

# Lecture Note on Privatization and Restructuring

Barry W. Ickes

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## 1 Privatization

Why is privatization problematic?

### 1.1 Coase theorem – ownership matters for performance

The *Coase theorem* states that the distribution of ownership rights is irrelevant to economic efficiency. What matters are that property rights be well-defined. But it does not matter who owns the firm.

Consider a hypothetical example. Oil is discovered under my backyard by a geologist for an oil company. The value of the oil exceeds the cost of taking it out, including the cost to me of losing my backyard to an oil derrick, which is minimal. Suppose that the law provides that I own the rights to any deposits under my backyard. Then the oil company will have to pay me royalties for the oil: we will split the surplus somehow, but I will get a good share because I can refuse to let them pump. Alternatively, suppose that the law gives the rights to the oil to the discoverer of the asset: I am only entitled to a small payment to compensate me for the loss of view, which is far less than the value of the oil. In both cases the oil will come out of the ground – the efficient outcome – the only difference is how the wealth is distributed between me and the oil company. This is the essence of the Coase theorem.

What is implicit in this example is the importance of *specified* property rights and *enforced* contracts. To see this, alter the example. Suppose that I farm the backyard, and that this produced \$10,000. If I lease the land to

the oil company the revenues will be \$15,000. If I have complete ownership of the land I would clearly lease: that is the efficient outcome. But suppose I farm under a contract that specifies that any lease revenue must be split 50 – 50 with my neighbor.<sup>1</sup> Then I would be better off farming, even though this is inefficient.

Now this argument is not quite correct. Given that farming results in a \$5,000 overall loss to both of us, I ought to be able to write a contract with my neighbor giving me the right to lease for greater than 50% of the revenues; say, for example we write a contract which pays my neighbor \$3,000 for the rights to lease. We are both better off. So the Coase theorem seems restored.

Restoration, however, is dependent on the capacity to *enforce* the contract. What if there are no courts that enforce the contract? Then the neighbor may take my \$3,000 but still demand 1/2 of the lease revenue after the fact (holdup). If this is a possibility I will not sign the contract, and no oil will be produced.

Alternatively, suppose that I am entitled to 100% of the lease revenue, but the neighbor controls access to the backyard. I have full *cash rights* but my neighbor has *control rights*. In this case the neighbor may demand 50% of the lease revenue, and once again we get inefficiency. A contract would help, once again, but only if it could be enforced.

Now further suppose that there are 1000 neighbors who collectively control access. Now I would have to bargain with 1000 potential agents who can each hold up the contract. The cost of gaining an agreement may exceed the efficiency gain, so I may just end up farming.

This suggests that for the Coase theorem to be applicable it is necessary that:

- property rights be fully specified,
- contracts be enforceable.<sup>2</sup>

It is also important that transaction costs not be so high that efficient bargains are prevented. If these conditions are not satisfied ownership may matter a great deal.

An important implication of this result is that it makes a difference whether incumbent managers are allowed to control the enterprise without

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<sup>1</sup>We ignore why this would be so in the first place.

<sup>2</sup>It is also important that contracts can specify the relevant contingencies, but many are unforeseen.

ownership versus managers are given ownership. And it certainly matters whether we have  $PG$  or not. Thus, privatization does imply a tradeoff between efficiency and equity. Transition economies have chosen different points on this continuum.

## 2 Methodological Issues

Disentangling the empirical relationship between privatization (ownership type) and enterprise restructuring is complex. We want to discern whether ownership type leads to greater restructuring. There are three main problems. First, although easy to understand, restructuring is not easy to define. It refers to a multitude of changes in the way the enterprise performs. Hence, obtaining indicators of restructuring can be complex, and often differs across studies. Some use quantitative indicators, such as the change in output, revenue, or employment. Others use qualitative indicators from surveys.

The second problem is selection bias. Studies of enterprise restructuring estimate an equation of the form:

$$y_i = \alpha + \beta x_i + \gamma P_i + \varepsilon_i \quad (1)$$

where  $y_i$  is a performance indicator,  $x_i$  is a vector of enterprise characteristics that would include initial performance, and  $P_i$  is the ownership type. This is the treatment variable. Studying the effects of privatization on restructuring involves estimating  $\gamma$ , the impact of the treatment. The problem is that ownership types are most likely not randomly determined.<sup>3</sup> If ownership type is systematically related to some determinant that also affects  $y_i$ , but is not included in  $x_i$ , then estimates of  $\gamma$  will be biased. For example, are privatized enterprises more productive *because* they are privatized, or were enterprises with better initial conditions more likely to be privatized.<sup>4</sup> Many empirical studies of restructuring pay attention to selection bias, but it is not always easy to find appropriate instruments.

The third problem is that measuring ownership is hardly straightforward. It is easy to distinguish between state-owned enterprises and those that are

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<sup>3</sup>In [3] this hypothesis is tested directly on enterprises in the Czech Republic. They find that, indeed, enterprises were not chosen randomly for different privatization methods, and that controlling for selection bias alters the evaluation of its effects.

<sup>4</sup>[1] surveys a vast array of empirical studies on restructuring. They observe that the selection bias is important, but that the **direction** of the bias seems to differ across studies.

not. But within the latter category one finds many different types depending on which group dominates ownership: employees, managers, financial companies, domestic outsiders, foreign outsiders. These various forms of private ownership are quite heterogeneous, and it would be surprising if the effects on restructuring would be invariant to these forms. But the decision to choose which type is not random, which introduces the noted selection bias. Moreover, within individual countries there is often not sufficient numbers in all types to discern the effects of the different categories.

## 2.1 Empirical Studies

Various studies have attempted to study the connection between privatization and restructuring, and many have tried to control for selection in various ways [e.g., [5], [4], and [2]].<sup>5</sup> In [4] the initial level of productivity is used to control for selection bias.<sup>6</sup> But this works only to the extent that productivity is measured correctly. In [2] selection is controlled for by dropping enterprises purchased by insiders – which is effective at controlling selection due to insider bias, but does not deal with other sources<sup>7</sup> – and by estimating a fixed effects model.<sup>8</sup> Other papers use instrumental variables techniques to control for selection.

