	2.98	1099	6.04	25

Source: Bank of Slovenia, own calculations.

\* In thousands of Slovene tolars (SIT).

Now we turn to empirical testing of the main HMY hypothesis: less productive firms sell only to domestic market, more productive firms serve foreign markets via exports and the most productive firms serve foreign markets via production in foreign affiliates. As noted above, HMY test their hypothesis by estimating equation (1) and postulate the following order of regression coefficients for dummy variables,  $0 < \alpha_5 < \alpha_6$ . In the present work, we focus only on differences in total factor productivity between exporters and firms that also invest in foreign affiliates. This decision can be justified by two reasons: (i) our interest is in potential substitution between exports and foreign affiliate sales, and (ii) given that we deal with a sample of firms with 10 or more employees, a large majority of these are exporters who supply almost 85 percent of total domestic sales. We hence estimate the HMY equation for the sample of exporting firms only. The estimation equation given in (2) is adequately modified by taking the relative productivity as a dependent variable and relative capital intensity of firms as an independent variable in order to account for sectoral differences. At the same time, as shown in Griliches and Mairesse (1990), by including the capital intensity in (2) the regression coefficients can be interpreted as measures of total factor productivity .

<sup>5</sup>There is an explicit rule in Slovene banking that limits the maximum amount of credit below total value of project. Moreover, larger exporters insured by Slovene Exports Agency may treat favorably larger firms and banks give credit to finance exports on the basis of this insurance.



We estimate following model:

$$\ln ry_{it} = \alpha_0 + \alpha_1 \ln rk_{it} + \alpha_2 OFDI_{it-1} + \sum_k \alpha_{3j} D_{ik} + \mu_i + \varepsilon_{it}, \varepsilon_{it} \sim N(0, \sigma^2). \quad (2)$$

where  $OFDI_{it-1}$  is a dummy variable with 1 if firm has a foreign affiliate in period  $t-1$  in any country, and zero otherwise<sup>6</sup>  $ry_{it}$  and  $rk_{it}$  denote relative labor productivity and capital intensity. Note again that these relative categories are ratios of firms' values and two-digit NACE sectoral averages.  $D_{ik}$  denote sectoral dummies.  $\mu_i$  captures potential remaining unobserved firm specific heterogeneity apart from heterogenous productivity already captured by  $ry_{it}$ , while  $\varepsilon_{it}$  denotes i.i.d distributed residuals with zero mean and variance  $\sigma^2$ .

**Table 8: Does FDI increase parent firm's productivity?  
firm level analysis, 1995 - 2002**

Variable	Manufacturing	Services	All
$rk_{it}$	***0.26 (48.89)	***0.29 (30.05)	***0.27 (55.78)
$OFDI_{it-1}$	*0.05 (1.88)	***-0.19 (-2.73)	-0.01 (-0.47)
$Const$	***0.76 (32.81)	***0.76 (11.42)	***0.75 (27.65)
$N$	6,752	3,297	10,049
$Sec.Dum.$	Yes	Yes	Yes
$R^2_{Adj}$	0.26	0.21	0.24

Notes: Dependent variable is firm's relative productivity ( $ry_t$ ).

t-statistics are given in parentheses;

\*\*\*, \*\*, and \* indicate significance of coefficients at 1, 5, and 10 per cent, respectively.

Another important issue is the static nature of the original estimation equation (1) by HMY, that is, it is estimated on a cross-section of firms in a given year. Hence, it ignores the potential problem of endogeneity. Firms with FDI may have higher TFP relative to other firms in a given year due to technological spillovers from affiliates to the parent company. This would induce upward bias of estimate for OFDI dummy. In order to control for this we include  $OFDI$  dummy lagged by one year, which enables us to take into account the dynamic effect of FDI decision on future productivity of firms investing abroad. Our results, which were obtained using the the pooled cross-section of firms for the whole period 1995-2002, are summarized in Table 8. We estimate (2) separately for firms in service industry and manufacturing to allow for differences in marginal returns to capital,  $\alpha_1$ . We find that in general investing abroad does not affect the firm

<sup>6</sup>Note that we do not account for firms' FDI decisions made until 1994, since we cannot properly model these decisions as our data set starts in 1994.

productivity in a subsequent year. Estimating the model on splitted samples of manufacturing and services firms gives, however, interesting results. Services firms are found to decrease their productivity levels in a year following investment abroad. Manufacturing firms, in contrast, increase their productivity in a subsequent year after establishing an affiliate abroad implying positive technological spillovers from affiliates to the parent company. The pattern of outward FDI of Slovene firms, hence, confirms the validity of the HMY model, but of course for manufacturing firms only.

## 4.2 Decision for outward FDI

In this subsection we study the dynamic outward FDI decision making of Slovene firms. Since our dataset has a panel structure and contains detailed information on timing of OFDI, we can determine directly, what are the factors underlying the decision for OFDI. Moreover, we have also information to which markets firms decided to invest in each year. To fully exploit the potential of the data, we do two sets of estimations. First, we focus on firm-level decision to invest in any foreign market and relate this decision to firms' characteristics (we refer to this as firm level analysis). Second, we use firm - exports market level decision to invest in particular market depending on firms' characteristics as well as market characteristics (we refer to this as firm-market level analysis). We present the results of these estimations in turn.

**Table 9: Number of outward FDI projects, 1994-2002 [by year, sector and markets]**

Year	Total	Services	Manuf.	Man_EU	Man_YU
1994	290	105	185	52	107
1995	35	16	19	2	10
1996	76	24	52	17	20
1997	58	19	39	4	21
1998	75	21	54	12	32
1999	65	11	54	9	28
2000	50	14	36	7	18
2001	71	16	55	8	41
2002	91	25	66	13	36
Total	811	251	560	124	313

Source: Bank of Slovenia, own calculations.

