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1 The Choice of Exchange Rate Regime in Developing and Middle Income Countries

Sebastian Edwards

1.1 Introduction

In most developing and transitional economies, exchange rate issues have tended to dominate macroeconomic policy discussions during the past few years. In particular, attention has focused on two broad problems: first, defining, measuring, detecting, and correcting situations of *real* exchange rate misalignment and overvaluation and, second, understanding the relationship between *nominal* exchange rates and macroeconomic stability. Issues related to real exchange rate misalignment have been central, for example, in debates that preceded the devaluation of African currencies participating in the Communauté Financière Africaine franc zone in 1994, in post mortems of the Mexican crisis of December 1994, and in recent analyses of the Argentine stabilization program of 1991.

Regarding the relationship between exchange rates and macroeconomic stability, four specific questions have attracted the attention of analysts and policymakers: (a) Why have some countries adopted rigid, including fixed, exchange rate regimes, while others have opted for more flexible systems? (b) Do fixed exchange rate regimes impose an effective constraint on monetary behavior and thus result in lower inflation rates over the long run? (c) Are exchange-rate-based stabilization programs superior to money-based stabilization programs? (d) How should exchange-rate-based stabilization programs actually be designed?

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The first two issues deal with the long run, while the third is related to the short-run, transitional consequences of stabilization programs.[1] All four issues, however, have important implications for a country's macroeconomic performance and growth. Moreover, most of these questions are intimately related to political economy and institutional considerations.

This paper deals with the first question from a political economy perspective. I ask why some countries (e.g., Argentina) have fixed exchange rate regimes while other countries (e.g., Chile) opt for significantly more flexible systems. The more general question is why, approximately 25 years after the abandonment of the Bretton Woods system, 84 countries (out of 167 reported in the IMF's *International Financial Statistics*) continue to peg their currencies to a major currency or a currency composite (these are data for December 1994). The theoretical discussion, presented in section 1.2, emphasizes the role of credibility, politics, and institutions. In the empirical analysis (section 1.3) I use a large cross-country panel data set for developing and middle-income countries to analyze empirically the determinants of the choice of regime.

1.2 The Political Economy of Exchange Rate Regimes

In this section I develop a simple theoretical framework for analyzing the selection of an exchange rate regime. The analysis relies on the existence of a trade-off between "credibility" and "flexibility" and assumes that a pegged exchange rate system allows the authorities to resolve, at least partially, the time inconsistency problem. I assume that policymakers minimize a loss function defined over a monetary variable (inflation) and a real variable (say, unemployment). In order to simplify the discussion I initially assume that the two alternative regimes are a flexible exchange rate system and a permanently fixed exchange rate system. I then extend the analysis to the case where the two options are a flexible regime and a pegged-but-adjustable regime. In this case I assume that the abandonment of the pegged exchange rate entails important political costs.

1.2.1 Fixed or Flexible? A Simple Framework

Assume, for simplicity, that the monetary authorities must choose between two nominal exchange rate regimes: (permanently) fixed or flexible. Assume that the authorities take into account the expected value of a loss function under the two alternative systems. Consider the case where the loss function is quadratic and depends on inflation (π) squared and on squared deviations of unemployment (u) from a target value (u^*). This type of approach has been adopted, with some variants, by a number of authors (see, e.g., Persson and Tabellini 1990; Devarajan and Rodrik 1992; Frankel 1995). The model is given by equations (1) through (5):

1. See Sachs (1996). On the selection of exchange rate regimes, see Corden (1994), Edison and Melvin (1990), Tornell and Velasco (1995), and Isard (1995).

$$L = E[\pi^2 + \mu(u - u^*)^2], \qquad \mu > 0; \tag{1}$$

$$u = u' - \theta(\pi - \omega) + \psi(x - x'), \qquad E(x) = x', \quad V(x) = \sigma^2; \tag{2}$$

$$u^* < u'; \tag{3}$$

$$\omega = E(\pi) + \alpha E(x - x'); \tag{4}$$

$$\pi = \beta d + (1 - \beta)\omega. \tag{5}$$

Equation (1) is the loss function. Equation (2) states that the observed rate of unemployment (u) will be below the natural rate (u') if inflation exceeds wage increases ($\pi - \omega > 0$) and if external shocks (x) are below their mean (x'). Variable x can be interpreted as a composite of terms of trade and world interest rate shocks. It is assumed to have a variance equal to σ^2. Equation (3) establishes that the target rate of unemployment u^* is below the natural rate u'. Equation (4) implies that agents are rational in setting wage increases ($\alpha < 0$), and equation (5) defines inflation as a weighted average of the rate of devaluation (d) and the rate of wage increases (ω). Under fixed rates d is by definition equal to zero, while under flexible rates the authorities set d according to an optimal devaluation rule. A limitation of this approach is that it assumes fixed rates are unchangeable. The case of a pegged-but-adjustable regime can be handled assuming that the fixed rule has escape clauses (see Flood and Isard 1989).

