THE CHOICE BETWEEN ACCOMMODATIVE AND

NON-ACCOMMODATIVE EXCHANGE RATE POLICY IN THE PRESENCE OF FOREIGN SHOCKS

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Abstract:

This paper analyzes two issues. First, we analyze the likely consequences of the possible increase in the monetary instability and decrease in the rate of wage indexation in EU (that can result from the completion of economic and monetary union) on the macroeconomic stability of small, open economies which are in the process of integration with EU. And then we try to answer the following question: if the macroeconomic instability of a small, open economy is primarily caused by the monetary instability of its large trading partner, should it adopt more or less accommodative exchange rate policy?

1.   Introduction

Even though the global integration of capital as well as goods markets of national economies has become almost an irreversible process, it is still too early to see whether or not, the "efficiency gains" that are expected from the free flow of global capital and goods will outweigh the instability costs associated with the increased vulnerability of particularly small developing countries to external shocks. Such external shocks primarily include the sudden and unexpected capital flow reversals, increases in international rate of interest, constraints on external borrowing, adverse shocks to terms of trade, an increase in the price and/or reduced availability of a major imported input and a decline in demand for exports. The dramatic aspect of globalization process is the fact that integration of a small, open economy with one of the global economic powers (such as USA, European Union or Japan) could mean increased exposure to most of these shocks simultaneously. In other words, the monetary or real shocks impinging on large economies are likely to have destabilizing repercussions in small economies through their domestic effects on large economy's output, interest rate, price level and the wage rate. Fluctuations in these variables could have adverse impact on the stability of a small, open economy through trade and capital markets channels.

The adoption of common currency, the EUR, on January 1, 1999 represented a critical step forward for the member states of EU to form an economic and monetary union in the real sense of the word. In 2002, EUR replaced all national currencies, and the European Central Bank (ECB) became the dominant actor in setting the monetary policy of EU as Federal Reserve is for USA. Even though ECB will benefit (in terms of credibility) from the reputation of Bundesbank of Germany as "inflation fighter", the extent to which ECB will be able to achieve the degree of independence (from political process) and the monetary discipline exerted by Bundesbank is still unclear. At least some of the empirical and theoretical work about the consequences of monetary union (for EU) suggests that under certain conditions the monetary union could lead to increased monetary instability. One of the most important factors that could lead to increased monetary instability has been pointed out to be the divergent preferences (of member states) regarding the respective ratios of fiscal deficits and stock of government debt to GNP (see Aarle, Bovenberg and Raith, 1997). Even though Maastricht Treaty attempted to set some upper limits for these ratios to which each state should converge before joining the monetary union, asymmetric preferences about fiscal imbalances (within the bounds corresponding to these upper limits) among member states might put pressure on ECB to monetize part of these deficits. Furthermore, these fiscal deficits can result not only from undisciplined fiscal behavior but also from adverse regional shocks to demand which may generate sudden and unexpected decrease in employment and tax receipts of the regional authority. Krugman (1993) and Bayoummi and Eichengreen (1993) argued that the magnitude and the frequency of such regional shocks are likely to increase as the process of economic and monetary union leads to growing specialization of different regions within EU. Such regional shocks to demand (which may result from shifts in tastes and preferences) can potentially lead to substantial loss of output and create a funding crisis for the regional governments which may be forced to inject liquidity to the financial system to reduce the risk of financial crisis that can result from inability of "crisis hit" firms to service their debts (see Giovannini, 1995).

Another important factor that increases the potential uncertainty about the future monetary policy of EU is the fact that, even though Maastricht Treaty contains substantial number of provisions concerning the ECB, it does not mention targets for the bank; this, in turn, means that the issue of targeting for ECB is open from both a legal and a practical point of view (see Cukierman, 1997). The implication of this and other points raised above is clear: There is a great deal of uncertainty about the nature of the future monetary policy of ECB in general and the variability of key monetary aggregates in particular.