Empirical studies tend to focus on privatization in one country or a group of neighboring countries. There are few studies that include data across the NIS and CEE. Nonetheless, it is possible to obtain some results by comparing across studies. There are several robust findings. First, the type of privatization matters: inside ownership appears to differ little from state ownership, while outside ownership tends to induce more significant effects on performance. Second, and related to the first, it is typically observed that the impact of privatization on restructuring is greater the more concentrated is ownership. Third, competition matters; the greater the degree of product

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<sup>5</sup>For a survey of such papers and a rating of their efforts to deal with selection bias, see [1].

<sup>6</sup>Because of the difficulty in measuring capital services, [4] use energy use as a proxy. But this means that countries where enterprises have not had incentives to reduce energy use in transition will have higher "measured" capital services, and hence lower productivity growth. Hence, differences across countries ([4] uses pooled data for various economies) in energy prices can contaminate productivity measurements.

<sup>7</sup>For example government decisions about which enterprises to privatize based on political decisions.

<sup>8</sup>Which assumes that the method of selection does not change over time.

market competition the greater the level of enterprise performance. Fourth, it appears that there are differences according to the measure of performance used. In [2] the effects of ownership types are found to be much greater with regard to revenue and productivity than with cost or employment. One interpretation of this finding is that hardening the budget constraint causes common effects across ownership types with regard to cost and employment. This is a reactive response, and will hardly differ based on who controls the firm. But increasing revenues and productivity requires entrepreneurial effort which will likely differ according to ownership type.

Perhaps most important for our purposes, the evidence strongly suggests that the effect of privatization on restructuring is much greater in CEE's than in the NIS.

- The results from empirical studies of restructuring suggest that privatization is effective only when private owners are able to control management. Therefore the effect of privatization depends on the strength of corporate governance.
- Privatization improves performance but various factors impact the success of the privatization.
  - Most importantly is that allowing incumbent managers to gain control of privatized firms, through whatever means, will yield disappointing results.
- Whenever possible, firms should be privatized, for cash, in as transparent a method as possible, and through an auction or sale process that is open to the broadest possible cross-section of potential buyers (including foreigners).
- Finally, institutional factors matter. The gains from privatization come from change in ownership combined with other reforms such as institutions to address incentive and contracting issues, hardened budget constraints, removal of barriers to entry, as well as an effective legal and regulatory framework.
  - Does this explain the superior performance of non-CIS countries? They had the institutions of Soviet planning for shorter time.

## 2.2 Hypotheses

There are a variety of ways in which privatization is supposed to change performance. This could be due to: better managers, competition, hard-budget constraints, entry and exit, among other factors. Distinguishing among these is difficult. One big problem is that differences across firms within transition economies is greater than in market economies.

Three basic determinants of speed and depth of restructuring:

- initial conditions: these refer to inheritance, and would include the sector, initial level of productivity, firm size
- enterprise-specific factors: these could include the system of corporate governance, the capital stock and labor force (it is sort of arbitrary whether this is an initial condition or a firm-specific factor), privatization, bank lending to the enterprise.<sup>9</sup>
- external environment: this could be the general state of liberalization in an economy; similarly, the state of financial development could affect performance. This latter is hard to capture, however.

## 2.3 Claessens-Djankov-Pohl

CDP use a panel of firm-level data for 1992-95 for seven CEE countries (Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovakia, Slovenia). Plant level data for manufacturing firms that were the majority of firms registered in 1991. Missing observations excluded, so there is no entry or exit.

*Remark 1 The absence of entry and exit could have interesting biases. Privatized firms that are unsuccessful drop out (although in practice few actually did), while unsuccessful state enterprises do not. Absence of entry could be problematic since new firms have higher productivity growth than existing firms. But entry is lower in manufacturing than in services.*

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<sup>9</sup>Notice that the direction of causality is unclear with respect to the latter. The enterprise could have higher lending because it is not doing well, or it could attract funds because it is doing well. Inherited bank lending is clearly an initial condition, while continued bank lending may be due to performance. But we also have to remember soft-budget constraints.

**Indicators of Restructuring** CDP want to measure restructuring. They look at three variables: labor productivity, TFP, and operating profit. The latter excludes debt and interest, which may be allocated across enterprises in arbitrary ways due to socialism. Labor productivity is straightforward, but few use TFP in transition. Why? Because of the problems with capital stock data. CDP solve this by using energy consumption as a proxy for capacity utilization. But this is problematic because the extent to which the two move together depends on whether the enterprise restructures or not. So if state firms are less responsive to markets, then their energy use will fall less than market firms as prices rise. So it will look like they use more capital than similar privatized firms.

### 2.3.1 Initial Productivity as a Conditioning Variable

To control for fixed differences across plants it is typical to use the initial level of productivity (labor or TFP, or some other measure). But the problem you face is that initially the observations are taken from a distorted environment. Even if industrial dynamics were such that efficient firms grew under socialism, these may no longer be efficient under marketization. So it is unclear what to make of the initial values.

**Some Results** CDP basic results depend on the indicator, but the basic results show that enterprises in Czech Republic, Hungary, Poland, and Slovakia do better than those in Bulgaria and Romania.

Slovenia does slightly better than Romania on some indicators (it does well on profitability, but poorly on TFP). This seems surprising. This could be due to the fact that Slovenia received much less of an energy shock than the other countries, since they were never members of the CMEA. Hence, during this period they were not reducing energy use as fast.

They then take the performance measures and regress them on characteristics, such as privatization, firm size, sector, initial TFP level, and bank financing in different years. These are all dummy variables.

Privatization dummies turn out to be very good at explaining differences in TFP growth. These effects seem to be strongest in the initial period (note for later, this is a cost effect). Financial discipline also seems important, but this effect is independent of privatization; inclusion of the former does not render the latter insignificant. They find evidence of convergence in TFP. Productivity growth is also negatively related with firm size. Enterprises in

tobacco, furniture, and paper improve faster than average, while those in textile, lumber, petroleum refining, rubber, and non-electrical machinery do less well.