The model's solution depends on the sequence in which decisions are made. Assume that workers determine ω before they observe x, d, or π. The government, on the other hand, sets its exchange rate policy after both ω and x are observed. The government's objective is to set its exchange rate policy so as to minimize the value of the loss function (1). The solution in the case of fixed exchange rates is

$$\pi = 0, \tag{6a}$$

$$u = u' + \psi(x - x'). \tag{6b}$$

These results assume that the fixed exchange rate system allows the government to solve its credibility problem by providing a precommitment technology.

The solution is slightly more complicated under flexible exchange rates. In this case the authorities have to determine the optimal exchange rate adjustment rule. The final solution for d, π, and u under flexible exchange rates is given by

$$d = -\Delta[\beta^2(1 + \theta^2\mu)\theta\mu(u^* - u') - \mu\theta\beta\psi(x - x')], \tag{7a}$$

$$\pi^{\text{flex}} = \pi^{\text{fixed}} - \theta\mu(u^* - u') + \beta^2\mu\theta\psi\Delta(x - x'), \tag{7b}$$

$$u^{\text{flex}} = u^{\text{fixed}} - \beta^3\psi\Delta(x - x'), \tag{7c}$$

where

$$\Delta = [\beta^2(1 + \mu\theta^2) - \beta]^{-1},$$

which under most plausible conditions is greater than zero. Equation (7b) establishes that due to the unemployment objective, inflation under flexible rates will tend to exceed its equilibrium level under fixed rates. That is, if the unemployment objective is important in the loss function, the authorities will be tempted to "overinflate." On the other hand, unemployment under flexible rates will be higher (lower) than under fixed rates if there are negative (positive) external shocks.

In selecting the exchange rate regime, the authorities will compare the expected value of the loss function under both regimes:

$$K = E(L^{\text{flex}} - L^{\text{fixed}}). \tag{8}$$

If $K > 0$, a fixed exchange rate regime will be adopted. It is easy to see that K is given by

$$K = E[(\pi^{\text{flex}})^2 + \mu(u^{\text{flex}} - u^*)^2 - \mu(u^{\text{fixed}} - u^*)^2]. \tag{9}$$

This expression is intuitively appealing. It states that the selection of the exchange rate regime will depend on the square of inflation under flexible rates—remember that expected inflation is zero in the fixed rate regime—and on the difference between the squared deviations of unemployment from their respective targets. After some manipulation equation (9) can be rewritten as

$$K = (\theta\mu)^2(u^* - u')^2 - \gamma\sigma^2, \tag{10}$$

where γ is a positive function of Δ, β, μ, θ, and ψ. For K to be positive, and thus for fixed rates to be preferred, the country's "employment ambition"—measured by $u^* - u'$—has to be "large enough." More specifically, it has to exceed the variance of the external shocks. On the other hand, if σ^2 is high enough, K can be negative, indicating that flexible rates are preferred. This would allow the authorities to reduce the deviation from their unemployment target. An important question in the empirical evaluation of this (and related) models is how to *measure* the degree of "ambition" of the authorities' unemployment target, $u^* - u'$. I take up this issue in section 1.3.

1.2.2 Flexible versus Pegged-but-Adjustable Exchange Rate Regimes

The preceding analysis assumed that under a fixed regime the nominal exchange rate would never be altered. This is, of course, a major simplification. In reality, under fixed exchange rates, governments always have the choice of abandoning the peg. This possibility can be captured formally by assuming that the authorities follow a rule with some kind of escape clause. In other words, the nominal exchange rate will be maintained at its original level under certain circumstances. However, if these circumstances change markedly, the peg will be abandoned. This means that at any moment in time there is a positive probability that the pegged rate will be altered. This type of arrangement

formed the basis of the original Bretton Woods system that ruled the international monetary system from 1948 to 1973. According to the original International Monetary Fund (IMF) Articles of Agreement, a country could alter its peg if it was facing a "fundamental disequilibrium." In this subsection I sketch the analytics of this case.

Assume that ex ante a country can choose between two possible regimes: flexible nominal rates (F) or pegged but adjustable rates (P). Also consider a two-period economy, where under a pegged regime there is a positive probability that the peg will be abandoned at the end of the first (or beginning of the second) period. The probability of abandoning the peg is denoted by q, and the discount factor by β. As in the preceding analysis, assume that the authorities have a distaste for both inflation and for deviations of unemployment from a target level.

