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LINKAGES BETWEEN EXCHANGE RATE POLICY AND MACROECONOMIC PERFORMANCE

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Abstract. Using a sample of 104 countries, we study macroeconomic performance from 1973 to 2007. We examine GDP growth, inflation rate, growth volatility and inflation volatility, and their response to a 'words versus deeds' measure of exchange-rate policy, which is obtained by interacting a country's de jure and its de facto policy. For non-industrialized countries, the highest growth rates and the lowest inflation volatility are associated with countries that pursue fear of floating policy, whereas countries that pursue a matched float policy (de jure and de facto floating) have the highest inflation rates but the lowest GDP volatility.

JEL Classification: F43, F31

1. INTRODUCTION

The present paper is an empirical investigation of the linkage between exchange rate policy and macroeconomic performance. We study a panel data set consisting of annual observations from 1971 to 2007 across 112 countries. Our measure of exchange rate policy is a four-category interaction between the official International Monetary Fund (IMF) (de jure) and the de facto classification of Reinhart and Rogoff (2004) that indicates whether the central bank actually implements its publicly announced policy. We refer to exchange rate policy measured in this way as 'words versus deeds' policy.

The published literature has offered many reasons why exchange rate policy might impact economic performance, but has been less clear-cut in the direction of its predictions. On the one hand, flexible exchange rates might lead to better performance because they provide better insulation and adjustment to external shocks. On the other hand, exchange rate uncertainty might have a negative impact on investment and, therefore, growth when investment is irreversible (e.g. Dixit and Pindyck, 1994; Aizenman and Marion, 1999). In this case, exchange rate stability might lead to better outcomes. Therefore, it is perhaps not surprising that the empirical significance of exchange rate policy in macroeconomic performance remains an open question.

The genesis of this line of empirical work begins with Baxter and Stockman (1989), who find no difference in either the growth or volatility of GDP growth in OECD countries before and after the collapse of the Bretton Woods exchange

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rate system. Frankel and Rose (2002), in contrast, estimate that joining a currency union can potentially raise GDP by as much as 38%. Ghosh *et al.* (2002), who use a consensus classification, and Reinhart and Rogoff (2004), who use their own natural de facto classification, find that high GDP growth is associated with more stable exchange rates.[1]

However, Levy-Yeyati and Sturzenegger (2003), who classify exchange rate regimes using cluster analysis, find that higher growth is associated with exchange rate flexibility.[2]

A clearer picture of exchange rate policy and performance seems to be forming for non-industrialized countries. Husain *et al.* (2005) use the Reinhart and Rogoff (2004) classification and find that the de facto pegging has a significant impact on the macroeconomic performance for developing countries by delivering low inflation without sacrificing economic growth. Using a set of 42 counties, Fatas *et al.* (2007) analyse how setting and achieving quantitative targets for monetary policy affects inflation. They examine several alternative monetary policy frameworks (including de facto currency pegging) and find that the economy enjoys the lowest rate of inflation when the central bank's 'deeds' correspond with its 'words'. Aghion *et al.* (2009) find that for countries in a lower quartile of financial development, the exchange rate flexibility is negatively associated with real economic growth. Our study contributes to the published literature by considering the complete set of 'words versus deeds' exchange rate policies, to provide a more nuanced account of the exchange rate channel for domestic macroeconomic performance. The empirical part of our paper proceeds in two stages.

In the first stage, we examine the relationship among output growth, inflation and exchange rate policy. Here, we find that de jure floats and de facto pegs (those with a fear of floating (Calvo and Reinhart, 2002) are associated with the highest GDP growth rates, whereas the de jure and de facto floaters (matched float category) are associated with the highest inflation. By identifying subcategories of de facto peggers and floaters that produce different macroeconomic performance, our results extend the findings of Reinhart and Rogoff (2004) and Husain *et al.* (2005), who find that de facto currency pegging is positively associated with real GDP growth and negatively associated with inflation. Our first result supports the hypothesis that the fear of a floating policy has a growth promoting effect, whereas the second result is consistent with the Barro–Gordon inspired notion on inflationary bias reduction by means of nominal anchors.

In the second stage of empirical analysis, we examine the impact of exchange rate policy on the volatility of GDP growth and inflation volatility. Ever since Lucas (1987) argued that welfare gains associated with higher growth exceed

[1] In Ghosh *et al.* (2002) the regimes are classified as fixed, intermediate and flexible. The highest growth rates are found to be associated with the intermediate regimes. Reinhart and Rogoff find the highest growth rates to be associated with regimes of 'limited flexibility', which is the second most stable category in their five-way classification.

[2] Frankel (2003) shows that these alternative de facto classifications are largely uncorrelated with each other.

those associated with a reduction of business cycle volatility, little attention has been paid to empirical modelling of macroeconomic volatility. In comparison to the huge literature devoted to finding statistically robust factors in the growth regression framework (see Levine and Renelt (1992) and Romer (1986) for an overview), the literature on the determinants of macroeconomic volatility is very thin (see Ramey and Ramey, 1995). However, the possible returns from bringing growth and business cycle research together have considerably increased over the past two decades as most central banks have adopted macroeconomic stabilization as a principal objective of monetary policy. Here, we find that non-industrialized countries with a fear of floating face a trade-off between GDP growth and GDP volatility. In terms of inflation performance, those with a fear of floating outperform other categories as they exhibit levels of consumer price index (CPI) inflation that are insignificantly different from de facto/de jure peggers but enjoy significantly lower inflation volatility.

What is it about fear of floating that associates itself with higher growth and inflation stability? It is doubtful that countries purposively select fear of floating as a policy choice. Instead, some authors (e.g. Eichengreen, 2002; Detken and Gaspar, 2003; Kumhof *et al*., 2007) suggest that formal or informal monetary policies that target inflation produce de facto stable exchange rates under a de jure float. Thus, our results can be viewed as evidence that inflation targeting is a sound policy if one buys this argument and views fear of floating as a way to identify whether a country is an inflation targeter.

The paper proceeds as follows. The next section describes the words versus deeds exchange rate policy classification that we use and the policies' evolution over our sample. The main empirical results are reported in Section 3, and Section 4 concludes.

2. CLASSIFYING EXCHANGE RATE POLICY BY WORDS AND DEEDS

Economists have long been dissatisfied with the de jure exchange rate classification because of the large discrepancies in the actual exchange rate behaviour under publicly stated policies. For example, Reinhart and Rogoff (2004) argue that exchange rates may have been much more flexible during the Bretton Woods era, which is associated with pegging, and much more stable during the post-Bretton Wood era, which is associated with floating. This thinking has yielded a number of de facto schemes, which use the observed behaviour of nominal exchange rates and monetary policy indicators in order to define the exchange rate regimes actually pursued by the central bank.

We obtain our 'words versus deeds' factors from an interaction between the de facto classification of Reinhart and Rogoff (2004) and the de jure classification from the *IMF's Annual Report on Exchange Rate Arrangements and Exchange Restrictions*.