## 2.4 Frydman, et al.

Another approach to studying performance is in Frydman, et al. They look at a panel of medium sized firms across several CEE's (Czech Republic, Hungary, and Poland), about 190 in all. The idea is to compare the effects of privatization.

### 2.4.1 Revenue as an Indicator

They argue that revenue is a better indicator of performance in transition than profits. Profits can be difficult to measure because of accounting rules, and differences across countries: e.g., depreciation. Revenues may be more accurately measured.<sup>10</sup> Revenues are also more forward-looking, while costs reflect past decisions. So the effect of entrepreneurial ability may be more apparent with respect to revenues. Of course, if you use revenues you have to control for mergers and acquisitions, but apparently there are no important cases in their sample.<sup>11</sup> Similarly, state enterprises may be more likely to be split up, so this could downward bias their revenues.

### 2.4.2 Methodology

The onset of transition causes a downward shock to performance. So it is important to measure performance relative to this *transition* shock. Let  $y_i$  measure the (annualized) performance measure of enterprise  $i$  over the sample period,<sup>12</sup> and let  $x_i$  be the initial performance of the enterprise. Then if we regress

$$y_i = \alpha + \alpha_1 x_i + \beta P_i + \varepsilon_i \quad (2)$$

where  $P$  is a dummy variable (=1 if the enterprise is privatized). Then we can interpret  $\tau = \alpha + \alpha_1 x_i + \varepsilon_{i1}$  as the transition effect, and  $\rho = \beta P_i + \varepsilon_{i2}$  as

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<sup>10</sup>Though clearly not if this were Russia.

<sup>11</sup>They looked at what happened to employment at enterprises where revenue grew dramatically.

<sup>12</sup>There are problems with the way these are measured because enterprises are of different vintages. But they must be pooled because of the size of the data set.



the privatization effect.

Notice that in this formulation there is still selection bias to worry about. First, it could be that the privatized enterprises were the better ones. This, it is argued, can be dealt with by comparing the pre- and post-privatization experience of the *same* enterprise. Is this difference different for private and state enterprises? The idea is to look at the enterprises pre-privatization and see if the state and privatized enterprises looked different then and compare this to post-privatization differences. But this assumes that the factors that guided privatization were *observable* in the pre-privatization period. It could be that they only show up once transition starts.

The second bias could occur if prior to privatization enterprise performance is deliberately deteriorated, so that post-privatization experience is greater. This could occur if managers attempt to solidify their hold on the enterprise, for example. To control for this enterprises for which insiders took control of the firm are excluded from the sample, and equation (2) is re-estimated. They find that the pre-privatization differences get smaller but post-privatization differences remain significant. The argument is that insiders do get slightly better firms,<sup>13</sup> but that these benefits are dissipated over time (e.g., by employee-owner arrangements).

*Remark 2 Does this really solve the endogeneity problem? The real problem is that the variable  $P$  is not exogenous. Any variable that is correlated with  $P$  and with performance but not observed by the econometrician shows up in the error term. By excluding insiders you can deal with one type of endogeneity; the problem if insiders know more about the firms.<sup>14</sup> But other factors could play a role, such as what year was machinery purchased. This is especially problematic with Hungary where privatization primarily followed the IPO track.*

*Remark 3 What is needed is an instrument for privatization. Something correlated with privatization but not performance. But what? Here we need*

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<sup>13</sup>Notice that the argument could go either way. It may be that insiders purposefully hide the value of the enterprise to acquire at a lower price. This would cause pre-privatization performance of these enterprises to look worse than average. Frydman, et al., find the opposite, using the excess of revenues of material and labor costs as the indicator.

<sup>14</sup>It is not clear that even this works. Suppose that insider purchases signal that the enterprise is worth more than it appears to be. Then the fact that enterprises were not purchased by insiders is also a signal of asset quality.

to be careful in thinking about how privatization is carried out in different countries. Mass privatization versus IPO's will have different effects.

Remark 4 Thus one idea would be to re-estimate equation (2) using just the Czech sample. Of course now you cannot get an estimate of  $\beta$  because all the enterprises in the sample were privatized. But you can estimate the difference in pre- and post-privatization performance. Then you use this estimated differential with the Hungarian

Remark 5 Notice that even if there is mass privatization, as in Russia and the Czech Republic, you still have the problem, because the firms that were not privatized were special, e.g., defense plants. So what do you compare them to? One possibility is to compare them with state firms in other countries. Maybe use of the FSU would be valuable because you would have the same initial conditions.

Dummy variables are added for industry characteristics, such as sector and time of privatization, along with dummies for the country.

### 2.4.3 Some Results

In the data set the transition effect is striking. Over 80% of state and over 56% of privatized firms lost revenue in each year between 1990 and 1993, and the numbers are even bigger for employment, where a majority of privatized firms lost employment. To isolate the effects, estimate (2) for various performance measures:

Table 1: Transition and Privatization Effects  
(over the 1990-93 period)<sup>15</sup>

Performance Measures	Transition effect ( $\alpha$ )	Initial Value ( $\alpha_1$ )	Privatization Effect
Revenue	-15.82*	-0.25*	19.01*
Employment	-7.47*	-0.40**	5.88*
Revenue/worker	-5.21*	-0.28**	11.17*
Cost/revenue	30.06*	-0.31*	-3.0

\*refers to  $p < 0.05$ , and \*\* to  $p < 0.10$ .

The key point of the table is that there is a big mean transition effect, which can be thought of as the average performance of state firms. Privatized firms clearly outperform state firms on each measure. Notice that the effect is strongest with revenue growth. In this case the privatization effect is as strong as the mean transition effect.

These results suggest that the initial shock is one of *marketization*, but that privatization can provide a powerful remedy to the situation. Frydman, et al., argue that privatization is the dominant employment strategy in transition. It is the antidote to employment falls. Of course, all this is subject to the caveat about sample selection.