Assume further that the authorities will incur a political cost equal to C if the peg is indeed abandoned. This assumption captures the stylized fact, first noted by Cooper (1971), that stepwise devaluations have usually resulted in serious political upheavals and, in many cases, in the fall of the government. Cooper reports that more than two-thirds of the finance ministers that engineered the devaluations lost their jobs within two months of the devaluation (see also Edwards 1994). The magnitude of this cost will, in turn, depend on the political and institutional characteristics of the country, including the degree of political instability. In politically unstable countries a major economic disturbance, such as the abandonment of a parity that the authorities have promised to defend, will tend to have major political consequences. For example, this can explain why the vast majority of stepwise devaluations take place during the early years of an administration, when its degree of political popularity is higher. The degree of political instability will also affect the government's discount factor. In more unstable countries the authorities will tend to be more impatient, discounting the future more heavily. This means that, denoting the degree of political instability by ρ, we can write

$$C = C(\rho), \qquad \text{with } C' > 0; \tag{11}$$

$$\beta = \beta(\rho), \qquad \text{with } \beta' < 0. \tag{12}$$

In this two-period economy, the loss function under flexible rates is (where the notation is consistent with that used in the previous section)

$$L^{\text{flex}} = \xi(\pi^{\text{F}})^2 + \mu(u^{\text{F}} - u^*)^2 + \beta(\xi(\pi^{\text{F}})^2_{t+1} + \mu[(u^{\text{F}})_{t+1} - u^*]^2), \tag{13}$$

where ξ is a parameter that captures the degree of distaste for inflation. The loss function under a pegged rate regime is

$$L^{\text{pegged}} = \xi(\pi^{\text{P}})^2 + \mu(u^{\text{P}} - u^*)^2 + \beta\{(1 - q)(\xi(\pi^{\text{P}})^2_{t+1} + \mu[(u^{\text{P}})_{t+1} - u^*]^2) + q(\xi(\pi^{\text{D}})^2_{t+1} + \mu[(u^{\text{D}})_{t+1} - u^*]^2) + qC\}, \tag{14}$$

where the superscript D refers to the value of a specific variable in the second period under the devaluation scenario. If the escape clause is exercised and the peg abandoned, we assume that the country moves into a flexible regime. That is, once the peg is abandoned, inflation and unemployment in the second period will be determined as under a flexible system. The rate of inflation will be higher under the pegged-but-adjustable regime than under the (unrealistic) "forever" fixed system considered in section 1.2.1. This is because under a pegged regime the public's expected rate of inflation (in period 2) will explicitly take into account the probability that the peg will be abandoned:

$$E(\pi^{P})_{t+1} = q(\pi^{D})_{t+1} + (1 - q)(\pi^{P})_{t+1}$$

(see Edwards 1996).

In order to simplify the discussion and concentrate on the selection of the exchange rate regime, I do not specify explicitly the process governing the decision to use the escape clause. As in equation (8) in the preceding section, the regime decision rule will be based on an ex ante comparison between both loss functions:

$$K = E(L^{\text{flex}} - L^{\text{pegged}}). \tag{15}$$

If $K > 0$, then the pegged-but-adjustable regime is preferred. Some simple manipulation yields

$$K = \xi(\pi^{F})^2 + \mu[(\kappa^{F})^2 - (\kappa^{P})^2] + \beta(1 - q)\xi(\pi^{F})^2_{t+1} + \beta(1 - q)\mu[(\kappa^{F})^2_{t+1} - (\kappa^{P})^2_{t+1}] - q\beta C, \tag{16}$$

where $(\kappa^{F})^2 = (u^{F} - u^{*})^2$ and $(\kappa^{P})^2 = (U^{P} - u^{*})^2$. From the analysis in the previous section it follows that $(\kappa^{F})^2 - (\kappa^{P})^2 < 0$ and that $(\kappa^{F})^2_{t+1} - (\kappa^{P})^2_{t+1} < 0$. From equation (16) it is possible to derive a number of hypotheses regarding the likelihood of a country's choosing a pegged-but-adjustable exchange rate regime. A higher rate of inflation under flexible rates (in either period) will increase the likelihood of a pegged regime's being chosen. Moreover, with other things given, a higher weight for inflation in the loss function—that is, a higher ξ—will also increase the probability of choosing a pegged exchange rate. On the other hand, an increase in unemployment volatility under pegged rates, generated by a higher variance in the foreign shock—a higher σ^2, from the previous section—will increase the likelihood that a flexible system will be selected. A greater distaste for unemployment deviations—that is, a higher μ—will reduce the likelihood of selecting a pegged rate. Likewise, a higher cost of abandoning the peg—a higher C—will reduce the ex ante probability of selecting a pegged rate. Interestingly enough, a higher probability of abandoning the peg—a higher q—will have an ambiguous effect on the ex ante likelihood of choosing a pegged regime. This follows from the expression

$$K_q = -\beta\gamma(\pi^{F})^2_{t+1} - \beta\mu[(\kappa^{F})^2_{t+1} - (\kappa^{P})^2_{t+1}] - \beta C. \tag{17}$$

Notice that the presence of political costs of abandoning the peg (C) increases the likelihood that this expression will be negative, making it more likely that a flexible regime will be selected.

An important question relates to the relationship between political instability and the selection of exchange rate regime. In principle there will be two offsetting forces. First, a higher degree of political instability will increase the cost of abandoning the peg—recall equation (11)—and thus will reduce the ex ante probability that a pegged regime will be chosen. Second, a higher degree of instability will increase the authorities' discount rate—equation (12)—reducing the importance of "the future" in their decision-making process. Formally,

$$K_p = -\beta q C' + K_\beta \beta'. \tag{18}$$

While the first term is negative, the second can be either positive or negative, because the sign of K_β is indeterminate. This means that the way in which instability will affect the selection of an exchange rate system is an empirical question. I tackle this issue in the following section, where I present the results of a number of probit regressions on panel data for 49 developing and middle-income countries during 1980–92.

