

TAXES AND PRIVATIZATION

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Abstract. Why were state-owned firms so common in the past, even in Western countries, and why were many of them privatized during the past two decades? Some recent papers argue that through state ownership the government can avoid the distortions to managerial incentives created by the corporate income tax. When the corporate tax rate is high enough, state ownership may be less inefficient than private ownership. If this argument were right, then the capital intensity of state-owned firms should fall with privatization. However, the data show instead that firms lay off a sizable fraction of their work force when they are privatized, suggesting that state firms are unusually labor intensive. This paper proposes an explanation for these observations. It argues to begin with that the government can use cheap loans from state-owned banks rather than state ownership of firms more generally to maintain the capital stock at an efficient level, in spite of a high corporate tax rate. With state banks, therefore, there is no reason to expect that state-owned firms will be more capital intensive than equivalent privately owned firms. The paper then argues that many other distortions to a firm's incentives, e.g. the minimum wage and unemployment insurance programs, result in private firms employing too few workers, and particularly too few low-skilled workers. State-owned firms can then compensate for the resulting misallocations by hiring relatively more low-skilled workers than would an equivalent privately owned firm.

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Public ownership of firms and banks was a common phenomenon during the first few decades following World War II, not just under Communist governments but even in many developed market economies. Such ownership was rationalized in the academic literature by Lange (1938) and Lerner (1944), who argued that in *theory* a state-owned firm can replicate the allocation decisions of a privately-owned firm, and yet can avoid misallocations resulting from externalities or market failures. The strong economic performance of the most market-based economies, and of private relative to state-owned firms, during this period likely explains the shift in both political and academic views towards one favoring complete and immediate privatization of state-owned firms. The expectation now appears to be that privatization is always appropriate, and that productivity of firms should jump following privatization, once market forces more freely come into play, inducing firms to exploit rapidly any efficiency-enhancing reallocations.¹

Since the 1970's, Latin American and Western European countries, as well as Japan, have privatized many firms that had long been state-owned. More recently, one of the first priorities in many transition countries has been to privatize their existing state-owned firms quickly and fully. This occurred not just in what had been the GDR, where available market institutions in the rest of Germany provided an appropriate legal, tax, and regulatory environment for a market economy. It occurred as well in countries such as Russia and the Czech Republic, where these other institutional changes often occurred gradually following the initial privatizations. Again, the initial expectation seemed to be that productivity would jump quickly in these firms.

Outcomes, however, have been surprisingly mixed, raising questions about whether this immediate privatization in fact was well-advised. For example, the most successful transition countries, China and Poland, have been very slow in privatizing at least their larger state-owned firms. While privatized firms in Russia may have been successful at reducing their tax obligations and transferring wealth from outside investors to insiders in the firm, productivity gains within these firms have been limited, and investment in these firms has been stagnant.

One possible explanation for the poor initial performance among the newly privatized firms is that institutions that ensure effective corporate governance were initially weak, yet are an essential prerequisite for efficient operation of at least larger privately owned firms.²

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¹ See, for example, Havrylyshyn and McGettigan (1999).

² For example, Claessens, Djankov, and Pohl (1997) and Frydman et al (1998) both document that concentrated outside ownership is a key factor explaining the productivity gains of privatized firms. Yet voucher privatization is characterized, at least initially, by very diffuse outside ownership.

Without these institutions, managers can easily gain at the expense of outside shareholders as well as the government, by hiding profits e.g. by transferring funds to a private firm fully owned by the manager. In contrast, managers may have only weak incentives to undertake real investments in the firm in the hopes of future profits. The personal cost to them of foregoing current payouts in order to finance new investment is clear. Given that these individuals may no longer be in control in the future, they may not be able to reap directly the future profits from the new investment. In addition, given the poor information flows to the financial market, they may see little current capital gains in the price of their shares in the firm.

These arguments, however, would not be relevant for Western European, and presumably Latin American, countries, where the appropriate institutions ensuring effective corporate governance are long-standing. Even in well-developed market economies, however, recent papers have raised questions about whether private ownership always dominates state ownership.³ These papers accepted the premise that state-owned firms operate less efficiently than private firms *if* the private firms face efficient incentives. However, due to corporate tax distortions, private firms have an incentive to reduce their capital stock (and their *reported* taxable profits) whenever the resulting efficiency costs are more than offset by the implied tax savings. The overall excess burden of the resulting misallocations should roughly be proportional to the square of the tax rate the firm faces. In contrast, they argued, the efficiency costs from state ownership should not directly depend on the tax structure.⁴ If tax rates are high enough, then state-ownership can be less inefficient than private ownership, and conversely.

Based on this argument, we should expect to see state ownership primarily in countries where tax rates are high. Privatization should then occur in response to a fall in tax rates, around the date when the relative efficiency of state-owned and privately-owned firms are equal, in which case there may be no immediate efficiency consequence when a firm is privatized. In contrast, if privatizations occur following a sharp drop in tax rates, the resulting efficiency gain could be large. Conversely, if a firm is privatized when tax rates are still too high (as perhaps was the case in Russia), then efficiency can fall in response to a privatization. Since the excess burden from corporate tax distortions should be higher the more capital intensive the firm, whereas the inefficiencies from government ownership would not clearly be linked to the firm's capital intensity, these papers forecast that more labor-intensive firms should be privatized first, with the most capital-intensive firms privatized only when corporate tax rates have fallen yet further. In any case, a firm's capital/labor ratio should drop, output should fall, and after-tax profits should rise following privatization since the firm then maximizes after-tax rather than before-tax profits. Section 1 provides a summary of these past arguments.

Unfortunately, some of these forecasts seem to be counterfactual. For example, during the 1980's and 1990's as Chinese state-owned firms have faced increasingly strong market incentives, managers commonly complained about having excess workers (and particularly

³ See, for example, Gordon, Bai, and Li (1999) and Huizinga and Nielsen (forthcoming).

⁴ The compensation package of the manager is under the control of the government, and in principle can be designed to induce managers to focus on before-tax rather than after-tax profits.

excess low-skilled workers), rather than excess capital.⁵ Similarly, when privatizations occur, the key policy concern is commonly not a resulting drop in investment but rather a fear of large-scale layoffs.⁶ For example, the Treuhand often imposed constraints on those acquiring privatized firms to maintain employment for at least some time period.

The objective of this paper is to provide a possible explanation for why state-owned firms seem to be unusually labor-intensive, contrary to the forecasts in earlier papers. The argument has two parts. First, we will argue that cheap credit from state-owned banks is sufficient in itself to avoid the underinvestment otherwise caused by high corporate tax rates, even if nonbank firms remain privately owned.⁷ With bank subsidies for *marginal* investments, the corporate tax becomes a tax on *inframarginal* profits. If a state-owned bank were as effective at allocating funds across firms as privately-owned banks, then ownership of a state bank alone accomplishes the desired reallocation of resources while avoiding the costs incurred from state ownership of firms more broadly. Capital/labor ratios should then be comparable in private and any nonbank state-owned firms, contrary to the previous forecasts. This argument is developed in detail in section 2.

