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HOW DOES GOVERNMENT WAGE POLICY AFFECT WAGE BARGAINING IN BRAZIL? *

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Abstract

Over the last thirty years, Brazil has had official wage policies, with the government determining the minimum rate of adjustment for all wages in the formal sector of the Brazilian economy. The rise in union activism after 1978 and the consequent gradual return of collective bargaining reduced the scope of influence by the government to determine the exact wage rate of the economy. Some authors viewed this phenomenon as a sign of decrease in the importance of the wage policy. In this paper, we argue instead that government wage policy remained important after the resurgence of union activism in Brazil, because it shifted the focus of discussion on the bargaining table to wage adjustment in excess of the official wage adjustment numbers. The importance of wage policy in affecting wage determination is theoretically examined by solving a right-to-manage model of wage bargaining. The innovation here is to consider the utility associated with the institutional wage as one of the components that form the union's fall-back utility level. Our main finding is that the institutional wage affects the result of the wage bargaining. We show that, in the most plausible case, a rise in the institutional wage raises the bargained wage, even though the effect is ambiguous in general. We conclude by arguing that empirical tests of the importance of wage policy in Brazil should take these theoretical considerations into account, instead of using ad-hoc models of wage determination, as had the previous empirical literature, which in most cases simply tested the null hypothesis of an unitary institutional wage coefficient.

1. Introduction

Over the last thirty years, Brazil has had official wage policies. According to one of its creators in 1965, the main objective of the introduction of a wage policy in Brazil was to substitute an endless game of strikes and pressures for a simple arithmetic formula (see Simonsen, 1983).

By means of an Wage Adjustment Law, the government determines the minimum rate of adjustment of all wages in the formal sector of the Brazilian economy. The specific format of the Wage Adjustment Law has changed several times since 1965, as had the Brazilian political-institutional environment. Its importance in the wage formation process, however, has always been an object of interest.

The attempt to centralize wage determination, explicitly recognized by its formulators, has been extensively studied over the last fifteen years. Most authors argued that the repression of unions and the control of labor justice decisions resulted in a centralized wage formation process from 1965 to 1978 (*e.g.* Amadeo, 1994, and Camargo, 1990). However, some others argued that individual contracts responded mostly to market forces even in that period, since there were always ways to avoid complying with the official wage adjustment through turnover and recontracting workers without specific human capital (*e.g.* Smith, 1988).

The rise in union activism after 1978 and the consequent gradual return of collective bargaining reduced the scope of influence by the government to determine the exact wage rate of the economy. Most authors (see Amadeo and Camargo, 1993, and Carneiro and Henley, 1994) viewed this phenomenon as a sign of decrease in the importance of the wage policy. This would be a correct interpretation if one associates the importance of the wage policy to a situation of complete absence of wage drift, *i.e.* the case in which bargained wages strictly follow the institutional wage[1]. However, the presence of wage drift does not mean that the institutional wage is not considered in the bargaining table. On the contrary, one could argue that the government wage policy is important exactly because it changes the focus of discussion on the bargaining table to wage adjustment in excess of the official wage adjustment numbers. In other words, what is bargained over is the wage drift. In that

[1] Throughout the text, we call the institutional wage the wage that would result if the official wage adjustments were strictly applied.

interpretation, one could argue that the wage policy remained important throughout the period.

Most of the empirical literature was concerned with measuring the importance of the institutional wage *vis-a-vis* market forces in the wage formation process. Time series regressions of nominal average industrial wages (in some rare cases, real wages; in others, log-differenced nominal wages) on some measure of indexation (past inflation or the institutional wage) and some measure of slackness in the labor market (unemployment or the GNP gap) were typically used to test the institutional hypothesis against the market hypothesis.[2] The effectiveness of wage policy was examined by testing the null hypothesis that the institutional wage coefficient was equal to one.

