

The Organization of Markets and Its Role in Macroeconomic Stabilization During Transition*

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Abstract

In the paper, we explain the ways in which the organization of markets influences the process of macroeconomic stabilization in countries in transition. First, we argue that aspects of market organization cause economic policies to have persistent effects over time. As a consequence, market organization influences the response of enterprises to macroeconomic policy and, so, the change in macroeconomic conditions that a given type of stabilization policy is likely to produce. In turn, these changes in macroeconomic conditions affect the ability of the government to sustain the policy, as well as introduce new policies to promote reform.

We focus in great detail on the way in which market organization causes policies to have persistent effects. We examine the role of market organization in stimulating investment and growth, and, ultimately, in improving a country's fiscal balance. We use an *option-value* approach to understand the process of investment, and find that market organization affects the investment process by influencing, primarily, its sunk costs, its downside risk, and profits foregone while waiting to invest. When incentives to invest are not adequate to stimulate growth, fiscal imbalances increase, and the likelihood of future macroeconomic instability rises. In this environment, excessively tight monetary policy can exacerbate the difficulty of stabilization. Instead of signaling "toughness," such policy might simply be viewed as not credible.

At the core of our more narrow argument are empirical questions concerning the relationship between market organization, investment, and growth. Therefore, we follow our theoretical analysis with an empirical analysis of this relationship. First, we provide cross-country evidence that market infrastructure in countries in transition is very underdeveloped and, in some aspects, might be deteriorating. The absence of adequate infrastructure suggests that the spatial structure of industry determines the types of investment that can most easily take place. Hence, we provide a cross-country comparison of patterns of industry location, with their implications for investment and job growth. All else equal, we expect inter-industry reallocation to be more sensitive to problems in investment than intra-industry reallocation. Finally, we demonstrate, using data from a recent survey of Russian enterprises, that market organization, in fact, has led to a pattern of growth in which intra-industry reallocation is the dominant determinant of growth.

We conclude by discussing the implications of this relationship for stabilization and reform. The clear result of our analysis is that shock therapy programs are less likely to be successful when the incidence of vertical dependence among firms is great and market infrastructure is highly underdeveloped.

The Organization of Markets and Its Role in Macroeconomic Stabilization During Transition

1. Introduction

One of the most interesting features of the transition is the attention that has been paid to macroeconomic stabilization. Many economists expected that stabilization would be one of the least complex aspects of transition. Liberalization of prices and other barriers to free trade would lessen the need for the government to provide enterprises with subsidies. As a consequence, the government's budget deficit would fall and inflationary expectations would be reduced. Hence, macroeconomic stabilization could be achieved quite naturally if the government could make a credible commitment to tight monetary policy. In this context, stabilization should have been a relatively straightforward prelude to the real problems of structural adjustment and privatization.

In fact, macroeconomic stabilization has been problematic in many economies experiencing transition.¹ Some countries have managed the stabilization process quite well, such as the Czech Republic and Estonia. In many other cases, however, the stabilization process has proved much more problematic.

Why has stabilization proved so difficult to achieve in some countries, like Russia, while in other countries stabilization has been relatively more successful? Many economists argue that differences in the experiences of these countries can be attributed to a lack of credibility on the part of reformers. While this argument is clearly suggestive, it begs the question of why reformers were more credible in some countries than in others. One cannot appeal to the reputation of the policy makers to explain variations in credibility. In all of the countries of transition, the policy makers were new to their positions, and there had been a (policy-) regime change of staggering proportions.² Why then the differences in credibility? To some extent, the form of the policies themselves might have affected credibility: the imposition of a currency board in Estonia naturally comes to mind. One might also point to the use of a fixed exchange rate as a nominal anchor.³ But, this raises the question of what accounts for policy design.

To understand the relative success of stabilization, it is therefore crucial to inquire into why these differences in credibility arise. Credibility is an issue because stabilization requires the implementation of policies that are costly to sustain. Recognition of these costs leads agents to doubt whether these policies can be sustained. This suggests that, to understand variations in credibility, it is useful to focus on what determines the costs of carrying out such policies. The argument we present in this paper is that the organization of domestic markets plays a critical role in

¹For example, see Gelb and Balcerowicz (1994) and De Melo, Denizer, and Gelb (1995).

²Although policy makers might all have been new, there might have been other differences that affected relative credibility. One factor would be the nature of political institutions. It is clear that in Russia, where Gaidar was never confirmed by the Parliament as Prime Minister, the radical stabilizers had less credibility than, say, Klaus in the Czech Republic.

³Jeffrey Sachs, in particular, has emphasized the role of the exchange rate as a nominal anchor.

enhancing or weakening credibility. Market organization affects credibility because it determines the cost of carrying out the policies necessary to stabilize the economy.

Our argument that credibility is affected by the organization of markets takes on even greater force during transition than at other times. The intensity of the restructuring process, and the associated reallocation of resources that this entails, has important macroeconomic consequences. Economic recovery requires that enterprises *invest* in the opportunities that transition makes available. The problem is that uncertainty over the durability of reform might cause investors to postpone such activity until some of this uncertainty is resolved. If many investors act the same way, the consequent effects on the government's budget constraint endanger stabilization. Market organization is intrinsic to this uncertainty and to other incentives that govern the investment process.

We define the organization of markets to include both market structure and market infrastructure. Market structure is the set of horizontal, vertical, and spatial relationships between enterprises. Market infrastructure is the set of institutions that support transactions between enterprises, including those that provide information, physical infrastructure, finance, and the legal framework. The quality of market infrastructure determines the ease with which a transaction between a producer and customer in two randomly chosen sites in a country can take place. Underdeveloped market infrastructure often exacerbates problems in market structure by segmenting markets into smaller, more isolated regions.

In the remainder of this paper, we explain the ways in which the organization of markets influences the process of macroeconomic stabilization in countries in transition. First, we argue that aspects of market organization cause economic policies to have persistent effects over time. As a consequence, market organization influences the response of enterprises to macroeconomic policy and, so, the change in macroeconomic conditions that a given type of stabilization policy is likely to produce. In turn, these changes in macroeconomic conditions affect the ability of the government to sustain the policy, as well as introduce new policies to promote reform.

Next, we narrow our argument, focussing in more detail on the way in which market organization causes policies to have persistent effects. We examine the role of market organization in stimulating investment and growth, and, ultimately, in improving a country's fiscal balance. We use an *option-value* approach to understand the process of investment, and find that market organization affects the investment process by influencing, primarily, its sunk costs, its downside risk, and profits foregone while waiting to invest. When incentives to invest are not adequate to stimulate growth, fiscal imbalances increase, and the likelihood of future macroeconomic instability rises. In this environment, excessively tight monetary policy can exacerbate the difficulty of stabilization. Instead of signaling "toughness," such policy might simply be viewed as not credible.

At the core of our more narrow argument are empirical questions concerning the relationship between market organization, investment, and growth. Therefore, we follow our theoretical analysis with an empirical analysis of this relationship. First, we provide cross-country evidence that market infrastructure in countries in transition is very underdeveloped and, in some aspects, might be deteriorating. The absence of adequate infrastructure suggests that the spatial structure of industry determines the types of investment that can most easily take place. Hence, we

provide a cross-country comparison of patterns of industry location, with their implications for investment and job growth. Finally, we demonstrate, using data from a recent survey of Russian enterprises, that market organization has significant consequences for investment and growth. We conclude by discussing the implications of this relationship for stabilization and reform.

2. Credibility and Stabilization

The importance of credibility in policy implementation is well understood in the literature on stabilization. The effects of stabilization programs depend crucially on how expectations are affected, and this in turn depends on how credible the policies are. When policies are not credible, they often result in outcomes opposite to what was intended.⁴ Credibility can, however, become a crutch with which all failures of stabilization are explained. Thus, many observers argue that the key difference between the Polish and Russian stabilization attempts was that the former was more credible. This begs the basic question: “*How does a government that plans to do all the right things and, indeed, puts them on paper secure the credibility that makes it possible to live with the policies?*” (Dornbusch 1988: 426, italics in the original).

Most of the literature on policy credibility focuses on the *credibility of policy makers*. In these models, agents attempt to infer the policy maker’s type from observed performance.⁵ Policy makers always desire that agents view them as “tough,” as this improves the tradeoff they face. Thus, “weak” policy makers will attempt to obtain a reputation as being “tough,” so that this can be exploited at some future date. These models focus on the signaling that takes place when policy makers choose policies. They do not, however, consider the effects of the *choice of the policy itself on credibility*. It might be that some policies are more credible than others.

To make the choice of policies interesting, it is important that policies have *persistent effects*. In most models in the credibility literature, policies do not have persistent effects. Usually, the models consist of a one-period game, which is repeated over time. There is no effect of policy choice on credibility because the state of the economy in period $t+i$ is independent of the choice of policy in period t . Thus, for example, tough anti-inflation policy in the current period is assumed not to affect the level of unemployment in the next period. But, when the policies have persistent effects, the economic states in the two periods are no longer independent. For example, tough anti-inflation policy might create high levels of unemployment. This is important because even the toughest policy maker might choose to renege on, say, an anti-inflation policy in the wake of a severe enough shock, such as a war. With persistence, current policies can affect the policy maker’s room to maneuver in the future. Four periods of tight monetary policy, with its consequent unemployment effects, might affect popular tolerance for anti-inflation policy in the fifth. Hence, committing to the tough policy today might make the commitment to future anti-inflation policy

⁴An excellent example would be the announcement by the Romanian government that its cancellation of inter-enterprise arrears would be a one-time event, and that in the future hard-budget constraints would be imposed. Evidence that this policy regime was not credible is apparent in the subsequent growth in inter-enterprise arrears. Agents clearly did not believe the government policy announcement (Clifton and Kahn (1993)).

⁵For example, as in Barro and Gordon (1983).

less credible. Or, as we argue later, a policy of monetary tightening today might ultimately increase government debt, and this might make inflation more likely in the future.⁶

An example of this problem might be the pledge to stick to a fixed exchange rate. Suppose that the stabilization program causes unemployment to grow to a high level during the period. Does this enhance the commitment to stick with the peg? Investors might demand a larger interest premium when unemployment has been high for several periods because they believe the government is more likely to introduce policies to combat unemployment; hence, they might believe that the likelihood of devaluation is greater. The signaling model, on the other hand, would predict that credibility is enhanced in this case because the policy maker is more likely to be tough.

