# On the Determinants of Cross Border Co-operation of Austrian Firms with Central and Eastern European Partners

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## Abstract

*We analyse cross–border co-operation of Austrian firms with CEEC partners. Firm size, previous experience with co-operation and depth of integration with the most important partner are more important determinants of co-operation than distance to the closest potential partner. Firms with experience of co-operation are more likely to enter business relationships and less likely not to co-operate. Small firms are unlikely to co-operate in incentive contracts, while firms which are part of production networks typically co-operate in business and ownership relationships. Distance to the closest potential partner increases the probability of not co-operating and reduces the probability of ownership relationships.*


## Introduction

Austria experienced a remarkable increase in the internationalisation of its economy in the last decade. The opening of Central and Eastern European Countries (CEECS) was one of the driving forces for this development. 30% of Austrian foreign direct investments abroad were invested in the CEECs in 1998. Aside from this, the opening of CEECs also had implications for forms of cross – border relationships of firms, not so well documented by official data, such as franchising, subcontracting, long term supplier relationships and informal networks. With the planned enlargement of the European Union it has often been argued (e.g. BRESSAND and CSAKI, 1992 and KRÄTKE, 1998) that as integration proceeds, transboundary production networks should emerge. Furthermore, it is often stated (SCHMIDT, 1997) that these networks will have a regional dimension, favouring regions closer to the border. Case studies concerning East-West cross – border co-operation of particular industries (e.g. in a recent collective volume edited by Zysman and Schwarz, 1998) and border regions (e.g. SCHMIDT, 1998 and SCHMIDT and GERLING, 1998) by contrast suggest that both the extent of cross border networking has been low and relationships with CEECs are dominated by hierarchical structures based on joint or sole ownership by western partners.

This paper uses a data set of Austrian firms - as one of the countries most strongly affected by the opening of CEECs - to study the role of various factors in forming cross-border inter-enterprise co-operation. In particular

we argue that different forms of co-operation - such as ownership relationships, incentive contracts (franchising and subcontracting) and lose business relationships - may depend differently on certain variables – such as distance to the closest partner, firm size, previous experience with co-operation and expectations of future developments. We use econometric techniques to determine the relative importance of these factors in the conclusion of different types of co-operation agreements. To our knowledge this issue has not yet been analysed with such methods for cross border networks.[1] One variable of particular interest in this context is distance between potential partners in forming co-operations, since the advantages of small distances between partners in forming co-operation, may not pertain to all possible legal forms. If different forms of co-operation require different intensities of personal interaction and distance between potential partners is a measure of the cost of interaction, forms of co-operation which require much interaction should be preferred by partners close to each other and firms which are far from one another should chose co-operations which require less personal contact.

The paper also extends previous analysis on Austria in a number of ways: First, in contrast to earlier descriptive work on our data set, which has focused on the problems faced by co-operating firms in the CEE and the impediments to co-operation (AIGINGER and CZERNY, 1998) or on the regional distribution of co-operating firms (ALTZINGER et al, 2000) this paper analyses the determinants of entering a co-operation agreement. Second, the paper extends the analysis of business networks within Austria conducted on other data sets (FISCHER and VARGA, 1999; KAUFMANN and TÖDTLING, 1998, STEINER and HARTMANN, 1998) to the analysis of cross border activities of firms, which may be of particular relevance for a small open economy such as Austria. Third, it extends the analysis concerning Austrian FDI's in CEECs (ALTZINGER and BELLAK, 1998 and PFAFFERMAYR, 1999) to other relationships. In the next section we present the theoretical arguments which guide our analysis. In section three we describe the data set. Section four presents the econometric method and reports results. Section five summarises.

## Theoretical Starting Points

The last decades have brought forth new forms of industrial organisation which are not easily classified within the traditional co-ordination mechanisms of markets and ownership. These have been given different names such as networks (GRABHER, 1993), clusters (PORTER, 1990), clans (OUCHI, 1980) and hybrids (MENARD, 1996). While these terms differ in contents, their common focus is the idea, that the extent and nature of relationships

among firms is important to regional development, and that such relationships combine elements of both hierarchical and market co-ordination. The role of distance and firm size in establishing such networks are a central theme in the regional economics literature. In particular it has been found that regional networks are based on tightly knit webs of contacts among primarily small and medium sized enterprises located close to each other and that there is a link between the structure and density of networks and regional development and innovation (see: BALESTRI, 1994, BAYER, 1994, BOSCHMA, 1999 and GRAZIANI 1998, KAUFMANN and TÖDTLING, 2000 and GROTZ and BROWN, 1997).

Industrial and organisational economists by contrast have focused on individual firms' decisions to enter a relationship. According to transaction cost theory (WILLIAMSON, 1991) firms choose a form of co-operation to minimise transaction costs. In this theory, costs associated with building co-operation are not independent of the type of relationship chosen. FORSGREN and JOHANSON (1992) for instance differentiate between business relationships and strategic relationships. In strategic relationships a formal contract exists between partners; in business relationships such a contract does not exist. In consequence in strategic relationships the continuity and commitment to the relationship is regulated by legal norms. In business relationships they have to be redefined repeatedly. Thus building and maintaining "trust" among partners (see: LORENZ, 1998, LORENZEN, 1998, SCHMITZ, 1999) are important elements of transaction costs of such relationships. There is, however, also heterogeneity among contractual relationships. In particular there are differences in the kind of incentives provided by different contracts. In relationships based on ownership principals provide only limited incentives to agents. Thus control by the owner is the major method to secure motivation. In incentive contracts (such as franchising and licensing) by contrast incentives are provided. In consequence controlling agents will be less important (see: YEUNG, 1994).

This suggests a typology of inter-firm co-operation which distinguishes between the role played by different forms of transaction costs and the importance of building and maintaining trust. In such a typology a difference has to be made between forms of co-operation which are based on (majority and minority) ownership, where principal agent problems are most important, incentive contracts (such as franchising and licensing), where incentives are provided for by contract, and business relationships, which are not based on formal contracts and where building and maintaining trust will be more important.

