TRADE REORIENTATION, FIRM PERFORMANCE AND RESTRUCTURING OF SLOVENIAN MANUFACTURING SECTOR

Jože P. Damijan
Boris Majcen

WORKING PAPER No. 9, 2001

TRADE REORIENTATION, FIRM PERFORMANCE AND RESTRUCTURING OF SLOVENIAN MANUFACTURING SECTOR

Jože P. Damijan
Boris Majcen

WORKING PAPER No. 9, 2001

E-mail address of the authors: joze.damijan@uni-lj.si

majcenb@ier.si

Ljubljana, May 2001

Abstract

In the present paper a similar approach as in Repkine and Walsh (1999) has been used in order to study the process of recovering of Slovenian manufacturing sector during the transition period 1992-1998. The aim of the paper was to find out whether the structural change in Slovenian exports during the transition has been induced by FDI from EU firms and whether these FDI have contributed to the expansion of individual sector through product innovation processes within sectors. Results of our research can be summarized into three basic findings. First, in contrast to other CEEC's, the FDI inflows in Slovenian manufacturing sectors have predominantly brought about rather product destruction than product creation processes. Second, recovery of the individual manufacturing sectors is negatively associated with product innovations. And Third, FDI inflows are indeed very important for the recovery of Slovenian manufacturing, but their impact can hardly be captured by the model we used in this study. Based upon these findings, in the proceeding work more attention should be paid towards the impact of FDI on performance of individual firms. The factors associated with FDI inflows (transfer of technology and managerial skills, ownership controls, etc.) should be studied more thoroughly in order to explain the increase in the efficiency of sectors with significant FDI stocks.

1. INTRODUCTION

After disintegration from Yugoslavia in 1991 Slovenia faced another shock - in the middle of the first stage of a very quick foreign liberalisation process the large domestic market almost disappeared, followed by a radical restructuring of Slovenian sales. Sales to other republics of the former Yugoslavia decreased from 6.662 millions USD in 1990 to only 1.387 millions USD in 1996, while the exports to other countries increased from 4.118 millions USD to 6.919 millions USD.[1] The Slovenian economy and above all the manufacturing sector faced the need for rapid reorientation of non-domestic sales and change into the export oriented development strategy. Several studies have estimated the negative impact of trade losses for Slovenian economy. Bole (1992) using a small aggregated macro model predicted that the loss of ex-Yugoslav market led to a 6% decline in GDP. Potočnik (1992) using a two-region CGE model of Slovenia and the rest of Yugoslavia predicted the loss of the markets of ex-Yugoslavia to cause a 20% reduction of output. Buehrer (1994) using a CGE model for Slovenia estimated that the total trade losses (losses of markets of ex-Yugoslavia and CMEA) experienced by Slovenia can explain two-thirds or more of the GDP decline. As a consequence, a number of enterprises got into severe troubles - with much smaller domestic market import- substitution-oriented enterprises were not able to export at lower than cost covering prices. The economy was faced with an absolute necessity for major macro-economic restructuring of its manufacturing sector.

Slovenia continued the transition process after the independence in a situation of still existing specific market decentralised socialist economic system with socially-owned enterprises. Rapid trade liberalisation and collapsed domestic market, together with the need of establishing market economy through privatisation and restructuring process, forced the economy to move on the path of outward-looking, export-oriented development strategy. Until now, major attention of reforms on the enterprise level has been oriented to the establishing of legal and institutional framework for enterprise creation and promotion of enterpreneurship, rehabilitation of the enterprises and privatisation. These processes were accompanied with a rather successful macroeconomic stabilisation process,

---

[1] The main decrease was experienced during the period 1990-92 when the sales into ex-Yugoslav markets decreased to 1.508 millions USD (Source: Institute of Macroeconomic Analysis and Development and Statistical Office of the Republic of Slovenia).

institutional reforms and efforts to establish necessary institutional arrangements for the better inclusion of the economy in the international integration processes (membership in WTO, Europe Agreement, FTA's with several European countries). All these developments undoubtedly raise a number of questions regarding the capability of Slovenian economy to compete with increased foreign competition, achievement of sustained export expansion and thus also a long term economic growth according to its current specialisation.

