EXCLUSIVE AGREEMENTS AND TECHNOLOGY TRANSFER: COMPETITION POLICY AND EU ENLARGEMENT

2.5 MNE and supply-chain management

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Abstract

We test the relationship between exclusive agreements and technology transfer among firms in the automotive supply industry in EU applicant countries. Exclusive agreements come in bundles, are reciprocal and are passed on up- or downstream. The type of exclusivity employed by a firm depends on its position in the supply chain. Technology trickles upstream: Multinational final assemblers transfer a lot of technology; lower-tier suppliers less. We find that technology transfer is negatively related to the exclusive agreements that should protect it, suggesting anti- rather than pro-competitive motives. Some kinds of exclusivity are there to increase market power; others to protect R&D.

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Introduction

When firms employ vertical restraints (VRs) such as exclusive agreements the outcome may be pro- or anti-competitive. Ideally, the associated transfer of technology (TT) results in efficiency gains that eventually are passed on to consumers. But exclusive agreements also lend themselves to the creation or abuse of market power. Which of the two outcomes prevails is of concern to competition authorities, such as the European Commission. In the context of European Union enlargement, it is also of concern to policymakers in Central and Eastern Europe (CEE) for VRs used by multinational firms in foreign direct investments (FDI) may affect the accrual of gains between countries. We address these issues by analysing the incidence of exclusive agreements in automotive supplier networks in CEE, and how it is related to transfer of technology or know how.

We find that exclusive agreements come in bundles. A firm that uses exclusivity is also likely to be subjected to exclusivity itself: exclusive agreements seem to be reciprocal and passed on up or down the supply chain. Links between exclusivity and technology transfer are relatively weak. Some kinds of exclusivity increase market power but a firm may also request exclusivity from its customers to protect R&D. The type of exclusive agreements employed by a firm depends on its position in the supply chain. First-tier suppliers are more prone to request exclusivity from their customers while lower-tier suppliers are more prone to request it from their own suppliers.

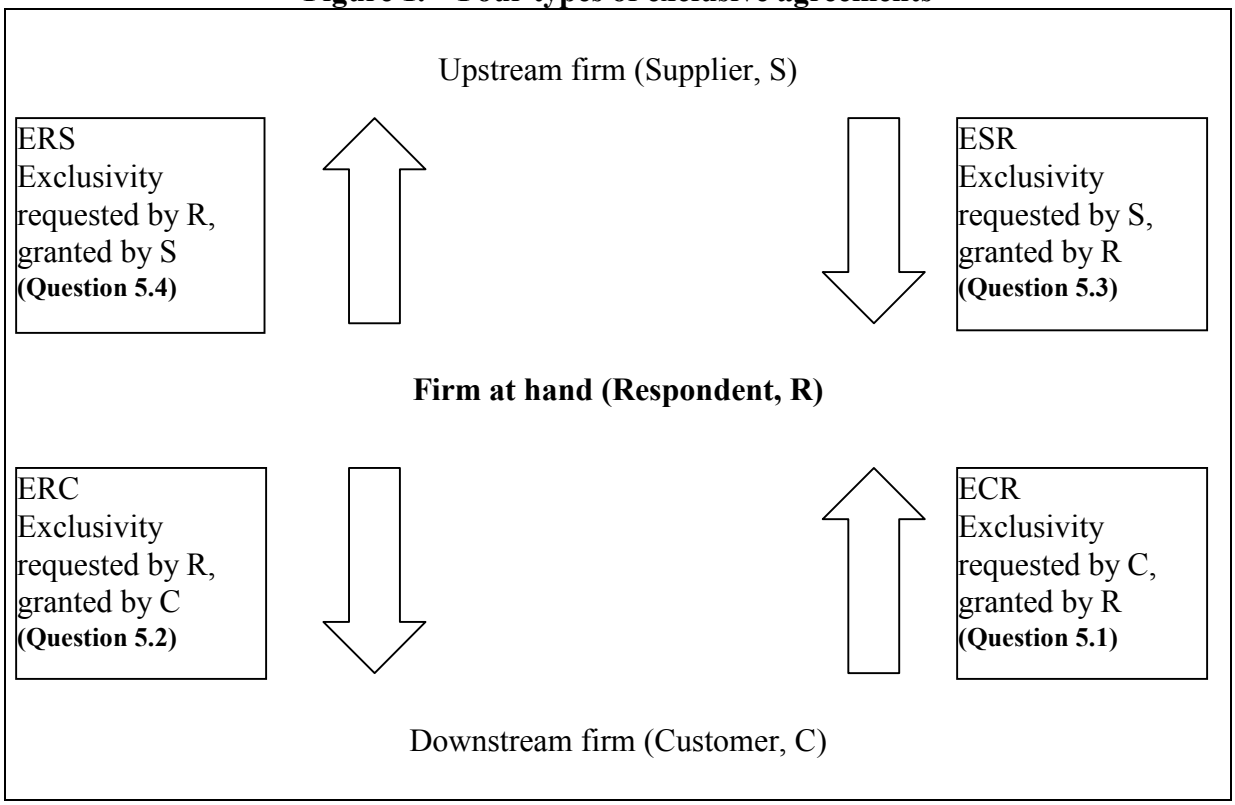
Technology and know-how trickle upstream. There is a lot of technology transfer upstream from multinational final assemblers and less from suppliers. Unsurprisingly, transfer of technology and knowledge increases with the complexity of the products, with R&D, and with the importance of technology. Surprisingly, we find that technology transfer is negatively related to the exclusive agreements that should protect the transfer, suggesting in these cases anti- rather than pro-competitive motives.

