

PARTIAL PRIVATIZATION AND YARDSTICK COMPETITION:

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**PARTIAL PRIVATIZATION AND YARDSTICK COMPETITION:
EVIDENCE FROM EMPLOYMENT DYNAMICS IN BANGLADESH¹**

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Abstract

We analyze the dynamics public and private sector employment, using the natural experiment provided by the partial privatization of the Bangladeshi jute industry. Although the public sector had substantial excess employment of workers initially, this excess was substantially eroded by the end of the period we study. The extent of such erosion differs between white-collar and manual worker categories, with excess employment persisting only in the former. Our findings are consistent with the idea that the central authorities used yardstick competition to reduce public sector managerial rents. We argue that partial privatization increases the efficacy of yardstick competition in the regulation of public firms, since heterogeneous ownership undermines collusion between public sector managers
Keywords: privatization, yardstick competition, excess employment, collusion.

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Privatization is normally viewed as a strategy that increases the internal efficiency of publicly owned firms. Public sector jobs in many developing countries often yield rents, as wages tend to be larger than the opportunity cost of the workers. Excess job creation in the public sector is a way of making transfers to special interests, and a source of patronage and political influence. Following Coate and Morris (1995), one can argue that making transfers in an inefficient manner, via job creation, maybe more viable than direct transfers since the populace at large² is unable to observe employment requirements of the public enterprise directly. Boycko, Shliefer and Vishny (1996) argue that privatization restricts the ability of politicians to make transfers to special interests, by employment generation, since the subsidies required to support such transfers become explicit. This argument provides a reason why privatization increases internal efficiency in publicly owned firms.

In this paper, we argue that *partial privatization* – the privatization of some firms in an industry, while leaving the rest in the state sector – provides useful *external* information, about the firms which remain in the public sector. This information may reduce the ability to sustain inefficient practices, such as excessive employment levels. In conjunction with yardstick competition, partial privatization may play an important role in increasing efficiency in public sector firms. The role of yardstick competition in the regulation of a multiple public sector firms is well recognized.³ However, such yardstick competition may be undermined by collusion, say between public sector managers. Yardstick competition is more likely to effective in a situation of *heterogeneous* ownership, when different firms have different objectives as private sector firms have no incentive to collude with public sector

² Or other “principals” such as the central budgetary authorities or international financial institutions.

managers and raise employment levels. This argument may be relevant in other contexts – for example, the entry of foreign firms may undermine cozy business practices and provide valuable information to consumers or stockholders.

We present evidence for this argument using firm level employment data from the jute industry in Bangladesh over the 1983-1994. In 1982 the military regime in Bangladesh privatized 31 of the 62 mills in the jute industry, while retaining the remainder in the public sector. This natural experiment is of interest in itself, since it provides a unique data set where one may disentangle the effects of ownership structure on economic performance. Bhaskar and Khan (1995) have analyzed the early years of this natural experiment. Our empirical work extends this analysis to the dynamic effects of privatization over time. In addition, we argue that the employment dynamics illustrate the informational role of partial privatization, in disciplining the public sector.

Our substantive findings are presented in terms of measures of public sector “excess employment”. We have two alternative measures, depending on whether it adjusts for output change or not. The adjusted measure shows excess employment in all categories of worker in 1988, but this excess is more than eliminated for the manual worker category by the end of the period. For white-collar workers, excess employment is reduced, but continues to be significant. We argue that this dynamic pattern is consistent with the notion of yardstick competition, where central authorities use information on private sector behavior to constrain public sector managers. Our second substantive and intriguing finding is that white-collar workers are the main beneficiaries of public sector employment generation – indeed, even

³ See Shliefer (1985), Laffont and Tirole (1994) and Sobel (1999) for analysis of the role of yardstick competition in the context of the regulation of several firms, all of which are homogeneous in ownership.

when pressures for employment reduction are very high, manual workers seem to bear the brunt of the burden.

The layout of the rest of this paper is as follows. Section 1 sets out the institutional background and describes our data. Section 2 sets out a formal model of the role of privatization in the context of yardstick competition. Section 3 reports the empirical results, and the final section concludes.

1. Background & Data

In 1982, the government of General Ershad initiated the New Industrial Policy, under which over 650 enterprises were privatized. In the jute industry, 31 of the 62 mills were privatized, while the rest were retained in the public sector. This policy dubbed as "re-privatization" was a partial reversal of the nationalization of the jute industry implemented in 1972, soon after the independence of Bangladesh. The jute mills that were owned by Bangladeshi nationals at the time of nationalization were returned to their former owners, while the mills that had belonged to West Pakistani nationals, continued to remain under public ownership. This partial privatization provides a panel data set, which allows us to infer ownership effects on employment. As the selection of mills to be privatized was not based on any economic criterion, but rather on the nationality of their former owners, our analysis is not subject to selection bias. Finally, the manner of re-privatization implied that government had no incentive to improve performance of the privatized mills, say by reducing labor, prior to privatization.⁴