If different forms of co-operation require different intensities of personal interaction and distance between two partners is a measure of the cost of such interaction, the choice of form of co-operation will depend on distance. In particular we would expect distance between potential partners to play a role in the formation of ownership contracts, since it can be considered a proxy for the costs of controlling agents, and potentially in relationships dependent on trust and commitment, to the extent that maintaining such trust and commitment requires personal interaction. Distance between actors is not the only influence on creation of inter-enterprise co-operation, however. The probability of co-operation also depends on a number of other firm specific characteristics: In most models of foreign direct investment, for instance, the decision to invest inter alia depends on the expected future development of the country under consideration (CAVES, 1996). Thus expectations about the future development of the receiving countries should be reflected in the choice of co-operation. Also empirical evidence (AMIR and WODERS 1998, CASSIMAN and VEUGELERS, 1999) points to a higher probability of co-operation for larger firms. These firms are more likely to have specialised resources for creating and administering relationships, and can thus handle co-operation agreements at a lower cost. Similarly, firms with previous experience of co-operation can be expected to have such specialised resources. Finally, a number of studies (CASSON and COX, 1992, RALLET and TORRE, 1998) argue that enterprise culture and ownership form may have an impact on the choice of relationship. In particular firms acquainted with more open information may find it easier to credibly communicate and co-operate with partners abroad.

## Data

Our data stems from a questionnaire conducted among 505 Austrian firms.[2] These were asked whether they co-operate with a partner from the CEECs, and whether they were also co-operating with a partner from the EU or within Austria. Furthermore, firms co-operating with CEEC partners were asked detailed questions on the number of co—operations, the legal form of co-operation (majority ownership, minority ownership, franchising, licensing or other) and the goal of the most important co-operation (sales, production, service). Finally, firms were asked to evaluate their expectations of the future development on a scale from 1 (very good) to 5 (very bad). [3] From this data we construct a variable which in accordance with theoretical considerations differentiates between three types of co-operation. These are first, ownership contracts in which the responding firm stated that

the relationship was based on either a majority or a minority stake in the CEE partner, second, relationships based on incentive contracts such as franchising and licensing and finally, all relationships where the firm responded to have another form of co-operation. We interpret this last group to represent mainly business relationships. We focus on the relative importance of the following variables in determining the probability to form a co-operation:

1) Road distance to the nearest border from the address of the firm under consideration - We use this variable as a proxy measure for the distance to the nearest potential partner. This allows us to measure the impact of distance even for non-co-operating firms, where distance between actual partners cannot be measured. This is necessary to identify the role of distance in the decision of firms not to co-operate but comes at the cost of not being able to identify the actual distance of co-operation. In the context of our analysis this may be less of a problem, because a) we focus exclusively on neighbouring CEECs of Austria (Czech Republic, Hungary, Slovakia and Slovenia) thus limiting the geographic extent of co-operation and b) because a minimum requirement for networks based on proximity to emerge would be a ceteris paribus higher chance of firms in border regions to engage in co-operation.
2) Firm Size – we use dummy variables for firms employing 1 – 49 and 50 - 99 employees, respectively. The reference category are firms with 100 or more employees.[4] Firm size may have a different impact on the form of co-operation chosen, if for instance, small firms face liquidity constraints and are thus less likely to engage in ownership based relationships or incentive contracts require specialised resources, which small firms are less likely to possess.
3) Proxies for the organisation of firms – here we use a dummy variable for unincorporated companies as well as for public limited companies as a proxy for enterprise culture and openness to co-operation. The reference category are private limited liability companies. Aside from proxying for differences in enterprise culture this variable may be again correlated with access to capital markets and may thus have differential impact on different forms of co-operation.
4) Dummies concerning the expected economic development in the CEECs as a proxy for the profits expected by the firm from engaging in a business activity in the CEE. -. Based on the information concerning firms

expectations of future developments in CEECs we formed a dummy which takes on the value one if the firms` management expects a positive (i.e. either very good or good) development and 0 else.

5) Dummies for previous experiences with co-operation - we include a dummy to measure previous experience with international and national co-operation which takes on the value 1 if the respective firm stated that it also co-operated with other partners from the EU or Austria, respectively. This variable was included to account for potential increasing returns to scale in co-operation activities.

Furthermore, we include a dummy variable if the firm is located in the south of Austria (Carinthia or Styria), because political problems of former Yugoslavia in the last decade may have prevented co-operation. Measuring distance to the border of Slovenia for the south could thus distort results. Finally, we control for firms which are part of production networks by including a dummy variable which takes on the value of one if the most important co-operation (in EU and CEE countries) mainly serves production. This variable is a proxy for the depth of integration in international networks of the respective firm and the nature of networks. Since franchising and subcontracting are more afine to sales than production networks, we expect this variable to have a differential impact on forms of co-operation.

Table 1 reports statistics concerning the co-operation activities of the sampled firms. The top panel shows the share of firms in border and non border regions (we define border regions as all territories within 100kilometres of the border) co-operating with a partner in at least one of three regions (EU, Austria, CEE). There is substantial interaction between CEECs and Austrian firms relative to co-operation within Austria or the EU. 41% of the firms sampled have at least one co-operation with a partner from the CEECs and 45% with the EU. Cross border co-operation is more important than co-operation within Austria. Only 36% of the firms have at least one co-operation partner within Austria. This finding is consistent with previous research on R&D co-operations and reflects the smallness of the country. [5]

{Table 1: Around here}

The share of firms co-operating with at least one partner in the CEE is higher in border than in non – border regions as is the share of firms co-operation with EU and Austrian partners. This can be attributed to the

economic structure of the Austrian border region. The three largest cities (Vienna, Graz and Linz) are all located within hundred kilometres from the border[6] and three of the five NUTS 2 regions bordering on the CEECs (Upper Austria, Lower Austria and Styria) are characterised by an industrial structure based on relatively large manufacturing firms, which may increase co-operative activity.

The numbers reported in the top panel of table 1 do not add to a hundred percent, since a large share of firms co-operate with partners from more than one region. This is shown in the bottom panel where all possible combinations of co-operation with the three regions are displayed, thus allowing for multiple partnerships. A large share of the firms (21.8%) co-operate with partners from all three regions considered, 8.5% of the firms co-operate with CEECs only. 39% of the firms have no partnership at all. Interestingly the share of firms co-operating exclusively with CEE partners is higher (9.1%) in non-border regions in border regions (8.1%), while for all other combinations the share of co-operating firms is higher in border regions.

Table 2 shows descriptive statistics of the independent variables. The average firm in our sample is located around 135 kilometres from the nearest border to the CEECs. Non – co-operating firms are located somewhat further from the border, than firms with an ownership based contract, incentive based co-operations are also closer. For other forms of co-operation distance to the border does not differ markedly from the average. Firms co-operating with the EU and other partners are clearly the most important category among co-operating firms. Only 22% of the firms not co-operating with CEE partners are co-operating with the EU as compared to 42% in the overall sample. The share of firms co-operating with EU partners is between 60% and 90% (depending on the co-operation) among firms co-operating with EU partners, by contrast. Finally, small firms are underrepresented among the co-operating firms.

