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Dangerous Liaisons?

An Empirical Assessment of Inflation Targeting and Exchange Rate Regimes*

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Abstract

The role of the exchange rate under inflation targeting (IT) remains an unresolved issue in literature and policy discussions -and a challenge for central banks implementing IT, especially in developing countries. This paper aims at assessing whether there is a relation between the nominal exchange rate regime and inflation performance in IT countries.

We use a panel of 22 countries that adopted IT between 1990 and 2006, and estimate models in order to determine whether an exchange rate regime that differs from a pure float entails higher or lower inflation. We use two *de facto* foreign exchange regime classifications (Levy-Yeyati and Sturzenegger, 2005; Reinhart and Rogoff, 2004), and a *de jure* one (IMF). We estimate regressions through methods that account for the dynamic character of the panel ("difference" and "system" GMM estimators). We deal with potential endogeneity between inflation performance and exchange rate regime choice through the use of instrumental variables. In order to check the robustness of the results, we use alternative specifications –by including different macroeconomic control variables-, and introduce changes in the sample –by using a balanced and an unbalanced panel-.

Our results suggest that the choice of exchange rate regime matters for IT countries: *de facto* arrangements that are less flexible than pure floats appear to deliver lower inflation, especially in developing countries. This is consistent with the fact that those countries have higher pass through coefficients and are more prone to the kind of problems dubbed as "fear of floating".

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I. Introduction

It is usually argued that implementation of inflation targeting (IT) goes together with a freely floating exchange rate regime. Both policy discussion and conventional wisdom hold that the best an IT country can do is pursuing some sort of interest rate rule together with a benign neglect of the exchange rate. This, however, stands in contrast with central bank practice, as many countries that have actually implemented IT have done so without putting in place an independent float –specially in the developing world. Is it risky in terms of inflation for countries to engage in *dangerous liaisons* between not purely floating foreign exchange regimes and IT? This papers aims at answering the question by assessing differences in inflation among IT countries with different degrees of foreign exchange flexibility.

Monetary authorities in developing countries tend to show concern for movements in the nominal exchange rate, usually higher than that displayed by their counterparts in industrial countries. It has long been recognized that exchange rates play an essential role in the monetary transmission mechanism of small, open economies: above all, they are an important determinant of inflation expectations -nominal depreciations are typically associated to inflation acceleration. In addition, the exchange rate weighs heavily on competitiveness and on real and financial aspects of the economy: in financially dollarized countries, movements in the nominal exchange rate translate into changes in real wealth, that can be potentially destabilizing on the private and the financial sector. It is therefore no surprise that "benign neglect" of the exchange rate is out of the cards for monetary policymakers in those countries, and should be explicitly included in their actions (Mishkin and Savastano, 2000; Corbo, 2002).

What is more, even countries that have adopted inflation targeting regimes do not always embrace independently floating regimes –and, in some cases, are actively pursuing some sort of intervention in the foreign exchange market. Mohanty and Klau (2004), and Hammerman (2004) find what could stand out as one "stylized fact" on emerging market inflation targeting central banks: their estimated reaction functions reflect a significant coefficient for the nominal exchange rate. According to Mohanty and Klau, the response of interest rates to the exchange rate is, in certain cases, higher than that to changes in inflation or the output gap. In turn, Ades et al. (2002) estimate reaction functions in four inflation targeting countries: whether foreign exchange interventions are found to be "normal" or "excessive", the exchange rate carries a significant coefficient in the central bank's reaction function. Chang (2008) reviews the experience of several Latin American central banks, and finds that their policies depart to a considerable extent from the "interest rate rule cum floating exchange rate" paradigm, reflecting concern for foreign exchange volatility and deliberate policies of reserve accumulation.

In contrast with central banks' actions, the standard literature on inflation targeting is either largely ignorant of the role of exchange rates, or basically unwilling to recommend any response by central banks to anything that exceeds the effect of exchange rates on inflation[1]. As pointed out by Edwards (2006), some of the most important works in the IT literature (for instance, Bernanke et al., 1999; Bernanke and Woodford, 2005) hardly include any mention to the relation between the exchange rate and monetary policy; moreover, considerations on design and implementation are mute on this matter. In turn, the conventional wisdom points to a very close link between IT and a purely floating regime; to quote Agenor (2002), "the absence of a commitment (whether implicit or explicit) to a particular level of the exchange rate… is thus an important prerequisite for adopting inflation targeting". Mishkin and Schmidt Hebbel (2002) are even more vocal when they assert that targeting the exchange rate "is likely to worsen the performance of monetary policy". Even those who recognize that the question is highly country-specific, like Edwards (2006), are relatively sceptic on the value of adding the exchange rate to the central bank's reaction function[2]. As Stone (2007) puts it, the role of the exchange rate under IT remains an unresolved issue.

Are IT central banks "ahead of theory" when they, formally or informally, react to exchange rate developments, or are they merely deviating from best practice? If the latter were true, then some cost in terms of inflation would be paid by those monetary authorities who maintain a foreign exchange regime different from a float. We aim at determining whether there has been such a cost, and if it has been significant at all, using annual data between 1990 and 2006 from a panel of 22 countries that adopted IT during that period, and the exchange rate classifications proposed by Levy Yeyati and Sturzenegger (2005), Reinhart and Rogoff (2004) and the IMF. We know of no analysis along these lines *within* the group of countries that pursue an IT policy.

When the relation between inflation targeting and exchange rates has been approached on an empirical basis, it has either been with a focus on specific country experiences or in a descriptive way. Thus, Holub (2004) examines the implications of foreign exchange intervention in the IT regime of the Czech Republic; Domac and Mendoza (2004) inquire whether foreign exchange interventions by the Banks of Turkey and Mexico have been effective in reducing volatility, and whether this has helped them or not in achieving their targets; Vargas (2005) provides some evidence on intervention and IT in Colombia. The general message of these studies is that in those economies subject to high foreign exchange volatility, and where volatility weighs on prices to a great extent, occasional central bank interventions may be useful to stabilize the currency –although the instrument should not be used systematically to keep a certain exchange rate level under an IT framework. In turn, other studies have explored the issue by comparing different countries' experiences: Ho and Mc Cauley (2003) examine the relation between inflation targets and foreign exchange management, finding that the latter is important even for industrial economies; using a narrative approach, Chang (2008) reviews policies in four Latin American countries, noting their motivations and actions -highlighting to what extent they

[1] Indeed, it is standard in classification of monetary regimes to consider that a country implements "full fledged inflation targeting" when it abandons any form of explicit exchange rate management (such is the case, for instance, of Chile and Israel).

[2] One should, however, do justice to a number of authors that do consider the case for managing the exchange rate in an IT framework; for instance, IMF (2006) accepts that reducing exchange rate volatility may be a secondary objective in such a framework. See also Amato and Gerlach (2002), Eichengreen (2002); in turn, Escudé (2007) presents a model that specifically accounts for IT and a managed floating regime.

differ from standard IT prescriptions[3]. Our paper is a contribution to this second literature strand, with the aim of conveying results that go beyond specific country experiences through the use of an econometric framework.

The rest of the paper is organized as follows. Section II presents what alternative classifications tell us about the evolution of foreign exchange regimes and inflation in IT countries. Section III goes on to review the methodology used to carry out the evaluation, and presents the model and its results, as well as a number of robustness checks (country groupings, unbalanced panel, endogeneity). Section IV concludes.

II. Exchange rate regimes and inflation performance in inflation targeting countries: an overview

Our sample comprises annual observations on the 22 industrial and developing countries that adopted inflation targeting between 1990 and 2002 (table 1); another four countries adopted IT in 2006 (Indonesia, Romania, Slovak Republic, Turkey) but were left out of the sample for methodological reasons -there would not be enough observations to ascertain any valid conclusions. Countries that are considered by many analysts to be effectively implementing IT policy, like Switzerland and the Euro Zone, were omitted from the sample as their authorities reject being engaged in such a regime. The date of adoption of IT is also open to question, as different authors refer to different dates; we have reviewed alternative criteria and, in general, tended to consider the earliest date available[4]. Thus, the sample includes countries that, at any moment of time between 1990 and 2006, were implementing IT or would be doing so in the near future. For the sake of robustness, we used both a balanced sample, including all countries at all times in 1990-2006, and an unbalanced one -only countries and periods when IT was in force, during 1990-2006.

In order to assess the impact of the foreign exchange regime on inflation performance, we use three different classifications (LYS, RR and IMF). A word of caution is in place here: each classification conveys a different measure of exchange rate volatility and/or policy –thus, a “float” might mean a deliberate policy of letting the foreign exchange rate float, or a period of unintended high volatility in the exchange rate following a crisis. Both the LYS and RR classifications are *de facto*, based on a systematic approach to quantitative data from each country, while the IMF one is *de jure* until 1997, and later it incorporates qualitative data and IMF economists’ judgment. The LYS classification uses information on nominal exchange rate and international reserves’ volatility –thus, the authors claim that it can capture foreign exchange policy in addition to volatility. In turn, the RR criterion works on

[3] See also Amato and Gerlach (2001) and Debelle (2001) for early recognitions of the weight of the exchange rate under IT policy.

