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ABSTRACT

The overlapping wage contract model, known as the staggered contract model, is expanded in an open economy context to include wage indexation to add some more realism to the model. In addition the effects of alternative assumptions about availability of information in wage negotiations are studied. It is shown that in the case of shocks in domestic costs indexation can improve economic stability if demand for the domestic good is price inelastic and wage negotiations are not sensitive to cyclical conditions. This contrasts strongly with static macro models where indexation reinforces the destabilizing power of supply shocks. With respect to shocks in the price of imported inputs, indexation reduces economic stability despite the fact that one could conjecture that indexation increases the responsiveness of wage contracts to shocks that affect domestic output.

INTRODUCTION

In macroeconomics it has been recognised for long that if wage earners are concerned not only about the purchasing power of the wages they receive but also about their wages relative to wages earned by others then nominal wages can be stickier than they would be otherwise and consequently, the necessary adjustment to various shocks is slow.

The most modern version of this idea has been developed by Taylor (1979). It is based on the observation that wage contracts for different groups are negotiated at different times (and sometimes the contracts differ even in their length, but this issue is ignored in these Taylor-type models). Thus the contracts overlap only partially. Since the various groups are concerned about their relative wages, they take into account both the previous contracts and expected future contracts negotiated by the other groups. This then produces the persistence of shocks over time. Of course, a deeper theoretical work would formalize the decision processes of the various groups, e.g. in the form of rivalry between different trade unions as in e.g. Jackman (1985). But this "more fundamental" approach does not lend itself easily to an analysis of the effects of various policy rules. Hence I stick to the "ad hoc" Taylor approach.

Recent macroeconomic analysis has also paid attention to real wage rigidities. Basic references are Gray (1976) and Fischer (1977) and more recently e.g. Karni (1983) and Simonsen (1983). Indexation in open economies has been studied e.g. by Aizenman and Frenkel (1985), Marston (1985) and Turnovsky (1983).

My purpose here is to study, in an open economy context, the implications of joint relative and real wage rigidities due to indexation on the persistence of shocks and on price and output variability. I shall view the wage indexation as a particular policy rule, which may or may not improve economic stability. My motivation for the study is factual: most multi-year wage agreements include indexation clauses. Indexation is prevalent also in many developing countries (see the volume edited by Dornbusch and Simonsen (1983)). Hence, it is important to analyse the connection between indexation and economic stability.

The Taylor models have been extended to open economies by Dornbusch (1980, 1982). He does not study the effects of wage indexation. Instead he considers the implications of an accommodative monetary policy rule and of a particular exchange rate policy rule (the PPP rule). His results thus provide a convenient point of comparison. Another extension has been made by Taylor (1985), who considers, in a multicountry setting, the interaction of monetary policies between different countries. But also in his model the nominal wages are rigid. With indexation nominal wages <u>of all groups</u> are flexible <u>in all periods</u>. Hence, one must make a distinction between the contracted base wage and the actual wage. The actual wage ruling in any period is the base wage adjusted as dictated by the indexation clause. In a related paper Buiter and Jewitt (1982) have tried to capture the idea of real and relative wage rigidity by assuming that the contract wage is set in a way that takes into account its expected purchasing power and the expected real value of wages earned by other groups. But even in their framework it still is true that the nominal wage once it is determined, remains constant over the contract period.

II THE MODEL

The model used is given by the following set of equations:

$$(1)\quad y_t = a(m_t-p_t)+b(\tilde{p}_t^*+e_t-p_t)+c(p_t-e_t-\tilde{p}_{mt})+\tilde{v}_t, a,b,c>0$$

$$(2)\quad p_t = (^d/2)(w_{t,t} + w_{t-1,t})(1-d)\tilde{p}_{mt} + \tilde{u}_t$$

$$(3)\quad w_{t,t} = w_t + \mu[kp_t + (1-k)\tilde{p}_t^*],\ 0<k<1, 0\leq\mu\leq1$$

$$(4)\quad w_{t-1,t} = w_{t-1} + \mu[kp_t + (1-k)\tilde{p}_t^*]$$

$$(5)\quad w_t = lw_{t-1} + (1-l)E_{t-1}w_{t+1,t}+g\,[lE_{t-1}\,y_t + (1-l)E_{t-1}y_{t+1}] + \tilde{x}_t \quad 0\leq l\leq 1$$