While the role of state banks can explain why state-owned firms are not *more* capital intensive than privately owned firms, it cannot explain why they are *less* capital intensive. The second part of the argument is that the corporate tax is by no means the only distortion resulting in inefficient (or inequitable) allocation decisions by private firms. As discussed in section 3, many of the other distortions result in too few workers, and particularly too few low-skilled workers, being hired. Examples are income taxes on labor income, the minimum wage, unemployment insurance programs, and unions. Cheap loans from a state-owned bank do nothing to offset these tax or regulatory distortions affecting the labor market. We examine below conditions under which state ownership of some firms can be used to address these labor market distortions. The resulting state-owned firms will be more labor-intensive (and more low-skilled intensive) than equivalent private firms, consistent with the available evidence.

1. Overview of the role of state ownership

Why are state-owned firms less efficient than privately-owned firms? The reasons can be many. As Kornai (1979) has emphasized, state-owned firms appear to face a soft-budget constraint, so that funds are not normally cut off if the firm pursues inefficient investments.⁸ Alternatively, the size of the government-owned sector may simply be too large to be efficient — as argued by Coase (1988), there is an optimal size for the firm, which in practice seems to be dramatically smaller than the size of the state-owned sector. In addition, state firms normally do not have publicly traded shares, making it much more difficult to tie the compensation of managers of state-owned firms to the value of the firm.

⁵ For a summary of this evidence, see for example Lee (1998).

⁶ Papers by Ramamurti (1997), LaPorta and López-de-Silanes (1997), D'Souza and Megginson (1998), and Dewenter and Malatesta (1998) all document sharp declines in employment following privatization.

⁷ While a state-owned bank will lose money by making such cheap loans, from the government's perspective these losses will be offset by the resulting increase in corporate tax revenue.

⁸ A recent theoretical rationale for the soft-budget constraint is found in Dewatripont and Maskin (1995).

The most obvious explanation, however, for the inefficiency of state-owned firms is that state-owned firms are vulnerable to political interference with respect to most any dimension of their operations. Private owners, in contrast, should care only about firm value, i.e. the discounted present value of firm profits. As argued by Boycko, Shleifer, and Vishny (1996), one key role of privatization is to make such political interference more difficult.

But using political interference to explain why state-owned firms are less efficient simply shifts the question to explaining why political interference will end up being used in ways that reduce efficiency. Possible explanations here are easy. As emphasized e.g. by Buchanan and Tullock (1962), political decisions at best respond to the preferences of the median voter. Except under unusually restrictive assumptions, the implied political preferences will not maximize efficiency or any other reasonable objective function.⁹ Once government bureaucrats have independent powers, opportunities for inefficient outcomes expand — campaign contributions and other forms of side payments can induce government officials to aid special interests at the expense of overall efficiency. Government officials would then favor state ownership as a way to gain access to such bribes. Even ignoring these political economy problems, governments appropriately have many objectives in addition to efficiency,¹⁰ implying willingness to accept some inefficiency if the resulting gains in other objectives are large enough.

In spite of these efficiency losses from state ownership, recent papers by Gordon, Bai, and Li (1999) and by Huizinga and Nielsen (forthcoming), explore conditions under which state ownership of firms can increase the sum of the utilities of residents, and even efficiency, if tax distortions are high enough. Rather than modeling these various sources of inefficiency from state ownership explicitly, they simply assume that state-owned firms operate less efficiently.¹¹ In particular, assume that a private firm chooses to produce output worth $f(K_p, L_p)$, using inputs of K_p units of capital and L_p workers. In contrast, a state-owned firm would produce output worth only¹² $g(K_g, L_g)$, choosing inputs of K_g and L_g , where $f(K, L) > g(K, L)$ for all K and L .

The social surplus from production can be measured by the value to consumers of the output minus the loss to suppliers of the factor inputs. Therefore the social surplus from a private firm equals $S_P \equiv f(K_p, L_p) - wL_p - rK_p$, whereas that of the public firm equals $S_g \equiv g(K_g, L_g) - wL_g - rK_g$. Here, w is the opportunity cost for workers while r is the opportunity cost of capital on the world market. Let K^* and L^* denote the inputs that maximize the surplus from a private firm, i.e. the inputs that would be chosen by a private firm operating in a competitive environment free of any distortions. For any choice of inputs

⁹ This was the key argument, for example, in Arrow (1951).

¹⁰ For further discussion, see Rees (1984).

¹¹ While many empirical studies do find that state-owned firms operate less efficiently, this finding is by no means universal. See, for example, Pestieau and Tulkens (1993), who find that the degree of competition in the industry rather than the form of ownership may be the key factor affecting efficiency. Since state-owned firms often are in industries where there is little competition, on average they are less efficient.

¹² Here, we generalize these past papers, where the output of public firms was assumed to equal $(1 - \alpha)F(K, L)$ for some value of α .

for the public firm, we know that $S_g(K_g, L_g) < S_p(K_g, L_g) \leq S_p(K^*, L^*)$. Let α measure the percent efficiency loss from public ownership, so that $\alpha = S_g(K_g, L_g)/S_p(K^*, L^*)$.

Due to tax distortions, however, a private firm would not choose K^* and L^* . Instead, the firm would choose input levels to maximize after-tax profits. If the firm faces a corporate income tax at rate τ , then the firm will choose inputs to maximize¹³

$$[f(K, L) - wL](1 - \tau) - rK.$$

If the firm takes all prices as given and $\tau = 0$, then the outcome should be efficient. If $\tau \neq 0$, then the equilibrium value of K is smaller than the efficient level. In particular, starting from the market equilibrium, the marginal efficiency gain from a dollar increase in K equals $\tau r/(1 - \tau)$. The average gain per dollar increase in K when moving from the market equilibrium to the efficient allocation is approximately $.5\tau r/(1 - \tau)$. The efficiency loss from the corporate tax is therefore $.5\tau r\Delta K/(1 - \tau)$, where ΔK measures the difference between the efficient K and the market chosen value of K . Note that

$$\Delta K \approx \frac{\partial K}{\partial p_K} \left(\frac{\tau r}{1 - \tau} \right),$$

where p_K is the cost of capital.¹⁴ Therefore, the efficiency loss from the corporate tax can be expressed as $.5\tau^2 r\epsilon K/(1 - \tau)$, where ϵ is the price elasticity of the demand for capital.

One key simplifying assumption made in these past papers, which we will continue to make, is that the behavior of state-owned firms is not affected by tax distortions. In particular, since the government controls the compensation package of the manager and workers in the firm, it can link compensation to before-tax rather than after-tax profits. In any case, taxes and dividends are functionally equivalent for a state-owned firm, so that all that matters is the sum, not the composition, of these payments, and dividends can adjust to offset any changes in tax rates.

