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## Strikes and Political Activism of Trade Unions : Theory and Application to Bangladesh.

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**Abstract :** The behavior of Bangladeshi trade unions is characterized by political activism, and momentous strikes, called *hartals* there, have played a crucial part in most political changes in this country. We offer a theoretical framework for discussing this fact, and we test empirically its main prediction by bringing out the political cycle that characterizes the occurrence of strikes in Bangladesh.

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## 1. Introduction

The economic importance of trade unions in developing countries is not commensurate with the size of their membership. In Bangladesh, the share of the active population concerned by unionization was officially estimated between 3 and 4 % in 1992. However, this figure is largely irrelevant for an evaluation of their power, as the urban population was only about 18 % of the total Bangladeshi population in 1995, and virtually no trade unions exist in the rural sector. Within the urbanite working population, and especially in the formal sector, the picture is quite different. Almost 100 % of the workers and employees of the public sector are unionized, while one out of six of the wage earners in the private formal sector are unionized. The jute and cotton sectors, which were nationalized in 1971, in the wake of the struggle for independence, and then privatized to some extent in the 1980s, are the most unionized sectors. Unions are also important in the transport sector and in various services.

As emphasized by Pencavel (1995), among others, unions in developing countries get their power from their privileged relationship with political parties, and in many cases with the government. The Bangladeshi trade unions are no exception, and are well known for their lobbying the government rather than acting vis-à-vis the private sector. In the public enterprises, the government fixes the wage schedule, and it fixes also the minimum wages for the private sector. The government intervenes in most industrial disputes, in all the sectors. In the private sector, collective bargaining takes place officially at the firm level, but the powerful SKOP, the main federation of unions, deals directly with the government, and has eventually the determinant influence on wage settlements.

The influence of unions goes beyond the standard reach of industrial relations, and extends to the political arena. All the political parties, even the smallest ones, exert some control over a trade union. The three main political parties have their own trade union federation, which accounts for 64 % of the unionized workers. The unions have played an

active role in most major political events of this country, like the massive demonstrations (*hartals*) that brought General Ershad down in 1990, or those which pushed the democratically elected government of Begum Khaleda Zia to resign in 1996. According to the World Bank (2001), an average of 21 full working days were lost annually due to *hartals* in the 1980s, and an average of 47 full working days per year in the 1990s. This report estimates that about 5 % of GDP is lost on average in the 1990s.

Therefore, the behavior of the Bangladeshi trade unions seems quite distant from the standard approach to the theory of trade unions, as surveyed for example by Oswald (1985) or by Booth (1995), which emphasizes the relationships between the union and the firms that employ its members. Its analysis is thus especially interesting, as a way to broaden our conception of the scope of trade union activity, with a view to take explicitly into account its political economy dimension. The massive demonstrations organized by the unions, called the *hartals*, are aimed at affecting the government much more than the firms. This type of political activism of the trade unions seems fairly widespread in developing countries, as well as in some developed countries, like France for example. One can remember the role of *Solidarnosc* in Poland for bringing communism down. In Britain, the conflict between Margaret Thatcher and the miners' union in the late 1970s was a major political event, rather than a simple industrial dispute.

The aim of the present paper is to provide a simple theoretical framework for analyzing this political dimension of trade union activity, and to test its main implication in the case of Bangladesh. Our approach is thus drastically different from the one followed by Devarajan, Ghanem and Thierfelder (1997), who have analyzed the behavior of trade unions in Bangladesh and Indonesia, within the more usual framework where unions seek to affect the behavior of the firms, rather than to influence the government. Rama (1997) and Rama and Tabellini (1998) also analyze models where the union affects government policy. They provide a theoretical model where the trade unions lobby the government with a view to get

some tariff protection for the firms, in order to create a rent that they can capture by imposing a wage increase. Then, unionized workers may get a redistribution of income in their favor. Similarly, Saint-Paul (2000) analyzes the political economy of labor market institutions as the result of redistributive pressures between rich and poor, skilled and unskilled labor. In his model, the government, or politicians, are simply the representatives of the various conflicting interests present in the labor market.

An additional benefit of our approach is to provide a theory where a positive level of strike activity takes place in equilibrium. This easily observable phenomenon is usually absent from the standard models of trade unions. Although a lot of empirical studies have been done for developed countries (see Booth, 1995, Kennan, 1985, Card, 1990, and references therein), analyzing the duration of strikes, very little work has been done in the theoretical literature aiming at explaining the occurrence of strikes. While the seminal paper on this topic (Ashenfelter and Johnson, 1969), and a small number of followers in the same vein (Farber, 1978, Kennan, 1986), were in fact assuming that a strike was going on, for analyzing its duration as a function of the concessions made by the firm, the most recent literature has taken a game-theoretic approach (*e.g.* Booth and Cressy, 1990, Hayes, 1984, and Tracy, 1987), where the strike results from asymmetric information between the firm and the union. Mumford (1993) presents a recent survey of both the theoretical and the applied literature on strike activity. Our approach also applies an imperfect information framework, in a game between the union and the government. However, instead of relying on asymmetric information for generating the occurrence of the socially sub-optimal conflict, our model rests on commitment failure. We emphasize the role of the imperfect credibility of the government, regarding its promises to adopt some policies that benefit the workers, in providing the incentive for the union to go on strike. Unlike a large part of the literature on strike activity, which is disconnected from the more standard literature on unions and wage determination, we deal with these two issues in a unified framework.

