

THE TRANSITION TO A MARKET ECONOMY: PITFALLS OF PARTIAL REFORM*

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We present a theory of a partial economic reform of a planned economy, similar to the one that took place in Russia since 1988 and in China earlier. In such a reform, some markets are liberalized in the sense that producers can sell output to whomever they want, including private firms, at free prices, but at the same time must sell to state firms at state prices. We show that such a reform can result in a substantial diversion of subsidized inputs away from state firms and toward private firms even when state firms value these inputs more. The result may be a reduction of total output. The simple analysis sheds light on many consequences of the Soviet reform, such as breakdown of coordination of production, increased state policing of delivery quotas, prohibitions of trading cooperatives, and opposition to privatization. The model also explains why partial reform failed in Russia but worked in China.

I. INTRODUCTION

In 1988 the former Soviet Union began a program of partial economic reform. The government gave firms much more freedom to decide what to produce and to whom to sell their output. It also allowed workers to form private cooperatives and to lease capital from their firms. Such quasi-private organizations proliferated, accounting for 5 percent of employment by the end of 1990. At the same time the government retained ownership of almost all enterprises, and continued giving them state orders for much of their output. It also continued to regulate most prices, both at the retail level and between enterprises. In these respects, the reform was clearly only partial.

By mid-1991 it became clear that the partial economic reform had failed.¹ The GNP fell 2 percent in 1990 and 8 percent in the first quarter of 1991. The declines in output have spread to almost all sectors. Consumer goods virtually disappeared from shelves. Unmet deliveries by enterprises have skyrocketed with almost 25 percent of firms failing to meet their contractual obligations. The economy seemed to be collapsing.

*We are grateful to the Bradley Foundation for financial support of this research.

1. World Bank et al. [1991] and Shleifer and Vishny [1991] present evidence on Soviet economic performance through mid-1991.

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The Quarterly Journal of Economics, August 1992

In this paper we show how the economic collapse can be understood in terms of coordination failures that were made much worse by partial reforms. The partial reforms have encouraged the diversion of many essential inputs away from their traditional users toward private and other enterprises who were less constrained by arbitrarily regulated prices and so could offer better deals to suppliers. We present a model that illustrates how such diversion undermines the planned allocation, and how it can reduce output and welfare.

Our economic argument can be easily summarized using an example from a market economy. Suppose that the state of Washington produces apples which are sold throughout the United States. Let the market-clearing price of apples be 15. Suppose first that all states impose the constraint on Washington apple producers that they cannot sell their apples above 10. The supply falls, and apples are rationed. There may be lines and speculation as well.

Suppose, alternatively, that not all but only 30 states impose the maximum price of 10 on Washington apples. What happens then? The answer is that the states that imposed the price ceiling are in bad shape. The people in the unconstrained twenty states get *all the apples they want* at the price of 10, because they can effectively pay just epsilon above the constrained price and get all the apples. They are even better off than they were under the free market equilibrium. In contrast, people in the 30 states with a price limit get only the remainder of the apples supplied at the price of 10, and so they experience a much more severe shortage than they did when all states have put on a price limit. When only a few states impose the maximum price, they hurt themselves as well as the producers, and benefit enormously the states that have not restrained prices, which simply free ride on them.

This example sheds light on the experience of state firms in the former Soviet Union after 1988. Traditional suppliers to many of these state firms broke their ties and sold or bartered the supplies to private or state enterprises who were able to offer better deals. The chief of a large oil distribution concern, for example, complained that refineries sold the oil to cooperatives who were then reselling it to consumers at triple the state price, with the result that officially designated users experienced acute shortages [Sovetskaya Rossiya, May 15, 1991]. At the same time, state firms were unable to replace the diverted inputs because they had no access to markets. As a result, state firms often cut output, broke contracts themselves, and by doing so created further bottlenecks

downstream. Like the U. S. states with price ceilings on apples, state firms that did not have the legal authority, financial resources, or barterable items to compete for inputs stagnated.

Section II presents our basic model of the effect on a socialist firm of introducing competition for inputs from a private firm. We show how such competition can reduce efficiency. Section III then extends the basic model, particularly to the case with tighter quotas for state firms relevant for China [Byrd, 1987]. Section IV asks what sectors private firms are likely to enter. Section V concludes.