Equation (1) gives the domestic output as determined by the demand for it. The demand is an increasing function of real money balances ,m-p, of price of foreign competing goods relative to the price of the domestic good ,p*+e-p, and of the price of the domestic good relative to the price of imported inputs ,$p-e-p_m$*. All variables are measured in natural logarithms and the subscript t refers to the time period. I shall assume that an increase in the domestic price p reduces the demand for domestic goods, able to conduct independent monetary policies. To make my analysis contrast with Dornbusch (and Taylor (1979)), I assume that they follow the policy of constant money supply ,m = constant = 0 by choice. Similarly I assume that the exchange rate is fixed, e = constant = 0 by choice. The prices of foreign competing goods p* and of imported inputs, p_m are exogenous and stochastic (which is indicated by ~ over a variable). Finally, demand can be subject to disturbances v. Equation (2) gives the price of the domestic good as a mark-up over costs. The share of wages in total costs is equal to d. There are two equal-sized groups of labour. For one of them the constract was signed in the previous period and the current wage according to that contract is $w_{t-1,t}$. For the other group the contract was signed at the beginning of the current period. The ruling wage of that group is $w_{t,t}$.

The current wages are given by equations (3) and (4). In (3) it is said that $w_{t,t}$ is equal to the contract base wage w_t plus the adjustment due to the indexation. Wages are indexed to the CPI in proportion μ. The domestic good has share k in the CPI and foreign competing goods 1-k. Note that I assume the indexation to be current and not lagged. In practice indexation is always lagged, wages are adjusted for inflation only after a delay. Lagged indexation would provide another source of persistence in the model, and would thus complicate analysis considerably. (For the effects of lagged indexation, see Simonsen (1983)).

In price equation (2) the share of imported inputs in total costs is (1-d) and u is a supply shock indicating e.g. changes in the mark-up or in productivity of labour.

Equation (4) is completely analogous to equation (3). The ruling wage of contracts signed in the previous period is equal to the base contract wage w_{t-1} adjusted for indexation.

Equation (5) is the fundamental equation in the theory of staggered contracts: it determines how the contract base wage develops over time. The parameter l describes whether the wage negotiations are backward or forward looking, a large (near unity) value of l indicates backward looking wage formation. The parameter g measures the extent to which wages react to cyclical phenomena. Finally the disturbance $\tilde{x}$ captures the effects of exogenous disturbances in wage negotiations. One of the crucial assumptions in the theory of staggered contracts is the assumption that current period base wage is negotiated before the information concerning the values of current period disturbances gets revealed: the information set on which the expectation E_{t-1} is conditioned does not include any of the current distubances (though there exists some discussion about the role of the $\tilde{x}$-disturbance, and I come to this below). This makes the model completely static with respect to all disturbances except $\tilde{x}$. I shall below consider the implications of relaxing this assumption. This may be important, since if e.g. $\tilde{p}_m$ - shocks are known at the time of contract negotiations then one may argue that indexation reduces its stagflationary impact: equation (5) tells us that with indexation the contract wage appears to be smaller than without indexation if pm > 0.