Moreover, our model must be understood as a triadic one, as discussed by Basu (2000), as the representative voter is a crucial actor in this game. We assume that the latter applies a retrospective voting strategy, à la Barro-Ferejohn (Barro, 1973, Ferejohn, 1986). Then, the failure of the government to keep the unions quiet affects negatively its chances of being re-elected. This gives the urban workers some leverage on the government that is not available to the rest of the population. Therefore, our analysis may be viewed as a contribution to the theory of the conflict between town and country which was emphasized by Sah and Stiglitz (1992) as a central theme in development theory.

The next section presents the basic model, while section 3 presents the assumed political setting. Section 4 describes the equilibrium in case of imperfect commitment. Section 5 presents the empirical results, analyzing the political cycle effects on the occurrence of strikes. Using monthly data on strikes in Bangladesh, we show the impact of forthcoming elections on their occurrence. Section 6 concludes.

## **2. The basic model**

In this section, we analyze a variant of the standard utilitarian union model discussed among others by Oswald (1982), assuming that there is a unique representative union for the whole urban labor force, with no internal migration. The only addition to this model done here is the inclusion of the level of strike activity in the tool kit of the union. We assume that the latter can decide to put up a level of  $S$  units of strike activity per worker, with a unit cost of  $\gamma$  utils to the representative worker, with a view to affect the behavior of the government. We assume that the latter can spend its resources in two different ways. First, it can spend  $G$  units as employment-generating expenditures. This may be comprised both of personnel expenditures, assumed to entail a non-negative employment multiplier, and of other types of productive expenditures that enhance the productivity of labor in the private sector. For example, expenditures on basic infrastructures etc., have a positive impact on employment,

for a given wage rate. It can also increase tariffs, boosting employment in the import-substitution sector, at the cost of a higher price for imports (Rama, 1997). Second, it can spend the remaining resources on government consumption which affects its utility positively, with no positive fallout for the workers. Hence, the political activism of trade unions is here modeled as part of the conflict over the sharing of the resources of the government between the former and the latter.

Assume that the rate of employment  $m$  is a decreasing function of the wage rate  $w$  and an increasing function of the level of government employment-generating expenditures  $G$ . This captures simply the ability of the government to affect the level of employment by either hiring more public agents, or by providing some productivity-enhancing public goods, or indirectly, by boosting aggregate demand, in a Keynesian way. Assume also that all the workers are identical, and thus have the same probability of being employed, which is determined by :

$$0 \leq m(w, G) \leq 1. \quad (1)$$

(-) (+)

We perform this analysis within the framework of the monopoly union model, where the latter determines the wage rate, which is then taken as given by the firms, when making their hiring decisions. This assumption is more realistic, at least in the Bangladeshi case, than the optimal bargaining solution discussed by McDonald and Solow (1981).

However, we assume that the trade union must choose the level of the wage rate before the actual level of employment-generating public expenditures is known. Hence, the union selects the level of the wage rate  $w$  and of strike activity  $S$  on the basis of the expected level of government employment-generating expenditures  $G^e$ . This expected level of expenditures may be based on explicit promises made by the government, if the latter is credible, or on the analysis by the union of the government's behavior, if it is subject to moral hazard. We will restrict the analysis to a rational expectations equilibrium, where  $G = G^e$ . If

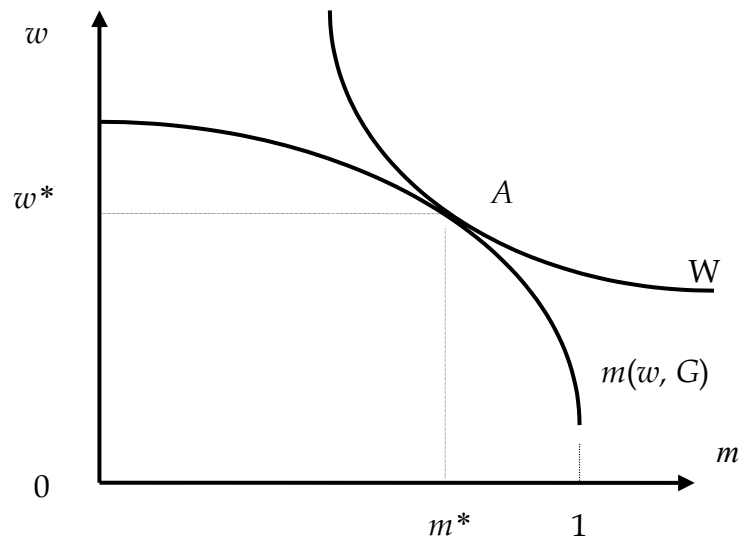
the government can commit credibly to any level of  $G$ , then the union regards  $G^e$  as exogenous.

Let  $U(w)$  ( $U'(w) > 0$ ,  $U''(w) < 0$ ) be the level of utility reached by a worker when employed, while earning a wage rate  $w$ . As usual in this type of models, we assume that the worker gets a fixed level of utility  $\bar{U} < U(w)$  when being unemployed. Then, if the latter takes  $G^e$  as given, the utilitarian union selects the couple  $\{w, S\}$  that solves the following problem:

$$\max_{w,S} W = m U(w) + (1-m) \bar{U} - \gamma S, \quad (2)$$

$$\text{s.t. } m = m(w, G^e) \quad (3)$$

$$\text{and } S \geq 0. \quad (4)$$



**Figure 1: Union Equilibrium with Credible Government**

Notice that this set up assumes that all the workers must participate in the strike, independently of their employment status, and thus bear the utility cost  $\gamma$ . This will be the case if the unions must select their  $\{w, S\}$  policy before the firms select their workers at random. The first-order condition resulting from setting the derivative of  $W$  with respect to  $w$  equal to zero can be written as :

$$\frac{wU'(w)}{U(w) - \bar{U}} = \frac{-wm_w}{m(w, G^e)} \quad (5)$$

In (5), as in the other equations of this paper, a subscript is used to represent the partial derivative of the function with respect to the corresponding variable. Condition (5) is pretty standard (e.g. Oswald, 1985), and figure 1 illustrates the resulting equilibrium, in the  $\{w, m\}$  space, in the case where  $G = G^e$ . A similar diagram may be found in Oswald (1982). Equilibrium is found where the union balances the benefit of the increased wage with the increased risk of unemployment borne by the workers, at the tangency point  $A$  between the union's indifference curve  $W$  and the employment rate curve  $m(w, G)$ . The new element introduced in this model is the effect of  $G^e$ .