Under these assumptions, the efficiency loss from state ownership is simply αS_p^* , regardless of the tax rate. State ownership then dominates on efficiency grounds if $\alpha S_p^* < .5\tau^2 r\epsilon K/(1 - \tau)$, or if $\tau > \sqrt{2\alpha(1 - \tau)S_p^*/\epsilon rK}$. Therefore a government can rationally favor state ownership on efficiency grounds, if for whatever reason it chooses a high enough corporate tax rate.¹⁵

Similarly, if the firm is not a price taker in some market, then again the chosen allocation under private ownership will be inefficient. Regulatory policies may reduce this inefficiency,

¹³ We implicitly assume here that the firm finances its capital with equity, and we ignore economic vs. tax depreciation.

¹⁴ Note that p_K equals $r/(1 - \tau)$ in the market equilibrium and r at the efficient allocation.

¹⁵ Of course, one can also “explain” the association of high tax rates with public ownership by arguing that political parties in favor of big governments favor both high tax rates and public ownership. The argument proposed in these papers eliminates the need for assuming a “taste” for public ownership, arguing that rational behavior in response to high tax rates is sufficient in itself to explain state ownership. In principle, data can be used to differentiate between the two hypotheses. The first argues that high tax rates of any sort should be associated with state ownership, while the latter argues that a high distortion to investment incentives (through a high corporate tax rate) leads to state ownership.

for example by imposing government controls over the output price but not over other choices of the firm. As emphasized in the regulatory literature, inefficiencies inevitably will remain, e.g. goldplating if the rate of return allowed exceeds that available elsewhere. Whether private ownership, perhaps subject to regulatory control, is more or less efficient than state ownership, ignoring taxes, depends on the size of the relevant parameters. Taxes, however, further lower the efficiency under private ownership, thereby tending to favor state ownership.

The starting point for this paper is the apparently counterfactual implications of the above stylized model. According to this model, state ownership should be more common when tax rates are high, which does seem consistent with the stylized facts. State ownership should also be more common in industries where monopoly power is an unavoidable problem, again very much consistent with the data. However, the theory forecasts that state-owned firms should be more capital intensive than equivalent privately-owned firms in the same industries. Their capital intensity should then drop following privatization.

These latter forecasts all seem inconsistent with the available evidence. To begin with, managers of state-owned firms complain about having “too many” workers, rather than too much capital. In addition, the commonly cited form of political interference in the operations of state-owned firms is pressure to hire more workers, rather than pressure to invest more. Furthermore, when a state-owned firm is privatized, the fear is layoffs of workers more than disinvestment.

In the next section, we explore how state ownership of the banking system alone may be sufficient to avoid tax distortions to the amount of capital investment, even when other firms are privately owned. This seems a plausible explanation for why state ownership and control of banks has been so common.

2. Role of State Ownership of Banks

Before we can sensibly explore the role of state ownership of banks, we need to begin by providing a rationale for the existing tax distortions. In particular, if the assumed tax system does not maximize the government’s objective, then any of a variety of policies might provide a third-best means of pushing the incentives faced by private agents towards those consistent with the optimal tax system, including policies affecting bank lending. We therefore begin by constructing a base case in which the tax system is second-best optimal, and then explore whether other nontax policies may improve the resulting allocation.

In the previous models, the corporate tax played a key role. There are various reasons for use of a corporate income tax in the overall tax system. One role, emphasized in Musgrave (1959) and explored empirically recently by Gordon and Slemrod (forthcoming), is to prevent income shifting from the personal to the corporate tax base, undertaken to avoid personal taxes on labor income. Whenever the corporate tax rate is below an individual’s personal tax rate, the individual can save on taxes by receiving compensation in a form that is taxed as corporate rather than personal income. For employees in large firms in the U.S., the main approach that is available to reclassify personal as corporate income for tax purposes is qualified stock options, use of which is tightly limited by law. For a closely held firm, however, where owners are also workers in the firm, simply retaining income rather than paying wages is sufficient, and here there are no legal restrictions. The

best way to prevent this income shifting is to impose a corporate tax rate equal to the maximum personal tax rate. This is exactly the policy, and rationale, seen in Bradford (1989) in his proposed X-tax and in McLure (1991) in his proposed SAT. If conversions between corporate and noncorporate status involve no real costs, then this tax policy ensures that firm owners pay tax at the same rate as they owe on their other personal income.

A second rationale for the corporate tax, also emphasized in Musgrave (1959), is as a needed supplement to existing personal income taxes on income from equity. While interest income is taxed in full under the personal income tax, income from equity largely takes the form of capital gains, which face a lower effective tax rate due to deferral of the tax until realization, due to a lower statutory tax rate if the stock is held until the gains are “long-term,” and due to the possible write-up of basis at death. One possible aim of the corporate tax is to provide enough of a supplementary tax on income from equity that the effective tax rates on income from equity and debt are equalized.

Unless the tax rates on income from equity and debt are equalized, then the tax system will distort a firm’s financial policy.¹⁶ In particular, if the net-of-corporate tax interest rate paid on corporate debt is below the net-of-tax interest rate that shareholders can earn if they buy these corporate bonds, then there are arbitrage gains when the firm borrows from these investors. Firms will then use debt finance until the offsetting real costs, at the margin, arising plausibly from the resulting higher risks of bankruptcy, are large enough to offset the tax savings from further debt finance.

The key complication is that the corporate tax rate that avoids distorting corporate debt decisions is very different than the rate that avoids any shifting of labor income. As show for example in Gordon and Bradford (1980), the effective personal tax rate on interest income that is embodied in equity prices in theory should equal a weighted average of the personal tax rates faced by all investors, with the weight on each individual’s tax rate equal to the value of that person’s financial assets divided by a measure of his risk aversion.¹⁷ This weighted average tax rate is necessarily below the maximum personal tax rate. Yet if the corporate rate is below the maximum personal tax rate, then all individuals in higher personal tax brackets will gain from income shifting. In short, because of the progressive nature of the personal tax, the corporate tax rate cannot be chosen to simultaneously accomplish both objectives. For simplicity of notation, assume that the pressures from income shifting dominate.¹⁸ The chosen corporate tax rate, τ , should then equal the maximum personal tax rate, t_M .¹⁹ In contrast, the weighted average personal tax rate on

¹⁶ Similarly, any differences between personal and corporate tax rates can lead firms to shift between corporate and noncorporate status. Here, the key rate is not the effective personal tax rate on interest income embodied in market prices, but the personal tax rates of the shareholders of the smaller firms that can most easily change status. The same general issues arise, however.

¹⁷ Under certain assumptions this weighted average tax rate will equal the implicit tax rate that reconciles the interest rates on taxable and tax-exempt bonds. In U.S. date, this implicit tax rate has been far below the statutory corporate tax rate.

¹⁸ The evidence in Gordon and Slemrod (forthcoming), for example, shows that the amount of income shifting is large and very responsive to tax differentials. In contrast, Gordon and Lee (forthcoming) find only very limited effects of taxes on corporate financial decisions.

¹⁹ For simplicity of notation, we ignore any personal taxes on equity income.

interest income is denoted by t .