II. A MODEL OF SUPPLY DIVERSION

We present a simple model of competition for inputs between a state firm and a private firm. In the model, a private firm should be interpreted broadly as any firm that can circumvent state price ceilings and outbid the traditional buyers in the competition for inputs. It can be a private cooperative, another state enterprise that can offer a higher price or bribe, or even a state enterprise that has attractive items to barter in exchange for inputs. The traditional state buyers often lose this competition for inputs because they lack financial resources or barterable goods, or, alternatively, are too closely monitored to risk paying more than the official price.

For concreteness, it is easiest to think of a specific stylized example. Think of the market for timber, and let there be two uses of timber: boxcars and houses. Timber is produced in the state sector, which initially must deliver it to users at a price below the market-clearing price. Initially, both houses and boxcars are produced in the state sector as well, and the plan allocates timber between the two sectors. The reform enables "private" house builders to buy timber from the state timber sector at negotiated prices either legally or at a substantially lower expected penalty. The production of timber and of boxcars remains in the state sector. We are interested in how the production of houses and of boxcars is affected by the reform. We make six specific assumptions about the allocation of timber.

A1. The official price P of timber is below the market-clearing price: timber is rationed. This assumption is accurate in virtually all socialist countries. One reason for underpricing inputs is the desire of planners to stimulate the production of intermediate and final manufacturing goods. For example,

paper is underpriced because the government is selling newspapers cheap, and timber is underpriced because housing is cheap. Also, many goods are underpriced in socialist countries because underpricing causes rationing, and so enables ministries to collect bribes from the rationed buyers [Shleifer and Vishny, 1992].

- A2. The price P is what the buyers of timber actually pay. In particular, they do not pay bribes to get the scarce timber. In reality, bribes of course are very common. However, not every firm is willing or able to bribe the ministries, and hence bribes do not allocate the inputs fully efficiently. We consider bribes in subsection III.D.
- A3. Producers of timber are on their supply curves and are not compelled to produce more than they wish to at P . This assumption is appropriate after the reforms of 1988 that gave state firms more control over their choice of output. In subsection III.C we treat the case where the timber industry is forced to supply more than it wants to at P .
- A4. Initially, timber is rationed efficiently between the two sectors, so that the marginal valuation of timber P^* at which aggregate demand for timber equals the supply at P is the same in the two sectors. The assumption of efficient rationing is inappropriate if, for example, the planners compel the timber industry to supply all the timber the boxcar industry wants, with the residual going to the housing sector. We modify this assumption in subsection III.A.
- A5. After the reform, the timber industry can choose to whom to sell its output. This assumes more freedom than state firms have in practice, but may well approximate the ex-Soviet situation, where plan enforcement has been very lax after the reforms. In subsection III.B we consider what happens when the timber industry must deliver a quota to the boxcar industry.
- A6. After the reform, the boxcar industry cannot bid more than P for timber, but the housing industry can. This assumption captures the fact that, in the former Soviet economy, cooperatives were often allowed to, and even required to, pay higher prices. Even when prices are controlled and transactions occur through barter and bribes, private firms often have greater

financial resources and barterable goods than state firms do, and so can outbid them. The assumption that the state buyers of inputs face greater constraints on what they can pay than the private buyers do is the essence of the model.

Figure I describes the allocation of timber before the reform. Panel A shows aggregate supply and demand for timber; Panel B shows the demand by the boxcar sector; and Panel C shows the demand by the housing sector. The demand curves by the boxcar and housing sectors can be thought of as marginal value product schedules in these sectors. Under our rationing rule, the timber industry delivers Q_b (plan) to the boxcar sector and Q_h (plan) to the housing sector at the price P per unit, and its output is the supply at P .

When the partial reform allows house builders to buy timber from the state timber industry at a negotiated price, the problem becomes identical to that of Washington apples, where the boxcar industry corresponds to states with a price limit, and the housing industry to the states without such a limit. After the reform, the housing industry buys all the timber it wants at a price epsilon above P . The boxcar industry, in contrast, gets only what is left over from the unchanged quantity supplied at the price P . In equilibrium the housing sector expands until it gets all the input it wants at the subsidized price; the boxcar industry contracts because it does not get its timber; and the total supply of timber stays constant (Figure II).