They also estimate equation (2) with  $P$  replaced with a variable that identifies the type of the largest owner. The idea is to see if outside owners do better than insiders. It seems that outsiders in fact do better than insiders, despite any moral hazard. But the interesting result is that the biggest differences are due to revenue growth not employment. It is also important to distinguish insiders: manager dominated do better than employee-dominated, which are hardly different from state-owned enterprises. They also find little evidence in favor of the strategic investor hypothesis, nor do foreign investors provide much of a difference.

To some extent (not necessarily in Russia) all enterprises in transition engage in restructuring. Frydman, et al. focus on *how*. It seems that they are better at restoring revenue growth. But this still needs to be explained further.

This is interesting stuff, but it cannot really settle the issue until the decision to privatize is controlled for.

## 3 Restructuring

How to think about restructuring

### 3.1 Types of restructuring

- Survival-oriented
- Internal
- External

We can also distinguish between restructuring that involves investment in

- traditional
  - usually involves scale

- new activities

## 4 Restructuring and R-D Space

Survival orientation is the key motivation. Why? Enterprise directors can appropriate resource flows if the enterprise stays open. It is a function of soft-budget constraints surviving in implicit form.

### 4.0.1 Market Distance

Reform via the budget constraint is premised on the assumption that the only dimension for survival is profits. If enterprises cannot earn profits, they cannot survive. Hence, tightening the budget constraint would force enterprises to increase efficiency. Of course, this weakens all enterprises on impact. But such a policy is also intended to have a *differential* effect on enterprises based on their relative efficiency. The key idea is that the weakest enterprises will be the most severely impacted by the policy, while the stronger enterprises will survive and, presumably, get stronger.<sup>16</sup>

The underlying notion here is *monotonicity* of reform. Reform is monotonic if its impact on an enterprise is related to its degree of inefficiency. A profits tax is likely to be monotonic, if profits are monotonically related to efficiency. A random monitoring of enterprises will not be a monotonic policy, however. Policies that are monotonic may be preferable, because their impact is directly related to a characteristic of the enterprise that we are interested in. But we need an index of efficiency with which to characterize the enterprise. A useful measure is the distance an enterprise must traverse to produce a marketable product.<sup>17</sup> Let  $d_i \in (0, D)$  be the distance of enterprise  $i$ . An enterprise that produces a product it can sell in world markets has  $d_i = 0$ , while a completely inefficient enterprise has  $d_i = D$ . Transition starts with some initial distribution of enterprise distance.<sup>18</sup> The greater is  $d$

<sup>16</sup>The image suggested is that of a vaccine, which introduces minute amounts of a virus in order to trigger the immune system to produce antibodies. The rationale for hardening budget constraints represents an attempt to stress the organism to induce it to restructure its behavior to increase long-run viability.

<sup>17</sup>The notion of market distance is discussed at length in [?].

<sup>18</sup>Let  $\mu_i$  be  $i$ 's share of GDP (or employment), then  $\Omega = \int_0^D (d_i \mu_i) di$  is a measure of the average distance of the economy. It thus represents the initial level of the gap that must be overcome in transition. An important point about Russian initial conditions is that  $\Omega$

the less viable the enterprise. Suppose that  $\underline{d}$  is the cutoff point for viability: that is, all enterprises with  $d_i > \underline{d}$  are not financially viable.

Notice that  $d_i$  is a state variable that describes the conditions of the enterprise. At the start of transition it is inherited. During transition, however, it is an endogenous variable. If an enterprise restructures it can reduce its  $d_i$ .<sup>19</sup>

Now consider the effect, for example, of an increase in tax collection. This tightens the budget constraint for all enterprises, essentially increasing  $d_i$  for all  $i$ . Those enterprises that were closest to the breakeven point,  $\underline{d}$ , are pushed beyond it. The pressure to restructure is greatest for enterprises closest to this point, but all feel the pressure. The more inefficient, the greater the shock. The most inefficient may be wiped out by the shock, but healthier enterprises will grow stronger as a result of the intervention.

This unidimensional view of restructuring – reform means reducing  $d_i$  – lies at the heart of much reform advice.

#### 4.0.2 Relational Capital

Now suppose that the organism has another survival mechanism. Enterprises also differ in their inherited stock of relational capital. Some enterprises (directors) have better relations with local and/or federal officials than others. Relations with other enterprises (directors) will also vary. The stock of these relationships determines the types of transactions that can be supported (barter versus cash, pre-payment, etc.). Relational capital is goodwill that can be translated into informal economic activity.<sup>20</sup>

Let  $r_i$  be the stock of relational capital of enterprise  $i$ . The actions that an enterprise takes can affect its stock of  $r$ . Just as investment augments the physical capital stock, enterprises can invest in relational capital as well.<sup>21</sup>

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was larger than in other transition economies.

<sup>19</sup>But distance depends not only on the decisions within the enterprise but also on what is happening in world markets.

<sup>20</sup>It is important to note that relations aid in production. Hence, investing in relations is not the same activity as rent-seeking. The extent to which relational capital has positive or negative impacts on the economy depends on the environment. In a transparent market economy,  $r$  may reduce transaction costs – acting like trust. In an opaque environment, such as Russia's Virtual Economy, however,  $r$  may be used to circumvent fiduciary responsibilities.

<sup>21</sup>“Organizations will also encourage the society to invest in the kinds of skills and knowledge that indirectly contribute to their profitability. Such investment will shape

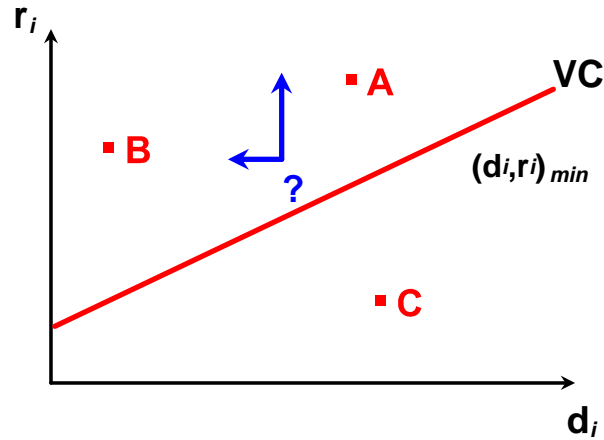


Figure 1: R-D Space

An enterprise can, for example, perform services for the local government. This action may enhance the enterprise's relationships with local officials, and thus increase its capacity to conduct informal activities in the future. It is important to recognize that augmenting relational capital is costly.

