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Productivity growth and functional upgrading in foreign subsidiaries in the slovenian manufacturing sector

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Povzetek

Zmanjševanje zaostanka v produktivnosti, s katerim se srečujejo nove države članice EU, bo izredno pomembno za njihovo uspešno vključevanje v EU oziroma za realno konvergenco njihovih gospodarstev. Neposredne tuje investicije (NTI) tradicionalno veljajo kot pomembno sredstvo za povečevanje produktivnosti tranzicijskih gospodarstev. Vpliv NTI na povečevanje produktivnosti gre skozi različne kanale; v glavnem skozi vzpostavljanje podjetij s tujim kapitalom, kar pomeni dodatne zmogljivosti (ob upoštevanju razlik med novimi investicijami (greenfield) in prevzemi), ki so načeloma bolj produktivne kot v domačih podjetjih, in skozi posredne učinke na domača podjetja (tako imenovani "spillover" učinki). Medtem ko so dokazi o višji produktivnosti podjetij s tujim kapitalom v novih državah članicah številni in ocene o tem dokaj enotne, pa ekonometrične analize o "spillover" učinkih ne dajejo jasnih in nedvoumnih rezultatov.

V tem prispevku nas zanimajo procesi rasti produktivnosti in razvoja v podjetjih s tujim kapitalom (tujih podružnic), ki poslujejo v slovenskih predelovalnih dejavnostih, kako se te spremembe dogajajo ter kaj jih določa. Te procese skušamo razumeti s pomočjo analize sprememb položaja tujih podružnic v sistemu matičnega podjetja, pri čemer je v središču našega zanimanja vpliv kontrole na rast produktivnosti v podružnici. Še zlasti nas zanimajo dejavniki in procesi, ki so po eni strani povezani z rastjo produktivnosti, prodaje in izvoza ter z dvigovanjem ravni tehnologije in kvalitete v podjetjih s tujim kapitalom, po drugi strani pa s prevzemanjem novih poslovnih funkcij, na splošno in glede na tuje matično podjetje. "Spillover" učinkov se lotevamo zgolj posredno z raziskovanjem povezav med podjetji s tujim kapitalom in domačimi podjetji iz države prejemnice.

V drugem poglavju prispevka načrtamo konceptualni pristop k analizi. V tretjem poglavju na kratko povzamemo obstoječe znanje o vplivu NTI na rast produktivnosti in prestrukturiranje v Sloveniji. V četrtem poglavju razložimo vzorec analiziranih podjetij in njegove značilnosti. V petem poglavju prikažemo rezultate raziskave, kot izhajajo iz deskriptivne analize. V šestem poglavju opišemo model in analiziramo dejavnike, ki določajo rast produktivnosti v podjetjih s tujim kapitalom, ter interpretiramo rezultate. V sedmem poglavju podajamo zaključke.

Pri ocenjevanju determinant rasti produktivnosti v podjetjih s tujim kapitalom uporabljamo standardni pristop ocenjevanja prispevkov k rasti. Posebno pozornost posvečamo vplivu vzorca kontrole na rast produktivnosti v podjetju s tujim kapitalom. Poleg tega analiziramo še vpliv višine tujega lastniškega deleža, velikosti podjetja, področij konkurenčnosti ter izvozno uvoznih tokov med podružnico in matičnim podjetjem na rast produktivnosti. Baza podatkov temelji na vprašalniku, s katerim smo anketirali 72 podjetij s tujim kapitalom v slovenskih predelovalnih dejavnostih.

Empirična analiza kaže, da industrijska integracija preko NTI vodi v precejšnje povečanje produktivnosti, tehnološke zahtevnosti in kakovosti, kakor tudi k povečanju prodaje in izvoza. S pomočjo modela smo glede rasti produktivnosti in kontrole v podjetjih s tujim kapitalom prišli do naslednjih zaključkov:

- a/ Stopnja kontrole tujega matičnega podjetja v celoti in njihova stopnja kontrole nad trženjem in strateškimi funkcijami so najbolj pomembne determinante rasti produktivnosti v podjetjih s tujim kapitalom v slovenskih predelovalnih dejavnostih. Večja, kot je kontrola tujega matičnega podjetja v celoti, ter večja, kot je njihova kontrola nad trženjem in še zlasti strateškimi funkcijami, višja je rast

produktivnosti v podružnici. Tuja matična podjetja skušajo prevzeti nadzor nad strateškimi in trženjskimi poslovnimi funkcijami, operativni nadzor pa prepuščajo podružnicam samim.

- b/ Takšen odnos med kontrolo in rastjo produktivnosti velja ne glede na to, ali v model vključimo višino tujega lastniškega deleža kot dummy spremenljivko, ali ne. Velikost tujega lastniškega deleža kot taka ni determinanta rasti produktivnosti in višina tujega lastniškega deleža se ne kaže kot alternativa za kontrolo tujega matičnega podjetja nad trženjem in strateškimi poslovnimi funkcijami podružnice. Nadzor nad trženjem in strateškimi poslovnimi funkcijami je očitno pomemben sam po sebi in verjetno temelji na dejavnikih, kot so tehnologija, trženje, nabavni tokovi itd. Tuja matična podjetja si zelo prizadevajo za nadzor nad trženjskimi in strateškimi funkcijami ne glede na to, ali je njihov lastniški delež večinski ali manjšinski. Povedano drugače, stopnja in mehanizmi nadzora nad posameznimi poslovnimi funkcijami niso povezani z velikostjo tujega lastniškega deleža.

Model kaže tudi na nekatere druge determinante rasti produktivnosti v podjetjih s tujim kapitalom. Prva je velikost podjetja; velika podjetja s tujim kapitalom beležijo precej višje povprečne spremembe v produktivnosti kot srednje velika in mala podjetja. Druga je delež prodaje tujemu matičnemu podjetju; podružnice z večjim deležem prodaje tujemu matičnemu podjetju ali drugim tujim kupcem beležijo večje spremembe v ravni produktivnosti. Tretja je, da podjetja s tujim kapitalom, ki poslujejo v visoko tehnoloških panogah, v dveh različicah modela izkazujejo značilno manjše spremembe v produktivnosti kot podjetja s tujim kapitalom v drugih panogah.

Če povzamemo, bolj ko so podjetja s tujim kapitalom vključena v tuje matično podjetje – glede strateškega upravljanja in trženja ter izvoznih tokov – višjo rast produktivnosti imajo. Ohranjanje strateškega nadzora in nadzora nad trženjem v rokah tujega matičnega podjetja se kaže kot glavna determinanta rasti produktivnosti v podjetjih s tujim kapitalom. Tuja matična podjetja si prizadevajo obdržati nadzor nad trženjem in strateškimi odločitvami ne glede na njihov lastniški delež.

Summary

The task faced by the new EU member-states of narrowing productivity gaps will play a key role in their successful integration into the EU, i.e. for the real convergence of their economies. Foreign direct investment (FDI) has traditionally been treated as an important vehicle for increasing the productivity of transition economies. This impact of FDI goes through various channels but basically involves creating foreign subsidiaries, which means additional capacity (taking into account the difference between greenfield ventures and acquisitions) which is in principle more productive than indigenous enterprises, and via spillover effects. While there is ample evidence of the higher productivity of foreign subsidiaries in new member-states and it is basically unanimous, the econometric research on spillovers reveals inconclusive results.

In this paper we are interested in the processes of productivity growth and upgrading in manufacturing foreign subsidiaries in Slovenia, how the related changes happen and in identifying the underlying determinants. We seek to understand these processes by analysing the developments in subsidiaries' positions in their parent companies' networks; here the impact of control patterns on subsidiaries' productivity growth lies at the centre of our interest. More precisely, we are interested in the factors and processes that are related, on one hand, to increased productivity, sales/exports, technology and quality levels in foreign subsidiaries and, on the other hand, to their functional upgrading, both overall and in relation to the foreign parent companies. The issue of spillover effects is tackled only indirectly, by exploring the scope of the foreign subsidiaries' relations with host-country firms. The paper reports on the results of research based on a survey of 72 subsidiaries in the Slovenian manufacturing sector.

Section 2 of the paper outlines the conceptual approach to the analysis. Section 3 briefly reviews the existing knowledge on the impact of FDI on productivity growth and restructuring in Slovenia. Section 4 explains the sample and its features. Section 5 reports on the results of research based on a descriptive analysis. Section 6 describes the model, explores the determinants of productivity growth in foreign subsidiaries and interprets the results. Section 7 concludes.

The intention of the paper is to assess the determinants of productivity growth in manufacturing foreign subsidiaries in Slovenia. The standard growth accounting approach is used to measure these determinants. Special attention is given to the impact of the control pattern on subsidiaries' productivity growth. Additionally, we check for the impact of foreign equity share, company size, areas of competitiveness, exports/imports to/from the foreign parent company on productivity growth. The database is a survey of 72 foreign subsidiaries in the Slovenian manufacturing sector.

Empirical analysis shows that industrial integration through FDI has led to considerable increases in productivity, technology and quality, as well as in sales and exports. The models suggest the following conclusions regarding productivity growth and control in foreign subsidiaries:

- a/ The level of foreign parent companies' overall control and the level of their control of marketing and strategic functions seem to be the most important determinants of productivity growth in foreign subsidiaries in Slovenian manufacturing. The higher the foreign parent's control overall, as well as of

marketing and especially of strategic functions, the higher the productivity growth in the subsidiaries. Foreign parent companies seem to seek control over strategic and marketing business functions and leave operational control to the subsidiaries themselves.

- b/ The above pattern of control and productivity growth holds regardless of whether we include or exclude the foreign equity share dummy in the model. The level of the foreign equity share as such is not a determinant of productivity growth, and the foreign equity share does not seem to be an alternative for foreign parent companies' control of marketing and strategic business functions. The control of marketing and strategic business functions is obviously important per se and is probably based on factors like technology, marketing and supply channels etc. Foreign parent companies are eager to exercise control over marketing and strategic functions, regardless of whether they hold a majority or minority equity share. In other words, the level and mechanisms of control of individual business functions seem not to be related to the level of the foreign equity share.