However, all papers in this empirical literature are plagued by the presence of unit roots in the nominal (and real) variables investigated. Spurious regressions with R^2's of 0.997 and t-statistics above 50 (in some cases, above 280) were typically reported.

This paper takes a different approach. Instead of starting with an ad-hoc specification of a reduced form model of wages with the institutional wage and unemployment as explanatory variables, we try to obtain it by solving a right-to-manage model of wage bargaining. In the right-to-manage model, unions (or, more generally, a group of workers with some degree of bargaining power) bargain with a firm over wages in the first stage. The firm, then, determines the employment level.

The innovation here is to introduce the institutional wage as a variable considered in the wage bargaining stage. We assume that unions take the utility associated with the institutional wage as one of the components that form its fall-back utility level, *i.e.*, the level of utility that unions would obtain if negotiations with the firm break down. The institutional wage is only one of the components of the fall-back utility level, since we assume that unions care for employment and, since the firm determines the level of employment in the second stage of the model, some workers may not remain employed at the institutional wage.

We believe that our model captures reasonably well the effects of the official wage policy on the wage bargaining process for most industrial sectors in Brazil since the resurgence of union activism in the late 1970s, especially for those that can not easily use turnover and recontracting practices to avoid paying the institutional wage floor.

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[2] For a feeling of the wage policy empirical literature of the 1980s, see Camargo (1984, 1990), Modiano (1985), Reis (1985), Gonzaga (1988), Luque and Chahad (1985), and Smith (1988).

The model has some similarities with the wage drift literature applied to countries with sectoral (or nationally) centralized wage negotiations (*e.g.* Holden, 1989). In these countries, firms and workers bargain at the firm level for wages in excess of the sectoral (or national) wage. In other words, the bargaining decides the size of the wage drift. Contrary to this literature, however, we do not assume that everyone would be employed at the sectoral (or national) wage, or the institutional wage in our case. More reasonably, we assume, instead, that fall-back incomes depend on the probability that the representative worker remains employed at the institutional wage.

The main result of the model is that the institutional wage affects the result of the bargain, even in the case when it is not binding, in the sense that the bargained wage is greater than it. We show that, in the most plausible case, a rise in the institutional wage raises the bargained wage, even though the effect is ambiguous in general.

2. Institutional Background

In the widely used terminology of collective bargaining by Calmfors and Driffill (1988), the Brazilian system can be classified as a hybrid case with a very low level of synchronization and an intermediate level of centralization (see Amadeo, 1994). This type of collective bargaining system is known for generating the most inefficient macroeconomic outcome, since it tends to produce excessive wage increases and real wages relatively unaffected by unemployment movements. It also generates a lack of macroeconomic coordination in wage formation.

Wages are negotiated at the individual or collective level. In collective bargains, unions organized by occupation and at the municipal level negotiate with firms in a very desynchronized way. Each month, known as the "base date" (*data-base*), a certain part of the occupied labor force is bargaining over wages. This group of workers will bargain again with the firm after one year, always in the same "base date".

The government tries to influence this bargaining process by fixing each month a rate of nominal wage adjustment by law, which is intended to be an adjustment floor for all formal wages negotiated in Brazil. Both collective and individual wage contracts, above the minimum fixed in the wage law, are negotiated by the firm with their workers.

The specific format of the Wage Adjustment Law has changed more than 20 times

over the last thirty years, most of them including modifications in the frequency of wage adjustment.[3] For instance, Brazil had annual wage adjustment between 1965 and October 1979, and since the Real Plan of July 1994; semester adjustment between November 1979 and February 1986; an automatic wage adjustment rule which was triggered any time the accumulated inflation rate since the last adjustment reached 20%, from March 1986 to May 1987; monthly adjustment based on the average inflation of the previous quarter between July 1987 and December 1988; and several policies since January 1989, including two brief periods with no wage policy from January 1989 to April 1989 and from March 1990 to May 1990.

