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Exchange Rate Regimes, Inflation and Output Volatility in Developing Countries

by

Michael Bleaney and David Fielding

Centre for Research in Economic Development and International Trade, University of Nottingham

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Abstract
The median developing country has had significantly higher inflation than the median advanced country since the early 1980s. A model is presented in which a developing country may reduce inflationary expectations by pegging its exchange rate to the currency of an advanced country (or a basket of such currencies), at the expense of forgoing its ability to compensate for real exchange rate shocks. Different types of pegged exchange rate offer varying degrees of anti-inflation credibility and of exposure to shocks. Tests on a sample of 80 developing countries support the empirical predictions of the model.

Outline
1. Introduction
2. The Model
3. Empirical Findings
4. Conclusions

I INTRODUCTION

Much has been written about inflation in developing countries over the past twenty years, almost all of it in connection with stabilising high inflations which have afflicted only a minority of countries. There has been virtually no discussion of the divergence between the inflationary experience of the *typical* developing country and that of the typical industrial country. Yet, as Figure 1 shows, the median developing country has had an inflation rate of about 10% p.a. in recent years, more than twice as high as that of the median industrial country, where inflation has dropped significantly below 5% p.a. Before about 1983, by contrast, the median inflation rates of the two categories of countries moved very closely together.[1]

The divergence in inflationary experience which has emerged is the stimulus for this paper. To what extent can it be explained by economic theory? An obvious starting point is that the monetary authorities may have different preferences at different levels of per capita GDP. Low inflation may have certain costs which developing countries are less willing to accept than are advanced countries. Figure 1 shows that the divergence in inflation rates coincided with the successful deflation in the advanced countries after the oil shocks of the 1970s. One hypothesis is that this divergence was associated with earlier shifts in exchange rate regime, and that, but for oil shocks pushing up advanced-country inflation rates, the divergence would have become apparent rather earlier, around the time that the Bretton Woods system broke down. Some recent work has certainly suggested that developing countries which peg their exchange rates achieve lower inflation than those whose exchange rate floats (Ghosh *et al*., 1995). In the absence of any other obvious candidate, we pursue this idea that the breakdown of the Bretton Woods system played a significant role in the divergence of inflation rates between developing and advanced countries. We present a model in which the authorities in a developing country face a trade-off in choosing their exchange rate regime: floating the exchange rate allows the authorities greater freedom to respond to exogenous shocks, so that they achieve greater stability of output (and inflation) than under pegged rates, at the expense of higher mean inflation. We then test this model empirically.

The advantages and disadvantages of different exchange rate regimes have inevitably spawned a massive literature (e.g. Aghevli *et al*., 1991; Obstfeld, 1995). Of more relevance here is empirical research into inflation and output experience under different

1 GDP-weighted mean inflation rates for developing countries, as published in *International Financial Statistics*, are much higher, because of the influence of a few large countries with very high inflation rates (e.g. Brazil). For this reason, the mean is a better measure of central tendency to use.

regimes. Alogoskoufis (1992) argues that under floating rates, inflation is likely to be more persistent and to be accommodated by monetary policy to a greater degree than under fixed rates. He finds supporting evidence in the experience of the US and the UK back to 1880, and for 21 OECD countries in the post-war period. Obstfeld (1995) confirms this last result except in the case of the US, a finding which he attributes to the role of the US as the reserve centre in the Bretton Woods system. Collins (1996) seeks to explain the choice of exchange rate regime, using a sample of 24 Western Hemisphere countries over the period 1978-92. She finds that smaller, less open economies were less likely to choose a flexible regime, but that countries with current account deficits or which were involved in International Monetary Fund (IMF) programmes were more likely to do so. She suggests that the political costs of exchange rate realignments are smaller under flexible rates, and that this (combined with shifting attitudes in the IMF) explains the trend towards flexible rates over time. The work of Ghosh *et al*. (1995) is most closely related to ours from an empirical viewpoint, although its theoretical approach is somewhat eclectic. The authors classify the exchange rate regime of 136 countries for up to 30 years (1960-89) into one of nine types (which are then further subdivided), using the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions*. Using deviations from annual global means, they find that inflation is significantly lower in pegged exchange rate regimes, particularly if the peg is only infrequently adjusted. They also find that output growth does not differ significantly across exchange rate regimes, nor does its volatility (after correction for terms of trade shocks and the variability of government consumption).