The essence of policy credibility⁷ is that agents believe that the policies announced will in fact be implemented. Two factors play a key role in creating such a belief. First, the policies must be dynamically consistent.⁸ That is, it must be the case that policies announced in period t for period $t+i$ must be optimal for the policy maker when period $t+i$ arrives. Otherwise, the policy maker will not implement the announced policy. For example, the government might announce that it will shut down all enterprises that cannot cover their operating costs in the hope that enterprises will adjust so that their costs are indeed covered. If, however, it turns out that many enterprises cannot cover their costs, the government might prefer not to impose the threatened action.⁹ The policy is not dynamically consistent. Rational agents will foresee this, however, and therefore will not adjust. Dynamically inconsistent policies are not credible because agents know that the threats implied are empty.

The second factor that affects credibility are the nature of the economic costs attendant to carrying out the policies.¹⁰ The credibility of stabilization policy is enhanced when the economic costs of carrying out the government's announced policies are low.¹¹ The incidence of the costs is also important. When the costs impose externalities on third-parties, the credibility of policy is more likely to be tested. Suppose that implementing a hard-budget constraint results in a chain reaction of enterprise closures. Closing down a key enterprise in a vertical chain of production might have deleterious effects on customers or suppliers. These "third-parties" might be innocent in the sense

⁶Drazen and Masson (1994) offer a perfect example. Suppose that someone tells you they wish to lose weight, and so they are skipping dinner. If he adds the statement that he has skipped dinner for the last three days, does that increase his credibility? In the signaling literature, the answer would be yes; by acting tough, he has enhanced his credibility. But with persistence, skipping meals makes him hungrier, reducing the likelihood that he skips the next one.

⁷With or without persistent effects.

⁸Time consistency is analogous to subgame perfection in game theory. A strategy is subgame perfect if it remains a player's optimal strategy when each of the relevant subgames is reached.

⁹Tckes and Ryterman (1994a) discuss the credibility of stabilization programs when the authorities are uncertain over how many enterprises cannot adjust as opposed to will not adjust. If the latter pool, then the costs of carrying out threats multiply. Hence, it becomes critical for the government to undertake actions that induce separation.

¹⁰As well as side effects. In medicine, an appropriate therapy can still have side effects. The problem with the shock therapy-gradual stabilization debate is that it focuses attention away from thinking about appropriate policies to cope with the side effects. The analogy with medicine is apt.

¹¹Although this point seems obvious, it should be noted that the government obtains a reputation for being tough, a reputation that enhances its credibility, by undertaking policies that are costly.

that they were not violating their budget constraints.¹² Yet, the loss of a key supplier might make it impossible to continue production. In cases where such strong vertical dependence exists, it might be harder for policymakers to carry out the threats implied by their policies. Hence, when policies have large third party costs, they might be less credible than when the costs fall directly on the “offending enterprises.”

The economic costs of carrying out macroeconomic stabilization policies are associated with idle resources that result from an enforcement of hard-budget constraints.¹³ These costs are greater when the penalties applied to a transgressing firm (i.e., liquidation of an insolvent enterprise) has large effects on other enterprises, either through employment effects or through effects on the demand or supply for the outputs of other enterprises. If market institutions are present to facilitate the reallocation of resources, then these downstream effects will be lessened, and hence the cost of carrying out the policy will be as well. When markets are well organized, the costs of pushing enterprises into bankruptcy are reduced. This, in turn, limits the extent to which the threats necessary to enforce the stabilization policy spillover to other enterprises. The smaller is the spillover, the greater is the credibility of stabilization policy.

Thus, while it is commonplace now to explain the success or failure of macroeconomic stabilization on the credibility of the reform program, it is evident that credibility depends on more than the backbone of policy makers or the coherence of the reform program.¹⁴ Credibility is enhanced by favorable circumstances, and market organization is an important determinant of these. Next, we analyze in more detail the mechanism by which market organization causes policies to have persistent effects. These effects potentially undermine the credibility of stabilization policies.

3. Investment and Stabilization

Macro stabilization is usually viewed as a problem of monetary stabilization. In a direct sense, this view is correct because excessive money growth is the proximate cause of inflation. Excessive money growth is, however, typically the response to unsustainable fiscal deficits, and this is certainly the case in transition economies. This point is crucial for understanding the success of

¹²Of course, the “third-party enterprises” might have been able to obey their budget constraints only because the other enterprises were violating their own budget constraints. Consider a vertical chain of production where the demand for the final good does not cover the cost. Shutting down the production of the final good might result in shutting down all of the upstream suppliers (this is an extreme example, of course). If there is no other demand for the outputs of these upstream enterprises, then carrying out the policy is efficient. Nonetheless, even in this case, the fact that the incidence of costs is dispersed over “third parties” must have some impact on the resolve of policy makers.

¹³The *political* costs might be far greater than the *economic* costs. Cutting production at value-subtracting enterprises reduces economic costs, but might have significant political costs if important parties are affected.

¹⁴“The central weakness of the Sargent position is to present ‘credibility’ as some objective, unquestionable fact -- as if passing a budget law or instituting an independent central bank is by itself enough to ensure that these institutions will in fact become what they represent on paper. Even though a government might intend or even initiate all the right measures...there remains still the problem of making these measures work once the costs of implementation become apparent (and hence actually being able to sustain them). This is of course the central issue in the transition to accomplishing a successful stabilization” (Dornbusch 1988: 410).

stabilization policies; monetary tightening that does not attack the fundamental source of the problem is not credible because agents know that money growth will be higher in the future.

Governments print excessive amounts of money when they are spending more than they can borrow or receive in direct taxes. In a sense, the budget is always balanced: the *inflation tax* replaces other sources of taxation. Governments in transition economies resort to the inflation tax for three reasons. First, the fall in output that accompanies transition leads to a decline in tax revenues. Second, the weakness of many transition governments reduces tax compliance. Finally, liberalization threatens the survival of state-owned enterprises, and governments in transition economies are typically slow to end the implicit fiscal subsidies that are a legacy from the previous regime.

High inflation only ends when the government either finds other sources of (current or future) revenue, or lowers expenditures. Without resolving the *fiscal* problem, advocating monetary restraint is pointless. At best, the government can reduce money growth temporarily, financing a part of expenditures by borrowing at home or abroad, by delaying payments (many state workers have not been paid in months) or other expenditures, by getting advance and usually discounted payment of taxes or other revenue, or by selling assets sooner. *But, sustainable, macroeconomic stabilization requires that the implied fiscal-sector deficits, which are really the contingent liabilities of state-owned and privatized enterprises that receive state credits, must be reduced.*

In order to cut fiscal-sector deficits, transition governments must harden budget constraints, which implies that some enterprises will contract. These deficits cannot be cut without real effects. These real effects will result in plant expansion and contraction, flows of capital and employment across sectors, and enterprise restructuring.¹⁵ There is no effective means of correcting the fiscal situation without such real effects. What is crucial for our argument, however, is that, for the most part, *these processes cannot occur without investment*. Investment is a critical component for labor reallocation, and it is critical for enterprises that contemplate entering new lines of production.

The market response to a stabilization program thus depends on the willingness of firms to invest in the opportunities created by liberalization. When investment opportunities are clear and institutions are present to facilitate investing, then resources flow easily from those sectors overdeveloped under planning to sectors where goods were undersupplied. This supply response will ease the pressure induced by tight money programs; job creation associated with the former will offset contraction created by the latter. What makes transition difficult, however, is that there are costs of adjustment. In the presence of adjustment costs, the central issue is: how much delay in growth will they create? If adjustment costs are too great, then the supply response might arrive too late to alleviate the pain from tight monetary policy. In such cases, the side effects from stabilization might weaken credibility and lead to unsuccessful stabilization.

¹⁵The fact that stabilization cannot proceed without real effects might seem commonplace, but recall that in most analyses of stabilization the key problem is that of influencing inflation expectations. In these models, a credible policy makes all agents expect lower inflation and in that case there is no real adjustment. The contrast here is clear because in the transition case even if the policy is fully credible there will be real adjustment.

3.1 Investment as an Option¹⁶

The essence of economic restructuring is investment, in the broadest sense: inducing economic agents to take actions that are costly or painful today, but will pay off in a future market economy. This not only involves physical investment -- building new plants or installing new machinery -- but restructuring enterprises, moving to new areas, setting up new institutions, and so on. Each of these activities involves current sacrifice against future reward. Future rewards are uncertain, however. This uncertainty is present in any investment problem, where firms are uncertain over future demand and cost shocks, but it is especially important in transition. In transition, there is an additional component to uncertainty over that which is normal to firms in market economies: *regime uncertainty*.

A key characteristic of uncertainty in transition is that much of the uncertainty facing firms will be reduced as the transition proceeds.¹⁷ Firms are uncertain over future rewards precisely because the regime is undergoing rapid institutional change. Firms are not sure of their own survival and that of their trading partners¹⁸, and because rules concerning their treatment, such as taxation of profits¹⁹ or the implementation of bankruptcy statutes, are being developed. This type of uncertainty generally declines over time, as the institutional and market setting begins to take shape and agents learn the rules of the new regime. Hence, with respect to regime uncertainty, much can be learned by waiting.

Greater uncertainty, by itself, is not problematic. With greater uncertainty, there are greater rewards as well as greater losses. Mean-preserving increases in uncertainty do not necessarily reduce investment.²⁰ The issue is very different, however, when there are *sunk* (or irreversible) costs associated with investment. When there are sunk costs²¹ and uncertainty over future outcomes, there is an *option value to waiting*. Because of the sunk costs, it might pay to delay investment until more is known about the likely outcomes. When there are no sunk costs, investments can be undone; hence, delay involves only costs -- deferred profits -- but no benefits. With sunk costs, however, *timing* is crucial. It might pay to delay an investment until more is learned about some key parameters of the decision. Investment opportunities are like an option. Investors can decide to invest, not to invest, or to wait and see if conditions will improve, in the meantime keeping any wealth they can hidden or abroad.

¹⁶Cochrane and Ickes (1995) and Ickes, Ryterman, and Tenev (1995b) first suggest that investment in transition can be viewed as an option.

¹⁷A second key characteristic is that uncertainty in transition is endogenous. We discuss this below.