Some of these modifications occurred as a response to the rise of union activism, known as "new unionism", in the late 1970s; others as a response to the rise of inflation. Although the frequency of wage adjustment varied considerably over the last thirty years, collective bargaining has always been held once a year.

Despite the huge variation in practical details of each law, the official wage policies can be generally classified in three types. The first one prevailed from 1965 to 1979 and stipulated that nominal wages should be adjusted once a year, at the *data-base* of each occupation, following a formula which was approximately equivalent to the average of the past and the expected future rates of inflation. The second type of wage policy is one of (usually partial) indexation to past inflation and has been used since 1979, with the exception of the periods following the Cruzado Plan and the Collor Plan (no official wage policy). Most wage policies of that type had different indexation percentages along the wage distribution, in general protecting more the lowest wages (below three minimum wages). The third type was the trigger rule adopted from February 1986 to June 1987 described above.

Each of these types of wage policy has different effects on the inflation rate, on the degree of protection of real wages with respect to inflation, and to overall macroeconomic coordination. However, an analysis of these effects is not the objective of this paper. Our only interest on the specific formats of the various types of wage policies is to help us to construct an institutional wage index in a future empirical application of the model derived here, following the procedure suggested by Gonzaga (1988), and used in Camargo (1990).

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[3] For a description of the official wage policies since 1965, see Gonzaga (1988) and Camargo (1990).

The degree of control by the government to check compliance with the law, of course, varies with the political-institutional environment and with other factors, such as the sector and the size of the establishment under analysis. Before 1979, for example, there were not even penalties for those firms that utilized turnover and recontracting in order to avoid paying the institutional wage adjustment floor.

On the other hand, the rise in union activism of the late 1970s should have changed the focus of the bargaining table discussion to wage adjustments in excess of the institutional wage, since organized workers were certain to get at least the official wage adjustment. In other words, what should have started to be bargained over is the wage drift. In that sense, the wage policy would have remained important despite the rise in union activism. The question here is how important.

Therefore, it is still an empirical question whether wages were set in levels above or at least equal to the institutional floor. However, in order to formulate correctly this empirical question, one needs to understand theoretically how the institutional wage would affect the wage bargaining process. This is the objective of the next section.

3. The Model

This section presents a right-to-manage model of wage bargaining to assess the influence of the institutional wage, as well as other variables such as the alternative (market) wages and the unemployment rate, on the bargained wage and the resulting employment level. The main innovation here is to depart from the usual assumption that the union's fall-back utility is given by the alternative wage, *e.g.* Layard *et al.* (1991). Instead, we focus on the role played by the institutional wage in the union's utility function. We argue that what enters the union's utility function are wages in excess of the institutional wage fixed by the government, which is viewed as a floor of wage adjustment at the bargaining table. Moreover, we assume that unions also care for employment. Therefore, the union's objective function is the difference between the expected utility of a bargained wage and the expected utility of the institutional wage. For both bargained and institutional wages, there is a certain probability (that depends on the labor demand function) that the representative worker does not remain employed, in which case he/she receives the alternative wage.

We start with a very general right-to-manage model to reach the main theoretical

results. In the next section, we use more specific objective functions for both parts involved in the bargain to reach a more explicit function relating the bargained wage to its underlying determinants (following the methodology in Layard *et al.* (1991)).

The right-to-manage model may be considered as a two-step decision making process. In the first step, firm and union bargain over wages. In the second step the firm unilaterally chooses the level of employment which implies that the bargaining outcome always lies on the labor demand curve. Rationality implies that both agents (firm and union) are aware of the reaction function of the firm, *i.e.*, the labor demand relationship, when bargaining over wages in the first step. A well-known result in this literature is that the outcome is, in general, not efficient, since workers care for employment and this is not considered in the bargaining-over-wages-only first stage.[4] We believe, however, that this model performs better the task of describing the bargain between firms and unions in Brazil, where, in general, bargains do not involve the employment level, which is unilaterally chosen by the firm.