{Table 2: Around here}

## Results

We model the choice between K different forms of co-operation as determined by the expected profit ($\pi_{ik}$) of this form of co-operation (k) for firm (i). The firm entering a particular co-operation decides simultaneously between

the forms of co-operation. Furthermore, we assume that expected profits of a particular co-operation depend linearly on the set $X_i = \{X_{i1}...X_{iN}\}$ of exogenous firm characteristics described above. Thus:

(2) $$\pi_{ik} = \alpha_k + b_k X_i + \xi_{ik}$$

with $\alpha_k$ a scalar and $\beta_k$ a vector of parameters to be estimated and $\xi_{ik}$ a random variable, distributed independently across the choices (k). An appropriate econometric model for such a problem is a multinomial logit model (see: Greene 1993). This estimates the probability that a firm is in one of several possible states which are encoded as: no co-operation (0), ownership (1), incentive contract (2) and business relationship (3), relative to the probability of being in an arbitrarily chosen reference state[7].

Results (reported in Table 3) suggest substantial heterogeneity in the determinants for each of the forms of co-operation: Performing Wald tests of the hypothesis that the coefficients of a particular variable are equal to zero for each and every form of co-operation (MADDALA, 1983) we find all variables, but the dummy variables for the public limited liability companies, unincorporated companies and expectations (see: the last column of table 3) have a significant impact on relative probabilities. For the distance variable, however, we can only reject the hypothesis at the 10% level. This is indication, that distance to the closest potential partner is less important in forming cross-border co-operation than other variables. Furthermore, testing the hypothesis that choices for the three forms of co-operations are determined in a similar fashion (i.e the null $b_k=b_j$. and $b_k=0$ for a comparison with the base category) suggests that our variables discriminate well between co-operating and non co-operating firms as well as between ownership and business relationships (see the last three rows of table 3). We, however, cannot reject the null that incentive based contracts are similar to either ownership based or business relationships, which supports the suggestion of the theoretical literature that such incentive contracts are forms of co-operation "intermediary" to ownership and relatively lose forms. [8]

{Table 3: Around here}

Since relative probabilities are hard to interpret table 4 displays marginal effects for the variables included. These can be interpreted as the percentage point change in the probability to enter a particular form of co-

operation given a 1% deviation from the mean for continuous variables such as distance, and the percentage point change in the probability to enter a particular form of co-operation if a dummy variable changes from 0 to 1.[9]

The impact of distance on the probability to co-operate is small relative to other determinants. A 1% deviation from the mean distance to the border increases the probability to have no co-operation by 0.05 percentage points and reduces the chances of having a ownership based relationship by –0,04 percentage points. Its impact on the probability to enter an incentive based contract (franchising or subcontracting) and business relationships is insignificant. An explanation for this may be that face – to – face contact may only be necessary in building trust rather than maintaining it, if such "trust contact" in for instance long term buyer - seller relationships, is mediated by meetings at neutral locations or by third parties, the need to form "trust" through personal contact in such relationships may be overemphasised..[10]

The presence of previous experience of co-operation with international partners is one of the most important determinants of co-operation. It, however, has impacts of different magnitude on different forms of co-operation. The presence of an international co-operation reduces the likelihood of having no co-operation at all by 33 percentage points and increases the chances of a business relationship by 17 percentage points. The impact on contractual and ownership based forms of co-operation by contrast is small. The presence of an international co-operation increases the probability of such an ownership based co-operation by only 11 percentage points. The impact on incentive based contracts remains insignificant. Experience with co-operation with Austrian partners by contrast has no significant impact on co-operation.

Firm size also has an effect on the choice of form of co-operation. The probability of small firms with less than 50 employees not co-operating is 19 percentage points higher than that of firms with more than 100 employees. While small firms co-operate significantly less in incentive based co-operations and slightly less in ownership based forms, medium sized firms co-operate slightly more in more lose forms of co-operation. Furthermore, unincorporated companies have a significantly lower chance of not co-operating with CEE partners.

Enterprises in southern Austria co-operate less in all forms of co-operation. The strongest impact is found for ownership based relationships. This fits well with our conjecture that the political risks in the Balkans have impinged on the co-operation activities. Since political as well as economic risks are primarily relevant to

investment decisions, higher political risks should also primarily impact on ownership based forms of co-operation.

Finally, firms which are part of a producer network aside from facing a lower chance of not co-operating also co-operate significantly more in ownership based and in business relationships. These results reflect the fact that franchising and subcontracting networks are more afine to the service and sales functions of enterprises.

{Table 4: Around here}

## Conclusion

This paper analyses the cross – border co-operation activities of Austrian firms with partners from CEECs. We focus on the relative importance of distance and other determinants in the decision to co-operate and the choice of form of co-operation. We find that firm size, previous experience with co-operation and depth of integration with the most important partner are more important determinants of the choice of co-operation than distance to partners. The importance of these determinants differs for different forms of co-operation. In particular firms with previous experience of co-operation are more likely to enter business relationships and less likely not to co-operate at all. Small firms are less likely to co-operate and particularly unlikely to co-operate via incentive contracts, while firms which are part of production networks tend to co-operate more often in business and ownership based relationships.

Furthermore, the probability of not co-operating increases with the distance to the closest potential partner. Distance has a negative impact on the probability of entering an ownership based relationship, but is uncorrelated with other forms of co-operation. The effect of distance is also small relative to the impact of other variables. Moving a 100 km from the nearest potential partner increases the probability of an ownership based co-operation by only 4%. Furthermore, our finding that the probability of entering a business relationship is independent of distance suggests that the role of face – to – face contact in maintaining trust in such relationships may be overrated.

Our findings have implications for the kind of cross border networks, which can be expected to emerge in the course of integration of the CEECs. In particular they suggest that the role of distance in creating cross-border

networks is overemphasised relative to the importance of other factors such as experience with co-operation and firm size. The results suggest that cross - border networks based on proximity should emerge primarily in relationships involving direct investments in particular when larger firms are involved. Chances for unhierarchical cross border networks based on proximity, as envisaged by many for European border regions, do not seem to be likely outcomes for the immediate border regions.