¹⁸For an analysis of the survival-oriented firm in transition, see Ickes and Ryterman (1994b).

¹⁹For an analysis of tax uncertainty on firm behavior in Russia, see Litwack (1993).

²⁰The last statement ignores risk aversion, of course. Adding risk aversion would only increase the force of our argument. The option value of waiting, however, does not depend on risk aversion.

²¹An investment is fully irreversible when it cannot be undone, in other words, when negative investment is impossible. When sunk costs are present, investment is at least partially irreversible, since one cannot recover the sunk costs associated with investment. It might be possible to sell a machine tool, for example, but even in a competitive industry the sale price will be less than the purchase price, since the machine tool will be excess capacity to another firm. The literature on irreversible investment has grown rapidly in recent years. See Dixit and Pindyck (1994) for a detailed survey, and Abel and Eberly (1994) for a unified approach to investment with adjustment costs and irreversibility.

Thus, potential investors must always weigh the returns to waiting (so that one can learn more) with the opportunity cost of delayed investment. The major cost of delaying investment is that of not being the first one in an activity. In a rapidly changing environment, there might be once-in-a-lifetime opportunities that will accrue to the first entrant.²² While this might be important in some activities, it is less true in others. For many activities, especially those that are associated with restructuring, haste is often not essential; in fact, it might be deleterious to survival in the long term.

The option value of waiting depends on two forces, the sunk costs and uncertainty associated with the investment on the one hand, and the profits foregone while waiting on the other. The greater the sunk costs and the more uncertain the future, the better it is to wait and see how the uncertainty is resolved. However, the more current profits are foregone by waiting, the better it is to get on with the investment project. Thus, in an uncertain environment with large sunk costs, investors may choose to wait to invest, even if the *expected* rewards are high.

Uncertainty with respect to returns is a central feature of transition. The policy and regulatory environment, the availability and prices of inputs, what markets will be good opportunities -- all these are much more uncertain in transition economies than in western economies. The fact that all other enterprises are *simultaneously* restructuring adds to the uncertainty.²³ Since the economy is in transition, immediate profits might be relatively small compared to future profits if reform succeeds. Under such circumstances, it might be of considerable value to delay investing until more is known.

This simultaneity in decision making brings out attention to the second key characteristic of uncertainty in transition, that there is a large *endogenous* component. The outcome of the transition process depends on the decisions made by actors. Consider, for example, the problem of the state budget. If enterprises undertake active investment policies, the contraction in output is reduced, and a regime of low tax rates is consistent with fiscal balance. If, enterprises delay investments, however, then the same tax rates and expenditure programs imply large public sector deficits and monetization. Thus, uncertainty over future tax rates depends, to a large extent, on the decisions made by other actors.²⁴

The tax problem is an important example of endogenous uncertainty in transition, especially with respect to stabilization. But, this is not the only type of endogenous uncertainty. Sachs (1994) develops several other examples, among them the willingness to hold domestic currency. Another critical example is enterprise adjustment itself, for, as we have noted above, if all enterprises are adjusting, then the side effects associated with stabilization are reduced, and the likely success of the program increased.

²²This seems likely to be true in banking, for example, in Russia.

²³For a discussion of simultaneous restructuring, see Ickes and Ryterman (1994b).

²⁴In this sense then, investment in the transition exhibits *strategic complementarity*. Sachs (1994) discusses several stylized models where multiple equilibria result from strategic complementarity of the decisions of agents in transition, leading to multiple equilibria.

What is crucial is that this endogenous uncertainty -- the “reform conundrum”²⁵ -- further complicates the stabilization problem. The possibility of multiple equilibria enhances the importance of credibility, because credibility can coordinate expectations. Thus, factors which enhance credibility are crucial to the success of stabilization.

3.2 Market Organization and Investment

Understanding the organization of markets in a country is critical to understanding the incentive for firms to restructure and invest. Market structure and infrastructure play an integral role in determining the sunk costs and uncertainty of investment as well as the profits foregone while waiting to invest.

First, market infrastructure is a key determinant of the sunk costs associated with plant expansion and resource reallocation. Market infrastructure influences the costs of finding new suppliers and customers. In the search for new trading partners, firms must expend resources to alter pre-existing arrangements. These are investments in new arrangements; they cannot be recovered once the expenditure is made. When market infrastructure is poor, potential trading partners might be located across the street, yet be difficult, if not impossible, to identify.²⁶

Many institutions are involved in the identification of trading partners. Firms might use wholesale and retail dealers, marketing firms, or advertising firms to attract new customers or identify potential suppliers. Physical infrastructure, such as telecommunications and information technology, are also integral. For many countries in transition, even simple technologies, such as telephone directories, might not be present.

Once potential trading partners are identified, a relationship must be forged. In developed economies with advanced legal systems, the relationship often can be based on impersonal criteria, such as the cost and quality of the product exchanged. Lawyers assist in negotiating and drafting the contract that defines the conditions of exchange, drawing on a well-developed and well-tested body of contract law. If disputes arise, a system of courts and other, more informal institutions are present to facilitate their resolution.

But, in most countries in transition, the legal system is not well-functioning; institutions are overburdened and underdeveloped.²⁷ The consequences of this underdevelopment are potentially quite serious. In the absence of a well-functioning system of law, more informal and more costly arrangements are needed to make agreements enforceable. Williamson (1975) provides many examples of these arrangements, including the investment of firms into transaction-specific assets

²⁵This term was introduced by Cochrane and Ickes (1995).

²⁶In 1994, we interviewed the director of a firm in Voronezh, Russia, who said that he searched all of Russia for months for a supplier for a particular input, and found it quite accidentally through casual conversation at a party: the supplier was located across the street!

²⁷For example, see Hendley (forthcoming) and Pistor (1995).

(“hostages”).²⁸ *But, this self-enforcing mechanism is predicated on the willingness of firms to incur sunk costs -- the very type of investment firms are least willing to make in a transition environment.* In the extreme, this problem is so serious that we expect that many potential transactions simply will not take place.²⁹ And, when they do, they often take place at very high cost.

Market structure is also linked to the downside risk that firms face when making investments. The risk of an investment is lower when the investor faces a strong pool of potential suppliers and customers in the *new* activity. If the entrepreneur enters into an activity in which it is very dependent on particular trading partners, then its success is closely tied to the success of those partners. Bad decisions by those trading partners, even if those decisions concern unrelated activities, could have adverse consequences for the entrepreneur. On the other hand, if the entrepreneur can easily replace its suppliers or customers, then the risk of bad decision making by the trading partner on the firm is reduced.

A separate, but related, argument concerns the willingness of firms to enter into a new activity, given the structure of its *traditional* market. According to this view,³⁰ the decision for a firm to enter a new activity is dependent on the downside risk of the activity, specifically, on its ability to continue traditional activities if the new activity fails. When a firm is very dependent on particular trading partners, it might be very reluctant to experiment with new activities, if such experimentation requires a reduction in the production of the traditional good or otherwise encourages important partners in the production of that good to stop producing inputs for or using the good. This is a subtle, but important argument.

Finally, high distribution costs lower profitability and, hence, the profits foregone while waiting to invest. In many countries in transition, the quality of physical infrastructure, such as transport vehicles, highways, and warehouses, is poor. Problems in the quality or utilization of physical infrastructure are further aggravated by problems of crime, which is often linked to corruption. With the breakdown of the central planning apparatus, crime has increased and the security of goods in transport has been jeopardized. Firms complain that the police often contribute to the problem by informing the “mafia” of the contents of trucks and rail cars they inspect.³¹

Problems with the quality or utilization of physical infrastructure are also exacerbated by the fact that the location of enterprises in many countries in transition does not conform to the pattern that might have emerged had the economy been market based in the preceding decades.³² In fact, given that transport costs were often external to the location decision under central planning, there

²⁸Firms will integrate, if they cannot identify mechanism to ensure contract compliance. However, during the transition, integration might be difficult because of the underdevelopment of institutions to facilitate the exchange of private property rights.

²⁹This problem is particularly acute for transactions in which one firm must incur sunk costs long before the final product is exchanged.

³⁰See Ickes, Ryterman, and Tenev (1995b).

³¹Based on interviews with Russian firms, 1994.

³²See Ickes, Ryterman, and Tenev (1994a) for more detail.

is no assurance that the historic trading partners are economically the most sensible. But, in the face of difficulties in finding new trading partners, these historic relationships are likely to persist.

Problems in market organization can also aggravate problems of market infrastructure. When a small number of firms controls a large share of the market, these firms can use a variety of techniques to lower the expected profits from investment. For example, dominant firms might sell products below cost for a short period to drive smaller firms out of the market.³³ Or, dominant firms might prevent potential entrants from gaining access to strategic inputs, customers, or distribution services.³⁴ Limited access to critical resources are a real threat to the job creation process in countries in transition. Markets tend to be highly segmented and wholesale, retail, and other distribution services tend to be highly concentrated, so that suppliers, customers, and distributors can be easily captured by existing firms. All these factors work together to lower the profitability of potential investment projects.

3.3 Financial Constraints

Unlike in economies with well-functioning capital markets, firms in transition economies cannot be assured that good investment projects will necessarily attract financial capital. In economies in transition, long-term finance is typically not offered by banks due to structural problems in capital markets and high levels of uncertainty in product markets. Therefore, investment is typically financed using the savings of the individual or firm.

In the absence of regulation, firms in imperfectly competitive industries might have an advantage over other firms in financing their investment projects. Monopolies and oligopolies often have greater profits than firms in more competitive industries. Hence, these firms attract investors. In addition, these firms can choose to allocate their profits to retained earnings, providing them with an important source of self-finance. Whether they will choose to do so will depend on the internal incentives within the firm.

Earlier, we argue that competition in input markets fosters investment by reducing its downside risk. However, this competition could produce an opposing force. Imagine, for example, two firms that are historic trading partners: firm A is a monopolist and has sold firm B a critical input for the past five years. Since the beginning of transition, firm B has experienced some uncertainty in the demand for its product. Unfortunately, because institutional problems in capital markets prevent banks from collecting good firm-level financial data, banks are not willing to finance firm B in periods of low demand based on B's expected future earnings. But, firm A, who knows B is creditworthy, is willing to provide firm B with trade credit during periods of low

³³However, these practices might be difficult to sustain in the long term.