This paper is structured as follows. The theoretical model is expounded in Section Two, and the empirical results are presented and discussed in Section Three. Conclusions are drawn in Section Four.

II THE MODEL

Consider a model of the Barro-Gordon (1983) type, in which policy-makers have two objectives (output and inflation), but their interest in the former tempts them to raise output above the equilibrium level, creating an inflationary bias. With rational expectations, this bias is built into the private sector's inflationary expectations, and the expected inflation occurs unless the government tries to establish a reputation for stable prices. One way in which poorer countries could experience higher inflation in this model is that, being poorer, they attach higher weight to the output objective. This causes their non-reputational equilibrium inflation rate to be higher. The question then arises why they do not peg their exchange rates to those of an advanced country. If this peg were credible, then inflation could be reduced to advanced-country levels without any loss in average output. The disadvantage of pegging is the reduced capacity to adjust the nominal exchange rate to terms-of-trade shocks. The point that the authorities may wish to accept some inflation in order to reduce output variability in the face of shocks was first made by Rogoff (1985). We develop a model in which the optimal choice of exchange rate regime depends on the size of shocks to the equilibrium real exchange rate. Using a sample of developing countries with different exchange rate regimes, we test whether, after controlling for a variety of factors, those with managed exchange rates achieve lower inflation and suffer higher output and inflation variability than those with floating rates.

In each time period the government of a developing country maximises the utility function

$$Z = -0.5\pi^2 - 0.5b(y - y^* - k)^2 \qquad b>0,\ k>0 \qquad (1)$$

where π denotes inflation, y is output and y^* equilibrium output. Because k is positive, this utility function is characterised by inflationary bias, and b determines the relative weight given to output maximisation rather than price stability. A fundamental assumption of the model is that in the advanced countries b takes the lower value b_a, implying greater attachment to price stability. The government maximises (1) subject to an open-economy expectations-augmented Phillips curve equation and an exchange rate regime. The Phillips curve equation is

$$y = y^* + a(\pi - \pi^e) - c(q - q^*) \qquad a>0,\ c>0 \qquad (2)$$

where π^e denotes expected inflation, q is the real exchange rate (an increase implying appreciation) and q^* is the equilibrium real exchange rate. The equilibrium real exchange rate is assumed to follow a random walk:

$$q^*_t = q^*_{t-1} + \varepsilon_t \qquad \varepsilon \sim N(0, \sigma^2_\varepsilon) \qquad (3)$$

The government may choose either a flexible exchange rate or a pegged exchange rate (at a later stage we shall allow for different types of pegged exchange rate). The distinction between the two lies in the information available to the government in setting q_t. Under flexible exchange rates, the government can choose q_t after observing the shock ε_t, whereas under pegged exchange rates it has to choose q_t before observing e_t.[2] Under flexible rates the government chooses $q_t = q^*_t$, and equation (2) becomes

$$y_f = y^* + a(p - p^e) \qquad (2f)$$

where the '*f*' subscript denotes floating exchange rates. Under pegged rates (subscript '*p*') the government chooses q so that $E(q_t) = q^*_t$, which implies that $q_t = q^*_{t-1}$. Equation (2) then becomes

$$y_p = y^* + a(p - p^e) + ce \qquad (2p)$$

Substituting (2p) into (3), differentiating with respect to p and setting the differential equal to zero reveals that with a pegged exchange rate the government chooses p such that

$$(1 + a^2 b)p = a^2 b p^e + abk - abce \qquad (4p)$$

Under rational expectations, the private sector chooses p^e by taking expectations of (4), which yields

$$p^e = abk \qquad (5p)$$

Substitution into (3) gives

$$p = abk - [abc/(1 + a^2 b)]e \qquad (6p)$$

and substituting this into (2p) yields

$$y = y^* + [c/(1 + a^2 b)]e \qquad (7p)$$

The solution under floating rates is obtained by setting $e = 0$, but we also need to take account of the differences in the value of b under the two systems. Under floating rates, we assume that b takes on its developing-country value, b_d. Then we have