1.3 Empirical Results

In this section I use a cross-country, unbalanced panel data set for 49 developing and middle-income countries during 1980–92 to analyze why some countries have adopted pegged exchange rate regimes while others have opted for more flexible systems; see the appendix for a list of the countries included in the analysis. I estimate a number of probit equations to investigate whether, when controlling for other factors, a country's political and economic structure, including its degree of political instability, helps explain the selection of an exchange rate regime. Two classes of independent variables were used in the analysis: the first attempts to capture long-term structural characteristics—both political and economic—of these countries, which are assumed to change very slowly over time. In the empirical analysis these variables are defined as averages for the decade prior to the one included in the analysis. The second class of independent variables tries to capture, for each country, the evolution of some key macroeconomic time series.

Probit equations of the following type were estimated:

$$\text{peg}_{it} = \rho' P_i + \lambda' Q_{it} + \phi' R_{it-1} + E_{it}, \tag{19}$$

where subindexes i and t refer to country i in year t; peg is an exchange rate regime index defined below; and ρ, λ, and ϕ are parameter vectors. P represents variables specifying national political and economic characteristics. In order to avoid simultaneity problems these variables were defined, in most cases, as averages for the previous decade, 1970–80 (see the discussion below

for details). Q and R are variables (economic and structural) for which panel data are available; while the Qs are timed at period t, the Rs are lagged one (or more) periods. This is done mostly to reduce the pitfalls of simultaneity problems.

1.3.1 Data

The empirical analysis poses some difficult data challenges. Chief among them are (a) classifying the broad variety of exchange rate systems observed in the real world into two broad categories, pegged and flexible, (b) measuring political instability, and (c) defining measures of the authorities' incentives to "tie their own hands."

Defining Exchange Rate Regimes

The IMF's *International Financial Statistics* (*IFS*) classifies countries according to their exchange rate systems in three broad groups:

1. Countries whose currencies are pegged either to a single currency or to a currency composite.
2. Countries whose exchange rate systems have limited flexibility "in terms of a single currency or group of currencies." This group includes a rather small number of countries that have adopted narrow bands, including those in the European Exchange Rate Mechanism. In June 1991, for example, only 11 countries were listed in this group.
3. Countries with "more flexible" exchange rate systems. This group includes countries where the exchange rate is adjusted frequently according to a set of indicators, countries that float independently, and countries with "other managed floating" regimes.

In the empirical analysis presented in this paper, a country is classified according to its exchange rate regime in a binary fashion as "pegged" or "flexible." A difficulty with this approach, however, is that it is not entirely clear how the middle group—that is, nations that according to the IMF have "limited flexibility"—should be classified. In order to deal with this issue I have used two alternative classifications. The first considers as having a pegged exchange rate system only those countries classified by *IFS* as such. Thus a variable peg1 that takes a value of one for those countries and zero for countries with "limited flexibility" and "more flexible" regimes was defined. The second classification considers as having a pegged regime those countries classified as such by *IFS*, plus those with flexibility limited "in terms of a single currency or group of currencies." Variable peg2, then, takes a value of one for "pegged" and "limited flexibility" countries and zero for those nations with "more flexible" regimes.

Measuring Political Instability

Most empirically based political economy studies have used rather crude measures of political instability, including the number of politically motivated

assassinations and attacks (Barro 1991). Other studies have used the frequency—either actual or estimated—of government change as a measure of political turnover and instability (Cukierman, Edwards, and Tabellini 1992). A limitation of this type of measure, however, is that it treats *every* change in the head of state as an indication of political instability, without inquiring whether the new leadership belongs to the same party as the departing leader or to the opposing party. In that sense, for example, the replacement of a prime minister by another from the same party is considered to have the same meaning as a change in the ruling party (Cukierman 1992).

In this paper I use a new index of political instability (POLTRAN) that focuses on instances when there has been a *transfer of power* from a party or group in office to a party of group formerly in the opposition, between 1972 and 1980; the merits of this type of index were first discussed in Edwards and Tabellini (1994). This index measures the instability of the political system by capturing changes in the political leadership from the governing party (or group, in the case of a nondemocratic regime) to an opposition party. In constructing this index, a transfer of power is defined as a situation where there is a break in the governing political party's (or dictator's) control of executive power. More specifically, under a presidential system a transfer of power would occur if a new government headed by a party previously in the opposition takes over the executive. Under a parliamentarian regime a transfer of power is recorded when a new government headed by a party previously in the opposition takes over, or when there are major changes in the coalition so as to force the leading party into the opposition. However, when the governing coalition remains basically unaltered, even if the new prime minister belongs to a party different from that of the outgoing prime minister, a transfer of power is not recorded. Finally, in the case of single-party systems, dictatorships, or monarchies, a transfer of power only takes place if there is a forced change of the head of state. The appointment of a successor by an outgoing dictator (as in Brazil during the 1970s) is not recorded as a transfer of power. This variable has a single value for each country, corresponding to the period 1971–80. By concentrating on the period immediately preceding the period used in the probit analysis, potential endogeneity problems are reduced.

