Disorganization or Self-Organization?

The Emergence of Business Associations in a Transition Economy

Francesca Recanatini
Randi Ryterman

During the period of widespread disorganization experienced during the former Soviet Union's transition to a market economy, business associations emerged spontaneously to share information about an uncertain environment. Joining a business or trade association helped firms reduce transaction costs by providing them with access to information about the location and reliability of potential trading partners. Disorganization may provide the proper conditions for the development of certain nonmarket institutions, which in turn affect firms' behavior in the face of market failures.

Summary findings

The transition from plan to market provides a rare opportunity for insight into the endogenous development of economic institutions. Economic activities under the Soviet regime were coordinated by a central authority. Soviet coordinating mechanisms were disrupted during the transition period, leading to an increase in firms' transaction costs.

Blanchard and Kremer (1997), among others, emphasize the negative impact of this "disorganization" on output behavior at the beginning of the transition. Although their argument is correct, Recanatini and Ryterman believe that their work and similar analyses stop short of fully characterizing the transition by concentrating only on reform's disruptive effects.

Recanatini and Ryterman start where the earlier work ends, examining the business associations that emerged spontaneously in response to the transition's challenges. They provide empirical evidence that institutions that help coordinate production and trade emerge spontaneously in a widely "disorganized" environment.

Using a largely unexplored set of firm-level data, they document the emergence of business associations at the beginning of the transition and provide evidence that these new coordinating institutions mitigated the initial decline in output. Building on the growing literature on complexity and transaction costs, they interpret the emergence of these informal institutions as the firms' rational attempt to coordinate activities in a decentralized economy.

In other words, the creation of complex organizations such as associations is the spontaneous result of a natural tendency in every system to create order at the edge of chaos. Business associations are more likely to emerge where there is disorder, to provide their members with stability, coordination, and the information needed to improve performance.

DISORGANIZATION OR SELF-ORGANIZATION?[1]

FRANCESCA RECANATINI AND RANDI RYTERMAN[2]

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This paper begins where the former works end by examining one of the key institutions that have emerged spontaneously in response to the challenges of transition: business associations. Its main contribution is to provide empirical evidence that institutions that help coordinate production and trade spontaneously emerge in an environment characterized by widespread "disorganization". Using a largely unexplored, firm-level data set, we document the emergence of business associations at the beginning of transition and provide evidence that these new coordinating institutions mitigated the initial output decline. Building on the growing literature on transaction costs and complexity, we interpret the emergence of these informal institutions as the firms' rational response to coordinate activities in a decentralized economy.

Keywords: Coordination Problems, Transition, Alternative Institutions

JEL classification nos.: D23, L10, O17, P21, D71

DISORGANIZATION OR SELF-ORGANIZATION?

Abstract

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"Indeed, if transaction costs are negligible, the organization of economic activity is irrelevant".

Oliver Williamson
"Transaction Cost Economics ", The Journal of Law and Economics, XXII, 1979

1. INTRODUCTION

The transition from plan to market provides a rare opportunity for insight into the endogenous development of economic institutions. Although a number of scholars have written on the endogenous emergence of economic institutions,[3] few have either discussed this issue in the specific context of transition[4] or focused on the link between institutional development and market failures. In this paper, we do both by examining one of the key institutional responses to the shock of the transition process: the organization of firms into formal and informal networks, which we refer to generically as business associations. Much has been written about this phenomenon (for example, see Johnson, 1997), but little empirical evidence has been provided on their impact on the performance of firms in the context of transition. Exceptions to this are Perotti and Gelfer (1998) and McMillan and Woodruff (1999). The former examines the role of groups in the allocation of credit in transition economies,[5] while the latter looks at the link between firm relationships and informal credit.[6] Credit reallocation, however, is but one of several roles played by these associations, as we explain below. This paper aims to offer a more encompassing analysis, by examining the impact of membership in associations on the overall performance of the firm.

The beginning of the transition was marked by a deep and, in some cases, enduring output collapse. Scholars attribute the observed decline to a number of different causes: a decline of

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[3] Seminal contributors to our understanding of the theory of organization include: Coase, Williamson, North, and Grief.
[4] Exceptions include Ickes and Ryterman (1995), Gaddy and Ickes (1998), Commander (1998), Pinto (1999), and others who study the evolution of barter, commercial paper, and trade credit as mechanisms to conserve on the need for firms to fully adjust to market-based competition.
[5] The authors find that firms in groups have easier access to finance for investment than independent firms.
[6] The authors find that in Vietnam access to trade credit is positively related with the length of the relationship, the level of search costs faced by the firm, and membership in business networks.

production of goods during the regime of central planning but subsequently in excess supply (Berg, 1994); mismeasurement of GDP due to a shift from official to unofficial activities (Kaufmann and Kaliberda, 1995); inconsistent and unsustainable macroeconomic policy (IMF, 1995); credit contraction (Calvo and Coricelli, 1992); coordination failures due to an institutional vacuum created by the dismantling of central planning institutions (Murrell, 1992; Blanchard and Kremer, 1997; Recanatini and Ryterman, 1999); and rent-seeking behavior (Aslund et al., 1996). The importance of each of these arguments certainly varies by country, but together they form a common image, that transition has produced an uncertain and somewhat chaotic environment in which firms must modify their organizational, productive, and transactional strategies or risk their own obsolescence.

Blanchard and Kremer (1997) provide one of the most visible of these arguments, observing that central planning was characterized by highly specific relationships between firms that were intermediated by central planning institutions. The elimination of these institutions resulted in a breakdown of relations, which the authors characterize as "disorganization". In our view, this argument is correct, providing an important example of the way in which transition has increased the cost to firms of transacting. But, this and similar arguments stop short of what we believe is a fuller characterization of the transition process, as one in which the shock waves of the reform process have triggered a search by firms for ways to survive this adversity, leading to the emergence of new institutions. In this paper, we begin where the former arguments end, by focusing on business associations and providing empirical evidence on their role in mitigating the initial output decline.

Specifically, we argue that business associations emerge as a spontaneous response by firms to address the uncertainty of transition. We build our argument intuitively on the literature on

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transaction costs[7] and complexity. As transition takes place, the existing relations, which guaranteed the completion of exchanges during the Soviet era, are broken: disorganization spreads and transaction costs for individual firms increase. Agents need now to learn to trade in a new and uncertain environment. In particular, firms have to gather information on potential trading partners, such as their location, their reliability, their creditworthiness, and the quality of their product. This information has suddenly become scarce and costly for firms. They need to identify ways to obtain finance and to ensure that agreements into which they enter are subsequently enforced. The initial absence and the slow introduction of market institutions further exacerbate these transaction problems. Some firms react by joining efforts and sharing information and other resources. This coordination of efforts translates into a decrease in transaction costs and an improvement in performance for the members of these networks. Associations can therefore be viewed as a rational response of firms to disorganization and higher transaction costs.

