

Pervasive shortages under socialism

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We present a new theory of pervasive shortages under socialism, based on the assumption that the planners are self-interested. Because the planners—meaning bureaucrats in the ministries and managers of firms—cannot keep the official profits that firms earn, it is in their interest to create shortages of output and to collect bribes from consumers. The theory implies that (1) an increase in the official price of a good might reduce output, (2) market socialism is bound to fail even without computational complexities facing the planners, and (3) price liberalization will succeed only if firms get to keep their profits.

1. Introduction

■ The single most pervasive phenomenon in socialist countries is shortage of goods. Consumer goods ranging from necessities, such as food, to luxuries, such as cars and gold, as well as many intermediate inputs, are typically in short supply. Kornai (1979) and Weitzman (1984) argue that shortages, as opposed to excess supply of goods, distinguish socialism from capitalism. In this article, we offer a new explanation of shortages under socialism.

Standard explanations of shortages of goods under socialism are not completely persuasive.¹ The classical explanation (Lange, 1936) argues that shortages result from temporary difficulties in calculating equilibrium prices, which occur because convergence to equilibrium takes time. It is hard to take this story seriously. In the former Soviet Union, shortages of some goods, such as cars, have lasted for decades, without any price increases. The planners simply did not raise prices to come closer to the market-clearing equilibrium.

Second, it is often argued that distributional considerations lead socialist planners to keep down prices of such goods as food (Weitzman, 1977). Although distributional considerations may explain shortages of some goods, such as food and housing, they are hardly a general explanation. Why, for example, has the former Soviet Union always had a shortage of such luxuries as cars and owner-occupied apartments? The government has long been trying to extract the excess savings from the rich, and raising the prices of luxuries would have been a natural way of doing this. It does not appear, then, that fairness is the real issue.

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¹ For an excellent overview of standard explanations, as well as an ingenious new theory, see Rotemberg (1990).

A third influential explanation of shortages, offered by Kornai (1979), is that socialist firms face soft budget constraints and so always want to get any inputs they possibly can at any price. In Kornai's model, it is not so much that goods are underpriced, but that the income of the buyers is effectively infinite. This model may be appropriate for some intermediate goods. But households face hard budget constraints, and therefore the systematic shortages of many consumer goods remain a puzzle. Moreover, we claim below that the notion that the socialist firm always wants to expand output is incorrect. Our explanation of shortages applies to consumer luxuries and necessities, as well as to intermediate goods.

We argue that an important reason for pervasive shortages is self-interested behavior by the ministry bureaucrats who set the planned prices and output. These bureaucrats intentionally plan shortages in order to invite bribes from rationed consumers. If markets cleared, firms in an industry could earn profits, but most of these profits would accrue to the state treasury, not to the managers or the ministries. The key feature of socialism is that the decision makers who determine the prices and output of firms do not, to a first approximation, keep any of these profits. In contrast, when there is a shortage of a good, potential customers try to obtain it by offering bribes and favors to the bureaucrats in the ministry (and to the managers of firms). These bribes tend to be much larger than the share of official profits that the bureaucrats and the managers are allowed to keep. And because the bribes are not official transactions, none of them goes to the treasury. As a result, the industry is better off creating a shortage of the goods and collecting the bribes than making official profits it cannot keep. To collect bribes, socialist industries will always try to produce a level of output entailing a shortage at official prices.²

Our article is an application of the general principles of rent-seeking, introduced by Tullock (1967), Krueger (1974), Posner (1975), and Bhagwati (1982). The literature on central planning has long recognized that price distortions can lead to Tullock-like welfare losses as people waste time queuing for goods (Stahl and Alexeev, 1985). This literature has taken underpricing as exogenous, however. Our article suggests that underpricing and shortages are the result of the rational choice made by key decision makers, who collect the rents that result from shortages. Although we focus on shortages in socialist countries, the point that bureaucrats create artificial barriers to private transactions in order to collect bribes is more general. Many laws, regulations, and other quantity restrictions in less-developed and even in developed countries are probably introduced largely to collect bribes (De Soto, 1990). We believed it would be useful to bring out the implications of this general principle for the most pervasive feature of socialism: the shortage of goods.

The next section of the article discusses the objectives of a socialist industry and presents our explanation of pervasive shortages. Section 3 discusses some of the center's responses to the problem of shortages and the related problem of industry losses on the official account. Section 4 concludes with some general implications of this theory for socialist and market economies, for market socialism, and for reform.

