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PRODUCTIVITY GROWTH AND FUNCTIONAL UPGRADING IN FOREIGN SUBSIDIARIES IN THE SLOVENIAN MANUFACTURING SECTOR

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Abstract

The paper discusses the determinants of productivity growth in manufacturing foreign subsidiaries in Slovenia. Special attention is given to the impact of

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control pattern. We show that productivity growth is significantly and positively correlated with the level of foreign parent companies' control of marketing and strategic business functions. Larger subsidiaries and subsidiaries with higher exports to sales ratio also experience higher changes in the productivity level. Subsidiaries in high technology intensity sectors exhibit significantly lower change in productivity than subsidiaries in other sectors.

KEYWORDS: Foreign subsidiaries, Slovenia, productivity, functional upgrading, control pattern

JEL classification: D20, F20, L20, O40

Introduction

The narrowing down of the productivity gap faced by new EU member states will be of major importance for their successful integration in the EU, i.e. for the real convergence of their economies. Foreign direct investment (FDI) has traditionally been treated as an important means of increasing the productivity of transition economies. The impact of FDI is mainly direct, i.e. through higher productivity of foreign subsidiaries, be they greenfields or acquisitions, rather than through growth of productivity in indigenous enterprises (Hunya 2000, Holland et al 2000, Jindra 2006, Dimelis and Louri 2002). Indirect effects of FDI as identified by econometric research suggest that horizontal spillovers are either absent or negative (Damijan et al 2003, Konings 2001, Jensen 2002, Gorg and Greenaway 2002). Vertical spillovers seem to be present (Damijan et al 2003, Smarzynska-Javorcik 2004) although wider evidence is needed.

In this paper we are interested in the processes of productivity growth and upgrading in the manufacturing foreign subsidiaries in Slovenia, how the changes happen and what are the determinants behind them. Specifically, we try to find answers to: What factors determine productivity growth in foreign subsidiaries? What types of subsidiaries in terms of competencies are present in Slovenia? What is the strategic, marketing and operational control of foreign parent companies? How do competency and control issues affect the productivity growth of subsidiaries? In conceptual terms, we approach the issue of productivity growth in FDI subsidiaries by building on the ‘developmental subsidiaries’ perspective (Birkinshaw and Hood 1998, Birkinshaw et al 1998, Birkinshaw 2001). In addition, our empirical research should contribute to the emerging literature that bridges the gap between international business and growth theories (Ozawa and Castello 2001).

This paper reports on results of research based on a questionnaire survey of 72 subsidiaries in the Slovenian manufacturing sector. Section 2 of the paper outlines the conceptual approach of the analysis. Section 3 explains the sample and its features. Section 4 reports on the results of the research based on descriptive analysis. Section 5 describes the model, explores the determinants of productivity growth in foreign subsidiaries and interprets the results. Section 6 concludes.

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 analyses this link through analysis of the costs and benefits of FDI, through estimates of spillovers and, at micro level, through linkages between growth and types of FDI (see Navaretti and Venables 2004 for a review). Beyond the initial investment, FDI may influence growth by raising total factor productivity in the recipient economy. This works through the linkages between FDI and foreign trade flows, the spillovers, and the direct impact on structural factors in the host economy. Most empirical studies conclude that FDI generally makes a positive contribution 'to both factor productivity and income growth in host countries, beyond what domestic investment normally would trigger' (OECD 2002, p. 13). It is, however, more difficult to assess the magnitude of this impact. Here, three issues attracted special attention. The first is the relation between foreign and domestic investment. The extent to which FDI enhances growth depends on the degree of complementarity and substitution between FDI and domestic investment (De Mello 1996). Cases of crowding out of domestic investment by FDI have been reported. The second is the importance of host country absorption capacity. FDI impact on growth varies considerably between developed and developing countries (De Mello 1997), although the beneficial effect of FDI is stronger in countries with an outward oriented trade policy than in those with an inward oriented policy (Balasubramanyam et al 1996). The third issue is that the ultimate impact of FDI on growth in the recipient economy depends on the scope for technological upgrading and knowledge/efficiency spillovers to domestic firms (De Mello 1997, Barrell and Pain 1997).

The main conclusions of this stream of literature as far as transition countries is concerned are that foreign subsidiaries are deepening trade linkages; that direct effects of FDI are the significantly higher productivity of acquired companies/greenfields than that 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).