In addition to the POLTRAN index of political instability, three indicators were used as proxies for the extent of weakness of the government in office. The first refers to whether the party or coalition of parties in office has an absolute majority of seats in the lower house of parliament. In any given year this indicator, called MAJ, takes a value of zero if the party (coalition) does not have a majority, a value of one if it has a majority, and a value of two if the system is a dictatorship. A higher value of MAJ, then, reflects a stronger government. In the cross-country regression the average of MAJ over 1971–80 was used.

The second indicator of political weakness is the number of political parties in the governing coalition (NPC). This index takes a value of zero for monar-

chical or dictatorial systems and the number of parties participating in a ruling coalition under a democratic regime (e.g., if there is a single-party government, NPC will take the value of one). It is expected that the higher the number of parties in that coalition, the higher the probability of conflict of interest across ministries and thus the higher the reliance on the inflation tax.

The third indicator of government weakness is whether the government is a coalition government or a single-party government (COAL). This index takes a value of zero for dictatorships, a value of one for single-party governments, and a value of two for coalition governments. As with MAJ, NPC and COAL were defined as averages for 1971–80.

Other Data

According to the model presented in section 1.2, in addition to the political factors discussed above, other variables that capture structural characteristics of the economy are important in the process of selecting an exchange rate system.

External shocks. Two alternative indexes were used to measure the extent of external shock variability. A coefficient of variation of real export growth for 1970–82 (CVEX) was constructed with raw data obtained from *IFS*. A coefficient of variation of real bilateral exchange rate changes for 1970–82 (EXVAR) was constructed from data obtained from *IFS*. The use of these variables in the regression analysis presents a potential endogeneity problem. In order to minimize this danger in the probit reported below, lagged values (for 1970–82) of these indexes were used. It is expected that the coefficients of these variables in the probit regressions will be negative, indicating that, as reflected in equation (10), countries with more volatile external sectors will tend to select more flexible regimes.

In principle, the actual importance of external shocks should also depend on the degree of openness of the economy—more open countries are more "vulnerable" to external disturbances. In order to consider this effect I added an interactive term (VAR_OPEN) between external variability and the degree of openness. The latter was defined as the ratio of imports plus exports to GNP and was constructed from data obtained from *IFS*. This variable was defined as the average for 1971–80.

Degree of "ambition" of the real target. A cornerstone of the model developed above—and of most Barro-Gordon types of model—is the idea that countries with very "ambitious" real objectives will have an incentive to "tie their own hands" in order to solve their credibility problems. That is, with other things given, they will have a greater incentive to select pegged exchange rate systems. It is not easy, however, to measure empirically this degree of "ambition." In particular, only a handful of middle-income and developing countries have reliable data on unemployment. For this reason I have used deviations of aver-

age real rates of growth of GDP from the group's average (for 1970–80) as a proxy for the countries' incentives to tie their own hands. In using this variable I assume that, with other things given, countries with historically low rates of growth will be more tempted to "overinflate" as a way to accelerate growth, even in the short run. If this is the case, low-growth countries will have an incentive to tie their own hands as a way to avoid falling into this temptation. It is expected that the coefficient of GROWTH will be negative in the probit regressions. Naturally, the use of growth as a regressor raises the possibility of endogeneity. It is indeed possible that the exchange rate regime will, per se, affect economic performance, including growth. In order to avoid this problem I use lagged averages (by one decade) of growth rates in the estimation of the probit model (19). To the extent that this variable tries to capture the historical and structural incentives faced by a country to tie its authorities' hands, the use of lagged averages is, indeed, appropriate.

Probability of abandoning the peg (or ability to maintain it). As discussed in the preceding section, a higher probability of abandoning the peg—a higher q—can, in principle, affect the likelihood of selecting a pegged rate either positively or negatively. Since it is not possible to observe q directly, three variables that capture the probability of having a devaluation were considered in the empirical analysis: LOGINF is the (logarithm of the) historical rate of inflation. A country with a history of rapid inflation will tend to have a greater propensity to devalue. This variable is defined as the average for 1970–80. RESMONEY is the yearly lagged ratio of international reserves to high-powered money. Higher reserves reduce, with other things given, the probability of abandoning the peg. This variable was defined, for each country and each year, as the one-year lagged ratio of central bank reserves to monetary base. CREGRO is the rate of growth of domestic credit. A country with a higher rate of growth of domestic liquidity will have a lower ability to sustain the peg. This variable was constructed from data obtained from the IMF and was defined as a five-year moving average. Notice that according to equation (17), in spite of the theoretical ambiguity of the effect of a higher q on the selection of exchange regime, in a country with a high political cost of devaluing, a higher q will reduce the likelihood that a pegged regime will be adopted.