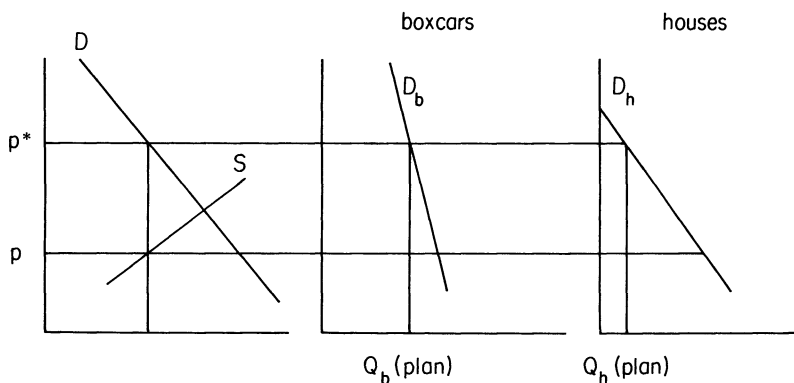


FIGURE I
Efficient Rationing of Timber

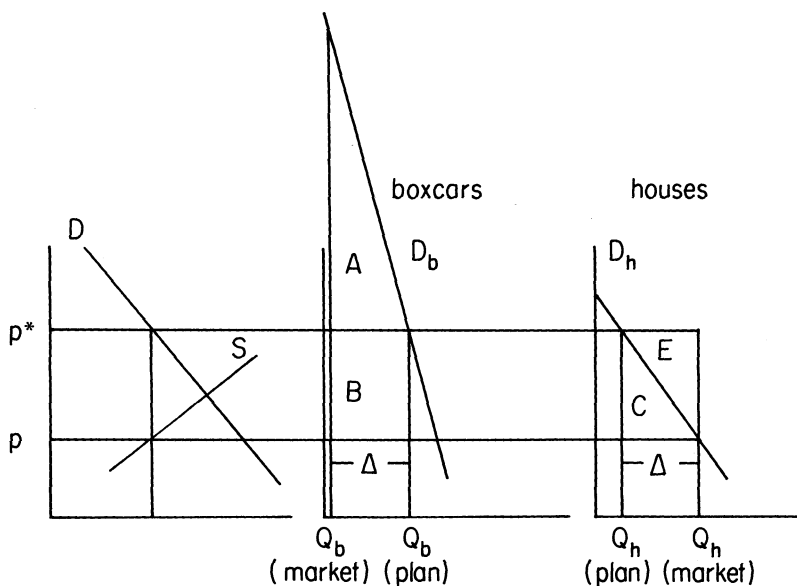


FIGURE II
Liberalizing the Housing Sector

Figure II shows the welfare consequences of allowing the private firm to buy timber. First, for the boxcar sector the shadow value (value marginal product) of timber rises sharply because deliveries fall by the amount Δ , equal also to the rise of deliveries of timber to the housing sector. As a result, the boxcar industry loses consumer surplus corresponding to the triangle *A*. In addition, the state (or the boxcar industry) no longer collects the surplus resulting from underpricing timber by $P^* - P$ on the Δ units: area *B*. On the other hand, the consumer surplus of the housing sector rises by triangle *C* as it can get all the timber it wants at P . The overall welfare falls since *C* is strictly smaller than *B*. The welfare loss is the sum of *A* and the triangle *E*. The reason for the welfare loss is that we started from efficient rationing, and ended up with less efficient rationing whereby the marginal valuation of timber is much higher in the boxcar industry than in the housing industry. In this model, partial reform reduces welfare because it diverts resources from higher to lower value use.

When is the welfare loss the largest? First, the more elastic is the demand for timber by the housing sector, the more extra

timber it buys, the more deliveries to the boxcar sector fall, and the greater the welfare loss. The misallocation of timber rises the most when the private firm can expand the most. Second, the less elastic is the demand for timber by the boxcar sector, the greater is the consumer surplus loss from the reduction in the deliveries of timber to that sector, and so the greater is the total welfare loss. The misallocation is the largest when the state boxcar sector really needs the timber, but cannot get it.

For several reasons, the case of elastic demand for timber in the free sector, and inelastic demand in the state sector, is realistic. First, private firms have the *ability* to enter sectors that require fairly little capital and complementary inputs. Second, private firms have the *incentive* to enter precisely the sectors where shortages leave a lot of room to expand. As a result, entry will occur where the demand for inputs is elastic. In contrast, the sectors remaining in state hands have a lot of fixed capital and require a variety of complementary inputs. Once the capital is in place and the complementary inputs are delivered—and cannot be resold—the demand for any other input in this sector is very inelastic. In addition, the demand for boxcars is likely to be inelastic since they might be needed as further inputs in production and have few substitutes. Both of these factors make the demand for timber by the boxcar sector inelastic. This combination of elasticities yields the maximum misallocation of resources, since the sector from which timber is diverted values it a lot more than the sector that gets it.