Profits $\Pi(W)$ are defined in the general model as the difference between revenues and the wage bill. Since in a right-to-manage model the outcome is always on the labor demand curve, the objective function of the firm is:

$$\Pi(W)=Max_N\ R(W,N)-WN \qquad (1)$$

where R(W,N) is the revenue function, W is the wage rate and N is employment. Note that $\Pi(W)$ is decreasing in W, and, as a result of the envelope theorem, $\dot{N}= -\Pi_W(W)$, which defines the labor demand curve.

The representative worker in the union has an utility function which depends on the wage, the employment level, the exogenous membership level M and the alternative income A, *i.e.*, U=U(W, N, M, A). Using again the fact that the right-to-manage contract must lie on the labor demand curve, we get $U=U(W, -\Pi_W(W), M, A)$, or simply U(W, M, A). To correctly interpret the results of this model, the reader must have in mind that the way we postulate the problem (like in Blanchflower *et al.*, 1989) is slightly different from usual. It is quite common in the wage bargaining literature to define profits and utility as functions of both employment and wages, and then maximize the Nash bargain subject to the labor demand relationship.

[4] Oswald (1993) shows that in the special case of inverse-seniority layoffs the right-to-manage model has an efficient outcome.

Here we are simply incorporating these restrictions on the objective functions and solving an unrestricted maximization problem, which is obviously equivalent to the usual procedure.

Wage determination is modelled as an asymmetric Nash bargain of the form:

$$Max_{W}[U-U^{*}]^{b}[\Pi-\Pi^{*}]^{1-b} \qquad (2)$$

where b represents the union's bargaining power ($0 \leq b \leq 1$), U^* is the union's fall-back utility and Π^* is the fall-back profit level of the firm. The union's (firm's) objective function is given by the difference between the utility (profits) the representative member (firm) gets with the bargained wage and the fall-back utility (profits). The fall-back utility (profits) represents the utility (profits) the union (firm) attains if the bargain ends up in conflict. U^* is frequently characterized as the income level a representative union member gets in the case of a strike, incorporating strike funds, earnings from an alternative occupation during the strike and/or unemployment benefits[5].

We assume, instead, that fall-back utilities are closely associated with the institutional wage. As discussed in the previous section, the Brazilian Labor Legislation works in such a way that whenever the bargaining process fails, the institutional wage prevails. Moreover, as discussed above, the institutional wage is viewed as a floor in wage negotiations, which implies that the bargained wage is never below it. This restriction may, nevertheless, be less effective than we are assuming. If the institutional wage is set in an "excessively high" level, for example, the union may be willing to accept a smaller wage in exchange for a higher employment level. In the Brazilian case, however, this seems not to have happened over the

[5] Layard *et al.* (1991), for example, proposes $U^* = qW^e + (1 - q)B$, where W^e is the market wage, B is the unemployment benefit, and q is the probability of finding an alternative job; q is decreasing in the unemployment rate and increasing in a variable representing matching conditions. Carneiro and Henley (1994) suggest that U^* should incorporate the informal sector wage. They argue that a worker in strike is likely to turn temporarily to the informal sector as a source of alternative income.

last thirty years, so that ruling out this possibility does not seem to be unrealistic.[6]

In this case the Nash bargain is written as[7]:

$$Max_W\ [U(W,M,A) - U(W^*,M,A)]^b\ [\Pi(W) - t\Pi(W^*)]^{1-b} \qquad (3)$$

$$\text{s. t.} \qquad W \geq W^*$$

where W* represents the institutional wage, and the functions U(.) and Π(.) were previously defined. The fall-back profit level, tΠ(W*), deserves some comments. "t" is a constant that satisfies the inequality tΠ(W*) < Π(W). Since Π(W) is decreasing in wages and we assume W* is a lower bound for wages, we must assume that 0<t<1 for the problem to make sense. This constant may be interpreted as capturing the existence of some cost to the firm that arises from the conflict itself, including both institutional factors, such as production lost in the time interval the Labor Court takes to arbitrate over a labor conflict, and factors associated with the bargaining power of the union, such as the possibility of damaging machinery. One should note that if the inequality stated above fails to hold it would always pay the firm to force a conflict and call the Labor Court to obtain the institutional wage. In fact, in this last case, equation (3) would be meaningless, since the term related to the firm's objective function in the bargain would be negative.

