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Exploring Determinants of International Sourcing: Captive Offshoring vs. Offshore Outsourcing

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Abstract: The growing significance of international sourcing has been well documented and has spurred the emergence of extensive body of theoretical literature analyzing the organization of firms' activities on a global scale. Recent literature on integration strategies and global production sharing combines elements from international trade and industrial organization with the theory of the firm in order to explain endogenously the variety of organizational forms. Using the propositions of transaction costs and internalization, firm-specific advantages and location advantages, we examine the role of different factors as a determinant of the fragmentation strategy of Slovene firms. We evaluate how firm-level, industry-level and country-level characteristics influence the choice of sourcing mode (domestic sourcing, offshore outsourcing and captive offshoring) on recently conducted Eurostat survey.

Keywords: sourcing strategies, internationalization, captive offshoring, outsourcing, Slovenia

JEL Classification: M16

Introduction

The continuous globalization of the economy has pushed many enterprises to adopt international sourcing as a business model in order to retain competitive edge. Certain business functions that were previously performed in-house or sourced domestically to the resident subcontractor nowadays increasingly move to either non-affiliated or affiliated suppliers located abroad. These changes represent a challenge for

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traditional theoretical frameworks and measuring the intensity and scope of all new forms of international businesses involvement. Although international sourcing is increasingly performed as well as studied, firm-level analyses are still scarce (Mol, 2007; Quintens, 2006) and the lack of comparable studies keeps the assessment of determinants, magnitude and the impact of international sourcing difficult.

International sourcing is treated as complex foreign operation mode and existing empirical evidence show large differences in magnitude among countries (Eurostat, 2009; OECD, 2008). However, the use and varieties of foreign operation modes is increasing even in less developed economies, and complements the diversification in internationalization strategies.[1] Various firm-level, industry-level and country-level characteristics make international sourcing decision context-dependent, "existing" simple universal rules (like "outsourcing non-core activities") doubtful or false, and require integrated research in space and time. It is likely that the optimal degree of international sourcing vary much more than the optimal degree of domestic outsourcing, since the international sourcing depends more heavily on firm-specific factors like the level of internationalization, outward FDI presence, internal organization structure, access to resources and other industry and country (institutional) factors. Understanding complexity, determinants and patterns of international sourcing thus remains a challenge for shaping international business strategies and creating the incentives by policymakers.

The aim of this study is to explore the determinants of international sourcing on the case of Slovene firms in the context of the complex process of business process fragmentation that spans along various dimensions such as nationality, type of the relationship, and the choice of location. Rapid internationalization in the last fifteen years, transition towards a market economy, restructuring of "traditional" manufacturing corporate sector and integration of Slovenia into EU offer opportunity to test the relevance of determinants in the initial stages and trace the development of international sourcing strategies in rapidly changing international environment.[2] Unique data set is constructed for this purpose, linking the Eurostat survey of outsourcing, detailed national firm-level data, and several international data sources. It allows exploring firm-level heterogeneity and the relationship between firm characteristics, outside business environment and sourcing strategies.

Literature Review: What are the Major Determinants of International Sourcing?

International sourcing has become recognized as an important subject of research in the theoretical and empirical literature in the last years (Feenstra, 1998; Campa and Goldberg, 1997; Hummels, Ishii and Yi, 2001; Yeats, 1998, Mol, 2007). Although

international sourcing is not a new subject of research, definitions of international sourcing (Eurostat, 2007, Hijzen, Görg and Hine, 2004) or offshoring (Antras, 2007; OECD, 2007; Biemans and Van Leeuwen, 2006) still differ in most of the existing literature. In our study international sourcing refers to relocation or movement of (core or support) business functions currently conducted in-house to either unaffiliated (external suppliers) or affiliated enterprises located abroad and is in line with the definition used by Eurostat (2007), Helpman (2006) and others. In our study we distinguish between domestic and international sourcing, between international sourcing of core and support activities, between different types of international sourcing (captive and arm's length) and between the locations of international sourcing activities. Making a distinction between alternative modes of international sourcing enables a better insight in the complexity of the phenomenon and the understanding of various determinants of firms' international sourcing activities.

The evidence on international sourcing can be mostly found on the industry level and only few studies have used microeconomic or plant level data to analyze this issue, where they have mostly focused on the manufacturing sector. This study is one of the first to use firm level data for both manufacturing and services sectors in Slovenia in order to analyze the determinants of offshoring and its relationship with firms' heterogeneity, industry characteristics and country-specific factors.

The theoretical background of international sourcing can be found already in international trade theories of Smith and Ricardo, theories of international production, multinational firms and FDI, as well as in the theory of the firm. Firms' boundaries have been explored in vast theoretical literature that can be applied to international sourcing: the Transaction Cost Theory by Coase (1937) and Williamson (1975, 1985), the Hold-up problem by Klein, Crawford and Alchian (1978) and Grout (1984), Property rights theory of the firm by Grossman and Hart (1986), Hart and Moore (1990) and Hart (1995) and Theory of incentive system by Holmstrom and Milgrom (1991, 1994) and Holmstrom (1999) and other theories, such as Agency theory (Ross 1973, Jensen and Meckling, 1976), Team theory (Alchian and Demsetz, 1972) and the Resource-based Theory (Penrose, 1959; Wernerfelt, 1984, 1995). These theories can give us an important understanding of determinants of international sourcing and their relationship with the firm's decision to relocate its production of inputs and services outside of its national and firm boundaries.