2. The objective function of a socialist industry

■ To describe its objective function, we must first define what we mean by "a socialist industry." We define a socialist industry as the combination of the firms in the industry and the ministry that supervises them. We assume that this industry has some demand curve and some cost curve. The objective function of this industry is the objective function of the bureaucrats in the ministry and the managers of the firms. Importantly, we assume that the bureaucrats and the managers collude to pursue their common objective function.

² A Moscow taxi driver illustrated our point. When asked why all the most convenient turns seem to be prohibited on Moscow roads, resulting in huge traffic jams, he replied immediately: "So that policemen can collect the most bribes from the violators."

As a result, we do not focus on the potential conflicts between bureaucrats and managers. Our view is that both have the same broad objective—namely, to enrich themselves at the expense of their customers and the state treasury—and that they bargain efficiently on how to divide the surplus. One example of this is that the ministry gives the orders and the firms just follow them as best they can.

Given this view of a socialist industry, it is not important whether it consists of just one or several firms. Even if there are several firms, the bureaucrats in the ministry will enforce collusion between them, and they will act as a monopolist. In particular, the bureaucrats will not allow firms to compete for bribes. This assumption is quite natural: the ministry has a great deal of control over the prices and outputs of the firms it supervises, and it is in the long-run interest of the managers as well to make sure that the monopoly allocation is sustained. In short, we are assuming that the industry consists of one decision maker, who expresses the combined interests of the bureaucrats and the managers, and whom we shall call “the industry.”

What is the objective function of this industry? Typically, the industry does not keep any of the profits it earns from selling its output at official prices, since the tax rate levied by the central authorities is close to 100%. The argument made to justify the expropriation of profits is that the state owns the firms and thus is entitled to the profits. Even if the industry can keep some of the profits, virtually none of them accrue to the managers and to the ministry bureaucrats. Official profits are of no value to the decision makers. Such taxation of profits implies, in particular, that the industry has no interest in charging an official price equal to the monopoly price and supplying the monopoly output. Nor does the industry have any interest in producing a competitive output at a competitive price, since the profits on the inframarginal units, again, accrue to the state. A socialist industry gets no or virtually no benefits from earning legal profits.

The only way that the industry can get anything for itself is by having a shortage of the good it produces and then collecting the rents in the form of bribes from quantity-constrained buyers. When there is a shortage, buyers' valuation of the good exceeds the official price, so they are willing to stand in line, lobby the firm and the ministry, and most importantly, pay bribes to get the good. Of course, to the extent they lobby and stand in line, the buyers do not benefit the industry. But to the extent that the shortage brings in bribes, the industry decision makers benefit from a shortage. The advantage of bribes over profits is, of course, that bribes are hidden and therefore are not turned over to the treasury. As long as the tax rate on official profits is high enough that managers and bureaucrats prefer to collect the bribes, even despite all the waste associated with queuing and lobbying, they will try to create a shortage. The industry's objective, briefly stated, is to maximize the bribes.

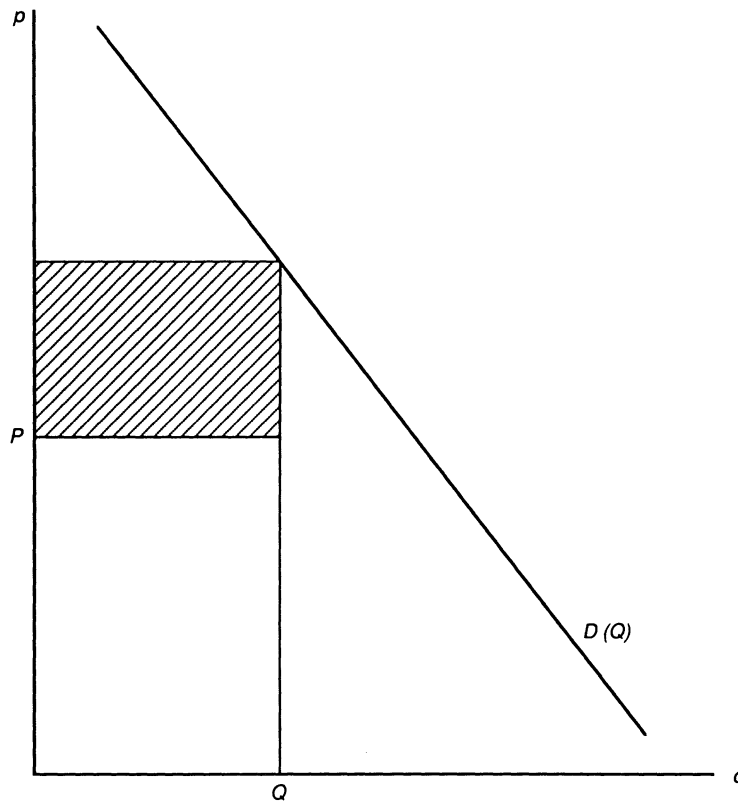
If we denote the inverse demand curve of the industry by $D(Q)$ and the official price by P , the objective function of the industry is given by