³⁴In market economies, integration often involves the merger of two corporations into one. However, in many cases, integration involves more informal relations. For example, Kodak recently accused Fuji of using its long-standing relationship with large Japanese distributors as a means for persuading them not to sell Kodak products. Given the immaturity of property rights and problems in capital markets in countries in transition, we expect that much of the integration of firms will take place using more informal mechanisms.

demand³⁵. Now, suppose that there is substantial new entry in the upstream industry, so that firm B can now buy the input from a new firm, say firm C. In the absence of a binding long-term contract, firm A might not be willing to finance firm B during periods of low demand because, in better times, firm B might defect and trade with firm C.³⁶ Under these circumstances, firm B is less likely to invest. Thus, *unless capital markets develop more quickly than product markets, competition in product markets might produce financial constraints on investment.*

4. Empirical Evidence

The theory in section 3 provides a framework for understanding the connection between the organization of markets in a country and its macroeconomic performance. In general, the lower the sunk costs of the investment, the higher the foregone profits while waiting to invest, the lower the downside risk of the investment, and the fewer the financial constraints on investment, the greater the volume of investment by the firm into new activities in the near term. When this investment leads to job growth, fiscal pressures lessen, and the macroeconomic performance of the country improves. The better the prospects for investment, the greater the credibility for the stabilization program.

Market organization plays a dominant role in this process. First, when infrastructure is poor, the search costs -- which are sunk costs -- associated with investing in relationships with new trading partners are very high. Second, high distribution costs lower profitability and, hence, the profits foregone while waiting to invest. Third, vertical dependence on other firms in new and traditional activities increases the downside risk of investing in new activities. Finally, firms in monopolistic industries, in the absence of regulation, often have greater profits than firms in more competitive industries. Hence, these industries attract investment as well as provide its firms with profits which can be used to finance investment in new activities.

In this section, we provide empirical evidence to test our view. In most countries in transition, imperfect competition arises because problems in market infrastructure and other barriers to trade segment markets.³⁷ Thus, we begin by providing cross-country evidence that market infrastructure in countries in transition is very underdeveloped and, in some aspects, might be deteriorating.³⁸ The absence of adequate infrastructure suggests that the spatial structure of industry determines the types of investment that can most easily take place. Hence, we provide a cross-

³⁵Firm A might be willing to provide firm B with credit at below-market rates of interest because firm A sells the input at the monopoly price.

³⁶A related argument, for a different context, is made by ???. They argue that the introduction of civil law in 19th century India resulted in decreased investment by farmers because it led to increased competition among village moneylenders.

³⁷See, for example, Brown, Ickes, and Ryterman (1994).

³⁸Comparable cross-country data on the extent of imperfect competition are not available. Until very recently, most countries in transition computed measures of imperfect competition based on very narrow -- too narrow -- product categories, resulting in exaggerated estimates of the degree of imperfect competition. Although these narrow measures were useful for the purposes of central planning, they are not useful in understanding the nature of competition in more broadly defined industrial categories.

country comparison of patterns of industry location, with their implications for investment and job growth. Finally, we demonstrate, using data from a recent survey of Russian enterprises, that market organization has significant consequences for growth.

4.1 The State of Market Infrastructure

We can think of the quality of market infrastructure as measuring the ease with which a transaction between a supplier and a customer in two randomly chosen locations in a county can take place. This process includes, first, identifying one another, second, forging the relationship that is necessary for a contract to be negotiated and production to take place, and, finally, physically moving the products from the production site to the consumption site. It is a complex process, which uses a variety of institutions, including, potentially, wholesale or retail firms, telecommunications, warehouses, transport, the legal system, and banks and other financial institutions.

Market infrastructure influences investment by affecting its cost. The process of searching for and forging a relationship with trading partners creates sunk costs. Typically, these costs are not recoverable if the project fails and related assets must be sold. Distribution costs are variable costs of production, which lower the profitability of the venture.

To claim that market infrastructure in countries in transition is underdeveloped is neither new nor controversial. Under the system of central planning, the identification of production goals and the distribution of products from producers to customers were generally functions carried out by centralized institutions. In some of the countries, certain aspects of these processes were decentralized even prior to transition, so that nascent market institutions could begin to form. For example, the adoption of the more flexible system of market socialism in Poland provided it with the opportunity to develop a cadre of small cooperative firms to assist in the distribution of goods and the provision of services. Thus, at the onset of liberalization, Poland was better prepared institutionally than, say, the former Soviet Union to launch a system of private trade.

Unfortunately, statistics concerning the adequacy of some of the most important aspects of market infrastructure are not available.³⁹ For example, cross-country statistics concerning the *quality* of wholesale and retail services, legal counsel for commercial transactions, and financial services prior to reform are not available. However, we do have important information on several important aspects of the process, the *quantity* of retail services, media access, the quality of telecommunications, and the cost of transport.

Table 1 contains information on the quantity of retail services in former socialist and selected lower-income Western European countries.⁴⁰ The statistics clearly indicate that the quantity of services, measured by the number of outlets per capita, are less in transition than in comparable economies. This difference can be attributed to the fact that the share of consumer goods in GDP in former socialist countries is lower. But, the demand for consumer goods and services is rising

³⁹In fact, one could argue that their absence indicates the very underdevelopment of the infrastructure!

⁴⁰Finland was included because of the close ties between its markets and those of the former Soviet Union.

rapidly. Unfortunately, constraints on retail space⁴¹ is limiting the flexibility with which economies can respond to this increase in demand.

Unfortunately, we do not have complete information on the quality of the services that the retail outlets in the two regions provides to its suppliers and customers. As a proxy, we provide statistics on the number of retail workers per capita and the number of scanning stores in each country to indicate the level of technology that the outlets use. We find no difference between the number of workers per capita, despite the larger share of consumer goods in GDP in Western Europe. One might be tempted to interpret this statistic to suggest that retail services per dollar expended in former socialist countries is higher than in comparable Western European countries. However, we point out that the services provided by each worker in transition economies is unlikely to be as high quality as those provided by workers in Western European countries. We do find that the technology used in Western Europe far exceeds the technology used in transition countries.

Table 2 presents comparative statistics on media access in former socialist and low-income Western European countries. We include these statistics to provide some insight into the potential fora for advertising that might be available to firms. We find that the number of consumer publications and percent of homes equipped with radios is greater in low-income Western European countries than in former socialist countries. The number of national newspapers and percent of homes equipped with TV's are the same.

Table 3 contains statistics comparing the quality of telecommunications in countries in transition to low-income Western European countries. These statistics suggest, in general, that telephone services in countries in transition are generally poorer than in low-income Western European countries. But, they also suggest that the variation in quality within both regions is large. We urge care in the interpretation of these data, particularly in the case of Russia. The percent of unsuccessful local calls in Russia is measured as seven percent in 1990 and eight percent in 1991. Yet, from many Russian cities,⁴² it was and currently is impossible to call even Moscow. Hence, the number of uncompleted calls does not accurately measure the lack of communications capacity because many calls are simply not made at all.

Table 4 compares the total cost of road, rail, and water transport in 1988 across a wide range of countries. Again, we see that transport costs are much higher in countries in transition than elsewhere. Moreover, we see that transport costs are substantially higher in the former Soviet Union than in other countries in transition.

The essence of transition is the building of market institutions to facilitate trade. Yet, this process has not been smooth. The introduction of markets required the dismantling of many socialist institutions, including those that coordinated trade. But, the building of new market institutions requires a significant amount of time as agents slowly acquire the skills and resources necessary for these institutions to grow. In the interim, the coordination of trade has faltered, and output has declined. To make matters worse, this coordination failure has occurred precisely at a

⁴¹See Harding (1995).

⁴²For example, in Saratov.

time when the central feature of recovery must be the introduction of new products and new production methods suited to markets. In fact, *part of the coordination failure can be attributed to the increase in demand for market infrastructure that is already overburdened and underdeveloped.* Hence, in many countries in transition, we expect the dynamics of improvements in market infrastructure to approximate a J-curve, declining prior to improving.

Table 5 presents statistics to test this view. These statistics are based on data we collected during a survey of Russian enterprises in 1994; we describe this survey in more detail later. The statistics suggest that, in many respects, the quality of market infrastructure in Russia has deteriorated since 1992. This deterioration is clearest for physical infrastructure -- telephone service and transport by air, land, and water. Part of the deterioration might be associated with the increased incidence of goods stolen during transport. We also find that all the firms that currently pay bribes for "road protection" to the police or mafia say that the problem of corruption and crime in transport has increased. We note however, that the data are censored; only firms that are currently paying bribes responded to this question. Firms (if any) that previously paid bribes, but currently do not, are not represented in the statistic. Thus, the severity of this problem might be overstated.

Financial services appear to have deteriorated as well. Since 1992, the incidence of barter has increased for almost half of the enterprises. Part of this increase might reflect an attempt by enterprises to escape the consequences of the tax system. Effective tax rates on net income of enterprises often approach (and sometimes exceed) 100 percent. Moreover, for enterprises that must cope with a decline in viability, tax avoidance might be an essential survival strategy. Also, the share of inter-enterprise debt in arrears in sales has increased for more than half of the enterprises. This statistic is remarkable, given mid-1992 is often considered to be the height of the arrears crisis in Russia.

The perception of deterioration is more ambiguous in the case of other aspects of infrastructure. Roughly a third of enterprises each said, respectively, that the number of trading enterprises interested in selling their products increased, decreased, and remained the same. Of course, these statistics could reflect differences in the demand shock of transition for their industries. Also, almost half of the enterprises said that it would be harder to find storage space of similar quality than in 1992, but a third said that it would be easier. In both these cases, we observe substantial variation across enterprises in the perception of the change in the quality of infrastructure since 1992. These perceptions do not appear to be correlated with the location or branch of operation of the firms.

Potentially, the most optimistic perception concerns the change in the importance of contracts. Despite the regular use of contracts during the period of central planning, more than half of the enterprises said that the importance of contracts has increased since 1992. However, we do not know precisely why this change has taken place. Contracts might have increased in importance because firms now believe contract execution is supported by reasonably well-functioning legal institutions. Or, it might be due to the absence of institutions, such as *obkobm* and other party officials, that enterprises could turn to when suppliers failed to make deliveries. Alternatively, their importance might have increased simply because transactions are now decentralized; written

contracts might facilitate the process of negotiating agreements. Yet, once these negotiations are complete, the contracts might never be referenced again.