Analyses of the foreign trade liberalisation process undoubtedly reveal the fact that the producers in manufacturing have already experienced the main shock in the period 1986-1993, accompanied by the forced rapid reorientation from domestic to foreign market (Majcen, 1995). Manufacturing industry output decreased together with capacity utilisation and employment. Initiated market reforms and stabilisation policies forced enterprises on the path of structural adjustment which is reflected also in the pattern of manufacturing output, trade and their changes in the observed time period.

One can thus observe a rather common U-shape development of the industrial output – after the years of declining path from the 1986, which was intensified in two years after the independence, the industrial output recovered after the year 1994. Theorists found explanation for the evolution of industrial output as an inefficient outcome driven by various supply side rigidities, common across countries, which constrain the transition process.[2] In this paper we followed new revisionist view stating that »industrial dynamics resulted from an intra-sector change in the market orientation of production away from products traditionally sold into the CMEA market and towards products traditionally sold into the EU market. This was induced by asymmetric investment demand shocks within sectors« (Repkine and Walsh, 1999:3).

The aim of the present paper is to find out whether the structural change in Slovenian exports during the transition has been induced by FDI from EU firms and whether these FDI have contributed to the expansion of individual sector through product innovation processes within sectors. More precisely, we aim to confirm or reject two hypothesises: (1)

---

[2] The reasons for the collapse in the output were found in the presence of labour market frictions (Atkeson and Kehoe, 1996), downward real wage rigidities during transition (Blanchard, 1997). According to the Blanchard and Kremer (1997) and Roland and Verdier (1999) disorganisation in historical links of production explains the U-shaped industrial output.

have exogenous investment demand shocks, brought about by FDI inflows from EU firms, induced significant positive creation/destruction product innovation processes resulting in trade reorientation of Slovenian manufacturing firms towards EU markets, and (2) have these product innovation processes had significant positive impact on expansion of individual sectors and, hence, contributed to the recovery of the manufacturing sectors.

The outline of the paper is as follows. In Section 2 we present the theoretical framework used. Section 3 outlines the estimation methodology and the data, whereby Section 4 presents the estimation results. Final Section summarizes the basic findings of the paper and set out some implications for further work.

2. THEORETICAL FRAMEWORK

The theoretical framework used in this paper was developed by Repkine and Walsh (1999). It decomposes sector growth into that determined by trade activity with the EU and unobservable deterministic heterogeneity. The contribution of traditionally EU-oriented products to sector growth is modeled both theoretically and empirically as endogenous Schumpetrian waves of vertical product innovations – a product creative destruction within this sub-sector. This waves are induced, among other deterministic factors, by an initial jump in foreign direct investment (FDI) originated from the EU. They model growth with endogenous shifts in the demand function due to the vertical innovations in products, created by firm turnover, in the presence of exogenous investment demand shocks.[3] Trade liberalisation process and free movement of capital induced positive investment shocks for use in traditionally EU-oriented production resulting in the evolution of growth in this monopolistic sub-sector (traditionally home and CMEA oriented production was on the other hand exposed to the negative investment demand shocks).

Investment resources are allocated between current production and research. Research is aimed at producing quality-improving innovations that will produce a new product and increase the size of the market for the monopolistic sub-sector. Innovation in the model results from the introduction of a vertically differentiated product by a new firm inducing

---

[3] The authors adapted the empirical counterpart of the endogenous growth model of Aghion and Howitt (1992) to model investment, product innovation and growth within EU-oriented industrial production. For a complete explanation see section 2 in Repkine and Walsh (1999).

the exit of the incumbent firm. Further they assumed that EU-oriented output within a sector is made up of many independent monopolistic EU-oriented sub-sectors. The dynamics of EU-oriented output is therefore determined by turnover in the products for EU exports, induced by discrete and permanent investment demand shocks across the monopolistic sub-sectors. The year-to-year growth rate of industrial sectors g is modeled in the following reduced form equation:

$$g = \xi \left[CD_t \left(I_{90} \right) \right] + RES_t \tag{1}$$

The exogenous investment demand shock created by trade liberalisation is predicted to induce a discrete jump of investment made available to EU-oriented production within sectors in 1990 (I_{90}). This will induce annual waves of product creative destruction, CD_t, through the changes in firm ownership, within EU oriented output and induce sector growth. The impact of non-EU oriented production on sector growth is modeled as deterministic unobservable heterogeneity or a residual (RES_t).