Let us first observe the time pattern of Slovene OFDI. In Table 9 we present data for firm's FDI into a particular market, where only first year's investments into the same market are taken into account. This is due to the fact that we do not have data on the firm - affiliate level but only on the firm - market level, hence, we cannot disentangle between the possibility that individual firm can either increase its capital stock in a given affiliate or can establish an additional affiliate in the same market. At the same time, incremental FDI into the same affiliate as well as establishing an additional affiliate in the same market suffers under the obvious endogeneity of this action. We believe that the decision making process is similar in both cases as it is affected by previous experience of the firm in the particular market. We are primarily interested in factors determining firm's first investment into a particular market, and given the difficulty to find proper instruments, we rather avoid the problem of endogeneity.

#### 4.2.1 Firm level analysis

In the firm level analysis, we estimate a pooled panel, where the dependent variable is the probability of new investment in any foreign affiliate and explanatory variables are firms' characteristics. The estimation equation has the following form

$$\Pr[OFDI_{it} = 1] = \beta_0 + \beta_1 ry_{it-1} + \beta_2 rk_{it-1} + \beta_3 rl_{it-1} + \sum_k \beta_{4j} D_{ik} + \mu_i + \varepsilon_{it}, \quad (3)$$

where  $\Pr[OFDI_{it} = 1]$  denotes probability that firm  $i$  invests in a foreign affiliate in period  $t$  in any country,<sup>7</sup>  $ry_{it-1}$  is lagged relative labor productivity,  $rk_{t-1}$  is lagged relative capital intensity and  $rl_{t-1}$  is relative labor employment. Note again that these relative categories are ratios of firms' values and two-digit NACE sectoral averages. We use lagged variables for relative productivity, capital intensity and employment in order to avoid possible problem of endogeneity between firms' current performance and possible technological spillovers due to previous FDI (see evidence in Table 8).  $\mu_i$  captures potential remaining unobserved firm specific heterogeneity apart from heterogenous productivity already captured by  $ry$ .  $D_{ik}$  denote sectoral dummies and  $\varepsilon_{it}$  denotes i.i.d distributed residuals with zero mean and variance  $\sigma^2$ .

We are interested in a pattern of dynamic FDI decision making process of manufacturing firms, and therefore, in what follows, we show results only for manufacturing firms. Table 10 summarizes the estimates of equation (3) for pooled panels of the whole period (1995-2002) as well as for two subperiods (1995-1998 and 1999-2002). Reasoning for splitting the period comes from the evidence of expanding OFDI projects by Slovene firms after 1998 when markets of former

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<sup>7</sup>Note that we do not account for firms' FDI decisions made until 1994, since we cannot properly model these decisions as our data set starts in 1994.

Yugoslavia got somehow more stabilized. This boost in OFDI projects, however, does not show up in number of projects but in the size of the projects (compare Table 9 vs. Table 2). First column in Table 10 indicates that more productive and large exporters engage in outward FDI. This result, however, is only due to omitting the capital intensity variable from the model. After including the latter in order to get a measure of TFP, we find only a modest and statistically not significant positive effect of firms TFP level on decision to invest abroad (see model 2 in Table 10). On the other hand, large firms and firms with higher relative capital intensity are more likely to establish foreign affiliates. Similar results are obtained also running year-by-year probit models. A significant impact (at 10 per cent) of productivity on FDI decision is found only in 2001, but at the very next year this relationship disappears.

**Table 10: Probit model of decision of manufacturing firms for outward FDI, firm level analysis, 1995-2002**

Model	1	2	3	4
Var	1995-2002	1995-2002	1995-1998	1999-2002
$ry_{t-1}$	***0.19 (4.4)	0.04 (0.8)	0.01 (0.1)	0.05 (0.8)
$rk_{t-1}$		***0.13 (6.2)	***0.13 (4.1)	***0.13 (4.7)
$rl_{t-1}$	***0.17 (16.2)	***0.18 (16.5)	***0.18 (12.1)	***0.17 (11.2)
<i>Cons</i>	***-1.9 (-15.1)	***-1.8 (-14.7)	***-2.0 (-12.9)	***-1.9 (-13.5)
<i>Sec. Dum.</i>	Yes	Yes	Yes	Yes
<i>Time Dum.</i>	Yes	Yes	Yes	Yes
<i>N</i>	7,170	7,170	3,517	3,598
<i>Ps.R<sup>2</sup> (<math>\chi^2</math>)</i>	0.15 (386)	0.17 (432)	0.17 (206)	0.14 (201)

Notes: Dependent variable is  $OFDI_{it}$  [1 if outward FDI takes place in period  $t$  and 0 if not].  $z$ -statistics are given in parentheses. \*\*\*, \*\*, and \* indicate significance of coefficients at 1, 5, and 10 per cent, respectively.

These results are at odds with the evidence of HMY, who find that firms with FDI are more productive in terms of TFP. There are three possible explanations. First, one can argue that HMY evidence might well suffer under possible problem of endogeneity between firms' current performance and possible technological spillovers due to previous FDI. They don't dispose with data at the firm level and hence cannot account for this while we do. Second, for some reason some firms may be more inclined to invest abroad. By pooling all firms over the sample period we might well ignore the unobserved firm specific effects. We therefore run random effects probit model, but find that results are robust to different estimation techniques (see random effects probit estimations in Table 10A in Appendix). Third, aggregation bias is quite likely to occur given the heterogeneity

of exports markets. Evidence presented above demonstrates that Slovene firms have a strong investment bias towards low wage countries of former Yugoslavia. It is likely that investing into these countries requires lower productivity, and hence by aggregating firms' FDI decisions to different markets to the firm level we might well introduce a bias. It is necessary, therefore, to estimate the firm's FDI decision model with regard to the observed heterogeneity of markets.