In the remainder of the paper, we first briefly review the rationale for – and the justification of – exclusive agreements, and how they are regulated in EU competition law. We then describe competition policy in CEE, the international automotive supplier industry, and car component manufacturing in CEE: changes in all three areas impact on the scope of the use of VRs in relationships between suppliers and assemblers and among suppliers. In the empirical part of the paper, we first present our data base of East European car component manufacturers and describe our method of analysis. Second, we discuss a series of results concerning the determination of exclusivity and TT. Third, illustrate the rationale behind VRs and their effect on market competition through a series of case studies. Finally, we conclude by speculating about possible explanations for the relatively weak link between exclusivity and TT and suggest directions for further research.

Technology transfer and vertical restraints

Exclusive agreements are vertical restraints that may go both ways. The firm may grant exclusivity to its customers (it will not sell to their competitors) and it may request exclusivity from its customers (they should promise not to deal in rivals' products). Hence, a firm may experience four different types of exclusive agreements: those that it grants and those that it requests combined with two "directions", up- and downstream (see Figure 1).

Figure 1. – Four types of exclusive agreements



Note: Questions 5.1-4 refer to our survey of which more below.

The reasons why a firm may grant or request exclusivity from either its suppliers (S) or its customers (C) are well known (see Rey & Caballero-Sanz (1996, 30-32) for a recent survey). For example, it may aim to protect a specific investment (in physical or human capital, technology or know-how), or to increase market power through vertical foreclosure or strategies that raise rivals' costs. Bernheim and Whinston (1998) demonstrate that exclusionary contractual provisions may be irrelevant, anticompetitive, or efficiency-enhancing, depending on the setting. In this paper we focus on technology transfer between firms. A firm may transfer technology or know-how both up- and downstream. Likewise it may itself receive it from its suppliers and its customers. This technology transfer will allow the recipient to upgrade its product. When the technology is received from a customer, it will also allow the recipient to tailor its product to that customer, who in turn may request that the technology not be used with rivals' products by insisting on exclusivity. However, if the two firms have to invest in specific (human) capital to carry out this upgrade, one would expect to see equity links (vertical integration) rather than vertical restraints, since the implied transfer of residual rights would benefit those investments (Grossman & Hart, 1986; Hart, 1995). For example, if the product is traded between different firms in the same group, the equity link is likely to substitute for the exclusive agreement.

Exclusivity and technology transfer in EU competition rules

The European Commission (1979), in its notice on certain subcontracting agreements, exempts from the prohibition of anti-competitive restraints exclusive agreements requested by a firm insofar as they cover products whose manufacture requires making use of the firm's proprietary knowledge, machinery, or equipment. Article 81(1) of the Treaty of Amsterdam does then *a priori* not apply to a sub-contracting agreement through which the sub-contractor

receives intellectual property rights, know-how, documents, dies, or tools belonging to the contractor, provided that the subcontractor uses these assets to manufacture a product that differs with respect to form, functionality, or composition from the product found on the (spot) market. It is thus material to the *a priori* presumption of legality that exclusivity be granted in return for a (broadly defined) transfer of technology.

It is also important that the subcontractor (or supplier) not already be an independent producer of the product covered by the agreement and that he not be able to source the technology freely elsewhere. Instead, he must use technical knowledge, designs, or other specific documentation provided by the contractor (or customer), allowing him to manufacture a different product. Stipulations that the subcontractor must use the technology or equipment exclusively for the purposes of the contracting agreement and/or that goods or services resulting from the technology transfer may only be supplied to the contractor do not violate Article 81, if the above conditions are met. It is thus important for firms wanting to impose exclusive agreements that they can rationalise them in terms of technology transfer. For further discussion of the Commission's Notice, see e.g. Goyder (1993, 301-3) and Van Bael and Bellis (1990, Appendix 42).

Vertical Restraints, Technology Transfer, and Competition Policy in the Transition Economies

For obvious reasons, competition policy has no tradition in the transition economies. Rules and regulations against the abuse of market power have been slow in coming. According to the EBRD (1999), competition legislation and enforcement capabilities have made the least progress of all market reforms in Central and Eastern Europe (CEE) over the last decade. Despite gradual legislative convergence towards EU law in the current pre-accession phase, competition culture in CEE is still rudimentary. This was even more so in the beginning of the transition when European multinationals (MNEs) began to invest in CEE. They did so in a regulatory environment that was clearly different both from their home environment and from the rules that will govern competition in the applicant countries at the very latest just prior to joining the EU. For business practice and government policy, this translates into a series of challenges. Policymakers need to understand the frequency and the impact of vertical restraints. Managers of multinational and of domestic CEE firms need to ensure that exclusive agreements they struck in the past adhere to EU law.

The impact and the legality of vertical restraints prominently depend on the extent to which they are linked to technology transfer. For policymakers and managers in CEE, vertical restraints ideally foster the embeddedness of foreign firms and support local capabilities of product or process improvements. For foreign investors, they ideally protect their knowledge assets in what continue to be relatively risky markets.

The Automotive Sector in CEE

The automotive sector in CEE is highly integrated with the world, and especially European, car industry. Car and car component manufacturing consistently attracted a large share of the sectoral distribution of inward direct investment (UNCTAD, 1999). Western component manufacturers followed car assemblers into the East in exchange for the promise of potentially

group-wide supply contracts. To this end, they acquired or teamed up with local firms, thus facilitating the consolidation of the formerly moribund eastern automotive industry into internationally competitive manufacturers of both cars and components. In the second half of the 1990s, trade in parts became the fastest growing component of CEE's external trade; of this, automotive parts were the most important. For example, in Poland their share in total exports and imports of parts to the EU rose by about 60 per cent in 1993-7. The import and export share of components and final assemblies in this sector also increased (21 per cent for imports from and fourfold for exports to the EU in the case of Poland). This suggests that many producers in CEE have become part of an intra-product division of labour organised around networks centred in the EU (Kaminski & Ng, 1999; see also Eichengreen & Kohl, 1998). The emergence of these networks through foreign direct investments and intra- or inter-firm trade opens up possibilities for technology transfer and, thus, lends itself to making use of vertical restraints.