$$D(Q) * Q - P * Q. \quad (1)$$

This objective function, for an arbitrary P and Q , is given by the rectangle in Figure 1. We are assuming that the true price the industry charges the buyers is $D(Q)$ —the reservation price of the marginal buyer—and that this price consists of two parts. The first is the official price P , and the second is the bribe $D(Q) - P$. The rents that this industry collects are the product of the bribe per unit of output times the output.

There is a simple way to think about this objective function. The first term, $D(Q) * Q$, is simply the revenue that any industry would collect if the market cleared at the output Q , which we will denote by $R(Q)$. However, the cost to a socialist industry is very different from the cost to a private industry. The real cost function does not even enter the objective function (1). As Kornai has pointed out, the socialist industry does not care at all about the cost of its inputs, since these inputs are paid for by the state, which usually covers the

FIGURE 1



losses of the enterprises. With close to a 100% profits tax and full compensation for losses, the official cost of the inputs only trivially affects the fortunes of the industry's bureaucrats and managers. The assumption we make means that the official revenues of the firm, $P \cdot Q$, are the only real cost to the managers and the bureaucrats. The higher the official price for its output, the lower the bribes the industry can collect per unit of output, and so the higher the effective cost of this output. To the bureaucrats and managers, the official revenues are a drain; they are just like the production cost or an excise tax to a private firm. Once this point is recognized, the objective function of the industry given by (1) is just the revenue minus the total cost.³

In writing down this objective function, we make several specific assumptions. First, we assume that bribes are collected efficiently. Customers do not stand in line or inefficiently lobby the producers, they just pay the bribe $D(Q) - P$. This assumption is obviously unrealistic, since in socialist countries we observe queues, lobbying, and other inefficient behavior, as well as bribes. We do not need such a strong assumption. We need only assume that the tax rate on official profits is high enough that the industry tries to collect bribes rather than official profits. Even if there are some restrictions on bribery that lead to queues in equilibrium, the objective function will be similar to (1), and we will still get the result that the industry wants to create a shortage.

³ We could alternatively assume that some or all of the industry's costs have to be paid in bribes in order to procure scarce inputs, or that the industry faces some minimum profitability constraint (as we assume below). These assumptions would make the industry care about its official costs and thus change its choice of output. Nonetheless, these assumptions do not change the basic conclusion that the industry wants to have a shortage of its output.

Second, we assume that there is no price discrimination in bribes. Every customer who gets the good pays $D(Q) - P$. If price discrimination in bribes were perfect, every customer would pay his reservation price in the form of bribes, and there would be no shortage at the official price. But as long as price discrimination is not perfect, there will be a shortage.

Third, as we already mentioned, the ministry precludes bribe competition between producers, so in equilibrium, bribes are chosen monopolistically. If bribes were chosen competitively, producers would cut bribes competitively until they reached zero. But unlike market economies, in which price competition is intense, socialist economies have a natural collusion device, namely the ministries, that prevents competition in bribes.

Fourth, we assume that bribery is not penalized. For socialist and other severely regulated economies, this assumption is much more realistic than it would be for a market economy. In part, bribery is so pervasive that it is difficult to detect more than a trivial fraction of it. In part, the authorities who are supposed to attack bribery typically get a cut of the proceeds and so protect corruption rather than attack it. Moreover, introducing a probability of detection and penalty into our model would not affect the qualitative results unless penalties are so severe as to stop bribes altogether. If the probability of detection or the size of the punishment is increasing in the size of the bribe, then bribes are lower than the level predicted by our model. But if the probability of detection increases in the number of people who bribe the monopolist, he might further reduce output and increase shortages to cut the number of customers and hence the probability of detection. These cases can be easily examined.