The first two columns of Table 1 demonstrate how we reduce the six-way IMF de jure classification to a two-way coarse classification of 'pegged' or

Table 1. Sorting the classifications

Six-way de jure (IMF)	Coarse de jure	Five-way de facto (Reinhart and Rogoff, 2004)	Coarse de facto
(1)	(2)	(3)	(4)
1) Independently floating		1) Freely falling	Free falling
2) Managed floating	Flexible	2) Freely floating	Flexible
3) Adjusted according to indicators		3) Managed floating Noncrawling band De facto wide crawling band Pre announced wide crawling band	
4) Cooperative arrangements	Fixed	4) De facto narrow crawling band De facto crawling peg Pre-announced crawling band Pre-announced crawling peg	Fixed
5) Limited flexibility		5) De facto peg Pre-announced horizontal band Pre-announced peg or currency board No separate legal tender	
6) Currency peg			

'flexible'.[3] If the announced regime for a given country in a certain year falls into any of the categories in column (1) of the table, we allocate it according to the categories in column (2). Columns (3) and (4) demonstrate how we reduce the Reinhart and Rogoff (2004) de facto five-way classification into a three-way coarse classification of 'free falling', 'pegged' or 'flexible' exchange rates regimes. Reinhart and Rogoff pay particular attention to countries in situations of currency crisis and hyperinflation, which they classify as having a 'free falling' exchange rate regime. In our classification we retain this regime as a separate category. The same country–year observations classified by Reinhart and Rogoff according to column (3) are thus allocated according to column (4) of the table.

In Table 2 we create the words versus deeds classification that records the nature of agreement or disagreement between the coarse de jure two-way and de facto three-way classifications described in Table 1. The words versus deeds classification has five regimes, where four regimes capture the discrepancy between announced and de facto currency regimes in countries under normal conditions. The country–year observations identified by Reinhart and Rogoff (2004) as crisis situations are allocated into a fifth free falling category regardless of the officially announced regime.

Countries in categories (1) and (2) do what they say, whereas those in categories (3) and (4) do not. Calvo and Reinhart (2002) present a systematic study category (3) countries, which they say have a 'fear of floating.'

[3] Unlike studies of Husain *et al.* (2005) and Ghosh *et al.* (2002), we do not identify the intermediate regime in the original exchange rate classification.

Table 2. Characteristics of the fear factor exchange rate regime classification

Fear factor classification	De jure and de facto classifications	Characteristics
(1)	(2)	(3)
1. Matched float	De jure floaters ∩	Announce the currency float and allow the currency to fluctuate
	De jure floaters	Monetary policy is discretionary
2. Matched fix	De jure fixers ∩	Announce the currency peg and maintain pegging
	De jure fixers	Monetary policy is anchored to the foreign policy
3. Fear of floating	De jure floaters ∩	Announce floating but exhibit the characteristics of fixers
	De facto fixers	Monetary policy may have domestic anchors
4. Broken commitments	De jure fixers ∩	Announce the currency peg but not able to maintain it
	De jure floaters	Monetary policy is officially anchored but is not credible
5. Free falling	De facto free falling	The announced regime can belong to any category but de facto country is in crisis

2.1. *Evolution of exchange rate policies*

One of the reasons for choosing the Reinhart and Rogoff (2004) classification is that it does a good job of distinguishing the 'fear of floating' policy. Figure 1 provides an overview of the evolution of the exchange rate policies according to constructed words versus deeds classification for the sample of non-industrialized countries, which is central to our study. The vertical axis tracks the share of countries that pursued certain exchange rate policy, plotted on the graph, in a given year with respect to the total sample in that year. We observe a downward trend in the relative number of countries that adhered to fixed exchange rate arrangements. An important observation is that the proportion of countries that de facto delivered their de jure commitment to pegging (matched peg category) was gradually decreasing until the currency crises of 1997–1998, whereas the proportion of countries that de jure pegged but de facto floated (broken commitment) was stable until the 1990s (when the proportion started to decrease).

An opposite picture is observed for the de jure floaters. The percentage of de jure floaters that let their currencies float freely (matched float category) was fairly stable during the 1970s and 1980s, and gradually increased in the 1990s. Most interestingly, the proportion of those with a fear of floating whose actual behaviour diverged from the stated exchange rate policy of de jure floating steadily increased until the late 1990s.

Figure 2 plots a similar graph for the sample of industrialized countries. We observe that the proportion of matched floaters and those with a fear of floating was about the same until the mid-nineties. After that, the proportion of industrialized countries that pursue a fear of floating policies declined, and by the end of our sample we observe only so-called 'corner solutions', either matched peg or matched float policies.

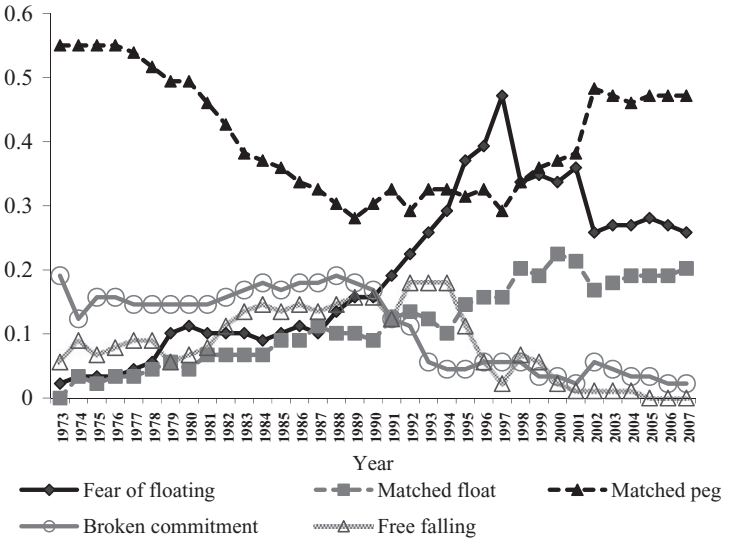

Figure 1. Evolution of words versus deeds exchange rate policies constructed from the Reinhart and Rogoff (2004) classification (Non-Industrialized countries)

An overall observation is that until the 1990s, trends in exchange rate policies were fairly stable across countries, with a growing number of central banks allowing their currencies to float de jure. However, as of the last decade of the previous century, the situation started changing and the variability in exchange rate policies across countries significantly increased. Several noticeable jumps in that time period deserve attention.

The first shift occurred in 1991, when the share of free falling countries increased by nearly 10% in the whole sample, and the share of the broken commitments category fell by 10%. There are two explanation for this. First, in 1991, a number of newly independent countries from the former Soviet Union and the Eastern Block entered the sample for the first time. Because these countries were in financial turmoil, Reinhart and Rogoff (2004) classify them as free falling. This boosts the free falling share in the sample. Second, in Table A1 in Appendix A, we can see that several countries that were classified as 'broken commitment' up to the early 1990s switched to de jure floating exchange rate policies in that time period. Among them are China, Egypt, Haiti, Honduras, Jordan, Kenya, Malawi, Suriname and Tanzania.

Another interesting phenomenon is the rapid increase in the proportion of fear of floating countries in 1994–1997 and a simultaneous decrease in the share of free falling countries. This development corresponds to a global trend of inflation stabilization, as the number of countries that were experiencing annual inflation rates over 40% managed to decrease rates to more normal levels. It is