In addition to the variables of political instability, external shocks, and probability of devaluing, the logarithm of per capita income (PCGDP) measured in 1989 dollars was included in the analysis. This variable was taken from the World Bank's *World Development Report.* More advanced countries tend to have a greater degree of intolerance for inflation. Also, it has often been claimed that less advanced countries do not have the institutional and administrative ability to implement a flexible exchange rate regime. On both counts, the coefficient of PCGDP should be positive.[2]

2. See Aghevli, Khan, and Montiel (1991). For a critical view, see Collins (1994).

1.3.2 Results

Table 1.1 contains the main results from the probit analysis for both the peg1 and peg2 measures of exchange rate regime. Overall these results are very satisfactory and provide broad support for the model developed in the preceding section. Surprisingly, perhaps, there are few differences in the estimates obtained when the alternative definitions of dependent variables were used.

The estimates obtained strongly suggest that the structural degree of political instability plays an important role in the selection of exchange rate regime—more unstable countries have, with other things given, a lower probability of selecting a pegged exchange rate system. The consistent negative coefficient of this variable indicates that empirically the direct effect of a higher political cost of devaluing offsets the effect via a higher discount rate on the authorities' decision-making process. Two indexes of the degree of weakness of the political system (NPC and COAL) are not significant; MAJ, on the other hand, is marginally positive, suggesting that a stronger government will have a greater tendency to select a pegged system. The intuition here is quite simple: a stronger government will be in a better position to withstand the political costs of a (possible) currency crisis and thus will be more willing to accept them.

The coefficients associated with the (lagged) indexes of external volatility—EXVAR and CVEX—are also negative, as expected, and in the case of EXVAR significantly so. What is particularly interesting is that the coefficients of the interactive term between external variability and openness (VAR_OPEN) are positive, and significantly so in four of the five regressions. This suggests—somewhat puzzlingly—that as countries become more open, the importance of external disturbances in the selection of exchange rate regime declines.

The estimated coefficients of the variables that capture the ability to maintain the peg have the expected signs and are also significant at conventional levels. The coefficient of lagged inflation is significantly negative, suggesting that countries with histories of inflation will have a lower probability of maintaining a peg and will thus tend to favor the adoption of more flexible systems. Along similar lines, the coefficients of lagged credit creation are also negative. The lagged coefficient of the ratio of central bank international reserves to base money (RESMONEY) is positive in all regressions, indicating that countries with lower holdings of international reserves will have a lower probability of adopting a pegged exchange rate regime. There is, however, a potential endogeneity problem: it is possible that a country that has decided to adopt a flexible rate regime will "need" a lower stock of reserves. The use of one-year lagged values of the reserves ratio reduces, however, the extent of this problem.

The estimated coefficient of the historical rate of deviations of GDP growth is significantly negative indicating that, with other things given, countries with lower growth rates than the average will tend to prefer more rigid exchange rate regimes. To the extent that historical growth deviations are a good proxy for the "temptation to inflate," this result can be interpreted as providing evi-

Table 1.1 **Determinants of Exchange Rate Regimes: Probit Regression Results for Developing Countries**

	peg 1			peg 2	
Variable	A	B	C	A	B
Constant	2.677	0.897	2.177	2.366	1.030
	(9.194)	(0.818)	(2.391)	(8.373)	(0.972)
POLTRAN	−1.761	−2.514	−2.099	−1.185	−1.930
	(−3.614)	(−4.856)	(−4.220)	(−2.486)	(−3.782)
NPC		−0.393	−0.150		−0.567
		(−1.616)	(−0.650)		(−2.361)
COAL		0.569	0.138		0.578
		(0.972)	(0.271)		(1.022)
MAJ		1.171	0.737		0.873
		(2.217)	(1.663)		(1.733)
EXVAR	−0.256	−0.288		−0.274	−0.031
	(−4.581)	(−5.087)		(−4.319)	(−4.872)
CVEX			−0.007		
			(−0.402)		
VAR_OPEN	0.039	0.049	0.004	0.047	0.061
	(1.949)	(2.104)	(0.129)	(2.317)	(2.597)
CREGRO	−0.102	−0.084	−0.128	−0.113	−0.114
	(−1.184)	(−1.017)	(−2.000)	(−1.362)	(−1.401)
LOGINF	−0.919	−0.899	−1.232	−0.819	−0.760
	(−6.795)	(−5.833)	(−8.884)	(−6.287)	(−5.173)
RESMONEY	0.171	0.099	0.239	0.140	0.088
	(1.822)	(1.222)	(2.565)	(1.669)	(1.141)
GROWTH	−0.117	−0.126	−0.138	−0.095	−0.100
	(−3.976)	(−4.035)	(−4.162)	(−3.284)	(−3.361)
PCGDP	0.394	0.771	0.560	0.343	0.645
	(3.851)	(5.263)	(5.094)	(3.371)	(4.647)
N	566	566	593	552	552
χ^2	182.6	213.7	186.5	160.1	188.21

Note: Dependent variables are peg 1 and peg 2. Numbers in parentheses are t-values.

dence in favor of the "tying their own hands" hypothesis. Countries with poorer performance—measured, in this case, by the *historical* rate of growth deviations—will have a greater incentive to renege on their low inflation promises and thus will benefit from adopting more rigid exchange rate systems. In order to analyze the robustness of these results I used the yearly difference between the rate of unemployment and its long-term historical average (1970–90) as an alternative measure of the temptation to inflate. Within the context of the credibility view it would be expected that the estimated coefficient of this variable will be positive. A limitation of this measure, however, is that very few countries have data on unemployment. For this reason, the results obtained from these estimates should be interpreted with caution.