Careful examination of equations (2)-(5) leads to the main point of this exercise, which can be stated as :

**Proposition 1 :** *If the government can credibly commit to a predetermined level of employment-generating public expenditures, then a no-strike equilibrium prevails.*

The reason for this result is that from (5) and (3) one can derive the preferred levels of  $w$  and  $m$  as functions of  $G^e$  only :

$$w^* = w^*(G^e) \quad (6)$$

and

$$m^* = m^*(G^e). \quad (7)$$

Then, defining :

$$W^*(G^e, S) = \max_w W \mid (3)-(4), \quad (8)$$

it is straightforward to show that  $\partial W^*/\partial S = -\gamma < 0$ . Hence, the non-negativity constraint (4) must be binding in such an equilibrium.



Moreover, under very mild conditions, one can show that :

$$w^*(G^e)' > 0 \text{ and } m^*(G^e)' > 0. \quad (9)$$

However, it is quite unlikely that such a no-strike equilibrium will prevail, as the announced level of employment-generating public expenditures will not generally be credible, as we show below. Nevertheless, it is useful to characterize further this equilibrium, as a benchmark against which to analyze the consequences of the government's lack of credibility. This is done in the next section.

### 3. The political setting

We basically model the game between the government and the union as a conflict over the sharing of fiscal resources between employment-generating expenditures  $G$ , that the union likes, and non employment-generating public expenditures, which only affect positively the government's utility function. The latter is assumed linear with a unitary slope, for the sake of simplicity. Whether it remains in power or not, the government bears the cost of the employment-generating expenditures  $G$ . If it stays in power, the government enjoys a utility level  $\theta m - G$ . The positive effect of employment on the government's objective function ( $\theta > 0$ ) simply reflects the fact that the higher the level of employment, the higher is the resulting level of economic activity, and thus, for a given taxing capacity, the larger is the available budget. The government loses the benefit of this budget if it does not remain in power.

Let  $0 \leq q \leq 1$  be the probability of the government staying in power. Beside exogenous factors, like the proximity of elections, etc., we assume that  $q$  is simply an increasing function of the level of utility reached by the "politically representative agent" (PRA). The identity of the PRA obviously depends on the political regime. In a democracy, the PRA would be the median voter. In a non democratic regime, the PRA would probably

be a representative agent of the constituency that supports the ruler (*e.g.* ethnic or religious group, etc.). However, Alesina and Rodrik (1994) have suggested that the median voter assumption is a good approximation even in the case of non democratic regimes. In a full blown political economy model, the PRA should be determined endogenously, but this would be a useless complication in the present setting. The only relevant information that we need here is that the PRA, be it the median voter or some devotee of the ruler, is not likely to be a union member, as only a small fraction of the population is concerned by unionization in developing countries. For example, in Bangladesh, the median voter is certainly a rural person. However, this does not entail that the PRA is a peasant. On the contrary, political power belongs to a large extent to a proprietary class, using roughly the same mechanisms as the ones analyzed by Bardhan (1984) for neighboring India. The relevance of this analysis for Bangladesh comes out clearly from the fieldwork presented by Khan (1989). This can be regarded as exogenous for the type analysis performed here.

We assume that the PRA applies the retrospective voting rule whose properties have been analyzed by Barro (1973) and Ferejohn (1986). In the words of the latter “if the utility received at the end of the incumbent’s term in office is high enough, he votes to return the incumbent to office; otherwise he removes the incumbent and gives the job to someone else.” (Ferejohn, 1986, p.35 of reprint in Persson and Tabellini, 1994).

Beside exogenous variables that need not be presented explicitly, we assume first that the utility level of the PRA is affected positively by the employment-generating public expenditures, because there are positive fallout of these expenditures, like greater access to some infrastructure, improved public services, etc. Moreover, the hiring of workers in the civil service or in public enterprises may create a constituency in favor of the incumbent government, and the positive effect of  $G$  on the PRA’s utility function can also capture such an effect. This assumption is realistic for developing countries, where a large part of the government hiring policy is aimed at “buying” some political support. Being seen

unequivocally to “do something for employment” is almost everywhere regarded as a positive factor for staying in office.

Second, we assume that the level of strike activity, with all the disruption that it entails for economic activity in general, as well as the damages to property that may result from the demonstrations that they often entail, affects negatively the utility level of the PRA. Let  $v(S, G)$  ( $v_S < 0$ ,  $v_G > 0$ ) be this utility function. Then, the probability of the government remaining in power is  $0 \leq q(v(S, G)) \leq 1$ . We assume that a stochastic element in the PRA’s identity or preferences makes  $q$  differentiable, with  $q' > 0$  and  $q'' < 0$  in the relevant range. However, in most of the following, we will use the short-hand notation:  $0 \leq q(S, G) \leq 1$ , with the partial derivatives of this function defined as follows:  $q_S < 0$  and  $q_G > 0$ , and the second derivatives defined conformably.