The model points to some other determinants of subsidiaries' productivity growth. The first is subsidiary size; large subsidiaries have significantly higher average change in productivity compared to small and medium-sized subsidiaries. The second is the proportion of sales to the foreign parent company; subsidiaries with a higher proportion of sales to foreign parent companies or to other foreign buyers experience higher changes in their productivity levels. The third is that, in two variants of the model, subsidiaries in high-technology-intensity sectors exhibit a significantly lower change in productivity than subsidiaries in other sectors.

All in all, the more subsidiaries are integrated into foreign parent companies' – in terms of marketing and strategic management, and export flows – the more productivity growth they experience. Keeping marketing and strategic control in the hands of foreign parent companies seems to be the main determinant of subsidiaries' productivity growth. Foreign parent companies are eager to maintain marketing and strategic control regardless of the equity share they have.

1. Introduction

The task faced by the new EU member-states of narrowing productivity gaps will play a key role in their successful integration into the EU, i.e. for the real convergence of their economies. Foreign direct investment (FDI) has traditionally been treated as an important vehicle for increasing the productivity of transition economies. This impact of FDI goes through various channels but basically involves creating foreign subsidiaries, which means additional capacity (taking into account the difference between greenfield ventures and acquisitions) which is in principle more productive than indigenous enterprises, and via spillover effects. While there is ample evidence of the higher productivity of foreign subsidiaries in new member-states and it is basically unanimous, the econometric research on spillovers reveals inconclusive results.

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There is ample evidence of the higher productivity of foreign subsidiaries in new member-states

FDI has improved the overall growth potential of the recipient economies

A subsidiary can upgrade its position through functional extension and/or through lines of business extension

2. Conceptual approach

Conceptually, the paper is based on the literature that is focused on FDI and growth, developmental subsidiaries and on linkages between international business and endogenous growth theories. The literature on FDI and growth examines this link through an analysis of the costs and benefits of FDI, through estimates of spillovers and, at the micro level, through the linkages between growth and types of FDI. As far as transition countries are concerned, the main conclusions of this stream of literature are that foreign subsidiaries are deepening trade linkages, that the direct effects of FDI are the significantly higher productivity of acquired companies/greenfields than of domestic firms, and that the extent of spillovers from FDI is still very limited, non-existent or even negative (Holland et al. 2000, Hunya 2000, Resmini 2000, Rojec 2000, Konings 2001, Meyer 1998, Damijan et al. 2003). In short, 'FDI inflows have improved the overall growth potential of the recipient economies, but primarily through productivity improvements within the foreign affiliates themselves, rather than through increased capital investment, or technology spillovers to domestic firms' (Holland et al. 2000). The above literature, however, does not deal with the process by which productivity is generated, i.e. the mechanisms through which subsidiaries grow and integrate into parent companies' networks, the latter being of our specific interest. To address this issue, the international business literature offers more solid grounds.

The literature on subsidiary development focuses on the process through which multinational companies' (MNCs) subsidiaries enhance their resources and capabilities and, in so doing, add an increasing level of value to the MNC as a whole (for a review and conceptual analysis of subsidiary evolution, see Birkinshaw and Hood 1998). A review of this literature shows that national subsidiary types and their positions are related to the host country and regional attributes, that the nature of the organisational type of the MNC plays a role in the opportunities and modalities of the integration of a host country at the production network level, that the organisational types of MNCs are not straightforwardly related to the frequency of 'developmental subsidiaries' (for the concept of 'developmental subsidiaries' see Young, Hood, and Dunlop, 1988), and that the organisational structure is secondary to the management of decision-making processes within the MNC.

Increases in productivity at the subsidiary level have their equivalent in different forms of upgrading. Derived from the above theoretical considerations, our conceptual approach is based on two forms of upgrading the position of subsidiaries and on several dimensions of integrating a subsidiary into an MNC network¹. A subsidiary can upgrade its position through functional extension, i.e. by adding new mandates or functions and/or through lines of business extension, i.e. by extending the scale of the existing mandate through sales and exports or new lines of business. Upgrading of a subsidiary occurs via several dimensions, i.e. product flows, knowledge flows and capital flows. The mechanisms of subsidiary upgrading and productivity growth involve the introduction of new functions and new lines of businesses (expansion of scope) as well as an expansion of the existing functions (expansion of scale).

Below we discuss the relevance of the above concept for productivity growth in foreign subsidiaries and propose several hypotheses. First, following Szalavetz (2000) we distinguish between the static and dynamic modernisation effects of

¹ For a full description of this model, see Majcen, Radosevic and Rojec (2003)

FDI. A static modernisation effect is an expansion within a basically unchanged mandate and is reflected in subsidiaries' autonomy over operational functions. Dynamic effects are present when a subsidiary expands the range of functions under its control (functional upgrading) (ibid, p. 358).

Second, differences between subsidiaries in terms of their autonomy reflect differences in the tasks designated to them by their parent companies. Subsidiaries differ in the extent to which they are only production units and the extent to which they are business organisations. The more subsidiaries have to be specialised within the MNC network the narrower will be the range of the business functions they control. Equally, the range of inherited capabilities could determine the degree of functional control.

Third, the increased autonomy of a subsidiary in the corporate function portfolio develops from operational to more strategic autonomy, which shows the dynamic effect of industrial integration. In this context, product development and marketing are two functions with a distinctive strategic element. Szalavetz (2000, p. 369) points out that 'the quality of the transferred technology depends not only on the recipient's absorption capabilities but also (or maybe even more) on its marketing capabilities'. However, this probably greatly depends on the market orientation of subsidiary. For exporters, a shift from production only to a subsidiary with autonomous control of the marketing functions is very difficult. For local market-seeking FDI the marketing function is an essential part of the mandate. Here, the situation for transition countries' subsidiaries is probably similar to partial participation or the production-only participation of local firms from emerging markets in transnational value chains (Craig and Douglas, 1997). Marketing capabilities are linkage capabilities and thus may be crucial for breaking dependence on the parent company.

Fourth, responsibility for strategic functions, especially product development and strategic management, is much harder to acquire. Autonomy in this area denotes quite autonomous subsidiaries that can potentially operate as centres of excellence within the MNC network.

In the context of the above conceptual approach, at the empirical level our main objective is to identify productivity growth in foreign subsidiaries in Slovenian manufacturing and to explore which factors are responsible for that productivity growth. To do this, we analyse the magnitude of productivity growth and other changes, the relationships of sample subsidiaries with their headquarters and the competence profiles of subsidiaries. Specifically, we analyse the following parameters that define the position and its upgrading of subsidiaries in foreign parent companies' networks and which represent potential determinants of productivity growth: (i) selected firm-specific variables of foreign subsidiaries (foreign equity share, company size, technology intensity of the industry in which a subsidiary is engaged); (ii) the division of control between subsidiaries and their foreign parent companies in various business functions; (iii) the structure of sales of subsidiaries; and (iv) the main areas of competitiveness of foreign subsidiaries. All in all, our interest is specifically focused on the link between productivity growth and division of control (autonomy) between a foreign parent company and its Slovenian subsidiary.

Increased autonomy of a subsidiary develops from operational to more strategic autonomy

Marketing capabilities are linkage capabilities and may be crucial for breaking dependence on the parent company

3. Impact of FDI on productivity growth and restructuring in Slovenia – the existing evidence

FDI fosters the restructuring of Slovenian manufacturing sector in an allocative-efficient way

The literature on the productivity and restructuring impacts of FDI in Slovenia is relatively ample; its results are in line with the above general findings on the impact of FDI in transition countries. By tending to locate in manufacturing industries with above-average profitability, value added per employee and export propensity, FDI fosters the restructuring of Slovenian manufacturing sector in an allocative-efficient way. Foreign investment enterprises (FIEs)² generally perform better than domestic enterprises (DEs). The reasons for this lie in the integration of FIEs in the foreign parent companies' network and in their superior sectoral allocation and in the fact that, compared to DEs, FIEs are much larger in size, more capital-intensive, have a better structure of assets (more machinery and equipment, and less land and buildings) and are much more export-oriented (Rojec and Šušteršič 2002).

Table 1 compares the structure of FIEs and DEs in view of the technological intensity of the industries in which they are engaged. While FIEs are most intensively engaged in medium-high-technology industries, DEs are most intensively engaged in low-tech industries. This is also reflected in the importance of FIEs in particular groups of industries; while the overall share of FIEs in Slovenian manufacturing enterprises' fixed assets is 21.8%, the corresponding share in medium-high-technology industries is 31.5%. FIEs have the lowest (16.1%) share in low-technology industries³. In the case of DEs, their share in total Slovenian manufacturing enterprises' fixed assets is the highest in low-technology industries (83.9%). This seems to indicate that FDI makes a positive contribution to the technological upgrading of the Slovenian manufacturing sector. FIEs are also much more capital-intensive and export-oriented than DEs.

FIEs have significantly higher export propensity than DEs

Export orientation. Panel analysis of the export propensity of Slovenian manufacturing enterprises shows that FIEs have significantly higher export propensity than DEs, even after controlling for the different industrial distribution of FIEs and DEs, and for the impact of sample selection bias. Thus, the higher export propensity of FIEs compared to DEs is the result of differences in the structural operational characteristics of both types of enterprises. On the other hand, FIEs also show a higher import propensity than DEs (Rojec et al. 2000).

FIEs also show a higher import propensity than DEs

FDI is an important source of technology transfer in the Slovenian manufacturing industry (Damijan and Majcen 2001). However, it seems that this technology is on average relatively standardised (Rojec and Stanojević 2001). In principle, the entry of a strategic foreign investor in a company brings a number of changes to that company⁴. Besides technology, the foreign investor usually brings resources for

² In the text we use both terms, i.e. FIEs and foreign subsidiaries, interchangeably.