Once the objective function (1) is granted, our main point follows immediately. The industry maximizes the value of the bribes, and this value is zero if markets clear. The only way this industry can get anything to itself—meaning to its bureaucrats and managers—is if quantity and official price combine in a way that creates a shortage. Only if there is a shortage will the value of bribes be positive. Shortage is thus not just the coincident consequence of the difficulty of socialist calculation; it is the most generic consequence of the true objectives of socialist industries.

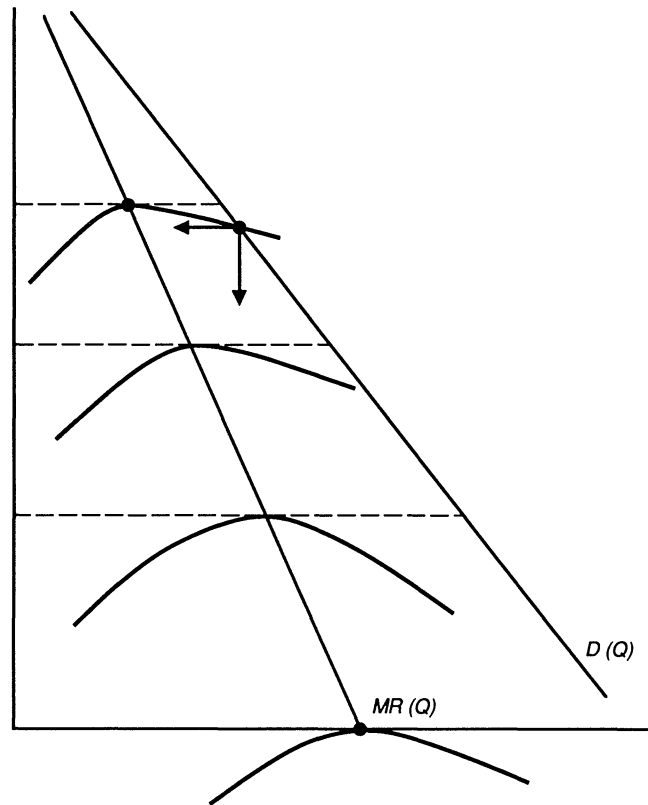
Figure 2 illustrates what an unrestrained socialist industry would like to do. Differentiating (1) with respect to Q , holding the official price constant, we obtain the first-order condition for the industry for the case where the official price is given exogenously:

$$R'(Q) = P. \quad (2)$$

If the industry takes the price as exogenous, it will set the marginal revenue equal to the official price. This result is obvious once we recognize that the official price is the marginal cost of the socialist industry. Equation (2) explains the indifference curves of the socialist industry presented in Figure 2. These indifference curves peak out at their intersection with the marginal revenue curve and decline on both sides of it. Figure 2 illustrates that if the industry could pick both its price and the quantity it produces, it would set the price equal to zero (to minimize what it perceives to be its marginal cost) and set the output at the point where the marginal revenue from producing more is equal to zero.

More generally, Figure 2 illustrates that, starting from any market-clearing price/output combination, the industry always wants to cut both its official price and its output. The industry wants to cut its price because lower official prices for a given output simply raise the market-clearing bribes. And the industry wants to cut its output at a given price for precisely the same reason that a monopoly wants to cut output from the competitive level at a given marginal cost: the marginal revenue curve is to the left of the demand curve. By cutting output from the market-clearing level, the socialist industry increases the value of the rents it collects. This socialist industry always wants to move southwest from the market-clearing position, i.e., to create a shortage. If the plan imposed from the center is so tight as to force the industry to be on the demand curve, the market would clear, and no bribes would be collected. But if the socialist industry has any discretion whatsoever to renegotiate

FIGURE 2



the plan, or to underfulfill the plan, so as to move southwest from a point on the demand curve, it would do so and thereby create a shortage. This is the central proposition of this article.

Note that this result is quite different from the usual observation that socialist firms have low-powered incentives to produce, and therefore produce less than profit-maximizing firms would in the same circumstances. If the only problem were low output, the market would clear at a low output and a high price, and there would be no shortages. Instead, our result shows that socialist firms have an incentive to cut both output and price and create shortages, because that strategy maximizes bribes. Socialist firms have strong incentives, but these incentives are to maximize the value of bribes rather than value of official profits.

