ECONSTOR
Make Your Publications Visible.

A Service of

ZBW Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Marin, Dalia

Working Paper

A New International Division of Labor in Europe: Offshoring and Outsourcing to Eastern Europe

Munich Discussion Paper, No. 2005-17

Provided in Cooperation with:
University of Munich, Department of Economics

Suggested Citation: Marin, Dalia (2005) : A New International Division of Labor in Europe: Offshoring and Outsourcing to Eastern Europe, Munich Discussion Paper, No. 2005-17, Ludwig-Maximilians-Universität München, Volkswirtschaftliche Fakultät, München, https://doi.org/10.5282/ubm/epub.714

This Version is available at:
https://hdl.handle.net/10419/104167

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN
VOLKSWIRTSCHAFTLICHE FAKULTÄT

Dalia Marin:

A New International Division of Labor in Europe: Offshoring and Outsourcing to Eastern Europe

Munich Discussion Paper No. 2005-17

Department of Economics
University of Munich

Volkswirtschaftliche Fakultät
Ludwig-Maximilians-Universität München

Online at http://epub.ub.uni-muenchen.de/714/

A New International Division of Labor in Europe:
Outsourcing and Offshoring to Eastern Europe*

Dalia Marin
University of Munich

September 2005

Abstract

Europe is reorganizing its international value chain. I document these changes in Europe's international organization of production with new survey data of Austrian and German firms investing in Eastern Europe. I show estimates of the share of intra-firm trade between Austria and Germany on the one hand and Eastern Europe on the other. Furthermore, I present empirical evidence of the drivers of the new division of labor in Europe. I find among other things that falling trade costs and falling corruption levels as well as improvements in the contracting environment in Eastern Europe are affecting the level of intra-firm imports from Eastern Europe. They are also favoring outsourcing over offshoring. Low organizational costs of hierarchies and large costs of hold-up (when there are no alternative investors in Old Europe or no alternative suppliers in Eastern Europe) are favoring offshoring over outsourcing. Tax holidays granted by host countries in Eastern Europe also mildly affect the organizational choice.

JEL classification: D23; D51; F11; L14; O11.
Keywords: the empirics of global sourcing, intra-firm trade, contract enforcement, comparative advantage in Eastern Europe, empirical test of the theory of the firm

*Acknowledgement: Paper prepared for the Papers and Proceedings of the European Economic Association Congress, Amsterdam, August 2005. We thank participants of the session "The Empirics of Global Sourcing" for helpful comments and Thorsten Hansen and Alexander Raubold for excellent research assistance. Financial support by the German Science Foundation through GESY SFB/TR 15 and through a research grant is gratefully acknowledged.

Department of Economics, Ludwigstrasse 28, 80539 Munich, phone: ++4989/2180-2446, fax: ++4989/2180-6227, e-mail address: dalia.marin@lrz.uni-muenchen.de

1. Introduction

In the last decade a new division of labor has emerged in the world economy. The international division of labor is characterized by firms geographically separating different production stages across the world economy to exploit differences in production costs. Thus, firms organize their activity in a global value chain. With Eastern Enlargement Europe is reorganising its international value chain. European firms outsource and offshore production to Eastern Europe. As a result, Eastern Europe is becoming an important location for European firms' international organisation of production. This paper raises three issues. First, why do firms organize in an international value chain? Second, what is the extent of outsourcing and offshoring to the new member states (New Europe), to the countries of the next enlargement round (Bulgaria, Romania, Croatia) and to the Former Soviet Union including Russia and Ukraine? Third, what determines empirically the level of offshoring and the organizational choice between offshoring and outsourcing Eastern Europe? To address these questions the paper makes use of new firm survey data of 660 German and Austrian firms with 2200 investment projects in Eastern Europe during the period 1990 to 2001. The new survey data represent 100 percent of Austrian and 80 percent of German direct investment in Eastern Europe.[1]

1. Outsourcing versus Offshoring

Why do firms organize in an international value chain? The firm decides over two things. First, how much control does she want to have over the firm activity. Should the firm produce inside or outside of the firm boundaries. Second, where should she locate production, at home or abroad. These two decisions lead to the phenomenon of 'international outsourcing' or 'offshoring'. International outsourcing is a relocation of activity outside the firm to an independent input supplier in New Europe. Offshoring is a relocation of activity to New Europe which remains inside the firm.