[4] Dates of adoption are usually related to a country’s regime fulfilling with all the conditions to be considered a “full fledged inflation targeting” one; this is usually (although not always) related to the absence of foreign exchange intervention; thus, some authors claim that Chile adopted IT in 1992, whereas others point to 1999, when the crawling band foreign exchange regime was abandoned. We consider, however, that what distinguishes IT is the announcement of an explicit inflation target, to whose achievement the central bank is committed, and that the inflation forecast is the *de facto* intermediate target of policy (Batini and Laxton, 2005); this does not, in principle, prevent the existence of some implicit or explicit exchange rate objective, and one should distinguish a monetary strategy from a foreign exchange regime (Edwards, 2006).

information on dual or parallel exchange rate to obtain a measure of volatility. It seems to be a measure more apt to reflect nominal exchange rate volatility by itself; still, Reinhart and Rogoff incorporate certain features that allow them to claim that they are capturing policy to a certain extent: they can tell whether announcements on the exchange rate are fulfilled, and also whether cases of extreme nominal volatility go together with high inflation. Therefore, both LYS and RR are, although from different standpoints, reflecting certain policy decisions or outcomes. Arguably, both criteria are subject to the same criticism: exchange rate stability and/or reserve changes may take place for reasons other than policy intervention. Finally, the IMF criterion from 1998 onwards seems to be a comprehensive approach in order to reflect policy, but it is, by construction, more dependent on judgment than the two other measures. With these caveats in mind, and taking into account the information they convey on policy (as opposed to "market driven" results), these measures are used here as alternative foreign exchange regime classifications that can partially capture policies and their outcomes[5].

What do the three alternative exchange rate regime classifications tell us about these countries? A casual look at figure 1 confirms the standard view: as countries have moved toward IT, they have become more flexible in terms of exchange rate regime. The share of "pure" or "independent" floats in the sample increases over time, as countries adopt IT –something that applies whether the criteria of Levy-Yeyati and Sturzenegger (in what follows, LYS), Reinhart and Rogoff (RR) or the IMF are employed. The conventional view, however, has to be readily nuanced: the "trend" toward flexibility has not proceeded in a steady fashion, and since the early 2000s it appears to have stopped.

Even after adoption of IT, not all countries exhibit purely floating regimes: depending on the classification used, regimes other than pure floats represented over 30% of IT countries in 2006 (IMF), 50% in 2004 (LYS), or more than 80% in 2001 (RR). Moreover, after 2002, when all countries in the sample were implementing fully fledged IT, the share of floats either became stable or decreased: this is consistent with recent studies that suggest that some kind of "fear of floating in reverse" is taking place in the 2000s[6]. A look at each country's "most frequent" exchange rate regime (as measured by the mode of the classification values) conveys a similar impression: a significant number of countries in our sample have put in place regimes that differ from purely floating strategies (table 2).

Are differences in exchange rate flexibility found in our sample due to differences among countries ("floaters" vs "non floaters") or to changes within countries along time? Both possibilities are found in the sample. At each point in time, countries show different degrees of foreign exchange flexibility; as we have seen, floaters tend to be the slight majority, but by no means the only regimes present. And over time, countries change foreign exchange regimes, even once inflation targeting has been adopted. In the balanced sample, countries have changed their regime four times on average, going by the LYS classification; both industrial and developing countries have shown changing regimes, although it is certainly the latter that have changed more frequently –up to nine times, while three industrial countries have kept the same regime throughout. The average regime change for RR is three times, while it is two times for the IMF; not surprisingly, the *de jure* classification shows the lower

[5] See annex for details.
[6] Levy-Yeyati and Sturzenegger (2007).

number of changes. When we look at the unbalanced sample, changes become less frequent on average in each country, and there are more countries that never change their regime; still, the number of changes that countries make over the total number of observations in each sample is fairly similar (table 3). Thus, the adoption of IT does not, by itself, preclude changes in strategies on the forex front –no matter which classification is employed.

While not all countries have embraced floating regimes under IT, inflation has clearly trended downward in our sample through time (figure 2). In addition, those countries that initially (1990) had not adopted IT showed convergence to the "old" inflation targeters in the sample. The latter, in turn, show rates of inflation relatively subdued from the beginning of the sample. This goes in line with the evidenced presented in those studies that claim that IT does "make a difference" after all, such as Batini and Laxton (2006) and Mishkin and Schmidt-Hebbel (2006)[7].

Can inflation performance be related to the foreign exchange regime in IT countries? There seems to be no straightforward answer, at least from an inspection of descriptive statistics and looking at the period when IT was in place (figure 3). For the LYS classification, the usual result of fixed regimes showing the lowest inflation applies; intermediate ones, like dirty and dirty/crawling peg, display higher inflation than floats. Likewise, going by the RR criterion, fixed regimes sport the lowest inflation, while intermediate ones -managed floating, *de facto* and *pre announced* crawling bands and pegs- show higher inflation than floats. In turn, following the IMF classification, managed floating regimes display lower inflation than freely floating ones, but the opposit holds for other forms of intermediate arrangements; still, fixed regimes in this classification show lower inflation than independent floaters.

Moreover, we look at the average inflation in each country in our unbalanced panel, and it is not always the case that floaters are the best inflation performers (table 2). Three of the top-five inflation performers had "fixed" regimes in place according to the LYS classification; also, the five of them had a regime that differed from a float (either a managed float or a de facto peg or crawling band) according to RR; or, on the contrary, all of them were independent floaters, according to the IMF.

Therefore, it is hard to conclude anything less general than that inflation has trended downward, overall, while countries had in place different foreign exchange regimes, and not always freely floating ones. Moreover, there is no apparent linear relation between the forex regime and inflation performance that we can be grasped from the data as it is. Can we go beyond descriptive statistics and try to isolate the "marginal" effect of the foreign exchange regime on inflation performance? The next section addresses this question.

III. Evaluating the effect of exchange rate regimes on inflation

In order to assess whether the adoption of an exchange rate regime different from floating has an effect on inflation, we adapt the specification proposed by Ball and Sheridan (2005) to study differences in inflation between developed inflation targeters and non-targeters. The same specification was applied by Batini and Laxton (2005) to study if inflation targeting in emerging

[7] We make no attempt at validating or rejecting this hypothesis; for the "negative" view on IT making a difference in terms of inflation, see Ball and Sheridan (2005).

countries delivers lower inflation than in non-targeting ones; and by Mishkin and Schmidt-Hebbel (2005), to analyse if IT "makes a difference" between countries who implement it and those who do not. We assume that inflation may be described by the weighted average of its own past and its long term mean,

$$\pi_{it} = \lambda \pi^*_{it} + (1-\lambda)\pi_{it-1} + \varepsilon_{it} \qquad (1)$$

where π_{it} is inflation measured in country *i* at year *t* (or quarter, depending on which data are used) as year-over-year change in the consumer price index (in logarithms), π^*_{it} is the long term mean of inflation, λ is the weight attached to the long term mean, and ε_{it} is a stochastic disturbance term. In turn, the long term mean of inflation can vary according to time- and country-specific factors, as well as to the type of exchange rate regime adopted by each country at different times,

$$\pi^*_{it} = \alpha ER_{it} + u_i + d_t \qquad (2)$$

where ER_{it} stands for a variable that measures the type of exchange rate regime adopted. Combining equations (1) and (2), we obtain the baseline specification for our panel data model,

$$\pi_{it} = \lambda \alpha ER_{it} + \lambda u_i + \lambda d_t + (1-\lambda)\pi_{it-1} + \varepsilon_{it} \qquad (3)$$

where inflation is a process described by its own past (with one lag), the exchange rate regime in place in each country *i* at each moment *t*, a country-specific effect and a time dummy[8]. ER_{it} takes different values according to the three different foreign exchange regimes classifications used as described in the previous section. For LYS and IMF, there are 3- and 5-way classifications, the former labelling regimes as floating, intermediate or fixed, the latter being "finer" or more detailed. For RR, there 6- and 15-way classifications, with the latter, once again, being more detailed. The coefficient on ER_{it} reflects whether exchange rate regime choice impinges, at any rate, on inflation.