Finally, the coefficient of log of per capita income is significantly positive, indicating that contrary to basic intuition, more advanced countries will tend

to adopt pegged exchange rate regimes. These results, in fact, contrast with those obtained in Edwards (1996) for a group of countries that included the advanced nations. The results reported in table 1.1 are in part explained by the fact that the poorer countries in the sample suffered from significant external crises during the period under analysis and had no alternative but to adopt more flexible exchange rate regimes.

1.4 Conclusions

This paper has dealt with the issue of exchange rate regime selection. In particular, I ask: why do some countries select a flexible exchange rate regime while others choose a pegged regime? I argue that the answer to this question is largely related to the political structure of the country in question. In this paper I develop a formal political economy model to analyze this issue. The model assumes that a fixed exchange rate regime is more credible than a flexible regime. However, if the pegged regime is abandoned—that is, if the authorities decide (or are forced) to devalue—the authorities suffer a significant political cost. The empirical results reported here indicate that for a sample of developing and middle-income countries, countries with more unstable political regimes will tend to select more flexible exchange rate regimes.

Appendix
Countries in the Sample (Listed by IFS Code)

South Africa
Bolivia
Brazil
Chile
Colombia
Dominican Republic
Ecuador
El Salvador
Honduras
Mexico
Nicaragua
Paraguay
Peru
Venezuela
Jamaica
Trinidad Tobago
Iran
Sri Lanka
India
Indonesia
Pakistan
Philippines
Thailand
Botswana
Burundi
Cameroon
Central African Republic
Chad
Congo
Zaire
Ethiopia
Gabon
Ghana
Côte d'Ivoire
Kenya
Lesotho
Mauritius
Morocco
Nigeria
Zimbabwe
Rwanda
Sierra Leone
Somalia
Sudan
Tanzania
Togo
Tunisia
Uganda
Zambia

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Comment

Anne O. Krueger

In this paper, Sebastian Edwards considers an important question: what determines what exchange rate regime governments choose? His paper is positive rather than normative, as he posits a trade-off for governments between inflation and unemployment. In his (Barro-Gordon) framework, when countries have high credibility as to their macroeconomic policies, they can afford to choose a flexible exchange rate regime; on the other hand, if credibility is limited, the inflation costs of a flexible exchange rate regime will be much higher.

On the basis of the model he develops, he tests the determinants of exchange rate regimes for 49 countries, finding that political instability, the probability of abandoning pegged rates, and variables reflecting the importance attached to unemployment and growth targets are the most significant determinants of the choice of exchange rate regime.

I have four comments regarding the paper. The first is a political economy question: is the choice of exchange rate regime a "rational choice" or the consequence of a learning experience? In the 1950s and 1960s, after Milton Friedman wrote his classic paper, much of the rejection of the idea of flexible exchange rates was based on emotional grounds: defense of national pride, belief in the sanctity of the gold standard, and so on. These same ideas permeated thinking in many developing countries: in Turkey, at the beginning of independent economic policy in 1931, one of the first measures was a law requiring the maintenance of a fixed exchange rate. The national currency was, especially in newly independent countries, a symbol of national sovereignty, and its fixity had considerable emotional appeal, whatever the realities of the trade-off between inflation and unemployment may have been. It should also be recalled that early development thought stressed the irrelevance of monetary incentives: primary commodity exports were thought by many to be in highly inelastic demand as exemplified by their exogeneity in the Chenery-Strout (1966) two-gap model. While there were some dissenters even in early days, the thinking continued, especially among policymakers, for a long time.

A second question relates to the assumption of a trade-off. Here, I have several misgivings. In the model, when an exchange rate is fixed there is zero inflation and unemployment costs can be higher than under a flexible exchange rate regime, where unemployment can be lower because of inflation. In reality, most of the developing countries that have chosen fixed exchange rates have not altered their domestic monetary and fiscal policies sufficiently to insure against inflation—how else could we have the specter of Ghana in 1984 with a black market premium on the exchange rate of over 900 percent? Indeed, in most countries where nominal anchor exchange rate policies have been cho-

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sen—even when the nominal anchor was a rate of exchange rate adjustment less than the domestic rate of inflation—the continuing inflationary process has undermined the nominal anchor regime.