The benefit of organizing an activity inside the firm is that the headquarter has more control over the activity and a stronger incentive to provide headquarter services. The costs of hierarchies, however, are the loss of the initiative of middle management. The benefit of organizing an activity outside the firm by outsourcing to an independent input supplier is that it promotes the incentives and the initiative of the input supplier. However, it involves the cost of hold-up due to incomplete contracting. The

[1] For more details on the data see Marin (2004).

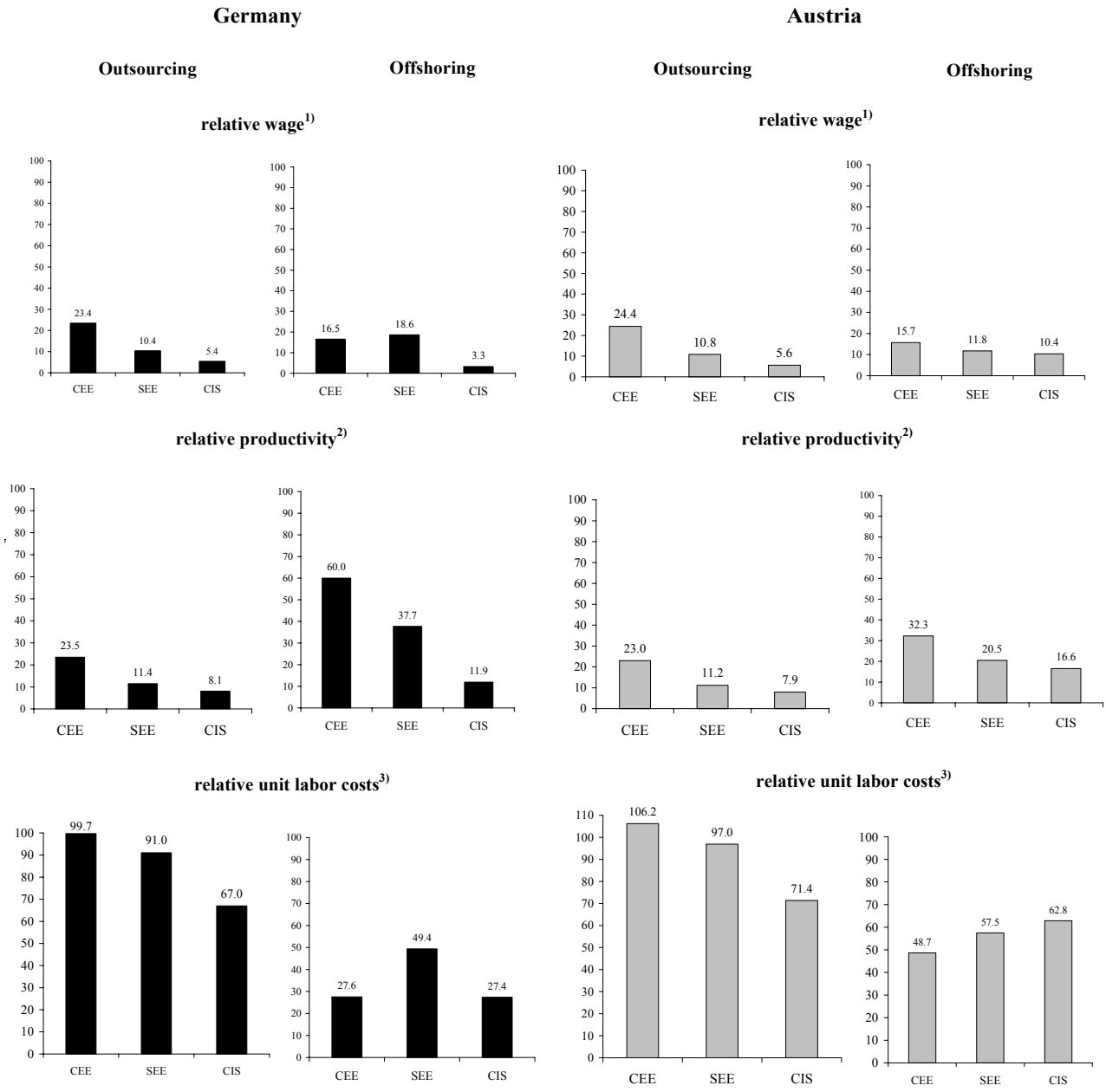
firm chooses to offshore when the net gain from organizing the activity inside the firm outweighs the costs, i.e. when headquarter services are more important than the incentives of the input supplier on the one hand and when the loss of the initiative of management workers is less severe than the hold-up problem on the other. The firm chooses to outsource when the reverse is the case. Furthermore, the firm chooses the location with lowest production costs (including wages, transport costs, and the cost of contracting). Hence, a European firm will relocate activity inside or outside of firm boundaries to New Europe when unit labor costs there are lower compared to Old Europe.[2] The question is how much can a European firm save in terms of labor unit costs when it decides to offshore or outsource to Eastern Europe?