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*Table 1: Patterns of Co-operation of Austrian firms*

| | border[1)] | non-border[2)] | overall |
|---|---|---|---|
| Involving EU | 46.97 | 40.57 | 44.75 |
| Involving CEE | 43.64 | 37.14 | 41.39 |
| Involving Austria | 39.39 | 28.57 | 35.64 |
| None | 35.76 | 45.14 | 39.01 |
| | | | |
| Austrian | 6.67 | 3.43 | 5.54 |
| Austrian and EU | 6.36 | 5.71 | 6.14 |
| Austria and CEE | 2.42 | 1.71 | 2.18 |
| EU only | 7.58 | 8.57 | 7.92 |
| EU and CEE | 9.09 | 8.57 | 8.91 |
| CEE only | 8.18 | 9.14 | 8.51 |
| All | 23.94 | 17.71 | 21.78 |
| None | 35.76 | 45.14 | 39.01 |
| | 100.00 | 100.00 | 100.00 |

1) Firms located less than 100 kilometres from the border 2) Firms located more than 100 kilometres from the border

*Table 2: Means and Standard deviations of independent variables by form of co-operation*

| Variable | Overall | No Co-operation | ownership | Incentive | Business Relationship |
|---|---|---|---|---|---|
| Distance | 135.53 (153.09) | 141.91 (158.08) | 114.13 (127.65) | 119.26 (150.63) | 139.19 (161.63) |
| Experience with co-operation (base category no co-operation) | | | | | |
| Co-operation with EU partners* | 0.42 | 0.22 | 0.63 | 0.78 | 0.89 |
| Co-operation with Austrian partners* | 0.50 | 0,33 | 0.71 | 0.83 | 0.90 |
| Firm size (base category firms with more than 100 employees) | | | | | |
| Less than 50 employees* | 0.53 | 0.68 | 0.38 | 0.26 | 0.14 |
| 50 to 99 employees* | 0.32 | 0.22 | 0.40 | 0,35 | 0.64 |
| Expectations of future development (base category others) | | | | | |
| Good or very good* | 0.43 | 0.35 | 0.58 | 0.57 | 0.54 |
| Legal Form (base category private limited company) | | | | | |
| unincorporated * | 0.16 | 0.17 | 0.18 | 0.17 | 0.08 |
| public limited company* | 0.06 | 0.04 | 0.08 | 0.09 | 0.13 |
| Control variables | | | | | |
| Firm located in the south of Austria (Styria or Carinthia)* | 0.13 | 0.14 | 0.09 | 0.09 | 0.08 |
| Most important cooperation serves the pupose of Production | 0.18 | 0.04 | 0.41 | 0.26 | 0.51 |
| | | | | | |
| No of firms | 501 | 317 | 90 | 23 | 71 |
| (in %) | 100.00 | 63.27 | 17.96 | 4.59 | 14.17 |

Note: Numbers in brackets refer to the standard deviations. Variables Indexed by * are Dummy variables. Their standard deviation is given by the square root of (1-mean)*mean

*Table 3: Estimation results of Multinomial Logits (Dependent variable legform)*

| | Coefficient. (Standard. Error) | | | Wald tests for independent variables[a] |
|---|---|---|---|---|
| | All Firms | | | |
| | Ownership versus None | Incentive versus None | Business rel versus None | P- Value (Chi2 with 3 dof) |
| Distance | -0.0027** | -0.0025 | -0.0016 | 0.058 |
| | (0.0011) | (0.0019) | (0.0009) | |
| Experience with co-operation (base category no co-operation) | | | | |
| Co-operation with EU partners* | 1.1011** | 1.7007* | 2.5240*** | 0.011 |
| | (0.5034) | (0.9446) | (0.8537) | |
| Co-operation with Austrian partners* | 0.05234 | 0.5577 | 0.3650 | 0.750 |
| | (0.4995) | (1.0557) | (0.8956) | |
| Firmsize (base category firms with more than 100 employees) | | | | |
| Less than 50 employees* | -0.7043 | -1.7072** | -0.9861* | 0.037 |
| | (0.4293) | (0.6624) | (0.5387) | |
| 50 to 99 employees* | 0.0426 | -0.7770* | 0.9127** | 0.047 |
| | (0.4127) | (0.6571) | (0.4603) | |
| Expectations of future development (base category others) | | | | |
| Good or very good* | 0.4380 | 0.4439 | 0.1798 | 0.457 |
| | (0.2919)) | (0.4780) | (0.3468) | |
| Legal Form (base category private limited company) | | | | |
| unincorporated * | 0.6998* | 0.9795 | 0.3267 | 0.152 |
| | (0.3697) | (0.6014) | (0.5414) | |
| public limited company* | 0.2000 | -0.2013 | 0.5689 | 0.781 |
| | (0.5902) | (0.9726) | (0.5979) | |
| Control variables | | | | |
| Firm located in the south of Austria (Styria or Carinthia)* | 2.5552*** | 1.6996** | 2.8134** | 0.000 |
| | (0.4301) | (0.6635) | (0.4972) | |
| Most important cooperation serves the pupose of Production | -1.0016*** | -1.1429 | -1.1450** | 0.034 |
| | (0.4308) | (0.8314) | (0.5380) | |
| constant | -1.9645*** | -2.8892** | -3.6578*** | |
| | (0.4770) | (0.8880) | (0.6282) | |
| Hausmann tests of IIA assumption (Chi2 with 22 dof)[b] | 2.306 | 0.681 | 1.503 | |
| Wald test for merge with Incentive (Chi2 with 10 dof)[c] | 0.779 | | | |
| Wald test for merge with Business ( Chi2 with 10 dof) [c] | 0.011 | 0.253 | | |
| Wald test for merge with None (Chi2 with 10 dof) [c] | 0.000 | 0.000 | 0.000 | |
| Log likelihood | -386.00 | | | |
| Model chi – squared | 152.37 | | | |
| Pseudo R2 | 0.28 | | | |
| Sample size | 501 | | | |

Dependent variable: Form of Co-operation, Numbers in brackets are heteroskedasticity robust standard errors of the estimate, a) Ho: All coefficients associated with given variable(s) are 0 (P-Value) b) H0: Odds(Outcome-J vs Outcome-K) are independent of other alternatives ($\chi^2$ values) c) Ho: All coefficients except intercepts associated with given pair of outcomes are 0 (i.e., categories can be collapsed) (P-Value).