In our study we focus on firm heterogeneity as a determinant of the international sourcing strategy. Literature suggests a number of determinants of international sourcing at the firm level, with the size, productivity and ownership status as one of the most evident. Other determinants in this group include firm capital intensity, average wages (proxy for skill and capital intensity), export status, financial dependence and profitability. It has been recognized that the decision to engage in international trade and organization of production, as well as the decision to source

internationally is determined by the size of the firm (Görg and Hanley, 2004; UNCTAD and Roland Berger, 2004; Tomiura, 2004), since larger firms tend to relocate part of their production process or service abroad more often that smaller firms.

Recent extended empirical studies that focus on the role of productivity in international sourcing strategies emphasize the growing importance of the role of offshoring for enhanced productivity, achieved through rationalization of the production process, restructuring of firms' activities or through external knowledge spillovers from foreign affiliates or external suppliers to firms in the domestic market. In the empirical literature, positive impacts on productivity from international sourcing of materials (Görzig and Stephan, 2002; Görg and Hanley, 2005; Girma and Görg, 2002) and services (Görg and Hanley, 2003; Criscuolo and Leaver, 2005; Girma and Görg, 2002) on the firm level are well documented. In the literature we can also find positive impacts of international sourcing at the industry level, where Amiti and Wei (2005, 2006) find positive impacts on productivity from material and services sourcing, while Egger and Egger (2001) find positive impact on productivity from international sourcing materials only in the long term and Egger et al. (2001) in general.

The impacts of international sourcing on productivity can differ considering the ownership status of the firm (Görg, Hanley and Strobl, 2005). Firms that belong to international groups enjoy greater productivity gains from international sourcing than exporting firms (the first enjoy productivity gains at international sourcing of materials and services, while the latter enjoy productivity gains only at international sourcing of materials). Heterogeneity of firms therefore affects the impact of international sourcing on productivity as well as other determinants of international sourcing. Ownership status influences not only the impacts of international sourcing on productivity but also the decision to source itself, since firms that are part of larger groups tend to source internationally more often than firms, that are not part of enterprise groups (Heshmati and Pietola, 2007).

In the recent literature we can find various determinants of international sourcing, whether it is taking place inside or outside of enterprise groups. Ge, Konan and Tanriverdi (2004) support the decision to source inside or outside of enterprise groups according to the stage in the business cycle of the production process and claim that firms tend to source outside of enterprise groups when the production process is already at the mature level in its business cycle, when small asset specificity and rich firm experiences are present and in the environment of low risk, low strategic vulnerability and greater competitive pressures. Antras (2005) also focuses on the level of maturity of technical products when deciding to source internationally outside of enterprise groups and finds that a firm should source new and non-standardized products inside of enterprise groups because that provides

more control over incomplete contracts, while sourcing of mature products should take place outside of enterprise groups. High R&D intensity as well has been identified as incentive for integrated (internal) vertical integration (Teece 1986, Williamson, 1985). Kotabe and Murray (2003) next find that service firms tend to decide to source inside of enterprise groups according to firms' sensibility to tacit knowledge.

The interaction of firms characteristics and its decision on the mode of international sourcing of activities is being explored also by Antrŕs in Helpman (2003, 2007), claiming that in the presence of incomplete contracts the decision on sourcing inside or outside of enterprise groups is determined by interaction between firms productivity, intensity of its production factors and contract environment on foreign markets. Firms that are dependent on intermediate products will opt for internalization when cooperation with independent firm in the locations of weak contract environment presents high hold-up costs. Also Grossman and Helpman (2002) claim that the decision to source outside of enterprise groups (arm's length) will take place in highly competitive markets due to cost advantages.

In the theoretical and empirical literature we can find diverse evidence on certain determinants of international sourcing, such as firm-level average domestic wages and employment as well as profitability. Empirical evidence on the effects of international sourcing on increased average domestic wages and employment are found in Sethupathy (2008), while Falk and Wolfmayr (2005) find support for the decreased average wages and employment. Evidence on increased profitability (Kotabe and Swan, 1994; NAPA, 2006; Sethupathy, 2008), where impacts of international sourcing of materials on profitability are positive (Görzig and Stephan, 2002; Görg and Hanley, 2004) and negative (Marjit in Mukherjee, 2005) are available, while impacts of international sourcing of services on profitability were found negative in the study by Görg and Hanley (2004). An important determinant of international sourcing on the firm level is also the main activity of firms, which is demonstrated by the focus of the empirical literature on the firms in the manufacturing sector (Görzig and Stephan, 2002; Amiti and Wei, 2005, 2006; Biemans and van Leeuwen, 2004; Tomiura, 2004). Other explanatory variables of firm's sourcing strategy such as export status or the level of internationalization of the firm are identified in Ge, Konan and Tanriverdi (2004). The decision on the mode of international sourcing depends on the position of the firm in the value chain and the characteristics of the industry (Oberoi and Khamba, 2005).

In this paper we focus also on the determinants of international sourcing at the industry level, where our aim is to examine the role of product characteristics and industrial structure on the choice of international sourcing strategy as well as other determinants, such as headquarter intensity, R&D intensity, technological intensity, and the presence of scale economies.

An important determinant of international sourcing at the industry level are product or service characteristics, especially the standardization or personalization of products and services and the complexity of production processes (Karmarkar, 2004), complexity of the product and services (Tadelis, 2002), the level of the cycle (Abraham and Taylor, 1996) and specialization of business activity (Carr et al., 2001). Karmakar (2004) finds that only standardized services in simple production process should be sourced internationally outside of enterprise groups mostly to cut costs, while personalized services and standardized services in complex production processes should be sourced inside enterprise groups and only certain non-profitable activities should be sourced to independent firm. According to Trefler (2005), routine and well defined activities should be sourced to independent firms, while activities that are more difficult to define should be sourced inside the firm boundaries. Similarly Tadelis (2002) claims that complex products should be sourced inside the firms' boundaries, while simple products should be sourced on the market.