The key point is that relational capital can aid enterprise survival. Enterprises that have high  $d$  may survive by exploiting relational capital,  $r_i$ . Thus if we let  $\rho_{t+1}$  be the probability that an enterprise in operation at time  $t$  will survive to time  $t + 1$ , we can now write  $\rho_{t+1} = \rho(d_{it}, r_{it})$ . The unidimensional view of restructuring ignores the effect of  $r$  on this probability. We can also consider that the enterprise chooses to invest in reducing  $d$  and in increasing  $r$  in order to increase this probability.

This yields the  $r - d$  space diagram:

The  $VC$  line in figure 1 gives the minimum combinations that keep an enterprise viable. Enterprises below that locus asset strip and go out of business. Enterprises above the locus can choose to restructure, invest in relations, or do both.

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the long-run growth of skills and knowledge, which are the underlying determinants of economic growth" [?, 79].

## 4.1 Relational Capital and Increasing Returns

The ability of an enterprise to use relational capital to circumvent the strictures of the budget constraint will depend on the strategies employed by other enterprises. If all other enterprises eschew relational capital the ability of an enterprise to exploit it may be attenuated. This may seem paradoxical: if enterprise  $i$  is the only one to possess relational capital surely its return ought to be higher as it is more scarce. This seems plausible, but it ignores the means by which relational capital is utilized.

The more enterprises eschew relational capital the more transparent is economic activity. This makes it more difficult to use the strategies that enterprises utilize – such as barter and tax offsets – to circumvent the budget constraint. When all other enterprises act like firms in a market economy the one that tries to exploit relational capital stands out. This raises the cost of getting officials to help; especially as they must also use non-transparent means to provide resources. In using informal activities to survive there is strength in numbers. This may lead to economies of scale in using relational capital.

Consider, for example, the use of barter. If most enterprises do not use non-monetary transactions then it will be hard for an enterprise to employ barter. The costs of finding a partner to transact with will be harder. When barter is widespread, on the other hand, it is easier to find such partners. Barter thus is an example of a thick-market externality. The fact that others use barter increases the return to me from using it.<sup>22</sup>

Increasing use of relational capital results in reduced transparency. This lowers the cost of using relational capital. It may thus enhance the net return to investing in relational capital, even if it means that more agents are seeking resources. When transactions are transparent it is difficult to transfer value via a non-monetary exchange. The reason is that stakeholders can readily see the subsidy element contained in the transaction. This vitiates the point of the transaction. To engage in such a transfer in a transparent economy would then require more resources to buy off those now privy to the real deal. When the economy is opaque, on the other hand, the value transfer is hidden from view. This may mean that more resources are available to be redistributed.<sup>23</sup> Hence, the cost of implementation is lower. Consequently, the return to using

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<sup>22</sup>See [?] for empirical evidence of economies of scale in the use of barter in Russia.

<sup>23</sup>This may offset the effect of more contestants for the pie. The pie may increase with greater non-transparency.

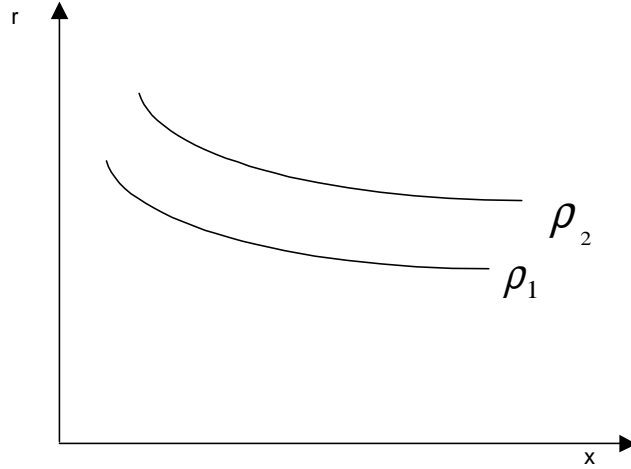


Figure 2: Relational-capital intensive enterprise

relational capital must increase with the number of enterprises employing such strategies.

It is useful to consider the analogy to rent seeking. The greater the number engaged in a contest over rents the smaller is the expected return. But this is because the size of the rent is fixed, so that a greater number of contestants means a lower probability of achieving the given prize (or a smaller share). With relational capital this may no longer be the case. When the economy is transparent government resources must be used for their official uses. Government officials may find it very difficult to divert tax revenues to enterprises. In an opaque economy, on the other hand, the cost of diverting resources decreases, as it is harder to follow the transactions. In a transparent economy a tax offset is a clear subsidy to an enterprise, and an official will have to answer for his action in allowing it. In an economy where these are widespread, however, granting an offset no longer appears out of the ordinary.

This increasing returns phenomena turns out to plan an important part in the following analysis.