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2 In reality a government sets a nominal exchange rate peg rather than a real exchange rate peg. The two are equivalent, however, if the government is assumed to know expected inflation when the exchange rate is set.

$$\pi = ab_d k \qquad (6f)$$

$$y = y^* \qquad (7f)$$

The value of b under pegged rates requires further discussion. Because each country is allowed to reset the peg in each period, there is no guarantee that inflation will be reduced to advanced-country levels. In effect there are multiple equilibria, depending on the degree to which the developing country chooses to accommodate excess inflation (relative to the advanced countries) by adjusting the peg. In the simplest case, where the government is known to be unwilling to accommodate any excess inflation, then we have $\pi = \pi^e = ab_a k$. The government has to behave as if its true value of b is b_a rather than b_d (otherwise equation (4p) cannot be made consistent with rational expectations). In the general case, it is convenient to define a variable λ, which we refer to as the credibility of the commitment to advanced-country levels of inflation, such that

$$b = \lambda b_a + (1-\lambda) b_d \qquad 0<\lambda<1 \qquad (8p)$$

Evidently, if $\lambda=0$, expected inflation is the same as if the exchange rate were floated. In general, however, expected inflation is less than this by an amount that depends on the degree of credibility (full credibility is equivalent to $\lambda=1$).

At this point it is appropriate to consider different types of peg. We shall consider three: a peg to a basket of currencies ('basket peg'), a peg to a single advanced-country currency ('single-currency peg') and a co-ordinated peg to a single currency by a number of countries ('co-ordinated single-currency peg' – the case which we have in mind is the CFA zone, where the countries actually have a common currency).[3] We shall assume that the basket peg is based on the trade-weighted real effective exchange rate, the evolution of the equilibrium value of which is described by (3). Pegging to a single currency raises the variance of the real exchange rate shock, because of fluctuations in the real exchange rates of individual advanced countries. Since the breakdown of the Bretton Woods system these have been quite substantial, so we need to allow for the fact that the anchor currency will fluctuate in value relative to the trade-weighted basket. Since the real exchange rates of advanced countries follow something close to a random walk, we may write, for a single-currency peg,

$$q_t = q^*_t + \varepsilon_t + \eta_t \qquad \eta \sim N(0, \sigma_\eta^2)$$

(9ps)

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3 We ignore a co-ordinated basket peg because no case exists in practice.

where η represents the shock to the anchor country's real exchange rate. In the case of a co-ordinated single-currency peg, the difference is that the nominal exchange rate cannot be set solely by reference to the expected value of each individual country's equilibrium real effective exchange rate. Thus we can no longer assume that the peg is selected such that $E(q_t)=q^*_t$. Instead, the peg is chosen such that $E(q_t)$ is equal to the mean value of q^*_t over the participating countries (Q^*_t). Denoting the difference between Q^* and q^* as ω, we may write, for the co-ordinated case:

$$q_t = q^*_t + \varepsilon_t + \eta_t + \omega_t \tag{9psc}$$

Unlike ε and η, ω does not have a zero mean, since it will reflect the accumulated values of ε in the participating countries since the beginning of the co-ordinated peg.[4]

How might the choice of the type of exchange rate peg affect its credibility? We assume that, of the three types considered here, a basket peg (*b*) has the lowest credibility, since devaluations are less visible and therefore less easily monitored by the private sector than for a single-currency peg (*s*). On the other hand, relative to an unco-ordinated peg, co-ordination of a single-currency peg (*sc*) augments credibility, since all the governments have to agree to change the exchange rate, and an individual government can no longer decide to devalue unilaterally. Thus we assume that

$$\lambda_{sc} > \lambda_s > \lambda_b \tag{10}$$

Using (8p) and (9psc) and substituting into (6p) and (7p), we get the following:

$$\begin{aligned} \pi &= a(\lambda b_a + (1-\lambda)b_d)k \\ &\quad - [a(\lambda b_a + (1-\lambda)b_d)c][(1+a^2(\lambda b_a + (1-\lambda) b_d))]^{-1} (\varepsilon+\eta+\omega) \end{aligned} \tag{11p}$$

$$E(\pi) = a(\lambda b_a + (1-\lambda)b_d)k \tag{12p}$$

$$\mathrm{var}(\pi) = [a(\lambda b_a + (1-\lambda)b_d)c]^2 [(1+a^2(\lambda b_a + (1-\lambda) b_d))]^{-2}(\sigma_\varepsilon^2+\sigma_\eta^2+\sigma_\omega^2) \tag{13p}$$

$$y = y^* + [c/(1+a^2(\lambda b_a + (1-\lambda)b_d))] (\varepsilon+\eta+\omega) \tag{14p}$$