Given these assumptions, firms choose the size of K , L , and the amount of debt finance D to maximize the net income of equity holders:

$$[f(K, L) - wL - rD - c(D/K)K](1 - t_M) - r(K - D)(1 - t). \quad (1)$$

Here, $c(D/K)$ measures expected bankruptcy and other agency costs per dollar of capital, as a function of the debt to capital ratio.²⁰ For simplicity, assume that $c(0) = c'(0) = 0$, $c' > 0$, and $c'' > 0$.²¹ We assume in addition that $c'(1)$ is sufficiently large that a firm would never be 100% debt financed.

The implied first-order condition for K equals²²

$$f_K = r + c - \gamma c' + r \frac{t_M - t}{1 - t_M}, \quad (2)$$

where $\gamma \equiv D/K$, while the first-order condition for D is

$$c' = r \frac{t_M - t}{1 - t_M}. \quad (3)$$

Note, conditional on the firm's choice for γ , that the efficiency-maximizing level of K would be such that $f_K = r + c$. Equation (2) therefore implies underinvestment in the competitive equilibrium due to the tax distortions. The more progressive is the personal tax structure, and the higher are tax rates more generally, the larger are the efficiency costs from these combined tax distortions, arising both from the underinvestment in capital and from the agency costs c .

To begin with, how could state ownership of firms be used to lessen these combined efficiency costs (though at the expense perhaps of generating other efficiency losses)? If the government owns the firm and induces the manager to maximize pretax profits, providing government funds for new investment at an accounting price of r , then the manager should invest until $f_K = r$ and choose D so that $c' = 0$. With privately owned banks, but state-ownership of firms, this outcome arises only with no use of debt finance, and with all investment financed instead either by retained earnings or by budgetary transfers from the government. The question is then whether the resulting efficiency gains are enough to offset the lower assumed rate of return earned by these firms, due to other implications of state ownership.

²⁰ Many of these costs are borne by the lender, and then are passed along to the borrower through a higher interest rate.

²¹ Jensen and Meckling (1976), in contrast, describe reasons why a firm may use some debt finance, even ignoring tax incentives, in order to minimize agency costs.

²² In contrast, if the corporate tax rate could be set ignoring income-shifting pressures, then it would be set equal to t and these first-order conditions would imply $f_K = r$ and $c' = 0$, since a uniform tax avoids any portfolio distortions. Note, however, that the model ignores any effects of taxes on savings, by implicitly assuming that savings are inelastic.

What if the banks are state owned but the firms are privately owned? To what degree can state banks induce firms to choose the efficient level of capital, and to avoid the bankruptcy costs c ? If the bank simply considers fully financing an extra dollar of capital, there is no net gain for either the firm or the government: the firm faces no tax distortion at the margin when it uses debt to finance extra capital, since all resulting costs are tax deductible.²³ In particular, the resulting change in pretax firm profits would equal $f_K - r - c - (1 - \gamma)c'$. Using equations (2) and (3), it immediately follows that this expression equals zero, implying no change either in after-tax profits for the firm or in tax revenues.

To provide any efficiency gain through lending from a state-owned bank, the bank would need to reduce the bankruptcy costs, $c + (1 - \gamma)c'$, incurred on extra debt-financed investment. What if the state-owned bank entirely ignores enforcement efforts on its own loans to the firm, so that (to take the extreme case) loan repayments are zero, and any associated bankruptcy costs are also zero?²⁴ What happens to overall bankruptcy costs, including those arising from loans from private banks? Can the state bank successfully push K to the efficient level? In short, will a state-owned bank choose to make loans to a private firm, knowing that the loans will not be repaid?

Assume that the government is indifferent between firms having an extra dollar in profits and the government receiving an extra μ dollars in tax revenue. Presumably, government revenue is valued more highly than firm profits, e.g. $\mu < 1$, both due to the marginal costs to the government of raising revenue through other taxes and also due to the equity gains from transferring revenue from shareholders through the government to the population more broadly.

Starting from the competitive allocation described by equations (2) and (3), what happens if a state bank lends a dollar to the firm? If the government gains from this change, then there is a potential role for a state bank.

If the firm can continue to choose the amount of equity finance and debt finance freely, so that equations (2) and (3) continue to be satisfied, then the real allocation decisions of the firm cannot change. The only consequence of the loan from the state bank is that the funds will be transferred directly to shareholders. For the loan to have any real effect on the level of investment, the government must impose some constraint preventing the transfer of the funds to shareholders. In particular, assume that the total payouts to equity holders, whether through dividend payments or equity repurchases, can at most equal the after-tax profits of the firm. Such constraints are in fact common covenants in private loan contracts, so that this assumption should be a reasonable one.

With this restriction, equation (2) will no longer be satisfied. Instead, the amount of capital contributed by equity-holders will be held fixed at its initial level, due to the binding constraint limiting payouts.²⁵ Since the extra funds cannot be paid out to equity

²³ If some costs were not fully deductible, e.g. depreciation allowances were less generous than economic depreciation, then the bank could undo these distortions through charging a lower interest rate. But the government could also undo these distortions through shifting to economic depreciation for tax purposes.

²⁴ We continue to assume, however, that the corporate tax is enforced.

²⁵ The reduced rate of return earned by shareholders as a result of the extra investment represents an implicit tax on these inframarginal holdings of the firm's capital stock.

holders, they must either be invested or used to retire private loans.²⁶ Assume that private bank loans, denoted by D , remain unrestricted.

The question is then how much of any funds from the state bank will be used to add to the capital stock. The net profits of the firm now equal $[f - wL - rD - (D + E)c(D/(D + E))](1 - t_M)$, where E is the market value of the equity in the firm. Note that the previous identity that $K = D + E$ no longer holds: due to the binding constraint limiting payouts, the market value of equity understates the replacement cost of the capital whose return goes to equity holders. I assume that the agency costs from debt finance then depend on the debt to value ratio as perceived by the firm's private owners, multiplied by the value of assets they jointly have at stake.

To judge whether there is *any* role for a state bank, consider the net welfare change when the state bank lends an extra dollar to the firm for new investment starting from the competitive equilibrium. Given that the government values a dollar of firm profits and μ dollars of tax revenue equally, the objective of the government is to maximize

$$W = (t_M + \mu(1 - t_M))[f - wL - rD - (D + E)c] - rK. \quad (4)$$

Due to the new loan, net profits of the firm go up by²⁷ $[f_K - (c - c'\gamma)(\partial E/\partial K)](1 - t_M)$. In contrast, the resulting change in tax revenue, minus the lost income of the state bank, equals $t_M[f_K - (c - c'\gamma)(\partial E/\partial K)] - r$. As a result, the weighted sum of the net gains to both the firm and the government equal

$$\frac{\partial W}{\partial K} = [\mu(1 - t_M) + t_M] \left(f_K - (c - c'\gamma) \frac{\partial E}{\partial K} \right) - r. \quad (4')$$

At the competitive equilibrium, equity holders would invest until the market value of the returns to extra investment just equals the cost of the investment, so that $\partial E/\partial K = 1$. With only a marginal change from this competitive equilibrium, we still have $\partial E/\partial K = 1$. Therefore, given equations (2) and (3), equation (4') also equals

$$\frac{\partial W}{\partial K} = \mu r(1 - t) - r \left[\frac{1 - t_M(2 - t)}{1 - t_M} \right]. \quad (5)$$

Under what conditions is this expression positive? If the term in brackets is negative, then the expression is certainly positive, since government revenue goes up even though the loan is never repaid. This occurs if $t_M > 1/(2 - t)$. For example, if $t = .25$, then tax revenue goes up if $t_M > .57$. In general, the expression is positive as long as

$$\mu > 1 - \frac{t_M - t}{(1 - t_M)(1 - t)}. \quad (6)$$

For example, if $t_M = .5$ and $t = .25$, then the expression is positive if $\mu > .33$, so that the government values a dollar of profits at least at a third the value of a dollar in tax revenue.