One of the other key consequences of the completion of internal market (through economic and monetary union) is expected to be the increased flexibility of labor markets due to the increased mobility of labor across member states. In some EU countries (like France) wage bargaining is still dominated by backward looking compensation for past inflation. Over time, as labor becomes more mobile enhancing the degree of

competitiveness in labor markets across EU, the rate of indexation of wages (on average) to price indexes is expected to decrease (see Anderton, Barrell and McHugh, 1993). However, even in USA, where labor is highly mobile, the percentage of labor (taking part in collective bargaining process) whose wage contracts are based on some form of COLA (Cost of Living Adjustment) was around 39 % between 1988 and 1991 (see Dornbusch and Fischer, 1998). This observation coupled with the uncertainty in the future rates of inflation suggests that the decline in the rate of wage indexation may not be as fast and substantial as expected.

The main focus of this paper is to analyze the likely consequences of the possible increase in the monetary instability and the decrease in the rate of wage indexation in EU that can result from the completion of economic and monetary union on the macroeconomic stability of small, open economies which are in the process of integration with EU. Such periphery countries include countries like Poland, Czech Republic, Hungary, Slovakia, Turkey and others.

To analyze the above raised questions we use a 2-country framework whereby one of the countries is defined to be a large economy (EU) which can critically affect the stability of the other economy (defined as small, open economy) through trade and capital markets channels. We assume that the respective wage determination processes in both countries are given by "backward indexation" of the wage rate to changes in the price level. And small economy is assumed to adopt a "crawling peg" kind of exchange rate regime whereby the exchange rate is also indexed to past changes in the price level. Monetary instability in the large economy affects the small economy through its output, price and interest rate effects at home, and the magnitude of the resulting long-run instability in the small economy's output and the price level will depend, not only on the respective degrees of indexation of it's wage and exchange rate, but also on the rate of indexation of the wage rate of the large economy.

The simulation of the analytical results based on the models we used, suggests that a given increase in the monetary instability in the large economy is likely to lead to proportionately larger instability in both output and the price level of the small economy than the instability it causes in home variables. The reduction in the rate of indexation of wages to price level in the large economy is found to improve the long-run price stability of the large economy but only at the expense of worsened output and the interest rate stability. However, the net impact of these changes in the macroeconomic stability of the large economy on the small economy's stability is likely to be negative; relatively lower degree of wage indexation increases the long-run equilibrium variances of both small economy's output and the price level resulting from the monetary variability in the large economy. On the other hand, similar decrease in the rate of indexation of wage rate in small economy is found to lead to better long-run stability of its price level but only at the expense of worsened output stability. And finally we show that when the monetary shocks originating from the large economy are the predominant source of instability, adopting a less accommodative exchange rate policy (meaning decreasing the rate of indexation) is likely to reduce the long-run instability in both output and the price level of the small economy.

In the next section, we describe the models of large and small economies and specify the plausible values for the structural parameters of both models that we use to simulate the analytical results of the paper. Section three focusses on the potential impact of a change in the rate of indexation of wage rate in the large economy on the long-run instability of its output and the price level. In section four, we first compare the resulting magnitudes of long-run instability of output and the price level for the two economies which are measured in terms of their respective steady-state variances and then we analyze the likely impacts of given changes in the rate of wage indexation (in each economy separately) and rate of indexation of the exchange rate on the long-run stability of output and the price level of the small economy. In the conclusions, we discuss the policy implications of the fundamental results of the paper particularly in terms of EU and the corresponding periphery countries.

2.   The Models of Large and the Small Open Economy

In this section, we first describe models of the small and the large economies and explain the basic

assumptions behind them. Then we specify the plausible values for the structural parameters of both models

that we use in the next two sections to simulate the analytical results.