#### 4.2.2 Firm - market level analysis

Our dataset enables us to include the heterogeneity of markets into the firm's FDI decision model. Subsequently, we consider also country specific effects and their interaction with firm specific characteristics for which we use fully blown dataset, where the individual observation is a firm exporting to a particular country. We term this firm-market-level analysis as opposed to firm-level analysis we considered so far. The estimation equation in its most expanded form is

$$\Pr[OFDI_{ijt} = 1] = \beta_0 + \beta_{0,YU}D_{YU} + \beta_{0,EU}D_{EU} \quad (4)$$

$$+ \beta_1 r y_{it-1} \cdot [D_{YU}, D_{EU}] + \beta_2 r k_{it-1} \cdot [D_{YU}, D_{EU}] \quad (5)$$

$$+ \beta_3 r l_{it-1} \cdot [D_{YU}, D_{EU}] + \beta_4 ExSh_{ijt-1} \cdot [D_{YU}, D_{EU}] \quad (6)$$

$$+ \beta_5 \ln GDPpc_{jt-1} \cdot [D_{YU}, D_{EU}] + \sum_k \beta_{6k} D_{ik} + \varepsilon_{ijt}$$

where dependent variable  $\Pr[OFDI_{ijt} = 1]$  is the probability that firm  $i$  invests in country  $j$  in period  $t$ . Equation (4) includes also regional dummies  $D_{YU}$  and  $D_{EU}$  for countries of former Yugoslavia and European Union, respectively. These dummies capture region-specific differences in institutional arrangements (differences in trade barriers and specific risks related to exports and FDI, e.g., uncertainty of payments which we discuss below), proximity and other foreign market characteristics (e.g., competition and mark-ups) and relative wages. Countries of former Yugoslavia and EU differ in these aspects. In particular, while trade barriers were mainly lifted for industrial products, there were significant differences in security of payments for exports to ex-Yugoslav countries. Also, competition in these markets is much weaker, which implies higher prices and mark-ups which may encourage firms to export to these markets using direct-sales approach. Notice that these two factors are tightly related to trade-promoting motive for FDI. Finally, ex-Yugoslav countries have much lower wages than EU countries, which is an additional incentive for investment in both horizontal (according to HR's model) and vertical FDI. Given these reasons, we expect that likelihood of investment to ex-Yugoslav countries should be much higher. Indeed, estimates of  $\beta_{0,YU}$  and  $\beta_{0,EU}$  shown in column 4 of Table 11 are consistent with this conjecture. Specifically, while probit coefficient for EU countries is negative the coefficient for a dummy variable for ex-Yugoslavia is positive and high, pointing to relative attractiveness of these markets for Slovene firms.

**Table 11: Probit model of decision of manufacturing firms for outward FDI, firm-market level analysis, 1995-2002**

Var	1 All	2 EU	3 ex-YU	4 All
$ry_{t-1}$	** $-0.14$ (-2.2)	** $-0.21$ (-2.2)	* $-0.10$ (-1.7)	$-0.15$ (-1.1)
$ry_{t-1}.D_{YU}$	-	-	* $-0.24$ (-1.7)	$-0.18$ (-0.9)
$ry_{t-1}.D_{EU}$	-	** $0.35$ (2.4)	-	$0.25$ (1.4)
$rk_{t-1}$	*** $0.13$ (4.8)	*** $0.13$ (4.5)	*** $0.13$ (4.6)	** $0.12$ (2.2)
$rk_{t-1}.D_{YU}$	-	-	-	$0.03$ (0.4)
$rk_{t-1}.D_{EU}$	-	-	-	$0.003$ (0.1)
$rl_{t-1}$	** $0.02$ (2.4)	** $0.02$ (2.6)	*** $0.02$ (2.8)	*** $0.06$ (5.0)
$rl_{t-1}.D_{YU}$	-	-	-	*** $-0.08$ (-3.4)
$rl_{t-1}.D_{EU}$	-	-	-	*** $-0.07$ (-3.6)
$ExSh_{j,t-1}$	*** $0.87$ (7.0)	*** $0.88$ (6.9)	*** $0.89$ (7.0)	*** $0.93$ (4.3)
$ExSh_{j,t-1}.D_{YU}$	-	-	-	$0.16$ (0.6)
$ExSh_{j,t-1}.D_{EU}$	-	-	-	$-0.16$ (-0.4)
$\ln GDPpc_{j,t-1}$	-	* $-0.05$ (-1.8)	$-0.05$ (-1.6)	$-0.05$ (-1.5)
$D_{YU}$	-	-	-	*** $0.81$ (3.2)
$D_{EU}$	-	-	-	$0.38$ (1.3)
<i>Const.</i>	*** $-3.5$ (-17.6)	*** $-3.3$ (-9.1)	*** $-3.2$ (-10.0)	*** $-3.8$ (-9.5)
<i>N</i>	142,345	121,391	121,391	121,391
<i>Sec.Dum.</i>	Yes	Yes	Yes	Yes
<i>TimeDum.</i>	Yes	Yes	Yes	Yes
Pse. $R^2 / \chi^2$	0.08 (78)	0.09 (89)	0.09 (91)	0.12 (123)

Notes: Dependent variable is  $OFDI_{ijt}$  [1 if outward FDI takes place in period  $t$  and 0 if not].  $z$ -statistics are given in parentheses. \*\*\*, \*\*, and \* indicate significance of coefficients at 1, 5, and 10 per cent, respectively.