²⁶ In fact, we will find that new loans from the state bank, by increasing the collateral available to private banks, induce some additional lending as well from these private banks.

²⁷ Note that resulting changes in L or D have no first-order effect, due to the envelope condition.

If some lending is worthwhile, then lending should continue until the expression in equation (4') equals zero, or until

$$f_K = \frac{r}{A} + (c - \gamma c') \frac{\partial E}{\partial K}, \quad (7)$$

where $A \equiv \mu + (1 - \mu)t_M$ measures the social value of a dollar of extra profits to the firm.

To calculate $\partial E/\partial K$, we know that

$$E = \frac{[f - wL - rD - (D + E)c](1 - t_M)}{r(1 - t)}.$$

Differentiating with respect to K and making use of equation (7), we find that

$$\frac{\partial E}{\partial K} = \frac{1 - t_M}{A(1 - t)}. \quad (8)$$

By equation (6), we infer that $\partial E/\partial K < 1$ as long as any state loans are worthwhile. Intuitively, the government induces the firm to expand its capital stock, pushing the return per unit of capital below the point sufficient to compensate equity holders for additional new equity-financed investments.

Given equation (8), we find that the capital stock implied by equation (7) is larger than it would be without a state bank. In particular, given equations (2), (7), and (8), we find that $f_K^s/f_K = \partial E/\partial K < 1$, where f_K^s is the value implied by equation (7) with state loans and where f_K is the value in equation (2) without state loans. The optimal capital stock can even be larger than the efficient level, where $f_K = r$,²⁸ since extra government-financed capital reduces bankruptcy costs.

In addition, equation (8) implies that $\partial E/\partial K$ is a declining function of t_M , so that f_K^s/f_K is also a declining function of t_M . Therefore, if the effective corporate tax rate varies by firm, then state banks should focus their lending on firms that face higher effective corporate tax rates, so presumably on larger firms.

Note that in this equilibrium the state bank necessarily loses money. In fact, under our admittedly extreme assumptions, there are no loan repayments at all. In addition, there will be no new equity finance for any firm receiving loans from the state bank — the marginal return on new investment will be below the shareholders' opportunity cost of funds, i.e. $\partial E/\partial K < 1$.

What happens to private lending in the process? Private lending to the firm continues until $\partial E/\partial D = -1$, implying that equation (3) is still satisfied. With unchanging tax rates, γ remains unchanged as well. Therefore, $\partial D/\partial K = \gamma/(1 - \gamma)\partial E/\partial K > 0$. Rather than extra loans from the state bank being used to retire private loans, we find instead

²⁸ This certainly occurs if $\mu = 1$. To see this, note that $c - \gamma c' < 0$ due to the convexity of the function c .

that the resulting capital investment provides more collateral for private loans, leading to increased private lending as well.²⁹

Unless state ownership per se reduces the efficiency of operation of a bank, therefore, there are strong reasons to expect to see lending from state-owned banks in equilibrium. Inevitably, however, state banks will not be able to allocate funds as effectively as was assumed in this model. When firms can receive loans without any need for repayment, all firms will want as many loans as they can get. The bank no longer receives any credible information from firms, based on their willingness to take on extra debt. The bank, therefore, rather than the firms must decide what level of capital stock is appropriate for each firm. The bank of course has poorer information than the firm has, resulting in a worse allocation of available funds across firms. The cost of these misallocations can potentially be very high.

If private investors *must* contribute a large enough fraction of the costs of new investment, however, then the government can potentially rely on their willingness to invest to guide and constrain the lending undertaken by the state bank. Assume, for example, that a firm is required to finance some fraction γ^* of any new investments I , in order to qualify for a state loan for the remaining fraction of the investment cost, $(1 - \gamma^*)I$. If the firm is allowed to choose I freely, then the state bank no longer needs to be relied on to make these allocation decisions. What value of γ^* maximizes the government's objective, and how does this equilibrium compare with the previous one?

With this requirement, the firm will choose I to maximize $[f - wL - rD - (D + E_0 + \gamma^*I)c](1 - t_M) - r(E_0 + \gamma^*I)(1 - t)$, where E_0 is the market value of shares in the initial capital stock, K_0 . In equilibrium, the firm will continue to request further funds until $\partial E_0/\partial D = \partial E_0/\partial I = 0$. The optimal value for D still satisfies equation (3), so that γ is unaffected by the choice of γ^* . In contrast, the optimal value for I satisfies

$$f_K = \gamma^* \left[r + c + (1 - \gamma)r \frac{t_M - t}{1 - t_M} \right]. \quad (9)$$

Comparing equations (3) and (9), we immediately conclude that the capital stock will be larger than in the competitive equilibrium when the firm receives loans from the state bank for any $\gamma^* < 1$.

The government in contrast hopes to maximize

$$W^a \equiv [t_M + \mu(1 - t_M)][f - wL - rD - (D + E_0 + \gamma^*I)c] - \mu r(E_0 + \gamma^*I) - (1 - \gamma^*)rI. \quad (10)$$

Its desired level of γ^* then satisfies³⁰

$$\frac{\partial W^a}{\partial I} = \frac{AIc - rI(1 - \mu)}{\partial I/\partial \gamma^*}. \quad (11)$$

²⁹ In this equilibrium, loans from private banks continue. Any equilibrium with loans from both state banks and private banks has to be described carefully, however, since the firm would clearly prefer a loan it does not have to repay to one that it does need to repay. The approach above implicitly assumes that the state bank is a Stackelberg leader, and chooses first how much to lend to the firm. Given the size of this loan, the firm then chooses how much to borrow in addition from private banks so as to satisfy equation (3). The key requirement in this equilibrium is that the amount of private loans not affect the amount of loans from the state bank.

³⁰ Here, we calculate $\partial W^a/\partial \gamma^*$, recognizing that I is a function of γ^* , set the derivative equal to zero, and solve for $\partial W^a/\partial I$.

In order to make sense of this equation, note that the optimum would require $\partial W^a / \partial I = 0$ if there were no tax distortions and the government cared only about economic efficiency. Equation (11) captures two reasons why the government would want to deviate from this allocation. First, on distributional grounds it would want to increase γ^* further, to the extent that $\mu < 1$, since it gains from shifting more of the cost of new investment onto private investors. In addition, however, the government would gain from reducing γ^* to the extent that $c > 0$, since more government financing means lower bankruptcy costs.