III INDEXATION AND ECONOMIC STABILITY

The current wage levels $w_{t,t}$ and $w_{t-1,t}$ can be solved from equations (3) and (4) after equation (2) has been substituted in. The solutions are:

$$(6)\quad w_{t,t} = nw_t + nijw_{t-1} + nij^2\ (1-d)\tilde{p}_{mt} + nij^2\tilde{u}_t + nij\mu(1-k)p_t$$

$$(7)\quad w_{t-1,t} = nijw_t + [i+n(ij)^2]\ w_{t-1} + ij(1-d)\ [1+nij^2]\ p_{mt} + + \mu(1-k)\ i+n(ij)^2\ \ \tilde{p}_t^* + ij[1+nij^2]\ \tilde{u}_t$$

where $j = \mu kd/2$, $i = {}^1/(1-j)$, and $n = {}^1/[1-j(1+ij)]$ (note that $j = 0$, $i = 1 = n$ without indexation).

I shall first proceed with the assumption that the information set on which E_{t-1} is conditioned includes at most the current value of $\tilde{x}$, the current values of other disturbances are unknown. I assume that all disturbances are serially uncorrelated and stationary with mean 0. Then (6) and (7) yield:

$$(8)\quad E_{t-1}w_{t,t} = nE_{t-1}w_t + nijw_{t-1}$$

$$(9)\quad E_{t-1}w_{t-1,t} = nijE_{t-1}w_t+[i+n(ij)^2]\ w_{t-1}$$ and by updating

$$(10)\quad E_{t-1}w_{t+1,t+1} = nE_{t-1}w_{t+1}+nijE_{t-1}w_t$$

$$(11)\quad E_{t-1}w_{t,t+1} = nijE_{t-1}w_{t+1}+[i+n(ij)^2]\ E_{t-1}w_t$$

Now with (8) - (11)

$$E_{t-1}p_t = ({}^d/2)[E_{t-1}w_{t,t}+E_{t-1}w_{t-1,t}] \text{ and}$$

$$E_{t-1}p_{t+1} = ({}^d/2)\ E_{t-1}w_{t+1,t+1}+E_{t-1}w_{t,t+1} \quad \text{and}$$

$$E_{t-1}y_t = -(a+b-c)E_{t-1}p_t, E_{t-1}y_{t+1} = -(a+b-c)E_{t-1}p_{t+1}$$

Hence the difference equation for the contract wage, equation (5) can now be written in terms of the contract wages and of expectations of future contract wages. Before going that far the role of the x-shock in the information set must be clarified. The original Taylor version assumed that the realisation of $\tilde{x}_t$ is not known when the contract is negotiated (Taylor 1979), and this lead was taken by Dornbusch (1980, 1982). In a recent essay Driskill and Sheffrin assume that it is known when wages are negotiated. The Taylor-assumption would seem to be proper under conditions where the negotiations are first conducted at a fairly central level and, after the agreement has been reached there, the separate unions which belong to the central agreement negotiate at the industry level the final contract for which the central agreement provides a basis. The base wage w_t describes then the base wage after the industry level negotiations are over and $E_{t-1}w_t$ describes the cental agreement. In the Driskill-Sheffrin case x_t catches all other influences on wages than those explicitly taken into account in equation (5).

I shall first follow the Taylor-approach. Equation (5) can be written as:

$$(12)\quad w_t = -\ lm_1+(1-l)m_2\ E_{t-1}w_t+l(1-m_2)w_{t-1}+(1-l)(1-m_1)E_{t-1}w_{t+1}+\tilde{x}_t$$
$$m_1 = (a+b-c)({}^d/2)gn(1+ij) \quad \text{and}$$
$$m_2 = (a+b-c)({}^d/2)gi[1+nj(1+ij)]$$

In what follows I assume the $m_{1,}m_2 < 1$. (Note that $m_1 = m_2$ if $\mu = 0$)
The solution to (12) can be found by proposing that it is of the form

$$(13)\quad w_t = r_1w_{t-1}+\tilde{x}_t$$

When (13) is substituted back in equation (12) and the coefficients are equated, the solution for r_1 (which is assumed to be stable $0<r_1<1$) is

(14) $r_1 =$

$$\frac{1+lm_1+(1-l)m_2-\{[1+lm_1+(1-l)m_2]^2 \; -4\; l(1-l)(1-m_1)(1-m_2)\}^{1/2}}{2(1-l)(1-m_1)}$$