*Table 4: Marginal effects of estimates*

| | none | Ownership | Incentive | Business |
|---|---|---|---|---|
| | Total Sample | | | |
| Distance | 0.0005*** | -0.0004** | -0.00007 | -0.00006 |
| | (0.0002) | 0.0002 | (0.00007) | (0.00007) |
| Experience with co-operation (base category no co-operation) | | | | |
| Co-operation with EU partners[1)] | -0.3323*** | 0.1076 | 0.0495 | 0.1752** |
| | (0.1031) | 0.0729 | (0.0438) | (0.0398) |
| Co-operation with Austrian partners[1)] | -0.1024 | 0.0715 | 0.0160 | 0.0148 |
| | (0.1007) | (0.0723) | (0.0386) | (0.0547) |
| Firmsize (base category firms with more than 100 employees) | | | | |
| Less than 50 employees[1)] | 0.1904** | -0.0802* | -0.0612** | -0.0489 |
| | (0.0804) | (0.0619) | (0.0311) | (0.0323) |
| 50 to 99 employees[1)] | -0.0386 | -0.0025 | -0.0285 | 0.0696* |
| | (0.0804) | (0.0579) | (0.0197) | (0.0383) |
| Expectations of future development (base category others) | | | | |
| Good or very good[1)] | -0.0801 | 0.0626 | 0.0131 | 0.0044 |
| | (0.0548) | 0.0437 | (0.0174) | (0.0203) |
| Legal Form (base category private limited company) | | | | |
| unincorporated[1)] | -0.1495** | 0.1045 | 0.0382 | 0.0067 |
| | (0.0766) | (0.0682) | (0.0376) | (0.0350) |
| public limited company[1)] | -0.0554 | 0.0237 | -0.0098 | -0.0415 |
| | (0.1160) | (0.0903) | (0.0279) | (0.0514) |
| Control Variables | | | | |
| Firm located in the south of Austria (Styria or Carinthia) [1)] | 0.1812*** | -0.1104*** | -0.0257 | -0.0451** |
| | (0.0513) | (0.0421) | (0.0163) | (0.0209) |
| Most important cooperation serves the pupose of Production[1)] | -0.5598*** | 0.3653*** | 0.0189 | 0.1756*** |
| | (0.0734) | (0.0694) | (0.0263) | (0.0588) |

Values in brackets are heteroskedasticity robust standard errors of the estimate, Variables designated by [1)] are dummy variables. For these the marginal effects reported are the effects of a c.p. change of the variable from 0 to 1 at the mean of all other variables. For distance the marginal effect is the partial derivative evaluated at the mean vector.

## NOTES

[1] Although the literature on franchising (see: KEHOE, 1998, LAFONTAINE and SHAW, 1996, DNES, 1996) uses similar techniques to establish findings in accordance with ours, this literature focuses on franchising networks within a country. We analyse a wider set of relationships in a cross border context between neighbouring countries. This may lead to different results, if borders represent an additional barrier to co-operation.

[2] A detailed description of the data is available in AIGINGER and CZERNY (1998). A copy of the questionnaire is available from the author upon request.

[3] Non co-operating firms were asked whether they were planning to co-operate, had already co-operated or were interested in co-operation. Furthermore, both co-operating and non-co-operating firms were asked detailed questions concerning problems and impediments to co-operation. These have been analysed in AIGINGER and CZERNY, 2000 and ALTZINGER et al 2002. We do not repeat this analysis.

[4] The choice of dummy variables rather than actual size is due to data limitations in the questionnaire.

[5] For instance, HUBER and KLETZAN (2000) report that 42% of the firms sampled in the community innovation survey co-operate with partners from the EU but only 36.6% with Austrian partners.

[6] MAYERHOFER and WOLFMAYER - SCHNITZER (1997) present evidence that in particular Vienna has attracted headquarter functions for CEECs.

[7] We chose the state 0 (no co-operation) as reference state.

[8] The independence of irrelevant alternatives (IIA) was tested by the test proposed by HAUSMANN and MC FADDEN, (1984) We cannot reject the IIA assumption. Our model is thus well specified.

[9] Results are robust across a number of specifications: Exclusion of insignificant variables, exclusion of firm size dummies as well as inclusion of a large city dummy variable leave results qualitatively unchanged. Estimation including only firms with less than 100 employees or only manufacturing firms do not change qualitative results. Results are available from the author upon request.

[10] Unfortunately, this issue is beyond the scope of our data. We lack information on the how and under what circumstances co-operation agreements were concluded.

## Appendix: Robustness of Results

To check for the robustness of our results we conducted a number of additional experiments. First, we omitted all insignificant variables (i.e. the AG, POSEXP and NATCOOP variables) from our regression. Second, we included a dummy variable which takes on the value 1 if the firm was located in one of the large cities (Vienna, Linz, Graz) of Austria to control for potential effects arising from headquarters. These variations change the quantitative estimates only minimally and leave the main qualitative findings untouched (see Tables A2 and A3). The dummy variable controlling for large cities fails to be significant, however, which is evidence in favour of our original specification.

We were also concerned that firm size may be collinear with other explanatory variables such as the dummy for the presence of a co-operation with EU partners or the organisational form of the firm, thus we excluded the size dummies from our regression. (see Table A5) This changes the magnitude of coefficients which may be collinear with size (such as existing co-operations with the EU. It, however, also leaves the qualitative results of our regressions unchanged.

Finally, we considered potential differences in coefficients across different kinds of firms. We hypothesise, that due to smaller capacities of acquiring information in small firms, distance could be more important in shaping their co-operation behaviour. Thus we estimated equation (3) including only firms with less than 100 employees (see Table A1). Our results suggest few differences in the behaviour of small firms relative to that of large firms.[1] Although we find a higher marginal effect of distance on the probability to enter an ownership based co-operation, the increase relative to the overall sample is small. Also we find that positive expectations concerning the future development of the CEE have a more important impact on the probability to co-operate for small firms. In particular the probability of entering an ownership based co-operation is increased by better expectations of small firms.

We also hypothesise that firms in manufacturing may be less sensitive to distance in their co-operation activities. Thus we estimated equation (3) focusing on manufacturing firms only (see Table A4). Again our hypothesis finds only weak support. The impact of distance on the probability changes by a small amount. Effects of previous co-operation on the probability to enter an incentive based co-operation are stronger for production enterprises and firm size has a more pronounced impact on the chances to enter a business relationship. In general, however, differences in the determinants of co-operation among different types of firms seem to be small.