In Figure 1 I compare relative wages, relative productivity, and relative unit labor costs under outsourcing and offshoring, respectively between Austrian and German firms on the one hand and New Europe (CEE), the candidate countries of the second round (SEE), and the countries of the former Soviet Union (CIS), respectively on the other. I focus first on Germany. It appears from the left panel of Figure 1 that under outsourcing wages in New Europe are about 23 percent of those in Germany, while these countries' productivity level has reached about 23 percent of Germany's productivity level. As a result, under outsourcing labor unit costs in New Europe are the same as in Germany. These costs can, however, be substantially reduced when German firms offshore rather than outsource and produce the input in a German affiliate in New Europe. Figure 1 reveals that German affiliates in New Europe pay 17 percent of German parent wages but are increasing their productivity to 60 percent of the parents' firm productivity level. Hence, under offshoring they can reduce the labor unit costs by 72 percent relative to their parent firms' cost in Germany.

Under outsourcing to the SEE countries (Romania, Bulgaria, Croatia) both wages and productivity are low so that unit labor costs are 91 percent of Germany's unit labor costs. Under offshoring, German firms can reduce labor unit costs to 84.2 percent of their parent German firms' costs only, since producing locally in SEE does not help to increase productivity as much as in New Europe. In the CIS (Russia, Ukraine) offshoring helps to reduce labor unit costs much more compared to outsourcing (to 35 percent versus 67 percent of the German level) due to the low wages paid by German affiliates in this region. Hence, German offshoring to New Europe and to the CIS is particularly attractive due to the high productivity level of German affiliates in New Europe and due to the low wages of German affiliates in the CIS. The right panel of Figure 1 gives the data for Austrian firms with a similar pattern of relative costs as among German firms.

[2] For the different global sourcing strategies see Antras (2003), and Antras and Helpman (2004), for the costs of hierarchies in the world economy see Marin and Verdier (2003, 2005), for the extent of the division of labor, see

Figure 1. Comparative Advantage of Outsourcing and Offshoring to Eastern Europe



Source: The Vienna Institute for International Economic Studies (wiiw); Statistisches Bundesamt; Statistik Austria; Chair of International Economics, University of Munich, firm survey of 2200 investment projects in Eastern Europe by 660 firms

[1)] outsourcing: average wage (wage bill per employee) in Eastern Europe relative to Germany and Austria, respectively, in 2001
offshoring: average wage (wage bill per employee) of affiliates in Eastern Europe relative to parent firms in Germnay and Austria, respectively; for Austria in 1999-2000, and for Germany in 1997-2000

[2)] outsourcing: GDP per employment in Eastern Europe relative to Germnay and Austria, respectively, in 2001
offshoring: sales per employee of affiliates in Eastern Europe relative to parent firms in Germany and Austria, respectively; for Austria in 1999-2000, and for Germany in 1997-2000

[3)] outsourcing: wage bill divided by GDP in Eastern Europe relative to Germany and Austria, respectively, in 2001
offshoring: wage bill divided by sales of affiliates in Eastern Europe relative to parent firms in Germany and Austrisa, respectively; for Austria in 1999-2000; for Germany in 1997-2000

Acemoglu, Antras, Helpman (2005).