But, if membership in a business association positively affects a firm's performance by reducing transaction costs, why doesn't every firm join one? We propose that firms are heterogeneous in terms of their transaction technologies. Some firms, in an attempt to recreate the past system, prefer personalized exchanges within a small, known group of agents; other firms, instead, prefer to use impersonal markets.[8] This heterogeneity in transaction technologies helps to explain the firm's initial decision to join an association at the beginning of transition. Moreover, this heterogeneity could have persisted because of the difficulty of observing why certain firms succeed. In a chaotic environment, where firms are experimenting with a number of new survival strategies simultaneously, it can be difficult even for profitable firms to understand fully the reasons for their own success.

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[7] We define "transaction costs" broadly as search costs, bargaining and decision costs, and policing and enforcement costs.

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We test this view of business asssociations using data on the characteristics and performance of firms in five Russian cities. This data set was constructed by a team from the World Bank[9], and includes statistics on the membership of firms in different types of business associations. The data were collected for 1994, a year witnessing active privatization and a dramatic decline in the volume of government subsidies to firms. These conditions suggest that 1994 is precisely the time period during which we would expect firms to actively search for survival strategies.

We estimate a bivariate model to jointly explain the firm's probability to experience a decline in output and to join a business association. We define the probability of decline in a firm's output as a function of changes in the demand for its products and other characteristics of the firm, including the potential for disorganization in its relationships and its membership in a business association. The decision to join an association, in turn, is a function of its potential for disorganization as well as local incentives for cooperation among firms. The empirical analysis supports our intuition: being a member of a business association improves a firm's performance significantly. Moreover, firms are more likely to join an association in regions where cooperation among firms is most likely. Hence, these results characterize the use of associations by firms as a mean to coordinate activities by sharing information and reducing transaction costs.

The novelty of this work is to suggest a simple, yet promising, framework of analysis and provide empirical evidence of the link between institutional disorganization, output decline, and the endogenous emergence of new coordinating institutions. In doing so, this paper offers new evidence on the role of spontaneous institutions on firm's performance. The approach employed

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[8] See also Kranton (1998) for a detailed discussion of the coexistence of different modes of exchange.

[9] Led by Barry Ickes (The Pennsylvania State University) and Randi Ryterman (The World Bank), with the assistance of Annette Brown. The National Council for Soviet and East European Research also provided funding.

also helps begin thinking about the causes triggering the endogenous emergence of these institutions and their evolution over time.

The rest of the paper is organized as follows. Section 2 introduces some preliminary evidence on business associations, and a simple model that provides a framework for our empirical analysis presented in Section 3. The concluding section discusses the implications of our findings for understanding the transition process and presents possible extensions.

2. WHY DO ENTERPRISES JOIN GROUPS?

The change in regime, which occurred in previously centrally planned economies in the early 1990s implied the destruction of the old ways of doing business and the creation of new ones based on market mechanisms. During the early years of the Russian transition, however, observers recorded a new, unexpected phenomenon: the emergence of business associations. In 1994, nearly half of all firms were members of some business or trading associations (see Table 1).

Some might think that the emergence of business associations in countries such as Russia is not an unlikely phenomenon. After all, the ministries of the former Soviet Union and its constituent republics could be characterized as managing a formal network of plants producing similar types of goods. Beginning in the 1960s, the plants within ministries were further organized into smaller units, known as production associations, which primarily consisted of plants producing the same types of goods located in the same city or town. In fact, we agree with this characterization and suggest that the blueprint for the self-organization of enterprises existed in the Soviet system and possibly before.

As shown in Table 2, the key organizers of about half of the associations were former ministerial officials at the all-union or republic levels. As the institutions of central planning

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were dismantled, these officials found themselves without a public office, but with extensive experience in planning and solving problems of production. Many moved out of the public sector into the non-government sector, trying to coax firms into joining associations that would help them navigate some of the difficulties of the transition.

While the propensity to associate might be driven by a historical legacy, the associations formed during the transition were typically quite distinct from their antecedents. As shown in Table 3, these were no longer predominantly comprised of firms in the same industry (firms that post-1992 became competitors), but also included suppliers, customers, and banks. This new composition reflected the expanded role of associations, which shifted from primarily allocating a fixed stock of inputs among competing firms in an industry to helping firms find and transact in new input and product markets and finance their production, preferably at below market rates (Table 4). Associations also appear to provide its members with better information about alternative trading partners (Table 5). Using the same data set, Ickes, Ryterman and Tenev (1995) find that firms that are members of business associations are more likely to undertake restructuring activities than other firms.

We believe this fundamentally new form of organizing exchange emerged as an efficient response to the uncertainty of transition. To make this intuition explicit we introduce a simple, illustrative model that describes the decision process faced by firms. We assume that the benefits of joining an association are uncertain over some horizon and depend on the heterogeneity existing in what we define "the transaction technology" of each firm. The benefits are also a function of the size of the association and of the degree of disorganization in the economy. There are however some costs associated with becoming a member – an organizational fee, or the time spent looking for or forming the association itself.

In particular, assume there are N firms in the economy, who must decide whether

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or not to join an association. The decision concerning membership in an association is made prior to the realization of its returns, and is made simultaneously by all firms.

The benefits of joining an association for a given firm are given by:

$$B(\Delta,\mu)+e_i \qquad (1)$$

where:

- Δ is the degree of institutional disorganization present in the economy, $\Delta \in [0,1]$

- μ is the fraction of firms that decide to join $\mu \in [0,1]$

- e_i is the benefit specific to firm i and

$$e_i \in [-E,E] \sim f(e_i)$$

$$E(e_i) = \int_{-E}^{E} e_i f(e_i) de_i = 0$$

The variable e_i represents the firm-specific benefits from joining an association. We interpret these firm-specific benefits as arising from differences in the transaction technologies of firms. This particular interpretation introduces the idea that some managers in transition economies may have a so-called "Soviet mentality" in doing business: they may have very little faith in (or knowledge of) market institutions and prefer to use, instead, personalized modes of exchange (high e_i). Business associations are an example of these personalized exchange institutions. Other managers, instead, less influenced by the Soviet legacy, may prefer impersonal, market exchanges and derive, therefore, lesser benefits from joining an association (low e_i).[10]

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[10] While we express the transaction technology of the firm in terms of a manager's preferences, these preferences may be reflected (or in fact derive from) an organizational structure of the firm. Such structures are often highly resistant to change (Nelson and Winters 1982; Murrell 1992), and can be viewed as exogenous characteristics of the firm.