³ FIEs hold the highest shares in transport equipment (DM), paper, publishing and printing (DE), electrical and optical equipment (DL), rubber and plastic products (DH) etc.

⁴ The following are the most frequent changes brought by foreign investors to the Slovenian companies they invest in: (i) increased product quality as a result of changes in the production and technological process, and increased attention given to quality control; (ii) an improved production programme, narrowing down of production programmes and concentration on the company's core activity; (iii) alignment of the organisational structure with the business methods of the foreign parent company; (iv) training of management and other employees; (v) an improved information system: introduction of new accounting and financial reporting systems, better collection and dissemination of information, investment in internal informatisation and controlling; (vi) reduction of employment; and (vii) a major improvement in the role and quality of management (Rojec & Stanojević 2001).

Table 1: FIEs and DEs in the Slovenian manufacturing sector by technology intensity of industries; 2001 income statements/balance sheets data

Industries	FIEs				DEs			
	Fixed assets	Sales	Exports	Employment	Fixed assets	Sales	Exports	Employment
STRUCTURE; in %								
High-tech	12.3	8.6	8.3	10.9	11.8	11.1	13.7	9.1
Medium-high tech	35.5	50.4	55.5	37.6	21.5	22.5	29.4	21.9
Medium-low tech	25.2	21.0	21.5	26.3	27.7	24.2	25.2	23.7
Low tech	27.0	20.0	14.6	25.1	39.0	42.1	31.7	45.3
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
SHARE IN ALL ENTERPRISES; in %								
High-tech	22.5	21.4	23.7	19.1	77.5	78.6	76.3	80.9
Medium-high tech	31.5	44.2	49.1	25.3	68.5	55.8	50.9	74.7
Medium-low tech	20.2	23.5	30.4	18.0	79.8	76.5	69.6	82.0
Low tech	16.1	14.4	19.1	9.9	83.9	85.6	80.9	90.1
TOTAL	21.8	26.2	33.8	16.5	78.2	73.8	66.2	83.5
OPERATING INDICATORS								
	Fixed assets/empl. (SIT mill.)	Exports/sales (%)		Fixed assets/empl. (SIT mill.)	Exports/sales (%)			
High-tech	24.2	71.8		19.7	62.8			
Medium-high tech	20.0	81.1		14.9	66.5			
Medium-low tech	20.4	76.1		17.7	53.2			
Low tech	22.9	53.7		13.0	38.7			
TOTAL	21.3	73.7		15.2	51.4			

Source: Calculated using data from the Bank of Slovenia and the Agency for Payments data.

investment and access to foreign markets. FIEs in the Slovenian manufacturing sector also exhibit positive vertical spillover effects on domestic suppliers, while horizontal spillovers have proved to be neutral (Damijan et al. 2003).

The motivation pattern of foreign investors in Slovenia shows that access to the local market is the most important single motive, however, foreign investors are increasingly motivated by the possibility of establishing efficient export-oriented production in Slovenia (Gral iteo & Agencija RS za gospodarsko promocijo Slovenije in tuje investicije pri Ministrstvu za gospodarstvo 2001). This is confirmed by data on the export propensity of FIEs in Slovenia. In 2001 FIEs in Slovenia on average exported 47.3% of their sales, with the ratio in the manufacturing industry being as much as 71.5%. The situation in non-manufacturing sectors, where the exports-to-sales ratio in FIEs was only 13.7%, is very different.

Foreign investors are increasingly motivated by establishing efficient export-oriented production in Slovenia

4. Methodology and sample

The above conceptual framework was tested via a two-page ‘Questionnaire for foreign investment enterprises’⁵. The questionnaire was sent to 209 manufacturing FIEs, representing 69.2% of all FIEs in the Slovenian manufacturing sector⁶. 72 questionnaires were returned, meaning a 34.4% response rate. In value terms, the response rate is much higher; in terms of fixed assets it was 56.9%, in terms of sales 64.4%, in terms of exports 66.8% and in terms of employment 52.2%. The response rate in high- and medium-high-technology industries is higher than in medium-low and low-technology industries (see Appendix). In general, the sample questionnaire exhibits a high level of representativeness, although to some extent it is biased towards larger and technology more intensive FIEs. The main characteristics of the sample are:

- a/ FIEs which answered the questionnaire, i.e. the sample FIEs, represent 23.8% of all FIEs in the Slovenian manufacturing and are responsible for 50.8% of their employment, 53.6% of fixed assets, 62.1% of sales and 64.2% of exports⁷. Sectoral distributions of the sample FIEs also fit well to the sectoral distribution of all manufacturing FIEs.
- c/ Sample FIEs include all sizes of firms (measured by the number of employees) among which small and medium-sized FIEs prevail, i.e. 47.2% of them have between 51 and 500 employees, and 38.9% have less than 51 employees.
- e/ Most of the sample firms, i.e. 56.9%, were registered as FIEs in the 1994-1998 period. Only in 15.3% of cases is the registration dated before 1990.
- f/ The vast majority of the sample FIEs is majority-owned by strategic foreign investors. In 41.7% of cases FIEs are 100% foreign-owned, while in 37.5% of cases foreign investors hold 51%-99% of the equity.
- g/ Intermediate goods are a much more frequent product of the sample FIEs than final products. Intermediate products are produced by as many as 76.4% of the sample firms, while final products are produced in 50.0% of cases. 26.4% of firms produce both intermediate and final products. This pattern is linked to the predominantly factor-cost-advantage-seeking motivation of manufacturing foreign investors in Slovenia.

⁵ See the questionnaire at <http://www.iwh-halle.de/projects/productivity-gap/>

⁶ They represent more than 95% of the total manufacturing FIE population in terms of fixed assets, sales, exports and employment.

⁷ The sample FIEs are also a very relevant part of the overall Slovenian manufacturing sector; they hold 11.7% of its fixed assets, 8.4% of its employment, 6.3% of sales and 21.7% of its exports.

5. Productivity growth of the sample FIEs and their operational characteristics – a descriptive analysis

In the descriptive analysis we explore those operational characteristics of the sample subsidiaries which will be subsequently used as variables in our model. They relate to the magnitude of changes, the relationships of the sample subsidiaries with their headquarters and the local and foreign environments, and to the competence profile of the subsidiaries.

5.1. Changes and upgrading of activities in the sample FIEs after the engagement of strategic foreign investors

The changes and upgrading of activities in the sample FIEs after the involvement of strategic foreign investors lie in the focus of our interest. It is the changes and upgrading of activities in a company after the entrance of a strategic foreign investor that bring productivity improvements to the invested-in firm and possibly a reduction of the productivity gap between the host and investing country. The two main features of changes and upgrading of activities in the sample FIEs after the engagement of strategic foreign investors are: (i) that foreign investors have generally brought positive changes to the companies and that, when changes are introduced, this does not happen in just one or two areas but on the broad scale of the company's operations and with similar intensity; and (ii) that FIEs themselves and not their foreign parents are the biggest initiators of the changes.

Foreign investors have generally brought positive changes to the companies

Table 2: **Magnitude of changes in individual areas after the sample FIEs were registered as a foreign investment enterprise**

Magnitude of change	Value of sales	Share of exports	Level of productivity	Level of technology	Level of quality	OVERALL
SAMPLE FIEs DISTRIBUTION BY MAGNITUDE OF CHANGE						
Considerable reduction	1.4	1.4	0.0	0.0	0.0	n.a.
Reduction	2.8	2.8	0.0	1.4	0.0	n.a.
No change	13.9	22.2	19.4	22.2	29.2	n.a.
Increase	38.9	27.8	43.1	44.4	44.4	n.a.
Considerable increase	43.1	45.8	36.1	30.6	23.6	n.a.
No response	0.0	0.0	1.4	1.4	2.8	n.a.
TOTAL	100.0	100.0	100.0	100.0	100.0	n.a.
INDICATOR OF MAGNITUDE OF CHANGE*						
TOTAL	0.597	0.569	0.585	0.528	0.471	0.550
High technology industries	0.583	0.500	0.333	0.417	0.333	0.433
Medium-high technology industries	0.593	0.556	0.556	0.481	0.481	0.533
Medium-low technology industries	0.643	0.625	0.630	0.519	0.481	0.580
Low technology industries	0.500	0.500	0.682	0.727	0.500	0.582

Note: *Calculated so that responses »considerable reduction« are weighted by -1.0, responses »reduction« by -0.5, responses »no change« 0, responses »increase« by 0.5 and responses »considerable increase« by 1.0. The higher the indicator the more a particular business function is controlled by foreign parent companies.

The magnitude of changes seems to decrease with the increase in FIEs' technological intensity

FIEs themselves and not their foreign parents are the biggest initiators of changes

Magnitude of changes. In the questionnaire, the changes were classified in five areas: changes in the value of sales; changes in exports; changes in the productivity level; changes in the technology level; and changes in the quality level. Table 2 suggests that foreign investors have in general brought positive changes to the companies. On average, their engagement has resulted in a change meaning slightly more than an 'increase' (0.55; see the notes for Table 2 for a definition of the indicator). The magnitude of changes in all areas was on average pretty much the same. This is confirmed by Spearman's coefficients of the rank correlation between the magnitude of changes in individual areas; the coefficients are positive and significant. This demonstrates not only that changes in one area are positively correlated with changes in other areas but also that, when changes are introduced, this does not only happen in one or two areas but on the broad scale of the company's operations and with similar intensity. The highest correlation is found between changes in productivity and quality (0.710), and productivity and technology (0.692). It is obvious that changes in productivity go along with changes in technology and quality.