2.1 *The Model of the Small Open Economy*

$$y_t = a_1(e + p^* - p)_t + a_2 (i)_t + a_3 (m\text{-}p)_t + a_4 (y^*)_t \quad \text{where} \quad a_1 > 0, a_2 < 0, a_3 > 0, a_4 > 0 \qquad (1)$$

$$m_t - p_t = b_1 (y)_t + b_2 (i)_t \qquad \text{where} \qquad b_1 > 0, b_2 < 0 \qquad (2)$$

$$P_t = c_1(e + p^*)_t + c_2(y)_t + c_3(w)_t \qquad \text{where} \qquad c_1 > 0, c_2 > 0, c_3 > 0 \qquad (3)$$

$$i_t = i^*_t \qquad (4)$$

$$w_t = \alpha_1 P_{t\text{-}1} \qquad \text{where} \quad 0 \le \alpha_1 \le 1 \qquad (5)$$

$$e_t = \alpha_2 P_{t\text{-}1} \qquad \text{where} \quad 0 \le \alpha_2 \le 1 \qquad (6)$$

2.2 *The Model of the Large Economy*

$$y^*_t = d_1 (i^*)_t + d_2 (m^* - p^*)_t \qquad \text{where} \qquad d_1 < 0, d_2 > 0 \qquad (7)$$

$$m^*_t - p^*_t = d_3 \, (y^*)_t + d_4 \, (i^*)_t \qquad \text{where} \qquad d_3 > 0, \, d_4 < 0 \tag{8}$$

$$p^*_t = d_5 \, (y^*)_t + d_6 \, (w^*)_t \qquad \text{where} \qquad d_5 > 0, \, d_6 > 0 \tag{9}$$

$$w^*_t = \beta \, p_{t\text{-}1} \qquad \text{where} \qquad 0 \le \beta \le 1 \tag{10}$$

$$m^*_t = m^*_{t\text{-}1} + \varepsilon^*_t, \qquad \text{where} \qquad \forall \, t \quad \varepsilon^* \underset{\sim}{} N \, (0, \sigma^2_{\varepsilon*}). \tag{11}$$

y - output of the small economy

y^* - output of the large economy

i - interest rate of the small economy

i^* - interest rate of the large economy

p - price level of the small economy

p^* - price level of the large economy

m - money supply of the small economy

m^* - money supply of the large economy

w - wage rate of the small economy

w^* - wage rate of the large economy

e - exchange rate of the small economy's currency; expressed as units of domestic

currency per unit of the currency of the large economy

ε^* ‾ random shock to large economy's money supply

All of the above variables except the interest rates are expressed in (natural) logarithm form. The most

important assumptions about the two models specified above are as follows:

a)   the small economy produces an imperfect substitute of the good produced by the large economy which is its trading partner;

b)   there is perfect mobility of capital between the two economies and the investors of both countries are risk- neutral. Under these circumstances, when financial markets are in equilibrium expected rates of returns on assets in the two countries (when the monetary returns are expressed in terms of a common currency) will be equalized. This is the essence of "uncovered interest rate parity" theorem. In the framework of our model, we assume that bonds of one-period maturity denominated in the respective currency of each country are the only internationally traded assets for the two countries and the respective interest rates on these bonds are i (for the small economy) and i^* (for the large economy). Exchange rate is kept fixed for each period until the beginning of the next period. Given this assumption, i, and i^* will represent both actual and the expected rates of returns from holdings such bonds and the free flow of capital between the two countries coupled with the risk-neutral investors will equilibrate the prices of similar financial assets (which are bonds of similar maturity in our model) and the rates of returns on such assets (i and i^*);

c)   while fluctuations in the output, interest rate, and the price level of the large economy affect the small economy through trade and capital markets channels, the changes in the economic activity of the small economy have no effect on the large economy.