We define ER_{it} as a dummy variable to capture if there is an effect of "not being a float" with as many dummy variables as each classification admits (*n-1* dummies, with *n* being the number of categories in each criterion). Alternatively, we may use a categorical variable that ranges from the most flexible to the most rigid regime; in this case, linearity is assumed to hold between exchange rate regimes and inflation. Whether or not this is a plausible assumption is a completely empirical matter[9]. In what follows, the main approach is to use dummy variables, with independently or freely floating regimes as the omitted category to contrast with the rest –this is done for the LYS and IMF 3- and 5-way classifications, and for the RR 6-way classification. For the sake of robustness, we also define ER_{it} as a categorical variable or "flexibility index", that takes as many values as categories are included in each classification -this is done for the LYS and IMF 5-way classifications, and for the RR 6-and 15- way classifications.

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[8] The inclusion of time dummies controls for factors that affect all individuals at any point in time; it is thus useful to remove correlation across individuals and so to obtain a variance-covariance matrix "free" from this effect. See note 15.

[9] Figure 5 suggests that linearity may not apply to the relation between foreign exchange regimes and inflation.

The baseline specification (3) should be considered with two caveats in mind: in the first place, we are measuring statistical association between inflation and the exchange rate regime rather than a causal effect. This is because there may be endogeneity between the exchange rate regime and inflation –typically, fixing or managing the exchange rate is a tool for price stabilisation, and so the "effect" we observe of the independent variable on inflation may just be a matter of reverse causality; besides, it could be argued that lower inflation makes the adoption of fixed regime more feasible. It should be noted, however, that as long as the exchange rate regime in time *t* depends on inflation in *t-1*, these potential sources of endogeneity are accounted for in the model as specified in (3)[10]. In order to deal with potential endogeneity, we use instrumental variables along two different lines: instrumenting the foreign exchange regime through its own past values, and using other variables that may account for exchange rate regime choice, as described later.

In addition, we are only "explaining" inflation in terms of its own past and the exchange rate regime, but a number of other variables may be highly relevant –in particular, the relation between inflation and money, output and interest rates. Thus, we specify a new model as follows:

$$\pi_{it} = \lambda\alpha ER_{it} + \lambda\beta X_{it} + \lambda u_i + \lambda d_t + (1-\lambda)\pi_{it-1} + \varepsilon_{it} \qquad (4)$$

where X_{it} is a set of macroeconomic control variables. In particular, from a standard money demand function we infer that differences in inflation performance among countries are a function of money growth, output growth, and nominal interest rates. In this way, we aim at capturing the effect of the exchange rate regime on inflation "net" of the standard determinants of changes in the price level; we also include the degree of trade openness, since according to Romer (1993) it may raise the costs of monetary expansion. This is a procedure fully analogous to that used by Ghosh et al. (1997) and by Levy Yeyati and Sturzenegger (2001), among others[11], to measure whether foreign exchange regimes have an impact on inflation performance –the main difference is that they worked with a set of countries irrespective of their monetary regime. We therefore propose the following model:

$$\pi_{it} = \lambda\alpha ER_{it} + \lambda(\beta\ m_{it} - \gamma\ y_{it} + \delta\ i_{it} + \phi\ o_{it}) + \lambda u_i + \lambda d_t + (1-\lambda)\pi_{it-1} + \varepsilon_{it} \qquad (5)$$

which we estimate through the same methods applied to (3). M_{it} and y_{it} are year-over-year changes in, respectively, the money stock and output (both measured in logarithms); i_{it} is the logarithm of the nominal money market interest rate[12]; o_{it} is the degree of openness of each country, measured as the ratio of exports and imports to GDP.

A few more comments on variables' definitions and data frequency and span are in order. The time dummy variables, d_t in (3), are expressed in terms of change from a base year: that is, instead of binary variables (that take value one for a given year *t*, and 0 otherwise), they are defined as indicators centered around a specific year, $d^*_t = d_t - d_{2000}$, and so the coefficient for each time dummy

[10] Nonetheless, problems of collinearity may still be present.
[11] See also Alfaro (2003).
[12] See annex for variables' definitions.

measures a contrast with the overall conditional mean of inflation over the sample. In this way, dummy coefficients become independent of the base year chosen.

The data employed are annual for the three classifications used, LYS, IMF and RR, and quarterly only for the latter. We consider that data frequency should be, naturally, that of the classification adopted: all three criteria applied provide annual classifications, while only RR also provides monthly data. In the latter case, we understand monthly frequency data may introduce unwelcome "noise", so a quarterly basis is preferred.

We are using a balanced panel, in the sense that, for the 1990-2006 period, data for all the 22 countries listed in table 1 are included. This, of course, means that at each moment in time the sample includes countries that were conducting IT or would be doing it later. Arguably, results from the model should be interpreted with this point in mind: rather than limited to inflation targeting regimes only, they may also be reflecting "transitional" features of economies that were on their way to adopting IT – this is certainly of interest, even at the risk of obtaining conclusions that do not exclusively pertain to IT regimes. For results that apply to IT regimes proper, an "unbalanced" panel should be used –that is, including observations that correspond only to the period when each country was an inflation targeter. The latter analysis is also carried out.

With (3) and (5) so defined, we have a baseline model and a model with macroeconomic controls that can be estimated for each exchange rate regime criterion[13]. The presence of the lagged dependent variable may yield inconsistent estimates, and so we turn to dynamic panel data methods that can account for such presence, those known as "difference GMM" (Arellano and Bond, 1991) and "system GMM" (Arellano and Bover, 1995; Blundell and Bond, 1998)[14] [15]. These models are robust to individual-specific patterns of heteroskedasticity and serial correlation.

In order to check whether equations in levels included in some of the models were appropriate, the panel was tested for unit roots using both the Levin-Lin-Chu and Im-Pesaran-Shin procedures; in the former test, we rejected the null hypothesis of a common unit root process for all countries; in the latter, we rejected the hypothesis of an individual unit root process for each country in the sample. In both tests we included individual effects and linear trends (see table 4).

III.1 Exchange rate regimes as dummy variables: annual data and balanced sample

The first exercise consists in estimating models (3) and (5) for annual data and three-way classifications: LYS and IMF; no estimation was performed for RR here as it has more categories. The baseline specification shows no relation between the foreign exchange regime and inflation for either classification, and no matter what method is applied –difference GMM assuming regressors' exogeneity, difference and system GMM with the exchange rate regime instrumented through its own

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[13] We instrument the exchange rate regime with its own lagged values to control for potential endogeneity.

[14] Difference and system GMM methods assume that idiosyncratic disturbances may have individual-specific patterns of heteroskedasticity and autocorrelation -but not correlation across individuals. That is why the inclusion of time dummies is useful to control for the latter source of correlation. See Roodman (2006).

[15] Difference and system GMM methods were implemented through the *xtabond2* command in Stata 9.0 by Roodman (2006).

past values or with other instruments (tables 5.1 and 6.1, columns 1, 3, 5, 7 and 9). Lagged inflation, as expected, is significant and its coefficient is almost 0,5.

Things change when we introduce macroeconomic control variables (tables 5.1 and 6.1, columns 2, 4, 6, 8 and 10). First of all, the addition of money growth takes away a substantial amount of persistence from lagged inflation, and so does the inclusion of the nominal interest rate. Coefficients of both variables have the expected positive signs, while that of output is either zero or negative. Trade openness is assumed to reflect a certain "disciplinary" effect of integration on economic policy; in general, the coefficient of this variable turns out to be either positive or zero, which certainly does not speak of any such effect; instead, it could be the reflection of "imported inflation" through higher integration.

As for the foreign exchange regime, although the model with exogenous regressors does not show any sizable association between it and inflation, the four models that take into account potential endogeneity reveal a negative effect of intermediate arrangements on inflation, under the LYS classification. It appears that higher inflation in intermediate regimes as found in the data (figure 3) could be attributed to an extent to monetary expansion, as well as to certain "credibility" effect as captured by interest rates (in the sense of Ghosh et al, 2002): once these variables are factored in, inflation is actually lower in intermediate arrangements than in floating ones. There is no effect at all, however, when the IMF criterion is used. Perhaps not surprisingly, only a *de facto* classification is indicative of any effect of regimes on inflation, while a *de jure* one, that is limited to declared regimes, shows no relation: both the foreign exchange regime and its classifications matter –it is not only whether a country has a regime different from a float, but also which criterion is used to define it, that can explain inflation performance.