3. Eastern Europe – A New Member in the International Division of Labor?

We have just seen that by saving labor costs, it pays for a firm to relocate activity to Eastern Europe, particularly in the form of offshoring. But, how important is outsourcing and offshoring to Eastern Europe? One way to answer this question is to look at the pattern of intra-firm trade with Eastern Europe. In Table 1 I define an offshoring investment when a parent firm in Germany or Austria is exporting input goods to its affiliate in Eastern Europe as well as is importing these goods back from its affiliate in Eastern Europe after refinement. Thus, offshoring investments involve an intra-firm export from the parent firm in Germany or Austria to its affiliate in Eastern Europe as well as an intra-firm import from the affiliate in Eastern Europe to Germany or Austria. [3]

Table 1. Offshoring to Eastern Europe[1)]

	Austrian	German
	Firms in percent[2)]	
CEE	**17.12**	**46.68**
Baltic States	3.11	28.43
Czech Republic	11.73	75.95
Hungary	10.19	27.18
Poland	41.54	14.50
Slovak Republic	9.94	68.71
Slovenia	15.49	12.44
SEE	**12.06**	**55.68**
Bulgaria	2.99	71.94
Romania	24.20	63.68
other SEE	8.46	14.29
CIS	**42.11**	**29.15**
Russia	67.90	26.59
Ukraine	16.14	17.11
other CIS	3.72	49.36
Total Eastern Europe	**17.27**	**45.44**

Source: Chair of International Economics, University of Munich, firm survey of 2200 investment projects in Eastern Europe by 660 firms
[1)] parent firms export intermediate goods as well as import intermediate or final goods from their affiliates in Eastern Europe; A tighter criterion for outsourcing requiring that parent firms import at least 20 percent of their Eastern European affiliates' output (rather than import at all) reduces the German multinationals' outsourcing numbers for the Czech
[2)] of all foreign direct investments in respective Eastern European country.

I focus first on Germany. From Table 1 we see that on average 45 percent of German investment to Eastern Europe fulfill these criteria and are offshoring activities of German firms. The importance of offshoring investment becomes, however, much larger for individual Eastern European countries. Offshoring dominates among German investment in the Czech Republic, Bulgaria, Slovakia, and Roma-

nia (a share of around 70 percent). It plays little role in Slovenia and Poland. Offshoring to Eastern Europe is much less important among Austrian firms. Only 17 percent of Austrian investment to Eastern Europe are offshoring investments. There is again considerable variation across individual countries with 68 percent of offshoring investment in Russia and 42 percent in Poland. [4]

Finally, the data allow me to calculate for the first time the share of intra-firm trade - international trade that takes place inside the multinational corporation between parent firms in Germany and Austria, respectively and their affiliates in Eastern Europe. This is given in Table 2. It turns out, that intra-firm trade with Eastern Europe is a dominant phenomenon in Austria (68.5 percent of Austria's imports from Eastern Europe are goods from Austrian affiliates in Eastern Europe to their parent firms in Austria and 22.4 percent of Austria's exports to Eastern Europe is trade within the multinational enterprise), while it is not very important for Germany's trade with Eastern Europe (only 21.6 percent of imports and 11.7 percent of exports to EE are intra-firm trade). However, there is considerably variation across individual countries with a share of 65 percent of Germany's imports from Slovakia and a share of 34 percent of its export to Slovakia as intra-firm trade.

[3] For different measures of offshoring and outsourcing see Hummels et al (2001) and Hanson et al (2001).
[4] The reason for this difference between Germany and Austria is that in Germany 56.5 percent of offshoring investments to Eastern Europe are in the manufacturing sector, while in Austria they are mainly in services (71.7 percent), in particular in banking and financial services.

Table 2. Intra-Firm Trade in Total Trade with Eastern Europe

	Austria [1]		Germany [2]	
	share of intra-firm exports in total exports to Eastern Europe [3]	share of intra-firm imports in total imports from Eastern Europe [4]	share of intra-firm exports in total exports to Eastern Europe [3]	share of intra-firm imports in total imports from Eastern Europe [4]
	in percent			
CEE				
Baltic states	13.95	n.a.	5.19	14.41
Czech Republic	19.67	42.17	6.83	15.64
Hungary	20.03	136,47 [5]	11.95	40.46
Poland	41.08	64.91	17.77	15.34
Slovak Republic	26.11	54.71	34.01	64.98
Slovenia	18.70	48.36	3.32	9.38
SEE				
Bulgaria	3.36	11.32	2.30	4.20
Croatia	16.08	40.40	1.78	1.95
Romania	22.72	57.46	3.86	7.17
CIS				
Russia	34.57	26.70	4.94	1.67
Ukraine	12.00	21.52	4.51	2.44
total	**22.40**	**68.52**	**11.67**	**21.56**