The first order condition of the maximization described in (3) is an implicit function relating the bargained wage to the exogenous variables in the model. There are two extreme cases. The first one occurs when we set "b" equal to unity. In this case, equation (3) becomes the monopoly union model, a framework in which the union picks the wage and, given this choice, the firm chooses the employment level. We will use the notation W^m to represent the

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[6] A more problematic issue, however, is that the institutional wage plays the role of a minimum wage to workers already employed at the firm, but not to entrants. Therefore, despite some penalties in the labor legislation, some firms are able to use turnover, firing its current workers right before a new bargaining period, and contracting new workers at a lower wage. We assume in our model either that penalties are actually enforced or that union workers have first call on jobs. However, we have a feeling that the practice of turnover and recontracting has not been negligible in Brazil. This is certainly an important topic that should receive special attention in further research.

[7] This general functional form is very similar to the one used by Blanchflower *et al.* (1989), with the exception of the treatment given here to the profit fall-back $t\Pi^*$ and to the interpretation of U^* as the expected fall-back income associated with the institutional wage.

wage choice under the monopoly union framework. The second extreme case occurs when "b" is set equal to zero (the union has no bargaining power), a case in which the firm chooses both wages and employment. Since profits are decreasing in wages, the firm will obviously choose employment subject to the binding restriction of paying the lowest possible wage, W*. In this paper, we focus on the case where $0 < b < 1$. The resulting wage W is then such that $W^* < W < W^m$.[8]

Taking logs and maximizing the Nash maximand in (3) results in:

$$\frac{bU_W}{U(W,M,A)-U(W^*,M,A)} - \frac{[1-b]N}{\Pi(W)-t\Pi(W^*)} = 0 \qquad (4)$$

Or in a more interesting form:

$$U(W,M,A) = U(W*,M,A) + \frac{b}{[1-b]}\frac{\Pi(W)-t\Pi(W^*)}{N}U_W(W,M,A) \qquad (5)$$

The last term in the right-hand side of (5) shows how profit gains (in excess of the fall-back profit level) per worker are captured by workers. Equation (5) thus states that the utility level resulting from the bargain is equal to the fall-back utility level plus a profit-sharing term which coefficient depends positively on the union's to firm's bargaining power ratio and on the partial derivative of the union's utility with respect to the wage.

We use equation (5) to make simple comparative static exercises. The effect of an increase in union's bargaining power, b, on the bargained wage W is given by:

$$\frac{\partial W}{\partial b} = \frac{\frac{\Pi(W)-t\Pi(W^*)}{N[1-b]^2}U_W}{U_W + \frac{b}{(1-b)}\frac{\Pi(W)-t\Pi(W^*)}{\Pi_W(W)}U_{WW} + \frac{b}{[1-b]}[1-\frac{\Pi(W)-t\Pi(W^*)}{NW}\varepsilon_{WN}]U_W} \qquad (6)$$

where, for notational convenience, we use U_W to represent the partial derivative of U(W, M, A) with respect to the wage evaluated at the bargained wage W. U_{WW} is the second partial derivative of U(W, M, A) with respect to W, ε_{WN} is the wage-elasticity of labor demand and N* is the employment level the firm chooses at wage W*.

[8] The restriction is never binding in this case, given the assumptions made above.