3. METHODOLOGY AND DATA

3.1. THE MODEL

In order to estimate the indirect impact of FDI through CDI on individual sector, we estimate the following Repkine and Walsh's growth model derived from (1):

$$Growth_{it} = \alpha + \beta_1 CDI_{it} + \beta_2 IFDI_i + \beta_3 ISIZE_i + \beta_4 S_i + \beta_5 T + v_i + \varepsilon_{it} \tag{2}$$

Growth model (2) is estimated in two stages. In the first stage, we instrument for CDI index using initial sector FDI (*IFDI*), initial sector size (*ISIZE*), and sector (*S*) and time (*T*) dummies (OLS technique is used). In the second stage, we then estimate (2) using instrumented CDI index from the first stage. As it follows from (2), sector growth is decomposed into that determined by the observable product innovation turbulence within EU oriented output, induced by FDI, and into unobservable but deterministic sector development (v_i) and a random element (ε_{it}). Unobserved sector heterogeneity comprises a set of factors not included in the regression that are specific to sectors and constant over time. We control for sector heterogeneity by the inclusion of a unit specific residual (v_i) using a random effects panel data model (REM). We also include initial sector size in order to test whether small sectors grew faster than large sectors due to exogenous inter-sector

structural changes. In order to test whether FDI have only an indirect impact on growth through product innovation turbulence (CDI), we also include either initial FDI or current FDI flows. In case that the model performs in line with the theoretical considerations, both the impact of initial as well as of current FDI flows on sector growth should be insignificant.

3.2. CALCULATION OF CDI INDICES

We estimated the product innovation index of the inherited EU-oriented production within particular sectors in the period 1992-1998 using the Repkine and Walsh's product creative destruction index (CDI). From the EU exports of 6-digit CN (Combined Nomenclature) products k within each sector of industry i over a defined period t-1 to t the index is expressed as follows:

$$CDI_{it} = \sum_k \left[\frac{x_{kit}}{X_{it}} \left(\frac{|x_{kit} - x_{kit-1}|}{|x_{kit} + x_{kit-1}|/2} \right) \right] \tag{3}$$

For each product k, the absolute change in the level of exports over the period t-1 to t is calculated and divided by the average size of the product exports over the defined time interval. This term in open brackets in (3) is bounded between 0 and 2 for each product. To obtain the weighted average of product turbulence classified within sectors of industry one should sum over products up to the sector level. Originally, each product's contribution is weighted by its share in the sectors EU exports in the current year, x_{kit}/X_{it}. But with this weighting procedure the exit of product categories (with the maximum value of CDI = 2) has the zero weight and thus does not contribute to the average CDI for that sector – the estimated CDI is underestimated.

We therefore correct the original index with the average share of the product's exports in the average total sector's EU exports:

$$CDI_{it} = \sum_k \left[\frac{(x_{kit} + x_{kit-1})}{(X_{it} + X_{it-1})} \left(\frac{|x_{kit} - x_{kit-1}|}{|x_{kit} + x_{kit-1}|/2} \right) \right] \tag{4}$$