The optimum of this game, from the government’s point of view, is found when assuming that the latter can commit credibly to a pre-announced level of employment-generating public expenditure  $G$ . Then, the government plays first, and is in the position of a Stackelberg leader. The latter solves the following problem :

$$\max_G q(S, G) \theta m - G, \quad (10)$$

$$\text{s.t.} \quad m = m(w, G) \quad (11)$$

$$\text{and} \quad w = w^*(G) \text{ and } S = 0. \quad (12)$$

The first-order condition for this problem is :

$$\theta [q_G m + q (m_w w^{*'} + m_G)] = 1. \quad (13)$$

This condition means that the government should take into account not only the positive impact of an increase in employment-generating public expenditures on its probability of remaining in power and on its budget via the direct employment effect, but also the negative impact on the rate of employment due to the increase in the wage rate.

#### 4. The case of imperfect commitment

However, the optimum outcome characterized above is not very likely to prevail, if the government does not have access to institutional devices, or other methods, that make its commitment fully credible. This can be stated as proposition 2:

**Proposition 2:** *Under imperfect credibility of the government's commitment, the optimum outcome is not a Nash equilibrium.*

In order to prove this proposition, we need to clarify the effect of the lack of credibility. When the government is not committed credibly to a given level of employment-generating public expenditures, this game cannot anymore be solved by backward induction as it was done above. Now, the union is playing first, while the government chooses the level of employment-generating public expenditures taking as given the equilibrium  $\{w, S\}$  pair chosen by the union. Then, the government solves the following problem at the second stage, given  $\{w, S\}$  :

$$\max_G q(S, G) \theta m - G \quad (14)$$

$$\text{s.t.} \quad m = m(w, G) \quad (15)$$

This results in the following first-order condition :

$$\theta [q_G m + q m_G] = 1. \quad (16)$$

Comparing (16) to (13), and assuming that the second-order conditions for these two problems are satisfied, we find that the government will spend more on employment-generating public expenditures in the Nash equilibrium without commitment than at the optimum. The mechanism at work here is simply that, given the state of the labor market, as characterized by the optimum  $\{w, S\}$  pair, the government has an incentive to increase *ex post* the level of employment-generating public expenditures in order to increase employment

and fiscal resources, and its probability of remaining in office. It overestimates the marginal utility of an increase in public expenditures, by not taking into account the effect on employment via the wage rate, as it rationally takes the latter as given at stage 2. However, the union takes its best-response *function* as given at stage 1, anticipating rationally the government's response to its own choice of the  $\{w, S\}$  pair, and thus chooses the latter with this response in mind.

Moreover, the second-order condition can be written as :

$$\theta [q_{GG} m + 2 q_G m_G + q m_{GG}] < 0. \quad (17)$$

This can be used for analyzing the government's reaction function :

$$G = G^*(w, S). \quad (18)$$

Totally differentiating (16), and taking (17) into account, yields the following signs of the derivatives of the government's reaction function :

$$\text{sign } \partial G^* / \partial w = \text{sign } \{ q_G m_w + q m_{Gw} \} \quad (19)$$

$$\text{sign } \partial G^* / \partial S = \text{sign } \{ q_{GS} m + q_S m_G \}. \quad (20)$$

These results will be discussed and used below for characterizing the equilibrium of the game. Notice that these signs depend on the second derivatives  $m_{Gw}$  and  $q_{GS}$ , which are playing here a key role.

#### ***Conditions for a positive equilibrium strike level***

Let us now analyze stage 1 of the game, taking (18) into account. When the government cannot commit credibly, the union is the first mover (see the appendix for the detailed timing). Its problem is now to maximize (2), under (3), (4), and (18). We can apply again the Kuhn and Tucker theorem, with complementary slackness for the non negativity

constraint (4). This can be used to characterize an interior solution, with  $S > 0$ . In this case, the first-order condition relative to the level of strike activity reads :

$$(U(w) - \bar{U}) m_G G_S = \gamma. \quad (21)$$

This implies that  $G_S > 0$ . In view of (20), this can be stated formally as :

**Proposition 3 :** *When the government lacks credibility,*

(i) *a necessary condition for  $S > 0$  in equilibrium is  $q_{GS} > -q_S m_G / m$ , which implies in particular  $q_{GS} > 0$ . This condition can be rewritten using explicitly the PRA's utility function, in terms of elasticities, as :*

$$\frac{v_{GS} G}{-v_S} - \frac{q'' v(-)}{q'} \frac{v_G G}{v(-)} > \frac{m_G G}{m};$$

(ii) *a sufficient condition for  $S > 0$  in equilibrium is  $m_G G_S (U(w) - \bar{U}) > \gamma$  when evaluated at  $S = 0$ .*

When expressed in terms of elasticities of the PRA's utility function, the necessary condition for  $S > 0$  in equilibrium does not seem too restrictive, especially in the case where  $q'' < 0$  and  $v_{GS} > 0$  in the relevant range. The right-hand side of this condition is the elasticity of the employment rate to the level of employment-generating public expenditures. The left-hand side is the sum of the two second-order effects that an increase in these expenditures has on the re-election probability: first, it reduces its marginal sensitivity to changes in the PRA's utility level, if the former is concave, and second, it reduces the latter's sensitivity to the occurrence of strikes. Then, this condition may be interpreted as saying that strikes will be positive in equilibrium, under imperfect commitment, when the government is quite efficient at shielding its re-election probability by expanding employment-generating public expenditures. Then, a high level of strikes will elicit a strong response in favor of employment. This is what the union is looking for.