Using equation (4) and the second order condition for the maximization problem (3), which we assume to be satisfied, it is easy to show that the denominator of equation (6) is positive. Equation (4) also implies that $U_w > 0$ in the vicinity of the equilibrium, which implies that the numerator of equation (6) is also positive. Therefore, our model predicts unequivocally, as expected, that an increase in the union's bargaining power 'b" leads to a higher bargained wage.

The effect of the institutional wage on the bargained wage is given by:

$$\frac{\partial W}{\partial W^*} = \frac{U_{w^\bullet} + \frac{tb}{1-b}\frac{N^*}{N}U_w}{U_w + \frac{b}{[1-b]}\frac{\Pi(W)-t\Pi(W^*)}{\Pi_w(W)}U_{ww} + \frac{b}{[1-b]}[1-\frac{\Pi(W)-t\Pi(W^*)}{NW}\varepsilon_{wN}]U_w} \quad (7)$$

where $U_{w^\bullet}$ is the partial derivative of U(W, M, A) with respect to the wage evaluated at the institutional wage W*.

A rise in the institutional wage has an ambiguous effect on the bargained wage[9] [10]. The second term in the numerator of (7) is certainly positive, representing the fact that a higher institutional wage reduces the fall-back profits of the firm. It follows that the firm becomes more fearful of entering a conflict, so it is more prone to accept higher wages.

However, the first term in the numerator, U_w, may be positive or negative. It represents the gain (loss) in the fall-back utility of the union resulting from an increase in the institutional wage. This term is negative whenever the marginal rate at which the union

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[9] Blanchflower *et al.* (1989) found that a rise in the fall-back utility unambiguously raises the bargained wage. It is noteworthy, however, that our result is more general, since they use much stronger assumptions, namely:

a) they assume U_{ww} is negative. Since U(W) incorporates both the direct and the indirect (via labor demand curve) effect of wages on employment, there seems to be no good reason for this condition to hold, except in a vicinity of the monopoly union wage.

b) they assume that the variable profit (gain) per worker is exogenous and independent of the bargained wage rate, a procedure that is clearly inadequate.

[10] This ambiguity results from the fact that we are making very few assumptions on the function U(W, M, A). In particular, since there is no reason to suppose that this function is concave, it is possible to have a global maximum satisfying $W > W^*$ and also be true that, starting from W*, the union would gain with a wage reduction, in which case U_w would be negative. Even if U_w is negative, however, the bargained wage may be greater than the institutional wage, so the condition $W \geq W^*$ may not be binding.

is willing to substitute wages for employment (keeping utility constant) is smaller than the slope of the labor demand curve, both in absolute terms, evaluated at (W*, N*). In this case the signal of (7) would be ambiguous. However, it is quite unappealing in intuitive grounds to think that a rise in the institutional wage would deteriorate the union's welfare in case of conflict. In our opinion, this case should be regarded as a mathematical curiosity, so that, in general, one should expect that a rise in the institutional wage would raise the bargained wage both because it results in a reduction of the fall-back profits and an increase in the fall-back utility. In this case, the effect of an increase in the institutional wage would unambiguously increase the bargained wage.

Note, however, that this effect depends on several parameters of the model, which is far more complex and interesting than the ad-hoc hypothesis of an unit coefficient that was usually tested in the empirical wage policy literature (see footnote 2). In the next section, we try to obtain a more specific version for the wage determination function.

4. Transition to Empirical Work

In order to obtain an explicit function relating the bargained wage to its fundamentals, that would be the basis for a future empirical work, we use some specific utility and revenue functions in our general model sketched above. We consider a risk-neutral union which treats each of its members identically. If employed, a union member receives the prevailing wage. If unemployed he/she receives the alternative wage A (which will be further specified later). Membership is fixed and normalized to one, so that the probability of employment of any member is equal to the employment level N. It follows from these assumptions that the expected utility and utilitarian approaches are equivalent[11]. We thus have $U(W,M,A) = N(W)W + (1-N(W))A$, where N(W) is the labor demand.