Expansions and contractions together with entry and exit of product categories for EU exports generate turbulence and move the index closer to two. CDI reflects product

creative destruction and innovation within EU-oriented production. Additionally, we decomposed this corrected CDI into two indices – CI (creative index) reflecting expansions together with entry of new product categories and DI (destruction index) reflecting contractions together with exit of product categories:

$$CI_{it}, \text{ when } x_{kit} > x_{kit-1} \tag{5}$$

$$DI_{it}, \text{ when } x_{kit} < x_{kit-1} \tag{6}$$

In Table 1 we present the year to year evolution of the corrected CDI index[4] weighted by the size of sector's exports within total manufacturing exports. Exports of products to the EU generated turbulence in the order of 63% of the sector export size from 1992 to 1993. This turbulence is decreasing over time and has thus the opposite trend as found for the other Central and Eastern Europe countries (see Table 6 in Repkine and Walsh, 1999:31). Decomposition of the CDI index reveals that it was mainly induced by rapid decline of creation index, while the destruction index exhibits an increasing tendency. On the other hand, the quality index of Slovenian exports to the EU markets shows a good starting position, however, only a modest quality upgrading tendency in the observed period was found (with the exceptions at the sector level).

Table 1: Development of CDI indices for the Slovenian total manufacturing sector in the period 1993-98

	1992	1993	1994	1995	1996	1997	1998**	Change 97/92 (%)
1. Creative/destruction index	0,618	0,637	0,380	0,375	0,325	0,275	0,249	-55,6
2. Creative index	0,560	0,607	0,283	0,302	0,168	0,182	0,104	-67,5
3. Destruction index	0,058	0,030	0,097	0,073	0,157	0,093	0,145	59,7
4. Quality index*	1,019	1,081	1,095	1,086	1,113	1,061	1,105	4,1

* calculated as the weighted average of unit values of Slovenian exports of 5-digit SITC products to EU relative to the average unit values of total intra+extra imports of 5-digit SITC products into the EU.

** estimated values

Source: Eurostat Comext data base, own calculations.

This inverse trend of product innovation turbulence may be to our opinion, although it is opposed to figures obtained by Repkine and Walsh, completely plausible. A decreasing trend of CDI index may indeed fit exactly the theory, which predicts that the FDI have

---

[4] For calculation of CDI indices, we used 6-digit Combined Nomenclature (CN) product categories (some 5,100 product items) within each 6-digit UCA and NACE Rev. 1 sectors. Repkine and Walsh (1999) used 5-digit SITC product categories (some 3,100 product items).

induced initial investment demand shocks, which in addition caused large oscillations in product innovations. Over time, with the stabilisation of firms, however, these product innovation oscillations should be dampened. Hence, from these results we can expect negative relationship between output growth and CDI (CI) index and a positive one for the DI index.

Another possible reasons for a low and even decreasing trend of product innovation turbulence could perhaps be found in the small share of FDI in Slovenian manufacturing sector (FDI could not significantly amplify this turbulence) and in the process of privatisation. The privatisation process is only in the first, formal phase when the enterprises get new owners. This is still far from "normal" ownership structure, which should develop in future. The fact is that the privatisation process has in a number of enterprises postponed the necessary restructuring for the increase of the national competitive advantages of a country highly dependent on export markets. Increasing deficit in foreign trade balance with stagnating exports since 1995 suggest that enterprises (with some exceptions) has difficulties in keeping their export competitiveness on the basis of present export pattern and structure of the manufacturing sector. The role of the FDI in the restructuring process is certainly a positive one but their importance is increasing very slowly.

3.3. PERFORMANCE OF SLOVENIAN MANUFACTURING SECTOR

As shown in Table 2, Slovenia has been, similarly to other CEEC's, faced with the U-shaped manufacturing output during the transition period. The last year of growth was 1987, while until 1993 the aggregate output has fallen to the level of 49% of output of the initial 1986 year. Afterwards, there is evident a recovery of manufacturing sector, but the aggregate output in 1998 is still some 33% below the 1986 level. At the same time, while the "typical socialistic production" has collapsed due to economic and political turbulence in ex-Yugoslavia at the end of the 1980's, the viable manufacturing sales have been increasingly reoriented towards EU markets. Hence, the share of manufacturing sales sold into the EU markets has risen 5-fold until 1998, but in real terms by some 160%.