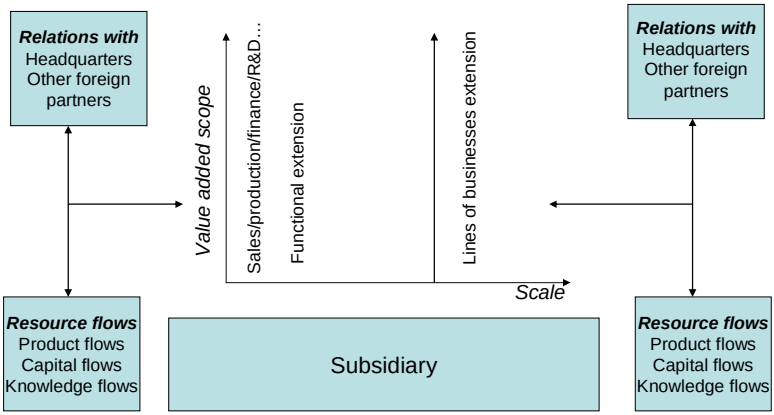
The above literature, however, does not deal with the process by which productivity is generated, i.e. the mechanisms by which subsidiaries grow and integrate into parent companies' networks, the latter being of our specific interest to us. To tackle this issue, the international business literature offers more solid grounds. The literature on subsidiary development is focused on the process through which multinational companies' (MNCs) subsidiaries enhance their resources and capabilities, and in so doing add increasing level of value to the MNC as a whole (for a review and conceptual analysis of subsidiary evolution see Birkinshaw and Hood 1998). The literature on subsidiary strategy (White and Poynter 1984, Bartlett and Ghoshal 1986, 1989, Young et al 1988, Birkinshaw and Hood 1998, Andersson and Forsgren 2000) has advanced our understanding of how MNCs operate. Heterogeneity in the role of subsidiaries has led to a view of MNCs as a 'differentiated network of subsidiaries' (Bartlett and Ghoshal 1989) which operate as 'quasi firms' (Tavares 1999) while the multinational enterprise (MNE) itself can be treated as an 'interorganisational network' (Roth and Morrison 1992).

This paper builds on the literature on subsidiary development by introducing the notion of subsidiary upgrading and linking it to productivity issues. Our focus is on productivity growth and its determinants in foreign subsidiaries, from the host country perspective. The host country perspective focuses on the micro basis of growth and hence could be defined as Porterian (Porter et al 2002). The approach that comes closest to our perspective is that of Young et al (1988) and 'developmental subsidiaries' in a regional development context. We focus on subsidiary autonomy and resource development (Penrose 1959). As the literature on subsidiary development suggests 'the subsidiary is a semiautonomous entity capable of making its own decisions but constrained in its action by the demand of head office managers and by the opportunities in the local environment' (Birkinshaw and Hood 1998, p. 780). This brings to the fore issues such as subsidiary's competencies and autonomy (or, *vice versa*, of a foreign parent company's control) as productivity growth factors. Types of competencies will affect the scope of productivity improvements. Subsidiaries that are strong in R&D and operate in growing high tech sectors are likely to record higher productivity rates than those that operate in low-tech areas and base their competitiveness only on production quality. In addition, the degree of

autonomy of subsidiary may also affect the scope for productivity growth. In subsidiaries that are tightly controlled in all their functions and are very dependent on the parent, local managers will not have the freedom to exploit the opportunities for productivity growth. Autonomous subsidiaries are more likely to be centres of excellence and highly productive enterprises.

Increases in productivity at subsidiary level have their equivalent in different forms of upgrading. Our conceptual approach, derived from the above theoretical considerations, is based on three forms of upgrading the position of subsidiaries and on several dimensions of integration of subsidiary into MNC network. A Subsidiary can upgrade its position through: (i) functional extension (sales, manufacturing, finance), i.e. by adding new mandates or functions and/or (ii) expansion of lines of business (for example, colour TV and audio-visual equipment), (iii) value added expansion by extending the scale of the existing mandate through sales and exports or new lines of business. Upgrading a subsidiary occurs through several dimensions, i.e. product flows, knowledge flows and capital flows. Mechanisms of subsidiary upgrading and productivity growth are the introduction of new functions and new lines of businesses (expansion of scope) as well as the expansion of the existing functions (expansion of scale). Figure 1 illustrates this conceptual approach.