Our result casts doubt on Kornai's (1979) argument that because socialist firms do not pay for their inputs, they have an incentive to expand output ad infinitum. Perhaps they have an incentive to get all the inputs they can lay their hands on, since they do not pay for them and may be able to sell them. But output expansion is not costless to socialist firms, because it limits their ability to collect bribes. As these firms expand, marginal revenue falls, and at some point it falls below the true marginal cost to these firms, which is the official price. Since socialist firms have a well-defined objective of maximizing the value of bribes, they have the incentive to restrict output to the level where the marginal revenue equals the marginal cost they face; this output certainly is not infinite.

The message of this section, then, is that a socialist industry has a very strong incentive to create a shortage. So long as it has some discretion over its price and output, it will do so. Of course we do not really believe that the socialist industry will get its maximum bribes and charge a zero official price. The central authorities would then run an enormous deficit

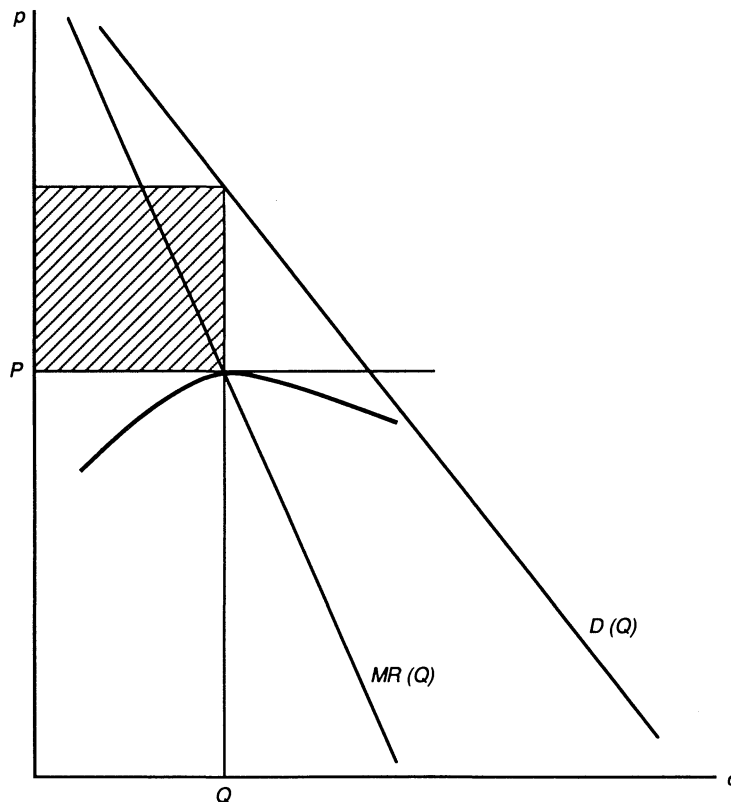
and face enormous pressure from consumers to somehow interfere. In the next section, we discuss some plausible forms of such interference and their implications.

3. Response to shortages

■ It is implausible to assume, as we have so far, that an industry can generate severe shortages and large official losses without provoking at least some response from the central government. It is more likely that public complaints about shortages and budget deficits will prompt a response. That response, of course, is going to be muted by the fact that bureaucrats in the ministries and higher up usually share in the bribes and so have a strong incentive not to eliminate them. In particular, they have strong incentives not to stiffen plans and enforce production quotas. Nonetheless, sometimes the center responds to pressure and changes the constraints on the industry. One obvious strategy to combat shortages—used in the Soviet Union in April 1991 and again in January 1992—is to raise prices. Another common strategy is to restrict the level of losses that an industry can run. In this section we consider the consequences of these strategies.

□ **Price increases.** What happens when the center sets the price for the industry is clear from equation (2) and is illustrated in Figure 3. The industry sets output at the point where the marginal revenue is equal to the official price. Because output at this point is below demand, there is a shortage, and the industry collects positive bribes. Suppose now that central authorities raise prices to reduce shortages. In this model, raising prices reduces rather than raises output, since a higher marginal revenue corresponds to a lower output. The reason for this is that the official price of output is the marginal cost to the socialist

FIGURE 3



industry. Raising official prices is just like raising the marginal cost, and so leads to a reduction in output. Because higher official prices lead to losses of bribes on the marginal units, it pays the industry to cut its output. An official price increase thus has the perverse effect of reducing supply, as the industry struggles to keep up the value of the bribes. A price increase does not solve the problem of shortages. This is because the industry collects its returns in the form of bribes rather than official revenues. While official price increases raise the value of official revenues, they reduce the value of bribes and hence the incentive to produce.