Let us define  $x_i = \frac{1}{d_i}$  as enterprise *competitiveness*. We can consider combinations of  $r_{it}$  and  $x_{it}$  that yield a constant probability of survival – *iso-survival* curves. Then consider figure 2 which gives the *iso-survival* curves



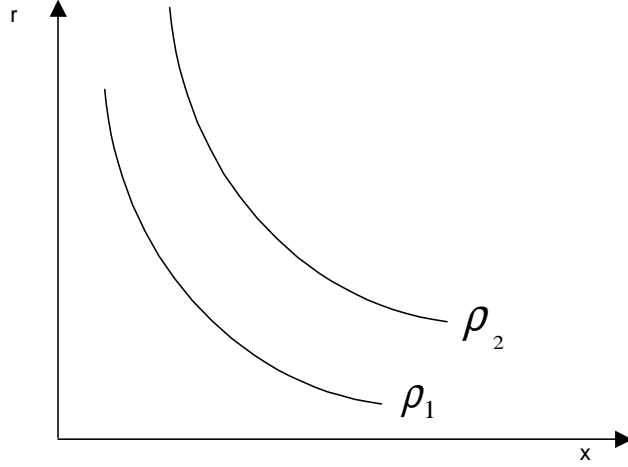


Figure 3: Restructuring-intensive enterprise

for a typical "rust-bucket" enterprise. Greater  $r$  and/or greater  $x$  increases the probability of survival,  $\rho_2 > \rho_1$ , but at the margin the return to investing in relational capital is much greater. This can be contrasted with a "restructuring-intensive enterprise" i.e., one with low  $d$ , as in figure 3. The latter can be thought of as one that exports a "hard good," though it could also reflect an enterprise with very poor inherited relations; hence, its only option is to invest in restructuring.<sup>24</sup>

Now the actual decisions of the enterprise will depend on relative prices. If we ignore the future then this fully determines the enterprise's decisions. We can consider that the enterprise has a fixed amount to invest in relations and restructuring in any period,  $I$ . Then we can draw *iso-cost* lines, given by

$$r = -\frac{P_x}{P_r}x + \frac{I}{P_r} = -px + \frac{I}{P_r} \quad (3)$$

The relative price of restructuring,  $p$ , then determines how much restructuring will take place, along with the funds available,  $I$ .<sup>25</sup> Of course, it is critical

<sup>24</sup>That is, two enterprises may have iso-survival curves that have the same shape, but the survival probability may be very different given identical values for  $r$  and  $x$ .

<sup>25</sup>Note that investing in restructuring requires funds, while investing in relations can use non-cash goods. This means that if  $I$  is measured in monetary units, then the price of

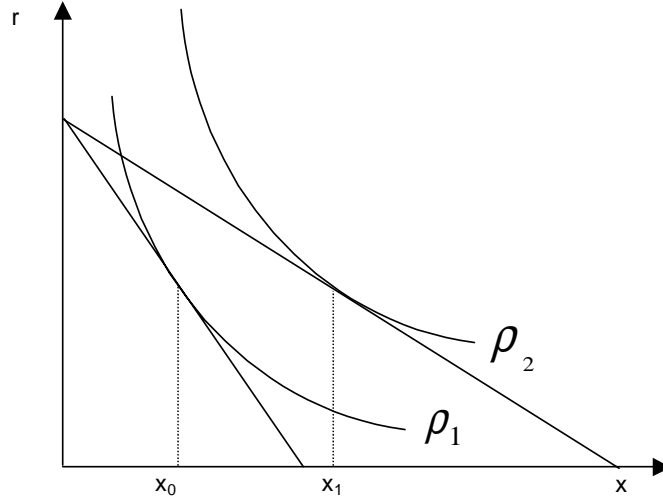


Figure 4: Fall in the relative price of restructuring

to explain the determinants of the relative price. The key policy problem of transition can thus be thought of as lowering  $p$ .

In figure 4 the relative price of restructuring falls, solely through a change in  $P_x$ . In this case the amount of restructuring increases, as does  $r$ , because of the income effect. Notice that a policy that eliminated non-transparency, and thus made  $P_r \rightarrow \infty$ , would result in vertical *iso-cost* lines, and the only means of increasing  $\rho$  would be through restructuring – the conventional view.

One shock that lowers  $p$  is devaluation. This increases the competitiveness of most enterprises. Hence, it lowers the cost of trying to survive by making the product more marketable. One must be careful, however, because devaluation also increases tax revenues and so enables governments to offer more resources – subsidies – for any given level of relations. In a similar manner we can consider how real appreciation – due for example to Dutch Disease type effects for Russia – leads to less restructuring.

We can think of the enterprise as choosing  $x, r$  to maximize the probability of survival. This gives a desired level of distance,  $x^*$ , that the enterprise relational capital is discounted relative to restructuring for this reason before we consider any others.

would prefer to attain given the current relative price ratio,  $p$ . We can think of the current rate of restructuring as a function of the difference between the current distance and the desired distance:

$$i_d = \gamma(d_{it}^* - d_{it}) \quad (4)$$

where  $\gamma < 1$  is the adjustment parameter. Note that in the theory of investment we typically assume costly adjustment of the capital stock. It seems natural to think that this will be important in transition as well.

## 4.2 Restructuring (Investment) as an Option

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. 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 partners, and because rules concerning their treatment, such as taxation of profits 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.<sup>26</sup> The issue

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<sup>26</sup>The 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.

is very different, however, when there are sunk (or irreversible) costs associated with investment.<sup>27</sup> When there are sunk costs 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.

*Remark 6 The option value of waiting creates a discontinuity in the effect of changes in  $p$  on restructuring. In the theory of investment, irreversibility creates a wedge that  $q$  must exceed before investment takes place. We can consider the effect on restructuring analogously.*

In the theory of irreversible investment a *range of inaction* is created around  $q = 1$ . This range,  $\bar{q} - \underline{q}$ , is due to the option value of waiting.

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. 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

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<sup>27</sup>An 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.