The misallocation of resources is obviously the consequence of the fact that some, but not all, resources can move to the private sector. If capital and other inputs from the boxcar industry moved into the private sector as well, and this industry could compete for timber, then timber would be allocated efficiently at the market-clearing price. The reason for large inefficiencies is that the state firms cannot sell some of their factors of production, such as capital and centrally distributed inputs, but cannot compete for the complementary inputs either.

In the former Soviet Union some adjustment to this problem took the form of leasing. State enterprises were allowed to lease some of their plant and equipment to their employees who formed cooperatives. This practice became common. Unfortunately, the state constrained leasing arrangements, in part due to monitoring problems. The government could not make sure that the state firms did not simply neglect the plan and gave cooperatives extra

use of the equipment, particularly in exchange for bribes. As long as the movement of capital into the private sector was restricted, the mismatch of resources persisted.

This simple model helps explain how partial economic reform has led to significant input diversion from state firms, a breakdown of economic coordination, and sharp output declines in many sectors. In fact, the model suggests how every firm can simultaneously experience a shortage of some input, since the state sector is probably short of inputs that got competed away, while the private firms are short of capital that they cannot bid away from the state firms. Moreover, the strong complementarity of inputs can explain how moderate amounts of diversion can have large effects on output.

The commodities that were most commonly diverted from downstream producers in the former Soviet Union were raw materials, such as timber and oil, and fairly universal intermediate goods, such as steel pipe and cement. These goods could be easily resold at market prices, and in fact many commodity exchanges specialized in making markets in them. As a result, diversion was widespread.

Another extremely important form of input diversion is diversion of human capital into private activities. As some of the best employees either quit the state enterprises to work for themselves, or else even retain their state jobs without showing up, the state sector loses another critical input it cannot easily replace, namely qualified labor. Such diversion is very costly as well.

Even when the state can effectively demand a fixed quantity of inputs from the upstream industry, quality is much harder to monitor. As a result, higher quality inputs would be sold to the private firms, with the lower quality delivered to the state sector. This too could result in a welfare loss if the state sector has an inelastic demand for quality. This mechanism has been important in agriculture and construction industries, where the higher quality of private sector output in part reflects the higher quality of diverted inputs.

In the model the diversion of inputs from the state sectors, or the reduction of the quality of inputs delivered to the state, reduces welfare because the value of state output is high. This assumes, perhaps incorrectly, that the demand curve for timber in the state sector reflects social preferences. For example, the state might be producing boxcars that no one wants, or wasting timber on defense in a situation of severe shortage of consumer goods. In this case,

true demand for these goods is much lower than state demand and the efficiency loss from the diversion of inputs from the state sector may actually be an efficiency gain. This point should not be taken too far, however, since many goods are produced by state monopolies, and the disruption of production by these monopolies can lead to genuine economic hardships.

III. ALTERNATIVE ASSUMPTIONS

A. Inefficient Rationing to Start

Assumption A4 says that the government rations timber efficiently between the boxcar and the housing sectors. This assumption assures that the total value of output strictly falls after a partial liberalization. A more plausible assumption is that the state favors the industrial sector, such as boxcars, in its rationing scheme.

The simplest way to model this is to assume that, before liberalization, the boxcar sector gets all the timber it wants at the price P and the housing sector gets only the rest of the supply (Figure III). The marginal valuation of timber is therefore lower than before in the boxcar sector, and higher than before in the housing sector, where the shortage of housing is extreme. After partial liberalization, when the housing sector can bid what it wants for timber but the boxcar sector cannot, the final allocation becomes the opposite of the planned allocation. The housing sector now gets all it wants at the price P and the boxcar sector gets the residual. Because timber is underpriced, there are now too many houses being built, and a severe shortage of boxcars (assuming that the demand curves measure true social valuations).

The gain to the housing sector is the consumer surplus gain, given by triangle A . The loss to the boxcar sector is the consumer surplus loss, given by triangle B . The net welfare gain is the difference between these two triangles. If the demand for timber by the housing sector is elastic, but inelastic by the boxcar sector, then triangle A is smaller than triangle B . When a fixed amount of timber moves from the sector where it is inelastically demanded to a sector where it is elastically demanded, the overall welfare (or value of output) falls. The reason is again that resources are misallocated because all the capital and complementary inputs in the boxcar sector are standing idle. In this case as well, partial reform reduces welfare.