4.2 The Role of Industry Location in Investment and Growth

Given the problems of market organization we have discussed, a concern is raised regarding the abilities of countries in transition to restructure and grow. If the investment process is delayed by problems in market organization, can restructuring take place? In this section, we argue that some restructuring can take place, but that it will be greatly affected by the location of industry in a country.

4.2.1 *The Nature of Restructuring During Transition.* Restructuring is not a process that is restricted to countries in transition. In market economies, a tremendous volume of restructuring is a normal occurrence. Gross flows of labor are so large that jobs created and jobs destroyed swamp the net change in jobs. Moreover, gross flows are greater within sectors than across sectors. The picture one gets from an examination of the U.S. data on job flows⁴³ is that of constant churning, a dynamic process where the aggregate net numbers mask the more voluminous changes below.

In the standard literature on job creation and destruction, the forces that drive these processes are typically sector-specific rates of exogenous technical change and differences in firm productivities. These changes leads to the creation of new plants and the destruction of old ones. Job destruction occurs when, given the equilibrium path of prices, a plant can no longer cover its variable costs.

In an economy in transition, the driving forces of job creation and job destruction include other factors beyond the normal churning that is a response to technical change. The creation of a market economy involves special processes that affect job creation and destruction. One of the most important processes in the transition is the change in the economic structure from a command system to a market system. The former system concentrated resources in heavy industry. The transition witnesses a shift to consumer goods and services. This shift can be considered as induced by an exogenous supply shock (like the oil shocks of the 1970's) that alters relative prices. In the wake of such a shock, inter-sectoral flows become uncharacteristically important.

The second critical process in the transition is the shake-down of inefficient enterprises. The inherited industrial structure in planned economies derives from a regime under which there was an absence of exit. Thus, at the outset of transition, there was a backlog of inefficient plants that needed to be shut down, even in industries for which the shock of transition was positive.

These two types of restructuring differ in the extent to which they depend on investment. First, the downsizing and liquidation of inefficient plants can take place quite independently of the investment process.⁴⁴ This downsizing and liquidation frees resources that can be purchased, often

⁴³For example, see Dunne, Roberts, and Samuelson (1989) and Davis and Haltiwanger (1992).

⁴⁴Except when the government, in fear of unemployment, intervenes to prevent it from taking place.

at relatively low cost, by other firms. We expect that most of the firms that are able to take advantage of these opportunities are other, more efficient, firms in the same industries.

The more complex type of restructuring is inter-industry restructuring. This type of restructuring often requires substantial investment, not only in assets but in organizational re-engineering and in the retraining of workers. In many cases, the expansion of growing sectors takes place because of the entry of new firms. Thus, all else equal, we anticipate that *the process of inter-industry restructuring will be more sensitive than intra-industry restructuring to the problems of market organization we discuss.*

4.2.2 Industry Location. But, some restructuring can and will take place. Given problems in market organization and, in particular, market infrastructure, we predict that resources are most easily reallocated between firms in the same location.

In this context, the question, then, is what is the pattern of industry location in countries in transition? If firms in different industries are located in the same place, then, inter-industry restructuring, which is at the heart of the transition, is facilitated. But, if firms in the same industries are located in the same place, then intra-industry flows of resources are more likely.

Table 6 compares the geographic concentration of industry in Russia, China, Western Europe, and the US. The statistic we use is based on a statistic devised by Krugman (1993), and measures on a scale of zero to one⁴⁵ the similarity of industrial structures of pairs of regions.⁴⁶ A value of zero indicates that two regions have identical industrial structures, while a value of one indicates that the two regions have no industry in common. Thus, the greater the value, the greater the geographic concentration of industry. Table 1 presents an unweighted average of these statistics for each of the countries.

The statistics reveal that industry in Russia is geographically concentrated to a much greater degree than in either the U.S. or China and to roughly the same degree as in Western Europe.⁴⁷ In part, this ranking reflects differences in labor mobility between countries. Labor mobility tends to be much greater in the U.S. than either in Russia or between the countries of Western Europe, making geographic concentration of industry in the U.S. somewhat less integral to the process of job creation and destruction than elsewhere.

⁴⁵The statistic developed by Krugman (1993) using an interval of zero to two. For this paper, we have rescaled the statistic by dividing Krugman's statistic by two. Hence, our statistic has an interval of zero to one.

⁴⁶The statistic is equal to:

$$\sum_i \frac{|s_i - s_i^*|}{2}$$

where s_i is the share of industry i in total manufacturing employment and s_i^* indicates the share is for a second region or country.

⁴⁷This analysis is somewhat sensitive to the level of aggregation used in the comparison. Krugman (1993), for example, divides the U.S. into four regions (northeast, midwest, west, and south) and compares their degree of specialization to specialization between U.K., Italy, France, and West Germany. Using a more aggregate definition of industry (two-digit SIC), he finds that the U.S. is slightly more specialized than these European countries.

But, differences in labor mobility do not fully explain differences in geographic concentration. Why, for example, is industry in Russia so much more concentrated regionally than in China? Both countries had centrally planned economies during their most intense periods of industrialization, with legal and cultural restrictions on labor mobility.⁴⁸ In theory at least, central planning should have fostered regional concentration. Regional concentration simplified planning by facilitating the monitoring of enterprises,⁴⁹ the allocation of labor,⁵⁰ and the smoothing of supply uncertainties among firms in an industry⁵¹. In addition, the traditional limits to regional specialization in market economies -- high local rents and problems of pollution and congestion -- were either not relevant or were external to the location decision under planning.

The question, then, is why is industry in China so diversified at the local level compared to industry in Russia. Leadership preferences clearly play a role. It is well known that the fear of invasion led Mao to adopt a policy of regional self-sufficiency. In the Soviet Union, on the other hand, fear of invasion had the opposite effect, as Stalin chose to locate industry in the Urals. Hence, the republics and provinces of the former Soviet Union are more regionally interdependent than the provinces of China.

Although we have not conducted this type of analysis for Eastern European countries, several factors suggest that the pattern of industry location in Eastern Europe bears greater similarity to the patterns in Western Europe and Russia than in China. Location decisions in Eastern Europe are the mixed outcome of market and socialist forces. Much of industry in Eastern Europe was created prior to the introduction of socialism, and, as a consequence, reflect market-based criteria. More recent location decisions were made during the socialist period, under regimes ranging from strict central planning to liberal forms of market socialism. But, these decisions were heavily influenced by product specialization agreements that came out of trade coordination with the former Soviet Union.

If, in fact, regional concentration of industry was integral to the absorption process under socialism, then a question is raised concerning the capacity of countries in Eastern Europe and the former Soviet Union to meet the critical challenge of *inter*-industry job reallocation. If a significant share of restructuring during transition involves transfers of resources between firms in different

⁴⁸However, rural-urban migration in both China and the former Soviet Union was significant during the process of industrialization.

⁴⁹From a planning perspective, it was important to distinguish factors under the enterprise director's control (such as his or her effort) from those that were not. When such distinctions were possible, the planner could reward a director who was working effectively despite adverse technological or local conditions. But, when enterprises were located in different cities, location-specific shocks were often difficult to separate from other types of shocks. This information problems created a moral hazard for the enterprise director, providing him or her with an incentive to reduce effort and to masquerade this reduction as location-specific problems. For more analysis of this problem, see Ickes, Ryterman, and Tenev (1995a).

⁵⁰Geographic concentration of industry created large pools of workers with similar skills in the same location.

⁵¹Uncertainty in the quality and delivery of inputs was a persistent problem under central planning. Regional concentration of industry reduces the adverse consequences of this problem to the extent that it facilitates the trading of input reserves by enterprises. For more analysis of this problem, see Ickes, Ryterman, Tenev (1995a).

locations, then we wonder whether these countries possess the institutions necessary to meet this challenge.⁵²

4.3. The Effect of Market Organization on Growth in Russia

Our central argument is that market organization influences macroeconomic performance by affecting growth. If this argument is correct, then a process of economic selection is in place which enables firms with particular types of market structure and access to particular types of market infrastructure to invest and grow. To test our view, we estimate a model that relates employment growth in a firm to changes in its rate of investment. To derive this model, we begin with a labor demand function for a firm in a given industry.

$$L = f(w, K) \tag{1}$$

where L is the number of workers in the firm, w is the real wage per worker in the industry, and K is the stock of capital in the firm. Next, we take the total derivative; manipulating the expression, we find:

⁵²The empirical literature (for example, Granick (1987), Boeri and Keese (1992), IMF-The World Bank-OECD-EBRD (1991)) on job creation and destruction suggest that labor turnover during the socialist period was only slightly less than turnover in Western European market economies. This is a remarkable feature, given the conventional view of socialist industry as fairly stagnant. The question, then, is how socialist economies could have achieved this level of change.

Part of the answer lies in the fact that, even in socialist economies, firms in an industry differed in their abilities to achieve high levels of productivity. Even in the absence of exit, this difference suggests that firms grew at different rates, as planners allocated more productive firms with more investment resources and higher output targets. To achieve this dynamic pattern of growth, the processes of job creation and job destruction were essential, almost as essential as they are to industrial dynamics in a market setting. Part of the explanation might also lie in the geographic organization of industry. If firms in an industry are located in the same city, then problems in labor mobility will not seriously constrain gross labor flows.