Eq. (1) and (7) describe the goods market equilibrium conditions for the small and the large

economies respectively. Eq. (2) and (8) specify the money market equilibrium conditions for the two

economies, whereas the pricing behavior of their firms are described by eq. (3) and (9). Eq. (4) is the interest

parity condition which results from the assumptions of perfect capital mobility and risk-neutrality of

investors. Eq. (5) and (10) reflect the assumption that wages in both countries are indexed to (one-period)

lagged value of the price level. Similarly, the exchange rate policy of the small economy is based on the

(one-period) lagged indexation of the exchange rate to its price level. Eq. (6) captures this kind of policy

behavior which is a variant of "crawling pag" type of exchange rate regime. Eq. (6) implies that the exchange

rate is a policy instrument which is kept fixed throughout each period by the intervention of the central bank

through purchase or sale of foreign currency (in exchange of domestic currency at this fixed exchange rate)

when pressures on domestic currency to appreciate or depreciate build up. This, in turn, means that for the

small economy money supply is endogenously determined and it cannot be used as an exogenous policy

instrument to attain any target. On the other hand, eq. (11) captures the assumption that money supply in the

large economy follows "random walk" type of process. In other words, unpredictable monetary shocks

(generated by policy makers) can cause the money supply to randomly deviate from its previous period's

value. For the sake of our analysis, we assume that these random monetary shocks in the large economy are

the only source of macroeconomic instability for both economies. It is worth to note that both "monetarists"

and the "equilibrium-business cycle" economists share the idea that the business cycles are largely driven by

monetary shocks (see Baily and Friedman, 1995).

2.3 Plausible Values for the Structural Parameters of the Models

In what follows we specify the plausible values for the structural parameters of both models, that we

use to simulate the analytical results:

$a_1 = 0.2$	$a_4 = 0.2$	$c_1 = 0.1$	$\alpha_1 = 0.8$
$a_2 = -0.1$	$b_1 = 1$	$c_2 = 0.2$	$\alpha_2 = 0.8$
$a_3 = 0.1$	$b_2 = -0.1$	$c_3 = 0.5$	$\beta = 0.8$
$d_1 = -0.1$	$d_3 = 1$	$d_5 = 0.2$	
$d_2 = 0.1$	$d_4 = -0.1$	$d_6 = 0.5$	

The values that we have assumed in the above for the structural parameters of both countries implicitly reflect the assumption of "structural symmetricity" in terms of the behavior of consumers and producers of the two countries. In other words, similar variables of the two countries have been assumed to have identically same coefficient values. In the aggregate demand equations (eq. 1 and eq. 7), such coefficients are respective elasticities of aggregate demand with respect to interest rate (namely a_2 and d_1) and real money

balances (namely a_3 and d_2). The value that we assumed for a_1 and d_1 is -0.1 which means that, a given one per cent increase in the interest rate is expected to lead to 0.1 decrease in aggregate demand through its contractionary effects on consumption and investment spending. On the other hand, the assumption of a value of 0.1 for a_3 and d_2 means that a one per cent increase in the real money supply of each country will lead to 0.1 per cent increase in aggregate demand of that country, through its positive effects on consumption which is close to values reported for some countries by Stewart (1988).

On the demand side of money markets of both countries we assumed that the respective income and the interest rate elasticities of money demand are respectively 1(b_1 and d_3) and -0.1 (b_2 and d_4). These values are consistent with a large number of econometric studies on the estimation of money demand equations which reported estimates on income elasticity of money demand close to 1 and relatively low values of interest rate elasticity of money demand (see Goldfeld, 1973; Meyer and Neri, 1975).