Since the firm always determines the employment level, even in the case of a negotiation break-down, the union's fall-back utility level must be $U(W^*,M,A) = N^*(W^*)W^* + (1-N^*(W^*))A$.

As in Layard *et al.* (1991), we assume that the production function is a constant-

[11] The assumption of fixed membership is crucial to establish the equivalence of these two approaches. Kidd and Oswald (1987) show that, in a dynamic context with varying membership, these approaches lead to different results.

returns-to-scale Cobb-Douglas, and that the firm faces a constant elasticity demand function. There are only two production factors: labor and capital. The bargain occurs in a short-run time horizon, so capital is fixed.

Within this framework, equation (3) may be restated as:

$$Max_{W}[N(W)W+[1-N(W)]A-N(W^{*})W^{*}-[1-N(W^{*})]A]^{b}[\Pi(W)-t\Pi(W^{*})]^{1-b} \quad (8)$$

The first order condition to equation (8) is given by equation (9), which is the specific version of equation (4):

$$\frac{b[N_{W}[W-A]+N]}{N[W-A]-N^{*}[W^{*}-A]} = [1-b]\frac{\alpha\kappa}{1-\alpha\kappa}\frac{N}{NW-tN^{*}W^{*}} \quad (9)$$

where $\alpha \in (0, 1)$ is the employment-elasticity of production and κ is a measure of product market competition ($\kappa = (\sigma - 1)/\sigma$, where σ is the price-elasticity of demand). Note that $\kappa \in [0, 1]$ for the relevant part of the product demand function, and is larger the closer the product market is to perfect competition. To obtain (9) we used the fact that, for the Cobb-Douglas production function, the profits to wage bill ratio is constant.

Equation (9) describes the bargained wage formation process in the specific framework we are considering. By totally differentiating it, we can evaluate the impact of each of the bargaining parameters on the bargained wage:

$$[\Phi\frac{N_{WW}[W-A]+2N_{W}}{N_{W}[W-A]+N}-\frac{\Phi^{2}}{b}-\frac{\Psi}{N}+\Psi\frac{N_{W}W+N}{NW-tN^{*}W^{*}}]dW=[-\Phi\frac{N_{W^{*}}[W^{*}-A]+N^{*}}{N[W-A]-N^{*}[W^{*}-A]}+$$

$$+\Psi\frac{t[N_{W^{*}}W^{*}+N^{*}]}{NW-tN^{*}W^{*}}]dW^{*}+\Phi[\frac{N_{W}}{N_{W}[W-A]+N}+\frac{N^{*}-N}{N[W-A]-N^{*}[W^{*}-A]}]dA-[\frac{\Phi}{b}+\frac{\Psi}{[1-b]}]db \quad (10)$$

where Φ is the left-hand side of (9), and Ψ is the right-hand side of (9).

Equation (10) implies that $\partial W/\partial b > 0$, just like in (6). It also implies that a sufficient condition for $\partial W/\partial W^{*}$ to be positive is:

The left-hand side of (11) is the absolute value of the slope of the labor demand curve

$$-N_{W^*} < \frac{N^*}{W^*-A} \quad (11)$$

at point (N*, W*). The right-hand side is the rate at which the union is willing to substitute wage for employment, also at (N*, W*). If condition (11) is satisfied a rise in the institutional wage results in a loss of employment (at that wage) that is smaller than the maximum loss the union would accept in order to be no worse than earlier (the marginal rate of substitution of wage for employment at (W*, N*)), so the union's fall-back utility rises with an increase in the institutional wage. As discussed earlier, this seems to be the most plausible case.