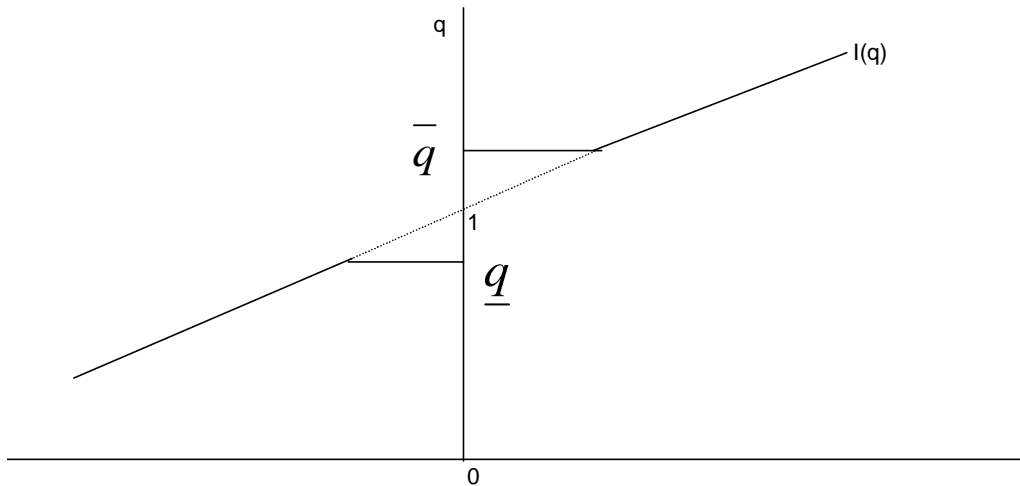


Figure 5: The Range of Inaction

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.

*Remark 7 Notice that the cost of profits may reduce further the rewards from early investment. A market leader will stand out and in the virtual economy will become a cash cow.*

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. 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.

### 4.2.1 Strategic Complementarity

This simultaneity in decision-making draws attention to a further key characteristic of uncertainty in transition, the importance of strategic complementarity. Actions are strategic complements when the marginal return to one firm from taking an action is increasing in the amount of the activity another firm undertakes. Many elements of transition exhibit this characteristic. Consider, for example, the case of an enterprise contemplating an investment in fixed capital. If many other enterprises in the economy also undertake investments at the same time, output will be high and tax rates will be low. The enterprise that chooses to invest in such a situation will be satisfied with the outcome. In contrast, if other enterprises are not undertaking investment, output will be low and tax rates high. Hence, the enterprise will choose not to invest. Because of the strategic complementarity, the possibility of multiple equilibria arises.

Notice that strategic complementarity enhances the option value to waiting. If investment activities are strategic complements, then the act of waiting causes a deterioration of the economic environment, in turn affecting the fiscal problem of the state. 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.

This can be seen in a trivial example. Let  $c_1$  be the cost of a unit of investment (each enterprise can make a unit investment, or not). Let  $R_1$  be the gross return of the investment. Suppose that there is a fixed amount of government spending,  $G$ , and that this is financed by taxing investment projects. Hence, the tax on a unit of investment will be  $\tau = \frac{G}{n}$ , where  $n$  is the number (measure) of enterprises that invest. For the purposes of the example we assume that

$$R_1 - G < 0 < R_1 - \frac{G}{n} \tag{5}$$

which means that investment is profitable when all other enterprises invest but not otherwise. Notice that we could also let  $R_1$  depend positively on  $n$ . Obviously we have a coordination problem. All enterprises investing is a Nash equilibrium, but so is no enterprise investing.

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, a subject to which we return, below.

#### 4.2.2 Irreversible Decisions, Sunk Costs, and Transition

Thus far, we have argued that macroeconomic uncertainty due to the incomplete nature of financial stabilization causes investors to postpone investment in growth-producing opportunities, if such investment involves sunk or irreversible costs. In this section, we deepen this argument by providing an institutional explanation of why the level of sunk costs tends to be higher for investment in restructuring than for other investment and especially high in the Russian transitional environment.

To make this argument, we distinguish between two types of investment:

- investment in new activities and
- investment in traditional ones.

The latter typically involve altering the scale of activities. Investment in new activities involves entry into new markets and the building of new relationships. The change in opportunities that accompanied liberalization implies that investment in new activities is critical for the long-term survival of firms. In the absence of government support, firms in declining industries will be forced to exit unless they can restructure their activities to produce new products and services with greater demand. However, such restructuring requires firms to incur a broad range of entry costs. A significant portion of these entry costs tends to be irreversible, as we explain below.

**Search and Bargaining** Entry into new activities requires firms to search for and establish relations with new trading partners. The processes of search and bargaining involve investments of time and resources in the collection of information about potential partners, as well as in the design of mechanisms to protect the firms from the risk of new partners behaving opportunistically. Such investment is often sunk; if the new activity is later deemed unsuitable, the firm will not be able to recover the time and resources it invested. Such costs tend to increase over distance. The greater the distance between a

firm and a potential trading partner, the greater the investment a firm must make in locating the new partner, establishing its reliability, and negotiating a transaction. In countries such as Russia, in which the quality of institutions designed to lower the cost of transacting over even moderate distances is poor, a role in investment is created for industry location.

Here there is a useful contrast to be made between Russia and other transition countries. In expanding into new markets, Polish and Hungarian firms could rely on many years of market-like interactions with domestic and Western European partners, developed during the era of reforms. Countries such as the Czech Republic, Estonia, and Lithuania, with benign geography, excellent transportation links, and cultural affinities elsewhere, would face lower levels of investment than Russian firms when building new relationships.

When search and bargaining are costly, firms that are located in regions comprising a large number of different industries often find that they can invest in new activities at lower cost than firms in regions specializing in a small number of industries. When local industry is diversified, managers have a greater opportunity to formally and informally meet with managers in industries outside their own to discuss new activities. Investments in new activities result, not only from the formal processes of search and bargaining, but also from the informal discussions that take place outside the formal business setting. These discussions are facilitated when managers in different industries typically belong to the same business associations, civic or political organizations, recreational clubs, and the like, which is more likely when regions are less specialized.

In Russia, regions tend to be highly specialized, reflecting the tendency of Soviet-era industrial planners to concentrate a specific industry in only a few regions to economize on the cost of building and monitoring plants producing similar products. Empirical analysis suggests that Russian regions are more specialized than comparable regions in Western Europe and the US and much more specialized than in China. This tendency to specialize tends to preserve traditional relationships, while raising the cost of investment into new ones.