III.2 Dealing with endogeneity

As we have already pointed out, there may be endogeneity between inflation and the foreign exchange regime, as long as the regime in place at time *t* depends on factors other than inflation at time *t-1* and the rest of the explanatory variables included in regression (5). We dealt with this problem in two ways: a) instrumenting all explanatory variables with the set of instruments formed by the lagged values of each variable; b) instrumenting the exchange rate regime with variables that are considered to determine regime choice . The number of lags that were included in each instrument in the GMM estimators was restricted to two, so as to avoid having "too many instruments"[16], as is often the case in panels where the number of periods is large with respect to the number of individuals. The advantage of option a) is that previous values of the exchange rate regime are highly correlated with

[16] The Sargan test of overidentifying restrictions resulted in acceptance of the null hypothesis of valid (exogenous) instruments with a p-value of 1 when no restriction was placed on the number of lags; thus, the test provided no information on instrument validity. We therefore restricted the number of lagged values to be used as instruments to 2 for the difference and system GMM estimators when all regressors were treated as predetermined, and we collapsed the dimension of the instrument matrix, without losing instruments; in this case, the test resulted in acceptance, revealing instrument exogeneity. This applied to the whole sample (all countries). However, when we restricted the sample to industrial or developing countries, we encountered the problem of "too many instruments" even when the number of lags was reduced.

current ones; this way of accounting for endogeneity is rather "mechanistic", in the sense that there is no obvious economic meaning behind it.

As an alternative to using the past values of the exchange rate regime dummies as instruments, we tackled potential endogeneity problems by instrumenting the exchange rate regime with variables that are related to its choice. We used instruments that are related to the optimal currency area literature, as well as with the "financial" view (Levy-Yeyati and Sturzenegger, 2004, Ghosh et al., 2002). The former comprise variables that account for the choice of fix-vs-flex regime depending on whether the country has closer real linkages to the currency with which it decides to peg, and on whether the exchange rate regime can have "insulating properties" from external shocks; the latter reflect the constraints that financial development and integration poses on monetary policy. Thus, the instruments chosen were: country size (measured as the ratio of country GDP to US GDP), terms of trade volatility (the standard deviation of terms of trade changes over the previous five years), a measure of *de facto* capital account openness (the sum of the absolute value of inward and outward portfolio flows in terms of GDP), two measures of financial development (the credit to GDP ratio, and the ratio of quasi money to narrow money) and a measure of financial dollarization (the relation between foreign liabilities and money.

III.3 Are country groupings relevant?

It may very well be that the effects we have found thus far are related to country groupings - that they hold for developing or industrial countries, but not for the group of IT-ers as a whole. It has been argued, for instance, that the "credibility" effect attached to pegs, which translates into lower inflation, is mainly found in developing economies, and is rare among industrial ones. Thus, we run models (3) and (5) for each country group[17], with the following results.

In the group of industrial countries and in the baseline model (tables 5.2 and 6.2, uneven number columns), fixed regimes are associated to higher inflation than floating ones under the LYS classification, but only when regressors are treated as exogenous; there is no association at all under the IMF classification. However, when we estimate model (5), there is a positive effect on inflation due to fixed regimes (LYS), even when the exchange rate regime is instrumented through its own past; in turn, for the IMF classification, intermediate regimes translate into higher inflation than floats (tables 5.2 and 6.2, even number columns). In this way, regimes that differ from pure floating appear associated to higher inflation over and above any effect that may be captured by the conventional sources of inflation. Indeed, such sources are not as significant in industrial as one would expect: in general, money and output growth display no effect on inflation, whereas nominal interest rates move in the same direction. In addition, the degree of trade openness carries a negative sign, as expected (although it is not always significantly different from zero). It seems that, in terms of inflation, there is no better regime than a float for industrial countries. This is certainly consistent with an interpretation of these countries as better suited to use the exchange rate as a "real shock absorber" while the

[17] See table 1 for details on country groupings.

nominal anchor is the inflation target –with developed financial systems strong enough to provide adequate insurance to movements in the exchange rate.

Results contrast sharply in the case of developing economies and model (5) (tables 5.3 and 6.3, even number columns). For the LYS classification, intermediate regimes deliver lower inflation than floats, no matter which estimation method is used, and in one of them –"system" GMM, with the foreign exchange instrumented through its own lagged values-, fixed regimes also induce lower inflation than floats. There is, however, no effect whatsoever found when the IMF classification is applied. If we take the LYS criterion as indicative of "deeds", in opposition with "words" as portrayed by the IMF classification, it may come as no surprise that only "deeds" count in developing countries –with the mere announcement of a regime not amounting to much in terms of inflation. The fact that managed regimes impinge negatively on inflation can be related to the long-recognized role of the exchange rate as a nominal anchor for inflation expectations in developing economies.

In developing countries, both money and GDP growth carry the expected signs (positive and negative, respectively), whereas higher openness translates into higher inflation. It appears, then, that "money still matters" for developing countries, in contrast with industrial ones, and also that the foreign exchange regime and the degree of openness play a different role. As for openness, the positive sign may be a reflection of the higher degree of "imported" inflation that comes with trade; and this could also help explain why regimes that are not "pure" floats may yield less inflation –*de facto* managed floating may entail lower foreign exchange volatility, and, via the pass through effect, lower inflation.

All in all, the effect of intermediate regimes on inflation for the whole sample seems to be driven partially by country grouping: in industrial economies, the association, if any, is positive between intermediate regimes and inflation, whereas it is negative for developing economies. Industrial economies may be better suited to reap the benefits of floating exchange rates with no "extra cost" on inflation. Instead, developing countries, with less advanced financial systems and the class of problems usually dubbed as "fear of floating", may find it more advantageous in terms of inflation performance to pursue less flexible strategies on the foreign exchange front –an advantage that is confirmed by the data.

III.4 Using finer classifications

Up to this point, we have used 3-way classifications; however, we can profit from the details of finer classifications as provided by the LYS, IMF and RR schemes[18]. We now review the results obtained employing 5-way classifications for LYS and IMF, and 6-way ones for RR.

As in the previous section, the baseline model does not yield virtually any relation between inflation and the foreign exchange regime. The model with macroeconomic controls, however, displays results along the lines of the previous section (table 7.1 and summary table 9[19]). According to the LYS classification, dirty regimes result in lower inflation than floats, and the same applies to crawling peg

[18] 5- and 6-way classifications for LYS and RR, respectively, are taken directly from the authors' respective databases; but see annex for construction of the IMF measure.

[19] Detailed regression output for the RR classification is included in tables 7.1-7.3; table 9 summarizes results for all classifications and country groupings. Detailed output for all regressions is available from the authors.

schemes; the latter is obtained when macroeconomic instrumental variables are used. No relation is found for the RR criterion, while crawling bands and pegs according to the IMF classification may be significant to explain inflation, but that result is limited to the model that assumes regressor exogeneity.

Splitting the sample into industrial and developing countries is again informative. In industrial countries, all three classifications suggest that some form of intermediate foreign exchange arrangement is linked to higher inflation (tables 7.2 and 9. Perhaps the strongest result, in the sense that it is obtained using instrumental variables that account for foreign exchange regime choice and with the most efficient estimation method, is that crawling pegs result in higher inflation (RR). When it comes to developing countries, only *de facto* classifications matter (tables 7.3 and 9). Dirty, crawling peg and pegged regimes bring on lower inflation than floats under the LYS classification; pegs also deliver lower inflation going by the RR criterion. As before, money demand (money and output growth, interest rates) appears to be more significant in developing countries than in their industrial counterparts, while opennes plays a different role in each group –positive in developing economies, negative or zero in industrial ones.

We still conclude that putting in place exchange rate regimes different from floats in IT countries may result in lower inflation in developing countries, while this would not be the case in industrial economies. Including the RR de facto only strengthens our previous findings, for we maintain the contrast between industrial countries, where schemes such as crawling pegs and managed floating may induce higher inflation than pure floats, and developing ones, where pegs give way to lower inflation.

III.5 Unbalancing the sample

Countries in our sample adopted inflation targeting between 1990 and 2006; however, adoption dates were different for each country, so at any point in time the sample includes countries that had IT in place together with others that did not have it yet. It may be argued that results are biased in that they consider, for instance, high inflation episodes in countries that were not, by the time those episodes take place, inflation targeters -such were the cases of Brazil and Peru in the early 1990s. Thus, interpretation of results obtained in thus far cannot apply to IT countries properly speaking – even if such "broad" interpretation is still relevant, as it captures features of the transition to IT from another regime[20].

We now turn, then, to an "unbalanced" panel, including only countries that were implementing inflation targeting at each point in time, taking the dates when the IT regime was in place as they appear in table 1. Unbalancing the panel does not only change the interpretation of results as pertaining exclusively to IT countries; it also goes a considerable way in alleviating potential endogeneity problems and getting rid of outliers in terms of inflation performance. It is not the case here that a "fixed" regime was in place to control inflation, as the monetary regime –inflation targeting-

[20] As we are interested to draw lessons from countries that adopted IT, especially when it comes to implementation issues before becoming ITers , the sample we are using can give useful lessons.

was explicitly designed to do so; that is, as long as we enter the world of "inflation targeters only", exchange rate based stabilisation programmes are ruled out, by definition. This, of course, does not preclude the use of the exchange rate as a tool to manage inflation expectations, but it certainly restricts the appearance of more or less "pegged" regimes aimed at stabilising inflation that could be present in the balanced panel. Likewise, this also rules out high- or hyperinflation episodes. With these points in mind, we estimate models (3) and (5), that is, our baseline model and the alternative specification that controls for money demand; we review results for the latter model.