Structural Changes in the Car Component Sector

In the 1990s cost reduction strategies by car assemblers changed the car component industry. Outside sourcing increased, ultimately raising the size and the scope of the suppliers of key components. The interdependence of assemblers and suppliers intensified even though carmakers sold off their component arms. Longer-term relationships through global supply deals replaced annual bidding contests in which carmakers tried to play their suppliers off against each other. Assemblers began to allow suppliers earlier access to new vehicle design in order to pass on R&D projects they did not want to do themselves (Lewis & Wright, 1999). Consolidation in the industry promoted the emergence of fewer but increasingly powerful component suppliers, so-called system integrators; this, in turn, shifted the bargaining between suppliers and assemblers in favour of the former. In components, the fastest growth area is electronic on-board systems, an example of the rising technological contribution to the value of a car. It suggests that the scope for technology sharing – between assemblers and system integrators – and technology transfer – between one or both of the former and lower-tier suppliers – is on the rise (Bursa et al., 1997; Virag & Mount, 1998). Opportunities for investments in relation-specific assets are likely to increase, with attendant consequences for the use of vertical restraints.

Data and methodology

We sent the questionnaire of Appendix A to all Polish firms with more than 20 employees that the respective national statistical offices, in accordance with NACE codes, classify as car component manufacturers. In Czech Republic, Hungary, Romania, Slovakia, and Slovenia, we used membership directories of relevant trade associations. Our analysis covers all the relevant locations of the automotive supply sector in the candidate countries. The weighted average return rate is close to 50 per cent. The questionnaire contains 24 questions on the nature of the products, sales, ownership, competition, position in the value chain, exclusive agreements, and technology transfer. Most responses are binary (YES/NO); some are on an integer Likert scale from 1 to 5 (complexity of the product (1.2), ranking of major markets (1.3), degree of competition (3.2), competence of suppliers (4.1.3a), relations between buyers and sellers (4.1.3b), and importance of technology transfer (6.4)); one is a percentage (export share (1.4)); while the rest are not easily codifiable (description of product (1.1), headquarter location

(2.2.1), location of MNE customers (4.2.2.1)). Our local partners translated the questionnaire from the original English version into their local language. As a test of the reliability of the translations we had the questionnaires translated back into English by subjects unknown to the partners.

We would like to test what explains exclusivity in the agreements, and what explains technology transfer. These variables take on the values YES (1) and NO (0), giving a binary dependent variable. We test our hypotheses using logit models (see Hutcheson & Sofroniou (1999) for an introduction and Liao (1994) for a guide on how to interpret probability models such as the logit model).

The (multiple) logit model is specified as

$$\ln\left[\frac{\Pr(y=1)}{1-\Pr(y=1)}\right] = \sum_i B_i x_i$$

where Pr(y = 1) is the probability that the response variable takes on the value 1 (as opposed to 0), B_0 is the coefficient to the constant and B_i is the coefficient to the i'th explanatory variable x_i. The interpretation of the model is that the odds may be written as

$$\frac{\Pr(y=1)}{1-\Pr(y=1)} = \prod_{i=0}^{k} e^{B_i x_i}$$

where $\mathbf{x} = (x_1, x_2, \ldots x_k)$ is the vector of explanatory variables. Thus if B_1 is negative the odds of observing y = 1 decrease as the explanatory variable increases *ceteris paribus*. If, for example, $B_1 = -.6931$ so that $e^{B1} = .5$, then the odds of observing y = 1 is half as big if $x_1 = 1$ as when $x_1 = 0$. In the tables below we report both B_1 and e^{B1}. Many of our explanatory variables are themselves binary or take on integer values on a Likert scale, in which case the corresponding e^{B1} may be interpreted as the change in the odds of y = 1 that follows from the presence of the attribute represented by x_1 or from an increase by one unit in the attribute represented by the scale, respectively.

Results on exclusivity and technology transfer

Before undertaking the econometric modelling we looked at correlations between the variables. Table 1 reports simple Pearson correlation coefficients with corresponding tests for significance. It is evident from the table that the presence of the four types of exclusive agreements is significantly and positively correlated between themselves and that the same is the case for technology transfer from buyers and technology transfer to suppliers. It is also noteworthy that there is no immediate link (i.e. no significant correlation) between technology transfer and exclusive agreements.

Table 1. – Correlation coefficients between exclusive agreement (questions 5) and technology transfer (questions 6)

Pearson Correlation	Q5.1	Q5.2	Q5.3	Q5.4	Q6.2	Q6.3
Q5.1	1.000	** .310	** .219	** .185	-.035	-.034
Significance	.	.000	.000	.000	.481	.497
N	412	412	412	412	412	412
Q5.2	** .310	1.000	** .410	.020	.020	-.023
Significance	.000	.	.000	.687	.687	.644
N	412	414	414	414	414	414
Q5.3	** .219	** .410	1.000	** .359	.087	.013
Significance	.000	.000	.	.000	.076	.793
N	412	414	414	414	414	414
Q5.4	** .185	** .302	** .359	1.000	.065	-.036
Significance	.000	.000	.000	.	.189	.464
N	412	414	414	414	414	414
Q6.2	-.035	.020	.087	.065	1.000	** .301
Significance	.481	.687	.076	.189	.	.000
N	412	414	414	414	414	414
Q6.3	-.034	-.023	.013	-.036	** .301	1.000
Significance	.497	.644	.793	.464	.000	.
N	412	414	414	414	414	414

** Correlation is significant at the 0.01 level (2 tailed)

We ran a series of logit regressions to check the link between technology transfer, vertical restraints, and other variables included in our questionnaire. Table 2 reports our preferred regression explaining technology transfer to suppliers (answer to question 6.2). More detailed information on this model may be found in Appendix B that also describes the model selection procedure. 47 percent of the firms reported to have transferred technology upstream. Table 2 shows that the odds that a firm will transfer technology to its own suppliers are almost three times higher if it receives technology from its own customers (Q.6.3). The odds quadruple if the respondent firm undertakes R&D (Q.6.1). Every time the firm thinks that technology transfer allows it to upgrade product or process on the Likert scale (Q.6.4), the odds increase by a factor of 1.2.