The coefficient r_1 measures the persistence of shocks over time: the larger r_1 is the "stickier" will the contract wage be, and the slower will the shock affect the contract wage. In the special case in which the contracts are completely backward looking ($l=1$) the solution is directly given by equation (12):

$$r_1 = (1-m_2)/(1+m_1) \text{ when } l = 1$$

From the definitions of m_1 and m_2 it can be seen that their values get larger when the indexation coefficient μ is increased from 0. But then, with backward looking negotiations, indexation reduces persistence.

In the general case $0<l<1$, it can be seen from equation (14) that the change in the value of r_1 when the indexation coefficient μ is changed is ambiguous: an increase in μ reduces both the numerator and denominator. Analytically it is clear though, that $m_2>m_1$ when $\mu>0$. Hence, there exists a value for μ such that $r_1 = 0$. It can be found by solving the equation $m_2 = 1$ for μ. But in other cases the only way out seems to be the use of numerical examples. This problem is generic to the staggered contracts model. All the papers I am aware of which utilize the staggered contract specification use numerical simulations to find out the properties of the model. See eg Dornbusch (1980, 1982), Taylor (1979, 1980, 1985). To make my simulations comparable to other works I shall incorporate the parameter values used in Dornbusch (1982) in calculations below.

In the following I present examples to compare with each other cases of $\mu = 0$ (no indexation) and $\mu = .6$ (partial towards full-indexation biased indexation). In all calculations I also assume (along with Dornbusch) that $d = l = .5$, and that $k = .5$ (i.e. the economy is quite open as regards the private demand). Finally, define $m = (a+b-c)(^d/2)g$. The values given in the following table correspond to different values of m which then can be thought as different values of a,b,c or g. The first two values of m are the same as used in Dornbusch (1982).

Table 1

m	$r_1(\mu = 0)$	$r_1(\mu = .6)$
.3125	.2829	.0761
.25	.3333	.1387
.15	.4417	.2745
.1	.5195	.3733

In each of the cases calculated it turned out that indexation produces a lower value for r_1 than would prevail without indexation. But it can be seen that the difference between the two cases depends very much on the structural parameters of the economy. In particular, the table reveals that.

Result 1 Wage indexation reduces the persistence of shocks the more elastic either domestic or foreign demand for the domesic goods is (i.e. the larger a+b-c is) or the more responsive wage agreements are for cyclical conditions (i.e. the larger g is).

This makes sense. The impact of wage changes on prices increases with indexation. Hence, the larger the price elasticity of demand and the larger the cyclical responsiveness of wages the smaller must be the influence of the wage agreements in other periods on the contract wage of this period. So indexation works in completely different direction than the accommodative monetary policy rule studied by Taylor and Dornbusch (op.cit.).

Dornbusch (1982) has studied how the so called PPP-rule for the exchange rate policy affects persistence. This rule dictates that currency is depreciated whenever domestic inflation rate is above the foreign rate and appreciated if the reverse holds. His main finding is that if the supply effects of exchange rate changes (which appear through the cost of imported raw materials) are large relative to the demand effects (which appear through the relative price effects and are measured by the coefficient b), then the PPP-rule reduces persistence. Table 1 reveals that wage indexation works in the opposite direction: when b is large indexation is effective in reducing persistence. The intuition is that the PPP-rule stabilizes demand by stabilizing the competitiveness of the domestic production. This is very effective in stabilizing output (and, hence, in increasing persistence) when b is large. Demand gets destabilized under the same conditions if indexation is used.