4 For the *j*th country, the real exchange rate disequilibrium ω_{jt} is equal to $(Q^*-q^*)_{j,t-1}$, and $\omega_{j,t+1}-\omega_{jt}=[(1/r)\Sigma\varepsilon_{jt}]-\varepsilon_{jt}$, where r is the number of participating countries. To avoid increasing variance of member countries' equilibrium exchange rates over time, we would have to add a mean-reverting element to (3). In the present context, however, this is an unnecessary complication to the model.

$$E(y) = y^* + [c/(1+a^2(\lambda b_a + (1-\lambda)b_d))]\Omega \tag{15p}$$

$$\mathrm{var}(y) = [c/(1+a^2(\lambda b_a + (1-\lambda)b_d))]^2(\sigma_\varepsilon^2+\sigma_\eta^2+\sigma_\omega^2) \tag{16p}$$

where Ω is the expected mean value of ω. These equations have to be evaluated as follows:

BASKET PEG: $\lambda = \lambda_b$; $\eta = \omega = \Omega = \sigma_\eta^2 = \sigma_\omega^2 = 0$;
SINGLE-CURRENCY PEG: $\lambda = \lambda_s$; $\omega = \Omega = \sigma_\omega^2 = 0$;
CO-ORDINATED SINGLE-CURRENCY PEG: $\lambda = \lambda_{sc}$.

Comparing these equations with the certain outcomes for floating rates given by (6f) and (7f) yields the following predictions (F=floating rates; B=basket peg etc.).

Mean inflation: F > B > S > SC
Inflation variance: SC > S > B > F
Output variance: SC > S > B > F

These predictions hold for given values of the parameters (a, b_d, c and σ_ε^2). If these parameters were identical across developing countries, and countries chose their exchange-rate systems at random, then we could test these predictions directly using the raw data. The model predicts, however, that the exchange-rate system will be selected by taking the expected value of equation (1), which implies that, with identical parameters, all countries would make the same choice. The fact that not all countries in practice make the same choice indicates either that the model is incomplete or that the parameters are not identical across countries (in truth, probably both of these propositions are true). In particular, more open economies (higher c) and those subject to larger shocks (higher σ_ε^2) would be more likely to choose floating rates. We deal with this by estimating a regression model which includes factors that we believe to be correlated with these variables amongst the regressors. In the next section we report the results of testing the predictions of the model on empirical data.

III EMPIRICAL FINDINGS

The basic data on exchange rate regimes which we use are those contained in the corrected version of Table 1 of Ghosh *et al*. (1995), which classifies each country in each year from 1965 to 1989. In order to focus on the recent period and to avoid eliminating too many countries which have undergone shifts in regime, we use data for the ten years

1980 to 1989. We also omit countries with very high inflation rates (defined as an average greater than 50% p.a.), which might exert excessive influence over the results because they would constitute outlying observations. This leaves us with a sample of 80 developing countries, which are listed in the Appendix. Macroeconomic data come from the World Bank CD-ROM (1996). We classify each country into one of the four exchange rate regimes discussed in the previous section: floating rates, a basket peg, a single-currency peg, and a co-ordinated single-currency peg (the CFA). Ghosh *et al*. (1995) use a much larger number of categories, allowing (for example) for the frequency of realignments of pegged rates within any given year (although this information was not always available and some countries remain unclassified in this respect). Since there are relatively few countries operating pure floating exchange rate regimes, we incorporate "intermediate" regimes into the floating-rate category, in order to maximise the sample size. This gives us 28 floating-rate countries (U to Z in Ghosh *et al*.'s categorisation) and 52 countries which have had pegged rates throughout the period (A to T).