If the suppliers request exclusivity (Q.5.3), the firm is also likely to transfer technology to those suppliers. This may hint that some suppliers are in a favourable (bargaining) position and can request both exclusivity and technology from their customers. It is not consistent with exclusivity as a protector of technology transfer. If that were the case, we should have found a link between questions 5.4 and 6.2.

Table 2. – Preferred logit regression explaining technology transfer to suppliers

x_i	B_i	S.E.	Wald	Sig.	Exp(B_i)
Q2.1A	.882	.381	5.370	.020	2.416
Q2.2	1.506	.416	13.095	.000	4.510
Q4.1.2B	-.949	.343	7.668	.006	.387
Q4.1.3B	.196	.114	2.944	.086	1.216
Q4.2.1B	-.576	.282	4.175	.041	.562
Q4.2.2	.790	.296	7.136	.008	2.202
Q5.3	.613	.299	4.194	.041	1.845
Q6.1	1.375	.253	29.583	.000	3.955
Q6.3	1.118	.278	16.115	.000	3.058
Q6.4	.188	.099	3.594	.058	1.206
Constant	-4.161	.689	36.467	.000	.016

Note: The Cox and Snell R^2 is .254. Nagelkerke R^2 = .339. Predictions are 53.0 percent correct if only a constant is used but 71.8 percent correct if the model is used. For a summary of the model, see Appendix B.

If the firm is domestically owned (Q.2.1A), then the odds in favour of technology transfer more than double. Similarly, if the respondent is part of a multinational firm (Q.2.2) the odds increase by a factor of 4.5. By implication, if the firm has mixed or foreign ownership but is not part of a multinational it will transfer less technology to its suppliers. This could reflect that joint ventures are generally an inferior, though less risky, entry mode; technology-intensive firms are more likely to want to wholly control their assets abroad.

Indeed, technology transfer to suppliers depends on how the firm is placed in the value chain. If the firm sources from foreign suppliers (Q.4.1.2b), the odds that it transfers technology to those suppliers will be only 39 percent of what they would be if the firm sourced from domestic (or domestic *and* foreign) suppliers. If the firm sells to final assemblers (Q.4.2.1b), odds will be only 56 percent of what they would be if customers were other suppliers or retailers! However, if there are MNEs among the customers, the odds in favor of technology transfer should be multiplied by 2.2. Thus if the customer is a multinational, final assembler the odds in favour of technology transfer to own suppliers should be multiplied by 2.202 x 0.562 = 1.24.

Technology transfer from customers happened to 60.7 percent of the firms. To a large extent this is connected with whether the firm itself transfers technology to its suppliers (see Table 3). The odds of getting technology transferred from the buyer almost triple if the firm transfers technology to its own suppliers (Q.6.2), and double for every unit of increase on the Likert scale regarding the importance of technology transfer (Q.6.4). The odds double if the customer is a final assembler (Q.4.2.1b). If there are MNEs among the customers (Q.4.2.2) the odds almost double also. If there are MNE final assemblers among the customers, the odds thus quadruple. However, if the respondent is part of an MNE (Q.2.2) then the odds are only 36 percent of what they would have been if the respondent were not part of an MNE. This could be because it then receives the technology in-house so that an equity link replaces the protection by exclusivity clauses (cf. above). It is noteworthy that exclusivity enters the regression insignificantly but with an unexpected sign. If the respondent indicates that its customers request it not to sell to their competitors (Q.5.1) then the odds in favour of

technology transfer from the customers is cut by a third! This is certainly inconsistent with the hypothesis that the exclusive agreement is there to protect technology transfer.

Table 3. – Preferred logit regression explaining technology transfer from buyers

x_i	B_i	S.E.	Wald	Sig.	Exp(B_i)
Q2.2	-1.024	.302	11.485	.001	.359
Q4.2.1B	.734	.289	6.437	.011	2.083
Q4.2.2	.567	.303	3.508	.061	1.764
Q5.1	-.397	.264	2.265	.132	.672
Q6.2	1.017	.260	15.291	.000	2.765
Q6.4	.830	.098	72.084	.000	2.294
Constant	-3.198	.424	56.842	.000	.041

Note: The Cox and Snell R^2 is .312. Nagelkerke R^2 = .423. Predictions are 60.7 percent correct if only a constant is used but 78.8 per cent correct if the model is used. For a summary of the model, see Appendix C.

We now turn to explaining the firm's use of exclusive agreements. We investigate ECR (Q.5.1), ERC (Q.5.2), ESR (Q.5.3) and ERS (Q.5.4) in turn. Exclusivity requested by the customer and granted by the respondent (ECR) occurred in 36.3 percent of the cases. Our preferred regression is found in Table 4. More details may be found in Appendix D.

Table 4 – Preferred logit regression explaining occurrence of ECR

x_i	B_i	S.E.	Wald	Sig.	Exp(B_i)
Q1.3A	.175	.087	4.055	.044	1.191
Q2.2	-.694	.261	7.087	.008	.500
Q5.2	1.332	.293	20.733	.000	3.788
Q5.3	.675	.297	5.178	.023	1.964
Constant	-1.117	.211	27.995	.000	.327

Note: The Cox and Snell R^2 is .121. Nagelkerke R^2 = .166. Predictions are 63.7 percent correct if only a constant is used but 71.0 percent correct if the model is used. For a summary of the model, see Appendix D.