It was noted above that the informational assumptions made here make the model completely static with respect to shocks other than the $\tilde{x}_t$ shock. Hence, their effects on price and output stability with and without indexation are the same as analysed e.g. in Gray (1976), Marston (1985), and need not be repeated here. For the $\tilde{x}$ - shock the price and output equations are:

$$p_t = r_1 p_{t-1} + (^d/2)\ (a_1+a_2)\tilde{x}_t + (a_2+a_3)\tilde{x}_{t-1}\ , \quad \text{and}$$

$$y_t = r_1\ y_{t-1}\ - (a+b-c)\ (d/2)\ \ (a_1 + a_2)\ \tilde{x}_t + (a_2 + a_3)\ \tilde{x}_{t-1}$$

where $a_1 = n$, $a_2 = nij$, and $a_3 = i+n(ij)^2$

(It is seen that $a_1 = a_3 = 1$ and $a_2 = 0$ when $\mu = 0$).

It is thus clear that the impact effects of a $\tilde{x}_t$ - shock on price and output are larger when indexation is used than when $\mu = 0$. This is a well-kown result from the static Gray type models. There indexation increases, output instability if the economy is hit by supply side shocks. But this means only that the current shocks have a larger destabilizing effect on current price and output with indexation than without it, it does not say what the effects of previous shocks are and what the "total" effect of all shocks are. To answer these questions one must look at asymptotic variances. Since here $\text{var}(y_t) = (a+b-c)^2\ \text{var}(p_t)$, indexation affects price and output stability in the same manner. The asymptotic price variance, when no indexation is used is given by:

$$(15)\ \mathrm{var}\,(p_t) = (d/2)^2 \frac{2}{1-r_1} \mathrm{var}(\tilde{x})$$

With indexation the variance is

$$(16)\ \mathrm{var}(p)_t = \frac{(d/2)^2 \ [(a_1+a_2)^2+(a_2+a_3)^2+2(a_2+a_3)(a_1+a_2)r_1] \ \mathrm{var}(\tilde{x})}{1-r^2_1}$$

The values for (15) and (16) based on calculations of Table 1 are given in Table 2 (assuming $\mathrm{var}(\tilde{x}) = 1$):

Table 2

$r(\mu = 0)$	$\mathrm{var}(p_t)$	$r(\mu = .6)$	$\mathrm{var}(p)$
.2829	.1743	.0761	.1873
.3333	.1875	.1387	.2009
.4417	.2239	.2745	.2205
.5195	.2601	.3733	.2376

Hence, wage indexation improves both price and output stability just in those cases where it is relatively ineffective in reducing persistence:

<u>Result 2</u> Wage indexation can improve both price and output stability, if the price elasticity of demand (a+b-c) and/or the wage response to cyclical conditions (g) are small.

This result is not surprising in view of the above discussion about the effects of indexation on r_1. Similarly, the results for indexation differ from the results for the PPP-exchange rate rule. Dornsbusch (1982) has shown that the PPP-rule reduces output stability when the price elasticity of demand is small.

These results characterize the effects of wage indexation under the assumption that the realization of $\tilde{x}_t$ is not known when wages are negotiated. Next I shall study the effects of indexation under the alternative assumption that the value of $\tilde{x}_t$ is known during negotiations.

This has been assumed by Driskill and Sheffrin (1985). With this assumption the contract wage equation (5) can be written as:

$$(17)\quad 1+lm_1+(1-l)m_2\ w_t = l(1-m_2)w_{t-1}+(1-l)(1-m_1)E_{t-1}w_{t+1}w_{t+1}+\tilde{x}_t$$

The solution to this equation can be found by proposing it to be of the form

$$(18)\quad w_t = r_1 w_{t-1}+r_2\tilde{x}_t$$

r_1 and r_2 can be solved when (18) is substituted back in (17) and coefficients are equated. The solution for r_1 is the same as above, equation (14).

The solution for r_2 is:

$$(19)\quad r_2 = 1/[1+lm_1+(1-l)m_2-(1-l)(1-m_1)r_1]$$

Since m_1 and m_2 get larger when indexation is used, then indexation reduces the value of r_2 if it reduces the value for r_1. In the case of Table 1, this condition holds. (Of course it is a sufficient condition, not a necessary condition).