*Table A1: Marginal effects of estimates for sub-groups of firms*

| | None | Ownership | Incentive | Business |
|---|---|---|---|---|
| | Small (less than 50 employees) firms only | | | |
| distance | 0.0006** | -0.0005*** | -0,0001 | -0.00001 |
| | (0.0002) | (0.0002) | (0,0001) | (0.0001) |
| eucoop[1)] | -0.3345*** | 0.1177* | 0.0433 | 0.1734** |
| | (0.1061)) | (0.0699) | (0.0392) | 0.0846 |
| natcoop | -0.1065 | 0.0772 | 0.0117 | 0.0176 |
| | (0.0934) | (0.0666) | (0.0296) | (0.0488) |
| medfirm | -0.1977*** | 0.0619 | 0.0149 | 0.1209*** |
| | (0.0594) | (0.0477) | (0.0181) | (0.0350) |
| Posexp[1)] | -0.0993* | 0.0848* | 0.0138 | 0.0007 |
| | (0.05419) | (0.0443) | (0.0128) | (0.0199) |
| Person[1)] | -0.1446* | 0.0815 | 0.0451 | 0.0179 |
| | (0.0764) | (0.0633) | (0.0350) | (0.0341) |
| ag[1)] | -0.1216 | 0.0535 | 0.0401 | 0.0280 |
| | (0.1103) | (0.0955) | (0.0665) | (0.0490)) |
| prod[1)] | -0.5392*** | 0.3272** | 0.0360 | -0.1761** |
| | (0.0941) | | (0.0339) | (0.0711) |
| | | (0.0874) | | |
| sued[1)] | 0,1504*** | -0.1020*** | -0.0205 | -0.0028 |
| | (0.0458) | 0.0363 | (0.0132) | (0.0215) |
| | Manufacturing Firms only | | | |
| distance | 0.0004** | -0.0003* | -0.00005 | -0.00005 |
| | (0.0002) | (0.0002) | (0.00006) | 0.00008 |
| eucoop[1)] | -0.3656*** | 0.1025 | 0.1073** | 0.1558** |
| | (0.1169) | (0.0751) | (0.0513) | 0.0785 |
| natcoop | -0.0359 | 0.0588 | -0.0369 | 0.0140 |
| | (0.1178) | (0.0765) | (0.0349) | (0.0627) |
| smallfirm[1)] | 0.1977** | -0.0752 | -0.0666** | -0.0559* |
| | (0.0770) | (0.0602) | (0.0296) | (0.0338) |
| medfirm | -0.0697 | 0.0096 | -0.0231 | 0.0832** |
| | (0.0790) | (0.0558) | (0.0196) | (0.414) |
| Posexp[1)] | -0.0850 | 0.0649 | 0.0111 | 0.0090 |
| | (0.0591) | (0.0466) | (0.0170) | (0.0255) |
| Person[1)] | -0.1108 | 0.1005 | 0.0091 | 0.0013 |
| | (0.0775) | (0.0716) | (0.0327) | (0.0373) |
| ag[1)] | -0.0888 | 0.0445 | -0.0096 | -0.0540 |
| | (0.1199) | (0.0932) | (0.0256) | (0.0579) |
| prod[1)] | -0.6019*** | 0.3858*** | 0.0207 | 0.1954 |
| | (0.0736) | (0.0781) | (0.0273) | (0.0641) |
| sued[1)] | 0.1445*** | -0.0841** | -0.0193 | -0.0411** |
| | (0.0581) | (0.0471) | (0.0171) | (0.0246) |

Notes: see notes to table 4

*Table A2: Estimation results of Multinomial Logits (Dependent variable legform)*

| | Results excluding insignificant variables | | | | Results including large city dummy | | | |
|---|---|---|---|---|---|---|---|---|
| | Coefficient. (Standard. Error) | | | Wald tests for independent variables[a)] | Coefficient (Standard. Error) | | | Wald tests for independent variables[a] |
| | Ownership versus None | Incentive versus None | Business rel versus None | P- Value (Chi2 with 3 dof) | Ownership versus None | Incentive versus None | Business rel versus None | P- Value (Chi2 with 3 dof) |
| distance | -0.0026** (0.0011) | -0.0024 (0.0018) | -0.0016 (0.0011) | 0.057 | -0.0027** (0.0011) | -0.0026 (0.0018) | -0.0016 (0.0009) | 0.055 |
| eucoop | 1.5871*** (0.3046) | 2.2192*** (0.5549 | 2.8672 (0.4301) | 0.000 | 1.0973** (0.5049 | 1.693* (0.9519) | 2.5178 (0.8570) | 0.012 |
| natcoop | | | | | 0.5309 (0.5034) | 0.5766 (1.0554) | 0.3830 (0.8991) | 0.744 |
| smallfirm | -0.7042*** (0.4317) | -1.6221*** (0.6082) | -1.6221 (0.6017) | 0.025 | -0.7050 (0.4301) | -1.7082** (0.6658) | -0.9872* (0.4349) | 0.038 |
| medfirm | 0.0687 (0.4195) | -0.6848 (0.6018) | 0.8353* (0.4726) | 0.074 | 0.0416 (0.4140) | -0.7777 (0.6595) | 0.9121** (0.4603) | 0.046 |
| posexp | | | | 0.123 | 0.4478 (0.2960) | 0.4738 (0.4783) | 0.1952 (0.3455) | 0.442 |
| persges | 0.7013* (0.3597) | 1.0181* (0.6030) | 0.2750 (0.5355) | 0.000 | 0.7181* (0.3693) | 1.0134* (0.6046) | 0.3494 (0.5346) | 0.134 |
| ag | | | | | 0.1805 (0.5939) | -0.2536 (0.9799) | 0.5406 (0.6027) | 0.796 |
| prod | 0.9551* (0.5484) | -1.1172 (0.8171) | 0.0136 (0.6334) | 0.033 | 2.5356*** (0.4279) | 1.6762 (0.7135) | 2..7920 (0.6334) | 0.000 |
| South | -0,9591*** (0.4152) | -2.7281*** (0.8193) | 2.8409 (0.4979) | | -0.9693*** (0.4349) | -1.1082 (0.8393) | -1.1305 (0.4478) | 0.044 |
| city | | | | | -0.3450 (0.6053) | -0.9197 (0.9994) | -0.4623 (0.6619) | 0.745 |
| constant | -1.706*** (0.4548) | 1.7900*** (0.6430) | -1.0906 (0.4478) | | -1.9434*** (0.4785) | -2.8507*** (0.8999) | -3.6369 (0.6310) | |
| Hausmann tests of IIA assumption (Chi2 with 16 dof)[b)] | 0.341 | -0.211 | -0.518 | (Chi2 with 24 dof)[b] | 5.494 | 0.652 | 0.643 | |
| Wald test for merge with Incentive (Chi2 with 7 dof)[c)] | 0.523 | | | (Chi2 with 11 dof)[c)] | 0.761 | | | |
| Wald test for merge with Business ( Chi2 with 7 dof) [c)] | 0.004 | 0.131 | | (Chi2 with 11 dof)[c)] | 0.018 | 0.288 | | |
| Wald test for merge with None (Chi2 with 7 dof) [c)] | 0.000 | 0.000 | 0.000 | (Chi2 with 11 dof)[c)] | 0.000 | 0.000 | 0.000 | |
| Log likelihood | | -370.78 | | | | -367.41 | | |
| Model chi – squared | | 141.76 | | | | 156.20 | | |
| Pseudo R2 | | 0.27 | | | | 0.28 | | |
| Sample size | | 501 | | | | 501 | | |