Odds in favour of observing ECR quadruple if ERC also occurs. They double if ESR is used and if the firm is not part of a multinational firm. There is a small positive effect of the domestic market being relatively unimportant. The first finding points to a certain level of reciprocity of the exclusive agreements. However, we do not know from our questionnaire whether the customer involved in an ECR agreement is the same customer that is involved in ERC. The second finding, that respondents that grant exclusivity to their customers also grant it to their suppliers may indicate a weak bargaining position of the respondent. This is consistent with the third finding, namely that firms who are not part of MNEs are *ceteris paribus* twice as likely to being subjected to ECR. Note, however, that the model only predicts 34.9 percent of the occurrences of ECR correctly (but 91.6 percent of the non-occurrences) so that the major part of the occurrence of ECR is left unexplained by the model.

Table 5. – Preferred logit regression explaining occurrence of ERC

x_i	B_i	S.E.	Wald	Sig.	Exp(B_i)
Q1.3C	-.242	.107	5.109	.024	.785
Q4.1.2A	.777	.400	3.772	.052	2.175
Q4.2.1B	.592	.342	3.002	.083	1.808
Q5.1	1.392	.297	21.936	.000	4.023
Q5.3	2.119	.318	44.421	.000	8.320
Q6.1	.810	.329	6.055	.014	2.248
Constant	-3.291	.486	45.905	.000	.037

Note: The Cox and Snell R^2 is .216. Nagelkerke R^2 = .346. Predictions are 80.8 percent correct if only a constant is used but 84.9 percent correct if the model is used. For a summary of the model, see Appendix D.

Exclusivity requested by the respondent and granted by the customer (ERC) occurs in 19.2 percent of the cases. Our preferred regression is found in Table 5. More details on the model may be found in Appendix E. Odds in favour of observing ERC quadruple if ECR (Q.5.1) also occurs – a mirror image of what we found in Table 4. "Reciprocity", in other words, is still at work. Even more dominantly, ESR (Q.5.3) enters the equation. Odds have to be multiplied by a factor of eight if the respondent has also been requested to grant exclusivity to its suppliers. This indicates a tendency to "pass on" exclusivity clauses downstream. In addition, ERC odds increase by a factor of almost three if the respondent undertakes R&D (Q.6.1). This could indicate the use of ERC to protect investment in R&D against downstream opportunism. ERC odds decrease by 1/5 if the EU is the more important market (Q.1.3C). This could reflect again the bargaining position of the respondent. If the respondent sources from domestic suppliers alone (Q.4.1.2A), ERC odds increase by a factor of 2.2. This could be taken to indicate an attempt to create barriers to foreign competition for firms that are predominantly domestic. If the firm sources domestically and sells primarily to the domestic market, odds are much higher that ERC will be used. Finally, ERC will occur more frequently if the customer is a final assembler (Q.4.2.1b), i.e. is not another supplier or a retailer. In this case the model predicts 39.2 percent of the occurrences of ERC correctly (but 95.8 percent of the non-occurrences), leaving the major part of the occurrence of ERC unexplained.

Table 6. – Preferred logit regression explaining occurrence of ESR

x_i	B_i	S.E.	Wald	Sig.	Exp(B_i)
Q4.1.3A	-.365	.143	6.515	.011	.694
Q5.2	2.147	.328	42.959	.000	8.562
Q5.4	1.793	.468	14.694	.000	6.010
Q6.1	-.691	.334	4.284	.038	.501
Q6.2	.666	.319	4.356	.037	1.947
Constant	-.936	.534	3.074	.080	.392

Note: The Cox and Snell R^2 is .193. Nagelkerke R^2 = .313. Predictions are 81.6 percent correct if only a constant is used but 85.4 percent correct if the model is used. For a summary of the model, see Appendix F.

Exclusivity requested by the supplier and granted by the respondent (ESR) occurs in 18.4 percent of the cases. Table 6 summarises our preferred regression for ESR. For more details on the model see Appendix F. ESR odds again increase by a factor 8.6 if ERC (Q.5.2) is also present. This does not imply causality. Table 5 showed that ESR increases the odds of ERC by a factor of 8, and Table 6 shows that this works both ways. In addition the presence of ERS increases the odds of ESR by a factor of 6, suggesting that the reciprocity may be at work in upstream contracts, too.

The more the respondents agree that the capabilities and competence of suppliers are high (Q.4.1.3A), the lower the ESR odds. This finding is also at odds with an efficiency explanation of exclusivity. We would have expected the opposite sign if more competent and capable suppliers wanted to protect their knowledge by requesting exclusivity from their customers.

The technology variables R&D (Q.6.1) and technology transfer to suppliers (Q.6.2) are significant in explaining ESR. If the respondent firm undertakes R&D, its odds of having an ESR imposed are cut in half. Perhaps the respondent has a better bargaining position if it has the resources to undertake R&D. Or, due to its R&D activity, the firm may be less in need of technology transfer. If the respondent transfers technology to its suppliers then ESR odds that (some of) the respondent's suppliers request exclusivity almost double. This is hard to explain!

Table 7. – Preferred logit regression explaining occurrence of ERS

x_i	B_i	S.E.	Wald	Sig.	Exp(B_i)
Q1.3E	-.614	.203	9.112	.003	.541
Q1.4	-.028	.009	10.627	.001	.972
Q4.2.1A	.993	.497	3.991	.046	2.698
Q5.1	.877	.523	2.814	.093	2.405
Q5.2	1.059	.533	3.952	.047	2.883
Q5.3	1.794	.512	12.251	.000	6.012
Constant	-1.143	.907	1.587	.208	.319

Note: The Cox and Snell R^2 is .160. Nagelkerke R^2 = .365. Predictions are 91.6 percent correct if only a constant is used but 91.9 percent correct if the model is used. For a summary of the model, see Appendix G (and H).