$B(\Delta,\mu)$ captures possible systemic reasons why a firm may decide to join an association. When economic activities are highly disorganized and institutions are not developed (high)[11], a firm may join an association as a means of reducing the costs of search, bargaining, financing, and contract enforcement. Hence, when the degree of disorganization increases, the benefits of joining an association also increase.

The institutional disorganization existing in the economy however is not the only factor affecting the benefits of joining an association. For a given degree of disorganization, firm i's benefits are affected by the number of firms also joining an association. As the literature on network externalities emphasizes (Cooper and John, 1988), the benefits of being a member could be increasing in the number of members because the addition of new members to the association facilitates for example the circulation of information by adding to the diversity of the experience. In this case, the system exhibits strategic complementarities. As the number of members continues to increase, however, the benefits of using a business association may decrease because of congestion effects.

Each period firm i draws e_i and then makes its decision. Firm i will join an association if:

$$B(\Delta,\mu)+e_i > \alpha$$

where α is the cost of joining an association.[12]

The fraction of firms joining an association each period is therefore defined as follows:

$$\mu^* = \int_{e^*(\Delta,\mu^*)}^{E} f(e_i)de_i$$

where:

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[11] Holding μ constant

[12] The cost of joining an association can be interpreted in a narrow or broad sense, as simply the nominal fee for joining or as the full cost of forming and maintaining the association, plus the net benefits of choosing the next best alternative.

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$$- e*(\ ,\mu*) \quad \alpha \quad B(\ ,\mu*)$$

It can be easily shown[13] that higher disorganization and lower costs increase the equilibrium

membership rate,

$$\frac{d\mu^*}{d\Delta} > 0$$

$$\frac{d\mu^*}{d\alpha} < 0$$

if the benefit function B( ) is increasing in the degree of institutional disorganization, $\frac{B}{\partial\Delta} > 0$, and

in presence of strategic complementarities, $\frac{\partial B}{\partial\mu} > 0$. Thus, the firm's decision to join an association

is determined by its degree of disorganization, the cost of joining an association, and the existence of

strategic complementarities among its members.[14]

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3. BUSINESS ASSOCIATIONS AND ENTERPRISE PERFORMANCE

The previous discussion has emphasized how a change in the coordinating institutions of an

economy, though it initially translates into a negative shock, may also trigger the emergence of

alternative, endogenous mechanisms to coordinate trade among firms. By focusing on the early

years of the transition process in Russia, we documented the emergence of business associations.

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[13] In the neighborhood of a locally stable equilibrium. See Appendix 1 for the proof of these results.

[14] Though institutional disorganization is an important factor in explaining this phenomenon, the degree of heterogeneity in the transaction technologies of the firms may also play a role. It can be shown that greater heterogeneity in transaction technology, measured by a mean preserving spread in $f(e_i)$, increases the membership rate in presence of strategic complementarities. This could explain why associations may be a seemingly more important phenomenon in some countries or regions within the same country than in others. Other types of heterogeneity related to the characteristics of the economic environment may also affect membership. Recently, Alesina and La Ferrara (1999) suggest that heterogeneity in income, race and ethnicity influences participation in social activities and groups.

We characterize this phenomenon as the spontaneous reaction of firms to the dismantling of Soviet institutions and to the coordination failures and higher transaction costs which followed.

But, does this alternative way of coordinating activities improve significantly firm performance? In the following section, we explore the link between these informal institutions and firm's performance using our firm data set. The results of this empirical exercise are startling. Being a member of a business association significantly improves a firm's performance, by reducing the probability of a decline in production. Moreover, firms are more likely to join an association in regions where incentives for cooperation among firms are stronger. Hence, the results of this estimation procedure characterize the use of associations by firms as a way to limit the (negative) "disorganization shock", which followed the dismantling of Soviet coordinating institutions, by "self-organizing" their activities.

3.1 THE STRUCTURAL MODEL

An observable implication, which can be drawn from our characterization of business associations, is that the decline in output following the dismantling of Soviet institutions should be smaller for firms which have organized their activities through business associations.

To explore the link between membership and firms' performance, we use a data set compiled at the end of 1994 by the World Bank. This survey gathered extensive information on 157 enterprises in five Russian provinces between January 1992 and October 1994. In particular, the data set contains information on firms' performance and membership in business associations.

Using this information, we construct two variables, y_i and $Assoc_i$, where y_i is an index for firm i's growth rate, and is defined as follows:[15]

- if $(y_i^{94} - y_i^{91}) \geq 0$ then $y_i = 0$;

- if $(y_i^{94} - y_i^{91}) < 0$ then $y_i = 1$;

where y_i^t is the level of production for firm i at time t, and $Assoc_i$ is a dummy variable which takes value 1 if firm i is a member of a business association, zero otherwise.

Following the set-up developed in Recanatini and Ryterman (1999), we introduce the following structural equation to estimate the impact of membership on the output decline of firm i belonging to sector I:

$$\Pr[\tilde{y}_i = 1] = \Pr[\beta_0 + \beta_1(P_I) + \beta_2(c_I) + \beta_3(Assoc_i) + \beta_4(x_i) + \beta_5(\Delta_i) + \tilde{\varepsilon}_i > 0]$$
$$= \Phi[\beta_0 + \beta_1(P_I) + \beta_2(c_I) + \beta_3(Assoc_i) + \beta_4(x_i) + \beta_5(\Delta_i)]$$

where:

- $y_i = 1$ means that firm i experienced a decline in output between 1991 and 1994;

- P_I represents the (log of the) change in prices for sector I, with I, between 1991 and 1994;

- c_I describes the (log of the) change in input costs for sector I, I, for the same period;

- $Assoc_i$ captures firm i's membership in business associations;

- x_i is a vector of firm specific variables to control for some other factors which may have contributed to the decline in output between 1991 and 1994;

- Δ_i is a vector of variables to proxy for the institutional changes and disorganization;

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[15] Our choice of creating this index of growth was determined by the fact that the survey provides information only on the sign of the change in production after 1991.