Figure 1: Mechanisms of Productivity Growth via Subsidiary Upgrading: A Conceptual Model



In continuation, 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 static and dynamic modernisation

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

Second, differences between subsidiaries in their autonomy reflect differences in the tasks designated to them by parent companies. Subsidiaries differ in the extent to which they are only production units and in 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 business functions they control. Equally, the range of inherited capabilities could determine the degree of functional control.

Third, 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), points that 'the quality of the transferred technology depends not only on the recipient's absorption capabilities but also (or maybe even more so) on its marketing capabilities'. However, this probably greatly depends on the market orientation of the subsidiary. For exporters, a shift from production only to subsidiary with autonomous control of marketing functions is very difficult. For a local market seeking FDI marketing function is essential part of mandate. Here the situation for transition countries subsidiaries is probably similar to partial participation or production only participation of local firms from emerging markets in the transnational value chains (Craig and Douglas 1997). Marketing capabilities are linkage capabilities and thus may be crucial for breaking dependence on parent company.

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

In the context of the above conceptual approach, on the empirical level our main objective is to establish the productivity growth in foreign subsidiaries in the Slovenian manufacturing and to explore, the factors responsible for that productivity growth. To do that, we analyse the magnitude of productivity growth and other changes, the relationships of sample subsidiaries with their headquarters and the competence profile of subsidiaries. Specifically, we analyse the following parameters, which define the position and upgrading of the position 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, (iv) the main areas of competitiveness of foreign subsidiaries. All in all, our interest is specifically focused on the issue of the link between productivity growth and the division of control (autonomy) between a foreign parent company and its Slovenian subsidiary.

Methodology and Sample

The above conceptual framework has been tested using a 2 page 'Questionnaire for foreign investment enterprises'.[2] The questionnaire was sent to 209 manufacturing FIEs, representing 69.2% of all FIEs in the Slovenian manufacturing sector.[3] 72 questionnaires were returned which gives 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%. Response rate in high and medium-high technology industries is higher than in medium-low and low technology industries. In general, the sample questionnaire exhibits a high level of representativeness, although it is to some extent biased towards larger and technology more intensive FIEs. The main characteristics of the sample are:

- FIEs which answered the questionnaire, i.e. sample FIEs, represent 23.8% of all FIEs in the Slovenian manufacturing (population) and are responsible for 50.8% of their employment, 53.6% of fixed assets, 62.1% of sales and 64.2% of exports.[4] Sectoral distributions of sample FIEs also fits well to the sectoral distribution of all manufacturing FIEs.
- Sample FIEs include all sizes of firms (measured by number of employees) among which small and mediums sized FIEs prevail, i.e. 47.2% of them have between 51 and 500 employees, and 38.9% less than 51 employees.
- 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.
- The vast majority of sample FIEs are 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 equity.

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[2] *See questionnaire on http://www.iwh-halle.de/projects/productivity-gap/.*

[3] *They represent more than 95% of total manufacturing FIEs population in terms of fixed assets, sales, exports and employment.*

[4] *Sample FIEs are also a very relevant part of the overall Slovenian manufacturing sector; they holds 11.7% of its fixed assets, 8.4% of employment, 6.3% of sales and 21.7% of exports.*

- Intermediate goods are much more frequent products of sample FIEs than final products. Intermediate products are produced by as much as 76.4% of the sample firms, while final products are produced in 50.0% of cases. 26.4% of firms produce intermediate as well as final products. Such a pattern is linked to the predominantly factor cost advantages-seeking motivation of manufacturing foreign investors in Slovenia.

Productivity Growth of Sample FIEs and their Operational Characteristics – Descriptive Analysis

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

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

Changes and upgrading of activities in sample FIEs after the engagement of strategic foreign investors are 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, which brings the improvements in productivity of the invested-in firm and possibly a reduction in the productivity gap between the host and the investing country.

In the questionnaire, the changes were classified into five areas: changes in value of sales, changes in exports, changes in productivity levels, changes in technology levels and changes in quality levels. Table 1 suggests that foreign investors in general brought about positive changes in the companies. On average their engagement has resulted in change meaning slightly more than ‘increase’ (0,55; see note to Table 1 for the definition of the indicator). The magnitude of changes in all the areas has been on average pretty much the same. The latter is confirmed by Spearman's coefficients of 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 happen only in one or two areas but on a broad scale of a company's operations and with similar intensity. The highest correlation is 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.