Previous work by Bhaskar and Khan (1995) compared employment levels in 1988 and 1983 and found that public sector mills had "excess employment" of white-collar workers, of

⁴ This appears to be an important factor in many privatizations. Dewenter and Malatesta (2001, p 321) find that "much of the firm performance improvement associated with

the order of one-third. There was no significant difference in the employment of manual workers between public and private sectors. In the period we study (1988-94), the jute sector was under increasing financial pressure. The financial losses accumulated in private and public sector firms were financed primarily by loans from publicly owned banks. The worsening financial performance was attributed by observers to the decline in demand for Bangladeshi jute products. By 1994 industry output had fallen by 20 percent relative to 1988. The World Bank prompted the government to reduce capacity in the jute industry, and in response, the government instituted a Voluntary Departure Scheme for staff and workers in the public mills. In July 1989 the benefits for departure from state owned enterprises were increased substantially. For example, an employee with 30 years service was entitled to 5 years pay as gratuity, in addition to pension benefits. These measures culminated in the World Bank's Jute Sector Adjustment Credit program of 1994, which financed restructuring of the industry and met the costs of the Voluntary Departure Scheme.

Our data consists of mill-specific employment levels of four categories of worker for the years 1983, 1988, 1991, 1992 and 1994. The first two categories, managers and clerical staff, are white collar. We also have data on permanent manual workers and total manual workers. The data was collected from records kept by the Bangladesh Jute Mills Corporation and the Bangladesh Jute Mills Association, organizations representing public and private sector mills respectively. As privatized mills were legally unable to layoff employees for a year after their privatization in 1982, the recorded 1983 figures may be taken to be the pre-privatization figure. We should mention that casual manual employment could fluctuate on a day-to-day basis. Therefore, measurement error is likely to be greater in this category than for permanent employees.

privatization actually occurs over the three years before the government reduces its

2. The Model

The purpose of this section is to set out two simple models which illustrate the informational role that partial privatization can play in the regulation of the public sector. One reason for setting out this model is that in the existing literature, the existence of a private sector does not play any important role. Indeed, in standard models of yardstick competition, the regulator will be able to play off public sector firms against each other, and heterogeneity of ownership plays no role.

Our analysis uses the private sector mills as the benchmark. The objective function of privately owned mills is relatively straightforward. We assume that these owners maximize profits and do not have any preference for employment-maximization. The typical private firm is family owned, and ownership is relatively concentrated. Even if there are principal-agent problems between owners and managers, these do not give rise to any pressures for employment generation.⁵ Thus employment in firm i , E_i , set equal to Z_i , the profit maximizing level of employment.

Turning to the public sector firm, we distinguish three distinct types of actor, reflecting three distinct levels in decision making:

- a) Firm level *managers*, who are “agents”, in the standard sense.
- b) The *central authority* regulating the public sector managers, in the ministries of industry and finance. The central authority sets the contracts for public sector managers.

ownership.”

c) The *overseers*, i.e. the general population and international institutions such as the World Bank that monitor and evaluate the performance of the central authority. While the overseers do not directly control the central authority, they retain the ability to “punish” any failings. The general public can do this by withdrawing political support and international agencies by reducing the level of aid and financial transfers.

Both central authorities and firm level managers may have preferences for employment creation, although it is likely that pressures for employment creation are more severe at local rather than at central level. In particular, local politicians may pressurize public firms to create employment for politically important constituencies, a phenomenon we call "clientelism".⁶

The firm level manager's ability to expand employment is subject to constraints and incentives imposed by the central authorities. However, the central authority will lack information on local employment requirements, which is available only to the managers.⁷ In addition, they may also lack the incentive themselves to rigorously regulate the managers, either because they also like to create employment, or because of a desire for a quiet life.

⁵ There do appear to be some agency problems, which are unique to our milieu, and are not of the usual sort arising from dispersed share ownership. The joint family system is prone to conflict and such conflicts between owners sometimes allow managers increased leverage.

⁶ Clientelism refers to a situation, where politicians dole out public sector jobs in order to maintain their political support base (see for example Shliefer and Vishny, 1994). Bhaskar and Khan (1995) argue that this explanation for public sector excess employment in the white-collar sections is more plausible than a "welfarist" explanation, which would generate excess employment among manual rather than white-collar workers. Clientelism can be augmented by sociological factors, whereby top managers in the public sector create jobs for the middle classes to whom they are tied by bonds of kinship or social affinity.

⁷ Alternatively, one may think of the principal as an international financial institution (such as the World Bank) or the general populace, which wishes to constrain excess employment. Similarly, we may also think of the agent as the local politician who exerts pressure on the manager to expand employment.