Exclusivity requested by the respondent and granted by a supplier (ERS) happens in only 7.5 percent of the cases. Table 7 reports our preferred regression explaining ERS. Appendix G reports the details of the model. As in the two previous models, the presence of other kinds of exclusivity – ECR (Q.5.1), ERC (Q.5.2) and in particular ESR (Q.5.3) – greatly increase the ERS odds. This again illustrates reciprocity and pass-on of exclusive agreements. In addition the location and nature of buyers change the odds. If the customers are primarily found in the rest of the world (Q.1.3e) – i.e. not in the home market, in the CEEC & CIS, or the OECD – then the odds are reduced. An explanation for this may be that firms with their most important markets outside the regional bloc to which they belong and outside the most important home countries of MNEs tend to be less integrated in the local networks and source freely on the global market. When the export percentage (Q.1.4) goes up, ERS odds go (a little) down. This again may be because an export-oriented firm is also more likely to source freely on the global market and not to try to bind its suppliers. Finally, if the respondent's

customer is itself a supplier (as opposed to a final assembler or retailer) then ERS odds triple. Recall from Table 5 that the ERC odds increased if its customer was a final assembler. In combination these findings thus show that the respondent's use of exclusivity clauses depends on its position in the supply chain. Lower-(i.e. second-, third-, etc.)tier suppliers are more likely to use ERS while first-tier suppliers are more prone to use ERC.

Unfortunately we do not have data on export share (Q.1.4) for Romania and Slovakia. This means that Table 7 is based on data from Poland, Hungary, the Czech Republic and Slovenia alone, a total of 310 out of 411 firms. To check the robustness of the findings, we did a similar regression leaving the export share out of the regression thus exploiting the whole data set. The results are shown in Appendix H and prove to be fairly robust to the omission of an important explanatory variable.

Ex ante we thought there would be a close link between product quality and complexity (Q1.2) on the one hand and exclusivity on the other, much as we thought we would find it between technology transfer and exclusivity. However, we never found a significant link between the two. To ensure that this was not due to the subjective bias in the respondents' self-assessment of the complexity of their products, we calculated their unit values. We used Eurostat's Comext database and computed unit values up to 8-digit codes of the Nimex classification for 217 products, roughly one half of our firm sample. Complexity is not significantly related to the unit values of the exported products of our firms' home countries. This could indeed confirm suspicions of respondent subjectivity, except that unit values – like complexity – are also not significantly related to technology transfer or exclusivity. Hence, this is yet another puzzling result which we interviewed individual firms about.

Case Studies

To throw light on the puzzle of why TT and VRs behave differently than expected, we contacted firms that had reported no TT but VRs. No such firms exist in Romania or Slovakia, or those that do did not want to be interviewed. This part of our project is still in progress; here we report results based on in-depth interviews with eight firms from Hungary and Poland. Shortly we will add results from Slovenia and Czech Republic.

Interviews in the four countries were held in the same format (see Appendix I). They focused on

- the way in which complexity, technology transfer, and vertical restraints are related
- how firms bargain about exclusive agreements
- what determines each party's bargaining position
- the direction and extent of efficiency gains.

Table 8 summarises the sample characteristics. Three sample firms rank the complexity of their product relatively low. This underlines our earlier results that VRs do not only appear in firm relationships where investments in complex technologies warrant protection. Similarly, more than half the sample reports that it operates at a level below the international technology frontier. In two of these cases, the VRs help new (foreign) owners of assembly plants of formerly integrated producers to control product documentation vis-à-vis the previously vertically integrated and now independent supplier. These two firms are the same that report

technology transfer. However, until the restructuring and the break-up of the larger SOE to which they used to belong, they themselves developed and controlled this very technology. Some of the other firms point out that their VR partners know nothing about the technology in question.

There are seven instances of passive and three of active VRs. Of the former, only one is in distribution; two come from suppliers; and four from customers. The active VRs are all imposed on customers. Three firms agreed to the VR because their sorry financial state left them no choice. In addition to the two aforementioned cases, this includes a firm that has since successfully renegotiated the more onerous provisions of the agreement and that evaluates its relationship with the VR partner very positively. One firm agreed to the VR in order to build up a relationship with a potentially large customer. There are three clear cases of investment protection. In one case a supplier needed to make an extra investment to use the sample firm's technology. In another case the sample firm imposed a VR on the customer to safeguard an expensive quality testing system. The final case concerns investment in a distribution network.

Four firms use vertical agreements to create market power. This takes various forms. A large assembler demands exclusivity from its supplier, our sample firm, even though the product in question is widely available. A manufacturer (not of cars) instructs its distributor not to import like products with similar or equal specifications. And two manufacturers of parts operate VRs (mutual in one instance) in order to keep prices high. Finally, six firms evaluate the relationship with their VR partners as positive. Reasons for this include access to new markets, increases in productivity and profitability, or a breathing space for restructuring. The discontent firms report being subjected to extremely low sourcing prices as well as, of course, restrictions on their customer base. Not all sample firms are in a position to judge whether price decreases translate into lower consumer prices but some report that the VRs afford them higher prices.

This brief glimpse at first results from our case studies confirms a number of insights hinted at in the econometric analysis. First, exclusivity in inter-firm relationships exists even in the absence of technology transfer. Firms that impose them do so because exclusivity allows them to increase market power. Firms that accept them do so either because the alternative is bankruptcy or because the potential VR partner insists on it – a first-best alternative is unavailable. Second, VRs may lead to higher prices. Third, when they lead to lower prices, it is not clear from our analysis whether these gains are passed on down the value chain to the final user. Fourth, the terms of the VR depend on the relative bargaining power of each party to the agreement. In East-West business relationships, as firms in transition economies restructure successfully, their control over resources may change over time, and with this the terms of the VR. The graduation away from VRs unassociated with technology transfer does not guarantee a more competitive market (only a different distribution of profits), but it does make it more likely. Fifth, competition authorities in CEE as well as the European Commission appear to be largely unaware of these practices. None of the sample firms had notified the respective authorities of its VR agreement, and only one professed to be familiar with the relevant legislation. Sixth, in the area of competition policy, the institutional remake of CEE has some way to go before it resembles EU practice. VR agreements are typically tacit rather than formalised into contracts. Dawnraids are no answer if anti-competitive practices never make it onto a – however well hidden – piece of paper.