As a check on the plausibility of the necessary condition stated at proposition 3, which may seem a bit complex, let us work out a simple parameterized example. Assume that, over the relevant range, the function governing  $q$  obeys the following specification, where  $\eta$ ,  $\omega$  and  $\alpha$  are strictly positive parameters:

$$q = \eta(G - \omega S)^\alpha.$$

Then it can be checked by simple calculations, using (16), that the necessary condition presented at proposition 3 for  $S > 0$  may be written in this case as:

$$\alpha < \frac{1 - (q/\eta)^{1/\alpha}}{1 - \eta\theta m},$$

if  $1 > \eta\theta m$ . As both  $\theta$  and  $m$  are probabilities, these conditions do not seem too demanding if  $\eta \geq 1$ . If  $\eta < 1$ , it can only hold if  $q < \eta$ . If  $1 < \eta\theta m$ , then the inequality above must simply be reversed, and thus becomes irrelevant, as  $\alpha > 0$ , and  $\eta \geq 1$  holds necessarily in this case.

The intuition behind this result is simply that the union will find it worthwhile to exert pressure on the government to expand its employment-generating expenditures, by increasing the level of strike activity, only if it is worthwhile for the government to respond in such a way to such an increase. This occurs if the expansion in employment-generating expenditures can actually offset the fall in the expected marginal budgetary benefit, due to the fall in the probability of remaining in power resulting from the strike.

#### *Impact on the wage rate*

In order to complete the characterization of the strike-on equilibrium, we now analyze the level of the wage rate relative to the one that prevails when the government does not lack credibility. This can be discussed on the basis of the other first-order condition.

$$\frac{wU'(w)}{U(w) - \bar{U}} = \frac{-wm_w}{m(-)} - \frac{m\sigma G^*}{m} \frac{wG^*_w}{G^*} \quad (22)$$

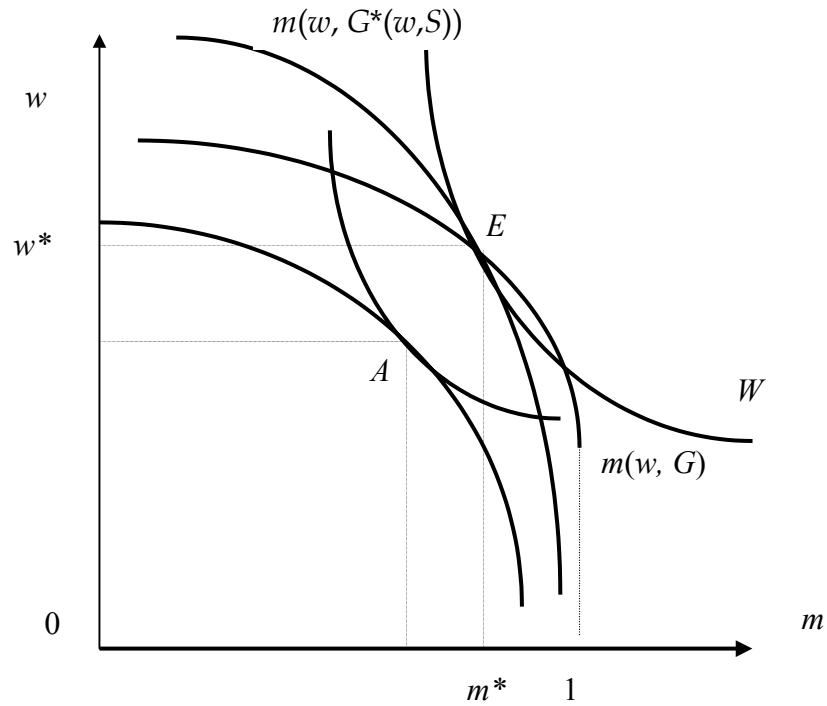
Compared to (5), this expression shows that the wage rate can either be higher or lower than in the no-strike equilibrium, depending on the sign of the second term on the right-hand side, i.e. mainly, on the sign of  $G_w^*$ . From (19), we know that the latter depends crucially on the sign of the cross derivative of the  $m(-)$  function. Moreover, the effect will depend on the elasticity of  $U'(w)$ . If the latter is larger than 1, the term on the left-hand side of (22) is a decreasing function of  $w$ , so that the wage rate will be higher than in the no-strike equilibrium if  $G_w^* > 0$ . From (19), this occurs if :

$$q_G m_w + q m_{Gw} > 0. \quad (23)$$

This implies in particular that an increase in the government's employment-generating expenditures reduces the marginal impact of the wage rate on the rate of employment, measured positively (*i.e.* makes it less elastic). This set of conditions seems rather realistic for developing countries, where workers can be expected to be strongly risk-averse, while employment-generating public expenditures can plausibly be assumed to reduce the elasticity of the demand for labor, especially if they imply a lot of hiring in the civil service and in various parastatals.

Figure 2 provides an intuitive interpretation of this equilibrium. Point *A* is the no-strike equilibrium, as described in figure 1. Point *E* is the new equilibrium obtained in this section when the government cannot commit credibly. It is located on the  $m(-)$  curve corresponding to a higher level of employment-generating public expenditures, at a point of tangency between an indifference curve of the union and a curve describing the response of the rate of employment to a change in  $w$ , taking into account the endogenous increase in employment-generating public expenditures. The impact on  $m^*$  is represented as positive in figure 2, while it is in fact ambiguous. This assumes that the positive effects on employment of the increase in public expenditures, entailed both by the increase in  $w$  and in  $S$ , offsets the negative effect of  $w$ , given  $G$ .





**Figure 2: Equilibrium with Commitment Failure**

However, we could also get the same sign of the comparative statics of the wage rate between the no-strike and the strike-on equilibria by reversing, roughly speaking, these two sufficient conditions.