Finally, the overseers are uninformed, and also lack the ability to directly set the incentive scheme of managers.⁸

More formally, we assume that the central authorities would like to have employment in firm i , E_i , set equal to $\alpha + Z_i$, where Z_i is the profit maximizing level of employment, and $\alpha \geq 0$. The preferences of central authorities are given by

$$V(E_i, t) = -[E_i - (Z_i + \alpha)]^2 - t, \quad (1)$$

where t is the payment made to the manager. However, the central authorities do not know the level of Z_i , which is known only to the manager of the public firm. The central authorities have the information that $Z_i = Z + \varepsilon_i$ where Z is distributed with a density function f on the interval $[a, b]$ and ε_i is distributed with a density function g on the interval $[-e, e]$. Z and ε_i are independently distributed. It follows that Z_i has support $[a-e, b+e]$.

The manager would like to create extra employment, possibly beyond that desired by the central authorities. His preferences are given by

$$U(E_i, t) = -\lambda[E_i - (Z_i + \beta)]^2 + t, \quad (2)$$

where $\beta > \alpha$ is a parameter, which measures the degree of employment bias of the manager. t is the amount of transfer made from the central authorities to the manager. The central authorities can provide incentives by making t depend upon on E_i , so that we can write $t(E_i)$. Bear in mind that t represents the expected value of incentive measures, such as promotions to a higher level, which can be made contingent on managerial performance. λ is a parameter,

⁸ These pressures for employment generation at the level of the public enterprise will vary depending upon the category of worker. One might expect that public sector managers wish to dole out jobs to those with whom they are connected by bonds of kinship or social affinity. This would tend to bias employment creation in favour of white-collar workers rather than manual workers. Differences in the extent of political clout between types of workers may also influence employment creation, although the direction of bias is not obvious apriori.

which measures the relative importance of employment objectives (as compared to financial or career motivations) in the manager's utility function.

Consider first the case where the central authority does not provide incentives to the manager for reducing employment, i.e. t does not depend upon E . This could arise either because the central authority likes employment to the same extent as the manager ($\alpha = \beta$), or because the conflict of interest is small, and central authority simply seeks a quiet life. In this case, the manager simply chooses $E_i = Z_i + \beta$. When all firms are in the private sector, there will be some variation in employment norms across firms (since $Z_i = Z + \varepsilon_i$, with ε_i varying across firms), but this variation will be small. Thus the overseers will not get any information on the extent of employment bias in the public sector. Partial privatization has a clear role here – the privatized firms will reduce employment levels, by setting $E_i = Z_i$. Thus the expected difference in employment levels between the two types of firm will be β . This can now be observed by the overseers, thereby providing pressure on the central authorities, who in turn will be compelled to provide incentives to the public sector managers to reduce employment.

Our second model abstracts from the role of the overseers, and considers how partial privatization enhances the ability of the central authority to more effectively regulate the managers. To simplify exposition, let us assume that $\alpha = 0$, so the central authority has no employment bias. Let us consider a transfer schedule $t(E_i)$. The manager has some outside level of reservation utility, u , and the central authorities must ensure that he gets this utility level regardless of the realization of Z_i . The manager's first order condition for utility maximization is

$$2\lambda[E_i - Z_i - \beta] = t'(E_i). \quad (3)$$

From this condition, it is clear that if the central authority sets $t'(E_i) = -2\lambda\beta$, the manager will find it optimal to $E_i = Z_i$. In other words, the central authorities can provide incentives so that the manager chooses employment optimally (i.e. without any excess bias), by taxing employment at rate $2\lambda\beta$. Letting T denote the fixed (wage) element of the manager's compensation, the incentive scheme which ensures optimal employment choice has the form

$$t(E_i) = T - 2\lambda\beta E_i. \quad (4)$$

The utility of the manager under the scheme, given that he chooses employment optimally, is given by $t(E_i) - \lambda\beta^2$, which must exceed his reservation utility u for all possible values of E_i . His utility is lowest when employment is highest, i.e. when $Z_i = b+e$. This implies that the manager's fixed component is given by

$$T = u + \lambda\beta^2 + 2\lambda\beta (b+e). \quad (5)$$

Notice that for any value of Z_i , the manager gets a rent of $2\lambda\beta(b+e-Z_i)$, which is strictly positive unless desired employment is at its highest possible level. That is, the central authorities have to make costly transfers in order to provide incentives, i.e. the manager gets a payment, which is in general above his reservation wage (which equals the sum of his reservation utility u , and the term $\lambda\beta^2$ which is the disutility cost on the job from choosing employment without bias). Thus at any Z_i which is below the maximum possible level ($b+e$), the manager gets a rent, since his payment is greater than his reservation wage. The expected cost to the central authorities of this incentive scheme can be computed, and is given by

$$\mathbf{E}(C) = u + 2\lambda\beta [b+e - \mathbf{E}(Z)] + \lambda\beta^2. \quad (6)$$

$\mathbf{E}(Z)$ is the expectation of Z . If the provision of incentives is sufficiently costly, the central authorities may prefer to provide low incentives, in which case there will be excess employment. This will also be the case if the ability to provide incentives is limited, say because promotion opportunities are limited in the public sector,

Yardstick competition

Yardstick competition may enable the central authorities to reduce managerial rents when there are multiple public sector firms, (i.e. even where there is no privatization), as has been noted in the regulatory context (see Sobel (1999), Shleifer (1985) and Laffont and Tirole (1994)). The central authorities can provide incentives by making t depend upon the employment of an individual firm *relative* to the average employment level of other firms, which we denote by E_{-i} , so that $t(E_i - E_{-i})$. Indeed, a linear incentive scheme with the same slope ($t' = -2\lambda\beta$) will induce the manager to choose employment appropriately so that $E_i = Z_i$.