If we compare government welfare here with the level of welfare that arose without the financing constraints, we find that welfare is necessarily higher. In particular, if γ^* is set equal to the level of γ chosen under the policies that optimize equation (4), then firms would demand unlimited amounts of credit — credit is effectively free to the firm, since the constraint on γ is nonbinding, yet equity holders get to keep some of the return from the resulting investment. The desired value of new investment I , is clearly a declining function of the fraction γ^* that the firm must self-finance. Therefore, to induce firms to choose the same level of K as the government would choose without financing constraints, the resulting value of γ^* is necessarily greater than the equilibrium γ in the previous allocation. Therefore, with the financing constraint, the same capital stock is feasible, but the government no longer needs to finance as much of it. Since $\mu < 1$, welfare is necessarily higher. In general, the optimal capital stock will change, so that the government can do yet better.

In theory, a subsidy through cheap state loans is equivalent to a subsidy through allowing the expensing of new investment under the corporate tax. With expensing, there is no distortion to marginal investment decisions even though the tax continues to collect revenue from existing capital.³¹ With a state bank, rather than saving the firm t_M in taxes through making each dollar of new investment immediately deductible, the government instead can provide a loan of t_M (that need not be repaid) to help finance the investment.³²

If t_M were the same for all firms, allowing expensing should be a far easier way to correct marginal investment incentives than setting up a state bank. However, the *effective* tax rate on new investment inevitably varies substantially across firms, depending on varying statutory provisions (e.g. statutory vs. economic depreciation), on differences in the real costs of using debt rather than equity finance, and also on the differing ease of tax evasion for different types of firms. Under expensing, all firms would save the same amount t_M in taxes, since they would be happy to report investment expenses in full. Yet, the size of subsidy needed to just offset in present value the taxes on the future return to the marginal investment will inevitably vary substantially across firms, due to variation across firms in their *effective* tax rates. The effective tax rates each firm faces would not be observable

³¹ Auerbach and Kotlikoff (1987) document the size of the potential gains from this policy shift, arising from what amounts to a windfall tax on existing capital. Both the shift to expensing and to lending from state banks are examples of time inconsistency in optimal tax structure, since in both cases the government takes past equity investments as given when determining current policies, yet past equity investments will be affected by investors' anticipations of future government policies.

³² Given distributional considerations as well as the distortions to debt decisions, the optimal policy as seen above is a bit more complicated, whether it is implemented through expensing or through state loans.

at the time that the statutory provisions are set. Therefore, the tax law will inevitably generate a misallocation of capital across firms.

State banks, in contrast, should have the ability to learn *something* about these effective tax rates when evaluating each loan application. State banks would then have the discretion to vary the required γ^* depending on their perception of the firm's effective tax rate. For example, effective tax rates are likely to be higher for large manufacturing firms, where auditing is easy. If so, then state loans should go more heavily to these firms. Conversely, if smaller firms pay little in taxes, then state banks would provide these firms little or no credit.³³

Whether a state bank is a preferable means of increasing capital investment than allowing expensing of (some fraction of) new investment then depends on whether the potential gain under a state bank from being able to direct funds more heavily towards firms facing a higher effective tax rate is greater than the loss from the lower operating efficiency of the bank itself (due for example to overstaffing and weaker internal financial incentives). The potential advantage of a state bank is larger the more that effective tax rates vary by firm. The higher are tax rates generally, the more room there is for such variation in effective tax rates by firm.

As tax rates increase, however, efficiency costs still rise with a state bank, since the bankruptcy costs c become larger, the costs of tax evasion become larger, and the misallocation of funds (due to the bank's lack of *full* knowledge of how effective tax rates vary by firm, or its lack of incentive to allocate funds based on this knowledge) becomes more costly. How then do these efficiency losses from use of a state bank compare with those arising from state ownership of the underlying firms? We have assumed that the government can induce managers of state-owned firms to choose the efficient level of K without use of debt finance, and the resulting costs c . Following the prior papers, we have assumed that state ownership of firms leads to some efficiency loss, αS_p^* , regardless of the tax rate t_M . If the loss with state-owned banks increases in t_M , then there can be three regimes: one at low values of t_M with no state ownership, a second at intermediate values of t_M with state-owned banks but no state-owned firms, and a third one at high values of t_M with a shift to state ownership of (some) nonfinancial firms.

The model therefore forecasts that following a drop in tax rates countries will first privatize nonfinancial firms, but only following further cuts in tax rates will they fully privatize the banking sector. Given the recent sharp drop in tax rates in Germany, for example, it would be natural to expect to see their state-owned banks privatized shortly.³⁴

3. Labor Market Distortions and State Ownership

In the previous section, we argued that state-owned banks can be used to lessen the efficiency losses from corporate tax distortions, even while maintaining private ownership

³³ If private funds come from the world market and smaller firms face a positive effective tax rate, then some state loans would still be desired in order to lessen the degree of underinvestment in these firms. However, if funds are drawn from other domestic investments (e.g. in large manufacturing firms), then loans may not be attractive.

³⁴ For a recent call for such a privatization, see Sinn(1999).

of nonbank firms. If so, then state ownership of nonbank firms is not needed to deal with corporate tax distortions. Also, any state-owned firms that do exist, e.g. natural monopolies, would not have a systematically higher capital/labor ratio than equivalent private firms.³⁵

While the role of state banks can therefore explain why state-owned firms are not systematically more capital intensive than private firms, they cannot necessarily explain why they appear to be more labor intensive. The corporate tax, however, is only one of many distortions affecting the allocation of resources under private ownership. The objective of this section is to describe a variety of other reasons why, from the government's perspective, private firms employ too few workers, and particularly too few low-skilled workers, on both efficiency and equity grounds. Cheap loans from a state-owned bank cannot induce firms to hire more low-skilled workers. Instead, state ownership of some firms can be used. If this is the explanation for state ownership, then these state-owned firms should be labor intensive relative to private firms, should tend to attract low-skilled workers relative to private firms in the same industry, and should tend to lose money, e.g. by paying wages above the marginal productivity of their workers. All of these forecasts seem consistent with the behavior of state firms.³⁶

Redistribution through changes in relative wage rates

A recent paper by Naito (1999) argues implicitly that state ownership of firms may be an effective supplement to existing income taxes in order to redistribute from skilled to unskilled workers. The key consideration in his model is that the relative wage rates of different types of workers depend on their relative supplies. By reducing the supply of low-skilled workers to the private sector, through hiring more of them into the state sector, the government can raise their relative wage rate. Starting from an allocation satisfying production efficiency, a marginal change in this direction has no first-order efficiency costs. Yet, it results in a first-order change in relative wages. Accomplishing the same additional redistribution through the tax system will have clear efficiency costs.