Studies of determinants of international sourcing at the country level, may include factors, such as market size (Grossman, Helpman, Szeidl, 2006, Eicher and Kang, 2005), factor differentials (Grossman and Helpman, 2003, 2005, 2006), capital endowment and skilled-labour endowment, GDP p.c., rule of law, IP rights (Datar, 2005; A.T. Kearney, CAPS Research, 2005; OECD, 2007), FDI restrictions, amount of credit to the private sector/GDP, net interest margin, transport costs (Eicher and Kang, 2005), distance to provider (Lacity et al., 1996; Dritna, 1994; Feenstra and Spencer, 2005; OECD, 2007), ICT infrastructure development (Amiti and Wei, 2004), the development and usage of broadband access (Bartel, Lach and Sicherman, 2005; Click and Duening, 2004), market thickness (Grossman and Helpman, 2005), institutional quality, financial development and other location characteristics. The entry mode decisions of multinational firms to foreign markets have been studied by Eicher and Kang (2005) who found that the decision is influenced by the size of the market, fixed costs of FDI, trade tariffs and transport costs. They found acquisition of firms to be present in greater extent in larger markets, the middle-size markets were dominated by exports (even when high trade tariffs are present), while FDI were mostly present in small markets.

Location characteristics, such as tax and other financial incentives (Deardorff, 1998), trade barriers, especially tariffs (Deardorff, 1998; Eicher and Kang, 2005), legal and administrative characteristics (Helpman, 2006; Ge, Konan and Tanriverdi, 2004), linguistic and cultural differences (OECD, 2007; Ge, Konan and Tanriverdi, 2004) and other characteristics are also found as important determinant of firms' international sourcing decision.

Data and ethodology

The Sample

The dataset used in this analysis combines two sources of firm level data: survey on international sourcing and financial statements collected by Agency of the Republic of Slovenia for Public records and Related Services (AJPES) that also serve as source for calculating some of the industry indicators. Country-level and industry-level variables taken from various different sources are described in detail in the Appendix.

The pilot survey on the reasons, extent and consequences of international sourcing[3] was conducted by the Statistical Office of the Republic of Slovenia from March to July 2007 as part of the Eurostat surveys and is one of the first attempts to estimate the extent of international sourcing in the EU. Twelve countries have launched an ad-hoc survey to establish statistical evidence of the phenomena. The survey results reveal that international sourcing is most common among Irish, UK, Danish, Finnish and Slovenian enterprises (Eurostat, 2009).

The stratified sample in Slovenia includes 962 medium-sized and large enterprises[4] and 856 enterprises responded (Table 1). The sample used in probit and nested logit analysis is restricted to around 350 units due to incomplete responses. In search of location determinants not only the most frequently used locations[5], but all 48 host countries that were identified within survey were used in analysis. Figure 1 illustrates the structure of the sample by location and mode of international sourcing. Number of sample enterprises using particular sourcing mode and location is reported. The unit of analysis in further models, created in order to consider the type of sourced business function when studying determinants, is particular business function within firm (function – firm).

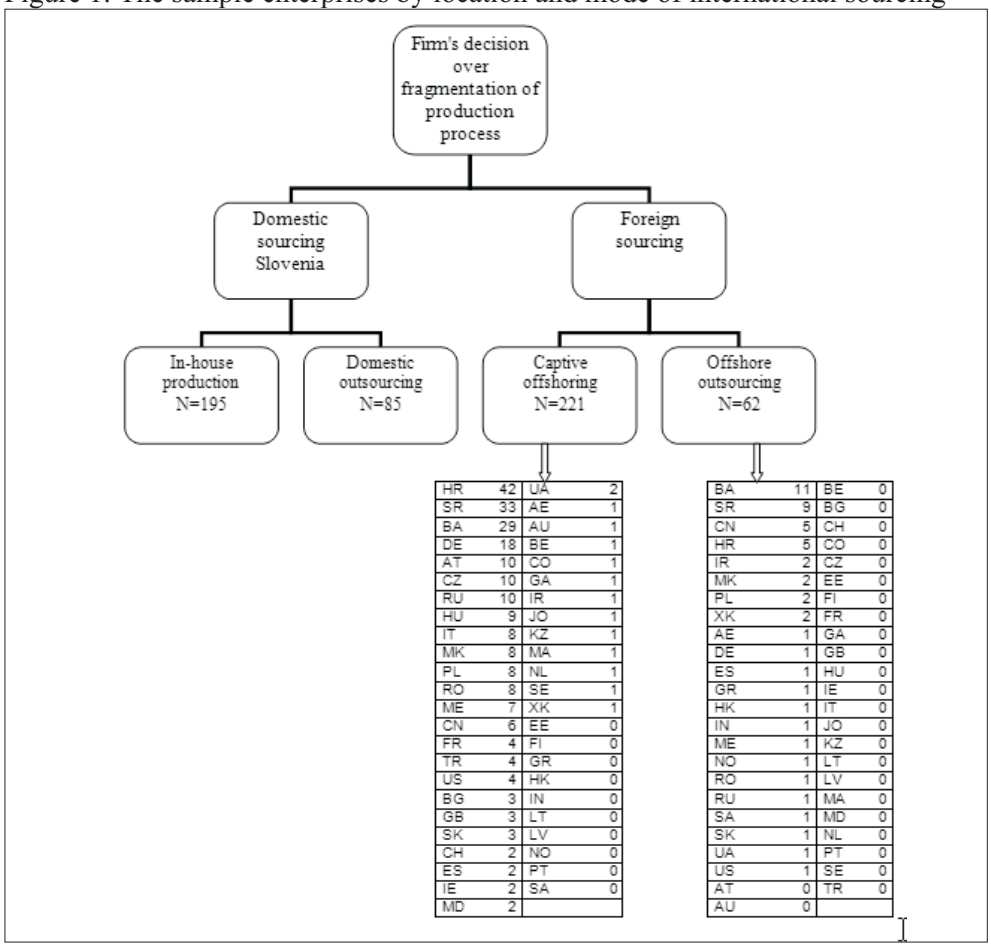
Table 1: Sample enterprises by activities