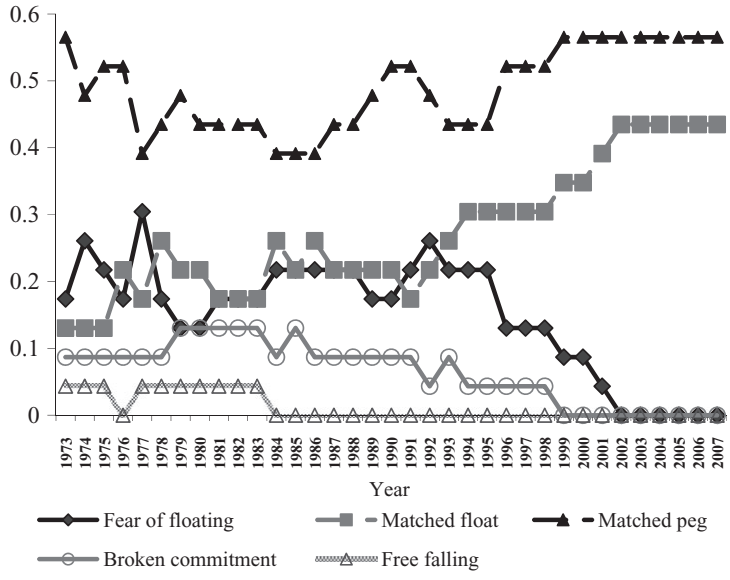

Figure 2. Evolution of words versus deeds exchange rate policies constructed from the Reinhart and Rogoff (2004) classification (Industrialized countries)

tempting to think that the surge in the number of those with a fear of floating and the de facto stabilization of exchange rates pursued by those countries is the cause of the inflation moderation and the drop of the proportion of free falling countries. However, it is also possible that the inflation stabilization was a result of monetary policies targeting domestic inflation, which also resulted in stable exchange rates. Although explicit inflation targeting is not possible for most countries with weak monetary institutions, Carare and Stone (2006) identify alternative policies, so-called inflation targeting lite (ITL) policies. These policies include informal inflation targets and a package of measures directed at reducing inflation, such as controlling money supply growth or smoothing out exchange rate fluctuations by adjusting domestic interest rates. When countries pursuing ITL policies succeeded in reducing inflation rates and left the free falling category, most of them relocated to the fear of floating group as their exchange rate policies were de jure floating but de facto pegged. Countries that switched to the fear of floating type of exchange rate policy in the mid-nineties are: Algeria, Brazil, China, Costa Rica, Dominican Republic, Egypt, Gambia, Guyana, Guatemala, Hungary, Jamaica, Kazakhstan, Malawi, Malaysia, Mauritania, Mauritius, Nicaragua, Peru, Philippines, Slovenia, Uruguay and Venezuela.[4]

[4] Table A3 in the Appendix lists countries that are classified by Carare and Stone (2006) as ITL together with the list of countries that pursued fear of floating exchange rate policies in the 1990s. As can be seen from the table, the lists overlap.

The last significant change in the conduct of exchange rate policies occurred in 1998, when we observe a sharp decline in the number of those with a fear of floating and an increase in the proportion of countries whose de facto and de jure policies match. This can be described as the 'vanishing middle ground phenomenon' (e.g. Eichengreen, 1994a; Frankel *et al*., 2001), meaning that a large number of countries opted for 'corner solutions'. Among them are Brazil, China, Cyprus, Ecuador, Hungary, Indonesia, Korea, Kuwait, Lebanon, Macedonia, Malaysia, Paraguay and Thailand. The timing of the trend and the countries involved confirm that the corner solution was an aftermath of the Asian, Russian and Latin American currency crises.[5]

However, as can be seen from Figure 1 and Table A3 in the Appendix, a fair number of countries (especially in Latin America) continue to pursue the fear of floating policies until the end of our sample period. Unfortunately, the Reinhart and Rogoff (2004) data ends in 2007 and, hence, we cannot extend our words versus deed analysis beyond that year.

3. EXCHANGE RATE POLICIES AND MACROECONOMIC PERFORMANCE

3.1. *Growth and inflation*

To filter out business cycle fluctuations we transform the annual data into non-overlapping 5-year averages (see Bekaert *et al*., 2005; Loayza and Ranciere, 2002). The dependent variables are GDP growth per capita and CPI inflation. Following Levine *et al*. (2000) and Aghion *et al*. (2009), we apply the generalised method of moments (GMM) dynamic panel data empirical specification developed by Arellano and Bond (1991), Arellano and Bover (1995) and Blundell and Bond (1998).

Let $Y_{i,t}$ be the measure of economic performance of country i in year t, $X_{i,t}$ be a vector of control variables and $P_{i,j,t}$ be the exchange rate policy dummy variable pursued by country i in period t. With the matched peg exchange rate policy being the reference category, the subscript j refers to one of the four words versus deed exchange rate policies defined in Table 2. The dynamic panel-data regressions take the form:

$$Y_{i,t} - Y_{i,t-1} = (\alpha - 1)Y_{i,t-1} + \sum_{j=1}^{4} \delta_j P_{i,j,t} + \beta' X_{i,t} + \mu_i + \gamma_t + \varepsilon_{i,t}, \quad (1)$$

where the error term $\mu_i + \gamma_t + \varepsilon_{i,t}$ has an error-components decomposition. γ_t is a fixed time effect, μ_i is a country-specific effect and $\varepsilon_{i,t}$ are i.i.d. random variables with finite second moments. The key parameters of interest are the δ_j, which link exchange rate policy to economic performance. For the growth regression

[5] Kumhof *et al*. (2007) demonstrate that countries pursuing inflation targeting policies and whose exchange rate resembles a fear of floating behaviour are vulnerable to speculative attacks and the size of the attack is increasing in the tradables' consumption share.

Table 3. Growth and inflation by industrialization and words versus deeds factors

	Non-industrialized		Industrialized		All countries	
	Mean	Observations	Mean	Observations	Mean	Observations
A. GDP growth						
Matched float	2.032	348	2.090	219	2.056	567
Broken commitment	2.155	322	2.387	56	2.191	378
Fear of floating	3.013	600	1.791	129	2.796	729
Matched pegged	1.966	1377	2.537	449	2.106	1826
Free falling	–1.447	262	3.081	10	–1.281	272
All	1.903	2909	2.311	863	1.996	3772
B. Consumer price index inflation						
Matched float	12.332	351	4.734	218	9.421	569
Broken commitment	11.583	328	7.913	36	11.220	364
Fear of floating	9.917	574	8.427	128	9.645	702
Matched pegged	7.301	1171	5.178	428	6.733	1599
Free falling	70.200	247	38.493	10	168.966	257
All	14.867	2671	6.093	820	12.806	3491

specification, the independent variables $X_{i,t}$ represent the standard growth controls (see Levine and Renelt, 1992). They are the government expenditure share to GDP, investment share to GDP, trade openness, the rate of population growth, and secondary schooling. They are shown to be robust proxies for the domestic policy outcomes in many empirical studies and are also used in the open economy context by Husain *et al*. (2005) and Aghion *et al*. (2009).

For the CPI inflation regression, we choose independent variables based on the studies of Ghosh *et al*. (2002) and Fatas *et al*. (2007). They are trade openness, private domestic credit to GDP, government expenditure share to GDP, and political constraints developed by Henisz (2000).

We extend the previous studies of Husain *et al*. (2005) and Aghion *et al*. (2009), who focus only on de facto exchange rate regimes, by examining how announcing and delivering exchange rate policies affects macroeconomic performance. Using our words versus deeds classification, the exchange rate policies correspond to the following types of monetary policies: (i) matched peg – successful exchange rate quantitative target; (ii) broken commitment – unsuccessful exchange rate quantitative target; (iii) fear of floating – implicitly pursued quantitative monetary target (ITL) with emphasis on exchange rate smoothing; (iv) and matched floating – any other quantitative monetary targets without exchange rate smoothing. Tables 3 and 4 provide the summary statistics of the GDP growth and CPI inflation performance across the words versus deeds regimes.