More recent research by Rutkowski and Sinha (1995) suggest that employment reallocation at the beginning of transition exceeds the levels found in industrialized and developing countries. It is important to note, however, that the authors compare gross hires and fires in the former Soviet Union with net jobs created in the U.S. and Colombia (taken from Dunne, Roberts and Samuelson (1989) and Roberts (forthcoming)). That is, the authors (and, implicitly, others who make similar comparisons) are comparing the turnover of workers in the former Soviet Union with the turnover of jobs in market economies. But, the latter turnover far less than the former, since many workers can hold the same job. To make this point clear, suppose, in a given period, a firm hires 100 workers and separates 25 workers. In the computations for the former Soviet Union, this firm would account for 100 hires and 25 separations in the aggregate data. However, in the computations for the U.S. and Colombia, the firm would account for 75 net jobs created, that is, 75 hires and no separations. Calculations based on U.S. data suggest that this problem leads to an overstatement of hiring and separation rates in the case of the former Soviet Union by at least 100 percent and turnover rates by at least 200 percent. Moreover, these statistics might be further exaggerated due to peculiarities in the restructuring process in the former Soviet Union; when parts of an enterprise “spin-off” into a new venture, the workers in the new venture are included both as separations (from the old enterprise) and hires (by the new enterprise), despite the fact they might be producing the same product using the same assets for the same wage. Hence, we do not believe that the hiring and firing rates in the former Soviet Union, in fact, exceed those in the U.S. and Colombia.

$$\dot{l} = \varepsilon_{LW} \dot{w} + \varepsilon_{LK} \dot{k} \quad (2)$$

where $\dot{l}, \dot{w}, \dot{k}$, are the growth rates of labor, real wages, and capital, respectively, and ε_{L_i} is the elasticity of labor with respect to i ($i=L, K$). Let \dot{k}^* be the average rate of investment in the industry. Then, (2) can be rewritten as:

$$\dot{l} = \varepsilon_{LW} \dot{w} + \varepsilon_{LK} \dot{k}^* + \varepsilon_{LK} [\dot{k} - \dot{k}^*] \quad (5)$$

This form of the equation is meant to emphasize that many of the factors leading to investment are industry specific, rather than firm specific, particularly those related to market structure and access to market infrastructure. This form allows us to distinguish, when present, the firm from the industry effects.

We assume that some portion, α , of employment growth, is constant across all firms in all industries. This portion of employment growth is a consequence of the change in economic system. In general, we expect that α is negative, as firms begin to shed the labor they hoarded during the period of central planning. We also assume that some portion, α_j , is constant across firms within a given industry. The direction of this effect will depend on the nature of the demand shock of transition for the industry. Because the system of central planning favored heavy industry at the expense of consumer goods and services, we expect, in general, the demand shock for heavy industry to be negative and the shock for consumer goods and services to be positive. We express these assumptions in the following way.

Let:

$$\alpha + \alpha_j = \varepsilon_{LW} \dot{w} + \varepsilon_{LK} \dot{k}^* \quad (6)$$

$$\beta_j = \varepsilon_{LK} \quad (7)$$

Substituting (4) and (5) into (3), we find:

$$\dot{l} = \alpha + \sum_j [\alpha_j I_j + \beta_j I_j \dot{k}^* + \beta_j I_j [\dot{k} - \dot{k}^*]] \quad (8)$$

where I_j is a dummy variable equal to one when the firm is in industry j .

Unfortunately, we do not have direct measures of investment to estimate this equation. However, we do have measures related to the firm-specific factors that the theory in section 3

suggests influence investment. These measures, which generally describe a firm's market structure and access to market infrastructure, can be used to test our view.

The data we use to estimate the model were collected during interviews in Russia with enterprise directors and other top managers during 1994. In collaboration with the Central Economics and Mathematics Institute (CEMI) in Moscow, we surveyed more than 150 enterprises in five Russian oblasts -- Barnaul, Novosibirsk, Saratov, Voronezh, and Yekaterinburg. Enterprises in our sample tend to be slightly larger than in Russia as a whole, but similar in terms of their distribution across heavy and light industry.⁵³ We also supplement this data set with data from the *1989 Census of Soviet Industry*.⁵⁴

Because of the limited number of useable observations in this data set, we make the further assumption that the $\epsilon_{L,K}$ are the same for all industries, so that $\beta = \beta_j$ for all j . The effect of this assumption is to weaken our ability to distinguish the role of market structure and infrastructure on employment growth. Hence, we believe we that, to the extent we are able to identify the role of markets on employment growth, we underestimate the full impact of these variables.

To specify the model, we begin with our theory which identifies four sets of firm-specific variables that determine the timing and quantity of investment: its sunk costs, the profits foregone while waiting, its downside risk, and financial constraints limiting access to capital. While we cannot directly observe each of these attributes for every potential investment project, we do know that investment projects that are undertaken will tend to have lower sunk costs, higher profits foregone, lower downside risk, and fewer financial constraints than other projects. Our survey contains information that enables us to measure at least some of these attributes.

First, investments tend to have low sunk costs when the search costs associated with the project are low. In the absence of adequate market infrastructure, this occurs when local conditions facilitate the creation of new projects. Specifically, we expect that *search costs are low when potential suppliers are located in the same oblast as the investing firm*. We assume that firms take advantage of their specialized skills and assets and tend to invest in projects related to their current activity. Thus, we anticipate that firms with local suppliers tend to have better opportunity to discuss and develop new projects than firms with trading partners elsewhere. Hence, they face lower search costs.

We also assume that *search costs are low when many firms in a branch are located in the same city*. Regional specialization of industry provides firms with several distinct advantages, including a larger local pool of skilled labor and other specialized inputs into production as well as the opportunity for technological spillovers between firms. These features of the local economy reduce the costs of searching for new investment opportunities and finding the resources to enable the project to be realized. To implement this feature, we use two variables. First, we calculate the number of firms in

⁵³For a more detailed comparison of our sample to all Russian enterprises, see Ickes, Ryterman, and Tenev (1995b).

⁵⁴This data set was translated and provided to us by PlanEcon.

the city that are also in the same branch⁵⁵ in which the firm currently operates. Second, we compute the share of workers in the city and branch that are employed by the largest firm in the branch. When a branch is dominated by a single firm, we assume that many of the other firms in the branch produce complementary goods;⁵⁶ we believe spillovers between these types of firms are especially likely.

The next set of variables we consider concern profits foregone while waiting, if the investment had been delayed or did not take place. Again, we assume that firms tend to invest in their own branches, and that the profitability of projects selected tend to be the same across all firms in the branch. Therefore, we do not expect that foregone profits affect firms within a branch differentially.⁵⁷ Thus, we include no firm-specific variables related to foregone profits in the regression. However, we do expect their effect to be included in the industry dummy variables, which we describe later.

Next, we consider the set of variables related to the downside risk of investment. In general, we expect that the *downside risk of investment increases when firms are very dependent on their trading partners in new or traditional activities*. Therefore, we include as regressors two variables: a dummy variable equal to one when more than 50 percent of a firm's sales are to one customer and a dummy variable equal to one when a firm knows of alternative suppliers for its most critical input. We expect that the first variable has a negative effect on investment, while the latter has a positive effect.

Privatization might also increase the downside risk of investment. Boycko, Shleifer, and Vishny (1994) argue that privatization severs the relationship of the state with the firm. If this is true, then the financial consequences of bad investment decisions must be worse for private firms than state-owned ones. Thus, we include a dummy variable equal to one when a firm has been privatized.

Finally, we consider variables related to financial constraints. First, we presume that *new firms are less likely to face financial constraints, given they recently obtained the investment to enable them to start their operations*. Therefore, we include as a regressor a dummy variable equal to one if the firm was created after 1990. Second, we suspect that *large firms might have better access to subsidies than smaller firms, given the political cost of liquidating large firms*. We measure the size of a firm based on its number of workers on March 31, 1992. Third, we suspect that *monopolists might have a greater ability to self-finance investment projects, given they tend to have higher profits than firms in competitive industries*. Therefore, we include as a regressor a dummy variable equal to one if the firm is currently identified by an anti-monopoly committee as a monopolist. Finally, we understand that *oblasts might differ in their fiscal policies and their access to federal resources*. Therefore, we include dummy variables to identify firms in four of the five oblasts.

⁵⁵We define a branch as an industry measured at the two-digit SIC level. A branch may consist of many related industries.

⁵⁶Imagine, for example, a city with a large automotive producer and firms that supply automotive parts.

⁵⁷We expect that a branch might include one or more industries that are monopolies. Investment in these industries might be more lucrative than investment in the more competitive industries in the branch. However, we assume that firms in a branch are potential, if not actual, competitors and can make investments, if they choose, in the industries with the monopolies.

To complete the specification, we include dummy variables to identify the branches in which the firm operates and a constant, which measures the effect of economic system on employment growth. To increase the degrees of freedom in the regressions, however, we include only those industry and regional dummy variables with a significance⁵⁸ of .50 or more. All the regressors in the model are described in Table 7.

We recognize that there might be some controversy concerning the way in which we classified the regressors into the various sets. For example, we classified the dummy variable identifying whether a firm has been privatized as related to the downside risk of investment because private ownership confers greater downside risk for the firm than state-ownership. However, we also could have classified this variable as related to financial constraints, for two reasons. First, most privatized firms have used at least some of their financial resources to purchase their assets, thereby reducing the pool of funds they have for investment. Second, some economists believe that privatized firms are less likely to receive subsidies than state-owned firms. Ultimately, however, how we classified this variable is not important because it is not statistically significant nor central to our main arguments concerning the importance of market organization in employment growth.

We also choose to classify the dummy variables identifying dedication in production and availability of alternative suppliers as related to risk, despite the fact that earlier we note that firms facing little competition in input markets might have better access to credit for investment. These two effects are opposing; our belief that the first effect will dominate is confirmed by the sign of relevant parameters in the regression.

A more important judgment concerns the way in which we classified the variables measuring the number of firms in same city and branch as the investing firm and the share of employment captured by the largest firm in the branch in the city. Although we classified them as related to the sunk costs of investment, we also recognize that one could interpret them as measuring the importance of a branch to an oblast. The more important the branch, the greater the potential willingness of the oblast government to seek subsidies from the federal government or to use their own fiscal resources (that is, if they have any, given an important branch is facing a negative demand shock) to rescue firms in the industry. Hence, we could have classified these variables as related to financial constraints.

However, we think this interpretation is not likely to be true. First, we do not include farms and military enterprises in our sample, which are the institutions most likely to have received subsidies from 1992 to 1994. Second, we control for the size of an enterprise, given we expect that larger enterprises are more likely to receive subsidies than smaller ones. Finally, even if oblast governments work to subsidize large declining branches, it is not clear that all the large branches will need subsidies. Not all branches are facing a negative demand shock. We expect, for example, that consumer goods and services are facing increases in demand. Thus, while a decline in demand for products of important branches might encourage the oblast government to work to rescue the industry, the increase in demand for products of other important branches should provide local

⁵⁸The significance is the (two-tailed) probability of observing a t-statistic greater than the observed value.

governments with a financial cushion to pursue reform.⁵⁹ The local governments are not likely to seek or provide subsidies for these profitable branches. Statistically, then, the net effect of this process will depend on the relative importance of growing and declining sectors to the oblast administration and the ability of local governments to extract subsidies from the federal government.