Table 1: Magnitude of changes of individual areas since 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	OVER-ALL
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

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

An interesting feature, which comes out from Table 1 is that the magnitude of changes seems to decrease with the increase of FIEs technological intensity, i.e. the lower the technology intensity the higher the magnitude of change. This pattern is the most obvious as far as the increase in the level of productivity and of technology is concerned. The increase in productivity/technology level is the lowest in high technology industries and the highest in low technology industries, medium technology industries being in between. A possible explanation is that in low technology FIEs, there was more scope for the increase of productivity/technology levels than in high technology FIEs, the latter being less behind their competitors than the former. Still, absolute differences in the magnitude of changes among various categories of technological intensity are rather small.

Relationships of sample FIEs with their headquarters and local and foreign environment

The relationships of the sample FIEs with their headquarters and local and foreign environment 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 sales and supplies of FIEs.

Pattern of decision-making and control in subsidiaries. Table 2 presents a 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 foreign parent or mainly foreign parent. Based on our conceptual approach, we distinguish among thirteen business functions, which are grouped into three groups: operational, marketing and strategic.

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, followed by higher control in marketing and most of all in strategic functions. Since sample FIEs are on average highly export oriented (exports to sales ratio is 72.9%; see table 3) we may also expect foreign parent companies will want to retain a relatively higher level of control in the marketing functions. Table 2 fully confirms our expectations. Somewhat surprising may be the fact that, on general, the vast majority of business functions are undertaken only or mainly by the sample FIEs themselves. There is not a single business function, which would be predominantly undertaken only or mainly by 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 the highest control in the marketing functions could be explained by the high export propensity of FIEs.

Spearman's coefficients of 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 the others. If they are keen to exercise tighter control they do that in most business functions, and *vice versa*, if they exercise lower level of control this is the case in most business functions.

A comparison of decision-making and control pattern in FIEs in terms of technology intensity of industries gives a mixed picture. Indicators of foreign parents' influence on decision making (see note to Table 2) shows the highest foreign control in high technology industries followed by low technology industries, and somewhat lower level of control in medium-high and medium-low technology industries. It is normally expectated is that foreign parent would reduce its influence on decision making in FIEs by decreasing technology levels of an industry, but high indicator of foreign parents' control in low technology industries does not support this view. Obviously there are other more important factors, which 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 in medium-high technology industries exhibit lower than average levels of foreign parents' influence on product development and on strategic management and planning, which are rather important business functions for technological development. Low technology FIEs exhibit much above average foreign parents' influence in these two business functions. For strategic functions in general, foreign parents' control is the highest in the case of low technology FIEs (see Table 2).

Table 2: Who undertakes individual business functions in sample FIEs?

Business functions	Only/mainly FIE (%)	Only/mainly 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
Advertisement	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**

* Alternatively, this can also be called the indicator of subsidiary's autonomy. It is calculated in a way that answers »Only FIE« are weighted by 0.0, answers »Mainly FIE« are weighted by 0.33, answers »Mainly foreign parent company« are weighted by 0.66 and answers »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.

The structure of sales and supplies is very important variable for understanding the autonomy of business functions as well as patterns of upgrading. It also indicates FIEs integration in foreign parent companies' networks and FIEs' relationships with local and foreign environment. Most of the sales of the sample FIEs goes to 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 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 advantages-seeking motivation of foreign investors in Slovenian manufacturing (see Rojec et al 2000). Almost non-existing sales to other local subsidiaries of foreign owners indicates that foreign investors in Slovenia, as a rule, do not have more than one subsidiary. Only other Slovenian companies are relevant as local buyers (Table 3).

The structure of supplies of FIEs is to a certain extent a mirror image of the sales structure. Most of supplies come from abroad, however, the major foreign suppliers are not foreign parents but other foreign suppliers. Also, other Slovenian companies have a much more important role as suppliers than as buyers; they are the major 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 3).

There are considerable differences in supplies' pattern of FIEs in terms of technology intensity of industries in which they are engaged. High technology FIEs get many more supplies from their foreign parents, the opposite situation being the case 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 parent companies' network, on the sales as well as on the supplies side. Technology – 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 is a very important reason for internalisation (Table 3).