An interesting finding emerging from Table 2 is that the magnitude of changes seems to decrease with the increase in FIEs' technological intensity, i.e. the lower the technology intensity, the higher the magnitude of change. This pattern is most obvious as far as the increase in the levels of productivity and technology is concerned. The increase in the productivity/technology level is lowest in high-technology industries and highest in low-technology industries, with medium-technology industries coming somewhere in between. A possible explanation is that in low-technology FIEs there is more scope for an increase in the productivity/technology level than in high-technology FIEs, the latter being less far behind their competitors than the former. Still, the absolute differences in the magnitude of changes among the various categories of technological intensity are relatively small.

Initiative for changes. In analysing the magnitude of changes and upgrading of activities of FIEs, the issue of who initiates changes in FIEs particularly relevant. The database enables us to analyse who initiates what kind of changes. We distinguish between functional upgrading (organisation and business functions), product diversification (number of lines of businesses) and sale upgrading (sales and exports). There is no doubt that FIEs themselves and not their foreign parents are the main initiators of changes. This is true for all the above areas, but especially so in the area of organisation and business functions (see Table 3). The subsidiaries seem to have a relatively high degree of autonomy within their current mandate.

Table 3: Who initiated changes in individual areas of the sample FIEs' operations?

	Organisation and business functions	Number of business lines	Sales and exports
DISTRIBUTION OF SAMPLE FIEs			
Only/mainly the FIE	75.0	61.1	58.3
Only/mainly the foreign parent company	25.0	38.9	41.7
Total	100.0	100.0	100.0
INDICATOR OF INITIATIVE*	0.366	0.431	0.431

Note: *Calculated so that responses »Only FIE« are weighted by 0.0, responses »Mainly FIE« are weighted by 0.33, responses »Mainly foreign parent company« are weighted by 0.66 and responses »Only foreign parent company are weighted by 1.0. The higher the indicator the more changes in an individual area were initiated by foreign parent company.

5.2. Relationships of the sample FIEs with their headquarters and local and foreign environments

The relationships of the sample FIEs with their headquarters and local and foreign environments are reflected in the division of decision-making and control of various business functions between a subsidiary and its foreign parent company, and in the structure of the sales and supplies of FIEs. The main characteristics of these relationships of the sample FIEs are: (i) the overall pattern of decision-making and control is that the vast majority of business functions is undertaken only or mainly by the subsidiaries themselves. Foreign parents tend to retain control in two areas of strategic and long-term importance, i.e. in product development and in marketing, including market research; (ii) most sales of the sample FIEs are in exports, with by far the most important buyer being the foreign parents of FIEs; and (iii) most supplies of FIEs come from abroad, but altogether other domestic suppliers are the main supplier of FIEs. FIEs are more integrated into the foreign parent company's network via sales than via supplies while, on the other hand, they are more integrated into the Slovenian economy via supplies than via sales. High-technology FIEs are definitely the most integrated into the parent companies' network, on both the sales and supplies sides. Later, we give a more detailed presentation of the relationships of FIEs with their headquarters and the local and foreign environments.

Pattern of decision-making and control in subsidiaries. Table 4 presents the pattern of decision-making and control in various areas of business operations in FIEs according to who undertakes them, i.e. only FIE, mainly FIE, only the foreign parent or mainly the foreign parent. Based on our conceptual approach, we distinguish thirteen business functions grouped into three groups: operational, marketing and strategic. The increased autonomy of a subsidiary in the corporate function portfolio develops from operational to marketing and then to strategic autonomy. Therefore, we expect that foreign parent companies exercise lower control in operational functions, followed by higher control in marketing functions and the highest in strategic functions. Since the sample FIEs are on average highly export-oriented (the exports-to-sales ratio is 72.9%; see Table 5) we may also expect that foreign parent companies will want to retain a relatively higher level of control in the marketing functions. Table 4 fully confirms our expectations. It may be somewhat surprising that, in general, the vast majority of business functions is undertaken only or mainly by the sample FIEs themselves. There is not a single business function that is predominantly undertaken only or mainly by the foreign parents. Foreign investors are eager to retain more control in two areas of strategic and long-term importance, i.e. in product development and marketing, including market research. The fact that foreign parent companies want to keep the highest control in the marketing functions can be explained by the high export propensity of FIEs.

Spearman's coefficients of the rank correlation between individual business functions according to who undertakes them show pretty high positive and significant correlations, the only exception being 'accounting and finance of operations', which is not significantly correlated with any other business function. Marketing functions are particularly highly correlated with each other. All in all, it seems that individual foreign investors do have their own patterns of control, some preferring tighter control than others. If they are keen to exercise tighter control they do that in most business functions and, *vice versa*, if they exercise a lower level of control then this is so in most business functions.

Foreign parents tend to retain control in product development and in marketing, including market research

Table 4: Who undertakes individual business functions in the sample FIEs?

Business functions	Only/mainly the FIE (%)	Only/mainly the foreign parent company (%)	Not defined (%)	Total (%)	Indicator of foreign parent company influence*				
					Average	High tech ind.	Medium-high tech. ind.	Medium-low tech. ind.	Low tech. ind.
Operational management	97.2	2.8	0.0	100.0	0.111	0.222	0.123	0.071	0.121
Process engineering	83.3	16.7	0.0	100.0	0.278	0.389	0.284	0.238	0.303
Supply and logistics	90.3	9.7	0.0	100.0	0.194	0.278	0.173	0.167	0.273
Accounting and finance	94.4	5.6	0.0	100.0	0.083	0.167	0.099	0.036	0.121
Operational functions	91.3	8.7	0.0	100.0	0.167	0.264	0.170	0.128	0.205
Distribution, sales	69.4	30.6	0.0	100.0	0.319	0.500	0.333	0.238	0.394
Advertising	65.3	29.2	5.6	100.0	0.333	0.556	0.333	0.267	0.364
After sale services	69.4	27.8	2.8	100.0	0.305	0.444	0.358	0.222	0.300
Marketing	59.7	40.3	0.0	100.0	0.403	0.500	0.370	0.381	0.485
Market research	52.8	47.2	0.0	100.0	0.463	0.444	0.444	0.440	0.576
Marketing functions	63.3	35.0	1.7	100.0	0.365	0.489	0.368	0.310	0.424
Determining the product price	70.9	29.1	0.0	100.0	0.315	0.500	0.272	0.226	0.545
Investment finance	79.2	20.8	0.0	100.0	0.269	0.333	0.259	0.238	0.333
Product development	54.2	45.8	0.0	100.0	0.454	0.444	0.444	0.405	0.606
Strategic management and planning	68.1	31.9	0.0	100.0	0.398	0.333	0.383	0.393	0.485
Strategic functions	68.1	31.9	0.0	100.0	0.359	0.403	0.340	0.316	0.492
OVERALL	73.4	26.0	0.6	100.0	0.302	0.393	0.298	0.256	0.377

Note: *Alternatively, this could also be called the indicator of subsidiary's autonomy. It is calculated so that responses »Only FIE« are weighted by 0.0, responses »Mainly the FIE« are weighted by 0.33, responses »Mainly the foreign parent company« are weighted by 0.66 and responses »Only foreign parent company are weighted by 1.0. The higher the indicator the more a particular business function is controlled by foreign parent companies.

A comparison of decision-making and control patterns in FIEs in terms of the technology-intensity of industries gives a mixed picture. The indicator of foreign parents' influence on decision making (see notes to Table 4) shows the highest foreign control in high-technology industries followed by low-technology industries, and a somewhat lower level of control in medium-high and medium-low-technology industries. The normal expectation is that a foreign parent would reduce its influence on decision-making in FIEs by decreasing the technology level of the industry, yet the high indicator of foreign parents' control in low-technology industries does not support this view. Obviously, there are other more important factors that determine the influence of foreign parents on decision-making in FIEs. What is especially interesting in this context is that FIEs in high- as well as medium-high-technology industries exhibit a lower than average level of foreign parent influence on product development and on strategic management and planning, which are relatively important business functions for technological development. Low-technology FIEs exhibit considerably above-average foreign parent influence on these two business functions. For strategic functions in general, foreign parents' control is the highest in the case of low-technology FIEs (see Table 4).

The structure of sales and supplies is a very important variable for understanding both the autonomy of business functions and the pattern of upgrading. It also indicates FIEs' integration in foreign parent companies' networks and FIEs' relationships with the local and foreign environments. Most sales of the sample FIEs are made in exports. The most important buyer of FIEs are their foreign parents. The highest export propensity as well as the highest share of sales going to foreign parents is found in high-technology industries (88.8% exports-to-sales ratio and 41.5% of sales going to foreign parents), followed by medium-low-technology industries (77.8% and 39.4%, respectively), medium-high-technology industries (67.7% and 36.1% respectively) and low-technology industries (64.5% and 31.5%, respectively). This confirms the predominant factor-cost-advantage-seeking motivation of foreign investors in Slovenian manufacturing (see Rojec et

Most sales of FIEs are in exports, with by far the most important buyer being the foreign parents

Table 5: **Structure of sales and supplies of the sample FIEs; %**

SALES	Sales to			
	Foreign parent company	Other foreign buyers	Other local subsidiaries of foreign parent	Other local buyers
TOTAL	37.1	35.8	0.5	28.1
High technology industries	41.5	47.3	0.0	11.2
Medium-high technology industries	36.1	31.6	0.9	31.4
Medium-low technology industries	39.4	38.4	0.4	28.9
Low technology industries	31.5	33.0	0.0	27.3
SUPPLIES	Supplies from			
	Foreign parent company	Other foreign suppliers	Other local subsidiaries of foreign parent	Other local suppliers
TOTAL	23.5	34.6	0.5	41.3
High technology industries	33.8	32.2	0.0	34.0
Medium-high technology industries	23.0	38.4	1.3	37.3
Medium-low technology industries	23.5	29.2	0.0	46.9
Low technology industries	18.8	40.2	0.0	41.0

Most supplies of FIEs come from abroad

al. 2000). The almost non-existing sales to other local subsidiaries of foreign owners indicates that foreign investors in Slovenia do not, as a rule, have more than one subsidiary. Only other Slovenian companies are relevant as local buyers (Table 5).