Under yardstick competition, it is cheaper to satisfy the individual rationality constraint of the manager. Let us assume that every other firm chooses employment optimally, so that $E_j = Z_j$ for $j \neq i$, and consider the individual rationality constraint for manager i . Although it is assumed that manager i knows Z and his own value of ε_i , he may or may not know the average value of ε_{-i} , and the two cases give rise to two different possibilities. In the first case, the maximum possible difference between ε_i and ε_{-i} is $2e$. The individual rationality constraint implies that the fixed component of pay under yardstick competition must equal

$$T_y = u + \lambda\beta^2 + 4\lambda\beta e. \quad (7)$$

Since relative employment of firm i only varies between $2e$ and $-2e$, the informational rents of the manager are reduced, especially if individual firm specific uncertainty (ε_i) is small relative to uncertainty about the industry wide term Z . Informational rents can be reduced even more if the individual firm does not know the average value of ε_{-i} . For in this case, the expectation of the manager is that this is zero, and hence the individual rationality constraint need only hold in expectation given any value of ε_i . To summarize, if all public sector managers act individualistically, then yardstick competition can play a useful role even in the absence of the private sector.

Collusion with Repeated Interaction

Yardstick competition based incentives schemes for the public sector are however vulnerable to collusion between the managers of different public enterprises. Such collusion may be sustained relatively easily since managers are involved in a repeated interaction. The basic idea is that managers could all be better off if they increased employment in a coordinated way. As managers are only penalized for raising employment relative to the industry average, none of them will be punished.

We assume that at every date k , the basic one period model is played anew. That is, at the beginning of the period k , nature chooses $Z_i(k)$, and these draws are independently and identically distributed across periods. We assume that the central authority chooses and yardstick competition incentive scheme at the beginning, at $k=0$. The scheme is stationary, so that transfers in period k to manager i only depend upon the vector of employment levels chosen in that period. At the end of each period, employment levels of each manager are observed. Managers maximize the discounted sum of payoffs, where δ is the discount factor.

Let us first consider expected payoffs of the managers when they play a Nash equilibrium of the stage game. In this case each manager sets $E_i = Z_i$. Expected utility is given by

$$E(U^N) = -\lambda\beta^2 + T_y + 2\lambda\beta E(\varepsilon_i - \varepsilon_{-i}) = u + 4\lambda\beta e. \quad (8)$$

Suppose now that managers collude by setting higher levels of employment. Specifically, let us assume that they choose employment equal to $E_i = Z_i + \alpha\beta$, where $0 < \alpha \leq 1$.

$$E(U^C) = -\lambda[(1-\alpha)\beta]^2 + T_y + 2\lambda\beta E(\varepsilon_i - \varepsilon_{-i}) = u + 4\lambda\beta e + \lambda[1-(1-\alpha)^2]\beta^2. \quad (9)$$

We see therefore that $E(U^C) > E(U^N)$, so that the managers can achieve a higher level of utility by colluding. It remains to see whether collusion can be sustained. Consider a repeated game

strategy profile where each manager chooses $E_i = Z_i + \alpha\beta$ as long as every manager has done so in every previous period. However, if any manager has failed to comply with the collusive scheme at any time in the past, manager i chooses $E_i = Z_i$, i.e. they revert to playing a Nash equilibrium of the stage game. Given this strategy profile, a manager can benefit in a single period by reducing employment, and his optimal deviation is to choose $E_i = Z_i$. The benefit from deviating is given by

$$-\lambda[\beta^2 - \alpha^2 \beta^2] + 2\lambda\alpha\beta^2 = \lambda\alpha^2\beta^2. \quad (10)$$

We see therefore that the one period benefit from deviating is independent of Z_i . A deviation is not profitable provided that the one period gain is less than the discounted present value of the losses from the breakdown of collusion. That is, the following condition must be satisfied

$$\delta/(1-\delta) \geq \alpha/(2-\alpha). \quad (11)$$

We see therefore that full collusion ($\alpha = 1$) can be sustained under the relatively mild condition that the discount factor is greater than one-half. Indeed, some degree of collusion can always be sustained for any value of the discount factor.