Source: Chair of International Economics, University of Munich, firm survey of 2200 investment projects in Eastern Europe by 660 firms, Statistik Austria, Statistisches Bundesamt

[1] For Austria total trade with Eastern Europe is the average of 1999-2000, since the numbers of intrafirm exports and imports from the firm survey are from these years. The survey information on intrafirm exports and imports varied greatly for individual countries in Eastern Europe due to missing cases. In order to make the intrafirm trade numbers comparable with total trade with Eastern Europe, we artificially reduced total exports and imports by the number of missing cases of intra-firm exports and imports for individual Eastern European countries. Exports and imports from Eastern Europe, respectively, are reduced by a factor of (0.17, 0.10) for the Czech Republic, by (0.51, 0.39) for Hungary, by (0.26, 0.24) for Poland, by (0.58, 0.30) for the Slovak Republic, by (0.55, 0.20) for Slovenia, by (0.48, 0.47) for Bulgaria, by (0.38, 0.11) for Croatia, by (0.62, 0.47) for Romania, and by (0.74, 0.62) for Russia. For the Baltic States and for Ukraine total trade is not reduced because of no missing cases.

[2] For Germany total trade with Eastern Europe is the average of 1996-2000, since the numbers of intrafirm exports and imports from the firm survey are from these years. The survey information on intrafirm exports and imports varied greatly for individual countries in Eastern Europe due to missing cases. In order to make the intrafirm trade numbers comparable with total trade with Eastern Europe, we artificially reduced total exports and imports by the number of missing cases of intra-firm exports and imports for individual Eastern European countries. Exports and imports from Eastern Europe, respectively, are reduced by a factor of (0.63, 0.50) for the Baltic States, by (0.13, 0.00) for the Czech Republic, by (0.60, 0.40) for Hungary, by (0.87, 0.52) for Poland, by (0.10, 0.00) for the Slovak Republic, by (0.57, 0.35) for Romania, by (0.64, 0.34) for Russia, and by (0.75, 0.00) for Ukraine. For Slovenia, Bulgaria, and Croatia total trade is not reduced because of no missing cases.

[3] intermediate inputs delivered by parent firms to Eastern European affiliates

[4] intermediate or final goods delivered by Eastern European affiliates to parent firms for marketing or further reprocessing

[5] Austria's share of of intra-firm imports in total imports from Hungary exceeds 100% due to one particular large investment for which we could not disentangle goods delivered to the parent firm in Austria from those goods delivered to the parent firm in Singapore.

In sum, the pattern of intra-firm trade that has emerged between Germany and Eastern Europe on the one hand and Austria and Eastern Europe on the other, suggests that some of the Eastern European countries like Hungary, Poland, the Czech and Slovak Republic, Romania, Bulgaria and Russia have clearly become new members in the international division of labor.[5]

[5] For the impact of the new international division of labor on the skill premia in Germany, Austria and Poland, respectively, see Marin and Raubold (2005), Lorentowicz, Marin, Raubold (2005), for its impact on unemployment in Austria and Germany, see Marin (2004). For the pattern of skill offshoring to Eastern Europe see Marin (2004), Marin, Lorentowicz, Raubold (2003).

4. Determinants of Offshoring and Outsourcing

What forces are driving the new international division of labor which is emerging in Europe? In section 2 I briefly summarized the factors determining the choice of organization. The firm will allocate power to the headquarter (offshoring) when the headquarter's supply of services is more important than the input supplier's incentives to deliver a specialized input for a certain price, since the party with control captures a larger fraction of the surplus and thus will have higher powered incentives to supply its services. Furthermore, the firm will allocate power to the headquarter when the organizational costs of hierarchies are less severe than the cost of hold-up. The fall of communism and the prospect of Eastern Enlargement resulted in a fall in trade costs and in the level of corruption as well as in an improvement in the contracting environment in the new member states increasing the attraction of this region as a location for European firms' activities.[6]