Table 1 gives the unconditional means of the inflation rate, the standard deviation of the output growth rate and the standard deviation of inflation (all in logs) for the pegged and flexible exchange rate countries. The 52 countries with pegged exchange rates averaged inflation of 9.5%, far lower than the 23.9% experienced by the 28 flexible-rate countries. The standard deviation of output growth is on average higher under pegged rates (0.0515 compared with 0.0406 for pegged rates). The standard deviation of inflation is, however, much higher in the flexible-rate sample (0.1027 compared with 0.0566). As we shall see later, this is entirely explained by the strong association between average inflation and its volatility, which reflects factors such as infrequent adjustment of government-controlled prices (e.g. electricity), varying degrees of wage indexation and oscillations in macroeconomic policy. Once we correct for this, the relationship between inflation variability and exchange-rate regime looks rather different.

Table 1. Unconditional means across exchange rate regimes

Exchange rate regime:	Pegged	Floating
Mean inflation rate	0.0911	0.2140
S.D. of output growth rate	0.0515	0.0406
S.D. of inflation rate	0.0566	0.1027

In the regressions which follow, we assume the exchange rate regime to be weakly exogenous. We have tested this assumption using a Hausman test, by adding the residuals from a probit model of regime choice to the regressions (the probit model included the following regressors (all in logs): GDP, share of services in GDP and the mean and standard deviation of the terms of trade and of import prices). Since the residuals are never statistically significant (as shown by the *t*-statistic for exogeneity attached to each regression), we can conclude that there is no evidence that the results are biased by endogeneity of the exchange-rate regime.

Table 2 presents our regression results for mean inflation. In the basic regression, we allow not only for exchange-rate regime effects but also for the possibility of systematic differences across continents (which are often found to be significant in growth regressions, for example) and for the openness of the economy. The argument here is that in less open economies prices will be less directly influenced by prices in world markets. We use two measures of openness: the ratio of imports plus exports to GDP, and the share of non-exported services in GDP (both in logs), the latter being a proxy for the size of the non-tradables sector. In fact the regional dummies and the service sector share are not statistically significant, so the second column of Table 2 gives the results when these variables are omitted from the regression. The findings are very similar for the two regressions. All *t*-statistics are adjusted to allow for heteroscedasticity. Pegging the exchange rate is estimated to reduce the inflation rate by about 13 percentage points, and this coefficient is highly significant, with a *t*-statistic greater than 4.50. It appears to make little difference, however, whether a currency is pegged unilaterally to a single currency or to a basket of currencies. A single-currency peg is estimated to raise the inflation rate by 1.0 to 1.5 percentage points relative to a basket peg, but the difference is not statistically significant. Membership of the CFA does, however, seem to yield some additional gains in terms of lower inflation. In the unrestricted regression, this effect is about 2.7 percentage points, and is not statistically significant, but when insignificant regressors are omitted, the estimated effect rises to 3.9 percentage points, and is significant at the 5% level.

Table 3 presents the regression results for output volatility. This regression allows for cross-country variation in the size of output shocks, as proxied by the standard deviation of the annual change in the terms of trade. It also includes a measure of country size (the log of GDP), since in large countries shocks to different regions may offset each other to some extent, and a proxy for economic structure in the form of the share of agriculture in GDP. All of these variables are significant, and the regional dummies are also collectively significant, with output volatility being particularly low in the Americas. After correcting for these effects, output volatility is estimated to be higher under pegged rates, as predicted by the theoretical model, but the difference is only statistically significant for the CFA countries, which have significantly higher volatility than other pegged-rate countries as well as floating-rate countries.

Table 4 presents the regression results for inflation volatility. The regression conditions for the size of terms of trade shocks, openness and mean inflation. Multiplicative effects are highly significant (terms of trade volatility times mean inflation) and appear to vary with the exchange-rate regime. On a one-tailed test, inflation volatility is significantly higher for the CFA countries relative to other pegged-rate countries. The comparison between pegged rates and floating rates is more complex since the effects depend on the inflation rate and on the size of terms of trade shocks. At low inflation and low terms-of-trade volatility, inflation is estimated to be less volatile under pegged rates, but the difference is not significant at average values of these variables. For average (pegged-rate) inflation of 9.5%, the standard deviation of the change in the logarithm of the terms of trade (*SDTOT*) must be greater than 20.7% for the estimated impact of pegging on inflation volatility to be negative. Since the average value of *SDTOT* for the pegged-rate sample is 15.0%, this implies a mildly positive effect at average values of inflation and *SDTOT*.