The three omnipresent firm characteristics: relative labor productivity, capital intensity and employment are also included in the estimation equation in a lagged form (4). In the columns 1 through 3 of Table 11, these variables enter in exactly the same way as in (3), while in column 4, these variables are interacted with regional dummies for EU and ex-Yugoslavia.<sup>8</sup> Not surprisingly, the coefficients in column 1 are in line with results obtained on a firm-level analysis. Larger and more capital intensive firms are more likely to invest in foreign affiliates, while relative TFP is even negative and significant. However, as demonstrated in columns 2 and 3, this result is obtained mainly due to dominant FDI into markets of former Yugoslavia. In column 2, where we include only a dummy for EU, we find

<sup>8</sup>Note that weights in estimation of equation (4) are different to weights in firm-level estimation. That is, firms that export to many markets are over-represented. However, since the estimates do not differ much between weighted and unweighted estimations, we report estimates based on unweighted probit.

positive and significant relationship between TFP level and probability of FDI, while in case of former Yugoslavia (see column 3) this coefficient is significantly negative. This can be interpreted as a consequence of higher fixed entry costs in EU markets.

Next variable included in (4) is a lagged share of firm's exports to specific markets in total firm's exports, which is denoted by *ExSh*. This variable is a proxy for importance of specific markets for individual firms and thus a measure of incentive for a firm to invest in a foreign affiliate. In the first two columns, where this variable enters in its basic form, the coefficient is positive and statistically significant which is in line with our expectations. We also include this variable interacted with regional dummies and find no difference to the overall pattern.

In (4) we also include log of GDP per capita in U.S. dollars adjusted for differences in purchasing power, which is intended to capture differences in real wages between different countries. Brainard (1997) finds positive relationship, which is in line with predominant flow of foreign direct investments between more developed countries. In our case, the evidence is mixed. In the column 2 through 4 of Table 11, this variable has negative sign, but has a statistically significant sign only when interacted with the EU dummy, which is an indication that Slovene firms are more likely to invest in countries with lower real wages. This evidence can be reconciled by arguing that predominant low real wage countries in which Slovene firms invest are ex-Yugoslav countries for which survey evidence (see Damijan, 2001) shows that these countries had been key targets for trade-promoting type of investment in the period from 1990 to 2001 in order to reduce uncertainty related to payments for exports. Note, however, that this trend may have reversed as also indicated by survey evidence analyzed by Damijan (2001) and Prašnikar et al. (2001).<sup>9</sup>

## 5 FDI vs. exports: substitutes or complements

This section explores empirical implications of theoretical models outlined in Section 2. That is, we test whether international factor mobility and trade are substitutes or complements in the of semi-developed countries. If Slovene OFDI are predominantly horizontal type of investments in order to serve foreign markets through production in foreign subsidiaries, than we should observe a substitution between investment in a foreign affiliate and consecutive bilateral trade. In contrast, vertical OFDI triggered by differences in relative factor endowments (wages) are more likely to create new trade flows, either exports or imports or both. Therefore in the remainder to this section, we explore the dynamic response

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<sup>9</sup>Furthermore, Prašnikar et al. (2001) show that the share of different types of OFDI have shifted in time. In 2001, only 33.3 percent while plans for 2002-04 revealed in survey were 41 percent in production plants.

of exports as well as imports to the decision to invest in a foreign affiliate.<sup>10</sup>

## 5.1 Trade-promoting or market-seeking motive?

Theoretical models developed in HMY and HR predict that in a horizontal type of OFDI firms completely cease to serve foreign markets through exports and supplement it by foreign affiliate production. This prediction is derived, however, under the assumption of a single product production plants, which are not very realistic, especially for large multinational firms. More realistic is to consider that firms with OFDI may still export some products of their products portfolio, while transferring production of the other products to foreign affiliates. Empirically we can at most expect that firms with OFDI would have slower growth of exports than firms without OFDI.

Alternatively, firms may decide to invest in a foreign affiliate in order to substitute indirect-sales to foreign markets through importers with direct-sales approach. By doing so, firms may capture extra marginal profits and increase profitability, while potentially boosting exports. One can easily imagine extensions of HMY or HR where firms can serve foreign markets through intermediary (importer) or directly by organizing own distribution network while exporting from domestic production plant in either of these cases. For example, exporting through intermediary might be associated with low fixed costs and high marginal costs and thus low marginal profits, while direct-sales approach may require high fixed costs and low marginal costs with high marginal profits. The underlying mechanism is the same as in HMY and HR, with the only difference being that here both options involve serving foreign markets through exports.

Relevance of this motive for OFDI was already shown in a study by Damijan (2001), who explored survey data for a sample of 115 largest Slovene firms. He finds that predominant motive for OFDI by Slovene firms is to promote exports from parent companies by establishing trade representative offices or even retail chain in host countries. This is especially important for Slovene FDI into ex-Yugoslav markets, where exporters tend to secure payments by establishing trade representative offices.<sup>11</sup> Therefore, we can interpret this (direct sales) type of FDI as a complement to exports.

A simple test of distinguishing between these two motives is to compare dynamics of exports of firms with and without OFDI. If the relationship is positive,

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<sup>10</sup>A significant increase in imports after FDI has been launched favors vertical OFDI.

<sup>11</sup>Furthermore, the study by Damijan (2001) found that Slovenian firms stress the importance of the investment mode of penetrating markets of former Yugoslavia simply as a means of securing payment. The poor financial discipline of local customers is quoted as a major reason for choosing the investment mode. In addition, size of markets and adjacency of local markets were also important factors in decision to invest in these markets, as well as high entry costs and low labor and material costs in these countries relative to EU. However, these are much less important factors when compared to security of payment.



i.e., firms with OFDI increase their exports to target country faster than firms without OFDI, then the prevailing motive for OFDI is trade-promotion. On the other hand, if this relationship is negative, the prevailing motive for FDI is horizontal market-seeking, and substitutability between FDI and exports takes place.