	Sample framework		Sample		Respondents	
NACE rev 1.1	No. of enterprises (over 50 employees)	No. of employees	No. of enterprises (over 50 employees)	No. of employees	No. of enterprises (over 50 employees)	No. of employees
C	7	3031	5	2.891	4	2.797
D	732	169.925	488	142.600	440	136.619
E	53	9.878	34	7.856	32	7.315
F	178	25.070	105	18.270	86	16.625
G	217	46.089	141	39.270	127	36.150

H	56	8.982	37	7.198	33	6.616
I	87	32.396	72	30.996	67	30.439
K	148	24.791	80	18.055	67	16.016
Total	1.478	320.162	962	267.136	856	252.577

Source: Statistical Office of the republic of Slovenia.

Figure 1: The sample enterprises by location and mode of international sourcing



Note: Only fifteen most frequently reported host countries were included in the analysis.
Source: Statistical office of the Republic of Slovenia, own calculations.

Methodology

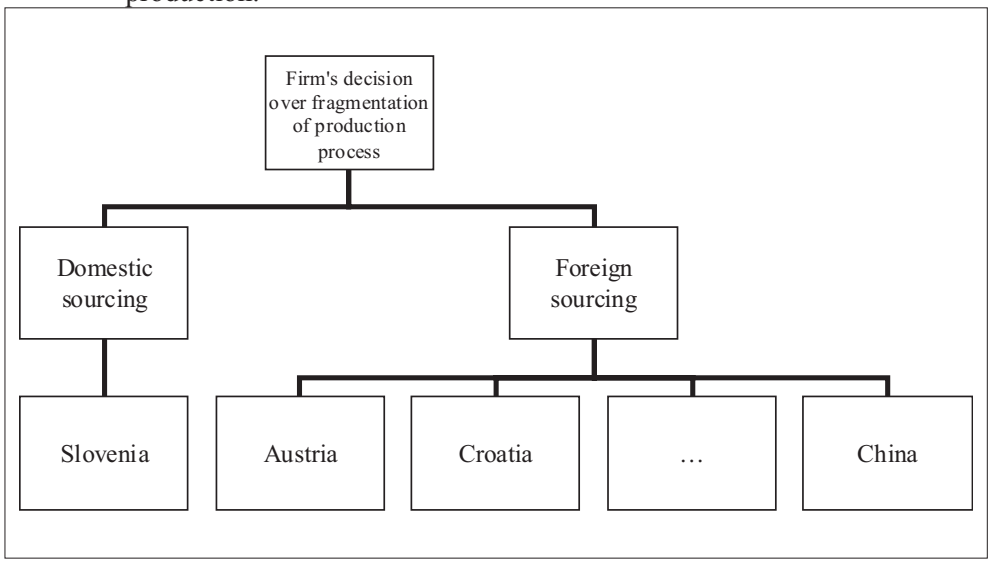
To model the choice of sourcing mode of Slovene firms with respect to type of sourcing and location, a discrete choice analysis is implemented here. A two-level nested logit framework is adopted since it enables us to relax strong assumptions of the multinominal or conditional logit model. The assumptions concerned are the ones of independently distributed errors and the independence of irrelevant alternatives inherent in the alternatives to the nested logit models. The basic idea of nested multinominal logit models is to extend the conditional logit model in order to allow groups of alternatives (nests) to be similar to each other in an unobserved way, in other words, to have correlated error terms.

In the upper level, firms are considering two modal choices: domestic sourcing and foreign sourcing (offshoring). In the bottom level, offshoring mode is further broken into 48 locational choices, identified in the survey. Assuming inappropriately that the random errors are independent would result in forcing the odds ratio of any two alternatives (for example domestic sourcing and sourcing to Austria) to be independent of the other alternatives (for example sourcing to Italy), a property known as the independence of irrelevant alternatives (IIA). Suppose that when a firm is considering an optimization of the value added chain, its sector suddenly gets pressed by low import prices. The unobserved shock (being squeezed from the market due to foreign competition) would raise the likelihood that the firm chooses to fragment part of its production process to one of the foreign locations, so the choice between two alternative foreign lower-cost locations would be much more relevant than the choice between a Slovenian subcontractor or in-house production. Nested logit model thus relaxes the IIA and allow us to group alternatives for which unobserved shocks may have concomitant effects. The structure of the nested logit model is shown below. It should be pointed that the classification of alternatives regarding their similarities into nests and the resulting tree structure does not have anything in common with a stochastic valuation of alternatives as the nested logit models do not define the process of decision making. We perform the utility maximization nested logit (UMNL) instead of the non-normalized nested logit (NNNL) because the former was shown to be consistent with random utility maximization as shown by McFadden (1977, 1981) and confirmed on the simulated data by Silberhorn, Boztug and Hildebrandt (2007).