[] is the standard normal cumulative distribution function.

Equation (1) tries to capture the essence of our argument: firms' activities are affected not only by changes in prices, costs, or firm-specific factors, but also by the change in the mechanisms coordinating economic activities. We separate the effect of this change in coordination regime into two different parts, the "disorganization" effect, measured by Δ_i, and the "self-organization" effect, measured by $Assoc_i$.

The dismantling of the Soviet coordinating institutions translated into a wide-spread "disorganization" of economic activities, which in turn led to an increase in the costs of search, contract negotiation, financing, and enforcement. The vector Δ_i proxies for this change in coordinating institutions and the disorganization, which followed. We expect these variables to affect negatively firm's growth.

But the transition process forced firms to learn to survive in a new environment and, in particular, to find new ways to coordinate activities. The dummy $Assoc_i$ attempts to capture these self-organization efforts and the institutional innovation, which followed the initial disorganization of the economic activities. Specifically, we expect that the dummy $Assoc_i$ will have a positive impact on firm's performance by alleviating the initial disorganization shock.

Following the findings of Recanatini and Ryterman (1999), we then define the vector Δ_i - the disorganization effect of the change in coordinating regime - as follows:

$$\Delta_i = (AU_I, Ic_I, ds_{Ip}, db_{Ip}, CMEAEX_I, CMEAIM_I)$$

with I and where:

- AU_I is a dummy variable that takes value 1 if the firm belonged to an All-Union sector during the Soviet era, zero otherwise;

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- Ic_I is the index of complexity introduced by Blanchard and Kremer and defined as follows:

$$Ic_I = 1 - \sum_k \left(\frac{z_{ik}}{\sum_j z_{ij}} \right)^2$$

with z_{ij} is the share of input j in the production of good i[16];

- ds_{Ip} and db_{Ip} are the distance of potential suppliers and buyers, respectively, for firms in industry I located in province p, and are defined as follows[17]:

$$ds_{Ip} = \sum_j \left[S_{jI} * \sum_h (C_{hj} * D_{ph}) \right]$$

$$db_{Ip} = \sum_j \left[B_{jI} * \sum_h (C_{hj} * D_{ph}) \right]$$

with:

- S_{jI} is the share of input j used in the production of commodity I;

- B_{jI} is the share of output I purchase by industry j;

- C_{hj} is the concentration of industry j in province h in 1990;

- D_{ph} is a dummy variable which takes value

- 0 if p and h are the same province;

- 1 if p and h are neighboring provinces;

- 2 otherwise.

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[16] This index was constructed using the 1990 Russian "100-sectors" input-output tables.
[17] These indices were calculated using the 1990 Soviet input-output Tables.

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- $CMEAEX_I$: the pre-transition share of sector I production exported to countries belonging to the CMEA[18];

- $CMEAIM_I$: the pre-transition share of inputs used by sector I imported from countries belonging to the CMEA.

These variables attempt to proxy the disorganization shock by exploiting different dimensions along which economic activities may have been coordinated during the Soviet regime. The intuition is the following. The Soviet system coordinated activities and exchanges though the use of government agencies and ministries. The transition from plan to market implied the dismantling of the old Soviet coordinating institutions with a subsequent increase in transaction costs for individual firms. This rise in transaction costs varied however across enterprises depending on the pre-existing institutional arrangements existing between firms and the government, their production links, and their spatial location.

Consider, first, the dummy AU_I, which exploits the institutional heterogeneity in terms of coordination existing across firms before the transition. During the Soviet period, firms' activities were monitored and coordinated by the Soviet government. In particular, each sector of the economy was controlled by a separate Ministry. The degree of control and coordination was however different across sectors. The activities and exchanges of sectors under the so-called All Union Ministries were highly monitored and coordinated. Sectors instead under the Union Republic or the Republic Ministries were given greater degree of freedom.[19] The dismantling of the Soviet institutions halted this coordinating activities and unevenly increased transaction costs across

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18 The Council for Mutual Economic Assistance, or CMEA, formerly coordinated trade between Soviet and East European countries. It was dismantled in 1991.

sectors. We should therefore expect that firms more closely monitored by the Soviet authority, that is, under the control of an All Union Ministry ($AU_I = 1$), should suffer disorganization more.

Disorganization manifested itself also through the break up of the very rigid production links existing among firms. Business relationships between firms during the Soviet period not only were set in fact by the government, but were also highly specific (Blanchard and Kremer, 1997). This specificity on the production side and the potential bargaining problems that could ensue were controlled by the central planner. The transition process eliminated the central authority without reducing the specificity of these relationships, opening the door for bargaining problems. The index of product complexity, Ic_I , captures this intuition: the more complex the product, the greater the specificity problem faced by firms, and thus the more likely is output to decline.

The third dimension we use to proxy for the disorganization shock is related to the spatial distribution of enterprises. Firms, in fact, differ not only in terms of their pre-existing institutional or production links, but also because of their geographical location. The increase in transaction costs, which followed the removal of the Soviet institutions, was uneven across firms depending on the spatial location of their alternative buyers and suppliers: the closer the potential trading partners are, the smaller the increase in transaction costs for firm i, the less likely is production to collapse. The indices ds_{Ip} and db_{Ip} capture this type of geographical heterogeneity in transaction costs existing across firms.

Finally, the last two measures of the vector Δ_i focus on the coordination of international trade activities by the CMEA by capturing the dependence of sector I on trade via this institution.

To complete our specification, we introduce the firm-specific vector x_i :

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[19] For more details on the institutional structure of the Soviet industry and how information traveled across firms, see Recanatini and Ryterman (1999).

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$$x_i = (AGE_i, DUR_I$$

where:

- AGE_i : the number of years firm i has been in business;

- DUR_I : the pre-transition index of durability of sector I.

To summarize, our estimating equation becomes the following:[20]

$$\Pr[\tilde{y}_i = 1] = \Pr[\beta_0 + \beta_1(P_I) + \beta_2(c_I) + \beta_3(Assoc_i) + \beta_4(AGE_i)$$
$$+ \beta_5(DUR_I) + \beta_6(AU_I) + \beta_7(Ic_I) + \beta_8(ds_{Ip}) + \beta_9(db_{Ip}) \qquad (2)$$
$$+ \beta_{10}(CMEAEX_I) + \beta_{11}(CMEAIM_I) + \tilde{\varepsilon}_i > 0]$$

How will being a member in an association affect firms' performance? If joining an association is a way to solve some of the coordination problems faced by firms, then members should experience a smaller decline in output. Table 8 presents the results of our estimation procedure. This simple exercise suggests that $Assoc_i$ does in fact affect positively firms. We could therefore conclude that associations - as a form of sharing information and coordinating activities - help firms' performance at the beginning of transition. This conclusion however can be easily challenged.