Note that our approach differs from HMY or HR as we do not have the information on foreign affiliate sales to determine the share of foreign markets served through exports after OFDI took place. Admittedly, our test is indirect. However, the advantage of our approach as compared to other studies is that we use panel data which allow us to observe dynamic response of exports to OFDI while other studies have to resort to inter-firm differences. We perform this test at firm-market-level as it allows us to control for specific market conditions for firms' products and country specific conditions. In order to do so, we include three additional variables: firms' growth of exports to all markets, growth of GDP per capita in exports markets and a dummy variable for countries of former Yugoslavia. Results of these regressions, summarized in Table 12, show no indication of substitution between exports and OFDI, although the coefficients are negative. Specifically, firms establishing affiliates abroad are found in five year period after the investment not to experience lower growth rates of exports comparative to exports growth to other markets.

**Table 12: Growth of exports, using growth rates with single differences, manufacturing firms, 1995-2002 [firm - market level]**

Var	$i = 1$	$i = 2$	$i = 3$	$i = 4$	$i = 5$
$D_{YU}$	0.004 (0.3)	0.02 (0.2)	0.01 (1.3)	*0.01 (1.8)	0.01 (1.5)
$iOFDI_{t-i}$	-0.004 (-0.03)	-0.002 (-0.03)	-0.003 (-0.1)	-0.02 (-0.5)	-0.03 (-0.8)
$iOFDI_{t-i}.D_{YU}$	-0.03 (-0.3)	-0.05 (-0.5)	-0.02 (-0.3)	-0.002 (-0.03)	0.01 (0.2)
$g_{TotEX}$	***0.68 (52.2)	***0.70 (50.5)	***0.72 (47.7)	***0.72 (43.5)	***0.74 (40.2)
$g_{GDPpc}$	***0.98 (18.7)	***1.16 (25.0)	***1.29 (25.8)	***1.22 (22.0)	***1.18 (20.1)
$Cons$	-0.34 (-10.1)	-0.22 (-10.3)	-0.29 (-16.2)	-0.16 (-10.6)	-0.15 (-10.6)
$Sec. Dum.$	Yes	Yes	Yes	Yes	Yes
$Time Dum.$	Yes	Yes	Yes	Yes	Yes
$N$	87,197	65,323	48,252	34,551	23,533
$R^2_{Adj} (F)$	0.04 (109)	0.05 (119)	0.07 (115)	0.08 (103)	0.11 (61.8)

Notes: Dependent variable is average annual growth of exports over  $i$  years.  
t- statistics are given in parentheses.

We provide several robustness checks. First, use a difference-in-difference approach with exports to all other markets serving as a control group in order to compare directly the pattern of exports between the markets with FDI and

markets without FDI. Results presented in Table 12A (in Appendix) show that our first results using single differences are robust to changed specification of the dependent variable. Second, one may argue that it is not appropriate to compare growth rates, since parent firm can still increase exports to the target markets but the huge dispersion in growth rates might cause the possible relationship with the non-parametric *OFDI* variable to turn out weak or non-existent. We therefore change the specification of the dependent variable to the non-parametric one in order to reduce the variability in the dependent variable. We first take a dummy variable with value 1 if exports increased in a given year, and zero otherwise. Table 12B (in Appendix) shows no decrease in exports in none of the 5 years after the establishment of an affiliate. Next, we generate a dummy variable with value 1 if firm's growth of exports to the country with FDI in period  $t$  is higher than its exports to all the other markets, and zero otherwise. Table 12C (in Appendix) shows that there might be some substitution between exports and FDI in the first year after the affiliates has been set up. Later on this relationship disappears and becomes significant and negative again in the fifth year.<sup>12</sup>

Based upon these results it is difficult to make conclusions about complementarity - substitutability between FDI and exports. If any, there is found only minor decrease of exports after establishment of an affiliate abroad. There is no inference about market-seeking or factor-seeking motive for FDI possible. On the other side, if trade-promoting motive for OFDI is indeed dominant, then its efficiency should be challenged. The strong tendency of Slovene firms to establish affiliates abroad does not seem to effectively promote their exports.

## 5.2 Horizontal or vertical FDI?

In this section, we examine whether Slovene OFDI are either horizontal or vertical in scope. The simplest test to distinguish between the two is to compare the dynamics of imports from the country of investment. Vertical OFDI induces an increase in imports in subsequent years from the respective countries. In Table 14 we show results where the dependent variable is the average growth rate of imports in the relevant period and right-hand side variables are selected by analogy with regressions for exports. The expected relation between dummy for OFDI and growth of imports is positive, which is not confirmed by our results.

As a robustness check of these results, we first run analogous regression with difference-in difference specification of the dependent variable, where the control group are the firm's imports from all the other countries. We find that establishing FDI might have negative impact on growth of imports from the target country, starting with year 4 after the investment is being made (see Table 14A

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<sup>12</sup>Similar results are found also at the more disaggregated level (see Table 13 in Appendix).

in Appendix). In addition, employing instead a discrete variable<sup>13</sup> yields negative relationship between imports growth and FDI over the whole period (see Table 14B in Appendix).