If the public firm competes with private firms in the output market, yet has the same technology, then it will end up running a loss due to its deviating from the cost-minimizing input proportions chosen by private firms. The government is willing to absorb this loss because of the redistributive benefits. Note that these benefits go to all low-skilled workers, and not just to those hired by state-owned firms. This redistribution is accomplished most easily through government ownership of firms in which the marginal product of low-skilled workers drops least as their input share expands.

³⁵ As noted above, under the optimal lending from state banks, the equilibrium capital stock for private firms may even be larger than that for state-owned firms, where the efficient allocation with $f_K = r$ would be chosen.

³⁶ See Li(1997), for example, for detailed evidence on Chinese state-owned firms.

Minimum wage

A similar argument can be made regarding the implications of the minimum wage. One way to rationalize the minimum wage is to view it as an alternative way for the government to reduce the supply of low-skilled workers to the private sector, in order to raise their wage rate. Rather than restricting supply directly, the minimum wage instead raises the price. The equilibrium, however, does not depend on whether quantity or price controls are used.

The costs and benefits of the restricted supply are not shared equally among the low-skilled, however. When the price of low-skilled workers is artificially raised through the minimum wage, some low-skilled get jobs at the minimum wage while others do not find employment. State-owned firms can then provide employment for some low-skilled workers, reducing the number who end up without jobs due to the minimum wage.³⁷ Presumably, the public firm also must pay the minimum wage. By hiring a larger fraction of low-skilled workers at the minimum wage than would a private firm, the public firm again will earn a lower rate of profit. On efficiency grounds, it should choose to hire further workers as long as their marginal productivity is above the value they place on their leisure, even if both are much below the minimum wage. While the firm will therefore have a low accounting profit rate, there can be important efficiency as well as distributional gains from hiring these low-skilled workers.

Redistribution based on income vs. wage rate

Another potential consideration when a firm is publicly owned is that it may acquire information about the hourly wage rate of its workers, and not just their overall labor income. With the income tax alone, in contrast, the government can reliably learn only the total amount paid from a firm to each worker.³⁸

With this extra information, the government can redistribute to these workers more cheaply than it could knowing just their overall labor income. For example, it can offer workers a contract providing them the same utility they receive in a job in a private firm, but in which they face undistorted incentives at the margin. As a result, redistribution towards the low skilled will be cheaper than when done outside state-owned firms. The state-owned firms would then expand given this added benefit of public employment.

By this story, however, state-owned firms will plausibly be *more* skill intensive than private firms. By observing an individual's wage rate, the government can avoid the efficiency costs of distorting their labor supply decisions. These efficiency costs are proportionately larger for more skilled workers.

³⁷ If all such workers were hired, the outcome would be the same as in Naito's framework.

³⁸ If the government tried to elicit information from a firm on hours worked for each worker, the firm would lose nothing directly by reporting a high figure, while its workers would gain if the government then treats them as being lower skilled in its tax/transfer program. As a result, any information is not likely to be credible.

Distortions in unemployment insurance programs

Unemployment insurance can serve an important efficiency-enhancing function, providing insurance to workers against an unexpected fall in income as a result of a layoff, and also providing immediate liquidity.³⁹ The problem, as emphasized for example by Feldstein (1974), is that unemployment insurance distorts both the incentives faced by firms, when making hiring and layoff decisions, and also the incentives faced by unemployed individuals when deciding whether to accept a new job offer.

One important issue is whether the tax payments made by firms or workers to finance the program are experience rated. If tax rates adjust so that the firm in the end has to finance any unemployment benefits paid to its laid-off workers, then there is no net transfer to the firm and its workers together because of the program. The program simply allows the firm to precommit credibly to provide unemployment benefits to its former workers, making it easier to hire these workers initially.⁴⁰ Experience-rating, however, requires that the government maintain complete records over time of the present value of benefits paid to past employees of the firm as well as the present value of the firm's past tax payments.⁴¹ While some U.S. states come close to providing full experience rating in their UI programs, most programs elsewhere are not experience rated.

If the financing of the program is not experience rated, then there is a net transfer to the firm and its workers when a worker is laid off, and a net fall in this transfer when an unemployed individual is hired. Due to this price distortion, firms will lay off too many workers and hire too few workers, since they ignore the implications of their decisions for the net costs faced by the unemployment insurance program. For example, if a worker's marginal product is w , the dollar equivalent loss in utility from foregone leisure is v , and the size of UI benefits is b , then a firm would in equilibrium gain by recalling a worker only when $w > v + b$. On efficiency grounds, however, the worker should be recalled whenever $w > v$.

In practice, due perhaps to distributional concerns, unemployment benefits tend to be a higher fraction of the normal wage for less skilled workers. As a result, these distortions to hiring and firing decisions will be worse for less skilled workers.

Under what conditions would there be a social gain from hiring unemployed workers in a state-owned firm, where the marginal productivity is m_p and the wage is w_p , rather than simply providing these workers unemployment insurance benefits? Holding the utility of the worker constant, the worker would need to be paid $w_p = v + b$. However, having the worker employed rather than unemployed results in an efficiency gain of $m_p - v$. These efficiency gains are present even if $m_p < w_p$, so that the state-owned firm loses money on these workers. By optimizing over w_p , welfare could be improved further.

³⁹ Individuals would have difficulty borrowing privately against (hoped for) future earnings, given their ability to declare bankruptcy before these future earnings materialize. See Bailey (1978) and Gruber (1997) for further discussion.

⁴⁰ The better designed the program, the more attractive a worker will find the proposed compensation package, for any given ex ante cost to the firm.

⁴¹ True experience rating also requires that any net benefits a firm received from the program be a liability owed in the event of closure.

Unions

Whether unemployment resulting from union-negotiated increases in wage rates provides a grounds for public employment is a trickier issue. On one level, the role of unions is closely analogous to the role described above for the minimum wage. One key difference is that union members tend to be relatively skilled, rather than low-skilled. Since, unions represent the interests of only a part of the labor force, their actions can harm nonmembers (including less skilled workers) by making it harder for them to obtain jobs.

The key difference between unions and the minimum wage, however, is that the government controls both the minimum wage and the amount of public employment, but it does not control the union-negotiated wage. By making it less costly for a union member to be out of work, the availability of extra public sector jobs will induce the union to try to cut the supply of skilled workers further. When this induced increase in the union wage rate is taken into account, as well as any efficiency/equity gains from employing laid-off union members, the net welfare gain from the public sector jobs may or may not still look attractive.

4. Summary

Why have state-owned firms, and state-owned banks, existed in the past? Why were many of these firms privatized during the last decade or two? One possible answer is that state-owned firms were never in the public interest, but the realization of this became apparent to the general public only during the past two decades. Government officials can find it in their personal interests to control firms, as a source of economic rents. Until the last two decades, officials may not have faced enough pressure from voters to prevent this rent-seeking.