As can be seen from the comparison of Figures 1 and 2, the structure of the decision tree in the nested logit is more simple than the one in Figure 1 because the method precludes identical bottom-level alternatives (for example Croatia under captive offshoring and Croatia under offshore outsourcing mode). Hence, we had to restrict our decision tree in a way that we bundled together arm's length and vertical integration strategies under the foreign sourcing choice. Nevertheless, to explore the

choice between the location (domestic vs. foreign sourcing) and type of sourcing (outsourcing vs. captive sourcing), we also performed the probit analysis of the two decisions.

Figure 2: Nested logit tree structure of firm's decision about fragmentation of production.



The Explanatory Variables

Explanatory variables comprise firm characteristics, industry variables, and country variables. In the upper level, firm's decision about domestic vs. foreign sourcing is modelled as a function of eight variables. Five of them are firm-specific and include: productivity in terms of value added per employee relative to the corresponding 3-digit industry average (rval), capital intensity relative to the corresponding 3-digit industry average (rkl), size as measured by the number of employees (emp), export dummy (ex_dummy), and financial liabilities in total assets (finliab_assets). Dummies for type of business functions (presented in Figure 3) are used (relatively to production function) in every estimation. The remaining three explanatory variables, presented in detail in Apendix, are industry-specific ad include: dummy indicating high-tech and medium-high-tech industries (hi_medhi_tech), industry R&D intensity relative to sales (rdind_med), and 75'th percentile employment in the corresponding 3-digit industry (pct75emp), a measure for the economies of scale.

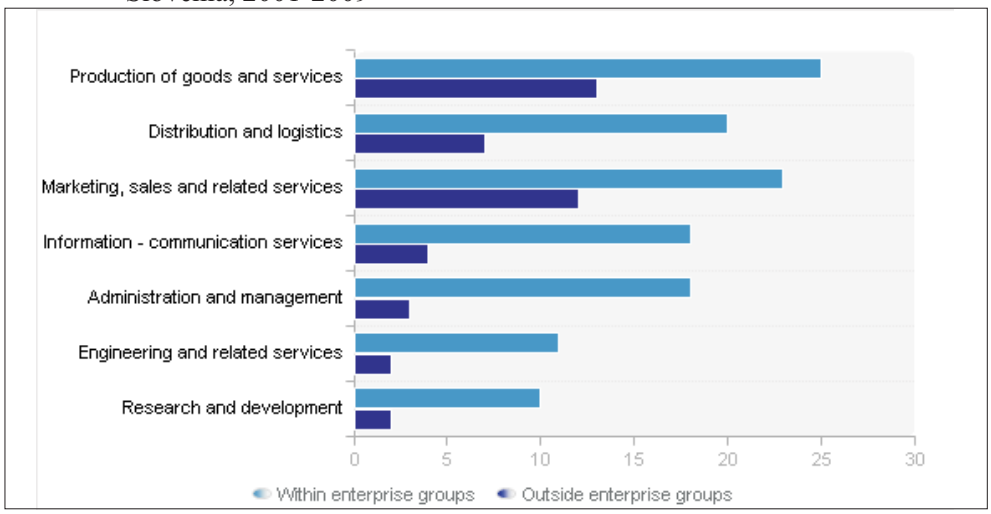
At the bottom level, the decision over specific location is modelled as a function of 13 country attributes, measuring the attractiveness of the location. These include gross national income per capita (gnipc), distance from Ljubljana to foreign capital (distance), dummy for common land border (border), dummy for overseas location (overseas), common historical and cultural links (links), dummy for EU membership (EU), time required to start a business (timebusiness), roads paved as % of total roads (roadspaved), market capitalization of listed companies as % of GDP (marketcapit), Index of economic freedom (econfreedom), private credit by deposit money banks and other financial institutions as % of GDP (privatecredit), the share of postsecondary educated in working-age population (highereduc), and the number of internet users per 100 people (internet). Unless stated otherwise in the Appendix, all the country data is for the year 2006.

Empirical Findings

In the period from 2001 to 2006, 21 % of Slovenian medium-sized and large enterprises sourced their business activities to foreign markets. The dynamics of international sourcing increased from 2001-03 to 2004-06, both in number of enterprises and volume of activities sourced abroad. Most of the enterprises that sourced their activities to foreign markets were from the manufacturing sector (that also has longer tradition of exporting, international subcontracting and investments abroad) while enterprises from services sector sourced less internationally.

The analysis of international sourcing revealed the pattern of sequential /evolutionary internationalization (as predicted by Uppsala School) identified also in other studies of Slovenian outward internationalization process (Jaklič and Svetličič, 2003; Burger et al., 2006). International sourcing frequently follows other less demanding entry modes like export and foreign direct investment (FDI) and serves as a tool for further diversification of foreign operation modes. International sourcing is more frequently used among exporters and enterprises with FDI. Sourcing within enterprises (captive outsourcing) is also more common within than outside enterprise groups. As many as 75% of all the enterprises, that sourced their activities internationally, sourced them within the enterprise group. Enterprises involved in offshore outsourcing frequently have previous experience with offshore outsourcing. Exploring the differences between in determinants of captive offshoring versus offshore outsourcing is thus particularly relevant. Enterprises sourced mainly the production of goods and services (core activity), as well as marketing, sales and similar services, distribution and logistics (Figure 3).

Figure 3: International sourcing, within and outside of enterprise groups (captive offshoring versus offshore outsourcing) by business function (in %), Slovenia, 2001-2009



Source: Statistical Office of the Republic of Slovenia.