**Table 14: Growth of imports, using growth rates with single differences, manufacturing firms, 1995-2002 [firm - market level]**

Var	$i = 1$	$i = 2$	$i = 3$	$i = 4$	$i = 5$
$D_{YU}$	*-0.03 (-2.0)	-0.01 (-1.5)	-0.01 (-1.4)	** -0.02 (-2.5)	***-0.02 (-3.2)
$iOFDI_{t-i}$	0.05 (0.4)	-0.04 (-0.5)	-0.06 (-1.0)	-0.01 (-0.2)	-0.01 (-0.1)
$iOFDI_{t-i}.D_{YU}$	-0.27 (-1.4)	-0.13 (-1.1)	-0.04 (-0.4)	*-0.14 (-1.9)	*-0.13 (-1.9)
$g_{TotIMP}$	***0.70 (66.1)	***0.75 (64.4)	***0.77 (58.9)	***0.80 (53.6)	***0.77 (43.4)
$gGDP_{pc}$	** -0.20 (-3.1)	0.05 (0.8)	***0.26 (4.1)	***0.55 (7.5)	***0.65 (8.0)
$Cons$	-0.07 (-2.3)	-0.20 (-10.5)	-0.02 (-1.6)	-0.04 (-3.2)	-0.10 (-7.3)
$Sec.Dum.$	Yes	Yes	Yes	Yes	Yes
$TimeDum.$	Yes	Yes	Yes	Yes	Yes
$N$	85,973	64,021	46,719	32,948	22,150
$R_{Adj}^2 (F)$	0.05 (143)	0.07 (141)	0.07 (123)	0.09 (113)	0.10 (86)

Notes: Dependent variable is growth of imports.  
t- statistics are given in parentheses.

These results, however, are at odds with our hypothesis on positive relationship if vertical FDI type is dominant. Similar negative response of imports to outward FDI are found also at the more disaggregated level (see Table 15 in Appendix). This response is very hard to reconcile with any motive for OFDI, in particular with motive for vertical OFDI stemming from differences in real wages in different countries. Therefore, we conclude that our results do not support the factor-proportion or HR explanation for Slovene OFDI. As noted above, these result may not extend to the future of investment as Slovene firms already report gaining importance of outsourcing and resource-seeking motive.

## 6 Conclusions

In this paper, we investigate the outward foreign direct investment behavior on the sample of Slovene exporting firms in the period from 1994 to 2002. Empirical analysis allows us to make several interesting conclusions. First, Slovene OFDI is fairly concentrated in the countries of former Yugoslavia and European Union. Second, we confirm theoretical predictions and empirical results that can be found in HMY but only for Slovene FDI in high wage countries. In general, however, Slovene firms that invest abroad do not have on average higher total productivity.

<sup>13</sup>A dummy with value 1 if difference in growth of imports from the target country over the imports from all the other countries is positive, and 0 otherwise.

Instead, we find that the key role in this decision plays capital intensity along with size of firms. Third, unless we control for regional-specific effects, Slovene firms are more likely to invest in poorer countries. After we control for these effects, firms are more likely to invest in countries with higher GDP per capita, in line with Brainard (1997). Fourth, firms are more likely to invest in countries where they already have high export shares. This is one indication of importance of trade-promotion motive of FDI, that is, investment to enhance trade. This evidence is in line with survey evidence (e.g., Damijan, 2001) where it is found that Slovene firms invest in trade representative offices in order to increase the security of exports payments and higher likelihood of investment in countries of former Yugoslavia. Fifth, we find that vertical type of investments can be ruled out as imports dynamics of firms with OFDI did not increase after OFDI took place. We find also little evidence in favor of trade-promotion motive and market-seeking motive, although these two effects seem to, on average, cancel each other out. At the end, a caveat is in place.

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## Appendix

**Table 10A: Random effects Probit model of decision of manufacturing firms for outward FDI, firm level analysis, 1995-2002 (robustness checks)**

Model	1	2	3	4
Var	RE Probit	RE Probit	RE Probit	RE Probit
	1995-2002	1995-2002	1995-1998	1999-2002
$ry_{t-1}$	***0.18 (3.5)	0.02 (0.3)	0.03 (0.3)	0.02 (0.3)
$rk_{t-1}$		***0.14 (5.2)	***0.16 (3.7)	***0.14 (4.1)
$rl_{t-1}$	***0.20 (12.3)	***0.20 (12.7)	***0.22 (9.1)	***0.18 (9.3)
<i>Cons</i>	***-2.2 (-13.1)	***-2.7 (-14.0)	***-2.5 (-10.2)	***-2.0 (-11.6)
<i>Sec. Dum.</i>	Yes	Yes	Yes	Yes
<i>Time Dum.</i>	Yes	Yes	Yes	Yes
<i>N</i>	7,191	7,191	3,547	3,644
<i>P<sub>s</sub>.R<sup>2</sup> (χ<sup>2</sup>)</i>	(217)	(240)	(103)	(133)

Notes: Dependent variable is  $OFDI_{it}$  [1 if outward FDI takes place in period  $t$  and 0 if not].  $z$ -statistics are given in parentheses. \*\*\*, \*\*, and \* indicate significance of coefficients at 1, 5, and 10 per cent, respectively.

**Table 11A: Probit model of decision of manufacturing firms for outward FDI, firm-market level analysis, by region, 1995-2002**

Var	EU	ex-YU	Other
$ry_{t-1}$	*0.35 (1.7)	** -0.38 (-2.1)	** -0.19 (-1.1)
$rk_{t-1}$	**0.20 (2.2)	*0.16 (1.7)	**0.14 (2.1)
$rl_{t-1}$	-0.01 (-0.4)	-0.02 (-0.7)	***0.07 (4.5)
$ExSh_{j,t-1}$	***1.21 (2.7)	***1.23 (5.8)	***1.04 (4.1)
$\ln GDPpc_{j,t-1}$	***0.54 (2.8)	***-0.24 (-4.0)	-0.05 (-0.9)
<i>Const.</i>	***-10.0 (-4.4)	***-1.92 (-3.2)	***-3.1 (-5.6)
<i>N</i>	12,714	29,679	43,826
<i>Sec. Dum.</i>	Yes	Yes	Yes
<i>Time Dum.</i>	Yes	Yes	Yes
<i>Pse. R<sup>2</sup> / χ<sup>2</sup></i>	0.21 (51)	0.17 (64)	0.13 (45)