To determine the choice of organization in Eastern Europe I am running two types of regressions. First, I am estimating the determinants of the share of intra-firm imports from the affiliate in Eastern Europe in percent of parent firms' sales in Austria and Germany, respectively (the level of offshoring) given in Table 3. Second, I am showing probit estimates of the choice between outsourcing and offshoring by German firms given in Table 4. As a proxy for the importance of headquarter services I use the variable *R&D in percent of sales* of parent firms. The dummy variable *Aalternative* captures the hold-up problem faced by German or Austrian investors. The hold-up problem is severe when there are no alternative suppliers in Eastern Europe for the German investor. *Property rights* is an alternative measure for the hold-up problem and captures the effectiveness of contract enforcement in Eastern Europe. *Workers' initiative* is a proxy for the organizational costs of hierarchies. The more decentral the decision making in the firm, the larger are the costs of organizing an activity inside the firm. This will be so, because firms choose a less hierarchical organization to avoid the costs of losing the initiative of their skilled workers.[7]

Turning to the right panel of Table 3, I find that in Germany intra-firm imports from Eastern Europe are the larger the more labor intensive (the smaller the capital to labor ratio *K/L)* and the more R&D intensive the German parent firm, the lower are the organizational costs of hierarchies (the more central the parent firm's decision making), the lower are transport costs (as measured by distance), the

[6] Marin and Schnitzer (1995, 2002) and Nunn (2005) show that incentive problems and the contracting environment affects the pattern of trade as well.

lower is the ratio of affiliate to parent wages, when contract enforcement is weak in the Eastern European country, and finally when the German firm cannot choose between alternative input suppliers in the host country. These results suggest that German firms want to offshore to a low wage country (and thus intra firm imports are larger) when labor costs matter and transport costs are not too high. We know from Figure 1 that German firms can reduce labor costs most effectively by offshoring rather than by outsourcing. The risk of hold-up is larger in countries with weak contract enforcement which increases the costs of organizing the activity outside the firm. The other measure of hold-up *Aalternative* appears, however, not to be significant at conventional levels, while the cost of hierarchies variable *workers' initiative* is highly significant. The other variables suggested by theory like the productivity dispersion among German firms and the ratio of affiliate to parent wages (see Antras/Helpman 2004) appear not to be significant.

The left panel of Table 3 shows the results for Austrian firms with some striking differences. Austrian firms do more offshoring when they are less rather than more R&D intensive and when they are capital intensive rather than labor intensive. This is so even when controlling for the fact that Austria's investments to Eastern Europe are mainly in banking and financial service industries. Moreover, Austrian parent firms import the more from their affiliates, the more R&D intensive are their affiliates in Eastern Europe.[8] Hold-up (*property rights, Aalternatives,* not shown*)* and organizational costs (*workers' initiative*) are not significant, while tax holidays granted by the host country and the productivity dispersion among firms in Austria both significantly affect the level of intra-firm imports.

I turn now to the choice of organization between outsourcing and offshoring by German firms in Table 4. By choosing between outsourcing and offshoring, the firm decides over the amount of control she has over the activity in Eastern Europe. I use the German firm's control stake in its Eastern European affiliate to distinguish between outsourcing and offshoring. I define as an outsourcing activity when the German parent firm's ownership share in the subsidiary in Eastern Europe is less than 30 percent and as an offshoring activity when it is more than 30 percent. With the parent's controlling stake of less than 30 percent, the relationship between the parent and affiliate firm resembles more an arms length transaction than a transaction inside the firm.[9] German outsourcing to Eastern Europe relative to offshoring is more likely, the more capital intensive and the less R&D intensive the German firm,

[7] See Marin and Verdier (2003,2005) for the reasoning.
[8] These results are consistent with the fact that Austria is human capital poor relative to Eastern Europe and thus offshores the skill intensive stages of production to Eastern Europe, see Marin (2004), for its effect on the skill premium in Austria, see Lorentowicz, Marin, Raubold (2005).
[9] I follow this procedure, since I do not have separate data on outsourcing. My data include offshoring investments with an ownership share of the parent company between 10 percent and 100 percent (fully owned subsidi-

and the larger are transport costs. These results are consistent with the estimates on intra-firm imports in Table 3. Moreover, outsourcing relative to offshoring is more likely when the host country has a low level of corruption, and when the hold-up problem is mild and the input supplier in Eastern Europe can choose between several alternative investors from old Europe. Both tend to lower the costs of organizing an activity outside the firm. Finally, larger firms (as measured by the number of workers) with larger organizational costs tend to favor outsourcing, while the most productive firms (relative to the industry average) tend to favor offshoring over outsourcing.

ary). Typically, national banks define an offshoring investment, when the parent firm owns at least 10 or 20 percent of the affiliate's assets.