Dependent variable: Form of Co-operation, Numbers in brackets are heteroskedasticity robust standard errors of the estimate, a) Ho: All coefficients associated with given variable(s) are 0 (P-Value) b) H0: Odds(Outcome-J vs Outcome-K) are independent of other alternatives (X2 values)c) Ho: All coefficients except intercepts associated with given pair of outcomes are 0 (i.e., categories can be collapsed) (P-Value).

*Table A3: Estimation results of Multinomial Logits (Dependent variable legform)*

| | Results excluding south variable | | | | Results including additional regional variables | | | |
|---|---|---|---|---|---|---|---|---|
| | Coefficient. (Standard. Error) | | | Wald tests for independent variables[a)] | Coefficient (Standard. Error) | | | Wald tests for independent variables[a] |
| | Ownership versus None | Incentive versus None | Business rel versus None | P- Value (Chi2 with 3 dof) | Ownership versus None | Incentive versus None | Business rel versus None | P- Value (Chi2 with 3 dof) |
| distance | -0.0022** (0.0010) | -0.0020 (0.0018) | -0.0011 (0.0011) | 0.149 | -0.0018 (0.0018) | 0.0014 (0.0043) | 0.0007 (0.0020) | 0.554 |
| eucoop | 1.0501** (0.5016) | 1.6434* (0.9525) | 2.4968** (0.8525) | 0.013 | 1.1238** (0.5030) | 1.7885* (0.9500) | 2.5449 (0.8485) | 0.038 |
| natcoop | 0.5090 (0.4972) | 0.5565 (1.0650) | 0.3088 (0.8931) | 0.760 | 0.5181 (0.4981) | 0.5649 (1.0543) | 0.3987 (0.8893) | 0.047 |
| smallfirm | -0.6857 (0.4202) | -1.6915 (0.5016) | -0.9646* (0.5367) | 0.034 | -0.6924 (0.4305) | -1.7083** (0.6640) | -0.9962 (0.5385) | 0.009 |
| medfirm | 0.0696 (0.3997) | -0.7535 (0.6509) | 0.9356 0.4548 | 0.048 | 0.0599 (0.4131) | -0.7674 (0.6546) | 0.9177 (0.4585) | 0.752 |
| posexp | 0.3990 (0.2882) | 0.3879 (0.4700) | 0.1510 (0.3427) | 0.531 | 0.4416 (0.2936) | 0.5075 (0.4708) | 0.2322 (0.3491) | 0.431 |
| persges | 0.6499* (0.3672) | 0.9256 (0.6052) | 0.2909 (0.5274) | 0.194 | 0.7067* (0.3731) | 1.1050* (0.6325) | 0.3939 (0.5431) | 0.127 |
| ag | 0.0560 (0.5937) | -0.3764 (0.9811) | 0.4505 (0.5972) | 0.814 | 0.1606 (0.5940) | -0.3307 (0.9516) | 0.4742 (0.6046) | 0.830 |
| prod | 2.5912 (0.4237) | 1.7346 (0.6457) | 2.8479 (0.4943) | 0.000 | 2.5303*** (0.4292) | 1.6499 (0.6569) | 2.7652 (0.4959) | 0.000 |
| south | | | | | -1.0163** (0.4302) | -1.1880 (0.8201) | -1.1719** 0.5340 | 0.028 |
| West | | | | | -0.3646 (0.6649) | -1.8012 (1.7941) | -1.0335 (0.8249) | 0.576 |
| constant | -2.1072 (0.4666) | -3.0406 (0.8945) | -3.8100 (0.6207) | | -2.0143 (0.4832) | -3.1794 (1.1116) | -3.8039 (0.6398) | |
| Hausmann tests of IIA assumption (Chi2 with 20 dof)[b)] | 0.027 | 2.270 | -2.559 | (Chi2 with 24 dof)[b] | -8.898 | 50.939*** | 0.868 | |
| Wald test for merge with Incentive (Chi2 with 9 dof)[c)] | 0.703 | | | (Chi2 with 11 dof)[c)] | 0.798 | | | |
| Wald test for merge with Business ( Chi2 with 9 dof) [c)] | 0.007 | 0.186 | | (Chi2 with 11 dof)[c)] | 0.014 | 0.138 | | |
| Wald test for merge with None (Chi2 with 9 dof) [c)] | 0.000 | 0.000 | 0.000 | (Chi2 with 11 dof)[c)] | 0.000 | 0.000 | 0.000 | |
| Log likelihood | | -371.89 | | | | -366.51 | | |
| Model chi – squared | | 142.97 | | | | 152.36 | | |
| Pseudo R2 | | 0.27 | | | | 0.28 | | |
| Sample size | | 501 | | | | 501 | | |

Dependent variable: Form of Co-operation, Numbers in brackets are heteroskedasticity robust standard errors of the estimate, a) Ho: All coefficients associated with given variable(s) are 0 (P-Value) b) H0: Odds(Outcome-J vs Outcome-K) are independent of other alternatives (X2 values)c) Ho: All coefficients except intercepts associated with given pair of outcomes are 0 (i.e., categories can be collapsed) (P-Value).