Defining  $\varepsilon = -wU''/U'$ , we can summarize the results of this comparative statics exercise with respect to the wage rate as :

**Proposition 4 :** *The wage rate is higher in the strike-on equilibrium than in the no-strike equilibrium*

$$\text{if } [(1-\varepsilon)(U(w) - \bar{U}) - 2w] \cdot [q_G m_w + q m_{Gw}] < 0.$$

Hence, beside the case sketched above, we could also predict that the wage rate would be higher in the strike-on equilibrium than in the no-strike equilibrium if (i) the workers had a low degree of risk aversion ( $\varepsilon < 1 - 2w/(U(w) - \bar{U})$ ), and (ii) employment-generating public expenditures did not affect significantly the slope of the employment-rate function.

## 5. Empirical test on Bangladeshi strike data.

We now turn our attention to the empirical test of the main proposition resulting from this theoretical framework, *i.e.* that the incidence of strike activity should go up when the degree of credibility of the government goes down. In Salmon (1998), a similar test is performed with the wage rates of the unionized sectors. The main empirical issue is to find some proxies for capturing the credibility of the government's commitment not to give in to the pressure of the unions. Our prior assumption is that the credibility of the government is weak just before the elections, while it is stronger after the result is known. The government is tempted to have a more expansionary policy when election time is coming, as this may increase its re-election probability, while its costs in terms of inflation or budgetary restrictions will only come up in the future, and might be borne by the future government, should the election turn adversely. In the terms of the theoretical model of the previous sections, the proximity of election time may be viewed as a downward shift of the  $q(-)$  function, for any value of  $v(-)$ , as this reduces exogenously the cost of bringing the government down. Hence, we expect the probability of a strike occurring to be affected positively by the approach of an election. Moreover, during the first part of the period covered by our data, there was a military dictatorship, under General Ershad. It can be argued that this type of government is potentially more credible for resisting the demands of the urban crowd than the more shaky democratic ones that followed, as it is less influenced by marches and demonstrations, even if their probable impact is negative on the median voter. After all, this government seized power by a coup, without much democratic scruple. Nevertheless, General Ershad was eventually brought down by popular unrest, with massive and repeated marches and demonstrations, with an unusual number of marchers. These were bloodless events, but involving a momentous mobilization. It is thus worthwhile

to test whether his government was more or less credible, in its commitment to resist popular pressure than the democratically elected ones that followed.

The data on strikes have been collected by Francesco Goletti in the regional press of Bangladesh between January 1988 and December 1992, for the industrial and the transport sectors. We estimate several equations using these data, which are presented at table 2. They are based on a probit analysis, aiming at identifying the main determinants of the probability of at least one strike occurring somewhere in the country on any given month. The theoretical analysis presented above, and especially propositions 1 and 3, predicts that strikes should mainly be observed when the government has a low credibility. For this purpose, we have constructed a dummy variable taking the value 1 when at least one strike occurred in any district in the country sometimes during a month. We have performed these estimations for the whole sample, and then by separating the industrial sector from the transport sector. Both the necessary and the sufficient conditions presented at proposition 3 involve a potentially sector-specific derivative  $m_G$ , measuring the impact of public expenditures on the probability of being employed. There is no reason why we should expect it to be the same in both the industrial and the transport sectors. The lagged values of the number of strikes in either sector is included in the equations, in order to take care of the inertia that characterizes these series, as can be expected at the monthly frequency.

Then come the variables related to the political cycle. Three elections took place at the national level and five elections took place at the local level during our period of observation. Table 1 lists them, distinguished by type, and provides the number of voters concerned by each of them. The elections are taken into account by a dummy variable indicating the three or four preceding months. We have experimented with different definitions of our election variable in the equations presented at table 2 and table 3, without affecting drastically the results. Our sample stops in December 1992, but we have taken into account the months preceding the January 1993 elections. The local elections are taking place either at the 'Union

Parishad' level, i.e. at the level of local governments, or at a lower level, namely the 'Upzila Parishad'. We have also included a dummy variable for the '*hartals*' (demonstrations) called at the national level by the unions and the political parties.

**Table 1: List of Elections in our Sample Period**

Date	Elections	Number of voters	Classification
February, 10, 1988	Union Parishad	47 millions	Local body election
March, 3, 1988	Parliamentary	49,8 millions	National
January, 28, 1989	Pourashava	NA	Local body election
March 14-25, 1990	Upzila Parishads	45 millions	Local body election
February, 27, 1991,	Parliamentary	62 millions	National
September 1991	Referendum	NA	National
January, 22- February 06, 1992	Union Parishad	49 millions	Local body election
30 January 1993	Pourashava	NA	Local body election

Source : Bangladesh Election Commission.

We use as control variables the change in the quantity of money, with a view to control for the impact of the business cycle, with an expected positive sign, as well as the change in the informal sector real wage, in order to capture the changes in the relative wage in the formal and the informal sector, while avoiding to include the real wage in the formal sector, which is likely to be endogenous. This should capture the cost of loosing a job in the formal sector. We thus expect more strikes when the informal sector wage goes up. We also take into account natural disasters, like cyclones and floods, unfortunately very frequent in this country. We expect them to have a negative impact on the occurrence of strikes, as public expenditures are then quite naturally tied up for relief operations, and are unlikely to be diverted for employment-generating public actions, whatever the unions activity. Moreover, at such times, the impact of the strikes on the PRA would not be in favor of the unions.