Table 3. Determining German and Austrian Intra-Firm Imports from Eastern Europe

Dependent variable: log (intermediate imports / parent sales)								
	Austria				**Germany**			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
log (K / L)$_P$	-0.487	5.407***	-0.276	-0.128	-0.705***	-0.760***	-2.334***	-0.700***
	[1.493]	[3.008]	[0.822]	[0.396]	[4.269]	[4.285]	[3.113]	[3.932]
log (R&D / sales)$_P$	-1.174***	-1.069	-1.192***	-1.413***	0.311***	0.341***	0.418	0.441*
	[4.523]	[0.986]	[4.177]	[4.892]	[3.005]	[3.305]	[0.643]	[1.760]
log (distance)	-0.314		-0.393	-0.455*	-0.926***	-1.156***	-1.553***	-0.962***
	[1.120]		[1.271]	[1.663]	[3.372]	[4.110]	[2.683]	[2.886]
log (K / L)$_A$		0.205						
		[0.493]						
log (R&D / sales)$_A$		1.814*						
		[2.066]						
var (productivity)				0.000***				0.000
				[2.864]				[0.873]
workers' initiative			0.067				-2.220**	
			[0.217]				[2.186]	
log (affiliate wage / parent wage)								-0.345
								[1.026]
Aalternative							0.653	
							[0.583]	
property rights						-0.642***		
						[3.058]		
tax holidays				4.421***				
				[2.626]				
industry fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Constant	-3.294	-64.390***	0.964	-0.610	13.160***	18.749***	22.495***	-343.168
	[0.927]	[3.297]	[0.187]	[0.125]	[3.592]	[4.656]	[4.386]	[0.847]
Observations (projects)	192	37	165	191	277	275	77	192
Adjusted R-square	0.34	0.63	0.35	0.39	0.43	0.45	0.62	0.45

Absolute value of t statistics in brackets

* significant at 10%; ** significant at 5%; *** significant at 1%

(K / L)$_P$: parent firm's capital to labor ratio.

(R&D / sales)$_P$: R&D expenditures in percent of parent firm's sales.

distance: distance in kilometers between parent firm and its affiliates.

(K / L)$_A$: affiliate firm's capital to labor ratio.

(R&D / sales)$_A$: R&D expenditures in percent of affiliate firm's sales.

var (productivity): variance of productivity among German and Austrian firms, respectively.

workers' initiative: mean of 16 parent firm decisions (without R&D) including decision over acquisition and hiring a secretary ranging between 1 and 5 with 1 as central decision at the CEO level and 5 as decentral decision at the divisional level.

Aalternative: Dummy variable equal to 1 when there is no alternative supplier in Eastern Europe for the investor and equal to 0 when there are a few or many alternative suppliers.

property rights: the enforcement of contracts in the country in Eastern Europe as perceived by the investor ranging between 1 (weak contract enforcement) and 5 (effective contract enforcement).

tax holidays: tax holidays granted by a country in Eastern Europe as ranked by the investor. Tax holidays ranges between 1 and 5 with 1 as decisive reason to invest in Eastern Europe for tax holiday reasons and 5 not at all important reason for investment.

Table 4. Choosing between Outsourcing and Offshoring among German Firms

Probit Estimates

Dependent variable: Dummy Outsourcing = 1 Offshoring = 0

	(1)	(2)	(3)	(4)	(5)
log (K / L)$_P$	0.124		1.035***	-0.043	1.022***
	[1.615]		[3.704]	[0.523]	[3.413]
log (R&D / sales)$_P$	-0.095***	-0.040	-0.379***	-0.232**	-0.452***
	[2.599]	[1.009]	[3.290]	[2.081]	[3.545]
log (R&D / sales)$_A$					0.781**
					[2.181]
ln (distance)		0.412**	0.750**	0.608*	
		[2.247]	[2.238]	[1.897]	
var (productivity)		-0.000***		-0.000**	
		[3.456]		[2.070]	
corruption			0.443**		0.390**
			[2.363]		[1.969]
Palternative				-0.913**	
				[2.214]	
log (L)					0.194*
					[1.838]
Constant	-2.962***	-3.859***	-20.019***	-3.949*	-21.608***
	[3.576]	[2.970]	[4.032]	[1.724]	[3.934]
Observations	330	461	205	156	205
Pseudo R-square	0.0591	0.1389	0.4104	0.3062	0.4583