When we consider only IT countries proper, the general message we have obtained so far remains: intermediate or pegged regimes impact negatively on inflation, especially so in developing countries (table 10[21]). For the whole sample, pegs are invariably associated to lower inflation than floats under the RR classification, while the same holds for dirty regimes under the LYS classification (but only when regressors are instrumented through their lagged values); in contrast, *de facto* crawling peg regimes (LYS) appear to lead to higher inflation. As for the *de jure* measure, it is only revealed as significant when our explanatory variables are treated as purely exogenous; and, in that case, managed floating and crawling bands are linked to lower inflation than independent floating schemes, while the opposite is true for arrangements with horizontal bands.

Country groupings are revealing as usual (table 10). For developing countries, pegs are synonimous to lower inflation than floats when the RR classification is applied; and the same applies to dirty regimes according to the LYS criterion. De facto pegs under the LYS classification, however, appear to deliver higher inflation than floats (but only when we specify the system estimation and use economic variables as instruments); and, as usual by now, there is no room for words –the IMF classification yields no signficant results, except when endogeneity is not dealt with. Interestingly enough, when we look at industrial countries, we find that *de facto* pegs translate into lower inflation than floats, under the LYS classification and for the two different ways of instrumenting the foreign exchange regime. Thus, in the unbalanced panel the idea that not having a float in place may lead to lower inflation applies even to developed countries under one of the *de facto* criteria used.

III. 6 An assessment of inflation targeting and exchange rate regimes

Our findings suggest that the foreign exchange regime does matter for inflation performance under IT, both in the transitional period from another monetary anchor to IT and once IT has been implemented. Using the 3-way classifications in the balanced panel (table 8), our strongest results (in the sense that both the effect of the lagged dependent variable and of potential endogeneity of regressors are accounted for) suggest that nominal exchange rate regimes that differ from "pure" floating are associated to lower inflation in developing countries and to higher inflation in industrial ones[22]; when all countries are considered in one single group, we find that intermediate regimes yield lower inflation than floating ones. We also find an effect of *de jure* regimes on inflation in industrial countries, but no such thing in developing economies. For the former, there seems to be nothing

[21] Only summarized results are reported for the unbalanced panel. Detailed output is available on request.
[22] One should note, however, that an association between higher inflation and less flexible regimes is found in industrial countries only when regressors' lagged values are used as instruments.

better than a float in terms of inflation, and no contradiction between "deeds" and "words" –perhaps an evidence of credible policies. When it comes to developing countries, it is deeds that matter mainly, but words fail (there is no effect on inflation according to the IMF criterion).

Five-way classifications offer a similar view: in the balanced panel (table 9), dirty and crawling peg regimes (LYS) deliver lower inflation than "pure" floating arrangements in all countries. Once again, these results depend on country grouping: for industrial economies, the adoption of a crawling regime under IT results in higher inflation (RR), and the same applies to managed floating arrangements (IMF); in developing countries, dirty, dirty/crawling peg and fixed regimes have a negative effect on inflation as compared to floats (LYS, RR[23]). For industrial countries, deeds matter just as words do; for developing ones, it is only deeds that counts, and they go together with outcomes –if we consider, as Harms and Kretschmann (2007) do, that the RR classification reflects outcomes since it focuses on nominal exchange rate volatility as a result of policies.

When the unbalanced panel is employed for all countries in 5-way classifications (table 10), pegged regimes (RR) weigh negatively on inflation, but dirty/crawling have the opposite effect (LYS); and the declared regime does not seem to matter. For both industrial and developing economies, less flexible arrangements such as managed floats are linked to lower inflation than floats (LYS), and so are pegs for developing countries (RR).

How can our results be rationalized? At first sight, it may seem counterintuitive to find that what has usually been thought of as "best practice" for IT economies is not warranted by the data –that pure floats are not the best thing IT countries can have, at least in terms of inflation performance. But once we consider some "usual suspects" of inflation in small, open economies, things appear more familiar. A possible explanation lies in the degree of pass-through of different economies: indeed, pass-through coefficients in developing economies are substantially higher than in industrial ones –thus, the exchange rate anchor becomes much more important in the former than in the latter. According to estimates by Cavaliere and Edwards (2006), the long-run pass-through coefficient from the exchange rate to consumer prices is, on average, about four times higher in developing IT economies than in industrial ones; in turn, the exchange rate pass-through to import prices is, on average, 17% higher in developing IT economies than in their industrial counterparts. Thus, it is far from a mere coincidence that relatively less flexible foreign exchange regimes are associated to lower inflation in developing economies, but not in industrial countries. This is also in line with the narrative by Chang (2008), according to which IT countries in Latin America are concerned about exchange rate management to a larger extent than is suggested by standard prescriptions.

Are differences in inflation, as captured by these models, of any economic significance –as opposed to merely statistical significance? It appears so, but this depends heavily on which classification is employed. For all countries, the adoption of a dirty regime may amount to 4 percentage points (p.p.) less inflation per year than if a float was in place (LYS). For industrial countries, intermediate regimes may "cost" 1 or 2 p.p. annual inflation higher than floats (RR). Instead, developing countries with a dirty regime may have up to 7 p.p. lower inflation than floats (LYS). When

[23] Pegs under the RR criterion are found to be significant only when lagged values of regressors are used as instruments.

results are restricted to the unbalanced sample, they become more nuanced, but remain economically significant: an intermediate regime may deliver 3 p.p. less inflation than a floating one in developing countries (LYS); in the same group, a peg will show less inflation for 5 p.p. than a float (RR). The latter are indeed powerful results, as they apply to countries that have implemented IT and do already show relatively low rates of inflation –in the unbalanced sample, average inflation is 4%, while average inflation for developing countries is 5,4%.

In order to determine whether the exchange rate regime helps explain differences in inflation performance, we test the hypothesis that all coefficients of the dummy variables are equal to zero[24]; in general, this hypothesis is rejected, and so the nominal exchange rate regime does "make a difference" in terms of inflation. Interestingly enough, it turns out that there is no such effect in two country-group regressions using the IMF classification –that is, "announced" regimes may not matter.

We also test whether time and country-specific effects as included in equations (3) and (5) are statistically significant; in general, they both are, validating the use of methods that account for their presence. The coefficients on time dummies confirm that inflation has decreased over time in IT countries. These coefficients reflect the difference between inflation in any given year and average inflation over the sample, once the effect of the other regressors has been considered. In the early to mid-1990s, deviations from the sample's mean inflation are generally positive, while they decrease in the second half of the sample. That is, even conditionally on its conventional determinants, inflation appears to have been going down in IT countries throughout the sample period: this finding is fairly robust to different estimation methods and to alternative foreign exchange regime classifications. Country groupings are, once again, relevant: the decline in inflation as measured by time dummies is marked in developing countries, but not in industrial ones. Finally, this conditional measures of inflation evolution through time are fairly similar to their unconditional, descriptive counterparts, as average inflation has generally decreased in these countries along the period under study.

As for unobservable country-specific effects, it should be noted that they turn out to be significant in the balanced sample but not in the unbalanced one; this may have to do with individual characteristics of each country, other than money demand and openness, becoming less important in determining inflation once IT has been adopted –in other words, with some notion of convergence in inflation performance within IT countries as a group.

Our results as we have described them are robust to a number of checks. As for the variables used, we included: a measure of real exchange rate misalignment, in order to isolate the effect of overvalued or undervalued currencies on inflation; an alternative definition of the nominal exchange rate (the time deposit rate instead of the money market rate); an alternative definition of the independent variable (using inflation defined as $\pi/1+\pi$ to rule out outliers). In the three cases, we still find that less flexible regimes either show lower inflation than floats or bear no significant difference with them –in any case, it is not risky in terms of inflation to put in place a regime that is not a float. As for regression methods, we tried both static and dynamic methods, and used different lag structures for the instruments, and also a "collapsed" version of the instrument matrix, in order to avoid the

[24] We perform this test as the use of dummy variables implies that results depend on the category that is chosen as base –in our case, independently or freely floating arrangements. Detailed results are shown at the bottom of tables 5 to 7 (for the rest of the regressions, they are available on request).

problem of “too many instruments”. We also considered an alternative definition of the exchange rate (not as a dummy variable), and change the data frequency; the next two sections describe those results in detail.