The results are presented in table 2. The first three columns do not separate the industrial and transport sectors. The next three columns only concern the industrial sector, while the results for the transport sector are presented in the last three columns. The fit is significantly better for the industrial sector than for the transport sector. Within each group of three columns, the results differ by the definition used for the election variable. In column (1), the included variable is a dummy which takes the value 1 during the four months before any election listed in table 1. In column (2) the national and the local elections are distinguished, and are still indicated by a dummy taking the value 1 over the four preceding months. In column (3), the national and local elections are again separated, but now indicated by a dummy for the three preceding months only. The results suggest that only the national elections matter at this level of analysis, whether they are indicated by the three or four preceding months. The results for the industrial sector are presented in the next three columns, which show qualitatively similar results than in the preceding three columns. All the estimated coefficients, which measure the marginal effects of the explanatory variables, are larger in size, but of the same sign and level of significance, except for one. Now, we find that the distinction between local and national elections does not matter. Hence, the impact of the electoral periods is positive and significant for the industrial sector, as predicted. The results for the transport sector are noticeably different. In particular, the elections are either insignificant, or have the wrong sign when measured as the four months preceding the national elections. This is a puzzling result, which might be a reflection of the fact that when the others are on strike, they need more transport services to go and participate in marches and demonstrations. They would probably be accused of breaking the strike if they were stopping their activity at these times.

Although the military dictatorship period witnessed a lower level of strike activity than the subsequent democratic one, this does not seem to be due to a higher level of credibility for this government. The coefficient for this dummy variable is never significant

in any of the columns. The impact of national demonstrations is positive and significant for the industrial sector, and the sum of the two, while it is negative for the transport sector, but not significantly so. This is a surprising result, unless it captures the fact that transportation services are required when large demonstrations are organized in Dhaka, the capital city, providing the transporter with an incentive to remain active at that time. However, it is not significant. The impact of natural disasters conforms with the theory in the industrial sector, as strike activity subsides when they occur, as unions cannot hope in this case to get an expansion in employment-generating expenditures. However, it is not significant in the transport sector. The signs of the other control variables do not reject the model either. Increases in the quantity of money impact positively on the occurrence of strikes, as the unions probably seek to grab a share of the resulting expected boost in economic activity for their members. A similar impact occurs when the real wage in the informal sector goes up, reducing the expected cost of losing one's job in the formal sector.

Table 3 presents another set of results obtained by taking election time into account differently. Now, a separate dummy variable is entered for each preceding month before the elections. Only the estimated coefficients concerning the political variables is presented in this table, for the sake of simplicity. In the first three columns, the national and local elections are not separated, while they are in the next four ones. The only new result brought about by this change is that we can see that it is mainly three or four months before the elections that strike activity is significantly affected. It suggests that unions want to leave some time to the government to respond to the strikes.

The marked difference in results between the two sectors may be due to some extent to the differences in structure that characterize their firms. In the industrial sector, there are some large firms, including state-owned ones, and the government is involved in the bargaining between the firms and the unions. Wage bargaining is organized in a tripartite way in this sector, while the government stays away from the transport sector. The garment

sector, for example, attracts a lot of attention from the government, as it is viewed as the most important stepping stone on the way to industrialization. Azam and Shahabuddin (1999) describe the efforts made by the Bangladeshi government to attract the remittances of the emigrant workers in the oil-producing countries, and to recycle them for financing the development of this sector. The transport sector is dominated by small private firms, and the government does not get involved in the bargaining between the firms and the unions. It thus seems politically less sensitive than the industrial sector. This fits quite well with our results showing that strikes in this sector seem less politically motivated.

## **6. Conclusion**

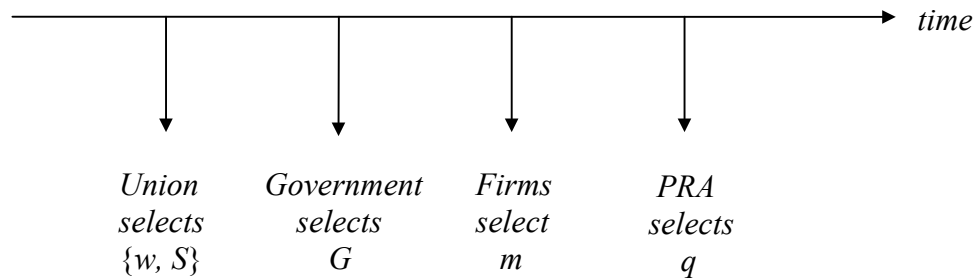
The empirical tests performed in this paper with the strike data from Bangladesh do not reject the main prediction of this paper, namely that the level of strike activity can be explained to some extent by political considerations. The results are generally better for the industrial sector than for the transport sector. During the months preceding an election, the government loses its credibility in its commitment not to expand employment-generating public expenditures with a view to increase its chances of remaining in power. This triggers an increase in strike activity, at least in the industrial sector, as unions try to make the best of the expected boost in the demand for labor. This was also true when the military dictatorship was in power. These results are suggestive that the political dimension of trade union activity is probably an important variable to take into account for understanding their behavior in developing countries, at least as far as the industrial sector is concerned. It is probably also a dimension worth investigating in various developed countries.

This prediction results from a simple game-theoretic model with imperfect information, in which the government cannot commit credibly to a given level of employment-generating public expenditures. This model predicts that, were the government fully credible, no strike would take place in equilibrium. However, the lack of commitment

provides an incentive for the unions to bet on an increase in employment-generating public expenditures, which the government is then induced to deliver in order to defend its chances of remaining in power. Hence, under certain conditions spelt out in the paper, a positive level of strike activity occurs in equilibrium. Such a prediction is not very common in the theoretical literature, which focuses most of the time on the relationship between the unions and the firm, while we have emphasized here the game that is taking place between the trade union and the government, taking due account of the third player, the median voter or other politically representative agent.