We note here that collusion need not be explicit – there may well be a culture in the public sector of not pursuing aggressive employment cuts and a manager who deviates from this may well become quite unpopular. Apart from repeated game considerations, social sanctions may make yardstick competition ineffectual when it is restricted to the public sector. **Privatization and Collusion**

Let us now consider the role of partial privatization. Managers in the private sector will seek to maximize profits and therefore, they will not have any employment bias. Since the central authority's objectives may differ from profit maximization, we assume that private sector managers will set $E_i = Z_i - \sigma$, where σ parameterizes the difference between profit maximizing behavior and central authority preferences for employment. Let m denote the

number of private sector firms and let n denote the total number of firms. Thus the relevant employment measure for public sector firm i is given by

$$E'_{-i} = [m\sigma + \sum_{j \neq i} E_j] / (n-1). \quad (12)$$

That is, we assume that the central authority operates a yardstick competition incentive scheme, where each public sector firm is taxed linearly on $(E_i - E'_{-i})$, where the yardstick E'_{-i} takes into account the fact that private firms choose employment differently from what the central authority would like.

Let us now examine the implications of partial privatization for collusive behavior. It is easy to verify that the expected utility of the public firm manager is the same as before, in the event that all public firm managers maximize single period utility. However, partial privatization reduces the expected utility of the managers when they collude, since the private firms have no incentive to increase employment, and will not be part of the collusive arrangements. The expression for expected utility is now given by

$$E(U^C) = -\lambda[(1-\alpha)\beta]^2 + T_y - 2\lambda\alpha\beta^2(m/(n-1)). \quad (13)$$

Where the last negative term reflects the tax on employment paid by public firms when they collude and raise employment. It can be verified that the one shot incentive to deviate from the collusive scheme is unaffected. We therefore conclude that partial privatization makes collusion harder to sustain, by reducing the payoff from colluding.

There is an additional informational role that partial privatization can play, which is possibly more important. When public firms collude, expected employment in the public firm is given $\alpha\beta + E(Z_i)$, while expected employment in the private firm is given by $E(Z_i) - \sigma$. Thus the difference in expected employment in the two sectors equals $\alpha\beta + \sigma$, rather than just σ in the absence of collusion. Thus the central authorities will learn over time about the collusive behavior in the public sector, and can therefore take steps to undermine it, possibly by

increasing the taxes on employment in the incentive scheme. In other words, employment in the private sector can be a useful benchmark for providing incentives to the public sector managers. The private sector will not be part of a culture of excess employment and be an independent source of information to discipline public firm managers.⁹

Consider the implications of this model in the context of Bangladesh. Our hypothesis is that the central authorities were increasingly able to use yardstick competition, vis-à-vis the private sector, as a way of controlling excess employment in the public sector relatively cheaply. This hypothesis implies that public sector excess employment is likely to diminish over time as the informational rents enjoyed by the public sector managers diminish. As a caveat, we should also emphasize that the model we have developed is illustrative, and is intended to allow us to interpret the data, and indeed other interpretations may well be consistent with our empirical findings. Based on these considerations, our empirical specification for employment in each category of employee is as follows:

$$\ln(E_{it}) = \alpha_i + \delta_t + \gamma_t O_{it} + \eta_{it}, \quad (14)$$

where α_i is the firm-specific effect, δ_t is the term capturing industry wide time varying effects, and η_{it} is a white-noise error term. O_{it} , the ownership dummy, takes a value of 1 when the firm is publicly owned, and is zero if the firm is privately owned. The parameter of interest is γ_t , which is the effect of ownership on employment. This is allowed to be period specific, in order to capture the effect of the changing constraints upon public sector behaviour. Our interest is on how the estimates of γ_t evolve over time.

⁹ The recent mechanism design literature investigates mechanisms, which are robust to collusion – e.g. Laffont and Martimort (2000) and Tangeras (2002). Our point is somewhat different, since we argue that institutional and ownership change makes collusion unsustainable, by changing the objective functions of agents.

Before proceeding to the empirical analysis, we outline a couple of other implications of the argument of this section. Our argument suggests that partial privatization may play a useful informational role, in disciplining the firms, which remain in the public sector. Indeed, in many developing countries and transitional economies, shortages of capital and entrepreneurial skills imply that large-scale privatization may be impossible. In addition, there may be political constraints on large-scale privatization.¹⁰ In this context, partial privatization may be very appealing, since only a small fraction of any given industry need be privatized in order to provide informational benefits. If there is noise in information provided by private firms, then this fraction cannot be too small, so the signal utilized in yardstick competition is sufficiently accurate. However, the informational benefits from marginal privatizations within the same industry are likely to be declining in the extent of privatization, so that partial privatization may well be optimal in the presence of other costs of privatization.

Our analysis of the role of yardstick information in the regulation of public firms also has implications for the interpretation of the empirical evidence on the effects of ownership on economic performance. One strand of this literature (Caves and Christensen, 1980; Martin and Parker, 1995; Kole and Mulherin, 1997) finds that product market conditions rather than ownership is the important factor promoting efficiency.¹¹ They find that under competitive conditions, there are no significant efficiency differences between private and public firms. Our model suggests that information revelation rather than product market competition may be playing the critical role here. Furthermore, it is not merely competition, as expressed for example in the number of firms, but the heterogeneity of ownership, which promotes public sector efficiency.