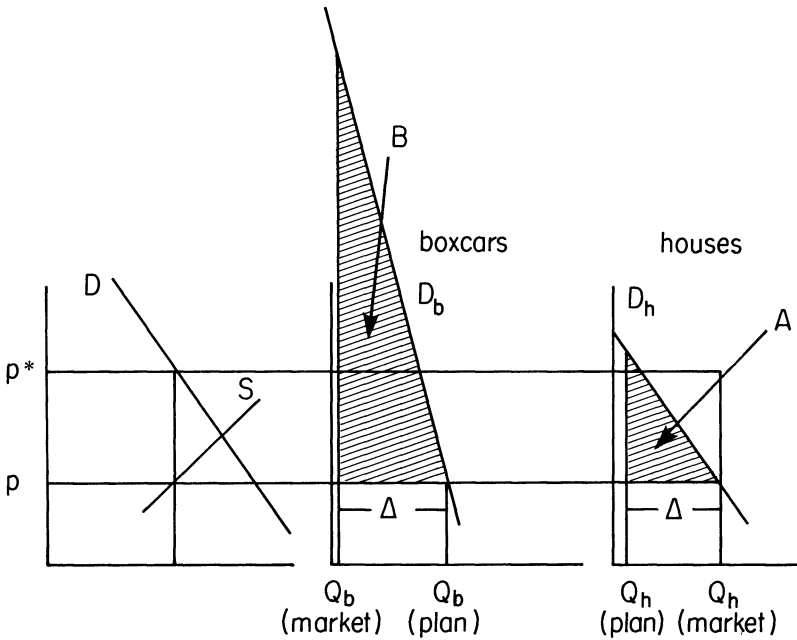


FIGURE III
Initial Rationing Favors Boxcars

B. State Use of Quotas: The Best Case

The key assumption that drives our welfare results is A6, namely that the timber industry has complete control over to whom to sell its output. In many cases, it is more plausible to assume that the state uses quantity controls to force the delivery of timber to the boxcar industry at the price P . For example, the state might demand that a fixed quota of timber be supplied even at the rationed price. Take the case where the boxcar sector got all the timber it wanted under rationing, and assume that even after the liberalization of the housing sector the state can still enforce the delivery of that same amount of timber to the boxcar sector. In the best case for quotas, the timber sector delivers its lowest production cost units to the boxcar sector, and then sells what it produces afterwards to the housing sector at an equilibrium price. This case is presented in Figure IV.

The quota in this case improves welfare relative to liberalization with no quota. As long as the quota is met, there is no change

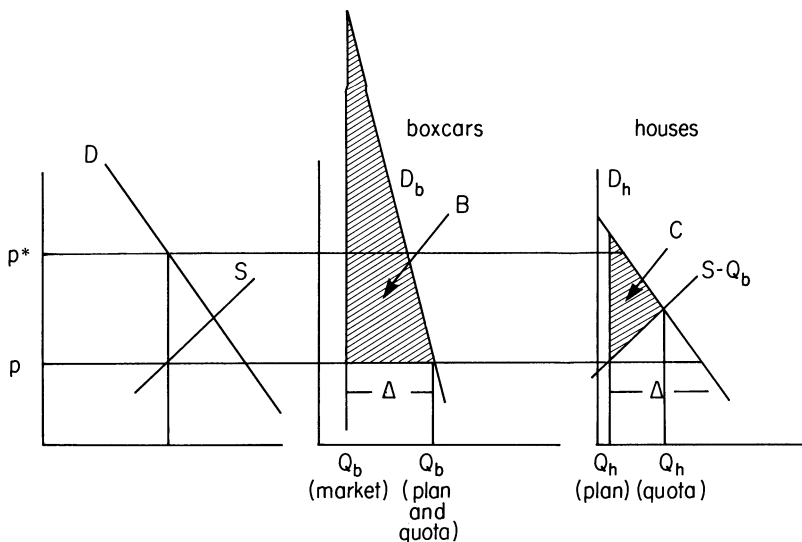


FIGURE IV
 Quota for Boxcars and Increased Supply for Housing

in the allocation to the boxcar sector, and the output in that sector stays constant. After the quota for timber is delivered, it flows to the highest value use, and so the supply of timber to the housing sector equals demand. The market clears at some price above P . With a quota, consumer surplus equal to triangle B in Figure III is no longer lost, although the welfare gain in the housing sector is now given by a smaller triangle C . Since we have assumed that in Figure III triangle B is larger than triangle A , i.e., demand in the boxcar sector is less elastic than that in the housing sector, it must be that C is smaller than B . The quota improves welfare. The strictly enforced quota prevents the highly valued timber in the boxcar sector from being diverted to the housing sector.