Result 3 The impact of exogenous shocks on wage agreements is smaller with indexation than without it.

The values of r_2 corresponding to values in Table 1 are:

Table 3

m	$r_2(\mu = 0)$	$r_2(\mu = .6)$
.3125	.8229	.7442
.25	.8889	.8031
.15	1.0392	.9403
.1	1.1544	1.0493

The price and output stability can again be measured by asymptotic variances. Since again $var(y_t)=(a+b-c)^2 \; var(p_t)$ indexation affects similarly both the price and output variances. It is straight forward to calculate that now the asymptotic price variance is equal the variance given by equation (15) or (16) multiplied by r_2^2. The numerical results corresponding to Tables 2 and 3 are:

Table 4

m	$var(p_t)(\mu = 0)$	$var(p_t)(\mu = .6)$
.3125	.1180	.1037
.25	.1482	.1296
.15	.2418	.1950
.1	.3466	.2616

Hence

Result 4 Indexation increases economic stability unambiguously if the wage disturbances are observed during the wage negotiations.

The intuition is that indexation makes the impact of the $\tilde{x}$-shock on price and output stronger. If it is observed when wages are negotiated, indexation reduces its impact on the contract wage.

Finally, one may want to relax the assumption that at most information about the $\tilde{x}$-shock is available during wage negotiations. As explained above, if this assumption is not relaxed, then the economy reacts in a static fashion to the other shocks. The relaxation may also produce interesting results. Take e.g. a $\tilde{p}_m$ - shock. From equations (1)-(4) can immediately be seen that if its effects are restricted to the current period then indexation necessarily reduces both price and output stability. But if the shock is observed when wages are negotiated then the contract base wage may be lower with indexation than without it. In the real world negotiations the parties form and use forecasts about the demand and supply (productivity) disturbances, about the prices of foreign competing production and about prices of imported raw materials. To assume that the realization of the current value of these shocks is observed during the negotiations is just to say that these forecasts of immediate future are exactly accurate. It may not be any worse an assumption than assuming that the shocks are not at all known during the negotiations.

I shall analyse the effects of wage indexation if the current value of the imported raw material price, i.e. the current realization of $\tilde{p}_{mt}$ is observed when wages are negotiated. The same exercise could be carried over for the other shocks.

Assume now that the realization of $\tilde{p}_{mt}$ is included in the information set on which E_{t-1} is conditioned. For simplicity assume also that no other shocks impinge on the economy. Then the contract wage difference equation can be written as:

$$(20)\ [1+lm_1+(1-l)m_2]w_t =$$

$$= \quad l(1-m_2)w_{t-1}+(1-l)E_{t-1}w_{t+1} - l(1-d)mm_3p_{mt}$$

where $m_3 = ij[nj(1+ij)+1]+({}^2/d)$

(i.e. $m_3 = 2/d$ if $\mu = 0$ and $m_3>2/d$ whenever $\mu>0$). The solution can be found by proposing it to be of the form

$$(21)\ w_t = r_1w_{t-1}+r_3\tilde{p}_{mt}$$

The solution for r_1 is again given by equation (14). The solution for r_3 is:

$$(22)\ r_3 = -\frac{l(1-d)mm_3}{1+lm_1+(1-l)m_2-(1-l)(1-m_1)r_1}$$

i.e. $r_3<0$. Hence, if the increase in price of imported inputs is observed during the wage negotiations, then the contract wage is reduced. The effect of indexation on the size of the contract wage adjustment is ambiguous however. Both the absolute value of the numerator and denominator are increased when μ is increased from 0. Thus, numerical examples must again be utilized. The values used in previous examples give the following table:

Table 5

m	$r_3(\mu = 0)$	$r_3(\mu = .6)$
.3125	-.2628	-.2377
.25	-.2271	-.2052
.15	-.1593	-.1442
.1	-.1180	-.1072

Hence,

Result 5 Indexation reduces the impact of shocks in the price of imported inputs on the contract wage.