The structure of supplies of FIEs is to a certain extent a mirror image of the sales structure. Most supplies come from abroad, however, the main foreign supplier is not the foreign parents but other foreign suppliers. Also, other Slovenian companies have a much more important role as suppliers than as buyers; they are the biggest supplier category of FIEs. All in all, it seems that FIEs are more integrated into the foreign parent company's network via sales than via supplies while, on the other hand, they are more integrated into the Slovenian economy via supplies than via sales. The latter definitely seems favourable from the host-country development point of view (Table 5).

There are considerable differences in the supply patterns of FIEs in terms of the technology intensity of the industries in which they are engaged. High-technology FIEs get many more supplies from their foreign parents, with the opposite situation being found in low-technology FIEs. On the other hand, medium-low-technology FIEs get many more of their supplies from other domestic suppliers. As expected, high-technology FIEs are definitely the most integrated into the parent companies' network, on both the sales and supplies sides. Technology – with the issues of complexity and mastering of technology on one side, and the wish to retain technological advantages and not to disclose them on the other – is obviously a very important reason for internalisation (Table 5).

5.3. Competence profile of the sample FIEs and sources of their competitiveness

Increasing competitiveness is the key issue in reducing productivity gaps. In this context, we explore how important individual areas of competitiveness are for FIEs. Four possible areas of competitiveness were put forward by the questionnaire: quality; patents, licenses and R&D; people and training; and management. Table 6 shows that the most important area of competitiveness is quality, followed by management, people and training, and patents, licences and R&D. With the exception of patents, licences and R&D, the other three areas are on average assessed as 'very important' or even higher. The relatively low level of importance of patents, licences and R&D reinforces the view that Slovenian subsidiaries base their market position on developed production, much less on technology capacity. This is not surprising given that in most manufacturing FIEs in Slovenia relatively standardised technology is in use and that relatively few FIEs are seen in high-technology industry sectors. This is important because patents, licences and R&D, and people and training are treated as much more important for the competitiveness of high-technology FIEs than of medium-high or medium-low-technology FIEs and even more so of low-technology FIEs (see Table 6).

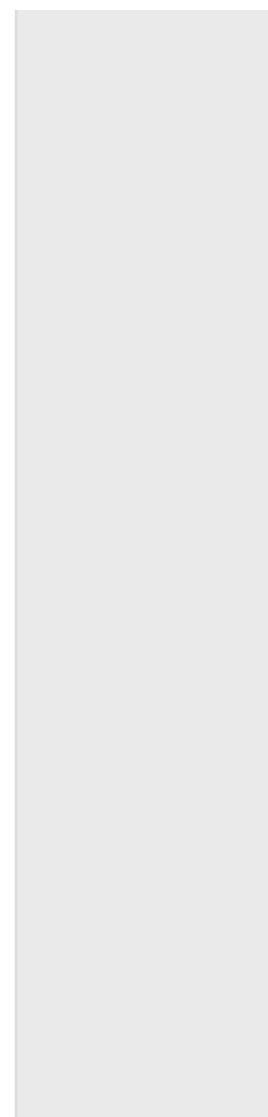
Spearman's coefficients of rank correlation between individual areas of competitiveness show relatively high positive and significant correlations. This demonstrates not only that competitiveness in one area is positively correlated with competitiveness in other areas, but even more so that competitiveness is a complex phenomenon composed of 'being good' in a number of areas. In other words, a company is either competitive or not because of its overall business setting; for instance, improvements and competitiveness in quality control spill over to management and training etc.

The most important area of competitive-ness is quality, followed by management, people and training

Table 6: Importance of various areas for the competitiveness of the sample FIEs

	Quality	Patents, licences, R&D	People and training	Management	Total
SAMPLE FIEs DISTRIBUTION BY IMPORTANCE OF AREAS OF COMPETITIVENESS					
Not important	0.0	5.6	1.4	0.0	n.a.
Less important	0.0	15.3	6.9	4.2	n.a.
Important	12.5	40.3	19.4	16.7	n.a.
Very important	30.6	20.8	44.4	47.2	n.a.
Extremely important	56.9	18.1	27.8	31.9	n.a.
TOTAL	100.0	100.0	100.0	100.0	n.a.
INDICATOR OF IMPORTANCE*					
TOTAL	0.861	0.576	0.726	0.767	0.733
High technology industries	0.833	0.750	0.792	0.792	0.792
Medium-high technology industries	0.861	0.611	0.741	0.769	0.746
Medium-low technology industries	0.857	0.571	0.741	0.768	0.734
Low technology industries	0.886	0.409	0.614	0.750	0.665

Note: *Calculated so that responses »not important« are weighted by 0.0, responses »less important« by 0.25, responses »important« by 0.50, responses »very important« by 0.75 and responses »extremely important« by 1.00. The higher the indicator the more particular area is important for the competitiveness of the sample FIEs.



6. Model and results of econometric analysis

6.1. Model

The previous section shows that industrial integration through FDI leads to considerable increases in productivity, technology and quality, as well as in sales and exports. It also provides a number of determinants that may influence productivity growth in subsidiaries (level of autonomy, sales structure, foreign equity share etc.). This section develops a model for assessing the determinants of productivity growth and interprets its results. The main features and operational characteristics of foreign subsidiaries described and explored in the descriptive analysis are used as dependent and independent variables.

The intention of the model is to assess the determinants of productivity growth in manufacturing foreign subsidiaries in Slovenia. The standard growth accounting approach of Solow (1957) can be used as a way to measure these determinants. The objective of this approach is to study the various factors that affect overall productivity, including the growth of technology. This is done by decomposing total factor (TFP) productivity or TFP growth into factors that are internal and external to the firm, including R&D investments and human capital, and the different sources of international technology transfer, respectively.

Following Basu and Fernald (1995), we consider a firm's i production function has the following form:

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

where Y_{it} is gross output, K_{it} , L_{it} and N_{it} represent capital stock, labour input and materials, and A_{it} is total factor productivity (TFP) or the Solow residual for firm i at time t . The production function is homogenous at degree r in K , L and N , so that $r = \alpha + \beta + \gamma \neq 1$.

To get the firm's TFP growth, we differentiate (1) over time. On the assumption of competitive markets, the marginal product of each input is equal to its factor price, hence, (1) can be rewritten:

$$(2) \quad y_{it} = a_{it} + \alpha k_{it} + \beta l_{it} + \gamma n_{it}$$

where $y_{it} = \log(Y_{it+1}/Y_{it})$, $a_{it} = \log(A_{it+1}/A_{it})$, $k_{it} = \log(K_{it+1}/K_{it})$, $l_{it} = \log(L_{it+1}/L_{it})$, and $n_{it} = \log(N_{it+1}/N_{it})$. According to the above accounting, TFP growth is the difference between the growth of output and the weighted sum of the growth of inputs, with the weights being the individual shares of factors used in production.

Estimating (1) or (2) on aggregate data or firm level data may give us some information on average technology stock or average TFP growth in the economy or across firms. Since the technology parameter is simply the regression residual, i.e. part of the variance of output that cannot be accounted for by the variance in factor inputs, it says nothing about the factors that influence TFP growth. In reality, this residual may capture a number of factors that may have little in common with technology level or TFP growth. In this specification the technology parameter depends crucially on the model's goodness of fit. This is especially true in transition

The intention of the model is to assess the determinants of productivity growth in manufacturing foreign subsidiaries in Slovenia

economies in which this estimation approach – due to an inefficient utilisation of production factors – may return incorrectly high parameters of the technology level or TFP growth. Ideally, the model should thus include those factors that determine the level of technology or its growth. Often this can be difficult since technology embodies skills and knowledge that are not easy to measure. As our main objective is to assess the impact of the control of individual business functions in subsidiaries on their productivity growth and on the overall magnitude of changes, we defined the firm's TFP A_{it} as:

$$(3) \quad A_{it} = G_i(BF_{it}, F_i, CS_i, X_i, M_i, COMP_i, d_j)$$

where BF_{it} captures the variables of control of business functions, and F_i through M_{it} captures the control variables - F_i is a dummy for the majority or minority foreign ownership, CS_i is a dummy of firm size, $COMP_i$ captures variables denoting the importance of areas of competitiveness. With X_i and M_i , that refer to the export propensity (exports to the foreign parent company or other foreign firms to sales ratio) and import propensity (ratio of imports from the foreign parent company or other foreign firms to the material costs) of the firm, respectively, we tested for alternative sources of TFP growth in foreign subsidiaries. In addition, we also allow for sector-specific effects by including a respective dummy variable d_j . With the use of all these control variables we tried to isolate the possible impact of the control of business functions variables on productivity growth, which is used as a proxy for a subsidiary's TFP growth. Due to the lack of data on capital and labour, we did not estimate equation 2 but directly estimated equation 3 with the variable of a firm's change in productivity growth being the endogenous and all the others being exogenous ones.

As the alternative responses regarding changes in productivity have a meaning of a logical ordering (considerable decrease, decrease, no change, increase, considerable increase), an ordered probit model was used. Estimation of the model is based on maximum likelihood where the implied probabilities enter the likelihood function. The interpretation of the coefficients is in terms of the underlying latent variable model – a positive coefficient means that the corresponding variable increases productivity or, in terms of the effects on the respective probabilities – the probability that the observed value of a response is 1 will increase, while the probability that the observed value of the response is 0 will decrease (the effects on intermediate categories is ambiguous).