This result sheds light on recent price increases in the former Soviet Union. In April 1991, the Pavlov government raised official prices by an average of 100% to 200%. Prices remained controlled. A “surprising” consequence of the price increases, discussed in all the Soviet newspapers, was the conspicuous absence of increases in supplies of goods on the store shelves. Even if postincrease prices remained below market-clearing levels, one would still expect a nontrivial increase in the availability of some goods and a reduction in queues. This, however, did not happen. In a second episode, on January 2, 1992, the Yeltsin government freed most prices and sharply raised even the prices of goods that remained controlled. Preliminary estimates by *Kommersant* (the Russian answer to the *Wall Street Journal*) indicate that retail prices rose three- to fourfold on average. In contrast to the earlier reform, there was an instant and tremendous increase of goods on the store shelves. Many items that the Russian consumers had not seen for years, such as coffee, sausages, and chocolate sweets, suddenly appeared in stores.

Our model might shed light on why goods appeared on store shelves in January 1992 but not in April 1991. In April 1991, although the government raised the prices, the stores’ profits were still largely taxed away. Since the store managers did not benefit much from earning higher official profits but could benefit from bribes, it did not pay them to offer any more output at the official prices. In fact, our model predicts that they should have restricted supplies further at official prices. In contrast, in January 1992, property rights to official profits changed dramatically. A much larger chunk of the profits could be kept by the employees and managers of the stores (as well as by suppliers). Moreover, stores could retain some profits to use for a subsequent buyout in privatization. As a result, it became more attractive to sell goods at high prices and keep the share of the legal profits than to keep down official supplies and use bribes. The goods shifted from sale through the back door to sale through the front door. In this way, the change in property rights to official profits may explain why the second price reform worked but the first one did not.

□ **Minimum profit constraints.** Another way central authorities in socialist countries limit bribery and shortages is to impose a minimum profit constraint on the industry while letting it choose the price and the output. We have already shown that if left to its own devices, the industry would charge a zero official price and collect huge bribes. It would consequently run a large loss on the official account, which, with a soft budget constraint, it does not care about. One way that the central authorities can raise prices indirectly is to harden the budget constraint.

Suppose the center demands from the industry an official account profit of at least A :

$$P*Q - C(Q) \geq A, \quad (3)$$

where $C(Q)$ denotes the official cost of producing the output Q . The minimum required profit could be zero, but it also could be positive or negative. Since the industry always wants to keep the official price as low as possible, constraint (3) always binds in equilibrium.

If we substitute (3) into (1), the objective of the industry becomes to maximize

$$D(Q)*Q - C(Q) - A. \quad (4)$$

Taking the first-order condition, we find that at the maximum level of bribes, it must be that