Taken together, these results are broadly supportive of the model. Given that the floating-rate sample also includes some "intermediate" cases, and all pegged-rate countries other than the CFA zone devalued during the period, the categories do not conform rigorously to the theoretical distinction between floating and fixed rates. The CFA is an exception, since the CFA franc was not devalued at all, but there are no polar opposite cases of a pure float. It is not surprising, therefore, that the model works best for the CFA zone, which, as predicted, experienced greater instability of output and inflation but lower mean inflation. Other pegged-rate countries were found to have significantly lower mean inflation than floating-rate countries, but the difference in output and inflation volatility was not statistically significant.

Table 2. Cross-country regression analysis of mean inflation

Dependent variable: mean inflation 1980-89 (in logs)

Variable	Coefficient	Coefficient
Constant	0.1991	0.1858
	(5.04)	(8.47)
Pegged exchange rate dummy (*DPEG*)	–0.1235	–0.1180
	(–4.55)	(–4.61)
Single-currency peg dummy (*DPEGSC*)	0.0114	0.0144
	(0.57)	(0.81)
CFA dummy (*DCFA*)	–0.0267	–0.0387
	(–1.23)	(–2.59)
Middle East dummy (*ME*)	–0.0086	
	(–0.40)	
Sub-Saharan Africa dummy (*SSA*)	0.0285	
	(0.98)	
Western hemisphere dummy (*AM*)	0.0129	
	(0.57)	
Asia-Pacific dummy (*AP*)	0.0063	
	(0.30)	
Openness (*OPE*)	–0.0460	–0.0512
	(–2.70)	(–3.01)
Service sector share (*SERV*)	0.0175	
	(0.61)	
number of observations	80	80
R-squared	0.423	0.408
standard error	0.0848	0.0830
Heteroscedasticity	$F(15,52)=3.11$	$F(5,69)=6.47$
RESET test	$F(1, 67)=0.01$	$F(1,74)=0.36$
Exogeneity:	0.11	0.08

Notes

Figures in parentheses are *t*-statistics using White's heteroscedasticity correction. Variables are defined as follows. *DPEG* =1 for all pegged-rate countries, =0 for floating-rate countries. *DPEGSC* =1 for all currencies pegged to a single currency, =0 otherwise. *DCFA* =1 for CFA countries, =0 otherwise. *Area dummies* =1 for region indicated, =0 otherwise. *OPE* = mean log ratio of imports + exports to GDP. *SERV* = mean log share of non-exported services to GDP. *Heteroscedasticity* is a test of the joint significance of regressors and squared regressors with the squared residuals as dependent variable. *RESET* is a test of functional form, adding the squared fitted values to the regression. *Exogeneity* is the *t*-statistic for the addition of the residuals from a probit model of exchange-rate regime choice to the regression.

Table 3. Cross-country regression analysis of output volatility

Dependent variable: standard deviation of real output growth 1980-89 (in logs)

Variable	Coefficient
Constant	0.0766
	(3.25)
Pegged exchange rate dummy (*DPEG*)	0.00438
	(0.87)
Single-currency peg dummy (*DPEGSC*)	0.00212
	(0.40)
CFA dummy (*DCFA*)	0.01903
	(2.65)
Middle East dummy (*ME*)	–0.0074
	(–1.70)
Sub-Saharan Africa dummy (*SSA*)	–0.0006
	(–0.14)
Western hemisphere dummy (*AM*)	–0.0152
	(–3.39)
Asia-Pacific dummy (*AP*)	0.0015
	(0.34)
Standard deviation of terms of trade (*SDTOT*)	0.1003
	(3.91)
Agriculture share (*AGR*)	–0.00723
	(–3.96)
Country size (*INC*)	–0.00247
	(–2.33)
number of observations	80
R-squared	0.484
standard error	0.0163
Heteroscedasticity: F(13,55)	1.53
RESET test: F(1, 68)	0.86
Exogeneity:	–1.10

Notes

See notes to Table 2. Figures in parentheses are uncorrected *t*-statistics. *SDTOT* = standard deviation of the change in the log of the terms of trade. *AGR* = mean log share of agriculture value added in GDP. *INC* = mean log of GDP.