The single-equation model estimated has taken $\tilde{\varepsilon}_i$ to be uncorrelated with the $Assoc_i$ dummy. This can be justified only if we have included in equation (2) all the relevant explanatory variables. This may not be the case. There may be unobserved factors which affect both $\tilde{y}_i$ and $Assoc_i$, leading to a bias in the estimates discussed above. Specifically, we believe there may be

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[20] Table 6 and 7 provide summary statistics for these variables.

some managerial characteristic which is related to both firm's performance and the decision to join an association.

Suppose for example we define an omitted variable called "Soviet mentality" (S) which captures a manager's characteristic. We can reasonably expect S to be positively related to both the decline in output and the decision to join an association: high S managers did not know how to adjust to the change in the system, and may have viewed associations as a recreation of the past. Hence, if this variable is omitted, there will be a positive correlation between the error terms and the single-equation estimates will be upwardly biased.

To correct this endogeneity problem, we introduce a second equation to explain the decision of joining an association:

$$\sum_{i}^{*} = \delta * W_i + \varepsilon_i^m \qquad (3)$$

where:

- $\sum_{i}^{*}$ is the latent variable measuring the benefits from joining an association; and

  $Assoc_i = 1$, when $\sum_{i}^{*} > 0$, zero otherwise;

- W_i is a vector of observable variables which influence $\sum_{i}^{*}$; and

- ε_i^m is the error term, where $E(\varepsilon_i^m) = 0$.

If all the relevant explanatory variables are included both in equations (2) and (3), then $E(\varepsilon_i^m, \tilde{\varepsilon}_i) = 0$, and the single-equation estimates are consistent. If however, $E(\varepsilon_i^m, \tilde{\varepsilon}_i) = \rho \neq 0$ (the unobserved determinants of output and association decision are correlated), then $\tilde{\varepsilon}_i$ and $Assoc_i$ are correlated and the estimates obtained using the single equation approach are inconsistent. To test

whether our estimates are consistent, i.e. $E(\varepsilon_i^m, \tilde{\varepsilon}_i) = \rho \neq 0$, we estimate equations (2) and (3) simultaneously.

But, which variables affect the decision to join an association? In Section 2, we argue that disorganization in a firm's relations with other firms provides an important incentive for the firm to join an association. Thus, we include in our estimation variables related to disorganization: the degree of government control firm i experienced during the Soviet era (AU_I), the distance of firm i from its suppliers and buyers (ds_{Ip}, db_{Ip}), and the complexity of the production process (Ic_I). We expect the effect of these variables on the probability of joining to be positive.

Our discussion in Section 2 also suggests that the cost of membership, as well as the extent of strategic complementarities among potential members, plays a role in explaining the membership decision. Although technically beyond the bounds of our simple static model, we believe that these two variables are important triggers for the emergence of associations. Unlike disorganization, which provides an incentive for an individual firm to search for an association, membership costs and strategic complementarities determine whether conditions are ripe among a group of firms for the actual formation of an association. Specifically, the costs of forming (e.g., the total cost of search for all members) and operating an association (e.g., the costs of meetings and between meeting communications) must be sufficiently low and strategic complementarities among firms must exist in order for an association to emerge.

We postulate that these conditions are most likely to met when a sufficient number of firms facing similar difficulties are located in close proximity. Proximity reduces the cost of forming and maintaining an association, and similarity of problems among firms increases the likelihood that cooperation will yield mutual benefit. In fact, we argue that the most pertinent form of similarity for the formation of an association is logically the potential disorganization in the firms'

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relationships . Thus, we proxy the role of membership costs and strategic complementarities with the variable AU_Ob_{ip}, which measures the share of firms in a province (*oblast*) that were formally part of an All-Union Ministry. We expect that the probability of joining an association is larger if firm i belongs to a region which has a greater concentration of controlled firms at the beginning of transition.

This interpretation of AU_Ob_{ip} - as a triggering factor for the endogenous coordination of activities through the creation of alternative institutions - helps also explain why this variable affects output, but only indirectly.[21] It also provides us with a justification for its use as an instrument for the $Assoc_i$ variable. The resulting system of two equations is in fact identified if we have at least one instrument for $Assoc_i$, which is not included in the output regression.

To summarize, the resulting system to be estimated is:

$$\Pr[\tilde{y}_i = 1] = \Pr[\beta_0 + \beta_1(P_I) + \beta_2(c_I) + \beta_3(Assoc_i) + \beta_4(AGE_i)$$
$$+ \beta_5(DUR_I) + \beta_6(AU_I) + \beta_7(Ic_I) + \beta_8(ds_{Ip}) + \beta_9(db_{Ip}) \qquad (2)$$
$$+ \beta_{10}(CMEAEX_I) + \beta_{11}(CMEAIM_I) + \tilde{\varepsilon}_i > 0]$$

$$\Pr[Assoc_i = 1] = \Pr[\delta_0 + \delta_1(P_I^1) + \delta_2(c_I) + \delta_3(AGE_i) +$$
$$+ \delta_4(AU_I) + \delta_5(Ic_I) + \delta_6(ds_{Ip}) + \delta_7(db_{Ip}) + \delta_8(CMEAEX_I) \qquad (3')$$
$$+ \delta_9(CMEAIM_I) + \delta_{10}(AU\_Ob_{ip}) + \tilde{\varepsilon}_i > 0]$$

---

[21] Alternative interpretations AU_Ob_{ip} are however possible, some of which make it more difficult to justify the exclusion of this variable from the output regression. High values of AU_Ob_{ip} may in fact capture the higher search costs faced by firm i because of the destruction of the information network existing in her region. In this case the variable should be included in the output regression. Our argument however is that this increase in transaction costs is captured by the transaction costs indices introduced above, while AU_Ob_{ip} only captures the institutional trigger for the emergence of associations.

To answer this question we test the following hypotheses: did the spontaneous emergence of alternative ways to coordinate activities and obtain information reduce the negative impact of the disorganization shock? And, are business associations more likely to emerge in regions where the incentives to coordinate activities are greater?