Spearman's correlation coefficients between the variables of control of business functions show that all 13 variables are significantly correlated with each other and therefore it is unsuitable to use them all in the model. To avoid the problem, we create four group indicators of a subsidiary's autonomy and use them as variables in the model. First, we use an overall indicator of a subsidiary's autonomy, calculated as the unweighted average of the indicators for 13 individual business functions (see note 1 to Table 8). Second, we also group individual business functions in three groups, i.e. in operational, marketing and strategic business functions, as proposed in Table 4. These three groups define the operational, marketing and strategic autonomy of subsidiaries. They are calculated as the unweighted average of the indicators of a subsidiary's autonomy in individual business functions in a particular group (see notes 2, 3 and 4 in Table 8). Since Spearman's correlation coefficients between the three groups of business functions also show a significant correlation with each other (see Table 7), we use them alternatively in the regression model.

Table 7: Spearman's correlation coefficients for business functions' group variables and for foreign equity share

	Foreign equity share	Overall autonomy	Operational functions (autonomy)	Marketing functions (autonomy)	Strategic functions (autonomy)
Foreign equity share	1.0000				
Overall autonomy	0.4083*	1.0000			
Operational functions (autonomy)	0.2379	0.8212*	1.0000		
Marketing functions (autonomy)	0.3778*	0.9504*	0.6791*	1.0000	
Strategic functions (autonomy)	0.4107*	0.8825*	0.6857*	0.7238*	1.0000

Note: *indicates significance at a 5% level.

The creation of group indicators of a subsidiary's autonomy thus provides us with four alternative group variables that represent the key alternative variables in our model. Their main intention is to find out if there is an interdependent relationship between the level of a foreign parent company's control (or alternatively, the level of a subsidiary's autonomy) of an individual group variable and the change in the subsidiary's productivity. A dummy variable is also included in the model to separate majority- from minority-foreign-owned subsidiaries in order to find out whether majority foreign ownership results in higher productivity growth because it facilitates the transfer of more complex technology and management skills to local firms. Majority versus minority foreign ownership could also represent an alternative proxy variable for foreign parent control/subsidiary autonomy in performing business functions. Namely, a logical expectation is that foreign parent companies with a majority equity share will exhibit greater control over the most important business functions of subsidiaries. This is confirmed in Table 7, where overall autonomy, marketing and strategic autonomy show a significant correlation with the foreign equity share. This fact is also taken into account in the model.

An ordered probit model was used to test the model. With the model we tested whether a subsidiary's productivity growth is a function of:

- overall autonomy: variable $f1$
- operational autonomy: variable $f2$
- marketing autonomy: variable $f3$
- strategic autonomy: variable $f4$
- foreign equity share: dummy $q5_skup$
- company size: dummies $dq22$ and $dq23$
- share of exports/purchases to/from foreign parent company/other foreign buyers/sellers: variables $q10a_sal$, $q10b_sal$, $q11_a$, $q11_b$
- importance of areas of competitiveness: variables $q12a_a - q12a_d$
- sector dummies: dummies $dumh$, $dumhm$ and $dumlm$

Several of the above dummies need further explanation. For company size we prepared two dummies for medium and large subsidiaries, with small ones being the control group. For equity share variable we use one dummy for subsidiaries with a majority-foreign-equity share, with subsidiaries with a foreign-equity share below 50% being the control group. For sector dummies, we grouped subsidiaries according to the technology intensity of the particular sector they belong to (high, medium high, medium-low), with subsidiaries in low-technology intensity sectors being the control group.

During the estimation procedure five alternative models are used. The difference between them is that: (1) in the first one we use only foreign equity share as a measure of foreign control/subsidiary autonomy; (2) in the second one, the variable related to the overall autonomy of subsidiary, with and without a foreign equity share is used; (3) in the third one the variable related to operational autonomy, with and without a foreign equity share is used; (4) in the fourth one, the variable related to marketing autonomy with and without a foreign equity share is used; and (5) in the fifth one, the variable related to strategic autonomy with and without a foreign equity share was used. In all models the other control variables are the same.

6.2. Results and discussion

In this subsection the variables denoting the control/autonomy over various groups of business functions and other variables are used in order to test for their possible relation with the productivity growth of manufacturing foreign subsidiaries in Slovenia. Based on equation (3), we estimate the following model:

$$(4) \quad a_i = b_i + \alpha_j f_{ji} + \delta F_i + \chi_k CS_{ki} + \beta_l X_{li} + \gamma_m M_{mi} + \eta_n COMP_{ni} + \theta_o dums_{oi} + \varepsilon_i$$

where b_i is a constant term (a residual that accounts for alternative sources of productivity growth not accounted for in the model), α_j represents the impact of four alternative group variables of a subsidiary's autonomy, δ measures the difference in productivity growth rates between subsidiaries with a majority and minority foreign equity share, χ_k measures the difference in productivity growth rates between different sized subsidiaries, β_l represents the impact of sales to the foreign parent company or other foreign firms, γ_m represents the impact of purchases of intermediate inputs from the foreign parent company or from other foreign sellers, η_n represents the impact of different areas of competitiveness, θ_o is a parameter of the sector dummy, while ε_i is the error term.

The results are presented in Table 8 below. After controlling for other possible determinants of productivity growth, three of four group business functions' control/autonomy variables are significantly and positively related to productivity growth. This means that the level of control of business functions by foreign parent companies or, alternatively, the level of autonomy of subsidiaries in performing business functions is found to be one of the determinants of differences seen in productivity growth between subsidiaries. The level of foreign parent companies' overall control and the level of their control of marketing and strategic functions in fact seem to be the most important determinants of productivity growth in foreign subsidiaries in Slovenian manufacturing. The higher the foreign parent's control overall, as well as of the marketing and especially of strategic functions, the higher the productivity growth in subsidiaries. Foreign parent companies seem to seek control over the strategic and marketing business functions and leave operational control to the subsidiaries themselves. This is expected since control over the operational functions has no significant impact on productivity growth. We presume that this control pattern means the maintenance of a basically production-oriented mandate of subsidiaries for products shipped to the parent or other foreign buyers.

In the basic model, which does not contain any variables of business functions' control, the foreign equity share proves to have a significant and positive impact on

The higher the foreign parent's control overall, as well as of the marketing and especially of strategic functions, the higher the productivity growth in subsidiaries

Foreign parent companies leave operational control to the subsidiaries

Table 8: Ordered probit estimates

VARIABLE	MODEL 1: BASIC With foreign equity share only		MODEL 2: WITH OVERALL AUTONOMY		MODEL 3: WITH OPERATIONAL AUTONOMY		MODEL 4: WITH MARKETING AUTONOMY		MODEL 5: WITH STRATEGIC AUTONOMY	
	Coefficient	Coefficient	With foreign equity share	Without foreign equity share	With foreign equity share	Without foreign equity share	With foreign equity share	Without foreign equity share	With foreign equity share	Without foreign equity share
Autonomy of the subsidiary - overall ¹		*1.804472 (1.895)		**2.279591 (2.637)						
Operational autonomy ²			1.127359 (0.801)	1.74861 (1.303)						
Marketing autonomy ³							*1.043399 (1.751)	**1.351204 (2.442)		
Strategic autonomy ⁴									**1.969829 (2.116)	**2.336313 (2.858)
Foreign equity share	**5428179 (2.152)	.3405947 (1.213)	*.4931603 (1.902)				.3884658 (1.419)		.2421125 (0.829)	
Dummy - medium size firm	.1808065 (0.469)	.2378056 (0.561)	.2492487 (0.630)	.3041201 (0.779)			.2007172 (0.477)	.2535815 (0.608)	.3596732 (0.894)	.39887 (0.999)
Dummy - large size firm	**1.276277 (2.926)	**1.040262 (2.284)	**1.274438 (2.933)	*1.496063 (3.585)			**1.011294 (2.221)	**1.172757 (2.665)	**1.382349 (3.114)	**1.492654 (3.518)
Exports to foreign owner	**4955838 (2.294)	**6237265 (2.688)	**5186912 (2.367)	**529233 (2.449)			**6179478 (2.676)	**6276832 (2.746)	**555962 (2.481)	**5653284 (2.532)
Exports to other foreign firms	*5346739 (1.782)	*5869635 (1.890)	*5351816 (1.781)	*5270566 (1.787)			**5919314 (1.906)	**6035566 (1.967)	**5894915 (1.912)	**5931247 (1.933)
Imports of intermediate products from foreign owner	-0.051931 (-0.878)	-0.090264 (-1.341)	-0.065898 (-1.060)	-0.077389 (-1.271)			-0.081915 (-1.239)	-0.088569 (-1.358)	-0.077723 (-1.254)	-0.083237 (-1.357)
Imports of intermediate products from other foreign firms	-0.014106 (-0.180)	-0.029223 (-0.346)	-0.026347 (-0.329)	-0.040877 (-0.520)			-0.018431 (-0.221)	-0.031489 (-0.383)	-0.053489 (-0.651)	-0.063721 (-0.786)
Quality control	.7598863 (0.795)	.5766136 (0.582)	.9566708 (0.968)	.5569246 (0.583)			.3829605 (0.388)	.0326343 (0.034)	.9769035 (0.999)	.8115212 (0.851)
Patents and licences	-1.1013095 (-0.165)	-2.669526 (-0.396)	-1.316194 (-0.215)	-2.520734 (-0.426)			-2.555861 (-0.380)	-3.621243 (-0.552)	-2.160861 (-0.346)	-2.825469 (-0.461)
People and training	.0971497 (0.098)	-0.668056 (-0.061)	.1281637 (0.129)	-1.23716 (-0.127)			-0.743803 (-0.068)	-2.937226 (-0.273)	-0.993088 (-0.099)	-2.345587 (-0.237)
Management	.3004607 (0.297)	.4063309 (0.379)	.1285967 (0.124)	.5214901 (0.526)			.5814359 (0.543)	.9682698 (0.950)	.2598874 (0.249)	.4636204 (0.461)
Sector dummy - high technology intensity	*-1.300509 (-1.822)	*-1.257646 (-1.724)	-1.367809 (-1.887)	-1.14681 (-1.607)			*-1.306101 (-1.790)	-1.127828 (-1.577)	-1.056729 (-1.457)	-8960678 (-1.286)

-Continued on the next page.