III.7 Exchange rate regimes as “flexibility indices”

The number of observations for each country and category make estimation difficult for the 5-way classifications, especially in the unbalanced panel; that is why it is worth looking at an alternative way of including the exchange rate regime as regressor, by treating it not as dummy variable but as a categorical one that takes different numbers depending on the regime in place, i.e. as a “flexibility index”. This certainly imposes linearity on the relation between the nominal exchange rate arrangement and inflation, and it also deprives estimated coefficients from their interpretation as “marginal” effects; but it also allow us to regain degrees of freedom when less observations are available. We turn to this alternative definition of ER_{it} in (3) and (5) in what follows.

Exchange rate regimes measured through a “flexibility index” allow us to include not only the 5- or 6-way classification of LYS, IMF and RR, but also the RR “fine” one, with 15 alternatives (RR15)[25]. The baseline model (for all countries included in the sample) shows no relation between the index and inflation for LYS and IMF, while it reveals a positive association between flexibility and inflation for RR6 and RR15, which although it is, in general, limited to static models. When macroeconomic controls are included (table 11), less flexibility is associated to less inflation in LYS, RR6 and RR15, although this result is stronger for RR, as that in LYS corresponds only to static models. We inspect results for country groupings: in industrial countries, higher flexibility goes together with lower inflation (LYS and RR), a result that holds for static and dynamic models (with the exception of LYS in OLS). Instead, developing countries reveal the opposite relation: as the flexibility index decreases, less inflation shows up (LYS and RR). There is no model in which the IMF criterion delivers a significant relation between the exchange rate regime and inflation: deeds and outcomes go together, but there seems to be no room for words. The latter, of course, may have to do with the imposition of a linear relation between the variables of interest.

These results survive endogeneity controls as previously described: difference GMM models with all regressors treated as predetermined show that, for all countries, higher flexibility on the foreign exchange front translates into higher inflation (RR6). Country grouping still determines different outcomes: industrial countries have higher inflation when less flexible regimes than floats are in place (RR6 and RR15); in developing countries, in contrast, regimes that entail less flexibility than floats lead to lower inflation (LYS, RR6 and RR15).

Looking at the “unbalanced” panel to gain an idea of these relations for IT countries properly speaking (table 12), it is also the case that regimes that imply some degree of intervention in the foreign exchange market go together with lower inflation under the RR6, RR15 and LYS classifications (in the latter, results are limited to “static” models), while the opposite is true for the IMF criterion. In industrial countries, higher flexibility is linked to lower inflation according to the IMF classification,

[25] Only summarized results are included, detailed ones are available on request.

whereas the RR6 and LYS criteria indicate that as less flexible arrangements are implemented, lower inflation results. In turn, for developing countries, the IMF and RR classifications suggest that less flexibility goes hand in hand with lower inflation. When we control for endogeneity, only RR6 and RR15 still point towards a direct relation between flexibility and inflation. All in all, results for exchange rate regimes as flexibility indices are in line with what was found for exchange rate regime dummies.

III. 8 Models with quarterly data

The RR methodology provides not only annual but also monthly data. It is therefore possible to estimate models (3) and (5) on higher-frequency (quarterly) data for the RR "coarse" and "fine" classifications[26]. We first run the models using dummy variables (RR6), then go on to estimate coefficients for the flexibility indices (RR6 and RR15)[27].

The baseline model with dummy variables for all countries suggests that crawling peg regimes are associated to lower inflation than floats, while "freely falling" episodes imply higher inflation28 –the latter should be true by construction, as a regime is labeled "freely falling" when nominal depreciation and high inflation concur. When macroeconomic controls are included, pegged and managed floating arrangements display higher inflation than floats, and so do "freely falling" episodes. These effects, still, are linked to country grouping. Thus, in industrial countries, pegs, crawling pegs and managed floats entail higher inflation than floats; but in emerging economies, managed floats (and "freely falling" regimes) deliver higher inflation than floats, while crawling pegs appear linked to lower inflation. Thus, it seems that intermediate regimes are linked to lower inflation in industrial countries, but some of them (managed floating) to higher inflation in developing countries. This contrasts with results as discussed previously, and calls for further exploration; at this point, we may hypothesize that it is linked to what the RR classification measures above all –nominal exchange rate volatility. With higher frequency data, it may be that we are evaluating how short-term movements in the nominal exchange rate impact on prices, once other factors have been taken into account: this, not surprisingly, is almost invariably a positive impact (or pass through), as the more volatile is the nominal exchange rate, the more volatile prices are. Lower-frequency (annual) data may not be so suitable to capture pass through as quarterly data is, and this shows in our results.

Alternatively, we look at RR6 and RR15 flexibility indices for quarterly data. The baseline model yields a positive association between flexibility and inflation in both static and dynamic models (RR6 and RR15); these results are maintained even after the introduction of macroeconomic controls, and when the two different country groups are considered. It should be noted, however, that the positive relation between flexibility and inflation holds after endogeneity controls are included only in the case

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[26] Regression outputs are available from the authors on request. It is worth noting that, for models based on quarterly data, including up to the fourth lag of inflation in the independent variables seems a convenient choice in order to capture the dynamics of inflation; when we did this, results were largely in line with those presented in this section, where only one lag is included.

[27] We have estimated models (3) and (5) using quarterly data also for LYS and IMF, but we consider that their results are not particularly meaningful as these classifications are of annual frequency, and thus there is no further information on the dependent variable to be gained by using higher-frequency data.

[28] These two results are verified only in static models.

of developing countries. A possible rationalization for the pervasive presence of this association is that the inclusion of "freely falling" regimes, under the assumption of linearity between regimes and inflation, weighs on the estimated coefficient. Overall, the use of quarterly data confirms the findings of the previous sections using annual data.

IV. Concluding remarks

Using panel data from the 22 countries that have implemented inflation targeting from 1990 onwards, we have tested whether there is any relation between the nominal exchange rate regime and inflation, using three alternative classifications of foreign exchange arrangements and controlling for macroeconomic variables that are conventionally associated to inflation. Our overall findings indicate that:

a) the nominal exchange rate regime is associated to inflation in IT countries, depending on country grouping and foreign exchange classification adopted;

b) developing countries that adopt intermediate (and sometimes fixed) regimes tend to show less inflation than those which float freely; such regimes may deliver 2 to 3 p.p. less inflation per year than floats;

c) instead, intermediate regimes in industrial countries appear to be associated to higher inflation than floating schemes;

d) *de facto* classifications tend to imply an effect of the nominal exchange rate regime on inflation both for industrial and developing countries; but *de jure* criteria only entail such an effect, whenever it is found, for industrial ones. That is while "deeds" and "words" matter for inflation in industrial countries, it is only "deeds", and the "outcomes" going with them, that count for developing economies.

These findings were obtained for annual and quarterly data using different estimation methods and accounting for the dynamic features of our models, and are robust to endogeneity and alternative sample design –including the 22 countries in the sample during the whole period from 1990 to 2006, or including them only when they were effectively implementing IT. In addition, exchange rate regimes classifications were included both as dummy variables and as "flexibility indices".

Results in b) are partially in line with the literature that has attempted at evaluating the inflation performance of alternative exchange rate regimes; indeed, our paper has employed the framework they propose in order to make that evaluation. Thus, Ghosh et al. (1997), Levy-Yeyati and Sturzenegger (2001), and Alfaro (2003) find that pegs are associated to lower inflation than floats – something that, to a certain extent, is echoed by our results for IT developing countries[29]. What is new about our results is that, focusing on IT countries, intermediate regimes in developing economies may also go together with lower inflation than floating ones. We consider that our findings make a contribution in a field that is yet to be explored, as the literature on IT is relatively subdued when it

[29] The qualification is here in place: there is no such a thing as a conventional peg for IT countries, but, as section II showed, there is a variety of foreign exchange regimes in IT countries, somewhat far from the view that IT goes, always and everywhere, together with exchange rate flexibility.