### Appendix : Timing of the game

Figure A.1 presents the timing of the game described in the paper when the government cannot commit credibly to an announced level of employment-generating public expenditures.



**Figure A.1: The Time Line**



<b>Table 2: Estimation Results</b>		Probit (1)	Probit (2)	Probit (3)	Probit (4)	Probit (5)	Probit (6)	Probit (7)	Probit (8)	Probit (9)
		All sectors	All sectors	All sectors	Industrial sector	Industrial sector	Industrial sector	Transport sector	Transport sector	Transport sector
Change in the informal sector real wage		2.403*** (2.91)	2.422*** (3.03)	2.238*** (3.01)	7.512*** (2.75)	7.758*** (2.67)	7.316*** (3.01)	5.090*** (2.21)	5.487*** (2.35)	5.322*** (2.33)
Change in the quantity of money		3.779*** (2.67)	3.391** (2.61)	3.275*** (2.64)	7.318*** (2.70)	6.231*** (2.88)	6.637*** (2.86)	11.902*** (2.90)	12.304*** (3.07)	11.898 (2.81)
Natural disaster		-0.266*** (-2.96)	-0.281*** (-3.63)	-0.227*** (-3.15)	-0.918*** (-3.06)	-0.732*** (-2.92)	-0.969*** (-3.23)	-0.101 (-0.32)	-0.264 (-0.97)	0.103 (0.27)
Log number of strikes in the industrial sector (-1)		0.167*** (3.29)	0.147*** (3.61)	0.139*** (3.49)	0.496*** (2.97)	0.448*** (2.82)	0.417*** (2.99)	0.427*** (2.77)	0.449*** (2.93)	0.585*** (3.48)
Log number of strikes in the transport sector (-1)		0.084*** (2.74)	0.078** (2.53)	0.078** (2.47)	0.168*** (2.32)	0.167*** (2.39)	0.155** (2.40)	0.276** (2.12)	0.307** (2.27)	0.263** (2.17)
Military dictatorship		-0.036 (-0.80)	-0.047 (-1.04)	-0.045 (-1.04)	0.021 (0.24)	0.018 (0.24)	-0.053 (-0.52)	-0.175 (-1.05)	-0.085 (-0.52)	-0.245 (-1.51)
National Political Demonstration		0.347*** (2.98)	0.314*** (3.17)	0.302*** (3.25)	0.894*** (3.52)	0.816*** (3.62)	0.826*** (4.06)	-0.123 (-0.72)	-0.078 (-0.46)	-0.040 (-0.24)
Election period defined as 3 months before election	National elections			0.088* (1.75)						
	Regional elections			0.057 (1.53)						
	All elections					0.241** (2.01)			-0.002 (-0.01)	
Election period defined as 4 months before election	National elections		0.118** (2.07)				0.389** (2.33)			-0.892*** (-2.66)
	Regional elections		0.044 (1.06)				0.228** (2.07)			-0.238 (-1.12)
	All elections	0.050 (0.97)			0.250* (1.88)			-0.219 (-1.07)		
Intercept		-0.145** (-1.97)	-0.117** (-2.52)	-0.112** (-2.45)	-0.583*** (-2.69)	-0.527*** (-2.65)	-0.445** (-2.56)	-0.330 (-1.35)	-0.509** (-2.31)	-0.375** (-1.97)
Number of observations		58	58	58	58	58	58	58	58	58
Log. Likelihood		-15.59	-15.28	-15.23	-17.94	-17.70	-17.57	-26.56	-27.18	-24.61
Pseudo R2		0.55	0.56	0.56	0.53	0.54	0.54	0.33	0.32	0.38

Notes : marginal effects. T-ratios corrected for heteroscedasticity. \*\*\* : significant at 1% ; \*\* : significant at 5% ; \* : significant at 10%.

**Table 3 : Marginal Effects of the Political Variables on the Probability of Strikes.**

	Political variables				Political variables			
	All elections	Military dictatorship	National political demonstration		National elections	Regional elections	Military dictatorship	National political demonstration
<b>All strikes</b>								
1 month before election	+0.098**	-0.036	+0.304***		-0.156**	+0.092	-0.069	+0.399***
2 months before election	+0.052	-0.038	+0.317***		-0.067	+0.048	-0.068	+0.397***
3 months before election	+0.069*	-0.020	+0.265***		+0.088*	+0.057	-0.045	+0.302***
4 months before election	+0.050	-0.036	+0.347***		+0.118**	+0.044	-0.047	+0.314***
<b>Industrial Strikes</b>								
1 month before election	+0.176	-0.057	+0.875***		-0.250	+0.233*	-0.093	+0.902***
2 months before election	+0.149	-0.0422	+0.842***		-0.002	+0.181*	-0.082	+0.863***
3 months before election	+0.241**	0.018	+0.816***		+0.076	+0.249**	-0.077	+0.849***
4 months before election	+0.250*	-0.021	+0.894***		+0.389**	+0.228**	-0.053	+0.826***
<b>Transport Strikes</b>								
1 month before election	+0.333	-0.028	-0.069		a	+0.413*	-0.144	-0.022
2 months before election	+0.170	-0.047	-0.084		a	+0.172	-0.158	-0.047
3 months before election	-0.002	-0.085	-0.078		-0.687**	-0.011	-0.196	-0.047
4 months before election	-0.219	-0.175	-0.123		-0.892***	-0.238	-0.245	-0.040

Notes : This table presents the marginal effects of the political variables. The estimated equations include also the same variables as in table 1. Their coefficients are not presented here.

a : variables omitted because they predicted perfectly the failures.

\*\*\* : significant at 1% ; \*\* : significant at 5% ; \* : significant at 10%.

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