3.1.1. *Growth performance*

The estimation results for GDP growth per capita are reported in Table 5. The results reported in columns (6)–(7) of the table suggest that, in the case of industrialized economies, exchange rate policies are largely neutral with respect

Table 4. Volatility of growth and inflation by industrialization and words versus deeds factors

	Non-industrialized		Industrialized		All countries	
	Mean	Observations	Mean	Observations	Mean	Observations
A. GDP growth						
Matched float	0.820	311	0.379	198	0.648	509
Broken commitment	1.037	291	0.411	54	0.939	345
Fear of floating	0.675	551	0.649	125	0.671	676
Matched pegged	1.196	1170	0.417	384	1.004	1554
Free falling	1.294	253	0.959	10	1.281	263
All	1.031	2576	0.452	771	0.898	3347
B. Consumer price index inflation						
Matched float	1.465	309	0.206	198	0.974	507
Broken commitment	1.421	296	0.644	31	1.347	327
Fear of floating	1.093	508	0.613	121	1.001	629
Matched pegged	1.221	979	0.157	368	0.931	1347
Free falling	2.960	231	2.191	10	2.928	241
All	1.424	2323	0.295	728	1.154	3051

Observations, number of country-year observations.

to growth as the estimates are statistically insignificant.[6] Hence, the following discussion focuses only on the economically and statistically significant results for non-industrialized countries.

The benchmark estimates for the non-industrialized sample, which includes 82 countries, are reported in column (2) of the table. We see that relative to the reference matched peg category, all exchange rate policy dummies are positive but only the fear of floating dummy is statistically significant at 1%. The reported standard errors are robust to Windmeijer (2004) small sample correction.

To confirm that the results are not driven by outliers, we conduct a battery of sample modifications. Because the free falling regime is not the country's natural choice, we exclude all observations that correspond to Reinhart–Rogoff free falling regime in column (3) of the table. This reduces our sample by 28 observations. Hence, the size of all exchange rate dummies goes up. For example, the coefficient on the fear of floating dummy increases from 1.855 to 2.308, which suggests that countries that chose to pursue fear of floating policies grew significantly faster relative to countries that chose to pursue matched peg policies.

In column (4) we exclude 28 countries (see Appendix A) that did not change their word versus deeds exchange rate policy over time. This is done because some countries could be better suited to a certain exchange rate regime and the choice of the exchange rate policy is predetermined. Compared to the full sample results, the signs and statistical significance of the exchange rate policy dummies remain unchanged.

[6] However, the relative sizes of the coefficients indicate that the matched float category is associated with the highest economic growth. This is consistent with Husain *et al.* (2004), who find that the de facto floating exchange rate policy is the most advantageous policy for developed countries.

Table 5. Growth performance and word versus deeds *factors. Dependent variable: real per capita GDP growth, Non-overlapping 5-year averages, 1973–2007*

	Non-industrialized countries				Industrialized countries	
Independent variable	Full sample	Drop free falling	Drop constant regimes	1986–2007 sample	Full sample	1986–2007 sample
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lagged growth$_{t-1}$	0.202*** (0.056)	0.229*** (0.057)	0.200*** (0.069)	0.155*** (0.053)	0.119 (0.243)	−0.258 (0.215)
Fear of floating	1.855*** (0.731)	2.308*** (0.763)	1.851*** (0.744)	1.278* (0.742)	0.144 (0.851)	0.654 (0.868)
Broken commitment	0.543 (0.854)	1.316 (0.828)	1.286 (0.924)	−0.022 (0.845)	−2.249 (2.908)	1.426 (1.960)
Matched float	0.472 (0.850)	1.184 (0.755)	0.789 (1.013)	−0.618 (0.893)	0.144 (1.481)	3.275* (1.824)
Free falling	−1.161 (1.442)		−1.469 (1.455)	−1.873 (1.517)	−1.668 (4.028)	
Government expenditure to GDP ratio	0.143 (1.039)	−0.145 (1.249)	−0.429 (0.945)	−2.203* (1.316)	10.157 (11.299)	−11.563 (10.499)
Investment to GDP ratio	2.232*** (0.932)	1.717* (1.017)	2.430 (1.518)	1.756** (0.820)	5.838 (4.289)	−3.906 (5.455)
Openness	0.773 (0.955)	1.260 (0.896)	−0.183 (0.955)	0.796 (1.018)	2.685 (2.616)	2.471 (2.292)
Secondary schooling	0.051*** (0.005)	0.050*** (0.023)	0.065*** (0.023)	0.047** (0.024)	0.016 (0.015)	0.015 (0.016)
Population growth	−1.768*** (0.44)	−1.895*** (0.492)	−1.549*** (0.372)	−1.785*** (0.452)	0.074 (2.080)	−1.437 (1.358)
Constant	8.465*** (4.398)	5.072 (4.913)	10.763** (5.219)	3.302 (5.043)	17.042 (19.426)	−31.572 (25.488)
N countries/*N* observations	82/378	81/350	54/257	82/270	22/127	22/87
Specification tests (*p*-values)						
a) Sargan test	0.311	0.379	0.196	0.286	1.000	0.934
b) Serial correlation						
First order	0.000	0.000	0.000	0.000	0.000	0.392
Second order	0.347	0.132	0.390	0.484	0.772	0.488
Wald test H0: Exchange rate regimes total effect = 0						
p-values	0.001	0.001	0.001	0.005	0.120	0.063

The estimation method is two-step system dynamic GMM with Windmeijer (2004) small sample robust correction. Time effects are included in all regressions. Standard errors are in parentheses. ***Denotes significance at 1%; **Denotes significance at 5%; *Denotes significance at 10%.

To further check the robustness of our findings, we reduce the benchmark non-industrialized countries sample and focus on the 1986–2007 time period. As can be seen in Figures 1 and 2, there is a much higher variation of exchange rate regimes in the post-1985 sample compared to the pre-1985 sample, when the matched peg category prevailed. The estimates are reported in column (5) of Table 5. The size and statistical significance of the estimation coefficient on the fear of floating dummy drops and the signs on the broken commitment and matched float dummies turn negative but statistically insignificant.

Endogeneity concerns

The overall conclusion that one can draw from these exercises is that the benchmark estimates are robust to the exclusion of outliers. The sign of the estimated coefficient suggests that fear of floating exchange rate policy is positively associated with real economic growth. It is tempting to interpret the results as causal, but reverse causality or endogeneity remains a concern. As pointed out by Aghion *et al.* (2009), the problem cannot be fully resolved in the single equation framework but could be mitigated by using the Blundell and Bond (1998) dynamic panel specification that uses GMM-type instruments. In particular, this procedure uses moment conditions of lagged levels of the endogenous and exogenous variables as instruments for the differenced equation, while lagged differences of the endogenous variable are used as instruments for the level equation.

To test the validity of overidentifying conditions, the *p*-values of Sargan tests are reported for each specification. All results indicate that the validity of instruments cannot be rejected. In addition, the moment conditions used by the dynamic panel specification are valid only if there is no serial correlation in the idiosyncratic errors. The reported *p*-values of Arellano–Bond serial correlation tests for the first-differenced errors indicate that we can safely reject the second-order serial correlation.

The econometric tests provide evidence that our results are robust with respect to the endogeneity bias and, therefore, provide a partial reconciliation to the contradictory Reinhart and Rogoff (2004) and Levy-Yeyati and Sturzenegger (2003) predictions on the relationship between exchange rate policies and growth. We find that countries that pursued de jure/de facto floating (matched float) grew faster relative to those that pursued de jure/de facto pegging (matched peg), albeit insignificantly. However, countries that pursued de jure floating /de facto peg (fear of floating) policies exhibited the highest and statistically significant real GDP growth.

3.1.2. *Inflation performance*

Table 6 reports regression results for CPI inflation. Given the negative link between high inflation and exchange rate stability established in previous studies (e.g. Ghosh *et al.* (2002; Fatas *et al.*, 2007), we attempt to assess if lower CPI inflation under a currency peg is due to the reduction of the exchange rate pass-through effect or if it is a result of disciplined and transparent monetary policies of central banks.