¹⁰ In transition economies, capital shortages imply that large scale privatization be associated with widespread foreign ownership of “strategic” sectors, which may be politically unpopular.

Our analysis also suggests that the magnitude of excess employment may depend systematically upon our ability to measure it. Measuring ownership effects is inherently a difficult problem -- cross sectional studies cannot control for firm specific fixed effects (or industry specific effects, if private and public firms are in different sectors), while studies of the privatization of natural monopolies may not be able to control for time varying effects. If regulators of public firms are also constrained by the same data limitations as empirical economists are, this suggests that regulation will be more successful where inference about ownership effects can be made with more confidence. Thus if central authorities are concerned with controlling excess employment, we may expect excess employment to be lower in those instances, where we as empirical economists are able to measure it with confidence--- the magnitude of excess employment will be inversely related to our ability to measure it.

The information revelation role of the yardstick competition with heterogeneous ownership also applies to other contexts. For example, when foreign firms enter a protected market, consumers and the shareholders of domestic firms may gain new information on possibilities. Competition between existing firms may not play the same role since managers may be reluctant to abandon their mutual accommodation.

3. Empirical Results

We have data on firm-level employment, for the following categories of employee - officers, staff and manual. There are three types of manual workers: permanent, temporary and casual¹². It is useful to distinguish two broad groups- white-collar, which consists of the officer and staff categories, and manual workers. The data on total manual workers is less

¹¹ Boardman and Vining (1989), Kumbhakar and Hjalmarsson (1998) and Dewenter and Malatesta (2001) find significant efficiency differences.

reliable as it measures less accurately the variable of interest. Since the employment of casual workers can fluctuate on a day- to-day basis, and our data pertain to employment at a point in time, the margin of error in treating this as average employment over the year may be large. These problems do not arise with white-collar employment, where there is no casual component. Table 1 presents summary statistics for the relevant years for public and private sectors. The public sector firm, on average is larger than the private sector firm, as shown by employment and capacity indicators. The table shows that there was an increase in white-collar employment in the public sector between 1983 and 1988 despite a decline in average capacity. In the private sector, on the other hand, average capacity increases, but employment declines in both white-collar and blue-collar categories. In the period after 1988, public sector employment trends in white-collar categories tracks the trend in the private sector.

Tables 2 and 3 report the mean percentage change in employment relative to 1983, at mill level, for the two sectors. We find that the public sectors had significantly expanded the employment of all permanent workers (white-collar workers as well as permanent manual workers) up to 1988, although total employment of manual workers shows a slight decline. However, workers were retrenched in the following years and by 1994, there was a large decline in employment of all categories of workers. The decline was significant in the manual worker category. In the private sector on the other hand, we find evidence of retrenchment in the white-collar categories as early as 1988. Employment declined further in subsequent years and was more evenly distributed across white collar and manual worker categories compared to the public sector.

Table 4 reports the evolution of aggregate output, sector-wise, for the years we have firm level employment data, relative to the 1982 benchmark. We have data on aggregate

¹²Casual workers have a more precarious employment status than temporary workers, since

output for the private and public sectors, for all the years since 1982, and also have firm level data on output for 1982. Since we do not have firm level output data for the later years, we rely on aggregate sector-level output data for our analysis.¹³ Public sector output contracted quite sharply. By 1994, output was 27% lower compared to output in 1982. In contrast, the private sector was higher in 1988 and only 5% lower in 1991. The final column of the table reports the difference in output changes between the two sectors – on average, public sector output declined faster than private sector output.

These output data suggest that one may use two alternative benchmarks to measure “excess employment” in the public sector in any year. The first measure, which we label the *unadjusted* measure, is the difference between the change in employment in the public sector and the change in employment in the private sector, in that year, where the change is computed relative to 1983. This is the measure, which is used by Bhaskar and Khan (1995). Alternatively, one can adjust this figure for the differential change in sectoral outputs. If we assume that employment requirements for any category of worker are proportional to the output produced, we should subtract the difference in output change between sectors from the unadjusted measure of excess employment, to get the *adjusted measure*. Note here that in performing this adjustment we are using aggregate sectoral outputs, rather than firm level outputs, since we do not have data on firm level output for all years.

Our main results are in table 5, which presents two measures for excess employment (unadjusted and adjusted), by category of worker and for each year in our sample. Our results differ between the white-collar and manual categories, but are rather similar within each of

they are hired on a day-to-day basis.