$$R'(Q) = C'(Q), \quad (5)$$

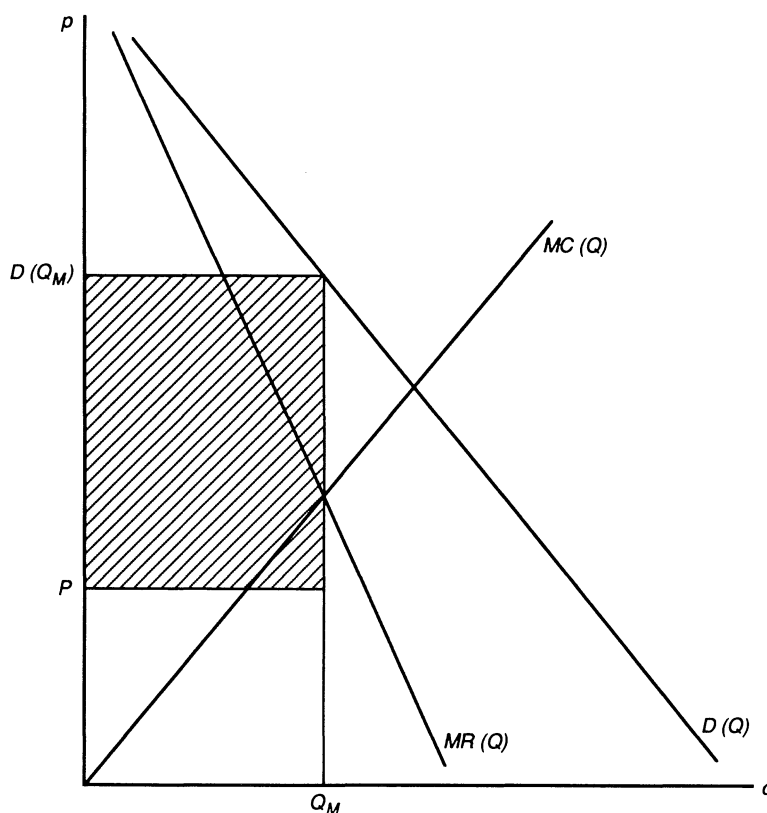
i.e., the marginal revenue is equal to the marginal official cost. The industry subject to a profit constraint always chooses monopoly output regardless of the level of the constraint (see Figure 4). It then chooses the lowest price for which its official profits are equal to the amount that it has to earn. The effective price to consumers is the monopoly price, but it is split between the official price that assures the industry the required level of profits and the bribe.

Hardening the budget constraint in this model raises official prices and reduces shortages. The reason for lower shortages, however, is not a higher output but a higher price: the output stays the same at the monopoly level. A harder budget constraint only redistributes profits between the industry and the treasury; it does not affect output. If the central authorities want a high output, they should set a low official price and let the firm run large losses on the official account.

4. Conclusion

■ We have presented a model of shortages in socialist economies intentionally created by an industry—meaning bureaucrats in the ministry and managers of firms—trying to collect rents in the form of bribes when it cannot keep the official profits. This theory suggests that because public ownership of firms and the resulting expropriation of official profits is endemic to socialist economies, so will be the shortages. In contrast, because under capitalism firms and their profits are owned privately, capitalist producers would always wish to collect “official” profits by charging higher “official” prices. At a given price, capitalist producers would want to sell more, leading to what Weitzman (1984) calls “excess supply” of goods. Our model thus accords well with the central distinction between capitalism and socialism stressed by both Kornai and Weitzman: “excess supply” of goods under capitalism and excess demand under socialism.

FIGURE 4



The issue of who keeps the profits arises in market economies as well. For example, public monopolies often underprice output and thus create shortages. In many countries with public phone companies, such as Brazil and France, it takes a long time to get a phone line, and a bribe helps to get it faster. Since public monopolies and their managers cannot keep a large share of the profits they generate, it is not surprising that they create a situation conducive to the collection of bribes and, more generally, favors. Similarly, inside large firms and other bureaucratic organizations, managers with negligible equity stakes often choose to allocate resources not through market prices but through quantity controls and other transfer-pricing mechanisms that leave them more discretion. This strategy might help them maximize the value of bribes and other favors rather than the firm's profits.

The major theme of our analysis is that socialist planners are self-interested. This assumption contrasts sharply with the one usually made in the debate on market socialism. Since Barone (1898), both opponents and advocates of market socialism have assumed a benevolent central planner. As a result, the market socialism literature has focused on the complexity of the computational task facing this benevolent planner (e.g., Lange, 1936). But if, contrary to the assumption of this literature, central planners are self-interested, then the possibility of efficient resource allocation under market socialism is in much greater doubt. For as we have shown, it is in the interest of such planners to cut output and to create price distortions. In direct contrast to Lange's claim that monopolistic output restrictions are the likely product of market economies, we have shown that such restrictions are likely to take place under socialism. Even without computational complexities, socialism with self-interested planners will not result in efficient resource allocation.

Last but not least, our analysis has an important implication for the economic reforms sweeping Eastern Europe today. A key implication of our analysis is that the question of price reform cannot be separated from the question of property rights. Producers respond to incentives afforded by free prices only if they get the property rights to enough of the profits that can be earned with free prices. Without such property rights to profits, higher prices do not solve the shortage problem endemic to socialist economies, as the Soviet experience in April 1991 has shown. In contrast, giving producers a right to their profits gives them an incentive to respond correctly to free prices as well as to many other signals that will come from free markets. Successful price reform, like most other reforms, boils down to allocating property rights to producers and therefore ultimately depends on privatization of profits.

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