Table 2: Performance indicators of the Slovenian manufacturing sector in 1986-98

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Output (1986=100)	100.0	100.6	96.7	82.9	72.1	64.5	51.2	48.9	52.1	53.9	58.5	63.7	66.7
Exports to EU (1986=100)	100.0	93.6	141.2	123.9	131.3	143.8	162.7	176.4	197.5	206.1	218.0	240.2	262.1
Exports to EU / sales (%)	10.6	9.9	15.5	15.9	19.3	23.7	33.7	38.3	40.2	40.6	41.3	44.7	51.2
Number of FDI	0	0	0	10	40	69	120	153	201	218	261	247	248
Foreign capital / total capital (%)	0.0	0.0	0.0	0.3	2.7	3.7	6.1	6.3	11.5	13.1	15.6	17.5	21.6

Source: Statistical Office, Bank of Slovenia, Register of firms.

EU firms started to penetrate Slovenian market through FDI in 1989, but until 1992 the stock of FDI inflows was very modest. As indicated by low values of CDI index[5], the FDI have not brought about significant amount of new products that would be sold back to EU markets. Instead, FDI have been oriented towards existing viable (tradable) products that were exported into EU markets already prior the FDI came in.

3.4. DATA

According to the specifications of the original Repkine and Walsh's econometric model (initial FDI in terms of investment demand shocks are crucial for intra-sector restructuring), it is obvious that econometric estimations for Slovenia cannot be performed using the data for the whole transition period (there were no FDI prior 1989). Therefore, we based our estimations upon two different periods. In a previous version of this paper we performed our estimations based upon the period starting with 1989 when first FDI inflows from EU occurred. However, due to small stock of initial FDI (only 10 foreign investments) the results obtained were correspondingly weak. Consequently, we turned to the estimations of the period starting with 1992. The use of year 1992 as a starting year in our estimations is justified for at least two reasons. First, the number of foreign operations increased to 120 (share of foreign capital invested in Slovenian manufacturing rose to some 6% of the total manufacturing capital). Second, in 1992 the methodology of foreign trade compilation has been adjusted to international standards – from 1992 on it is taken explicit account of the value of export processing production (therefore this large and artificial shift in the share of EU sales between 1991 and 1992 observed in the data).

---

[5] Aggregated CDI index has in no year exceeded the value 0.64, while (according to Repkine and Walsh) in other CEEC's the average value of CDI index in the period 1993-96 is about 1.8.

On the other hand, we performed our estimations of the theoretical model using two differently aggregated data sets. First data set consists of 13 NACE manufacturing sectors (similarly to Repkine and Walsh's paper). Since aggregation procedures lead to a loss of important information, we were motivated to use as much as possible disaggregated data set. Due to comparability problems of industrial output data for the periods before 1994 and after 1994, we could not make use of NACE classification, but instead we used data aggregated to the old Slovenian Unified classification of Activities (6-digit UCA). After controlling for missing data and statistical discrepancies, the data set was finally restricted to 111 broad product lines that account for about 90% of the total manufacturing output in the period 1992-98.

4. THE ECONOMETRIC ANALYSIS

4.1. INSTRUMENTALISATION OF CDI INDICES

In the first stage of our estimations we instrument the CDI indices using initial FDI flows, initial sectors sizes, sector and time dummies. Sector dummies were constructed using the Pavitt's (1984) taxonomy: all sectors were classified into traditional (*TR*), scale intensive (*ES*) and *OTHER* (specialised suppliers plus high technology based) sectors, whereby traditional sectors were taken as a reference point. For time dummies we used either year dummies or dummy for the period before 1994 and after 1994 (since after 1994 almost all sectors experienced growth). Estimation results do not differ significantly with respect to the use of different time dummies, hence, due to easier interpretations we only report the results obtained with the latter time dummy. The results of our instrumentalisation estimations of CDI indices for both data sets using OLS technique are reported in Table 3.