On the other hand, the coefficient c_1 in the price equation of the small economy represents the share of imported inputs in domestic production of the small economy which uses imports from the large economy not only in consumption but also as inputs in production. The value of 0.1 that we assumed for c_1 implicitly suggests that the small economy is not heavily dependent upon the imported inputs from the large economy. We have taken the values of c_2 and d_5 as 0.2 reflecting the assumption that a one per cent increase in the aggregate demand (proxied by the output) will lead to 0.2 % increase in the price level of each country. In countries which face relatively worsened "Philips curve" kind of trade-off between inflation and unemployment rate, in the short-run, the value of c_2 and d_5 can be higher than 0.2. In other words, a given increase in output (meaning a lower rate of unemployment) by putting pressure on demand for all types of inputs can exert relatively larger positive effect on prices depending on the structural characteristics of the economy in question. On the other hand, the value of c_3 (which can be taken as the share of labor input in unit cost of production) is assumed to be 0.5 which is likely to be in the range of the actual share of labor cost of production for most industrial sectors. On the other hand, the value of a_1 (elasticity of aggregate demand for the small economy with respect to relative price of large economy's good vis-à-vis the domestic good) is taken to be 0.2 suggesting that a given 1 % increase in the relative price of foreign good is expected to increase the aggregate demand for domestic good by 0.2 % through the positive effect on the net export (trade balance) of the small economy. Similarly we assumed a value 0.2 for a_4 which is the elasticity aggregate demand for the small economy's output with respect to large economy's output; in other words, a given 1 % increase in the large economy's real gross national product is assumed to lead to 0.2 % increase in the real gross national product of the small economy through the expansionary effect of higher aggregate demand in the large economy on the exports from the small economy: If one takes the large economy as the overall EU, this assumption seems to be not too restrictive for most of the small periphery economies whose exports to EU are a significant part of their overall trade.

3.   The Long-Run Stability of the Large Economy

The long-run macroeconomic stability of the large economy (as well as that of the small economy) will

depend on the extent of monetary variability which is measured by the variance of monetary shocks. In other

words, the long-run instability in output, price level and the interest rate (in both economies) will depend on

the magnitude of the variance of random policy shocks to the money supply process of the large economy.

The long-run equilibrium (or the steady-state) variances of large economy's output, price level and the

interest rate around their equilibrium values obtained from the reduced form solution of the large economy

model are as follows [1]:

$$\sigma^2{}_y{}^* = d_8{}^2 \, \sigma^2{}_\varepsilon{}^* \qquad\qquad (12)$$

$$\sigma^2{}_p{}^* = d_9{}^2 \, \sigma^2{}_\varepsilon{}^* \qquad\qquad (13)$$

$$\sigma^2{}_i{}^* = d_{10}{}^2 \, \sigma^2{}_\varepsilon{}^* \qquad\qquad (14)$$

where d_8, d_9 and d_{10} are simplifying notation (made up of structural parameters) and defined in endnote [2].

When we substitute the plausible parameter values (specified in previous section) for the structural

parameters in d_8, d_9 and d_{10} we obtain the following:

$$\sigma^2{}_y{}^* = 0.216 \, \sigma^2{}_\varepsilon{}^* \qquad\qquad (15)$$

$$\sigma^2{}_p{}^* = 0.024 \, \sigma^2{}_\varepsilon{}^* \qquad\qquad (16)$$

$$\sigma^2{}_i{}^* = 14.45 \, \sigma^2{}_\varepsilon{}^* \qquad\qquad (17)$$

Eq. (15), (16) and (17) suggests that a unit increase in the variance of the (log of) money supply of the

large economy will increase the variances of (log of) output, (log of) price level and interest rate by 0.216,

0.024, and 14.45 units respectively.

To investigate the possible effect of a given decrease or an increase in the degree of wage indexation in the large economy (β) on the long-run stability of output, price level and the interest rate, we take derivative of $\sigma^2_y{}^*$, $\sigma^2_p{}^*$, $\sigma^2_i{}^*$ with respect to β and then numerically simulate the resulting expressions using the plausible parameter values specified in section two. The results are presented below:

$$\partial \sigma^2_y{}^* / \partial \beta = -0.1302 \, \sigma^2_\varepsilon{}^* \tag{18}$$

$$\partial \sigma^2_p{}^* / \partial \beta = 0.0399 \, \sigma^2_\varepsilon{}^* \tag{19}$$

$$\partial \sigma^2_i{}^* / \partial \beta = -77.1653 \, \sigma^2_\varepsilon{}^* \tag{20}$$

As the above numerical simulations show, relatively larger degree of wage indexation leads to better output and interest rate stability but only at the expense of worsened price stability. Conversely, a given decline in the rate of indexation of wages to past price level leads to lower instability in the price level but higher instability in both output and the interest rate of the large economy.