**Table 12A: Growth of exports, using growth rates with difference-in-differences, manufacturing firms, 1995-2002 [firm - market level]**

Var	$i = 1$	$i = 2$	$i = 3$	$i = 4$	$i = 5$
$D_{YU}$	0.001 (0.04)	0.002 (0.2)	0.01 (1.2)	*0.01 (1.7)	0.01 (1.4)
$iOFDI_{t-i}$	-0.09 (-0.7)	-0.04 (-0.4)	-0.03 (-0.5)	-0.05 (-1.1)	-0.06 (-1.3)
$iOFDI_{t-i}.D_{YU}$	0.07 (0.4)	-0.04 (-0.4)	-0.003 (-0.03)	0.02 (0.3)	0.03 (0.6)
$gGDP_{pc}$	***0.99 (18.3)	***1.20 (24.9)	***1.35 (25.9)	***1.28 (22.2)	***1.27 (20.6)
$Cons$	-0.19 (-5.5)	-0.45 (-19.7)	-0.36 (-19.5)	-0.18 (-11.3)	-0.18 (-12.1)
$Sec. Dum.$	Yes	Yes	Yes	Yes	Yes
$Time Dum.$	Yes	Yes	Yes	Yes	Yes
$N$	86,325	64,617	47,718	34,160	23,257
$R^2_{Adj} (F)$	0.01 (27.1)	0.02 (39.2)	0.02 (41.3)	0.03 (36.9)	0.04 (33.6)

Notes: Dependent variable is firm's average annual growth of exports to a particular market minus the overall firm's average annual growth of exports to all the other markets over  $i$  years.

t- statistics are given in parentheses.

**Table 12B: Increase of exports, using dummy instead of growth rates with single differences [firm - market level]**

Var	$i = 1$	$i = 2$	$i = 3$	$i = 4$	$i = 5$
$D_{YU}$	0.002 (0.5)	0.01 (1.1)	0.01 (1.5)	*0.01 (2.0)	0.02 (2.2)
$iOFDI_{t-i}$	0.03 (0.8)	0.04 (1.0)	0.04 (1.2)	-0.02 (-0.4)	-0.02 (-0.4)
$iOFDI_{t-i}.D_{YU}$	-0.05 (-1.0)	*-0.08 (-1.6)	-0.05 (-1.0)	0.02 (0.3)	0.03 (0.5)
$gTotEX$	***0.16 (46.0)	***0.29 (45.0)	***0.43 (42.4)	***0.54 (37.8)	***0.67 (33.1)
$gGDP_{pc}$	***0.36 (25.2)	***0.69 (31.9)	***0.97 (28.9)	***1.04 (21.5)	***1.29 (20.0)
$Cons$	0.42 (46.6)	0.41 (40.5)	0.33 (27.4)	0.36 (27.5)	0.41 (40.5)
$Sec. Dum.$	Yes	Yes	Yes	Yes	Yes
$Time Dum.$	Yes	Yes	Yes	Yes	Yes
$N$	87,197	65,323	48,252	34,551	23,533
$R^2_{Adj} (F)$	0.04 (109)	0.06 (122)	0.07 (117)	0.08 (99)	0.10 (92)

Notes: Dependent variable is a dummy variable that assumes 1 if exports grew over the relevant period and 0 otherwise.

t- statistics are given in parentheses.

**Table 12C: Increase of exports, using dummy instead of growth rates with difference-in-differences, manufacturing firms, 1995-2002 [firm - market level]**

Var	$i = 1$	$i = 2$	$i = 3$	$i = 4$	$i = 5$
$D_{YU}$	-0.003 (-0.8)	0.01 (1.6)	0.01 (1.5)	*0.01 (1.5)	0.01 (1.2)
$iOFDI_{t-i}$	** -0.08 (-2.1)	-0.01 (-0.3)	-0.05 (-1.3)	-0.06 (-1.3)	** -0.11 (-2.2)
$iOFDI_{t-i} \cdot D_{YU}$	0.03 (0.7)	-0.08 (-1.5)	-0.01 (-0.2)	-0.05 (0.9)	0.03 (0.5)
$gGDP_{pc}$	***0.34 (23.5)	***0.75 (33.8)	***1.08 (31.1)	***1.28 (25.3)	***1.60 (23.3)
$Cons$	0.47 (51.2)	0.24 (22.7)	0.21 (17.2)	0.33 (23.9)	0.27 (16.2)
$Sec. Dum.$	Yes	Yes	Yes	Yes	Yes
$Time Dum.$	Yes	Yes	Yes	Yes	Yes
$N$	86,325	64,617	47,718	34,160	23,257
$R^2_{Adj} (F)$	0.02 (48.9)	0.02 (39.2)	0.04 (62.0)	0.04 (47.8)	0.05 (41.3)

Notes: Dependent variable is a dummy variable equal to 1 if firm's growth of exports to a particular market is higher than the overall firm's growth of exports to all the other markets over the relevant period, and 0 otherwise. t- statistics are given in parentheses.