Thus, at least these numerical examples do not support the conjecture that indexation improves the flexibility of wages with respect to raw material price shocks.

To consider price and output stability the following difference equations can be derived:

$$(23)\ p_t - r_1 p_{t-1} = [({}^d/2)r_3(a_1+a_2)+(1-d)a_4]\tilde{p}_{mt}$$

$$- \quad ({}^d/2)r_3(a_2+a_3)+(1-d)a_4\ r_1\tilde{p}_{mt-1}$$

where $a_4 = 1+ij(nj+1+nj^2)$
(i.e. $a_4 = 1$ when $\mu = 0$)

$$(24)\ y_t - r_1 y_{t-1} =$$

$$= \quad \{-(a+b-c)[({}^d/2)r_3(a_1+c_2)+(1-d)a_4]-c\}\tilde{p}_{mt}+$$

$$+\ (a+b-c)[({}^d/2)r_3(a_2+a_3)+(1-d)a_4 - c]r_1\tilde{p}_{mt-1}$$

Since without indexation $a_1=a_3=a_4=1$ and $a_2=0$, the model is completely static when $\mu=0$. The price and output variances can then be obtained: the price variance is equal to $b_1^{\ 2}$ and the output variance to $c_1^{\ 2}$ where b_1 = the coefficent of $\tilde{p}_{mt}$ in (23) and c_1 = the coefficient of $\tilde{p}_{mt}$ in (24) (I have normalized here $\mathrm{var}(\tilde{p}_m)=1$). With indexation the model is not static, in general, but for my numerical example it turns out that $a_1 \tilde{\ } a_3$ and hence in this special case it is static. The price variances are equal to:

Table 6

m	$var(p_t)(\mu = 0)$	$var(p_t)(\mu = .6)$
.3125	.1886	.2249
.25	.1964	.2341
.15	.2118	.2517
.1	.2214	.2628

Indexation thus increases price instability against shocks in imported input prices. But the loss of stability is smaller the less price elastic demand is and/or the less responsive contract wages are to cyclical fluctuations.

To calculate the output variance I assume that $c = .025$ and that $g = 1$. Hence the different values of m given below correspond to different values of the demand elasticity $(a+b-c)$. The numerical calculations give:

Table 7

m	$var(y_t)(\mu = 0)$	$var(y_t)(\mu = .6)$
.3125	.2682	.3224
.25	.1749	.2105
.15	.0631	.0762
.1	.0266	.0324

Hence,

Result 7 Indexation reduces output stability when the economy is disturbed by shocks in price of imported inputs. But the increase in instability due to indexation is relatively the smaller the larger the price elasticity of demand for the domestic output.

So indexation reduces the overall economic stability. But the reduction is not uniform in the sense that relative impacts on price and output variances differ. The more elastic the demand for domestic output is, the smaller will be the effect on output instability and the larger on the price instability.

IV CONCLUDING COMMENTS

It has been shown that combining relative wage rigidity with real wage rigidity in the form of wage indexation

a) will in the case of exogenous shocks in domestic costs, improve economic stability, if, the demand for domestic output is relatively price inelastic and wage negotiations are not very responsive to cyclical conditions. This result is strengthened if the information about shock is available in the wage negotiations.

b) will, in the case of shocks in the price of imported inputs, reduce overall economic stability. The loss of stability due to indexation is not uniform, however: the more price inelastic the demand is the more is output instability increased but the less price instability.

c) with respect to domestic cost shocks wage indexation works in a completely opposite fashion then the accommodative monetary policy or the PPP-exchange rate policy.

Almost all of the results are based on numerical calculations, only very few general results were obtained. This is the general situation in the staggered contracts model. Hence, the results lack the generality which is desired. Yet the results at least reveal some possibilities which are absent static models. The most startling of them is point a) above: indexation can improve economic stability even if the economy is hit by supply shocks.

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