In terms of equations (2) and (3'), these hypotheses imply $\beta_3 < 0$ and $\delta_{10} > 0$ [22]: being a member of an association, by facilitating coordination among firms and reducing transaction costs, decreases the probability that output declines. Moreover, firms are more likely to join the greater the incentives to coordinate surrounding them. The estimation of equation (3') may also help to shed some light on the different functions played by these institutions. A negative and statistically significant $\hat{\beta}_3$ in fact, though it highlights the existence of a link between firms' performance and coordinating institutions, it does not provide information on the role played by these institutions.

To estimate equations (2) and (3') we use a bivariate probit procedure.[23] The results of this regression are summarized in Tables 9 and 10.

Two are the key findings of our exploration. The first is that the bivariate probit estimates of equations (2) and (3') still support our hypothesis (Table 9): output is less likely to decline if firm i is a member of a business association. The average treatment effect - the difference in the probability of output decline between members and non-members - suggests that being a member of an association has a very strong impact on firm performance: belonging to an association reduces the probability that output declines by 47 percent. These findings therefore strongly support the

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[22] Recall that $\{y\} = 1$ means that output declined.

[23] Ignoring the discreteness of both dependent variables, we could estimate this model by using a standard linear procedure. The last column of Tables 9 and 10 presents the results of the 2SLS procedure. These results are consistent with the bivariate probit results discussed below and provide more evidence of the robustness of the "Association" effect.

importance of alternative ways to coordinate among firms and obtain information during transition in explaining firms' performance.

The bivariate estimation procedure also adds a relevant piece of information about the relationship between membership and output: $\hat{\rho}$ is significantly different from zero and positive, indicating that the single-equation estimates are inconsistent and likely to be upwardly biased (i.e. the effect of associations on output decline is more negative than equation (2) would imply). This result suggests that the single equation approach suffered of an omitted variable problem. It also highlights the potential role of the "Soviet legacy" variable.

Few other factors help explain the decline in output. Our proxy for institutional disorganization (AU) is statistically significant and positive ($\hat{\beta}_6 > 0$) indicating that the removal of the government institutions coordinating exchanges did have a negative impact on firms. The other measures of disorganization - $(Ic_I, ds_{Ip}, db_{Ip}, CMEAEX_I, CMEAIM_I)$ - are instead not statistically significant.[24] In addition, output declines more for older firms than for younger ones ($\hat{\beta}_4 > 0$). A possible explanation for this result is that older firms are less efficient and therefore more likely to be in need of restructuring at the beginning of the transition. Finally, higher prices also significantly reduce the probability of output decline ($\beta_1 < 0$).

Thus, these results seem to suggest that the dismantling of the Soviet coordinating system, the emergence of an alternative coordinating system and the price shock are the most important factors in explaining the output collapse at the beginning of transition.

But, why do firms choose to join a business association? The second key finding of our analysis is that firms are affected by regional characteristics in their decision to join. Specifically, associations are more likely to emerge in regions where the share of firms that were formally

controlled by the central government is high ($\delta_{10} > 0$). The analysis of Table 10 suggests that the decision regarding membership is also affected by the age of the firm ($\delta_3 > 0$) and the change in prices ($\delta_1 > 0$). The probability of joining an association is greater for older firms than for younger ones, possibly because the former are more likely to have been influenced more by the Soviet system and to have less knowledge of the market system rules. Moreover, since firm i joins an association in an attempt to decrease its transaction costs, an increase in the price of firm i's product reduces the benefits from using this alternative form of coordinating activities and sharing information.

The geographical distance of suppliers instead reduces the probability of joining an association. This somewhat surprising result, suggesting that associations among distant members are less likely to arise, reenforces our intuition that local incentives to coordinate are the triggering factor for the emergence of these institutions. Distance may in fact make it more difficult to coordinate activities with other members, reducing therefore the usefulness of business association. The other proxies of disorganization however are not statistically significant, though with the predicted sign ($\delta_4 > 0$ [25], $\delta_5 > 0$)

This last set of results on the role and the emergence of associations is in line with the theoretical framework discussed in Section 2 and with the studies of Greif (1989, 1993, 1994) and Milgrom et al. (1990) on the importance of historical institutions for trade and growth: firms may attempt to resolve problems due to market failures - such as information asymmetry and contract enforcement issues - by joining efforts with other firms. This strategy, though potentially socially sub-optimal, improves the performance of each single firm. Further work along these lines is necessary at this stage to better understand the evolution of these institutions.

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[24] For a more detail discussion on the link between coordination problems and output, see Recanatini and Ryterman (1999).
[25] The positive coefficient of AU may also suggests that firms under an All-Union Ministry are more likely to join an association because of the larger information loss brought by the transition.

3.3 BUSINESS ASSOCIATIONS: WHICH ROLE?

The results presented in the previous section highlight how somehow business associations have a positive impact on members' performance. Because of data availability issues, however, our analysis cannot sort through the competing hypotheses of why membership in associations is beneficial for firms. Do, for example, business associations reduce transaction costs by facilitating the circulation of information among their members? Or do they mitigate contract negotiation and enforcement problems? Or do business associations alleviate the credit constraints faced by firms?

A closer look to Table 10 indicates that the decision of joining an association is strongly affected by the institutional vacuum brought by the transition and the *"Soviet mentality"*. Next, we discuss the results of a few empirical exercises undertaken with the objective to better understand the role of business associations in improving firm's performance. Our exploration, though constrained by data availability issues, suggests that the beneficial effects of business associations are concentrated in their ability to facilitate contacts with suppliers and customers. More surprisingly, associations lead by former official of a Ministry of the USSR or Russia seem to have no effect on firm performance[26]. Finally, we cannot say whether or not associations facilitate access to credit, or help to coordinate activities with competitors because of the poor performance of the instrument used.

Specifically, in the attempt to separate potential functions of associations we build on the preliminary evidence presented in Section 2 on the composition of associations and their key organizers (Tables 2 and 3). In fact, being a member of an association that includes suppliers or financial institutions or was organized by a former official of a Ministry of Russia seems to be

associated to a smaller likelihood of output decline. We therefore repeat our bivariate analysis only for the firms who are members using a set of modified membership variables defined as follows[27]:

- *Supplier* = 1 if the association includes the most important suppliers, zero otherwise;

- *Banks* = 1 if the association includes financial institutions or banks, zero otherwise;

- *Customer* = 1 if the association includes the most important customers, zero otherwise;

- *Legacy* = 1 if the key organizer is a former official of a Ministry of the USSR or Russia, zero otherwise;

- *Industry* = 1 if the key organizer is an employee of an industrial enterprise, zero otherwise.