Table 8. – Characteristics of case study firms

Characteristics	Number
Complexity	
• relatively high	5
• relatively low	3
Int'l technological frontier	
• reached	3
• below	4
Technology transfer	
• not from VR partner	1
• from VR partner	2
Vertical restraints	
• passive (subject to)	7
• active (imposing)	3
Rationale behind agreement	
• no choice	3
• second-best partnership	1
• investment protection	3
• market power	4
Bargaining dynamics	
• renegotiation	2
• of which successful	1
Gains	
• positive	6
• negative	2

Note: Sum of "vertical restraints" and "rationale behind agreement" not equal to 8 because some case study firms have multiple agreements in place.

Conclusion

Our three main results are, loosely put, that exclusive agreements and TT explain themselves but not really each other. Exclusive agreements come in bundles, are to some extent reciprocal, and are passed on up- or downstream. When faced with a request for exclusivity by its customer, a firm seems likely to respond in kind. Also, the imposition of exclusive agreements at one point of the value chain appears to translate into other exclusivity clauses further up or further down, thus linking different tiers of suppliers and assemblers. We found that first-tier suppliers are more prone to request exclusivity from their customers while lower-

tier suppliers are more likely to request it from their suppliers. Likewise, firms that are technology recipients are more likely than those that are not to also pass on knowledge to other firms. Both of these findings suggest that technological competence is diffused along the automotive value chain, especially among upper-tier suppliers and assemblers, and that firms organise in networks. So the East European car component sector reflects the key technological and organisational trends, including probably the presence of the new breed of so-called 0.5 tier suppliers, that characterise the world automotive industry. No small feat for an industry that only a decade ago produced only outdated and unreliable vehicles for a captive demand. It also suggests that investments in the East European automotive sector led to technological spillovers with the potential to upgrade local productive capabilities.

Exclusivity and technology transfer are relatively weakly linked. We found weak evidence that the presence of exclusivity requested by the customer decreases the likelihood of getting technology from customers. Likewise, technology transfer to the supplier increases the likelihood of suppliers requesting exclusivity (or if the supplier requests exclusivity, then the respondent is more likely to transfer technology to suppliers). These findings may be interpreted as indicating that in some cases the rationale for exclusivity is not the protection of technology or knowledge transfer but rather the protection of market power or the use of bargaining power to influence the *cui bono* in inter-firm relations. We also found some evidence that R&D matters to the exclusivity that the respondent requests of customers in which case it may be efficiency enhancing or pro-competitive.

That exclusivity in contracts and TT do not explain each other more strongly was an unexpected result. Investor motivations, entry mode, government incentives, or the relative residual strength of the indigenous component supply sector may influence the kinds of exclusive agreements imposed and their impact on TT. For example, foreign car manufacturers more than in any other CEE invested in Poland for its large market and fast-growing demand. The government put high tariffs on vehicle imports and provided incentives for carmakers to undertake assembly in the country. By contrast, in the Czech Republic VW's strategy from the beginning was aimed at the domestic and export markets. In Hungary, foreign investors created an automotive supply industry *ex novo*, and the country continues to specialise in components rather than final assemblies. The different circumstances may have influenced how foreign manufacturers bargained with local firms and with host governments, thus influencing the context in which exclusive agreements were imposed.

Our results may herald a problem for car assemblers and component suppliers. With pre-accession in full swing (and, thus, the gradual extension of EU law in CEE) firms had better think hard about the justification for exclusive agreements. For competition authorities will surely ask questions about them.

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APPENDIX A

Questionnaire for Car Component Suppliers

Purpose
To understand the existence, frequency, and effect of vertical restraints in the car component supplier industry.

---

1 Product and sales

1.1 What do you produce?
……

1.2 Please indicate how well the following statement describes the nature of your product:
(1 = strongly disagree; 5 = strongly agree)

"Our product is highly complex and technical." [ ]

1.3 What are your major markets? (Please rank in order of importance: 1>2>3>4>5.)
Domestic [ ]
CEEC&CIS [ ]
EU [ ]
Other OECD [ ]
Rest of world [ ]

1.4 What is the share of exports in production (in per cent)? [ ]

2 Ownership

2.1 Domestic [ ]
Foreign [ ]
Mixed [ ]
(Please tick as appropriate.)

2.2 Are you part of a multinational firm? Yes [ ]
No [ ]

2.2.1 If yes, in which country is this firm headquartered?
……..

3 Competition and market structure

3.1 Where are your main competitors?
At home [ ]
Abroad [ ]
Both [ ]
(Please tick as appropriate.)

3.2 Please indicate how well the following statements describe your business environment:

(1 = strongly disagree; 5 = strongly agree)

a) "Domestic competition is intense." [ ]

b) "Global competition is intense." [ ]

4 Value chain

4.1 Inputs

4.1.1 What do you source?

……

4.1.2 From whom do you source?

Domestic suppliers [ ]
Foreign suppliers [ ]
Both [ ]

4.1.3 Please indicate how well the following statement describes your business environment:
(1 = strongly disagree; 5 = strongly agree)

a) "Capabilities and competence of suppliers are high." [ ]

b) "Relationships between suppliers and buyers are strong." [ ]

4.2 Output

4.2.1 Who buys your product?

(Please tick as appropriate.)