We measure employment growth over a two year period, from March 31, 1992 to March 31, 1994. On average, firms in the sample shrunk by 16 percent over the two-year period. We also point out that our sample is representative of the oblasts we surveyed, and is not troubled by the censorship problems that normally plague this type of analysis for market economies. That is, unlike most studies of firm dynamics, our estimate of mean employment growth is not biased upward by the exclusion of firms in the survey frame that might have exited during the period. First, we selected most of the firms for our sample in 1992, as part of an earlier survey effort. Second, very little exit occurred during this period, as exemplified by the fact that less than 20 percent of firms were aware of other firms in any sector in any part of Russia that had been closed.

Table 8 presents our regression results. For our discussion, we assume that $\epsilon_{i,K}$ is positive. That is, we assume that *firms tend not to invest in labor-saving technologies*, partly because of social constraints limiting firing, but mostly because of the low economic cost of using labor as an input. Thus, we expect that investment leads to job growth.

In general, the statistical evidence supports our view of the process of investment and growth. First, the constant term, which measures the effect of systemic change on employment growth, is negative and statistically significant. This confirms that the impact of the introduction of the market system has been to increase separations of workers by firms. Second, three of the industry dummy variables are statistically significant, for apparel, chemicals, and primary metal products. These results suggest that the demand shock of transition for apparel and chemicals is positive, while the demand shock for primary metals is negative.

The heart of our analysis concerns the importance of variables related to investment. The variables related to the sunk costs and downside risk of investment (other than the variable indicating that a firm has been privatized) are of the appropriate sign and are statistically significant. However, the variables related to financial constraints are not statistically significant. This suggests that market organization has a significant and important impact on the process of growth. But, to the extent that financial constraints inhibit the growth process, they are not firm specific.

Two of these results warrant further discussion. First, for the reasons we cite above, we expected that privatization might inhibit investment and, thus, employment growth. However, we found that, statistically, privatization has no significant effect on growth. Part of the explanation might lie in the fact that, as part of their strategy for privatization, managers of many state-owned enterprises promised not lay-off workers in exchange for worker support in the privatization process. Yet, because of the option-value of waiting, they might not have made the investments

⁵⁹Stoner-Weiss (1994) conducted a case study of four oblasts in Russia, in which she confirmed this view.

needed to stimulate growth. Thus, on balance, privatization is observed not to play an important role in employment growth.⁶⁰

For the reasons we cite above, we also expected that imperfect competition might stimulate investment and, thus, employment growth. Again, we found this attribute to have no effect on growth. Part of the explanation might lie in the incentive problems in monopoly firms. Even if they have the opportunity and resources to make investments, they might not do so, consuming their supra-normal profits rather than investing them. Alternatively, many of these monopolies face some type of regulation, which reduces their profitability and their ability to invest. Thus, we observe that imperfect competition in product markets does not play an important role in growth.

The regression results suggest that market structure and market infrastructure -- by affecting the sunk costs and downside risk of investment -- play an important role in enterprise growth. To evaluate its importance relative to other types of characteristics of the enterprise, we follow a methodology developed by Schmalensee (1985) and used by Korsun and Murrell (1994) and Ickes, Ryterman, and Tenev (1995b). This methodology uses the adjusted R^2 ⁶¹ to set plausible bounds for the amount of variance explained by different groups of variables.

To calculate these bounds for a particular set of variables, we estimate three models. The first model is the full model, which includes every variable in all sets. We use the model to estimate the percent of total variance in employment growth that is explained by our full set of regressors, as measured by the adjusted R^2 . Next, we estimate the model, restricting the coefficients for the given set of regressors to zero. By subtracting the adjusted R^2 associated with this regression from the R^2 associated with the first regression, we compute one measure of the amount of total variation explained by the variables. Finally, we estimated the model, restricting the coefficients *not* in the given set to zero. Its adjusted R^2 provides a second measure of the amount of total variation explained by the included variables.

Results of this procedure are presented in Table 9. We find that the economic system explains from 24 (55) to 37 (84) percent of the total (explained) variance, that industry characteristics explain from zero (zero) to seven (16) percent of the total (explained) variance, and that variables related to investment explain from nine (20) to 20 (44) percent of the total (explained) variance. Of the groups of variables related to investment, sunk costs explain the most variation, while financial constraints explain the least. Variables related to market structure and market infrastructure explain from 12 (28) to 22 (49) percent of the total (explained) variation. Given our estimation method understates the importance of variables related to investment, we consider this role significant.

4.4 Interpretation of Results

⁶⁰However, in other work (Ickes, Ryterman, and Tenev (1995b)), we did find that privatization inhibited *adjustment*, which is a more broadly defined measure of restructuring than investment.

⁶¹Our methodology requires us to estimate some of the regressions without constants. Following Judge, *et. al.* (1985), we use an alternative measure of the R^2 , which uses the uncorrected sum of squares in place of the corrected sum of squares in the calculation of the R^2 .

In the absence of problems with market structure and market infrastructure, we expect that the reallocation of resources both within and across industries would be equally likely to stimulate growth.⁶² Given the structural problems, however, we expect that intra-industry reallocation will be easier and less costly, and, thus, more likely to stimulate growth. Although preliminary, our results confirm this view. Problems in market organization -- by influencing the incentives to invest -- have resulted in a pattern of growth in which intra-industry reallocation becomes the paramount determinant of growth.

We note that this result strongly differs from the results of Glaeser, Kallal, Scheinkman, and Shleifer (1992), who empirically investigate the determinants of employment growth in 170 U.S. cities between 1956 and 1987. They find that employment growth was greatest in cities with diverse industrial structures, and in industries that were *not* overrepresented compared to the national average.

Why these different results? Again, we argue strongly that they reflect differences in market organization between the two countries. Inter-industry reallocation is much more intensive in investment than intra-industry reallocation and is particularly prone to the problems that especially characterize a transition environment. In the absence of these problems, firms can take better advantage of opportunities that arise as a consequence of spillovers between industries.

China might be an example of such a country. The gradual pace of economic reform has led to much less regime and endogenous uncertainty than in Russia and many other countries in transition. More diversified local economies have reduced the sunk costs of investment. All else equal, this context makes investment, and its consequent growth, more likely.

5. Conclusion

The capacity of a transition economy to successfully implement macroeconomic stabilization depends on the organization of its markets. Successful macroeconomic stabilization requires that policy regimes are credible. But, credibility is not an innate characteristic of reformers, or of the programs themselves. The same stabilization program might be more credible in some economies than in others based on characteristics of the two economies. In this paper, we have explored the role of market structure and infrastructure in determining the credibility of a stabilization program.

Macroeconomic stabilization programs in economies in transition impose side effects. These side effects -- enterprise insolvency and unemployment -- occur in any stabilization. But, but they are more important in this case because transition economies are initially in a state of structural disequilibrium, so that the adjustment to tight money policies are combined with the response to price liberalization. And, it is the pressure on policy makers caused by these side effects that induce policy makers to renege on tight money policies. Hence, the credibility of a stabilization program depends on the magnitude and distribution of these side effects.

⁶²We expect more intra-industry reallocation, but, *a priori*, we do not expect it to lead to more growth. A sizeable literature debates the role of intra- versus inter-industry effects in growth. For example, see Jacobs (1969) and Romer (1986).

The side effects of therapy, in our case tight monetary policies, depend on the health of the patient. In our case, the health of the economy is of issue, and we identify this with the state of market structure and infrastructure. The reason why market structure and infrastructure are so important is that they affect the process of restructuring, mainly via investment, which is the key to absorbing resources rendered unemployed by stabilization. If problems in market structure are present and if market infrastructure is underdeveloped, then costs of undertaking investment increase, and the restructuring process is delayed. Hence, in this case, the side effects of stabilization persist.

The effect of market structure and infrastructure on investment is magnified in transition because of the particular types of uncertainty associated with transition. When sunk costs are present, there is an option value to delaying investments so that more information can be acquired. Lack of market infrastructure and dependence on trading partners raises the sunk costs and the uncertainty that enterprises face. This further delays investment, delaying restructuring further, and exacerbating the side effects of stabilization.

The story does not end here, however. If investment is delayed, then recovery in the fiscal situation of transition governments is delayed. Yet, fiscal recovery is critical to a credible stabilization policy because fiscal deficits are the underlying cause of the inflation that stabilization is designed to cure. A tight money program that results in increased uncertainty and delayed investment might result in delayed restructuring. This would induce rational agents to expect that fiscal deficits are likely to persist, despite the claims made by policy makers. Credibility of the policy is attenuated by the inconsistency of the program.⁶³

Our results clearly suggest the importance of developing infrastructure in the restructuring process. The critical policy implication for understanding transition is that *credibility will be tested in different countries to different degrees. Where market infrastructure is more underdeveloped, macro stabilization is more costly.* There might, in fact, be a J-curve in infrastructure development. This, in turn, suggests that (assuming that J-curve is independent of stabilization!) stabilization programs will be especially tested early on. If programs are implemented that are extremely tough initially, then a lack of market infrastructure might make the program too costly to maintain.

The clear result of our analysis is that shock therapy programs are less likely to be successfully maintained in countries with high degrees of vertical dependence among firms and underdeveloped market infrastructure. If the effects of market structure and infrastructure are ignored, then an uninformed observer might conclude that a lack of credibility is the significant determining variable of the success of stabilization.⁶⁴

⁶³This argument suggests a role for foreign aid in the early stages of transition, since it would ease the fiscal burden on the government. This might allow the government to avoid raising tax rates that further inhibit investment.

⁶⁴Many observers, for example, argue that the key difference between Poland and Russia is that policy was more credible in the former case (e.g., Granville (1995)). What we have argued, however, is that this credibility difference can be explained by underlying fundamentals.