The case with the quota sheds light on an important difference between partial reforms in the former Soviet Union and in China. China has pursued partial reforms of the sort described here, except that the central government maintained extremely strict enforcement of state quotas and allowed firms to sell only the units above the state quotas to private buyers. As a result, the government managed to contain the supply diversion problem. The Soviet government, in contrast, while nominally retaining delivery quotas for state enterprises, substantially relaxed plan enforcement. To a

significant extent, this relaxation can be explained by the decline of the power of the central government and of the communist party, which historically have done most of the enforcing. As a result, diversion of inputs was not controlled in the former Soviet Union.

This difference between the ability of China and the former Soviet Union to control the amount of input diversion resulting from partial reform might explain why such reform has worked so well in China and so badly in the former Soviet Union. Unlike the Soviet economy, which collapsed as a result of partial reform, the Chinese economy showed a large increase in growth. The difference between the experiences of the two countries also suggests that partial reform does not succeed without continued coordination through planning. If such coordination cannot be sustained, prospects for partial reform are dismal.

The government of the former Soviet Union had responded to supply diversion as predicted by the theory, although not nearly so effectively as the Chinese government. Specifically, it created special police forces with the authority to inspect the inventories of the cooperatives and confiscate illegally purchased goods. The government also restricted trading cooperatives, which buy cheap inputs and resell them at higher prices. Finally, the government restricted cooperatives from participating in international trade, another lucrative area for arbitrage. These bans precluded the diversion of underpriced inputs from buyers who valued them but had no ability to pay. These increases in state policing might seem inconsistent with the spirit of liberalization, but make perfect sense once it is recognized that incentives to divert inputs to alternative users rise sharply when these users are private money-making firms that can pay market prices.

C. State Use of Quotas: The Worst Case

The critical assumption we made is that the timber firms met the quota to the boxcar industry using the lowest marginal cost timber, and then produced more timber for the free market. As a result, the housing industry faced the price of timber equal to the marginal cost, which led to an efficient output level conditional on the quota. Such a rosy scenario does not obtain if some of the efficient producers escape the quota and sell only to the housing industry. In fact, the most efficient producers have the greatest incentive to sell to private firms, since they are earning the highest profits from these sales. When the low marginal cost units are not

delivered to the state sector and the state uses quotas, the marginal cost of the units delivered to the state may be much higher than the price, creating a new inefficiency.

In the extreme case, suppose that the most efficient producers escape the quota, and sell to the housing industry all they want at a price epsilon above P . The remaining timber producers meet the quota at P . These producers are obviously off their supply curves, and meet the quota only for fear of penalties (Figure V). The government has to cover their losses. Since the quota is met, the boxcar sector does not lose the consumer surplus B as it did without the quota. The housing sector expands greatly, since it pays the price P for its timber, and so gets an additional consumer surplus equal to triangle A , just as it did without the quota. However, the timber industry is now selling this extra output going to the housing industry at a price below the true marginal cost, leading to a loss of producer surplus given by triangle E . It is clear from Figure V that the quota increases welfare if the supply curve of timber is more elastic than the demand curve for timber by the boxcar industry; i.e., if $B > E$. If the supply of timber is highly inelastic, because, for example, current capacity is limited, then the quota reduces welfare. Welfare gains from a quota are much larger when it is imposed on the efficient producers.