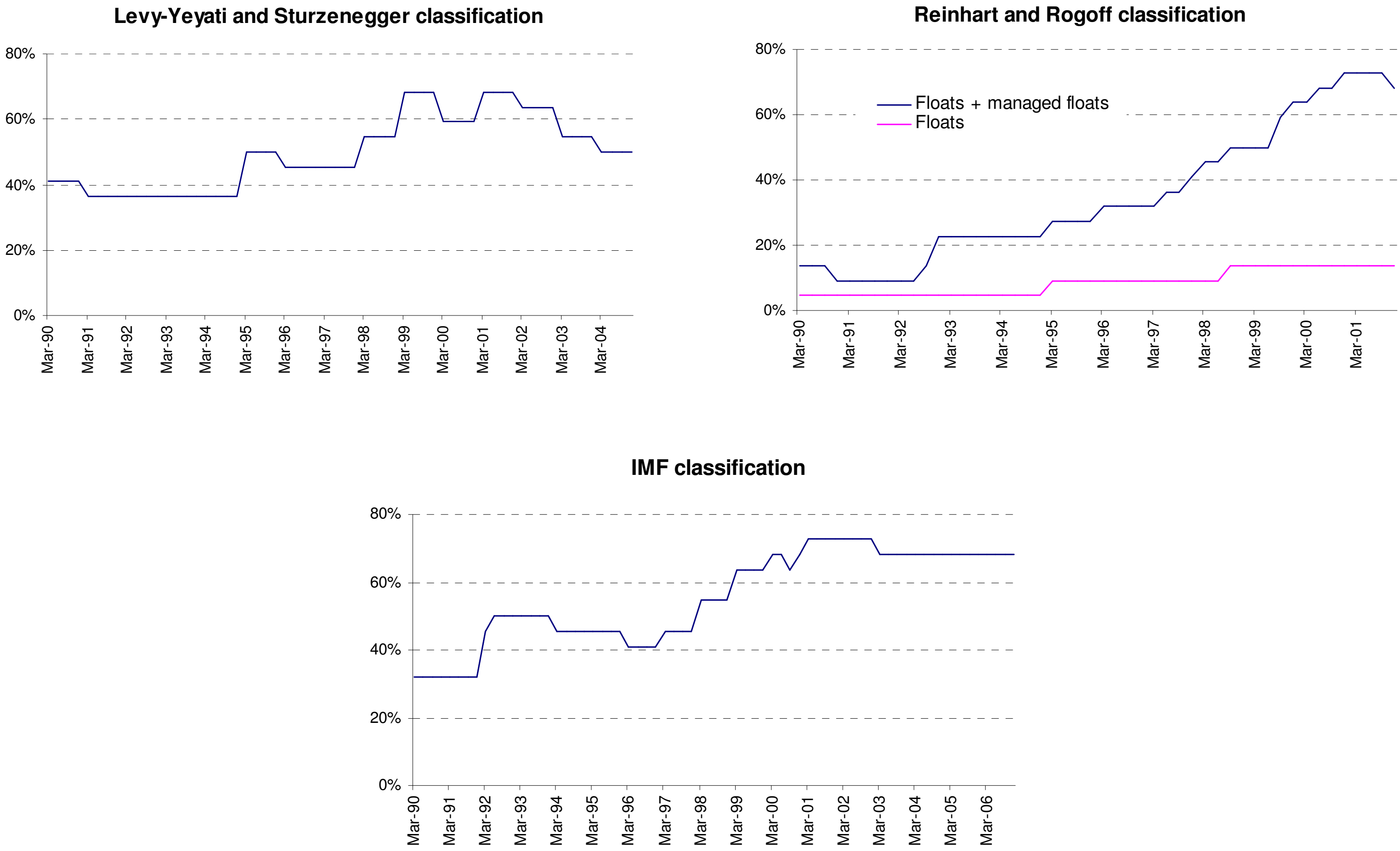
comes to foreign exchange policy -perhaps under the impression that any regime other than a float is not truly an inflation targeting one.

As noted elsewhere in the paper, our approach is a first approximation –still, to the best of our knowledge, a valid one. A number of extensions are in order. In the first place, we need a measure of exchange rate policy, but we only count on measures of foreign exchange regimes: it is a matter that goes beyond the scope of our study whether the three classifications employed are valid depictions of policy instead of mere statistics of nominal volatility[30]. As for the concrete way in which foreign exchange policy is implemented, one may wonder whether results change if interventions in the foreign exchange market are more or less systematic, or accompanied by sterilization policy. Regarding the methodology employed, alternatives could be explored: the structure of our panel might make it suitable to use pooled mean regression methods

We make no claims as regards policy recommendations –we are far from interpreting our results in normative terms. What we show is that, conditional on the method used to classify exchange rate regimes, there appears to be an effect of the nominal exchange rate regime on inflation performance in IT countries –and, in the case of developing economies, it runs contrary to the standard assumption of "dangerous liaisons" between exchange rate policy and inflation targeting. Thus, foreign exchange management by itself does not seem to be as risky for IT regimes as previously thought.

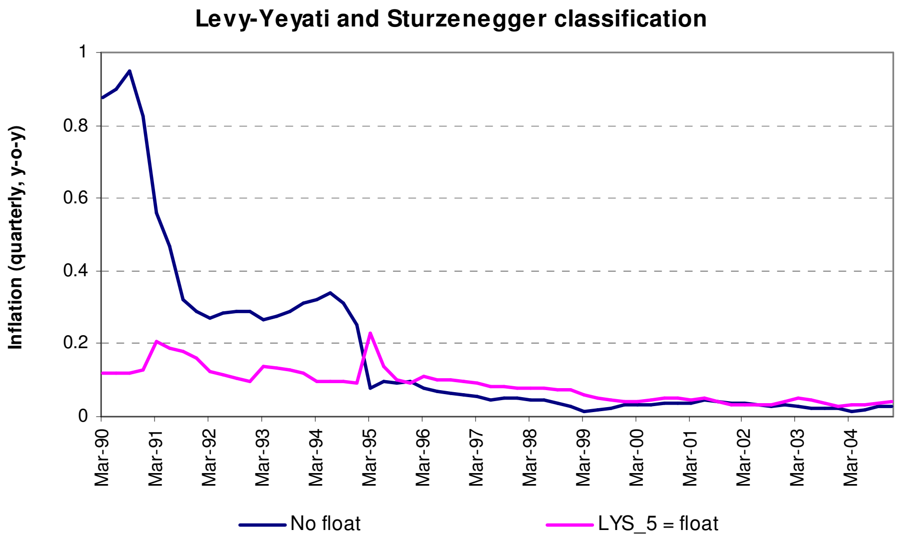
[30] Besides, at this point there is no way to distinguish, using these classifications, whether regimes that differ from independent floating are the result of interventions that intend to manage the level of the exchange rate or its volatility.

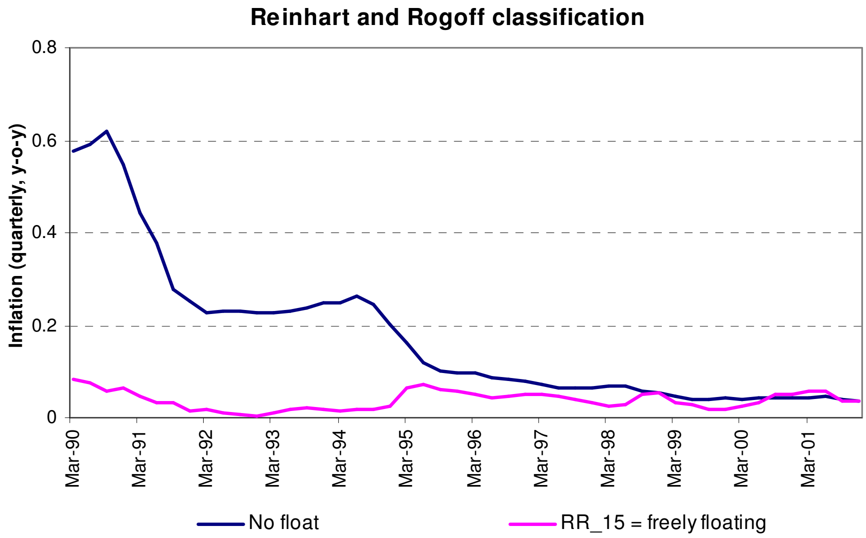
Figure 1. Share of floating regimes in inflation targeting countries, 1990-2006



Note: shares of observations of floating regimes over total number of countries at each point in time are calculated in the balanced panel

Figure 2. Inflation in floating and non-floating regimes (three classifications) (balanced panel)