Absolute value of z statistics in brackets, offshoring=0 when ownershipshare > 30%; Outsourcing when ownershipshare ≤ 30%

* significant at 10%; ** significant at 5%; *** significant at 1%

(K / L)$_P$. parent firm's capital to labor ratio.

(R&D / sales)$_P$. R&D expenditures in percent of parent firm's sales.

(R&D / sales)$_A$. R&D expenditure in percent of affiliate firm's sales.

distance: distance in kilometers between parent firm and its affiliates.

var (productivity): variance of productivity among German firms.

corruption: corruption in the country in Eastern Europe as perceived by the investor ranging between 1 (pervasive corruption) and 5 (no corruption).

Palternative: Dummy variable equal to 1 when there is no alternative partner for the supplier in Eastern Europe and equal to 0 when there are a few or many alternative partners.

L: number of parent firm's employees.

tax holidays: tax holidays granted by a country in Eastern Europe as ranked by the investor. Tax holidays ranges between 1 and 5 with 1 as decisive reason to invest in Eastern Europe for tax holiday reasons and 5 not at all important reason for investment.

References:

Acemoglu, Daron, Pol Antras and Elhanan Helpman. 2005. Contracts and the Division of Labor, Harvard University. Mimeo.

Antras, Pol. 2003. Firms, Contracts, and Trade Structure. *Quarterly Journal of Economics*, 118: 1375-1418.

Antras, Pol and Elhanan Helpman. 2004. Global Sourcing. *Journal of Political Economy,* 112: 552-580.

Hanson, Gordon H. Raymond J. Mataloni, and Matthew J. Slaughter. 2001. *Expansion Strategies of U.S. Multinational Firms*. National Bureau of Economic Research, NBER WP 8433, Cambridge.

Hummels, David, Jun Ishii, and Kei-Mu Yi. 2001. The Nature and Growth of Vertical Specialization in World Trade. *Journal of International Economics*, 54 (1): 57-96.

Lorentowicz, Andzelika, Dalia Marin, Alexander Raubold. 2005. *Is Human Capital Losing from Outsourcing? Evidence for Austria and Poland*, University of Munich, Mimeo.

Marin, Dalia. 2004. *A Nation of Poets and Thinkers – Less So with Eastern Enlargement? Austria and Germany*, Centre for Economic Policy Research, CEPR Discussion Paper No. 3526, London.

Marin, Dalia, Andzelika Lorentowicz, Alexander Raubold. 2003. *Ownership, Capital, or Outsourcing: What Drives German Investment to Eastern Europe?* In: Herrmann, Heinz and Robert E. Lipsey (Eds.) Foreign Direct Investment in the Real and Financial Sector of Industrial Countries, Berlin: Springer Verlag.

Marin, Dalia and Alexander Raubold. 2005. *The Declining Prospects for Human Capital in Germany: A Result of the New International Division of Labor?* University of Munich, Mimeo.

Marin, Dalia and Monika Schnitzer. 1995. Tying Trade Flows: A Theory of Countertrade with Evidence, *American Economic Review,* 85:1047-1064.

Marin, Dalia and Monika Schnitzer. 2002. *Contracts in Trade and Transition: The Resurgence of Barter*, Cambridge: The MIT Press.

Marin, Dalia and Thierry Verdier. 2003. *Globalization and the Empowerment of Talent*, CEPR Discussion Paper No. 4129, London.

Marin, Dalia and Thierry Verdier. 2005. *Corporate Hierarchies and International Trade*: *Theory and Evidence*, University of Munich and Paris School of Economics, Mimeo.

Nunn, Nathan. 2005. *Relationship-Specificity, Incomplete Contracts and the Pattern of Trade*, University of British Columbia, Mimeo.