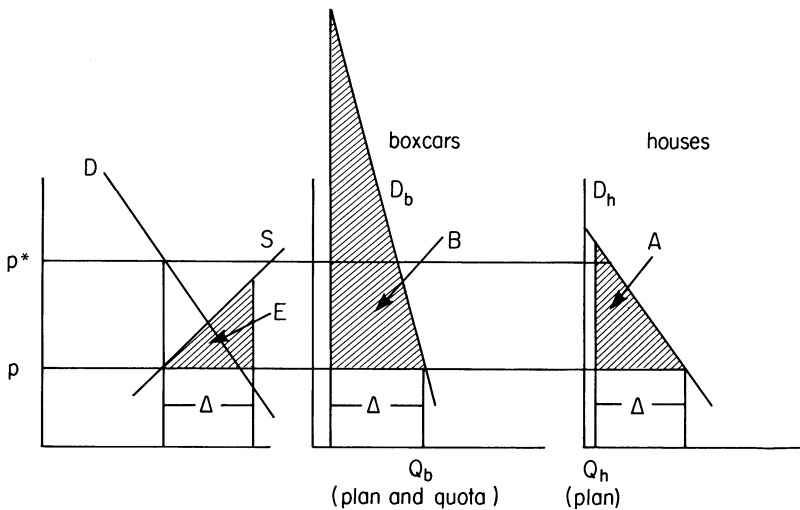


FIGURE V
Quota for Boxcars and Increased Supply of High Marginal Cost Units

This argument suggests an important cost of using quotas when private house builders can get timber at the rationed price. House builders are getting timber at a price below its true marginal cost, as they are forcing the extra production of timber to meet the boxcar quota at a high marginal cost. This inefficiency is smaller than the inefficiency without a quota if the supply of timber is more elastic than the demand for timber by the boxcar industry.

In general, there is likely to be a negative correlation between the efficiency of the enterprise and the ability of the planners to monitor it. Large, strategic state enterprises are likely to be most closely supervised by the planners, but also are likely to be the least efficient. In contrast, some of the smaller enterprises may be more efficient, but much harder to monitor. As a result, the planners are most likely to extract the input quotas from the inefficient producers, while the efficient ones sell their output to the private firms. The consequence is the inefficient production of marginal units by closely monitored firms. This view of quotas suggests even more strongly why the policing by the state of deliveries rises precisely at the time of liberalization: the most efficient enterprises are likely to try the hardest to avoid the quotas.

D. Bribes

We have assumed in our basic model that the price P is what the consumers of timber actually pay under rationing. At that price the marginal valuation of timber under rationing, P^* , is higher than P in both industries. In practice, this usually means that the timber ministry will collect bribes from the producers eager to get the timber. Assume for simplicity that the timber firms get only P and therefore produce the same supply as before.² Then $P^* - P$ per unit goes to the ministry in the form of bribes, and the equilibrium output remains the same as under rationing. The total price to both the boxcar and the housing industry will be P^* , the sum of the official price and the bribe. At that price the total demand is equal to the supply at P .³

What happens to this industry after the partial reform depends on whether the ministry or the timber firms have the property rights over the timber output. Suppose first that the

2. There is a delicate issue here of whether the timber firms actually pay the marginal cost, or whether the government pays it, in which case they will produce as if the marginal cost were zero. The case we treat makes the comparison to the basic model most simple.

3. In a more elaborate model, the ministry creates a shortage by optimally choosing P to maximize the value of bribes [Shleifer and Vishny, 1992].

timber firms continue to get P for timber, but the ministry can now openly negotiate timber prices with the housing firms and keep the profits, while continuing to take bribes from the boxcar firms. In this case, the partial reform does not change the allocation of inputs. The boxcar industry continues to pay the official price P plus the bribe of $P^* - P$ for timber, while the housing industry switches to paying P^* openly. The allocation stays the same, except that the ministry collects some of the profits officially rather than as bribes. If the official profits are taxed while bribes are not, however, the ministry will try to keep the official price of timber down to P for both buyers and to continue charging bribes. In this case, then, bribes prevent the detrimental consequences of the partial reform on the allocation of inputs because they effectively enable the boxcar producers to compete for the inputs through bribes.

Suppose alternatively that the ministry loses the property rights over timber, so that the timber firms now receive the revenues from the sale of timber to the housing sector. Assume first that the price that the timber firms get from selling to the boxcar sector stays at P . In this case, as in our basic case, the housing industry diverts all the timber it wants at the price of P from the boxcar industry. Timber in that industry continues to be allocated through bribes, and the full price to those who get it rises, but since the bribes go to the ministry rather than the timber firms, the latter prefer to sell to the housing industry for P plus epsilon. Partial reform in this case has all the same adverse consequences that it had without bribes.

This result, however, assumes unrealistically that the ministry stands idle as the value of the bribes it is collecting deteriorates. More realistically, the ministry responds to the loss of bribe income by raising the price paid to the timber firms, since that raises the value of bribes. As a result, the housing industry too must pay more for timber. In equilibrium the housing industry pays some price $P' > P$, and the boxcar industry pays P' plus the market-clearing bribe to its ministry. Moreover, because the price rises, the supply of timber rises as well. In this case as well, the distortion is reduced relative to the case with no bribes, since competition forces the ministry to raise the official price of timber and to reduce its diversion from the boxcar industry to the housing industry. Because bribes effectively enable the boxcar industry to compete for the inputs, they reduce the costs of partial reform. However, since marginal valuations of timber diverge in the two sectors even

with bribes, bribes do not completely eliminate the costs of partial reform.