Table 6. Inflation performance and word versus deeds factors. Dependent variable: consumer price index inflation, non-overlapping 5-year averages, 1973–2007

	Non-industrialized countries			Industrialized countries	
Independent variable	Full sample	Drop constant regimes	1986–2007 sample	Full sample	1986–2007 sample
(1)	(2)	(3)	(4)	(5)	(6)
Lagged inflation$_{t-1}$	0.126*** (0.013)	0.132*** (0.012)	0.128*** (0.014)	0.768*** (0.045)	0.719*** (0.034)
Fear of floating	–0.016 (0.039)	0.005 (0.041)	0.032 (0.040)	0.004 (0.009)	0.002 (0.009)
Broken commitment	–0.029 (0.037)	–0.037 (0.045)	0.043* (0.026)	0.048*** (0.017)	0.040** (0.018)
Matched float	0.098** (0.043)	0.093** (0.045)	0.172*** (0.046)	0.004 (0.013)	0.003 (0.012)
Free falling	0.890*** (0.092)	0.896*** (0.073)	1.019*** (0.088)		
Private domestic credit to GDP	0.001 (0.001)	0.003*** (0.001)	0.002* (0.001)	0.001 (0.001)	0.001 (0.001)
Political constraint	0.011 (0.035)	–0.002 (0.064)	–0.002 (0.033)	–0.042 (0.033)	–0.018 (0.027)
Openness	–0.230*** (0.031)	–0.300*** (0.044)	–0.191*** (0.035)	–0.017 (0.026)	–0.007 (0.024)
Government expenditure to GDP ratio	0.154 (0.134)	0.045 (0.125)	–0.031 (0.102)	–0.088*** (0.027)	–0.091*** (0.025)
Constant	5.577*** (0.337)	5.602*** (0.379)	9.420** (4.921)	1.772*** (0.231)	1.926*** (0.160)
N countries/*N* observations	79/287	51/194	79/242	22/101	22/82
Specification tests (*p*-values)					
a) Sargan test	0.331	0.399	0.232	0.351	0.112
b) Serial correlation					
First order	0.055	0.051	0.052	0.011	0.009
Second order	0.171	0.129	0.138	0.412	0.322
Wald test H0: Exchange rate regimes total effect = 0					
p-values	0.001	0.001	0.001	0.001	0.001

The estimation method is two-step system dynamic generalized method of moments with Windmeijer (2004) small sample robust correction. Time effects are included in all regressions. Standard errors are in parentheses. ***Denotes significance at 1%; **Denotes significance at 5%; *Denotes significance at 10%.

Our estimates for the industrialized countries reported in columns (6) through (7) of Table 6 indicate that, relative to the reference matched peg category, the broken commitment exchange rate policy is associated with significantly higher CPI inflation. This group of countries is characterized by higher transparency, credibility and accountability of central banks, which implies that private sector expectations regarding the central bank s monetary policy should play an important role. If the announced fixed exchange rate targets are not de facto maintained (broken commitment policy), the private sector is likely to form high inflationary expectations, which would result in inferior inflation performance. There is a body of empirical literature relevant to industrialized countries that establish evidence of weak exchange rate pass-through to consumer prices (e.g. Engel, 1993; Parsley and Wei, 2001). Our results do not contradict this evidence as we capture the impact of monetary policy conduct by central banks on inflation rather than the correlation between exchange rate movements and domestic prices.

The results for the non-industrialized countries sample are reported in columns (2)–(5) of Table 6. They indicate that relative to the reference matched peg category only the matched float policies are associated with a significantly higher CPI inflation. This suggests that in the case of non-industrialized countries, a publicly announced de jure peg that is de facto maintained delivers lower CPI inflation than policies with a de jure/de facto float. As the matched peg category represents the successful quantitative monetary policy target, our findings support the argument made by the Barro–Gordon inspired literature that explicit exchange rate pegging is the policy that is most transparent and easily understood by the public.[7] Our results suggest that this policy provides a good nominal anchor for stabilizing inflationary expectations and reducing inflationary bias.[8]

Mishkin and Savastano (2001) point out that the de jure free floating exchange rate policies mean nothing but a lack of a pronounced commitment to maintaining the domestic currency within a certain range and could be combined with any other type of monetary policies. Because non-industrialized countries typically have weak institutions, it is highly unlikely that they pursue explicit quantitative targets such as full-fledged inflation targeting. This suggests that the matched float category for this group of countries captures those countries that either do not pursue domestic inflation stabilization policies or do so unsuccessfully. It is not surprising that inflation is significantly higher for this group relative to the matched peg category. The fact that the matched float exchange rate policy is associated with higher inflation in non-industrialized countries demonstrates the inability of central banks with weak institutions to credibly follow anti-inflationary domestic policies.

[7] Frankel *et al.* (2001) emphasize the issue of verifiability of exchange rate regimes by the private sector. High verifiability of de facto/de jure pegged exchange rate policy might explain its superior inflation performance relative to other policies.

[8] Giavazzi and Pagano (1988) argue that some European countries successfully pursued such a strategy in the 1980s by joining the Exchange Rate Mechanism.

The fear of floating and broken commitment categories of countries do not exhibit significantly different inflation performance relative to the matched peg category. The 'fear of floating' central banks pursue policies that smooth out exchange rate fluctuations and reduce exchange rate pass-through. It might be argued that the de facto pegging isolates countries from nominal shocks and lower domestic inflation by reducing the pass-through effects from the exchange rate variability; however, our results demonstrate that inflation performance under this policy is not different than under a successful exchange rate peg.

3.2. *Volatility regressions*

A number of empirical studies document a negative link between growth and macroeconomic volatility (e.g. Ramey and Ramey, 1995; Acemoglu *et al*., 2003; Hnatkovska and Loayza, 2005). The work of Loayza and Raddatz (2007) summarizes these findings and demonstrates that the welfare costs of macroeconomic volatility are particularly large in developing countries. For example, Hnatkovska and Loayza (2005) estimate that a one-standard deviation increase in macroeconomic volatility results in an average loss of 1.28 percentage points in annual per capita GDP growth. The literature on macroeconomic volatility identifies three main reasons why developing countries experience higher volatility than industrialized countries: larger exogenous shocks, self-inflicted policy mistakes and weaker 'shock absorbing' institutional development.

In this subsection, we proceed with our investigation of macroeconomic volatility performance across alternative exchange rate policies. There is no consensus on volatility measurement in economics, as different authors use different techniques and time horizons. However, it is acknowledged that different volatility measures produce similar qualitative results in empirical studies. For example, Eichengreen (1994b) points out that the cycle component extracted by the Hodrick–Prescott filter measures long-term swings in the business cycle, whereas the centred moving standard deviation measures short-term variability. Applying these two techniques to pre-Bretton Woods and post-Bretton Woods samples, he does not find any strong qualitative difference between the two measures of business cycle variability.

We construct our volatility series by applying the centred moving standard deviation formula to the original annual data for each country in our sample:[9]

$$Vol(Y_t) = \left\{ \frac{1}{2m} \sum_{k=(t-m)}^{t+m} \left[Y_k - \frac{1}{2m+1} \left[\sum_{k=(t-m)}^{t+m} Y_k \right] \right]^2 \right\}^{1/2}. \tag{2}$$

By setting $m = 2$ in our calculations, we have a 5-year moving window of 'realized volatility'.

[9] The moving average of the standard deviation has been widely used in the international trade literature (e.g. Koray and Lastrapes (1989) and the references therein) and recently in studies by Bekaert *et al*. (2004) and Di Giovanni and Levchenko (2009).

In order to gauge the impact of the exchange rate policy on macroeconomic volatility we run regressions (1) on measures of real GDP growth volatility and CPI inflation volatility. The log transformation effectively handles the non-normality of the original series.