Unlike the rest of the literature, we find that the signal of $\partial W/\partial A$ is ambiguous[12]. A necessary and sufficient condition for this partial derivative to be positive is:

$$\varepsilon_{WN} > \frac{N^*W - NW}{N^*W - N^*W^*} \quad (12)$$

The alternative income affects the bargain in two distinct, conflicting, ways. It alters the wage/employment trade-off as it is regarded by the union. A higher alternative income makes the possibility of becoming unemployed less unattractive and thus tends to induce higher wage demands. But it also alters the relation between the utility at the initial equilibrium wage and the fall-back utility. Since the probability of becoming unemployed is higher with the bargained wage than with the institutional wage, a rise in the alternative income increases the difference between the utility attained with the bargained wage and the fall-back utility. Thus, although both U(W,M,A) and U(W*,M,A) increase with A, the union loses more if the bargain ends up in conflict as the difference between the two levels of utility increases, given the initial equilibrium wage. Therefore, this second effect makes the union more moderate in its wage demands in order to avoid conflicts.

The alternative income A is the income a worker expects to receive if laid-off. It captures the conditions of the labor market external to the firm. One simple way to model this variable is to assume that, when forced to leave the firm, a worker has a certain probability of finding a job in another firm, in which case his expected income is the average market

[12] See Layard *et al.* (1991), for example. Their unambiguous results, however, stem on a strong hypothesis, as they assume that the fall-back utility is equal to the alternative wage.

wage. If he fails to find a job, his income is zero (or equal to the size of unemployment benefits when existent). The probability of finding another job is likely to depend negatively on the unemployment rate "u" and positively on a variable μ representing matching conditions. Thus we have:

$$dA = p_u(u,\mu)W^a du + p_\mu(u,\mu)W^a d\mu + p(u,\mu)dW^a \quad (13)$$

where p(u, μ) is the probability of finding a job, and W^a is the average market wage.

Substituting equation (13) into (10) provides a characterization of the wage formation process in a right-to-manage model, relating the bargained wage to the institutional wage, the relative bargaining power of each part, the unemployment rate, the average market wage and the matching conditions in the labor market, with each coefficient depending on all parameters of the model.

5. Conclusions

In this paper we discuss the influence of the Brazilian government wage policy on the process of wage formation in sectors where workers have some bargaining power.

We use a right-to-manage model to obtain an equation of wage determination relating the bargained wage to its underlying fundamentals, giving special emphasis to the role played by the institutional wage. We show that the institutional wage affects the bargained wage through three basic channels. First, the institutional wage constitutes a lower bound to the bargained wage if we suppose the wage law is effective. The other channels are the fall-back utility and profit levels of the firm and the union.

Contrary to some other authors' view, the model shows that there is room for the claim that the institutional wage influences the bargained wage even in the case where the lower bound constraint is not binding. A rise in the institutional wage reduces the fall-back level of profits, making the firm more prone to accept higher wage demands to avoid conflict. It also affects, ambiguously, the union's fall-back utility. In the more intuitive case, a higher institutional wage results in higher fall-back utility, so the union loses less if negotiations with the firm break down. The result is that a higher institutional wage leads, in general, to a higher bargained wage and, consequently, to a lower employment level. This is not, however, a one-to-one relationship as tested in many empirical works. In fact, we argue that empirical

tests of the importance of wage policy in Brazil should take these theoretical considerations into account, instead of using ad-hoc models of wage determination, as had the previous empirical literature, which in most cases simply tested the null hypothesis of an unitary institutional wage coefficient.

The model also generates the standard prediction that a higher union's bargaining power leads to higher wages. However, a non-standard ambiguous relation between alternative income and the bargained wage was obtained. The ambiguity results from two conflicting effects. On one hand, a higher alternative income makes the menace of unemployment less fearful, and thus tends to make the union more aggressive in its wage demands. On the other hand, it also implies, given the initial equilibrium wage, a higher difference between the utility when the bargain ends up in agreement and the fall-back utility. Therefore the union loses more in the case where negotiations break down, so it may pay to be moderate in its wage demands to avoid conflict.

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