The results of instrumentalisation for CDI indices in both data sets are ambiguous. The results for the more aggregated (NACE) data set show, unlike Repkine and Walsh's results[6] for other CEEC's, that initial FDI flows did not have any significant impact on product innovations within sectors and that product innovations turbulence is more characteristic for larger sectors. However, decomposition of CDI index into creation (CI) and destruction (DI) indices clearly show that for initially large sectors product destruction

---

[6] Obtained with similarly aggregated data.

processes are prevalent, indicating that large sectors were faced with strong export contractions (exit of products and contractions of exports of incumbent products). In contrast to this, the results for more disaggregated (UCA) data set show a significant impact of initial FDI and no impact of initial sector size on product innovation turbulence within sectors. Decomposition of CDI index gives rise to the interesting finding that FDI predominantly brought about rather product destruction than product creation processes. It indicates that, since there were almost no greenfield investments but rather an acquisition type of FDI in Slovenian manufacturing sector, foreign owners simply dropped non-viable products sold into ex-Yugoslav markets and expanded exports of viable products that were sold into EU markets already prior FDI took place.

Table 3: Results for instrumentalisation of CDI indices

	NACE, Rev.1			UCA 6-digit		
	CDI	CI	DI	CDI	CI	DI
R2 adj.	0.544	0.538	0.391	0.115	0.219	0.070
F-statistic	22.44	21.95	12.56	17.87	37.23	10.75
Prob (F-statistic)	0.00	0.00	0.00	0.00	0.00	0.00
Constant	0.422	0.427	-0.005	0.748	0.581	0.166
t-statistic	12.22	10.61	-0.31	29.49	29.07	10.05
ISIZE	1.72E-02	8.63E-03	8.53E-03	-1.58E-03	-8.15E-04	-7.61E-04
t-statistic	4.27	1.84	4.54	-1.07	-0.70	-0.80
IFDI	-5.73E-03	-4.15E-03	-1.58E-03	4.64E-03	1.39E-03	3.25E-03
t-statistic	-1.23	-0.76	-0.72	3.95	1.50	4.24
ES	0.038	0.044	-0.006	-0.122	-0.023	-0.099
t-statistic	*0.966*	*0.97*	*-0.352*	*-4.169*	*-0.988*	*-5.198*
OTHER	0.057	0.021	0.037	-0.006	-0.022	0.016
t-statistic	*1.30*	*0.40*	*1.76*	*-0.06*	*-0.27*	*0.24*
Time dummy	-0.253	-0.323	0.070	-0.237	-0.323	0.086
t-statistic	-9.36	-10.24	5.49	-8.55	-14.76	4.74
Observations	91	91	91	*777*	*777*	*777*

Another interesting finding already observed in Table 1 as well as in Table 3 (which is valid for both data sets), is that product innovations turbulence was significantly lower in the second, the growth period (after 1994). However, a decomposition of CDI effects demonstrates an interesting tendency of product creation slow down and product destruction expansion over time. This is a very interesting finding that could potentially account for the observed stagnation of Slovenian exports after 1995 and expansion of trade deficit.

4.2. IMPACT OF PRODUCT INNOVATION TURBULENCE ON GROWTH

In the second stage, we regress the instrumented CDI indices (decomposed into CI and DI indices) using random effects model[7] against the initial sector size, initial FDI flows, product quality, sector and time dummies. Results for both data sets (see Table 4) exhibit the same picture: individual sector growth is negatively associated with product innovation turbulence. In other words, sectors with larger product innovation turbulence (for the EU market) have recovered slower than more "stable" sectors that continued to sell the same products and in the similar quantities to EU as they have done before. More precisely, the greater the product creation activity in individual sectors, the smaller is their growth, while product destruction activities are not significantly associated with growth.