*Table A4: Estimation results of Multinomial Logits (Dependent variable legform)*

| | Results Concerning small firms (less than 50 employees) | | | | Results concerning manufacturing firms | | | |
|---|---|---|---|---|---|---|---|---|
| | Coefficient. (Standard. Error) | | | Wald tests for independent variables[a)] | Coefficient (Standard. Error) | | | Wald tests for independent variables[a] |
| | Ownership versus None | Incentive versus None | Business rel versus None | P- Value (Chi2 with 3 dof) | Ownership versus None | Incentive versus None | Business rel versus None | P- Value (Chi2 with 3 dof) |
| distance | 0.0041** (0.0016) | -0.0028 (0.0028) | -0.0010 (0.0014) | 0.0064 | -0.0022** (0.0011) | -0.0019 (0.0018) | -0.0012 (0.0012) | 0.198 |
| eucoop | 1.2224*** (0.5120) | 1.8626* (1.014) | 2.5785 (0.8720) | 0.009 | 1.1765** (0.5703 | 2.8489*** (0.7715) | 2.4101** (0.9532) | 0.002 |
| natcoop | 0.6271 (0.5160) | 0.5787 (1.1480) | 0.4499 (0.9115) | 0.672 | 0.3825 (0.5674) | -0.9381 (0.8088) | 0.2472 (0.8991) | 0.358 |
| smallfirm | | | | | -0.7188 (0.4528) | -2.0167*** (0.7544) | -1.0764* (0.5823) | 0.023 |
| medfirm | 0.6651** (0.3382) | 0.8153 (0.6046) | 1.9000 (0.4356) | 0.672 | 0.1510 (0.4109) | -0.6104 (0.6488) | 1.0750** (0.4607) | 0.034 |
| posexp | 0.6550** (0.3295) | 0.6367 (0.5639) | 0.1457 (0.3964) | 0.194 | 0.4760 (0.3241) | 0.4237 (0.5081) | 0.2454 (0.3688) | 0.449 |
| persges | 0.6571 (0.4015) | 1.3423 (0.6442) | 0.4939 (0.5578) | 0.126 | 0.6388 (0.3964) | 0.3988 (0.7028) | 0.1825 (0.5729) | 0.435 |
| ag | 0.4717 (0.6010) | 1.1193 (1.1211) | 0.5793 (0.6714) | 0.671 | 0.3585 (0.6004) | -0.1736 (0.9724) | 0.7122 (0.6015) | 0.669 |
| prod | 2.4050*** (0.4850) | 2.0727*** (0.7480) | 2.7505*** (0.5653) | 0.000 | 2.8202*** (0.4591) | 1.9059*** (0.7021) | 3.0362*** (0.6316) | 0.000 |
| south | -1.0825** (0.4711) | -1.3314 (1.1597) | -0.8029 (0.5760) | 0.078 | -0.7701* (0.4560) | -0.8717 (0.8406) | -0.9309 (0.5506) | 0.184 |
| constant | -2.6826 (0.3397) | -4.9507 (0.9542) | -4.8259 (0.5809) | | -2.2553*** (0.4828) | -2.7637*** (0.9204) | -3.7976*** (0.6411) | |
| Hausmann tests of IIA assumption (Chi2 with 20 dof)[b)] | 1.226 | 0.797 | 0.615 | (Chi2 with 22 dof)[b] | 0.685 | 1.261 | 0.345 | |
| Wald test for merge with Incentive (Chi2 with 9 dof)[c)] | 0.523 | | | (Chi2 with 10 dof)[c)] | 0.303 | | | |
| Wald test for merge with Business ( Chi2 with 9 dof) [c)] | 0.004 | 0.131 | | (Chi2 with 10 dof)[c)] | 0.061 | 0.281 | | |
| Wald test for merge with None (Chi2 with 9 dof) [c)] | 0.000 | 0.000 | 0.000 | (Chi2 with 10 dof)[c)] | 0.000 | 0.000 | 0.000 | |
| Log likelihood | | -281.60 | | | | -315.56 | | |
| Model chi – squared | | 136.43 | | | | 133.23 | | |
| Pseudo R2 | | 0.30 | | | | 0.30 | | |
| Sample size | | 426 | | | | 443 | | |

Dependent variable: Form of Co-operation, Numbers in brackets are heteroskedasticity robust standard errors of the estimate, a) Ho: All coefficients associated with given variable(s) are 0 (P-Value) b) H0: Odds(Outcome-J vs Outcome-K) are independent of other alternatives (X2 values)c) Ho: All coefficients except intercepts associated with given pair of outcomes are 0 (i.e., categories can be collapsed) (P-Value).

*Table A5: Estimation results of Multinomial Logits (Dependent variable legform)*

| | Results excluding firm size Variables<br>Coefficient.<br>(Standard. Error)<br>All Firms | | | Wald tests for independent variables[a)] |
|---|---|---|---|---|
| | Ownership versus None | Incentive versus None | Business rel versus None | P- Value (Chi2 with 3 dof) |
| distance | -0.0026**<br>(0.0011) | -0.0021<br>(0.0016) | -0.0018<br>(0.0016) | 0.066 |
| eucoop | 1.3334***<br>(0.4800) | 2.1776**<br>(0.9111) | 3.0334<br>(0.8556) | 0.000 |
| natcoop | 0.4385<br>(0.4840) | 0.3980<br>(1.0389) | 0.0845<br>(0.8837) | 0.824 |
| Posexp | 0.4900*<br>(0.2851) | 0.4256<br>(0.4708) | 0.2733<br>(0.3349) | 0.360 |
| persges | 0.5467**<br>(0.3637) | 0.6783<br>(0.5962) | 0.1783<br>(0.5115) | 0.387 |
| ag | 0.4730<br>(0.5873) | 0.4817<br>(0.8215) | 0.7816<br>(0.6085) | 0.639 |
| prod | 2.6503***<br>(0.4265) | 1.9114<br>(0.6223) | 2.9217<br>(0.4797) | 0.053 |
| south | -1.0110**<br>(0.4519) | -1.9115<br>(0.6223) | -1.1253<br>(0.5605) | 0.002 |
| constant | -2.4099***<br>(0.2908) | -4.1279<br>(0.6440) | -3.7575<br>(0.4317) | |
| Hausmann tests of IIA assumption (Chi2 with 18 dof)[b)] | -3.797 | 1.309 | 0.044 | |
| Wald test for merge with Incentive (Chi2 with 8 dof)[c)] | 0.740 | | | |
| Wald test for merge with Business ( Chi2 with 8 dof) [c)] | 0.025 | 0.566 | | |
| Wald test for merge with None (Chi2 with 8 dof) [c)] | 0.000 | 0.000 | 0.000 | |
| Log likelihood | | -382.94 | | |
| Model chi – squared | | 135.01 | | |
| Pseudo R2 | | 0.25 | | |
| Sample size | | 501 | | |

Dependent variable: Form of Co-operation, Numbers in brackets are heteroskedasticity robust standard errors of the estimate, a) Ho: All coefficients associated with given variable(s) are 0 (P-Value) b) H0: Odds(Outcome-J vs Outcome-K) are independent of other alternatives (X2 values)c) Ho: All coefficients except intercepts associated with given pair of outcomes are 0 (i.e., categories can be collapsed) (P-Value).