Table 3: Structure of sales and supplies of 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

Competence profile of sample FIEs and sources of their competitiveness

Increasing of competitiveness is the key issue related to reducing of productivity gap. In this context we explore how important are individual areas of competitiveness for FIEs. Four possible areas of competitiveness were put forward by the questionnaire: quality, patents and licenses and R&D, people and training, and management. Table 4 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 capacities. This is not surprisingly, knowing that in most manufacturing FIEs in Slovenia a relatively standardised technology is in use and that relatively few FIEs are in the 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 for low technology FIEs (see Table 4).

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

Table 4: Importance of various areas for competitiveness of 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

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

Model and Results of Econometric Analysis

Model

We have shown 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 might 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 interpreting results. The main features and operational characteristics of foreign subsidiaries explored in the descriptive analysis, are used as dependent and independent variables.

The model is used to assess the determinants of productivity growth[1] in foreign manufacturing subsidiaries in Slovenia. Based on the conceptual framework presented in Figure 1, which builds on the 'developmental subsidiary' perspective, we explore the relevance of control (corporate governance) and resource-based variables as determinants of subsidiaries' productivity growth. Corporate governance variables go beyond equity proxy by extending to the real control of individual business functions. Competence proxies encompass production and technology related variables.

We define the firm's productivity growth A_{it} as:

$$A_{it} = G_i(BF_{it}, F_i, CS_i, X_i, M_i, COMP_i, d_j) \quad (1)$$

where BF_{it} captures variables of control of business functions, and F_i through M_{it} are the other control variables - F_i is a dummy for majority or minority

[1] *Previous research on FIEs performance in Slovenia and comparative studies (see, for instance, Damijan and Rojec 2004, 2003, Damijan et al 3003) proved statistically significant difference betwen domestic and foreign owned firms in labour productivity and total factor productivity (TFP) in terms of level as well as in terms of growth. This study considers higher average initial productivity of FIEs in general, but focuses on explaining changes in productivity after the entrance of foreign investor in relation with other changes in FIEs (see equation 1). In order to measure the effect of changes in busines functions and competitiveness on changes in productivity and examine the importance of particular determinants the homogeneus normalised five-grademetric scale based on managerial perceptions was taken for all variables. Validity of perceptions in productivity changes (i.e. evaluation potential personal evaluation bias) was tested by comparing the estimates of changes in productivity based on perceptions with changes in labour productivity after foreign investors' entry calculated from financial statements data. We found positive and significant correlation. As the sample size of FIEs did not allow further breakdown in productivity level (and sting variables fit better in the model than numerical variable), the manegerial evaluation of productivity changes was taken as best available measure of productivity change.*

foreign ownership, CS_i is a dummy for the firm size, and $COMP_i$ captures variables denoting the importance of areas of competitiveness. With X_i *and* M_i, which refer respectively to export propensity (exports to foreign parent company or other foreign firms to sales ratio) and import propensity (ratio of imports from foreign parent company or other foreign firms to the material costs) of the firm, we tested for alternative sources of productivity growth in foreign subsidiaries. In addition, we allow for sector specific effects by including respective industry dummy variable d_j. Using all these control variables we try to isolate the possible impact of the control of business functions variables on the productivity growth of the subsidiaries. Probit model was used for estimation.

Spearman correlation coefficients between the variables of control for business functions show that all 13 variables are significantly correlated with each other and therefore not suitable for use in the model. We therefore created four group indicators for subsidiary's autonomy and used them as variables in the model. First, we used an overall indicator for a subsidiary's autonomy, calculated as the unweighted average of the indicators for 13 individual business functions (see note 1 to Table 6). Second, we grouped individual business functions in three groups, i.e. operational, marketing and strategic business functions, as proposed in Table 2. These three groups define operational, marketing and strategic autonomy of the subsidiaries. They are calculated as the unweighted average of the indicators for a subsidiary's autonomy in individual business functions in a particular group (see notes 2, 3 and 4 in Table 6). Since Spearman correlation coefficients for the three groups of business functions also show significant correlation (see Table 5), we use them alternatively in the regression model.