Other suppliers [ ]
Final assemblers [ ]
Retailers [ ]

4.2.2 Are there MNEs among your customers? Yes [ ]
No [ ]

4.2.2.1 If yes, in which country are they headquartered?

……

5 Vertical restraints

5.1 Do (some of) your customers request that you not sell to their competitors?

Yes [ ]
No [ ]

5.2 Do you request that (some of) your customers not buy your product from alternative suppliers?

Yes [ ]
No [ ]

5.3 Do (some of) your suppliers request that you not purchase their product from other suppliers?

Yes [ ]
No [ ]

5.4 Do you request that (some of) your suppliers not sell their product to your competitors?

Yes [ ]
No [ ]

6 Technology

6.1 Do you undertake R&D? Yes [ ]
No [ ]

6.2 Do you pass on technology and/or knowledge to your suppliers? Yes [ ]
No [ ]

6.3 Do you receive technology and/or knowledge from your buyers? Yes [ ]
No [ ]

6.4 Please indicate how well the following statements describe technology transfer with your buyers:
(1= strongly disagree; 5 = strongly agree)

a) "The technology transfer allows us to upgrade what we make and how we make it." [ ]

NOTES TO APPENDICES B-H:

Logistic regression is used when you want to be able to predict the presence or absence of a characteristic or outcome based on values of a set of predictor variables. It is suited to models where the response variable is dichotomous or binary. Logistic regression coefficients can be used to estimate odds ratios for each explanatory variable in the model. Model selection and estimation can be carried out using a number of methods: **Block entry** is a procedure for variable selection in which the named variables are entered in a single step without checking any of the entry criteria except tolerance. **Forward conditional** is a stepwise selection method with entry testing based on the significance of the score statistic, and removal testing based on the probability of a likelihood-ratio statistic based on conditional parameter estimates. **Backward conditional** is a backward stepwise selection method in which removal testing is based on the probability of the likelihood-ratio statistic based on conditional parameter estimates. We ran forward and backward selection before settling on a particular model. For reasons of space we only report the results of the final block entry procedure that summarises the models well.

Classification tables. Prints a table of the observed versus predicted responses. You will find one for the "Beginning Block" which is for a logit model that only includes a constant and one for "Block 1: Method = Enter" which is for the model where using the block entry procedure all the suggested variables are entered simultaneously. Comparing the two classification tables allows comparisons of how well responses are predicted with and without the model. The cut value is .5 meaning that the model predicts a 1 if the predicted probability is greater than .5.

Chi-square goodness-of-fit test gives a test of how well a model fits the observed data.

-2 Log Likelihood or the **deviance** is another measure of how well the model fits the data. The smaller the value the better the fit. In stepwise methods, the change in -2 log likelihood tests the null hypothesis that the coefficients of the terms removed from the model are zero.

R Square or R^2 is a measure of the fraction of the variation in the data that is explained by the model (Cox & Snell 1981).

S.E.: Standard Error

Wald statistic tests the hypothesis that the regression coefficient for the explanatory variable is zero (i.e. that the explanatory variable has no effect on the response variable).

For a further discussion of these statistics related to logit models, see Hutcheson & Sofroniou (1999, chap.4).

Appendices B-H are available at the project's home page:

http://www.cbs.dk/departments/econ/staff/pmoellgaard/P97-8122R.htm

APPENDIX I

SEMI-STRUCTURED INTERVIEW WITH SELECT CAR COMPONENT SUPPLIERS (OR THEIR CUSTOMERS)[1]

Purpose

To understand

- in what way complexity, technology transfer, and vertical restraints are (or are not) related
- how firms bargain about exclusive agreements
- what determines each firm's bargaining position
- to what extent the (efficiency) gains resulting from the interaction between firms remain exclusive to the directly involved parties, spill-over to other firms, and/or are passed on to consumers.

A Complexity

1. What does the complexity of the product consist of?
2. Where does the international technology frontier lie in this product area? Who drives it (i.e. who are the main players)? Where is innovation most likely to come from in this area? [To frame your questions please make use of the background material about individual product categories in the FT survey on the automotive supply industry.]
3. How distant are you from this frontier? Why? What is your best bet of bridging the gap?

B Technology transfer

I. If you are a technology transfer recipient…

1. … what exactly is being transferred?
2. … does it upgrade what you make (product), how you make it (process), or something else?
3. … is the upgrade incremental (i.e. based on your previous capabilities) or does it introduce a genuinely new competence?
4. … could you have (easily) acquired this technology on the open market?
5. … did you produce this or a similar technology even prior to the transfer from your partner?

1. If you are not a technology transfer recipient…

1. …why not?

[1] Only interview an assembler if you have one of its suppliers among your other case studies.

Note: Sections C-D only for firms who have VRs in place.

C Vertical restraints

1. What does the VR consist of (i.e. what does the agreement say: scope, sanctions etc.)? How long is it valid for?
2. Why did you consent to an exclusive agreement?
3. Are you familiar with regulations concerning VRs in your country/in the EU?
4. Did you notify any authorities about the VR? If no, why not? If yes, how did they react?

D Bargaining

1. Is the agreement a standard contract specific only to the relationship in question (i.e. supplier to firm X must not sell to anyone else), or does it reflect your own situation as a manufacturer in terms of where you source from; who you sell to; who and where your competitors are; who and where your VR-party's competitors are?
2. Did you negotiate the agreement or did you just sign up to it? Did you change any of its provisions? Which?
3. Did you have problems (financial or otherwise) when you agreed to the VR?
4. Were you familiar with VRs or was this your first exclusive agreement?

E Gains from relationship

1. Has the relationship with your partner (i.e. the firm that imposes a VR, transfers technology, or both) improved what you make and how you make it, or how you get your product to the (which) market(s)? Has it broadened your value-added scope?
2. Have you become more productive?
3. Have you become more profitable?
4. Have you lowered prices? If yes, who benefited from this?
5. Has the relationship with your partner changed your relationships with other suppliers or customers? In what way?