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Table 1. Retail Services in Former Socialist and Selected Western European Countries

Country	Year	Retail Workers Per 1,000 Persons	Outlets Per 1,000 Persons	Retail Workers Per Outlet	Consumer Expenditure (\$ Per Outlet ¹)	Number of Scanning Stores ¹
Former Socialist:						
Albania	1978	--	5	--	--	--
Bulgaria	1990	31	4	7	175	--
Czechoslovakia	1989	17	4	4	211	--
Hungary	1991	33	11	3	174	83
Poland	1989	--	7	--	225	1
Romania	1990	12	2	5	333	2
Soviet Union	1989	23	3	9	1,108	73
Yugoslavia	1990	17	4	4	1,742	--
Former Socialist, Mean		22	5	5	882	40
Selected Western European:						
Austria	1992	33	5	6	2,591	1,200
Finland	1990	31	8	4	1,526	1,940
Greece	1985	30	16	2	353	--
Ireland	1988	25	9	3	820	101
Italy	1990	--	18	--	733	3,690
Portugal	1992	21	11	2	436	269
Spain	1989	--	23	--	380	5,039
Turkey	1989	3	7	0	213	1
Selected Western European, Mean		24	12	3	882	2,040
Test for Difference of Means		Not different	Different**	Different*	Not different	Different*

¹Data for total consumer expenditures and number of scanning stores are for 1990.

²Two-tailed test; *, **, *** indicate that the probability of observing a t-statistic greater than the observed value is between 5 and 10 percent, between 1 and 5 percent, and less than 1 percent, respectively.

Source: *European Marketing Data and Statistics*, 1994.

Table 2. Media Access in Former Socialist and Selected Western European Countries

Country	Number of National	Number of Consumer	Percent of Homes (in 1991) Equipped	
	Newspapers	Publications	With:	
	1990	1990	Radios	TV's
Former Socialist:				
Bulgaria	2	7	--	--
Czechoslovakia	8	16	75	98
Hungary	8	12	40	--
Poland	9	20	79	--
Romania	4	--	45	--
Soviet Union	11	10	96	98
Yugoslavia	8	16	86	61
Former Socialist, Mean	7	14	70	86
Selected Western European:				
Austria	5	32	95	97
Finland	11	25	96	98
Greece	2	28	98	94
Ireland	4	11	98	95
Italy	24	60	99	99
Portugal	12	17	75	95
Spain	15	47	95	98
Turkey	14	22	75	96
Selected Western European, Mean	11	30	91	97
Test for Difference of Means	No difference	Different**	Different**	No difference

¹Two-tailed test; ** indicates that the probability of observing a t-statistic greater than the observed value is between 1 and 5 percent.

Source: European Marketing Data and Statistics, 1994.

Table 3. Telecommunications in Former Socialist and Selected Western European Countries

Country	Telephone Mainlines	Faults Per 100	Percent of Unsuccessful Local Calls ²			
	Per 1,000 Persons ¹	Mainlines Per Year ¹	1990	1991	1992	1993
Former Socialist:						
Albania	--	27	15	13	13	--
Bulgaria	--	50	36	75	45	--
Cuba	--	--	51	51	47	--
Estonia	--	--	--	20	36	55
Georgia	--	39	--	--	--	--
Hungary	96	55	55	55	55	46
Latvia	--	--	29	30	34	38
Lithuania	--	46	--	30	--	--
Moldova	--	43	--	48	48	54
Mongolia	--	57	--	--	--	--
Poland	86	--	7	--	--	--
Romania	102	102	--	--	3	--
Russia	--	--	7	8	--	--
Turkmenistan	--	61	--	--	--	--
Ukraine	--	--	--	28	--	--
Former Socialist, Mean	95	53	29	36	35	48
Selected Western						
European:						
Austria	418	35	2	1	--	--
Finland	535	12	3	3	3	--
Greece	391	--	--	--	--	--
Ireland	281	40	--	--	--	--
Italy	388	21	44	42	42	--
Portugal	241	--	2	--	4	--
Spain	323	10	--	--	--	--
Turkey	123	1	5	5	5	--
Selected Western European, Mean	338	20	11	13	14	--
Test for Difference of Means ³	Not different	Different***	Not different	Different*	Different*	--

¹Source: *World Development Report 1994*, pp. 224-225

²Source: International Telecommunications Union (ITU)

³Two-tailed t-test; *, **, *** indicate that the probability of observing a t-statistic greater than the observed value is between 5 and 10 percent, between 1 and 5 percent, and less than 1 percent, respectively.

Table 4. Total Cost of Road, Rail, and Water Transport in Ton-Kilometers per Dollar of GDP in 1988

Country	Area in thousands of square kilometers	Total Cost	Cost as a Percent of the Cost in the Soviet Union
Soviet Union	22,272	3.59	100.00
Poland	305	0.86	23.96
CFSR	126	0.82	22.84
China	9,597	0.78	21.73
Canada	2,305	0.74	20.61
Bulgaria	111	0.72	20.06
USA	9,167	0.64	17.83
Hungary	92	0.68	18.94
India	2,973	0.51	14.21
Yugoslavia	255	0.48	13.37
Spain	499	0.37	10.31
Holland	34	0.34	9.47
Sweden	412	0.32	8.91
Belgium	30	0.32	8.91
W. Germany	244	0.28	7.80
U.K.	242	0.26	7.24
Italy	294	0.23	6.41
France	546	0.22	6.13
Austria	83	0.21	5.85

Source: Jane Holt (1993), p. 27.

Table 5. Change in the Quality of Market Infrastructure in Russia Since 1992

Type of Infrastructure	Measure of Quality	Percent of Responding Firms that Said Quality is:			Number of Firms for Which Data Were Missing or Not Applicable ¹
		Better	Worse	Same	
Wholesalers and Retailers	Number interested in selling firm's types of products	37	34	28	3
Telecommunications:	Quality				
Telephone, standard:					
Domestic calls		4	40	56	3
International calls		14	28	58	3
Mail		3	53	44	3
Storage	Ease of finding similar space	36	48	16	21
Transport:	Reliability				
Trucks		18	26	56	4
Rail		2	50	48	16
Plane		0	24	76	34
Boat		0	14	86	38
Finance:					
	Importance of barter	15	41	44	14
	Receivables in arrears as a percent of sales (compared to July 1992)	13	57	30	15
	Receivables in arrears as a percent of sales (compared to January 1993)	19	65	16	9
	Payables in arrears as a percent of sales (compared to July 1992)	16	50	34	20
	Payables in arrears as a percent of sales (compared to January 1993)	15	52	32	12
Law					
	Importance of contracts	55	45		4
	Fees/bribes for "road protection" ²	0	85	15	131

¹Total number of firms in survey is 157.

²This measure is biased downward because only firms that currently pay for road protection were asked to respond to this question.

Table 6. A Cross-Country Comparison of Regional Specialization

Country	Average Coefficient ¹
Russia	0.46
Western Europe	0.34
US	0.26
China	0.20

¹Based on data from Ickes, Ryterman, and Tenev (1995) and Kumar (1994).

Table 7. Definition of Variables

Variable	Description	Source
System:		
Constant	Dummy=1	N/A
Industry:		
Apparel	Dummy=1 if SIC=23	Survey
Chemicals	Dummy=1 if SIC=28	Survey
Crafts	Dummy=1 if SIC=39	Survey
Furniture	Dummy=1 if SIC=25	Survey
Electronics	Dummy=1 if SIC=36	Survey
Primary metals	Dummy=1 if SIC=33	Survey
Stone, clay, and glass	Dummy=1 if SIC=32	Survey
Transport equipment	Dummy=1 if SIC=37	Survey
Firm-level Investment:		
Sunk Costs:		
Importance of local suppliers ¹	Importance of suppliers in oblast relative to all suppliers	Survey
Number of local firms in branch ¹	Number of firms in branch in city	Census
Local concentration of employment in branch ¹	Share of workers in branch in city employed by largest firm	Census
Risk:		
Dedicated in production ¹	Dummy=1 if firm sells more than 50 percent of its output to one customer	Survey
Alternative suppliers ¹	Dummy=1 if firm knows of alternative suppliers for most critical input	Survey
Privatized	Dummy=1 if enterprise is privatized	Survey
Financial Constraints:		
New	Dummy=1 if enterprise was created in 1991 or later	Survey
Size	Number of workers	Survey
Monopolist ¹	Dummy=1 if firm is currently identified by an anti-monopoly committee as a monopolist	Survey
Barnaul	Dummy=1 if firm is located in Barnaul	Survey

¹Variables describing market organization.

Table 8. The Role of Sunk Costs, Risk, and Financial Constraints in Enterprise Growth, 1992 to 1994¹

Regressor	Parameter Value	Significance ²
System:		
Constant	-0.77	0.00
Industry ³		
Apparel	0.28	0.01
Chemicals	0.24	0.04
Crafts	0.43	0.12
Electronics	0.13	0.16
Furniture	0.18	0.37
Primary metals	-0.45	0.09
Stone, clay, and glass	0.14	0.31
Transport equipment	0.31	0.23
Firm-level Investment: ³		
Sunk Costs:		
Importance of local suppliers	0.93	0.09
Number of local firms in branch	4.90x10 ⁻³	0.00
Local concentration of employment in branch	0.36	0.02
Risk:		
Dedicated in production	-0.18	0.06
Alternative suppliers	0.14	0.04
Privatized	0.07	0.22
Financial constraints:		
New	0.16	0.2
Size	3.22x10 ⁻⁶	0.83
Monopolist	0.03	0.68
Barnaul	0.06	0.43
R-square	0.43	
Number of Observations	81	
Mean of Dependent Variable	-0.16	

¹Employment growth is measured as employment at the end of the quarter 1, 1994, less employment at the end of quarter 1, 1992, divided by employment at the end of quarter 1, 1992.

²Significance is measured as the (two-tailed) probability of observing a t-statistic greater than the observed t-statistic.

³Industry and regional dummy variables with significance of .50 or less are not included in this regression.

Table 9. Estimates of the Explanatory Power of Systemic, Industrial, and Investment-Related Characteristics¹

Set of Regressors	Percent Explained of:	
	Total Variance	Explained Variance
System:		
Minimum	24.4	55.0
Maximum	37.2	83.8
Industry:		
Minimum	0.0	0.0
Maximum	7.2	16.2
Firm-level Investment:		
Sunk Costs:		
Minimum	14.9	33.6
Maximum	19.2	43.2
Risk:		
Minimum	4.8	10.8
Maximum	12.1	27.3
Financial Constraints:		
Minimum	0.0	0.0
Maximum	5.2	11.7
All firm-level Investment:		
Minimum	8.8	19.8
Maximum	19.6	44.1
Market organization only:		
Minimum	12.3	27.7
Maximum	21.6	48.6
All:		
Max=Min	44.4	100.0

¹Based on adjusted R-squares.