In this analysis we have assumed that the market for timber clears through bribes. In truth, however, some firms are not well enough connected to pay the bribes; some might be afraid of criminal repercussions; and some might be too dumb to know how the market works. These firms are particularly hard hit by the partial reform, because they lose their inputs and will not be able to get them back. In sum, bribes reduce the distortions caused by partial reform by effectively providing the mechanism for state firms to pay more for their inputs. However, only in extreme circumstances do bribes completely eliminate these distortions.

IV. WHICH SECTORS DO PRIVATE FIRMS ENTER?

So far, we have specified the sector that private firms enter exogenously. Yet, it is also interesting to ask which sectors are most attractive to private firms, and therefore where entry is the most energetic and extensive. Private firms enter the sectors where they can expand and make money. The key attractions for entry are large unmet demand, availability of inputs such as capital and materials, and the low price of inputs. The last point implies, in particular, that private firms are likely to enter sectors where the inputs are most severely underpriced by the state, so that they can obtain them at the lowest prices relative to values.

This fact raises a major problem for partial reform, for inputs are the most valuable on the margin where they are the most underpriced. If timber is cheap, it is in short supply and has a high shadow value. The short supply makes entry attractive to the private firms, which enter and divert some of that supply of timber to their own use. The incremental producer surplus to the private firms is directly proportional to underpricing. The implication of this result is that private firms are likely to enter precisely where they can do the most damage in terms of diverting inputs from competing state sectors. Private firms are likely to enter sectors where the inputs are most scarce, and so create the largest resource misallocation as a result of their entry.

The result that private firms may enter where they do the most damage seems counterintuitive. In a market economy, private firms enter and buy up only the resources that they value more than the firms they are diverting the resources from. Here, in contrast, prices are distorted, and so private firms buy even the

inputs they value less than the state firms that are not getting these inputs. The trouble is that state firms cannot compete for these resources, and so are not getting them even if they value them more. In an economy with distorted prices, much of what the firm gains from entry is rents redistributed from other firms. As a result, private gains may be positive, and social gains negative. This critical difference between a socialist and a market economy explains how entry can reduce welfare.

This observation also sheds light on the difference between a private firm entering a socialist economy, as we have here, and a socialist firm entering a market economy. By a socialist firm we mean one that produces a certain possibly inefficiently high output level on state orders, and can afford to lose money thanks to state subsidies. A socialist firm entering a market economy buys inputs that are priced correctly. As a result, unless it has a strong effect on the prices of these inputs, it will not create large distortions in other sectors of the economy. Moreover, the state firm does not have an incentive to expand solely because its inputs are underpriced. When a socialist firm expands beyond the efficient level, it buys correctly priced inputs and *loses* money, which puts a check on its expansion. In contrast, a private firm in a socialist economy has a very strong incentive to expand precisely because it is buying underpriced inputs and so, assuming that demand is elastic, makes more money as it expands. Because inputs are priced correctly in a market economy, the socialist firm does not expand on the margin where it creates the greatest negative externality, whereas a private firm in a socialist economy does. This result perhaps explains why having a few state firms in a market economy, as is common in Western Europe, is not nearly as damaging as a small dose of the market can be to a socialist economy.

V. CONCLUSION: IMPLICATIONS FOR REFORM

Our discussion suggests that partial reform is fraught with pitfalls. When some, but not all, resources are allowed to move into the private sector, and state prices remain distorted, the result may be a significant disruption of the state sector. The reforms in the former Soviet Union illustrate the mistakes emphasized in this paper. In 1988 the government legalized some private enterprises, such as cooperatives, and substantially liberalized plan enforcement, allowing state enterprises more discretion on what to do with their output. At the same time, the arbitrary schedule of

official prices between state firms was largely retained. The result has been that only some resources moved to the private sector, but the ones that did often created bottlenecks and shortages in the state sector. By destroying the traditional coordination mechanisms in the economy, without substituting true markets, partial reform contributed to the collapse of output.

The most natural implication of the analysis in this paper is that the price reform should take the form of a big bang, with all prices being freed at once. Such a radical price liberalization will obviously eliminate the problems that we are discussing. The model also suggests some pitfalls of partial reform that at least in principle could be contained. The Chinese government, for example, has managed to control the diversion problem by strict enforcement of delivery quotas between state enterprises. Such controls require a much stronger government than Russia had in 1991. Fortunately, the Russian government moved to an almost complete price liberalization in early 1992.

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