The set of control variables $X_{i,t}$ includes variables that control for domestic policies and exogenous real shocks. Previous studies (e.g. Loayza and Raddatz, 2007)) find that external real shocks, such as abrupt changes in international terms of trade, a primary source of instability in non-industrialized countries. Di Giovanni and Levchenko (2009) and Loayza and Raddatz (2007) also show that countries that are more open to trade tend to be more volatile. They attribute this effect to the increase in specialization and industry concentration. We include terms of trade growth into the set of control variables to control for these effects.

Because macroeconomic volatility may be induced by domestic policies, we also include volatility of government consumption growth, volatility of investment spending and volatility of real interest rates into a set of control variables $X_{i,t}$. Inclusion of these variables on the right-hand side of our specification nets out their effects on the partial correlation between macroeconomic volatility and exchange rate policy.

3.2.1. *Growth volatility*

As is evident from Table 7, the estimated coefficients on all control variables that measure volatility of domestic policies are positive and highly significant. The signs are expected and are consistent with previous studies on macroeconomic volatility.

Regressing growth volatility on words versus deeds exchange rate policy on the non-industrialized countries sample yields the matched floating dummy as the only statistically significant coefficient. The negative sign of the estimate suggests that countries that pursue this policy experience lower GDP growth volatility relative to the matched peg and all other exchange rate policies. Because GDP volatility performance of those with a fear of floating is insignificantly different from the performance of countries that pursue matched peg policies, one can conclude that de facto flexible exchange rate policies (matched floating) better insulate small open economies from real external shocks relative to de facto fixed exchange rate policies.

This means that non-industrialized countries pursuing de jure floating exchange rate policy face a trade-off between high levels of GDP growth and GDP volatility. If they choose to de facto peg (fear of floating policy) they would exhibit higher GDP growth relative to matched peggers; if they maintain their announced policy they would exhibit lower GDP volatility relative to matched peggers.

In a related study addressing 'trilemma' policy configuration, Aizenman *et al.* (2010) find that for a sample of emerging market economies, greater exchange rate stability is associated with greater output volatility, whereas greater monetary autonomy is associated with higher levels of inflation. Our results for

Table 7. GDP volatility performance and word versus deeds *factors. Dependent variable: volatility of real per capita GDP growth, annual panel for 1973–2007*

	Non-Industrialized countries				Industrialized countries	
Independent variable	Full sample	Drop free falling	Drop constant regimes	1986–2007 sample	Full sample	1986–2007 sample
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lagged growth volatility $_{t-1}$	0.614*** (0.041)	0.591*** (0.041)	0.646*** (0.043)	0.599*** (0.043)	0.593*** (0.061)	0.619*** (0.067)
Fear of floating	−0.107 (0.079)	−0.043 (0.075)	−0.110 (0.082)	−0.104 (0.082)	−0.001 (0.073)	0.037 (0.103)
Broken commitment	0.052 (0.078)	0.073 (0.080)	0.011 (0.095)	0.080 (0.099)	0.268*** (0.080)	0.206*** (0.072)
Matched float	−0.138** (0.073)	−0.124** (0.057)	−0.129* (0.079)	−0.144* (0.078)	−0.031 (0.070)	−0.029 (0.078)
Free falling	−0.202** (0.100)		−0.177** (0.085)	0.205* (0.111)	0.179 (0.290)	
Government expenditure volatility	0.078*** (0.028)	0.064** (0.029)	0.067* (0.036)	0.081*** (0.032)	0.034 (0.031)	0.054 (0.036)
Investment volatility	0.362*** (0.047)	0.370*** (0.049)	0.363*** (0.059)	0.368*** (0.053)	0.377*** (0.048)	0.351*** (0.051)
Real interest rate volatility	0.083*** (0.034)	0.073** (0.033)	0.046 (0.028)	0.095** (0.038)	0.054 (0.035)	0.057 (0.032)
Terms of trade growth	0.006* (0.004)	0.005** (0.002)	0.004 (0.003)	0.006* (0.004)	0.001 (0.001)	0.002** (0.001)
Population growth	0.059 (0.053)	0.059 (0.048)	0.009 (0.061)	0.071 (0.053)	0.083* (0.049)	0.084* (0.050)
Constant	−0.643 (0.167)	−0.629 (0.169)	−0.449** (0.153)	−0.698*** (0.179)	−0.464*** (0.088)	0.447** (0.085)
N countries/*N* observations	71/1053	71/988	44/667	71/903	22/554	22/403
Specification tests (*p*-values)						
a) Sargan test	0.001	0.001	0.005	0.001	0.001	0.003
b) Serial correlation						
First order	0.001	0.001	0.001	0.001	0.001	0.001
Second order	0.823	0.894	0.899	0.985	0.063	0.083
Wald test H0: Exchange rate regimes total effect = 0						
p-values	0.032	0.085	0.059	0.032	0.014	0.001

The estimation method is two-step system dynamic generalized method of moments with Windmeijer (2004) small sample robust correction. Time effects are included in all regressions. Standard errors are in parentheses. ***Denotes significance at 1%; **Denotes significance at 5%; *Denotes significance at 10%.

matched float countries tell the same story. Relative to the matched peg category, matched floaters enjoy significantly lower GDP volatility but experience significantly higher levels of CPI inflation.

The coefficient estimates for the industrialized countries reported in columns (6)–(7) of Table 7 are largely insignificant, which concurs with the Baxter and Stockman (1989) neutrality results for the OECD countries. The exception is the estimates on the broken commitment policy dummy, which has a highly significant positive sign. This result supports our previous finding on inflation performance of industrialized countries reported in Table 6. Central banks in countries with more developed financial institutions that renege on their promise to maintain fixed exchange rate experience the worst macroeconomic performance relative to other exchange rate policies.

3.2.2. *Inflation volatility*

The next step is to look at inflation volatility performance across alternative exchange rate arrangements. From Table 4, we see that CPI volatility is significantly lower only under the fear of floating category, which confirms our claim that this category identifies countries that pursue domestic nominal anchors and are successful in maintaining them. If we accept the argument made by Eichengreen (2002), Detken and Gaspar (2003) and Kumhof *et al.* (2007), who show that a fear of floating policy is observationally equivalent to policies that pursue domestic price stability (ITL under Carare and Stone (2006) classification), the results reported in columns (2)–(5) suggest that de facto currency smoothing is associated with better inflation volatility performance relative to the performance under the explicit currency peg. However, this result is not very robust as statistical significance in columns (4)–(5) drops.

One should point out that the endogeneity issue remains a concern for all of our volatility regressions. The results of post-estimation analysis reported in Tables 7 and 8 indicate that the validity of overidentifying restrictions under the Sargan test is rejected across all columns. However, the results of serial correlation and Wald tests are favourable for our specifications.

Overall, we find that in terms of inflation performance, a fear of floating policy is strictly better than matched float policy. As we established in Table 6, those with a fear of floating exhibit CPI inflation levels that are insignificantly different from countries that pursue matched peg policies. At the same time, fear of floaters enjoy lower inflation volatility. In contrast, countries that pursue matched float policies exhibit higher levels of CPI inflation without any gain in terms of volatility performance.

For the industrialized countries, the results for 1973–2007 and 1985–2007 samples are mixed, which is probably due to the fact that the shorter sample includes a higher proportion of country–year observations that cover a period of a single Euro currency. If one interprets the results from the recent experience as the most relevant then our findings suggest that industrialized countries that pursue matched float exchange rate policy exhibit significantly lower CPI volatility relative to matched peggers.