Perhaps even more fundamental, fiscal deficits in developing countries are seldom incurred because of Keynesian-type considerations. Instead, they are largely the outcome of governments' inability to enforce fiscal discipline because of political weakness. Pressures to spend in order to gain political support and resistances to raising revenues are simply too strong in those circumstances.

Finally, many policymakers in developing countries are now rejecting inflation because it hurts growth. Certainly, in countries such as Argentina and Chile, policymakers do not view inflation as being consistent with more employment and growth; on the contrary, one reason for their commitment to achieving a stable price level has been their belief that inflation harms the real economy. To the extent that that belief is pervasive, the basis of the model is undermined: believers in the inefficacy of inflation for achieving real goals would believe there is a positive relationship between low or zero inflation and the real variables they seek, and not a trade-off.

Yet a third consideration has to do with the growth-rate–exchange-rate linkage. When high rates of inflation have been prevalent and policymakers have nonetheless adhered to a fixed exchange rate, there is an a priori basis to believe that low growth will result. One wonders how much of Edwards's results are picking up the low-growth–poor-policy relationship, rather than trade-offs between objectives on the part of rational decision makers.

Finally, I have misgivings about the use of similar time periods for all countries. After all, countries did alter their exchange and payments regimes at different times, and the use of common time periods obscures that fact. The Korean real appreciation of the latter half of the 1970s, for example, is seen by all analysts as having been a significant policy mistake; yet Edwards's choice of time periods would take that to have been the underlying exchange rate policy. If, instead, one picked "stable policy periods," such as Ghana pre- and post-1984, Turkey pre- and post-1980, and Chile pre- and post-1985 (or 1975?), the results might be significantly different. It would be interesting to see how the results would turn out if Edwards tested, within each country, for the periods when there were changes in policy regimes and then used the periods so delineated as his units of observation. Certainly the exchange rate regime would generally be far clearer than it is when the same chronological time periods are used for all countries independent of changes in their policy regimes.

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Comment Andrew K. Rose

Sebastian Edwards's paper deals with an important question that remains at the heart of open economy macroeconomics, namely: what determines the choice of exchange rate regime? His paper provides a rigorous theoretical framework, in which he derives the choice as an optimal response to the magnitude and sources of different shocks striking the economy. He does this in a familiar Barro-Gordon–style setting that includes the government's preferences over inflation and unemployment. He sensibly differentiates between two types of fixed exchange rate regimes: an adjustable peg and a permanent fix (which is really more akin to a currency union).

Edwards also takes the extra step of going to the data. Using a panel of 12 years of annual data for 49 developing and middle-income countries, Edwards estimates a probit model using both political and economic regressors to explain actual exchange rate choices. His most striking finding is that political stability is associated with fixed exchange rates. He also shows that growth is associated with flexible exchange rates. But he finds a number of other sensible (if more straightforward) results: lower real exchange rate variability, lower inflation, greater reserves, and capital controls are also associated with fixed exchange rates. All in all, this is clearly interesting and potentially important work.

I view this paper more as an intriguing taste of what is to come than as the sort of work that marks the end of a long-term project. Thus I encourage the author to continue the research program begun with this paper. A number of both technical and methodological improvements could make work like this more definitive, and I am sure that Edwards plans to pursue them (and many others) in future work. More research is very much warranted by the scope and importance of the task Edwards sets for himself.

There is a potentially nontrivial problem of reverse causality associated with many of the regressors, especially exchange rate volatility and inflation. After all, countries *choose* their exchange rate regimes, as the theoretical model implies. Thus an expected change in the nature of the economy (e.g., in the sources or sizes of shocks or in the government's preferences) should lead to a deliberate change in the exchange rate regime. In such circumstances, using historical data would be inappropriate, and using lagged data would provide an even less reasonable test of the model. In any case, the standard Lucas critique applies to work like this. The exchange rate regime should be expected to change the structure of the economy, even if the switch is inadvertent. This is yet another reason to treat the historical data carefully in cross-regime estimation.

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For all these reasons, I urge Edwards to consider estimation with instrumental variables, using his theoretical framework to derive the appropriate first-stage regressors. One of the great advantages of having an explicit structural model is the ability to derive reasonable instrumental variables. More generally, it would also be useful have more clear and well-defined linkages between the theory and the data.

While it is reasonable to use the IMF's exchange rate regime classifications as a starting point, the variable is suspect. For instance, Canada (the country I know best) is classified as a floating exchange rate country in this classification, and there is no distinction between the tight Dutch and loose Italian fixes in the European Monetary System. I urge Edwards to compare the IMF's categories with actual exchange rate volatility, as a simple robustness check. A propos, multinomial logit could be used to handle the "intermediate cases"; indeed, this is the way to test the appropriateness of a two-way (as opposed to a three-way) regime classification.

Edwards uses annual data, which is certainly reasonable from many perspectives (including handling the all-important data availability issue). Nevertheless, this frequency may be inappropriate in this context. Perhaps the right unit is "an exchange rate cycle" (just as some researchers believe that data should be "phase averaged" for business cycle investigations). An explicit test of "time deformation" would be a useful addition to the literature.

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