¹³ The two sets of data seem quite consistent for the years in which we have both. Two of our privatized firms were still in the public sector in 1982-83, and only privatized subsequently. We have made adjustments in the aggregate data to take this into account. We choose 1982 as

these categories. For white-collar employees, in 1988 there was a large amount of excess employment, of the order of 30 percent by the unadjusted measure, for both managers and clerical staff. However, unadjusted excess employment declined secularly in subsequent years. The public sector still had positive excess employment by the end of the period, but this is not statistically significant. Indeed, there is no significant difference in unadjusted excess employment in the category of clerical workers by 1994 and in managerial workers by 1992. However, when we take into account the larger output contraction in the public sector, adjusted excess employment of white-collar workers turned out to be larger and remained statistically significant throughout this period. Nevertheless, adjusted excess employment in the managerial category diminished from 50% in 1988 to 11% in 1994 for managers and from 47% to 17% for clerical staff.

For manual workers, the picture is rather different. Although there was no significant excess employment of total manual workers in 1988, by the unadjusted measure, the adjusted measure showed an excess employment of the order of 18%. However, by 1991 the public sector has negative excess employment of total manual workers according to the adjusted measure, and by 1994, this is also true for the permanent manual worker category, which should be measured with greater accuracy. This suggests that public sector managers may have concentrated the bulk of employment reductions upon manual workers rather than white collar workers, since the former were less able to resist such cuts.

To summarize, we find that employment of white-collar workers fell dramatically in the privatized mills following privatization in 1982. The public sector did not immediately follow the private sector in reducing white-collar employment. However, from 1991 the employment levels in the public sector started to decline, although this decline was less than

our benchmark in the case of output since there was no constraint on adjusting output, unlike

the fall in relative sectoral output, so that some excess white collar employment remains. For manual workers, the fall in employment mirrored that of relative output, so that excess employment is eliminated (and indeed becomes negative) even by the adjusted measure by the end of the period. This behavior over the period, with the gradual convergence of the public sector towards the employment norms in the public sector, is consistent with our argument that private sector behavior provided valuable information to the central authorities and allowed them to control managers.

While our empirical results provide some support for the theoretical model of the role of privatization, we must emphasize that other explanations are also possible. For example, the central authorities may have been increasingly constrained financially in the 1990s, and this may have increased the pressures to reduce public sector employment. To investigate this possibility, we consider total employment in public sector non-financial corporations other than jute, reported in table 6. From 1984 we find that total public sector non-jute employment rises sharply, and doubles by 1988. This figure is maintained in 1992, and then declines, so that the 1994 figure is about 19% lower than the 1992 level. Nevertheless, this is still 60% above the 1984 level.¹⁴ In contrast, the first column shows that average employment public sector jute mills is approximately constant till 1988, but then falls sharply, so that it is 40% below its 1983 level in 1994. This suggests that generalized financial pressures are not entirely responsible for the fall in public sector jute employment. Finally, it could also be argued that the Voluntary Departure Scheme (VDS) introduced by the central authorities played an important role in reducing public sector jute employment. This is undoubtedly true;

employment, where there was a bar on laying off workers for a year after privatization.

¹⁴ This figure overstates the fall in public sector employment since some of the reduction is due to privatization and re-classification of enterprises, and it also includes the jute sector.

however, it is also likely that revelation of the extent of excess employment by yardstick competition facilitated the introduction of the VDS.

4. Concluding Comments

We have argued in this paper that partial privatization, in conjunction with yardstick competition, can provide useful information for the regulation of public firms. Evidence in support of this argument comes from the dynamics of employment in the partially privatized jute industry in Bangladesh. The privatized mills take the lead in reducing employment, but this is followed thereafter by the public sector, and excess public sector employment is gradually reduced, in all categories. This behavior of the public sector can be interpreted as the fact that private sector employment norms made more transparent, to the central authorities, the general populace as well as international financial agencies such as the World Bank, the extent of excess employment, which was being supported by the public sector.

Notwithstanding the partial convergence of employment norms across the two sectors, we find that excess white collar is both larger to begin with and persists to a greater degree, as compared to the employment of manual workers. We have suggested that this could be due to sociological reasons – decision-makers in the public sector may have bonds of affinity with middle class employees, and would be less inclined to sack them. Alternatively, this could be due to greater political voice of this educated and articulate class. These explanations are obviously incomplete, and our work suggests a need for explanations for such a white-collar bias within a populist political economy.

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TABLE 1: AVERAGE EMPLOYMENT AND CAPACITY BY SECTOR

		EMPLOYMENT PUBLIC (EMPLOYEES)	CAPACITY PUBLIC (LOOMS)	EMPLOYMENT PRIVATE (EMPLOYEES)	CAPACITY PRIVATE (LOOMS)
1983	MANAGERIAL	122.2	465.2	72.2	248.8
	CLERICAL	406.2		244.4	
	MANUAL	4636.3		2482.0	
1988	MANAGERIAL	149.4	395.2	65.9	311.3
	CLERICAL	450.3		213.0	
	MANUAL	4568.1		2407.8	
1992	MANAGERIAL	110.7	395.2	62.4	341.3
	CLERICAL	352.3		212.9	
	MANUAL	2799.5		2139.5	
1994	MANAGERIAL	90.3	395.2	57.8	341.3
	CLERICAL	279.9		173.8	
	MANUAL	2541.5		1893.9	

NOTE: Number of mills: 31 state owned mills and 31 privatized mills.