Table 4. Cross-country regression analysis of inflation volatility

Dependent variable: standard deviation of inflation 1980-89 (in logs)

Variable	Coefficient
Constant	0.0339
	(2.43)
Pegged exchange rate dummy (*DPEG*)	0.0244
	(1.79)
Single-currency peg dummy (*DPEGSC*)	–0.0006
	(–0.07)
CFA dummy (*DCFA*)	0.02206
	(1.69)
Middle East dummy (*ME*)	–0.0042
	(–0.54)
Sub-Saharan Africa dummy (*SSA*)	–0.0122
	(–1.45)
Western hemisphere dummy (*AM*)	–0.0178
	(–2.15)
Asia-Pacific dummy (*AP*)	–0.0096
	(–1.16)
Mean inflation (*INFL*)	0.1135
	(1.56)
Standard deviation of terms of trade (*SDTOT*)	–0.1297
	(–1.57)
SDTOT x *INFL*	2.541
	(4.87)
SDTOT x *INFL* x *DPEG*	–1.428
	(–3.34)
number of observations	80
R-squared	0.731
standard error	0.0290
Heteroscedasticity	F(17,49)=0.79
RESET test	F(1, 66)=1.29
Exogeneity:	–0.51

Notes

See notes to Table 2. Figures in parentheses are uncorrected *t*-statistics. *INFL* = mean inflation rate in logs.

IV CONCLUSIONS

We began by making the observation that the divergence between the median inflation rates of developing and advanced countries that has emerged since the early 1980s has attracted virtually no research interest. We have explored the hypothesis that this divergence can be attributed to the inability of developing countries to import the anti-inflation credibility of the advanced countries in the way that they could under the Bretton Woods system, when virtually every country pegged its exchange rate to the US dollar with only infrequent adjustments.

Our empirical results, based on data from 80 developing countries over the period 1980-89, are generally consistent with the theoretical model. After allowing for effects such as differing variances of terms of trade shocks across countries, the chief prediction – that there is a trade-off in the choice of exchange-rate regime between inflation reduction and the stability of output (and inflation) – is supported by the data. The results are most clear-cut for the polar cases of floating exchange rates and the CFA franc zone, which experienced no devaluation during the period. The CFA countries had significantly lower inflation and significantly greater output and inflation variance than the typical floating-rate country. These differences were all significant at the 1% level. Countries with other types of pegged exchange rates displayed a similar pattern, also achieving much lower inflation, but the difference in output and inflation variance relative to countries with floating exchange rates was less marked. We were unable to detect any significant differences between a unilateral single-currency peg and a unilateral peg to a basket of currencies.

These results suggest that the widespread adoption of floating exchange rates in the developing world has had a significant cost, with inflation tending to be over 10% p.a. faster than in the typical pegged-rate country. Our model provides a framework within which to interpret this as a rational choice by countries which strongly prefer output stability to price stability.

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APPENDIX

The countries included in the sample were:

Algeria	Chile*	Ethiopia	India*	Malaysia	Philippines*
Suriname	Paraguay	Bahamas	Colombia*	Fiji	Indonesia*
Mauritius	W. Samoa*	Syria	Zaire*	Bahrain	Sierra Leone*
Gabon	Iran	Morocco*	Sénégal	Tanzania*	Costa Rica*
Bangladesh	Zambia*	Gambia*	Jamaica*	Burma	Madagascar*
Thailand	Zimbabwe	Barbados	Ghana*	Kenya	Côte d'Ivoire
Nepal	Congo	Togo	Lesotho	Belize	Hong Kong*
Guatemala	S. Korea*	Niger	Rwanda	Tonga	Singapore*
Liberia	Egypt	Guyana*	Kuwait	Nigeria*	Solomon Is.*
Trinidad	St. Vincent	Burundi	Ecuador	Haiti	Burkina Faso
Pakistan	Somalia*	Turkey*	Sudan	Cameroon	Domin. Rep.*
Honduras	Seychelles	Panama	Swaziland	Uruguay*	South Africa*
Sri Lanka*	El Salvador	Dominica	Malawi	Venezuela	Cent. Afr. Rep.
Vanuatu	Papua New Guinea				

(* denotes that the country was classified as having a flexible exchange rate)

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