Sequential pattern may be also found in geographical distribution since the proximity (cultural and physical) and historical ties seem important. The most frequently used host destinations were Serbia and Croatia, followed by Bosnia and Herzegovina, Germany and Austria.

First analysis of the survey (Čirjakovič, 2009) showed that the main motivation factor for the decision to carry out international sourcing was improved competitiveness, access to new markets, position on the market and reduction of costs.[6] Motivation for international sourcing differs especially according to the level of internationalization. Motives of exporters (without direct investments and not part of international groups) significantly differ from motives of non-exporters. Exporters were significantly more motivated by reducing labour costs, and other costs, by concentrating on core competences, by lack of skilled employees, lack of knowledge, more flexible foreign environment, and strategic reasons. MNEs (enterprises with inward or outward FDI) are significantly more motivated by access to new markets, following the competitors, concentrating on core activities, improving logistics and competitiveness, more flexible business environment, market position, and strategic decisions. Motivations also differ by location and mode of sourcing. Improving logistics, better market position, more flexible business environment and tax optimization are significantly more important motives for sourcing on foreign markets (compared to domestic sourcing). Less significant are differences in motives between captive offshoring and arm's length sourcing (offshore outsourcing). Arm's

length international sourcing is significantly more driven by increasing competitiveness and reducing other costs compared to captive offshoring (within enterprise group). Slovenian firms estimated that international sourcing had a positive impact on their operation and contributed to their competitive advantages. More than half of Slovenian companies estimated, that international sourcing had no impact on the employment in their enterprise. The main barriers were overall concerns that the sourcing operation would exceed the expected benefits, the high risk of sourcing internationally and a lack of management resources and know-how (Čirjakovič, 2009).

The results of the nested logit estimation are presented in Table A1 in Appendix. Interestingly, none of the determinants came out significant. For example, distance does not appear to influence the choice of the host country since the most frequent country choices are situated in the medium range from Slovenia (Serbia, Bosnia and Herzegovina, and Germany) whereas less frequent choices are neighbouring countries as well as more distant ones. Insignificance of determinants may also be the result of sample structure. Firms that responded to the survey on international sourcing are above average in terms of productivity, size, export intensity and R&D intensity (see Burger, 2009) and thus limit variation in the studied variables. As a rule, the response of less productive, smaller and less internationalized enterprises is lower[7], while more successful and more internationalized enterprises are more diligent respondents. If firm productivity affects the probability of choosing foreign sourcing to domestic production with a decreasing intensity, then the sample attrition in favour of more productive firms puts a negative bias on the coefficient. To alleviate this sample bias problem, we intend to experiment with weights that will put more weight on underrepresented cohorts of firms in terms of productivity, size or value added.

To delve deeper in the analysis of sourcing choice, we also perform three separate probit regressions that focus on the choice between domestic and foreign sourcing on one hand and the choice between captive and arm's length arrangements on the other hand. Table 2 shows the results of the probit regression on the determinants of choosing domestic vs. foreign sourcing. While capital intensity and export orientation come out insignificant firm-level productivity and firm size proved as significant determinant of sourcing decision. Greater the productivity reduces the probability for international sourcing. Similar is the influence of firm size, larger enterprises more likely source domestically. Financial liabilities relative to total revenues is also statistically significant. Firms with higher debt-revenue ratio are on average more likely to choose foreign sourcing. It must be noted, however that this variable is not an ideal indicator of firm's financial constrain since it rather shows the outcome. Highly leveraged firms are obviously not financially constrained, yet for the low-leverage firms one cannot say whether this is an outcome of deliberate choice

or financial constraints. Apart from indebtedness, also several industry-level variables showed influence. The headquarter intensity variable (median firm's value added over sales in the corresponding 3-digit industry), scale economies and technological intensity variables turns out significant.

Table 2: The determinants of firm's choice about the location of sourcing (domestic vs. foreign sourcing).

Probit regression — Number of obs = 1651; Wald chi2(17) = 201.12; Prob > chi2 = 0.0000; Log pseudolikelihood = -789.72451; Pseudo R2 = 0.1193

y_where	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
val	-.0000103	5.28e-06	-1.94	0.052	-.0000206	9.40e-08
rkl	.0004754	.0018097	0.26	0.793	-.0030716	.0040225
emp	-.0002653	.0000986	-2.69	0.007	-.0004585	-.0000721
ex_sales	-.1049632	.1310105	-0.80	0.423	-.3617391	.1518126
finobv_pro~a	.0064491	.0013103	4.92	0.000	.0038809	.0090172
pct75emp	-.0023647	.0010494	-2.25	0.024	-.0044214	-.000308
medvasales	.8968614	.3832522	2.34	0.019	.1457009	1.648022
hitech	.8773891	.3094809	2.84	0.005	.2708176	1.483961
medhitech	.4981601	.1831696	2.72	0.007	.1391542	.8571659
rdind_med	-5.589011	5.078284	-1.10	0.271	-15.54227	4.364243
por_kapitala	.0181558	.0677351	0.27	0.789	-.1146025	.1509141
_Ifunkcija_2	-.0777599	.1188749	-0.65	0.513	-.3107504	.1552307
_Ifunkcija_3	.2923161	.113475	2.58	0.010	.0699093	.5147229
_Ifunkcija_4	-.6086936	.1338925	-4.55	0.000	-.871118	-.3462692
_Ifunkcija_5	-.4161635	.1279561	-3.25	0.001	-.6669528	-.1653741
_Ifunkcija_6	-1.110943	.161169	-6.89	0.000	-1.426828	-.7950576
_Ifunkcija_7	-.9406998	.1503462	-6.26	0.000	-1.235373	-.6460266
_cons	-.6321832	.1578517	-4.00	0.000	-.9415669	-.3227996