**Downside Risk** A second aspect of sunk costs concerns the risk to old activities that is created when a firm enters a new activity. The industrial structure inherited from central planning is characterized by complex networks of firms, with high mutual dependence (Ickes and Ryterman, 1994b). During the Soviet era, enterprises did not have the freedom to structure



their own set of relations. Autonomy offers firms the opportunity to escape from these networks, and search for new suppliers and new customers. Escape may offer some enterprises significant gains, especially if participation in the current network forces the enterprise to neglect better opportunities elsewhere.

The decision to leave a network is potentially irreversible. If the enterprise leaves its network and cannot be replaced, then the very survival of the old network might be jeopardized. Moreover, a defection by one firm can instigate defection by other firms. Under these circumstances, the enterprise might not have the choice to return to its original network, in the event its new venture is unsuccessful. Hence, the firm must consider the effect of its departure on the survival of its old network when evaluating whether to make an investment in restructuring. Under such circumstances, uncertainty acts as a conservative force to slow restructuring.<sup>28</sup>

**Regulatory Costs** Most infamous among entry costs in Russia are the excessive costs associated with establishing new businesses in Russia. In a recent paper by Frye and Shleifer (1996), the cost of establishing a new business in Moscow is compared to that of establishing a new business in Warsaw. Their survey evidence indicates that it takes almost four times longer to establish a business in Moscow. The new business in Russia is then subject to an average of 19 inspections, more than twice as many as small businesses in Warsaw. Eighty-three percent of the Russian firms in the sample were fined by inspectors last year, almost twice the rate of Polish firms. Such regulatory compliance requires interactions with multiple officials, many of whom need to be bribed before the requisite documents are issued. The incidence of bribes appears to be at least 30 percent worse in Moscow than in Warsaw. Clearly, many of the formal regulatory costs and, certainly, all of the ‘informal’ side payments to officials are not recoverable and thus are sunk, should

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<sup>28</sup>To some extent, the ‘fragility’ of many industrial networks in Russia is augmented by the high cost of searching for and bargaining with new trading partners. Empirical evidence suggests that the potential level of competition in Russia is much stronger than was once believed. According to Brown et al, 1994, the number of firms in many Russian industries at the beginning of transition was adequate to ensure competition, absent any other barriers to competition. In a survey of more than 150 firms that we conducted in 1994, we found that nearly three-quarters of the firms were aware of alternative suppliers for their main input. Yet, during our interviews, we learned that, for many Russian firms, the cost of search and bargaining can be prohibitive, so that they are unable to forge new relationships with the defector’s competitors.

the investment later be deemed unsuitable.

Kauffman (1997) confirms the high cost of corruption in the operation of firms. Based on a survey of 50 enterprises in three large Russian cities in 1996, he finds that a significant portion of Russian firms pay substantial bribes to regulatory officials for enterprise registration, fire and health inspections, telephone line installations, leasing commercial real estate, and import and export licenses. Although Kaufman does not present data on the effect of the firm's age or size on the size of total side payments for Russian firms, he does present such evidence for the case of the Ukraine. He finds that, compared to state-owned and privatized enterprises, new private firms face substantially greater obstacles from local authorities, pay substantially more bribes, and devote a greater share of managerial resources to dealing with regulatory officials. One suspects this 'discrimination' against new private firms might also be present in Russia.

**Market Infrastructure** The level of development of market institutions in Russia plays a critical role in determining the sunk costs from investment in new activities. Underdeveloped market infrastructure raises the cost of search and bargaining. It reduces the mobility of firms, diminishing the implicit competition that might exist between regulators in different jurisdictions, if firms could easily relocate their plants. All these factors work to increase the sunk costs of investment in new ventures.

The set of institutions we consider as constituting market infrastructure is broad, and is discussed more fully below. One subset of institutions that is most pertinent comprises those firms engaged in the production of information services, whose products are integral to the process of search. For example, it includes firms that engage in wholesale and retail trade, marketing, and telecommunications. Another subset includes institutions that are integral to the process of bargaining, in particular, legal institutions, including law, lawyers, institutions for private arbitration, courts, and their more informal alternatives.<sup>29</sup>

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<sup>29</sup>In our 1994 survey of 150 Russian firms, we found substantial evidence that the quality of information services in Russia is poor and had declined at least between 1992 and 1994. The volume of intermediation of transactions by wholesale and retail trade firms declined substantially, with nearly two-thirds of the firms complaining that they were dissatisfied with their current channels of distribution. Two-thirds also complained that an important reason for using their current distribution channels is that these channels are their only real alternative. We also found that the quality of telephone services and mail delivery

In general deterioration in market infrastructure is not surprising. The introduction of markets required the dismantling of many socialist institutions, including those that had worked to coordinate transactions. But, the building of new market institutions is taking a significant amount of time as agents slowly acquire the skills and resources necessary for the new institutions. Hence, changes in the quality of services provided by market infrastructure over time approximate a J-curve, declining prior to improving. In fact, one could argue that the decline in output is at least partially due to the coordination failure that was caused by an increase in demand for a market infrastructure that was already overburdened and underdeveloped.

What is crucial is that this endogenous uncertainty – the “reform conundrum” – 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.

What determines the decision to restructure? Think of enterprises in a production chain as a coalition.

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decreased as well. Most revealing, however, is the fact that nearly every firm said that personal connections are important for finding new customers, with no other method receiving such unanimous use and acceptance.

In a more recent survey conducted in 1996 with a small number of firms in Moscow and Yekaterinburg, Hendley et al (1997) find that the legal system in Russia does not adequately support transactions. While a new civil code was passed in 1995, knowledge of that code is only slowly percolating to the level of managers, in part, because the legal departments of firms are not well integrated into the life of the enterprise. Firms frequently go to courts to adjudicate disputes, but problems in enforcement seem to push at least some firms to seek private, often illegal, methods of enforcing court decisions. In addition, Hendley et al find that Russia lacks informal networks that might facilitate new relationships.

In the absence of a well-functioning system of law or of low-cost substitutes, 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 (‘hostages’). But, this self-enforcing mechanism is predicated on the willingness of firms to incur sunk costs – the very type of investment that interacts with uncertainty to delay restructuring.

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