The above result obtains for all plausible values of the structural parameters. We can intuitively explain this property of the model as follows: A given positive shock to money supply leads to an expansion in aggregate demand both through its "real balance" effect and the decrease in interest rate it causes; as a result, both output and the price level increase in the impact period. Wage indexation means that in the next period wages are raised based on the degree of indexation leading to an increase in the unit cost of production and therefore further increase in prices making price level deviate further away from its long-run equilibrium level (meaning the level prevailing before the monetary shock). On the other hand, this subsequent additional increase in price level reduces real money balances causing an increase in interest rate and a contraction in output and therefore reducing the magnitude of their overall deviation from their respective long-run equilibrium values. In this sense, when the macroeconomic instability predominantly originates from monetary shocks, relatively higher degree of indexation improves the long-run stability of both output and the interest rate but only at the expense of worsened price stability.

4.   The Long-Run Stability of the Small Economy

The long-run equilibrium (or the steady-state) variances of output and the price level of the small economy obtained from the reduced form of the steady-state solution of the model are given below:

$$\sigma^2_{\,y} = [\,d_{14}\,d_{20}]^{\,2}\,\sigma^2_{\,\varepsilon}{}^{*} \tag{21}$$

$$\sigma^2_{\,p} = [\,d_{18} + d_{19} + d_{13}d_{14}d_8\,c_2a_4]^{\,2}\,\sigma^2_{\,\varepsilon,}{}^{*} \tag{22}$$

where $d_8, d_{13}, d_{14,}\,d_{18,}\,d_{19}$ and d_{20} are simplifying notation defined in footnote 2. We note that since $\sigma^2_{\,i} = \sigma^2_{\,i}{}^{*}$ (due to interest rate parity condition) eq. (17) also captures the steady-state variance of the interest rate of the small economy.

Substitution of the plausible parameters values into eq. (21) and (22) yields the following:

$$\sigma^2_{\,y} = 0.538\ \sigma^2_{\,\varepsilon}{}^{*} \tag{23}$$

$$\sigma^2_{\,p} = 0.288\ \sigma^2_{\,\varepsilon}{}^{*} \tag{24}$$

The comparison of eq. (18) and (19) with eq. (23) and (24) reveals that a given increase in the monetary variability in the large economy (an increase in $\sigma^2_{\,\varepsilon}{}^{*}$) leads to proportionately larger increase in the output and price stability of the small economy than it does for the large economy itself.

4.1 *The Impact of an Increase in the Degree of Wage Indexation in the Large Economy on the Output and the*

Price Stability of the Small Economy

Taking the derivative of σ^2_y and σ^2_p with respect to β and then substituting the plausible values for the structural parameters in the resulting analytical expressions yield the following:

$$\partial\sigma^2_y / \partial\beta = -1.586\ \sigma^{2\ *}_\varepsilon \tag{25}$$

$$\partial\sigma^2_p / \partial\beta = -0.177\ \sigma^{2\ *}_\varepsilon \tag{26}$$

The simulation results presented above suggest that a given increase (decrease) in the rate of wage indexation in the large economy is likely to reduce (increase) the long-run instability of both output and price level of the small economy. This, in turn, means that the positive effect of the decreases in the instability of both output and the interest rate of the large economy is likely to dominate the negative effect (on the small economy's stability) operating through the worsened price instability in the presence of a higher degree of wage indexation. However, in the presence of a relatively much higher share of imported inputs (c_1) in domestic production and relatively larger elasticity of aggregate demand with respect to relative price of domestic goods (a_1) negative stability effects of higher price instability might outweigh the positive effects operating through lower output and interest rate instability in the large economy, reversing the above conclusion.