As anticipated above, the bivariate estimation procedures suggest that the dummies *Supplier* and *Customer* significantly reduce the probability of output decline. This seems therefore to imply that business associations provide valuable information to their members about trading opportunities and contract enforcement issues. The regressions with the dummies *Banks*, *Legacy* and *Industry* instead do not provide us with clear-cut results. The instrument used in fact in the bivariate analysis is not statistically significant, undermining the estimation results. Thus, we cannot understand from our analysis whether associations facilitate access to credit or are simply an heredity of the Soviet regime.

To conclude, these exercises, because of the noisy measures used and the limited performance of the instruments, offer only limited evidence on the different functions potentially performed by these informal institutions and their impact on output behavior. Their main value is, however, to set the stage for further discussion and research on the role of these institutions and to indicate a possible approach to separate different functions.

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[26] This result may be driven by the somewhat poor performance of the instrument used.
[27] The complete results of these regressions are available from the authors upon request.

4. CONCLUSIONS

Do self-organizing institutions emerge endogenously? If so, in which circumstances are they more likely to emerge? And, do these institutions significantly affect firm's activities? The illustrative model and the empirical evidence presented in this paper provide some answers to these questions: self-organizing institutions emerge spontaneously in presence of incentives to coordinate as a response to the increase in transaction costs. Furthermore, these alternative institutions have a positive impact on firms' performance. A brief discussion of these results will highlight the importance of these conclusions and emphasize the need for further research.

The focal point of this paper is the firm's response to the widespread institutional disorganization experienced during the transition process. Blanchard and Kremer (1997) suggest that disorganization played a significant role in the output collapse: "once Humpty-Dumpty has fallen down, all the King's horses and all King's men cannot put him back together again". Our work begins where theirs ends and shows that the spontaneous emergence of some form of self-organization is a rational response to disorganization and mitigates the output decline: all King's horses and all King's men may have found a different way to put Humpty-Dumpty back together!

Our empirical analysis supports these conclusions emphasizing that being a member of an association reduces the probability that output declines and can be explained by the extent of the coordination problems present in the system. These findings help to characterize the endogenous emergence of associations as a means of self-coordinating activities by sharing information about an uncertain environment. Joining a business or a trading association helps firms in fact to reduce transaction costs by providing information not only about the location but also the reliability of the potential trading partners. These findings, therefore, suggest that disorganization may

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create the proper conditions for the development of certain non-market institutions, which in turn play a role in explaining firms' performance in an environment characterized by some type of market failures.

In summary, this work sheds some light on the complex relationships between firm behavior and the evolution of informal institutions, opening the door for further, much needed, discussions.

This perspective on coordination problems and self-organizing mechanisms suggests potentially fruitful directions for further empirical and theoretical research. The simple model presented in Section 2 could be elaborated to focus more on the evolution of market institutions to better represent the reality in which firms operate. The explicit introduction of the accumulation of knowledge on the part of the firms, for example, may improve our understanding of the evolution of market and non-market institutions for trade and exchange.

It is also important to emphasize that other arguments, observationally equivalent to the one presented here based on transaction costs and institutional disorganization, exist and could be used to explain the endogenous emergence of business associations. The recent advances in the science of complexity, for example, provide us with an alternative, intriguing explanation. This science suggests that the creation of complex organizations, such as associations, is not an unlikely phenomenon, but the spontaneous result of a natural tendency of every system to create order in presence of some chaos (or "order at the edge of chaos"). Business associations therefore are most likely to emerge endogenously in locations where disorder is most likely, with the effect of providing its members with some amount of stability and coordination and improving their performance.[28]

Few more questions are left open by this work. This paper provides evidence that sectors under all-union Ministries did in fact experience a larger decline in output. We label this effect as "the larger increase in transaction costs due to institutional changes", but other interpretations are

plausible. Although we have in fact controlled for many other factors which may have affected output - such as the CMEA collapse, demand and supply shocks and the durability of goods – a few more may still be missing. Among them, credit availability is the first to come to mind: all-union industries received from the central government not only the information but also the credit resources necessary to complete their trades. The collapse of the Soviet system, therefore, led to both a loss of information and a loss of credit resources. This point becomes less relevant, however, if we realize that the information lost with the transition was not only about trading and production, but also about access to credit sources.

The previous remark is related to the broader issue of the omission of potentially important variables because of data availability problems. In Eastern Europe and in Central Asia, for example, researchers have documented the somewhat different role played by business associations.[29] To make this analysis more robust, the collection of additional firm-level data and more empirical work are therefore necessary.

Cross-country comparisons are also needed to test the robustness of our findings and to reconcile the observed discrepancies in the evolution of institutions. Our intuition suggests that the differences in institutional patterns between Eastern Europe, the Former Soviet Union countries, and other emerging economies may lay in the coordinating mechanisms existing before transition in each one of these countries and in the institutional disorganization faced by firms. In line with the recent works on groups in Latin America and East Asia, a comparison between Russia and any of these countries will provide us with further, deeper insights on the possibility and the role of self-organizing institutions on firm's activities.

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[28] For a more complete treatment of this topic, see Kaufmann, 1995.
[29] See, for example, Anderson (2000) and Broadman (1999).

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TABLE 1

MEMBERSHIP IN BUSINESS ASSOCIATIONS
(Russia, 157 firms)

Are you a member of a business or trade association?	Percentage of Respondents
Yes[30]	42.3%
No	57.7%

TABLE 2

WHO IS THE KEY ORGANIZER OF YOUR ASSOCIATION?
(Russia, 58 firms)

A former official of a Ministry of the USSR	29.8%
A former official of a Ministry of Russia	21%
A current or a former employee of an industrial enterprise	24.6%
Other.	24.6%

TABLE 3

WHO DOES BELONG TO YOUR ASSOCIATION?
(Russia, 58 firms)

Your most important suppliers.	36.7%
Your most important customers	39%
Your most important competitors.	36.4%
Financial institutions.	36.7%

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[30] Of the 157 firms interviewed, 58 responded that they were member of an association, 79 that they were not, and 20 did not respond.