The creation of group indicators for subsidiary's autonomy thus provides us with four alternative group variables, which represent the key alternative variables in our model. Their main intention here 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 subsidiary's autonomy) of the individual group variable and the change in subsidiary's productivity. A dummy variable was included in the model to separate majority from minority foreign-owned subsidiaries, in order to discover 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 be an alternative proxy variable for foreign parent control/subsidiary autonomy in performing business functions. in that We would expect that foreign parent companies with a majority equity share exhibit greater control over the most important business functions of subsidiaries. This

is confirmed in Table 5, where overall autonomy, marketing and strategic autonomy show significant correlation with foreign equity share. This is taken into account in the model.

Table 5: 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

* indicates significance at 5% level

Using a probit model we tested whether the 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 variables need further explanation. For company size we constructed two dummies - for medium and large subsidiaries, small ones being the control group. For the equity share variable we constructed a dummy for

subsidiaries with majority foreign equity share, with subsidiaries with foreign equity share below 50% acting as the control group. For sector dummies we grouped subsidiaries according to the technology intensity of the sector they belonged to (high, medium high, medium low), subsidiaries in low technology intensity sectors acting as the control group.

Five alternative models (testing alternative areas of autonomy) are used in the estimation procedure. The differences between them are 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 overall autonomy of subsidiary, with and without foreign equity share is used, (3) in the third one the variable related to operational autonomy, with and without foreign equity share is used, (4) in the fourth one, the variable related to marketing autonomy, with and without foreign equity share is used, (5) and in the fifth one, the variable related to strategic autonomy, with and without foreign equity share was used. In all the models we use the same other control variables.

Results and discussion

In this subsection the variables denoting 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 foreign manufacturing subsidiaries in Slovenia. Based on equation (1), we estimate the following model:

$$a_i = b_i + \alpha_j f_{ji} + \delta F_i + \chi_k CS_{ki} + {}_l X_{li} + \gamma_m M_{mi} + \\ + \eta_n COMP_{ni} + \theta_o dums_{oi} + \varepsilon_i \tag{2}$$

where b_t 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 subsidiary's autonomy, δ measures the difference in productivity growth rates between subsidiaries with majority and minority foreign equity share, χ_k measures the difference in productivity growth rates between different sized subsidiaries, φ_l represent the impact of sales to foreign parent company or other foreign firms, γ_m represents the impact of purchases of intermediate inputs from foreign parent company or from other foreign sellers, η_n represent the impact of different areas of competitiveness, θ_o is parameter of sector dummy, while ε is the error term.

The results obtained are presented in Table 6 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 business functions is found to be one of the determinants of differences 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 the Slovenian manufacturing. The higher the foreign parent's overall control of business functions, as well as marketing and especially strategic functions, the higher the productivity growth in subsidiaries. Foreign parent companies seem to seek control of strategic and marketing business functions and leave operational control to the subsidiaries. This is as expected, since control of operational functions has no significant impact on productivity growth. We presume that this control pattern means maintenance of basically production-oriented mandate in subsidiaries for products shipped to parent or other foreign buyers.

In the basic model, which does not contain any variables for business functions' control, foreign equity share proves to have a significant and positive impact on 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 variables of business functions' control in the model, foreign equity share loses its significance almost completely; it is only in the model with operational autonomy, where the level of foreign equity share is significantly and positively related to productivity growth. The level of foreign equity share as such is, thus, not (or much less explanatory) a determinant of productivity growth, and 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 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 foreign equity share.