4.2 *The Impact of an Increase in the Degree of Wage Indexation in the Small Economy on the Output and the*

Topics in Middle Eastern and African Economies
Vol. 5, September 2003
Price Stability of the Small Economy

A given positive random shock to money supply in the large economy unambiguously increases both output and the price level of the small economy in the impact period through the decrease in the interest rate and the increases in the output and the price level of the large economy it generates. In the presence of wage indexation, given the increase in the price level of the small economy in the impact period, wages are adjusted upward (in the beginning of the next period) further increasing prices through its effect on labor cost of production. This subsequent increase in wages and therefore in prices happen to be larger in the presence of a relatively larger degree of wage indexation making the overall deviation of small economy's price level from its long-run equilibrium level bigger. In this sense relatively larger degree of wage indexation increases the price instability caused by the monetary shocks impinging on the large economy. On the other hand, since relatively higher increase in wage costs and therefore in prices means reduced competitiveness for small economy's exports, relatively larger degree of wage indexation unambiguously exerts contractionary effect on output in the subsequent period, reducing the size of the overall deviation of output from its equilibrium value. In this sense, in the presence of relatively larger degree of wage indexation, output instability caused by foreign monetary shocks is lower.

In what follows we numerically simulate the net impact of a given increase in the value of α_1 on σ^2_y and σ^2_p; taking the derivative of σ^2_y and σ^2_p with respect to α_1 and then substituting the plausible values for the structural parameters yield the following:

$$\partial \sigma^2_y / \partial \alpha_1 = -0.008 \ \sigma^{2*}_\varepsilon \tag{27}$$

$$\partial \sigma^2_p / \partial \alpha_1 = 0.2157 \ \sigma^{2*}_\varepsilon \tag{28}$$

4.3 The Impact of an Increase in the Degree of Exchange Rate Indexation on the Output and the Price Stability

of the Small Economy

Relatively larger degree of indexation of the exchange rate to price level unambiguously leads to worsening of both output and price instability caused by monetary shocks impinging on the large economy. As explained above, the net impact effects of a given positive ε^* on y and p are both positive. Relatively more accommodative exchange rate policy means, the subsequent devaluation (in the beginning of the next period) in response to previous period's increase in price level happens to be larger, leading to further increase in both output and the price level of the small economy. In other words, with relatively larger degree of exchange rate indexation, the overall deviation of both output and the price level from their equilibrium values happen to be bigger. In this sense, the long-run instability of both output and the price level of the small economy generated by foreign monetary shocks increases in the presence of a relatively more accommodative exchange rate policy.

Taking the derivatives of σ^2_y and σ^2_p with respect to α_2 and then substituting the plausible values for the structural parameters we obtain the following estimates for the likely quantitative impact of a given increase in the degree of exchange rate indexation on the long-run variability of output and the price level caused by a given variability of money supply of the large economy:

$$\partial\sigma^2_y / \partial\alpha_2 = 0.087\ \sigma^2_{\varepsilon}{}^* \qquad\qquad\qquad (29)$$

$$\partial\sigma^2_p / \partial\alpha_2 = 0.3684\ \sigma^2_{\varepsilon}{}^* \qquad\qquad\qquad (30)$$

5.   Conclusions

The process of globalization has been leading to greater degree of integration of individual small economies to regional blocs or "large economies". This, in turn, has increased the vulnerability of such economies to destabilizing effects of various types of shocks originating from large economies, which can be transmitted both through trade and capital flows. In this paper, we focused on the nature of the long-run output and price instability of a small economy that can result from monetary instability in its large trading partner. Furthermore, we assumed that there is "backward indexation of wages" to respective price levels in both economies; and the exchange rate of the small economy's currency is also assumed to be indexed to (lagged)

changes in the price level.