TABLE 4

PERCEIVED BENEFITS OF MEMBERSHIP
(Russia, 58 firms)

You decided to join your association because it helps provide:	
Access to capital at market interest rates	24.6%
Access to capital cheaply	40.3%
Access to important material inputs	55.2%
Access to important product markets	50.9%
The association is not expensive	8.8%

TABLE 5

ALTERNATIVE SUPPLIERS AND CUSTOMERS
(Russia, 58 firms)

Are you aware of	Members (percentage of YES)	Non-members (percentage of YES)
- alternative suppliers?	80.3%	68.2%
- potential customers?	61.1%	44.7%

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TABLE 6

DISCRETE VARIABLES BY REGION

Variables	Barnaul	Yekaterinburg	Novorsibisk	Saratov	Voronezh	Total
Output Decline[1]	22	24	24	17	23	110
AU[1]	18	21	21	23	13	96
Number of Firms	30	30	30	36	31	156

[1]Number of firms.

TABLE 7

CONTINUOUS VARIABLES BY REGION

Variable	Barnaul	Yekaterinburg	Novorsibisk	Saratov	Voronezh	Total
Log Prices[2]	1.52503	1.50948	1.54319	1.53227	1.49177	1.5239
Log Costs[2]	1.4504	1.48207	1.33821	1.284	1.5544	1.4218
Ic[2]	0.793	0.803	0.837	0.84	0.803	0.807
CMEAEX[2]	7.0867	5.7967	2.4897	6.7686	5.5931	6.2039
CMBAIM[2]	18.263	19.21	20.307	23.58	26.24	22.81
AU_OB[2]	0.6792	0.449	0.7639	0.8985	0.5246	0.6766
DS[2]	1.9253	1.7655	1.9146	1.8728	1.863	1.8686
DB[2]	2.3693	2.0751	2.2862	2.407	2.1957	2.3318
AGE[2]	26.8	52.3	41.3	23.1	39.3	36.6

[2]Average

TABLE 8

PROBIT REGRESSION
DEPENDENT: OUTPUT DECLINE

Variable	Standard	Augmented with Institutional Disorganization	Augmented with Associations
Intercept	1.045 (0.678)	4.7814 (0.40)	6.20 (0.28)
Log Prices	-0.991 (0.557)	-3.2618* (0.096)	-4.30** (0.04)
Log Costs	0.1214 (0.605)	0.025 (0.90)	-0.0359 (0.86)
AGE	0.015** (0.013)	0.0091 (0.1276)	0.0141** (0.041)
DUR	0.0227* (0.091)	0.0198 (0.14)	0.0191 (0.161)
AU	--	1.044** (0.0038)	1.143** (0.003)
Ic	--	-1.6763 (0.20)	-1.3321 (0.314)
DS	--	0.3656 (0.88)	0.2947 (0.91)
DB	--	0.176 (0.695)	0.1764 (0.698)
CMEAEX	0.0013 (0.95)	-0.0203 (0.38)	-0.0221 (0.36)
CMEAIM	0.0034 (0.78)	-0.0061 (0.668)	-0.0049 (0.733)
ASSOCIATION	--	--	-0.5845* (0.054)

Observation: 123

Probability Values in parenthesis (Chi-squared)
** Significant at the 5% level.   * Significant at the 10% level.

	TABLE 9			
	BIVARIATE PROBIT MODEL			
	DEPENDENT: OUTPUT DECLINE			

	Single Probit		Bivariate Probit model (MLE estimates)	
Variables	Coefficient	P Value(CHI) (BETA=0)	Coefficient	P Values(CHI) (BETA=0)
Intercept	6.2003	0.2835	9.193	0.1137
Log Prices	-4.3007**	0.0412	-5.827**	0.017
Log Costs	0.0359	0.856	0.0957	0.744
AGE	0.0141**	0.041	0.023**	0.0016
DUR	0.0191	0.161	0.0146	0.4259
AU	1.1430**	0.0025	1.0797**	0.0219
Ic	-1.3321	0.3139	-0.5636	0.6838
DS	0.2947	0.908	-0.4516	0.8784
DB	0.1764	0.6979	0.1979	0.6932
CMEAEX	-0.0221	0.3575	-0.021	0.4159
CMEAIM	-0.0049	0.7325	-0.0014	0.9193
ASSOCIATION	-0.5845*	0.0539	-1.6994**	0.0024
RHO			0.7757**	0.3896 (SE)
AVERAGE TREATMENT EFFECT			-0.4731**	0.1445 (SE)
Observations: 123				

** Significant at the 5% .   * Significant at the 10%

TABLE 10

BIVARIATE PROBIT MODEL
DEPENDENT: ASSOCIATION

Variables	Single Probit		Bivariate Probit model (MLE estimates)	
	Coefficient	P Value(CHI) (BETA=0)	Coefficient	P Values(CHI) (BETA=0)
Intercept	17.08**	0.0075	18.1*	0.051
Log Prices	-7.385**	0.0006	-7.1874**	0.011
Log Costs	0.2410	0.3267	0.2449	0.5753
AGE	0.0321**	0.0001	0.0328**	0.0013
AU	0.2786	0.4763	0.2609	0.5632
Ic	1.7238	0.1849	1.9517	0.2096
DS	-5.971**	0.0411	-6.8153*	0.088
DB	0.014	0.9742	-0.066	0.8802
CMEAEX	0.0025	0.9128	-0.0047	0.8421
CMEAIM	0.0119	0.4265	0.0202	0.2526
AU_OB	2.4059**	0.021	2.593**	0.0427

Observations: 123

* Significant at the 5% . * Significant at the 10%.

APPENDIX 1

Result 1: In the neighborhood of a locally stable equilibrium, a deterioration in the economic institutions (i.e. higher disorganization) increases the equilibrium membership rate, i.e.

$$\frac{d\mu^*}{\Delta} > 0$$

if :

$$\frac{B}{\partial \Delta} > 0$$

Proof: Define

$$\frac{d\mu^*}{d\Delta} \equiv \frac{\dfrac{B}{\partial \Delta} * f(e^*)}{1 - \dfrac{\partial B}{\partial \mu} * f(e^*)}$$

In the neighborhood of a locally stable equilibrium, the denominator of this expression is always positive. The numerator is positive if

$$\frac{B}{\partial \Delta}$$

is positive, since f(e*) is positive by definition.
QED.

Result 2: In the neighborhood of a locally stable equilibrium, a decrease in the costs of joining an association increases the equilibrium membership rate, i.e.

$$\frac{d\mu^*}{d\alpha} < 0$$

Proof: Define

$$\frac{d\mu^*}{d\alpha} \equiv \frac{-f(e^*)}{1 - \dfrac{\partial B}{\partial \mu} * f(e^*)}$$

In the neighborhood of a locally stable equilibrium, the denominator of this expression is always positive. QED.

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