Note: y_where: (0=domestic, 1=foreign)

Probit regression — Number of obs = 80416; Wald chi2(23) = .; Prob > chi2 = .; Log pseudolikelihood = -1295.2595; Pseudo R2 = 0.1846

chosen	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
timerequir~s	-.0090654	.0048612	-1.86	0.062	-.0185931	.0004624
marketcapi~p	.0020189	.0020487	0.99	0.324	-.0019966	.0060343
distance	-.0006956	.000155	-4.49	0.000	-.0009993	-.0003919
border	1.029716	.1598421	6.44	0.000	.7164315	1.343001
overseas	.5129983	.3220707	1.59	0.111	-.1182487	1.144245
links	1.137181	.5042051	2.26	0.024	.1489575	2.125405
eu	2.150378	.5735476	3.75	0.000	1.026245	3.274511
indexofeco~e	.1197045	.0244351	4.90	0.000	.0718126	.1675964
ruleoflaw	.0215622	.0147334	1.46	0.143	-.0073147	.0504391
regulatory~y	-.1930263	.0249269	-7.74	0.000	-.2418821	-.1441705
controlofc~n	.0203785	.0151258	1.35	0.178	-.0092676	.0500247
politicals~y	.0332403	.0076926	4.32	0.000	.0181631	.0483174
government~s	.0553335	.0149939	3.69	0.000	.025946	.0847211
postsecond~b	-.0318988	.0104485	-3.05	0.002	-.0523775	-.0114201
privatecre~s	.0170178	.386503	0.04	0.965	-.7405142	.7745498
internetus~e	-.0224142	.0067856	-3.30	0.001	-.0357136	-.0091147
gnipercapi~o	-.0000166	.000016	-1.04	0.301	-.0000479	.0000148
gnipppcurr~l	5.39e-13	6.24e-14	8.64	0.000	4.17e-13	6.61e-13
_Ifunkcija_2	-.0465933	.0812556	-0.57	0.566	-.2058514	.1126648
_Ifunkcija_3	.1000696	.0749425	1.34	0.182	-.0468151	.2469543
_Ifunkcija_4	-.1667822	.0869032	-1.92	0.055	-.3371094	.0035451
_Ifunkcija_5	-.1620064	.0862761	-1.88	0.060	-.3311044	.0070917
_Ifunkcija_6	-.4203024	.1065539	-3.94	0.000	-.6291443	-.2114606
_Ifunkcija_7	-.4163414	.1068073	-3.90	0.000	-.6256799	-.207003
_cons	-4.949451	1.551643	-3.19	0.001	-7.990617	-1.908286

Note: Variables used in the second probit estimation are:

Distance
Border dummy

Overseas dummy
Historical links dummy
EU member dummy
Time to start business
Index of economic freedom
Rule of law index
Regulatory quality index
Control of corruption index
Political stability index
Government effectiveness index
Market capitalization of listed companies
Post-secondary education
Private credit by banks / GDP
Internet users
GNI p.c.
GNI PPP $

Source: own calculations.

Scale economies decrease probability for international sourcing. Technological and headquarter intensity on the other hand increase probability for international sourcing. R&D intensity relative to sales contrary to expectations come out insignificant. Using dummies for exploring variations by business functions also revealed significant differences; marketing is more likely sourced in foreign markets than production function, while other business functions (see Figure 3) are (relatively to production) more likely sourced domestically.

In further investigation several location determinants appeared significant in sourcing decision. EU membership (EU), common historical and cultural links (links) and common land border (border) proved to be the most important location determinants, followed by Index of economic freedom (econfreedom). Distance from Ljubljana to foreign capital (distance) and time required to start a business (timebusiness) as well as the share of postsecondary educated in working-age population (highereduc) and the number of internet users per 100 people (internet) significantly reduce probability for international sourcing. Roads paved as % of total

roads (roadspaved), market capitalization of listed companies as % of GDP (marketcapit), private credit by deposit money banks and other financial institutions as % of GDP (privatecredit) show no significance. Market size (GNI PPP) and the government effectiveness index are also significant incentives for sourcing internationally. Surprising is result for regulatory quality index, which suggest poor regulation as incentive for international sourcing. This might be transition specific phenomenon related to specific knowledge of transition enterprises able to operate in environment with poor institutions. Insignificance of corruption variable enforce this explanation.

The choice between captive and arms' length arrangements appears to be significantly correlated with capital intensity, debt-revenue ratio, R&D, headquarter and technological intensity and also scale economies. Captive offshoring is more likely with higher capital intensity and indebtedness. More capital intensive firms relative to industry average are more inclined to choose partners within group for their foreign sourcing operations. In line with the findings of Antras and Helpman (2004) also headquarter and R&D intensity tends to favour captive outsourcing. Economies of scale (variable pct75emp) more likely lead to offshore outsourcing arrangements. Industries with more pronounced economies of scale tend to be more inclined towards arm's length sourcing. Relatively to production ICT is more likely sourced within enterprise groups.

Table 4: The determinants of firm's choice about the type of sourcing (captive vs. arm's length sourcing).