Table 8: Ordered probit estimates

VARIABLE	MODEL 1: BASIC With foreign equity share only		MODEL 2: WITH OVERALL AUTONOMY		MODEL 3: WITH OPERATIONAL AUTONOMY		MODEL 4: WITH MARKETING AUTONOMY		MODEL 5: WITH STRATEGIC AUTONOMY	
	Coefficient		Coefficient		Coefficient		Coefficient		Coefficient	
	With foreign equity share only	Without foreign equity share	With foreign equity share	Without foreign equity share	With foreign equity share	Without foreign equity share	With foreign equity share	Without foreign equity share	With foreign equity share	Without foreign equity share
Sector dummy - medium high technology intensity	-4423542 (-0.905)	-2223303 (-0.449)	-347836 (-0.684)	-4740909 (-0.964)	-2973948 (-0.623)	-4009337 (-0.787)	-2722067 (-0.546)	-2056749 (-0.408)	-0764767 (-0.160)	
Sector dummy - medium low technology intensity	-0660794 (-0.122)	.4887599 (0.894)	.2469059 (0.423)	-.0296298 (-0.054)	.3403559 (0.669)	.1432038 (0.249)	.3952035 (0.725)	.3426714 (0.589)	.5624791 (1.086)	
Pseudo R ²	0.2342	0.2405	0.2526	0.2390	0.2108	0.2482	0.2315	0.2689	0.2637	
Number of obs.	64	59	59	64	64	59	59	64	64	

Notes:

(i) Dependent variable: productivity growth.

(ii) Z-statistics in parentheses.

(iii) ** and * indicate significance at the 5% and 10% levels, respectively.

¹ Autonomy of subsidiary - overall: average value of subsidiary autonomy in all 13 business functions (see Table 4).² Operational autonomy: average value of subsidiary autonomy in 4 operational business functions (see Table 4).³ Marketing autonomy: average value of subsidiary autonomy in 5 marketing business functions (see Table 4).⁴ Strategic autonomy: average value of subsidiary autonomy in 4 strategic business functions (see Table 4).

The level of foreign equity share as such is not a determinant of productivity growth

Large subsidiaries have a significantly higher average change in productivity

Subsidiaries with a higher proportion of exports experience higher changes in productivity levels

Subsidiaries in high-technology sectors exhibit lower changes in productivity than subsidiaries in low-tech sectors

subsidiaries' productivity growth, i.e. productivity growth in majority-foreign-owned subsidiaries is significantly higher than in minority-foreign-owned subsidiaries. However, when we introduce the variables of business functions' control into the model, the foreign equity share loses its significance almost completely; it is only in the model with operational autonomy where the level of the foreign equity share is significantly and positively related to productivity growth. The level of foreign equity share as such is thus not a determinant of productivity growth, and the foreign equity share does not seem to be an alternative for foreign parent companies' control of marketing and strategic business functions. The control of marketing and strategic business functions is obviously important per se and is probably based on factors like technology, marketing and supply channels etc. Foreign parents exercise control over marketing and strategic functions, regardless of whether they hold a majority or minority equity share. In other words, the level and mechanisms of control of individual business functions seem not to be related to the level of the foreign equity share.

The model also points to two other determinants of subsidiaries' productivity growth. The first is the size of the subsidiary and the second is its (export) sales orientation. Subsidiary size dummies show that large subsidiaries (with more than 250 employees) have a significantly higher average change in productivity compared to small and medium-sized subsidiaries. This is expected given the importance of export orientation within basically production-oriented subsidiaries.

Subsidiaries with a higher proportion of sales to foreign parent companies or to other foreign buyers experience higher and statistically significant changes in productivity levels. In the case of the closer integration of subsidiaries in the foreign parent companies' network (measured by the share of the subsidiary's sales going to the foreign parent company), the latter seem to be more eager to increase the subsidiary's productivity level. As a consequence, more technology and other knowledge/skills are transferred to subsidiaries.

Although the descriptive analysis suggests various areas of competitiveness are important for a subsidiary's performance, most notably quality, management and human resources, the regression analysis does not confirm this conclusion. None of the four variables related to the areas of competitiveness included in the regression is significant for the productivity growth of subsidiaries. This is in line with the high importance of foreign parent companies' control over business functions for subsidiaries' productivity growth. Foreign parent companies seem to take care of subsidiaries' competitiveness.

In the two variants of the regression (models with overall and with marketing autonomy) subsidiaries in high-technology sectors exhibit significantly lower, in fact negative, changes in productivity than subsidiaries in low-tech sectors. One reason for this is that the scope of productivity growth in low-technology sectors has been much higher than in high-technology sectors. Also, what constitutes FDI in high-tech sectors in Slovenia are mostly the low value added segments of these sectors. Achieving production capability in these sectors obviously does not suffice for increases in productivity.

7. Conclusions

The intention of the paper is to assess the determinants of productivity growth in manufacturing foreign subsidiaries in Slovenia. The standard growth accounting approach is used to measure these determinants. Special attention is given to the impact of the control pattern on subsidiaries' productivity growth. Additionally, we check for the impact of foreign equity share, company size, areas of competitiveness, exports/imports to/from the foreign parent company on productivity growth. The database is a survey of 72 foreign subsidiaries in the Slovenian manufacturing sector.

Empirical analysis shows that industrial integration through FDI has led to considerable increases in productivity, technology and quality, as well as in sales and exports. The models suggest the following conclusions regarding productivity growth and control in foreign subsidiaries:

- a/ The level of foreign parent companies' overall control and the level of their control of marketing and strategic functions seem to be the most important determinants of productivity growth in foreign subsidiaries in Slovenian manufacturing. The higher the foreign parent's control overall, as well as of marketing and especially of strategic functions, the higher the productivity growth in the subsidiaries. Foreign parent companies seem to seek control over strategic and marketing business functions and leave operational control to the subsidiaries themselves.
- b/ The above pattern of control and productivity growth holds regardless of whether we include or exclude the foreign equity share dummy in the model. The level of the foreign equity share as such is not a determinant of productivity growth, and the foreign equity share does not seem to be an alternative for foreign parent companies' control of marketing and strategic business functions. The control of marketing and strategic business functions is obviously important per se and is probably based on factors like technology, marketing and supply channels etc. Foreign parent companies are eager to exercise control over marketing and strategic functions, regardless of whether they hold a majority or minority equity share. In other words, the level and mechanisms of control of individual business functions seem not to be related to the level of the foreign equity share.

The model points to some other determinants of subsidiaries' productivity growth. The first is subsidiary size; large subsidiaries have significantly higher average change in productivity compared to small and medium-sized subsidiaries. The second is the proportion of sales to the foreign parent company; subsidiaries with a higher proportion of sales to foreign parent companies or to other foreign buyers experience higher changes in their productivity levels. The third is that, in two variants of the model, subsidiaries in high-technology-intensity sectors exhibit a significantly lower change in productivity than subsidiaries in other sectors.

All in all, the more subsidiaries are integrated into foreign parent companies' – in terms of marketing and strategic management, and export flows – the more productivity growth they experience. Keeping marketing and strategic control in the hands of foreign parent companies seems to be the main determinant of subsidiaries' productivity growth. Foreign parent companies are eager to maintain marketing and strategic control regardless of the equity share they have.

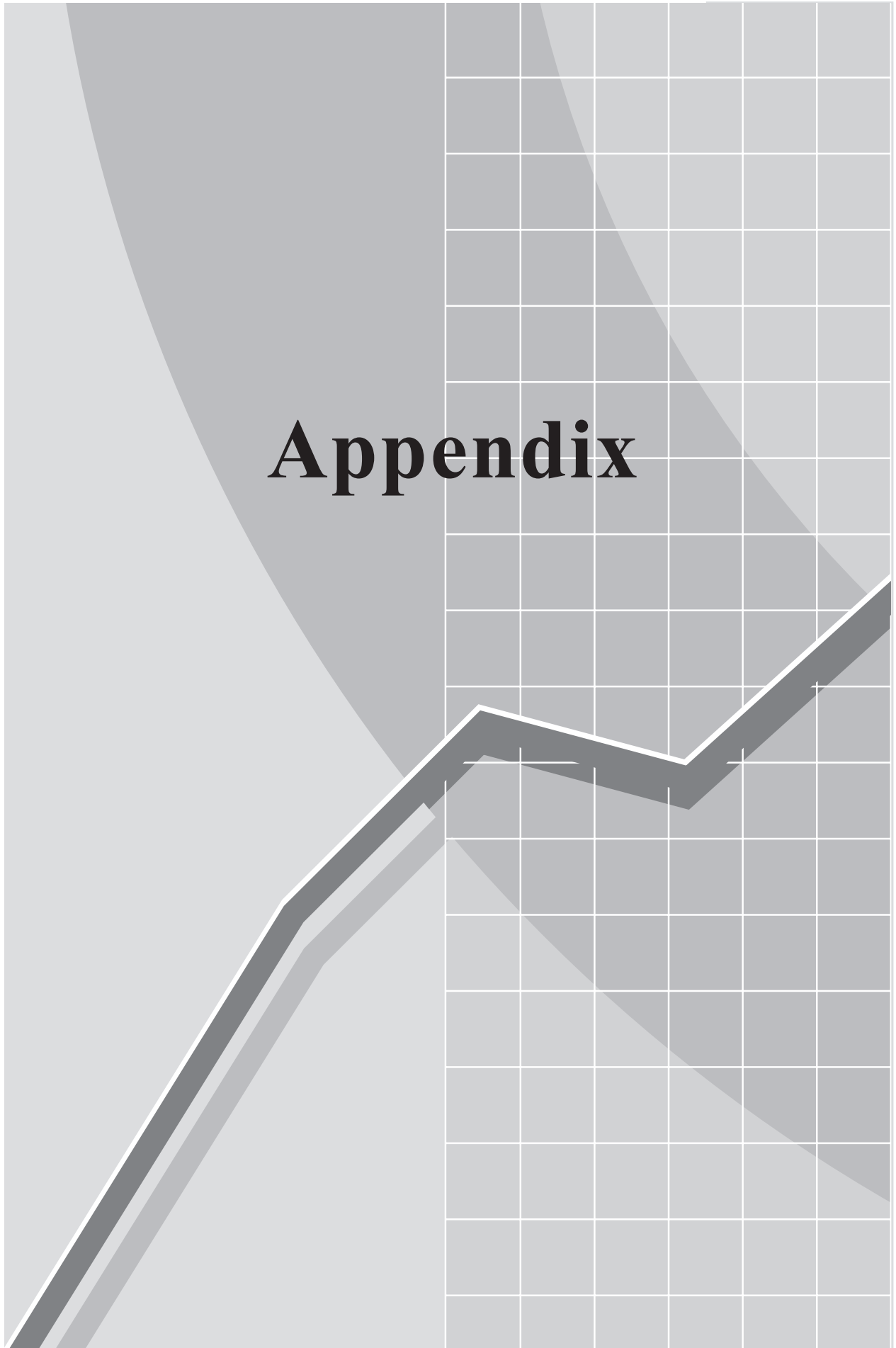
The more subsidiaries are integrated into foreign parent companies' the more productivity growth they experience