Table 4: Regression results

	NACE, Rev.1		UCA 6-digit	
	Initial FDI	Current FDI	Initial FDI	Current FDI
R2 (within)	0.477	0.671	0.193	0.248
R2 (between)	0.299	0.508	0.156	0.159
R2 (overall)	0.411	0.611	0.172	0.196
Wald (chi2)-statistic	65.92	150.28	177.2	235.8
Prob (chi2-statistic)	0.00	0.00	0.00	0.00
Constant	106.39	112.42	112.07	131.92
t-statistic	3.86	5.23	7.03	8.82
CI	-56.26	-39.76	-43.53	-55.88
t-statistic	-2.52	-2.21	-2.99	-4.14
DI	-35.00	-39.90	52.69	-27.01
t-statistic	-0.48	-0.69	1.16	-0.65
QUAL	0.127	0.155	-1.688	-1.403
t-statistic	0.64	1.00	-0.82	-0.70
ISIZE	0.939	-1.520	-0.294	-0.362
t-statistic	0.73	-1.55	-0.73	-0.91
IFDI	-0.054		0.145	
t-statistic	-0.05		0.40	
FDI		1.95		1.02
t-statistic		6.75		6.90
ES	22.24	8.36	24.86	10.60
t-statistic	2.29	1.21	2.67	1.20
SP	4.074	-1.079	18.721	22.131
t-statistic	0.36	-0.12	0.66	0.79
Time dummy	10.065	5.089	11.992	10.453
t-statistic	1.55	0.99	2.71	2.44
Observations	91	91	777	777

---

[7] Due to theoretical specification of the model (initial values of explanatory variables are important) we use random effects model in our estimations. We checked also for possible model misspecifications using Hausman test, which clearly confirms significant differences in estimated coefficients in comparison to the fixed effects model in all estimations. Hence, we do not report these tests.

How can be this finding, that is just the opposite of the Repkine and Walsh's findings for other CEEC's, possibly explained? There are several possible explanations. First, the most plausible explanation would be that sectors, that were significantly oriented towards EU sales already prior the transition period, are, consequently, less turbulent in terms of product expansions and contractions. Hence, their growth does not depend upon trade reorientation. Second, in the instrumentalisation process we found that foreign owners induced rather product destruction than product creation processes. One could, in addition, also imagine that at the same time as foreign owners dropped non-viable products they potentially induced a quality upgrading process of the remaining EU oriented products. However, after explicitly controlling for this possibility, we found no significant association between the change in quality (*QUAL*) and the growth of individual sectors.

Another quite plausible explanation for obtaining completely opposite results as compared to the results obtained by Repkine and Walsh (1999) is that they presumably used a cumulative CDI index (a CDI index with the constant base in 1989) in their estimations[8]. Since in a dynamic economy a CDI index with the constant base is, by construction, always increasing over time (every change - either construction or destruction – contributes to the turbulence), the relationship between growth and cumulative CDI index in CEEC's has to be positive. However, as stated above (cf. Section 3.2, p. 6), using the year-to-year CDI index as an explanatory variable in the growth model is the only theoretically justified approach. It exhibits the large jump in creation/destruction activities caused by FDI in the early period of transition with the depressing tendency over time. On the contrary, CDI index with the constant base only cumulates the creation/destruction activities over time.

Table 4 further reveals that higher growth of individual sectors in Slovenia is associated neither with initial sector size nor with initial FDI. The former fact indicates that there were no exogenous inter-sector structural changes during the transition period. However, one should note that the major inter-sector structural changes in Slovenian manufacturing sector were accomplished prior to 1992 when our data sets start.

---

[8] In order to verify this possible interpretation, we in addition did also calculate CDI indices for one of the CEEC's they studied in their research (Hungary) using the same data and weighting procedure. We found out that the year-to-year evolution of the CDI indices for the named country is (similarly to Slovenia) decreasing over time. The calculated cumulative CDI indices (with the constant (1989) base) are of course increasing over time but they reach by 1996 somehow smaller magnitude (about 1.3) than figures reported by Repkine and Walsh (1999:31).

Based upon these results (relatively poor fits in both data sets that are, in addition, mostly driven by included dummy variables and opposite signs of crucial independent variables) one could conclude that the underlying theoretical model is not particularly suitable to explain the process of recovery of Slovenian manufacturing sector. The fit of all estimations deteriorates significantly when excluding sector and time dummies, indicating that only a very modest proportion of sector growth can be explained by innovations in EU-oriented output after 1992. Having in mind the pattern of inherited trade structure before the open-up and the pattern of FDI afterwards in Slovenia, the results do not come up as extremely surprising. There are certainly other factors not included in the regression that should have driven the recovery of Slovenian manufacturing sector after 1992.