### Exports performance at the sectoral level

**Table 13: Increase of exports, using dummy instead of growth rates with difference-in-differences, manufacturing firms, 1995-2002 [firm - market level]**

Year	$i = 1$		$i = 2$		$i = 3$	
	$iOFDI_{t-i}$	* $D_{YU}$	$iOFDI_{t-i}$	* $D_{YU}$	$iOFDI_{t-i}$	* $D_{YU}$
DA: Food	-0.004	-0.10	*0.25	** -0.39	0.04	-0.08
DB: Textiles	-0.13	0.17	0.05	0.06	-0.05	0.08
DC: Leather	-0.26	0.21	-0.26	0.23	-0.22	0.06
DD: Wood	* -0.47	0.06	0.20	-0.24	* -0.13	0.22
DE: Paper	** -0.28	0.33	-0.15	-0.18	-0.18	0.09
DG: Chemicals	-0.08	-0.06	0.05	* -0.19	-0.09	-0.01
DH: Rubber	0.01	0.02	-0.01	-0.26	0.02	-0.34
DI: Non-metal	-0.02	0.24	-0.24	0.13	-0.14	0.20
DJ: Metal	-0.08	0.07	0.01	0.17	-0.15	-0.03
DK: Machinery	-0.17	0.26	-0.17	0.19	-0.01	-0.02
DL: Electric	0.10	-0.01	0.03	-0.04	*0.16	-0.21
DM: Transport	-0.42	0.31	-0.50	0.53	-0.49	0.62
DN: Furniture	-0.06	-0.17	-0.50	0.21	-0.47	0.58

Test of horizontal vs. vertical outward FDI

**Table 14A: Growth of imports, using growth rates with difference-in-differences, manufacturing firms, 1995-2002 [firm - market level]**

Var	$i = 1$	$i = 2$	$i = 3$	$i = 4$	$i = 5$
$D_{YU}$	*-0.03 (-2.0)	-0.01 (-1.0)	-0.01 (-0.8)	*-0.01 (-1.8)	***-0.02 (-2.6)
$iOFDI_{t-i}$	-0.04 (-0.3)	-0.08 (-0.9)	-0.08 (-1.2)	-0.03 (-0.6)	-0.02 (-0.3)
$iOFDI_{t-i}.D_{YU}$	-0.28 (-1.4)	-0.17 (-1.3)	-0.06 (-0.7)	*-0.15 (-1.9)	** -0.15 (-2.0)
$gGDP_{pc}$	** -0.22 (-3.4)	***-0.05 (-5.9)	***-0.02 (-4.9)	***-0.02 (-4.3)	***-0.02 (-4.5)
$Cons$	-0.39 (-12.5)	0.21 (5.3)	-0.03 (-1.0)	0.10 (3.3)	0.03 (1.0)
$Sec.Dum.$	Yes	Yes	Yes	Yes	Yes
$TimeDum.$	Yes	Yes	Yes	Yes	Yes
$N$	85,316	63,513	46,243	32,670	21,946
$R^2_{Adj} (F)$	0.01 (15.4)	0.01 (15.6)	0.01 (15.1)	0.01 (15.6)	0.01 (11.2)

Notes: Dependent variable is growth of imports.

t- statistics are given in parentheses.

**Table 14B: Increase of imports, using dummy instead of growth rates with difference-in-differences, manufacturing firms, 1995-2002 [firm - market level]**

Var	$i = 1$	$i = 2$	$i = 3$	$i = 4$	$i = 5$
$D_{YU}$	-0.005 (-1.2)	-0.004 (-0.8)	-0.004 (-0.7)	-0.01 (-1.1)	***-0.02 (-2.6)
$iOFDI_{t-i}$	***-0.11 (-2.8)	***-0.13 (-3.0)	*-0.08 (-1.7)	-0.02 (-0.5)	-0.01 (-0.1)
$iOFDI_{t-i}.D_{YU}$	0.001 (0.01)	0.02 (0.3)	0.01 (0.1)	***-0.19 (-2.7)	***-0.22 (-2.7)
$gGDP_{pc}$	0.03 (1.5)	***-0.02 (-6.4)	***-0.02 (-6.5)	***-0.02 (-6.7)	***-0.02 (-5.0)
$Cons$	0.34 (40.8)	0.63 (32.3)	0.51 (22.0)	0.67 (24.4)	0.53 (15.6)
$Sec.Dum.$	Yes	Yes	Yes	Yes	Yes
$TimeDum.$	Yes	Yes	Yes	Yes	Yes
$N$	85,316	63,513	46,243	32,670	21,946
$R^2_{Adj} (F)$	0.01 (27.8)	0.01 (23.0)	0.01 (16.5)	0.02 (20.0)	0.02 (14.4)

Notes: Dependent variable is a dummy that assumes 1 if imports grew over the relevant period and 0 otherwise.

t- statistics are given in parentheses.

Imports performance at the sectoral level

**Table 15: Increase of imports, using dummy instead of growth rates with difference-in-differences, manufacturing firms, 1995-2002 [firm - market level]**

<i>Year</i>	<i>i = 1</i>		<i>i = 2</i>		<i>i = 3</i>	
	<i>iOFDI<sub>t-i</sub></i>	<i>*D<sub>YU</sub></i>	<i>iOFDI<sub>t-i</sub></i>	<i>*D<sub>YU</sub></i>	<i>iOFDI<sub>t-i</sub></i>	<i>*D<sub>YU</sub></i>
DA: Food	-0.09	-0.03	0.08	-0.20	0.07	-0.15
DB: Textiles	-0.08	-0.10	** -0.36	0.11	-0.04	-0.02
DC: Leather	** -0.37	0.29	-0.28	0.13	-0.22	0.26
DD: Wood	-0.20	0.05	* -0.44	-0.28	-0.18	0.15
DE: Paper	-0.17	0.23	* -0.24	** 0.46	-0.10	0.33
DG: Chemicals	-0.08	-0.01	* -0.16	0.15	-0.04	-0.08
DH: Rubber	-0.13	-0.11	-0.01	0.08	0.08	-0.35
DI: Non-metal	-0.24	0.23	0.23	-0.09	-0.01	-0.03
DJ: Metal	-0.02	-0.23	0.02	* -0.28	-0.15	0.09
DK: Machinery	-0.41	0.22	-0.06	-0.08	0.08	-0.19
DL: Electric	0.01	0.18	* -0.17	0.20	-0.15	0.20
DM: Transport	-0.41	0.39	0.05		0.20	
DN: Furniture	-0.30	0.04	0.25	** -0.78	0.03	0.55