Probit regression — Number of obs = 298; Wald chi2(13) = 44.17; Prob > chi2 = 0.0000; Log pseudolikelihood = -74.479095; Pseudo R2 = 0.2819

y_how	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
val	-.0000106	.0000347	-0.31	0.760	-.0000786	.0000574
rkl	-.9060761	.2638708	-3.43	0.001	-1.423253	-.3888988
emp	.0009195	.0008999	1.02	0.307	-.0008443	.0026833
ex_dummy	-.0381689	.321584	-0.12	0.906	-.6684619	.5921241
findov_pro~a	-.0079916	.0033526	-2.38	0.017	-.0145626	-.0014206
pct75semp	.0344542	.0074934	4.60	0.000	.0197675	.0491409
medvasales	-7.675011	1.813823	-4.23	0.000	-11.23004	-4.119983
medhitech	3.045835	.8941652	3.41	0.001	1.293304	4.798367
rdind_med	-78.71257	34.03492	-2.31	0.021	-145.4198	-12.00535
por_kapitala	-.1582905	.3492775	-0.45	0.650	-.8428619	.5262808
_Ifunkcija_2	.0254885	.323937	0.08	0.937	-.6094164	.6603934
_Ifunkcija_3	-.1109275	.2986895	-0.37	0.710	-.6963481	.4744932
_Ifunkcija_4	-1.205233	.5392063	-2.24	0.025	-2.262057	-.1484076
_cons	1.746359	.7691522	2.27	0.023	.2388482	3.253869

Source: own calculations.

Conclusions

The analysis of international sourcing on the case of Slovenia, one of ex transition economies and recent new EU member states, shows increasing dynamics of this operation mode from 2001 to 2009 both in number of enterprises, host countries involved as well as activities sourced. The survey revealed sequential pattern in line with the Uppsala school predictions and the importance of previous internationalization experience, like export and/or FDI. Vast majority (75%) of international sourcing takes place within the enterprise group.

Motivations for international sourcing differ especially according to the level of internationalization. Exporters (compared to non-exporters) are significantly more motivated by motives that determine access to resources and labour-cost and other cost reduction. MNEs, on the other hand, are (compared to non-MNEs) significantly more motivated by improving logistics, competitiveness, and a number of strategic positions (defending market share, value chain optimization, and following competitors). Motivations also differ by location and mode of sourcing. Improving logistics, better market position, more flexible business environment and tax optimization are significantly more important motives for sourcing on foreign markets (compared to domestic sourcing). Less significant are differences in motives between captive offshoring and arm's length sourcing (offshore outsourcing). Arm's length international sourcing is significantly more driven by increasing competitiveness and reducing other costs compared to captive offshoring (within enterprise group).

Several country specific determinants were proven as significant for international sourcing. EU membership, common historical and cultural links and common land border proved to be the most important location determinants. Distance, time required to start a business significantly reduce probability for international sourcing. The same is valid for the share of postsecondary educated in working-age population and the number of internet users per 100 people which suggest the activities sources abroad currently are not knowledge intensive. Market size and the government effectiveness index are significant incentives, but surprisingly also poor regulation reveals as incentive for international sourcing. This might be transition specific phenomenon related to specific knowledge of transition enterprises able to operate in environment with poor institutions. Insignificance of corruption variable enforce this explanation.

More detailed investigation of international sourcing decision confirmed the relevance of firm- specific assets and explain the prevalence of captive offshoring. The decision about the second dimension of sourcing strategy, the type of sourcing relationship, appeared to be driven by three factors: economies of scale, relative capital intensity, R&D and headquarter intensity. Captive offshoring is more likely

with higher capital intensity, higher indebtedness, higher headquarter and R&D intensity. Industries with more pronounced economies of scale tend to be more inclined towards arm's length sourcing.

Outsourcing processes are complex and decision makers attempt to consider multiple rationalities and determinants simultaneously. Current analysis leaves many questions open, however, it establishes the base for future research. The data set that has been created from the detailed survey and financial accounts information enable in-depth further analyses on reasons and determinants as well as impacts and effects of international sourcing.

NOTES

[1] The new member states have become important suppliers of intermediate goods to several key EU producers. Their inputs are therefore increasingly vital to the competitiveness of final goods exports from other EU countries. In addition, EU10 countries are themselves expanding their sourcing of intermediate goods abroad, both within the Union and globally. Thus on the one hand EU10 companies are becoming more important sources for industries in other EU countries, while they themselves are becoming more globalised, taking advantage of greater openness both within the EU and towards the rest of the world to better integrate their production structure.

[2] As a new EU member state (NMS) Slovenia is one of the countries that have become important suppliers of intermediate goods to several key EU producers. Their inputs are therefore increasingly vital to the competitiveness of final goods exports from other EU countries. In addition, NMS are themselves expanding their sourcing of intermediate goods abroad, both within EU and globally. Thus on the one hand EU10 companies are becoming more important sources for industries in other EU countries, while they themselves are becoming more globalised, taking advantage of greater openness both within the EU and towards the rest of the world to better integrate their production structure (see also Curran and Soledad, 2009)

[3] International sourcing (offshoring) is defined as a total or partial movement of business functions (core or support business functions) currently performed in-house or currently domestically sourced by the resident enterprise to enterprises located abroad.

[4] All large enterprises (250 or more employees) and 57% of medium sized enterprises (50-249 employees) were included in the sample. Small enterprises (below 50 employees) were excluded from the survey as preliminary research showed very poor sourcing activity. Such methodological framework enables international comparisons with other countries included in the Eurostat survey.

[5] Austria, Bosnia and Hercegovina; Czech Republic, Croatia, Italy, China, Hungary, Macedonia, Germany, Poland, Romania, Russia, Serbia, USA and UK.

[6] 19 different motives were evaluated with 1-5 grade scale. .

[7] It would be useful to consider this fact in sampling when repeating the survey on internationa sourcing in the next years.

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