Table 8. Inflation volatility performance and word versus deeds factors. Dependent variable: volatility of consumer price index inflation, annual panel for 1973–2002

	Non-Industrialized countries				Industrialized countries	
Independent variable	Full sample	Drop free falling	Drop constant regimes	1986–2007 sample	Full sample	1986–2007 sample
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lagged inflation volatility	0.814*** (0.050)	0.782*** (0.048)	0.809*** (0.061)	0.836*** (0.057)	0.957*** (0.035)	0.853*** (0.052)
Fear of floating	−0.138** (0.72)	−0.167*** (0.066)	−0.099 (0.078)	−0.110 (0.077)	0.162* (0.089)	0.159 (0.112)
Broken commitment	−0.094 (0.129)	−0.185 (0.117)	0.097 (0.133)	0.101 (0.184)	0.017 (0.106)	−0.170 (0.172)
Matched float	−0.010 (0.081)	−0.039 (0.070)	0.027 (0.087)	−0.014 (0.095)	−0.065 (0.072)	−0.188** (0.088)
Free falling	0.122 (0.087)		0.188** (0.089)	0.183* (0.108)	0.577** (0.295)	
Government expenditure volatility	0.076*** (0.028)	0.089*** (0.033)	0.071* (0.038)	0.068** (0.032)	0.001 (0.038)	0.016 (0.050)
Investment volatility	0.044 (0.037)	0.054 (0.038)	0.087** (0.045)	0.043 (0.037)	0.090** (0.041)	0.045 (0.047)
Real interest rate volatility	0.237*** (0.044)	0.235*** (0.045)	0.221*** (0.049)	0.252*** (0.049)	0.091** (0.042)	0.055 (0.045)
Political constraintb	−0.178* (0.095)	−0.157 (0.107)	−0.292** (0.130)	−0.170* (0.104)	0.051 (0.250)	−0.126 (0.479)
Constant	0.041 (0.099)	0.038 (0.112)	0.056 (0.105)	0.012 (0.117)	−0.198 (0.215)	−0.013 (0.347)
N countries/*N* observations	65/939	65/877	40/581	64/715	22/508	22/322
Specification tests (*p*-values)						
a) Sargan test	0.001	0.001	0.004	0.001	0.052	0.209
b) Serial correlation						
First order	0.000	0.000	0.000	0.000	0.000	0.001
Second order	0.794	0.983	0.939	0.756	0.642	0.875
Wald test H0: Exchange rate regimes total effect = 0						
p-values	0.067	0.007	0.024	0.142	0.033	0.018

The estimation method is two-step system dynamic generalized method of moments with Windmeijer (2004) small sample robust correction. Time effects are included in all regressions. Standard errors are in parentheses. ***Denotes significance at 1%; **Denotes significance at 5%; *Denotes significance at 10%.

4. CONCLUSION

This paper investigates the empirical linkages between a country's exchange rate policy, per capita GDP growth and CPI inflation in an attempt to improve understanding of the how the choice of exchange rate regime impacts economic performance.

Our work can be viewed as indirectly addressing the exchange-rate disconnect puzzle, posed by Obstfeld and Rogoff (2001, p. 380) as 'the remarkably weak short-term feedback link between the exchange rate and the rest of the economy'. Using a so-called words versus deeds classification of exchange rate policies, which is based on the Reinhart and Rogoff (2004) de facto and the IMF de jure schemes, we identify clear patterns in macroeconomic performance across alternative exchange rate arrangements in non-industrialized countries. Our work extends the results of Husain *et al.* (2005) and Aghion *et al.* (2009), who find that de facto pegging has a significant impact on growth and inflation in the developing countries.

Several recent theoretical models (e.g. Gali and Monacelli, 2005) have the objective of representing monetary policy in an open economy context. Our study of words versus deeds policies could also be considered as providing a set of 'stylized facts' for the exchange rate channel in these theoretical models. Moreover, the results reported in our paper provide a partial reconciliation to the contradictory results on exchange rate regimes and growth found in Reinhart and Rogoff (2004) and Levy-Yeyati and Sturzenegger (2003). We find that non-industrialized countries pursuing de jure/de facto floating (matched float) grew faster than those pursuing de jure/de facto pegging (matched peg). However, it is the fear of floating (de facto pegging under de jure floating) exchange rate policy that is the most growth promoting. The estimates for industrialized countries are statistically insignificant, but the sizes of the coefficients suggest that the matched float category is associated with the highest real GDP growth for this group of countries.

For the non-industrialized countries sample we find that the matched float category is associated with the highest CPI inflation. This can be interpreted as follows: non-industrialized countries that both de jure and de facto float do not conduct successful domestic monetary policies and exhibit worse inflation performance relative to countries that matched peg, whereas countries that de jure float and de facto peg (fear of floating) usually adopt ITL domestic monetary policies and their inflation performance is not significantly different from countries that pursue matched peg policies. These results support the argument made by the Barro–Gordon inspired literature that explicit exchange rate pegging (represented by the matched peg category in our analysis) and ITL (represented by fear of floating) provide good nominal anchors for stabilizing inflationary expectations and reducing inflationary bias (see Fatas *et al.* (2007) for an overview).

Moving to macroeconomic volatility performance, we find a trade-off between exchange rate policies that seek to promote higher growth and stabilize the second moments of output. Our results demonstrate that non-industrialized

countries that pursue de jure floating policies exhibit a reduction in output volatility if they de facto maintain floating, whereas if they choose to pursue fear of floating they would exhibit higher GDP growth relative to matched peggers. These results supports a common view that flexible exchange rates provide better insulation to real shocks relative to fixed exchange rate policies and lead to significantly lower GDP volatility. At the same time, we find that fear of floating policy is associated with significantly lower CPI volatility.

We attribute the overall results regarding fear of floating to ITL policies pursued by the central banks in non-industrialized countries. This type of policy takes place under a publicly announced floating exchange rate when central banks adopt the package of domestic measures directed at offsetting foreign shocks that de facto stabilize the exchange rate. Our results suggest that relative to matched peg (which represents the successful quantitative target), this policy results in significantly higher economic growth and also lower CPI inflation volatility. This suggests that the appearance of fear of floating, which might be induced by adopting an inflation target, could be the most advantageous policy for non-industrialized countries.

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APPENDIX A. LIST OF COUNTRIES WITH DURATION OF THE EXCHANGE RATE REGIMES

Table A1. Exchange rate policies of the non-industrialized countries by years

	Words and deeds exchange rate policies				
	Matched peg	Matched float	Free falling	Broken commitment	Fear of floating
Algeria			1994	1973–1993	1995–2007
Argentina	1991–2001		1973–1978		1979–1980
			1981–1984		2002–2007
			1986–1990		
Benin	1973–2007				
Bolivia	2002–2007	1987	1973–1974	1975–1979	1988–2001
			1980–1986		
Botswana	1973–2001			2002–2007	
Brazil	1995–1996	1973	1975–1994		1997–1998
		2000–2007	1999		
Burkina Faso	1973–2007				
Burundi	1973–1985	1999–2001	1996	1986–1995	2002–2007
				1997–1998	
Cameroon	1973–2007				
Central African Republic	1973–2007				
Chad	1973–2007				
Chile	1979–1981	1983–1988	1973–1977		1989–1991
		1992–2007	1982		
China	1974–1980	1986–1992		1981–1985	1993–1997
	1998–2007				
Colombia	1974–1978	1984–2007			1979–1983
Congo		1973–2007			
Costa Rica	1974–1980	1984–1990	1981–1983	1971–1973	1991–2001
	2002–2007				
Cote d'Ivoire	1973–2007				
Cyprus	1973–1997	2002–2007			1998–2001
Czech Republic	1990–1995	1997–2001	1996		2002–2007
Dominican Republic	1973–1978	1986–1987	1985	1979–1984	1993–2003
		2005–2007	1988–1991		
Ecuador	1973–1981	1984–1986	1982–1983		1997
	2000–2007	1994–1996	1987–1993		
			1998–1999		
Egypt		1991		1973–1990	1992–2007
El Salvador	1973–1982			1983–1988	1989–1997
	1998–2007				
Equatorial Guinea	1973–2007				
Estonia	1993–2007		1992		
Gabon	1973–2007				
Gambia	1973–1980	1987–1991	1981–1986		1992–2007
Ghana		1988–1989	1974–1987		2001–2007
		1991–1993	1990		
		1997–1999	1994–1996		
		2001	2000		
Guatemala	1973–1984		1985–1986	1987–1988	1991–2007
			1989–1990		
Guinea	1975–1982	2000–2001		1973–1974	1986–1999
				2002–2007	
Guinea-Bissau	1973–2007				
Guyana	1973–1986		1987–1991		1992–2004
	2005–2007				
Haiti	1973–1988	1991–1992	1993–1994	1989–1990	
		1995–2007			