The objective of this paper is to provide an alternative and more benign explanation for the past state ownership, and one consistent as well with the more recent privatizations. This paper builds on prior work by Gordon, Bai, and Li (1999) and Huizinga and Nielsen (forthcoming). These papers argued that state ownership may be a way to avoid the efficiency losses from underinvestment caused by high corporate tax rates, at the expense of offsetting efficiency costs from public ownership per se (due for example to weaker internal incentives).

The arguments in these previous papers cannot explain why state-owned banks are so common, since banks typically face relatively low effective tax rates. These papers also suggest that state-owned firms will be unusually capital-intensive, yet the stylized evidence is that they are unusually labor-intensive.

This paper focuses first on the role of state banks. By providing cheap credit, these banks can induce firms to increase their capital stock, and in the process lessen the efficiency losses from the corporate income tax. While the banks may lose money from the cheap loans, this loss to the government can be more than offset by the resulting increase in corporate tax revenue on the profits from the new investments. While state banks may be less competitive than private banks, the gain from this improved allocation may be sufficient to offset any operating inefficiencies.

Given the presence of state banks, therefore, (nonbank) state firms need not be more capital intensive than equivalent firms in the private sector. However, this does not ex-

plain why state-owned firms tend to be labor intensive. Various possible explanations are examined. For one, by having state-owned firms hire unskilled workers, the government can drive up the equilibrium wage rate for the unskilled. Similarly, state-owned firms can beneficially hire workers who are unemployed due to the distortions created by the minimum wage, unemployment insurance programs, or unions. Finally, by observing each worker's wage rate as well as their overall labor income, a state-owned firm may be able to redistribute from skilled to unskilled more efficiently than can be done through the income tax system.

REFERENCES

- Arrow, Kenneth. 1951. *Social Choice and Individual Values*, New York: Wiley.
- Auerbach, Alan and Laurence Kotlikoff. 1987. *Dynamic Fiscal Policy*. Cambridge: Cambridge University Press.
- Bailey, Martin. 1978. "Some Aspects of Optimal Unemployment Insurance," *Journal of Public Economics*, pp. 279-402.
- Boycko, Maxim, Andrei Shleifer, and Robert W. Vishny. 1996. "A Theory of Privatization," *Economic Journal* 106, pp. 309-19.
- Bradford, David F. 1989. "An Uncluttered Income Tax: The Next Reform Agenda?" In *A Supply-Side Agenda for Germany*, ed. by Gerhard Fels and George M. von Furstenberg. New York: Springer.
- Buchanan, James and Gordon Tullock. 1962. *The Calculus of Consent*, Ann Arbor: University of Michigan Press.
- Claessens, Stijn, Simeon Djankov and Pohl. 1997. "Ownership and Corporate Governance: Evidence from the Czech Republic," World Bank Policy Research Paper No. 1737.
- Coase, Ronald. 1988. *The Firm, the Market, and the Law*, Chicago, University of Chicago Press.
- Dewatripont, Mathias and Eric S. Maskin. 1995. "Credit and Efficiency in Centralized and Decentralized Economics." *Review of Economic Studies* 62, pp. 541-55.
- Dewenter, Kathryn and Paul H. Malatesta. 1998. "State-Owned and Privately-Owned Firms: An Empirical Analysis of Profitability, Leverage, and Labor Intensity," University of Washington Working Paper.
- D'Souza, Juliet and William L. Megginson. 1998. "The Financial and Operating Performance of Newly Privatized Firms in the 1990's," University of Oklahoma Working Paper.
- Feldstein, Martin S. 1974. "Unemployment Compensation: Adverse Incentives and Distributional Anomalies," *National Tax Journal* 27, pp. 231-44.
- Frydman, Roman, Cheryl W. Gray, Marek Hessel, and Andrzej Rapaczynski. 1998. "When Does Privatization Work? The Impact of Private Ownership on Corporate Governance in Transition Economies," C.V. Starr Center Working Paper.
- Gordon, Roger H., Chong-En Bai and David Li. 1999. "Efficiency Losses from Tax Distortions vs. Government Control," *European Economic Review* 43, pp. 1095-1103.
- Gordon, Roger H. and David F. Bradford. 1980. "Taxation and the Stock Market Valuation of Capital Gains and Dividends: Theory and Empirical Results," *Journal of Public Economics* 14, pp. 109-36.
- Gordon, Roger H. and Young Lee. forthcoming. "Do Taxes Affect Corporate Debt Policy?: Evidence from U.S. Corporate Tax Return Data," *Journal of Public Economics*.
- Gordon, Roger H. and Joel Slemrod. forthcoming. "Are 'Real' Responses to Taxes Simply Income Shifting Between Corporate and Personal Tax Bases?" In *Does Atlas Shrug? The Economics of Taxing the Rich*, ed. by Joel Slemrod.
- Gruber, Jonathan. 1997. "The Consumption Smoothing Benefits of Unemployment Insurance," *American Economic Review* 87, pp. 192-205.

- Havrylyshyn, Oleh and Donald McGettigan. 1999. "Privatization in Transition Countries," IMF Economic Issues No. 18.
- Huizinga, Harry and Soren Bo Nielsen. forthcoming. "Privatization, Public Investment, and Capital Income Taxation," *Journal of Public Economics*.
- Jensen, Michael C. and William H. Meckling. 1976. "Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure," *Journal of Financial Economics* 3, pp. 305-60.
- Kornai, Janos. 1979. *Economics of Shortage*. Stockholm: Institute for International Economic Studies.
- Lange, Oskar. 1938. *On the Economic Theory of Socialism*, Minneapolis, University of Minnesota Press.
- LaPorta, Rafael and Florencio López-de-Silanes. 1997. "Benefits of Privatization — Evidence from Mexico," *Private Sector*, pp. 21-4.
- Lee, Young. 1998. "Essays on Chinese State-Owned Enterprise Reform," Ph.D. dissertation, University of Michigan.
- Lerner, Abba. 1944. *The Economics of Control: Principles of Welfare Economics*, New York: Macmillan.
- Li, Wei. 1997. "The Impact of Economic Reforms on the Performance of Chinese State Enterprises, 1980-1989," *Journal of Political Economy* 105, pp. 1080-1106.
- McLure, Charles. 1991. "Tax Policy for Economies in Transition from Socialism," *Tax Notes International* 27, pp. 347-53.
- Musgrave, Richard. 1959. *The Theory of Public Finance: A Study in Political Economy*. New York: McGraw-Hill.
- Naito, Hisahiro. 1999. "Reexamination of Uniform Commodity Taxes under a Non-Linear Income Tax System, and its Implications for Production Efficiency," *Journal of Public Economics* 71, pp. 165-88.
- Pestieau, Pierre and Henry Tulkens. 1993. "Assessing and Explaining the Performance of Public Enterprises," *Finanz Archiv* 50, pp. 293-323.
- Ramamurti, Ravi. 1997. "Testing the Limits of Privatization: Argentine Railroads," *World Development* 25, pp. 1973-93.
- Rees, Ray. 1984. *Public Enterprise Economics*. London: Weidenfeld and Nicholson.
- Sinn, Hans-Werner. 1999. *The German State Banks*. Elgar: Cheltenham.