What are these other forces behind the recovery? Table 4 presents faster growth of sectors characterized by economies of scale (relative to traditional sectors). Mapping the FDI inflows over individual sectors reveals that a large majority of them are directed into sectors characterized by economies of scale. After controlling for the impact of FDI directly through current FDI flows rather than indirectly through their product innovations activities (see columns 3 and 5 in Table 4), we can observe a significantly faster growth of sectors with larger FDI inflows. The results, hence, show that FDI are very important for the recovery of Slovenian manufacturing, but their impact can hardly be captured by the model we used in this paper. Another way of thinking about the role of FDI in the recovering process of Slovenian manufacturing sector is that FDI have not restructured Slovenian firms in terms of product composition, but they influenced it through fresh capital inflows, technology transfers, new managerial skills, ownership controls and through distribution networks in the EU markets. The above factors could be essential for improving the efficiency of firms and further opening of EU markets for exports of Slovenian firms. For us, the need to give more attention to the individual firm's performance and to control for differences in performance between domestic and foreign owned firms becomes urgent. Our current research concentrates in this area and first results (see Rojec, Damijan and Majcen, 2000) show indeed that there are significant differences between domestic and foreign owned firms in terms of their export propensity and in terms of their other fundamental operational characteristics.

5. CONCLUSIONS

In the present paper a similar approach as in Repkine and Walsh (1999) has been used in order to study the process of recovering of Slovenian manufacturing sector during the transition period 1992-1998. The aim of the paper is to find out whether the structural change in Slovenian exports during the transition has been induced by FDI from EU firms and whether these FDI have contributed to the expansion of individual sector through product innovation processes within sectors. Results of our research can be summarized into three basic findings:

1. In contrast to other CEEC's, the FDI inflows in Slovenian manufacturing sectors have predominantly brought about rather product destruction than product creation processes,

2. Recovery of the individual manufacturing sectors is negatively associated with product innovations, i.e. sectors with larger product innovation turbulence (for the EU market) have recovered slower than more "stable" sectors that continued to sell the same products and in the same quantities to EU as they have done before,

3. FDI inflows are indeed very important for the recovery of Slovenian manufacturing, but their impact can hardly be captured by the model we used in this study.

Based upon these findings, in the proceeding work more attention should be paid towards the impact of FDI on performance of individual firms. The factors associated with FDI inflows (transfer of technology and managerial skills, ownership controls, etc.) should be studied more thoroughly in order to explain the increase in the efficiency of sectors with significant FDI stocks.

REFERENCES

Atkeson, A. and P.J. Kehoe (1996), *Social Insurance and Transition*, International Economic Review, 37, 2, p. 377-402.

Blanchard, O.J. (1997), *The Economics of Post-Communist Transition*. Claredon Press Oxford

Blanchard, O.J. and M. Kremer (1997), *Disorganization*, Quarterly Journal of Economics, 112, 4, p. 1091-1126.

Bole V. (1992), *The Slovenian Economy in General Disequilibrium*, Gospodarska gibanja, No. 230.

Buehrer T.S. (1994), *Can Trade Losses Explain the Current Recession in Slovenia?* Ph.D. Thesis, Harvard University, Cambridge, Mass.

Majcen, B. (1995), *Foreign Trade Liberalisation of Industrial and Agriculture Products*, Institute for Economic Research, Ljubljana.

Pavitt, K. (1984), *Sectoral patterns of technical change: towards a taxonomy and theory*, Research Policy, Vol. 13, No. 6.

Potočnik J. (1992), *Two-Region CGE Model of Slovenian-Yugoslav Economy*, Master Thesis, University of Ljubljana, Ljubljana.

Repkine, A. and P.P. Walsh (1999), *Evidence of European Trade and Investment U-shaping Industrial Output in Bulgaria, Hungary Poland and Romania*, mimeo, 41 p.

Rojec, M., J.P. Damijan and B. Majcen (2000), *Export Propensity of Foreign Subsidiaries in Slovenian Manufacturing Industry*, mimeo, 18 p.

Roland, G. and T. Verdier (1999), *Transition and the Output Fall*, Economics in Transition, 7, 1, p. 1-28.