SOURCE: Bangladesh Jute Mills Association. Employment Records, Dhaka. Bangladesh Jute Mills Corporation. Employment Records, Dhaka.

TABLE 2: % CHANGE IN WHITE-COLLAR EMPLOYMENT RELATIVE TO 1983

YEAR	CATEGORY OF EMPLOYEE	PUBLIC SECTOR	PRIVATE SECTOR	EXCESS EMPLOYMENT IN PUBLIC SECTOR
1988	MANAGERIAL	0.22	-0.09	0.31 (5.4)**
	CLERICAL	0.16	-0.12	0.28 (3.3)**
1991	MANAGERIAL	0.01	-0.09	0.10 (1.7)**
	CLERICAL	-0.05	-0.17	0.12 (1.4*)
1992	MANAGERIAL	-0.08	-0.14	0.06 (1.1)
	CLERICAL	-0.14	-0.16	0.02 (0.3)
1994	MANAGERIAL	-0.24	-0.25	0.01 (0.2)
	CLERICAL	-0.30	-0.37	0.07 (0.8)

NOTE: Absolute t-ratios in parentheses.

* Significant at 10 per cent level.

** Significant at 5 percent level.

TABLE 3: % CHANGE IN MANUAL EMPLOYMENT RELATIVE TO 1983

YEAR	CATEGORY OF EMPLOYEE	PUBLIC SECTOR	PRIVATE SECTOR	EXCESS EMPLOYMENT IN PUBLIC SECTOR
1988	TOTAL	-0.04	-0.03	-0.01 (0.1)
	PERMANENT	0.14	0.06	0.08 (2.0)**
1991	TOTAL	-0.39	0.06	-.45 (7.8)**
	PERMANENT	-0.40	-0.08	-0.32 (7.9)**
1992	TOTAL	-0.50	-0.15	-0.35 (6.0)**
	PERMANENT	-0.39	-0.12	-0.27 (6.8)**
1994	TOTAL MANUAL	-0.53	-.27	-0.26 (4.5)**
	PERMANENT	-0.50	-0.27	-0.23 (5.6)**

NOTE: Absolute t-ratios in parentheses.

* Significant at 10 per cent level.

** Significant at 5 percent level.

TABLE 4: % CHANGE IN OUTPUT RELATIVE TO 1982

	PUBLIC	PRIVATE	DIFFERENCE
1988	-16	+3	-19
1991	-36	-5	-31
1992	-25	-10	-15
1994	-27	-17	-10

Source: Bangladesh Jute Mills Association and Bangladesh Jute Mills Corporation Reports.
Information on sectoral output (in tons), supplemented by firm-level data for 1982.

TABLE 5: EXCESS EMPLOYMENT IN THE PUBLIC SECTOR (PERCENT)

		1988	1991	1992	1994
MANAGERS	Unadjusted	31 (5.4**)	10 (1.7**)	6 (1.1)	1 (0.2)
	Adjusted	50 (8.7**)	41 (7.0**)	21 (3.9**)	11 (2.2**)
CLERICAL	Unadjusted	28 (3.3**)	12 (1.4*)	2 (0.3)	7 (0.8)
	Adjusted	47 (5.5**)	43 (5.0**)	17 (2.6**)	17 (1.9**)
TOTAL MANUAL	Unadjusted	-1 (0.1)	-45 (7.8**)	-35 (6.0**)	-26 (4.5**)
	Adjusted	18 (1.8**)	-14 (2.4**)	-20 (3.4**)	-16 (2.8**)
PERMANENT MANUAL	Unadjusted	8 (2.0**)	-32 (7.9**)	-27 (6.8**)	-23 (5.6**)
	Adjusted	27 (6.8**)	-1 (0.2)	-12 (3.0**)	-13 (3.2**)

NOTE: Unadjusted excess employment is the difference in difference estimate of (log) employment, category wise. The adjusted figure subtracts the mean difference in difference in log output between the two sectors.

* Significant at 10 per cent level.

** Significant at 5 percent level.

Table 6: **CHANGES IN NON-FINANCIAL PUBLIC SECTOR EMPLOYMENT**

	JUTE		NON JUTE (thousands)	
	AVERAGE PER MILL	INDEX	TOTAL	INDEX
1984	5165	100	80.1	100
1988	5168	100	158.2	197.5
1992	3263	63.1	160.7	200.9
1994	2912	56.4	131.2	163.4

Sources: For aggregate non financial public employment, Bakht and Bhattacharya (1991), Table 16, and World Bank and Asian Development Bank (May 2003), Bangladesh Public Expenditure Review, Statistical Appendix Table A.3.2. Data on average jute employment as in table 1 (1983 figure used for 1984, for ensuring comparability).