Keeping marketing and strategic control in the hands of foreign parent companies seems to be the main determinant of subsidiaries' productivity growth

Bibliography

- Birkinshaw, J. and N. Hood (eds.). 1998. *Multinational Corporate Evolution and Subsidiary Development*. London: Macmillan.
- Craig, C. S. and S. P. Douglas. 1997. Managing Transnational Value Chain – Strategies for Firms from Emerging Markets. *Journal of International Marketing*, 5 (3): 74-84
- Damijan, J.P. and B. Majcen. 2001. *Transfer of Technology through FDI and Trade, Spillover Effects, and Recovery of Slovenian Manufacturing Firms*. Ljubljana: Institute for Economic Research. Mimeo.
- Damijan, J. P., B. Majcen, M. Rojec, M. Knell. 2003. The role of FDI, R&D accumulation and trade in transferring technology to transition countries: evidence from firm panel data for eight transition countries. *Economic Systems*, 27 (2): 189-204.
- Gral iteo & Agencija RS za gospodarsko promocijo Slovenije in tuje investicije pri Ministrstvu za gospodarstvo (Trade and Investment Promotion Agency). 2001. *Raziskava podjetij s tujim in mešanim kapitalom v letu 2001 (Research of companies with foreign and mixed equity in 2001)*. Ljubljana. Mimeo.
- Holland, D., M. Sass, V. Benaček, M. Gronicki. 2000. The determinants and impact of FDI in Central and Eastern Europe: a comparison of survey and econometric evidence. *Transnational Corporations*, 9 (3): 163-213.
- Hunya, G., (ed.) 2000. *Integration through Foreign Direct Investment*. Cheltenham: Edward Elgar.
- Konings, J. 2001. The effects of FDI on domestic firms. *Economics of Transition*, 9 (5): 619-33.
- Majcen, B., S. Radošević and M. Rojec. 2003. Strategic Control and Productivity Growth of Foreign Subsidiaries in Central European Countries. *XI International Conference on European Studies*. Havana, September 30 – October 3 2003. Mimeo.
- Meyer, K. 1998. *Direct Investment in Economies in Transition: Making Central European Industries Competitive*. Cheltenham: Edward Elgar.
- Resmini, L. 2000. The determinants of foreign direct investment in the CEECs: New evidence form sectoral patterns. *Economics of Transition*, 8 (3): 665-89.
- Rojec, M. 2000. Restructuring and efficiency upgrading with FDI, In G. Hunya G, (ed.), *Integration through Foreign Direct Investment: Making Central European Industries Competitive*. Cheltenham: Edward Elgar, pp. 130-149.
- Rojec, M, J.P. Damijan and B. Majcen. 2000. Export Propensity of Foreign Subsidiaries in Slovenian Manufacturing Industry. *Globalisation and European Integration*. 6th EACES Conference, Barcelona, 7-9 September 2000. Mimeo.
- Rojec, M. and M. Stanojević. 2001. Slovenia: Factor Cost-Seeking FDI and Manufacturing. In *CEE countries in the EU companies' strategies of industrial restructuring and relocation* (edited by Grigor Gradev). Brussels: European Trade Union Institute, pp. 137-171.
- Rojec, M. and J. Šušteršič. 2002. Razvojnna vloga in politika do neposrednih tujih investicij v Sloveniji (Development role and policy towards foreign direct investment in Slovenia). *IB Revija*, 36(1): 78-94.
- Solow, R.M. 1957. Technical Change and the Aggregate Production Function. *Review of Economics and Statistics*, 39: 312-320.
- Szalavetz, A. 2000. Adjustment of Hungarian engineering companies to the globalising corporate network, In Bara, Z. and L. Csaba *Small Economies' Adjustment to Global Challenges*, Aula Publishing Ltd, Budapest, pp. 357-376.
- Young, S., N. Hood and S. Dunlop. 1988. Global strategies, multinational subsidiary roles and economic impact in Scotland. *Regional Studies*, 22 (6): 487-97.

Appendix



Sample FIEs, their relevance and representatives

NACE rev. 1 manufacturing sectors	Sample FIEs (values; bill. SIT)						Share of sample FIEs in all FIEs (%)					
	No. of firms	Fixed assets	Employees	Sales	Exports	No. of firms	Fixed assets	Employees	Sales	Exports		
DA	2	26.5	362	17.7	6.4	13.3	39.7	23.0	36.2	48.7		
DB	3	7.5	822	17.2	1.5	17.6	36.7	46.8	51.4	8.4		
DC	2	1.8	1,177	2.8	2.5	33.3	13.8	47.2	16.4	20.1		
DD	1	6.3	277	4.2	3.3	11.1	90.0	77.6	84.5	87.0		
DE	2	16.7	355	17.9	12.1	6.7	18.3	14.9	24.1	24.4		
DG	8	40.9	771	35.2	27.3	36.4	56.9	39.0	43.5	49.2		
DH	5	67.0	2,185	57.5	47.1	19.2	76.7	61.2	67.0	67.4		
DI	5	9.9	348	8.8	5.5	25.0	34.0	32.3	36.0	38.7		
DJ	16	35.8	2,225	40.6	31.3	29.6	49.8	48.9	50.5	51.9		
DK	11	40.5	2,667	56.7	50.8	33.3	56.2	50.7	63.3	66.5		
DL	11	94.8	3,910	77.6	58.1	25.0	79.9	65.8	69.7	66.1		
DM	5	51.0	2,505	226.2	184.0	29.4	53.4	64.3	88.6	87.9		
DN	1	2.4	204	3.1	1.4	11.1	78.3	80.3	83.3	77.1		
HTI ¹		73.5	2,319	48.0	33.3		79.6	60.6	61.6	59.6		
MHTI ²		153.5	7,510	347.5	286.8		57.8	56.9	75.8	76.9		
MLTI ³		113.0	4,782	107.0	84.0		59.8	51.8	56.0	58.1		
LTI ⁴		61.2	3,197	63.0	27.2		30.3	36.2	34.5	27.7		
Total Manufacturing	72	401.2	17808	565.5	431.4	23.8	53.6	50.8	62.1	64.2		

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Sample FIEs, their relevance and representatives

NACE rev. 1 manufacturing sectors	Sectoral distribution of (%)						Share of sample FIEs in all FIEs approach-Ed by the questionnaire, response rate (%)					
	All FIEs			Sample FIEs			No. of firms	Fixed assets	Employees	Sales	Exports	
	No. of firms	Fixed assets	No. of firms	Fixed assets	No. of firms	Fixed assets						
DA	5.0	8.9	2.8	6.6	22.2	40.1	23.3	36.7	48.9			
DB	5.6	2.7	4.2	1.9	25.0	36.7	46.9	51.4	8.4			
DC	2.0	1.8	2.8	0.5	40.0	13.8	47.2	16.4	20.1			
DD	3.0	0.9	1.4	1.6	16.7	91.2	78.7	84.7	87.0			
DE	9.9	12.2	2.8	4.2	13.3	18.4	15.0	24.2	24.4			
DG	7.3	9.6	11.1	10.2	50.0	57.5	39.3	44.9	50.5			
DH	8.6	11.7	6.9	16.7	26.3	76.9	61.4	68.2	68.8			
DI	6.6	3.9	6.9	2.5	35.7	36.0	34.1	38.8	42.4			
DJ	17.9	9.6	22.2	8.9	40.0	50.5	49.2	51.0	52.2			
DK	10.9	9.6	15.3	10.1	44.0	57.0	50.9	63.7	66.6			
DL	14.6	15.9	15.3	23.6	34.4	80.7	66.2	70.3	66.2			
DM	5.6	12.8	6.9	12.7	38.5	85.7	80.4	97.1	97.8			
DN	3.0	0.4	1.4	0.6	33.3	83.1	84.0	84.4	77.5			
HTI ¹		12.3		18.3		80.9	61.0	63.2	59.9			
MHTI ²		35.5		38.3		67.3	60.6	80.0	81.8			
MLTI ³		25.2		28.2		60.7	52.4	57.3	59.4			
LTI ⁴		27.0		15.3		30.5	36.5	34.7	27.8			
Total Manufacturing	100.0	100.0	100.0	100.0	34.4	56.9	52.2	64.4	66.8			

Source: Financial statements of firms, questionnaires, own calculations.

Notes: ¹ HTI = High technology industries; ² MHTI = Medium-high technology industries; ³ MLTI = Medium low technology industries; ⁴ LTI = Low technology industries.

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