Table 6: 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	
		With foreign equity share	Without foreign equityshare	With foreign equity share	Without foreign equityshare	With foreign equity share	Without foreign equity share	With foreign equity share	Without foreign equity share
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Autonomy of 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)		
Startegic 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)	.2939005 (0.700)	.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)	**1.181968 (2.687)	**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)	**.6343125 (2.755)	**.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)	**5947218 (1.932)	*.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	-.0051931 (-0.878)	-.0090264 (-1.341)	-.009804 (-1.476)	-.0065898 (-1.060)	-.0077389 (-1.271)	-.0081915 (-1.239)	-.0088569 (-1.358)	-.0077723 (-1.254)	-.0083237 (-1.357)
Imports of interm. products from other foreign firms	-.0014106 (-0.180)	-.0029223 (-0.346)	-.0043232 (-0.519)	-.0026347 (-0.329)	-.0040877 (-0.520)	-.0018431 (-0.221)	-.0031489 (-0.383)	-.0053489 (-0.651)	-.0063721 (-0.786)
Quality control	.7598863 (0.795)	.5766136 (0.582)	.336969 (0.350)	.9566708 (0.968)	.5569246 (0.583)	.3829605 (0.388)	.0326343 (0.034)	.9769035 (0.999)	.8115212 (0.851)
Patents and licences	-.1013095 (-0.165)	-.2669526 (-0.396)	-.3572424 (-0.542)	-.1316194 (-0.215)	-.2520734 (-0.426)	-.2555861 (-0.380)	-.3621243 (-0.552)	-.2160861 (-0.346)	-.2825469 (-0.461)
People and training	.0971497 (0.098)	-.0668056 (-0.061)	-.244356 (-0.227)	.1281637 (0.129)	-.123716 (-0.127)	-.0743803 (-0.068)	-.2937226 (-0.273)	-.0993088 (-0.099)	-.2345587 (-0.237)
Management	.3004607 (0.297)	.4063309 (0.379)	.6889491 (0.668)	.1285967 (0.124)	.5214901 (0.526)	.5814359 (0.543)	.9682698 (0.950)	.2598874 (0.249)	.4636204 (0.461)

VARIABLE	BASIC MODEL With foreign equity share	MODEL WITH OVERALL AUTONOMY		MODEL WITH OPERATIONAL AUTONOMY		MODEL WITH MARKETING AUTONOMY		MODEL WITH STRATEGIC AUTONOMY	
		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
	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient	Coefficient
Sector dummy – high technology intensity	*-1.300509 (-1.822)	*-1.257646 (-1.724)	-1.094299 (-1.532)	-1.367809 (-1.887)	-1.14681 (-1.607)	*-1.306101 (-1.790)	-1.127828 (-1.577)	-1.056729 (-1.457)	-.8960678 (-1.286)
Sector dummy – medium high technology intensity	-.4423542 (-0.905)	-.347836 (-0.684)	-.2223303 (-0.449)	-.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)	.2469059 (0.423)	.4887599 (0.894)	-.0296298 (-0.054)	.3403559 (0.669)	.1432038 (0.249)	.3952035 (0.725)	.3426714 (0.589)	.5624791 (1.086)
Pseudo R^2	0.2342	0.2526	0.2405	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 5% and 10% level, respectively.

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

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 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 closer integration of subsidiaries in foreign parent companies network (measured by the share of subsidiary sales going to foreign parent company), the latter seem to be more eager to increase subsidiaries productivity levels. As a consequence, more technology and other knowledge/skills are transferred to subsidiaries.

Although the descriptive analysis put forward various areas of competitveness as being important for subsidiaries perfomance, most notably quality, management and human resources, the regression analysis does not confirm such a conclusion. None of the four variables related to areas of competitiveness, included in the regression, is significant for productivity growth of subsidiaries. This is in line with the high importance of foreign parent companies' control of business functions for subsidiaries' productivity growth. Foreign parent companies seem to take care of subsidiaries' competitiveness. The result may also reflect the need that single area of competitivness is not enough to influence productivity growth, but only a set of competitive areas.

In 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[1]. One reason for this is that the scope for productivity growth in low technology sectors has been much higher than in high technology sectors. Also, what constitute FDI in high tech sectors in Slovenia is mostly low value added value segments of these sectors. Achieving production capability in these sectors obviously does not suffice for increases in productivity.

[1] *This is also confirmed by some other analyses, which use different databases (financial statements of the total population of FIEs) (see Damijan and Rojec 2004) and which claim that productivity growth is higher in FIEs in low and medium-low technology industries.*

Conclusions

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

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

- 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 the 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 subsidiaries. Foreign parent companies seem to seek control of strategic and marketing business functions and leave operational control to subsidiaries themselves.
- The above pattern of control and productivity growth holds regardless of the inclusion of foreign equity share dummy in the model or not. The level of the foreign equity share as such is not a determinant of productivity growth, and 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 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 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 foreign parent company; subsidiaries with higher proportion of sales to foreign parent companies or to

other foreign buyers experience higher changes in productivity level. The third is that, in two variants of the model, subsidiaries in high technology intensity sectors exhibit significantly lower changes 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 wise - the higher 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 keep marketing and strategic control regardless of the equity share they have.

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