Table A1. Continued

	Words and deeds exchange rate policies				
	Matched peg	Matched float	Free falling	Broken commitment	Fear of floating
Honduras	1973–1984 2002–2007	1991–1998	1990	1985–1989	1999–2001
Hong Kong	1998–2007				1973–1997
Hungary	2002–2007			1982–1994	1995–2001
India	1973–1978				1979–2007
Indonesia		1999–2007	1973–1974 1998	1975–1978	1979–1997
Israel	1986–1990	1991–2001 2005–2007	1974–1985	2002–2004	
Jamaica	1973–1977 1979–1982 1989		1978 1991–1993 1998		1983–1988 1994–2007
Jordan	1973–1988 1993–2007			1989–1992	
Kazakhstan			1992–1995		1996–2007
Kenya	1973–1986	1994–1995	1992–1993	1987–1991	1996–2007
Korea	1974–1979	1999–2007	1998	1971–1973	1980–1997
Kuwait	1973–1991	2000–2007			1993–1999
Latvia	1995–1996	2002–2007	1992–1993	1997–2001	1992–1994
Lebanon	1971–1972 1998–2007	1976–1983	1984–1991		1973–1975 1992–1997
Lesotho	1973–2007				
Libya	1971			1973–1998	
Lithuania	1995–2007		1992–1994		
Macedonia	1998–2007		1993–1994		1995–1997
Madagascar	1973–1985 1996–2007	1986–1993	1994–1995		
Malawi		2000–2003	1993–1994 1998–1999	1973–1992	1995–1997 2004–2007
Malaysia	1973–1992 1999–2005	1998			1993–1997 2006–2007
Mali	1973–2007				
Malta	2001–2007			1973–2000	
Mauritania	1973–1983 1992–1994	1987–1991		1984–1986	1995–2001
Mauritius	1976–1981			1982–1992	1993–2007
Mexico	1973–1975	1994 1996–2007	1982–1988 1995		1976–1981 1989–1994
Moldova			1995–1997	1998–1999	2000–2007
Mongolia			1993–1997	1991–1992	1998–2007
Morocco	1990–2007				1973–1989
Nepal	1973–1977 1982–2007			1978–1981	
Nicaragua	1973–1978 1991–1992 2002–2007		1983–1990	1979–1982	1993–2001
Niger	1973–2007				
Nigeria		1974–1982 1985–1990 1997–2007	1983–1984 1991–1996		
Pakistan	1973–1981				1982–2007
Panama	1973–2007				
Paraguay		2000–2007	1985 1989–1990	1973–1984 1986–1988	1991–1999
Peru			1975–1993		1994–2007

Table A1. Continued

	Words and deeds exchange rate policies				
	Matched peg	Matched float	Free falling	Broken commitment	Fear of floating
Philippines	1985–1987	1974–1983 1993–1995 1998–1999	1984		1988–1992 1996–1997 2000–2007
Poland	1990	1993–2007	1988–1989 1991–1992		
Saudi Arabia	1973–2007				
Senegal	1973–2007				
Slovak Republic	1993–1997 2006–2007				1998–2005
Slovenia	2002–2007		1992		1993–2001
South Africa		1979–1985 1995–2007		1973–1978	
Sri Lanka	1973–1976				1977–2007
Suriname	1973–1974 2002–2007	1996–1997	1986–1987 1991–1995 1998–2001	1975–1985 1988–1990	
Swaziland	1973–2007				
Syria				1973–2007	
Tanzania	1994–1996		1992–1993	1973–1991	1997–2007
Thailand	1973–1996	1998–2007			1997
Togo	1973–2007				
Tunisia	1973–1985 2002–2003				1986–2001 2004–2007
Turkey		1981–1983 1998–2000 2003–2007	1977–1980 1984–1997 2001–2002	1973–1976	
Uganda		1981–1985 1993–2007		1973–1980 1986–1992	
Uruguay			1973–1978 1983–1995		1979–1982 1996–2007
Venezuela	1973–1982	1990–1992	1987–1989 1993–1996	1983–1986	1997–2002

Table A2. Exchange rate policies of industrialized countries by years

	Words and deeds exchange rate policies				
	Matched peg	Matched float	Free falling	Broken commitment	Fear of floating
Australia	1973–1982	1984–2007		1983	
Austria	1973–2007				
Belgium	1973–2007				
Canada	2002–2007				1973–2001
Denmark	1973–2007				
Finland	1973–1991 1996–2007				1992–1995
France	1979–2007				1973–1978
Germany	1999–2007			1973–1998	
Greece	1973–1976 1998–2007	1982–1984			1977–1981 1985–1997
Iceland	1987–1997	1984–1986 2001–2007	1973–1983		1998–2000

Table A2. Continued

	Words and deeds exchange rate policies				
	Matched peg	Matched float	Free falling	Broken commitment	Fear of floating
Ireland	1973–1979 1990–2007				1980–1989
Italy	1983–1991 1996–2007	1976–1978		1979–1982	1973–1975 1992–1995
Japan		1978–2007			1973–1977
Netherlands	1973–2007				
New Zealand	1973–1983	1984–2007			
Norway		1992–2007		1973–1991	
Portugal	1992–2007	1973–1980			1981–1991
Spain	1989–2007				1973–1988
Sweden	1973–1992	1994–2007		1993	
Switzerland		1973–1981 1999–2007			1982–1998
UK		1973–1990 1993–2007			1991–1992
United States		1978–2007			1973–1977

Table A3. List of fear floaters and countries classified as pursuing inflation targeting lite policies

Fear floating policy	Inflation targeting*	Fear floating policy	Inflation targeting*
Algeria, 1995–2007	Lite	Kazakhstan, 1996–2007	Lite
Bolivia, 1988–2001		Korea, 1980–1997	Full-fledged
Costa Rica, 1991–2001		Mauritius, 1993–2007	Lite
Dominican Republic, 1993–2003	Lite	Nicaragua, 1993–2001	
Egypt, 1992–2007		Pakistan, 1982–2007	
Gambia, 1992–2007		Paraguay, 1991–1999	
Guatemala, 1991–2007		Peru, 1994–2007	Lite
Honduras, 1999–2001	Lite	Philippines, 1996–2007	Lite
Hungary, 1995–2001	Full-fledged	Slovenia, 1993–2001	Lite
India, 1979–2007		Sri Lanka, 1977–2007	Lite
Indonesia, 1979–1997	Lite	Uruguay, 1996–2007	Lite
Jamaica, 1994–2007	Lite	Venezuela, 1997–2002	Lite

*Inflation targeting policy according to Carare and Stone (2003).