Two-country framework we used has yielded some interesting insights about the basic questions on which the paper focused: A given monetary instability in the large economy may lead to proportionately larger long-run instability of both output and price level of the small economy relative to output and price instability it generates at home. Relatively higher degree of wage indexation in the large economy unambiguously improves the long-run stability of both output and the interest rate of the large economy, but only at the expense of worsened price stability. However, the simulation results suggested that both output and the price stability of the small economy are likely to improve as a result of larger rate of wage indexation in the large economy. On the other hand, when the dominant source of macroeconomic instability is the monetary shocks impinging on the large economy, a relatively higher rate of wage indexation in the small economy (unambiguously) leads to better long-run stability of output but only at the expense of worsened price stability. In case of exchange rate policy, a switch to relatively more accommodative policy (choosing relatively higher degree of indexation) leads to worsening of both output and the price instability of the small economy.

The possible policy implications of the above results in the framework of EU and its periphery countries (or USA and its periphery countries such as Mexico and Canada) are as follows: After the prospective replacement of national currencies by EUR in 2002, the European Central Bank will become the dominant actor in determining the monetary policy of EU. Some believe that possible non-symmetric preferences about fiscal imbalances (even when these imbalances are kept within the limits set by Maastricht Treaty) and the likely increase in the magnitude of regional shocks to demand could lead to greater degree of monetary instability in EU over time. On the other hand, the completion of internal market through "economic and monetary union" is expected to increase the real wage flexibility by inducing greater degree of labor mobility across member states. One implication of this is the possible decrease in the (average) rate of wage indexation across EU.

The fundamental insights of the paper suggests that the macroeconomic stability of periphery economies are likely to be adversely affected as a result of both of these possible changes in EU. In other words, a given increase in the monetary variability of EU is likely to lead to proportionately larger instability (in both output and price level) of the small periphery economies. A reduction in the degree of wage indexation in EU is likely to improve EU's price stability but only at expense of worsened output and interest rate stability for EU. However, simulation results have shown that as a result of these changes both output and price stability of periphery economies could be worsened in the long-run. On the other hand, a given

increase in the rate of wage indexation in a periphery economy is likely to reduce the output instability but only at the expense of worsened price instability caused by monetary shocks impinging on EU. With regard to exchange rate policy, it seems that adopting a relatively more accommodative policy is likely to worsen both output and the price instability caused by such shocks; therefore when the dominant source of macroeconomic instability is the monetary shocks originating from EU (or USA), a periphery economy can improve both its output and price stability by choosing relatively lower degree of indexation for the exchange rate to (lagged value of) domestic price level.

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Endnotes:

[1] The reduced forms of the "steady-state" solutions of both models are available from the author upon request.

[2] $d_8 = (d_1 / d_4 + d_2) / d_7$

$d_9 = d_5 d_8 / (1 - d_6 \beta)$

$d_7 = 1 + d_1 / d_4 (d_5 / (1 - d_6 \beta) + d_3) + d_2 d_5 / (1 - d_6 \beta)$

$d_{14} = 1 / (1 - a_1 d_{13} c_2 (\alpha_2 - 1) - a_3 (d_{12} - d_{13} c_2)$

$$d_{20} = d_{15}d_9 + d_{10}(a_2 + a_3b_2) + a_4d_8$$

$$d_{19} = d_{13}c_2d_{14}d_{10}(a_2 + a_3b_2)$$

$$d_{15} = a_1(d_{13}c_1(\alpha_2 - 1) + 1)$$

$$d_{18} = d_{13}d_9(c_1 + c_2d_{14}d_{15})$$

$$d_{10} = (1/d_4)\,[1 - d_8(d_5/((1 - d_6\beta) + d_3)]$$

$$d_{12} = b_1 + c_2/\,(1 - c_1\alpha_2 - c_3\alpha_1)$$

$$d_{13} = 1/(1 - c_1\alpha_2 - c_3\alpha_1)$$