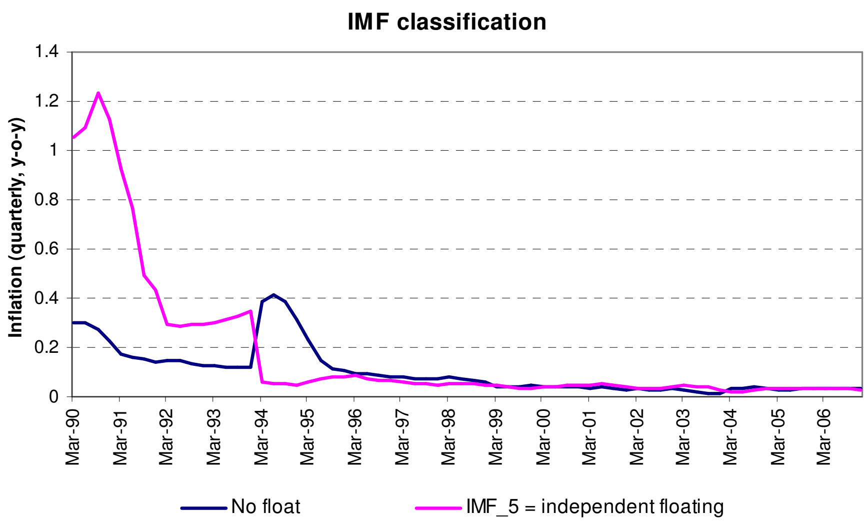
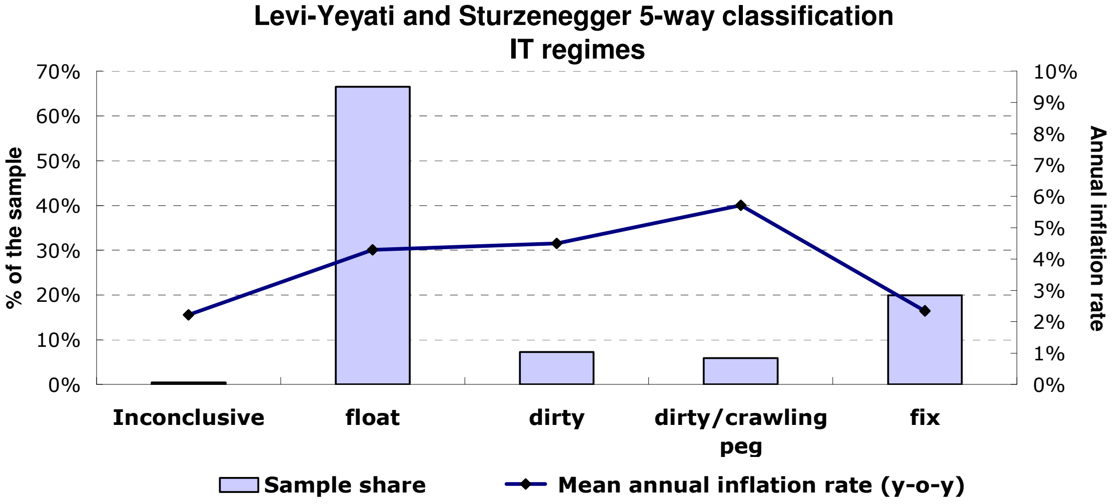
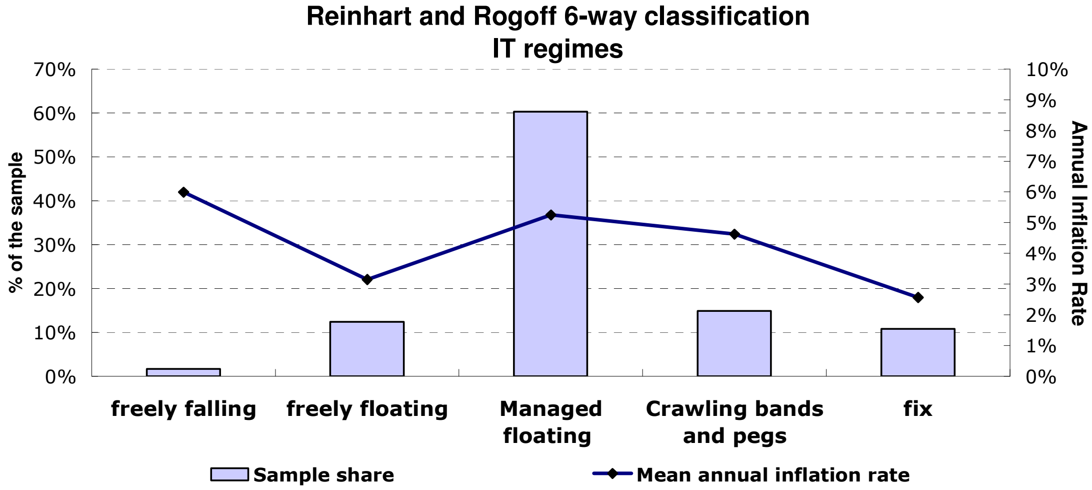


Figure 3. Nominal exchange rate regimes and inflation

(unbalanced panel - annual data)





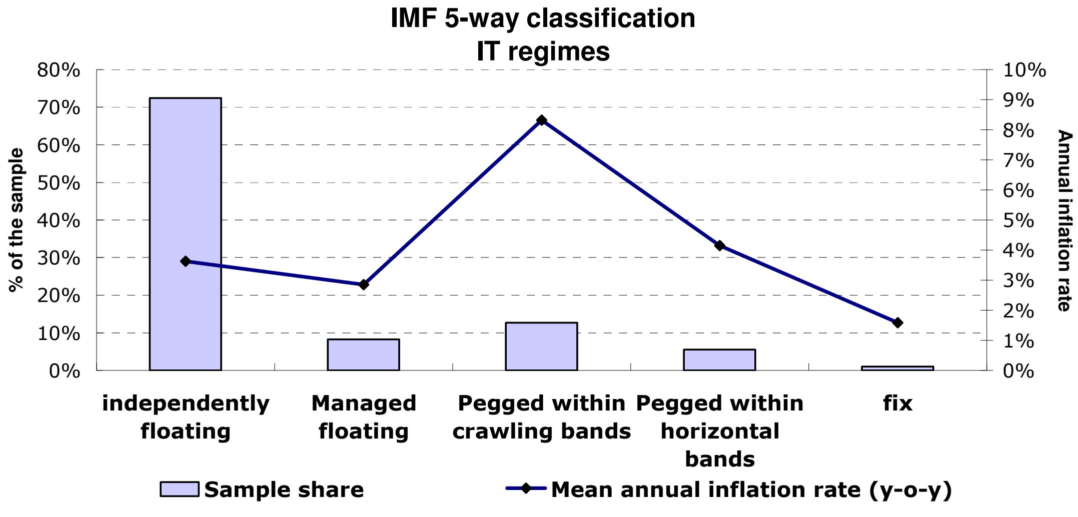


Table 1. Inflation Targeting countries and dates of adoption

	Country	Inflation Targeting Regime Adption date
Industrial Countries	Australia	1993Q2
	Canada	1991Q1
	Finland*	1993Q1
	Iceland	2001Q2
	New Zealand	1990Q1
	Norway	2001Q1
	Spain*	1994Q4
	Sweden	1993Q1
	United Kingdom	1992Q4
Developing Countries	Brazil	1999Q2
	Chile	1991Q1
	Colombia	1999Q3
	Czech Republic	1998Q1
	Hungary	2001Q2
	Israel	1992Q2
	Korea	1998Q1
	Mexico	1999Q1
	Peru	1994Q1
	Philippines	2002Q2
	Poland	1998Q4
	South Africa	1999Q1
	Thailand	2000Q2

* In 1998, the IT regime ended because of entry into European Monetary Union
Sources: Mishkin, Schmidt-Hebbel (2001), Stone (2005),Stone and Bundhia (2004)

Table 2. Foreign exchange regime and inflation, 1990-2006 – unbalanced panel

	Dominant Exchange Rate Regime (mode)			Annual average Inflation Rate
Country	LYS_5	RR_15	IMF_5	
Finland	***Fix***	***De facto peg***	Independently floating	1.23%
Sweden	Float	***Managed Floating***	Independently floating	1.45%
Norway	***Fix***	***Managed Floating***	Independently floating	1.85%
Canada	Float	***De facto Crawilng Band***	Independently floating	2.10%
New Zealand	***Fix***	***Managed Floating***	Independently floating	2.33%
Thailand	Float	***De facto peg***	***Managed floating***	2.51%
United Kingdom	Float	***Managed Floating***	Independently floating	2.60%
Australia	Float	Freely Floating	Independently floating	2.65%
Spain	***Fix***	***De facto peg***	***Pegged within horizontal bands***	3.09%
Korea	***Fix***	Freely Floating	Independently floating	3.29%
Czech Republic	Float	***Managed Floating***	***Managed floating***	3.33%
Poland	Float	***Managed Floating***	Independently floating	4.20%
Iceland	***Fix***	***Managed Floating***	Independently floating	4.64%
South Africa	Float	Freely Floating	Independently floating	5.11%
Philippines	Float	-	Independently floating	5.28%
Israel	Float	***De facto crawling band***	***Pegged within crawling bands***	5.88%
Hungary	Float	***Pre anounced crawling peg***	***Pegged within horizontal bands***	6.16%
Peru	Float	***De facto crawling band***	Independently floating	6.29%
Colombia	Float	***Managed Floating***	Independently floating	6.74%
Mexico	Float	***Managed Floating***	Independently floating	6.80%
Chile	Float	***Managed Floating***	Independently floating	7.01%
Brasil	***Dirty/Crawling peg***	***Managed Floating***	Independently floating	7.62%

The mode of the exchange rate regime is calculated over periods starting in 1990 and finishing in: 2001 (RR), 2004 (LYS) and 2006 (IMF). The average inflation rate is calculated over the whole 1990-2006 period, based on quarterly data.

Table 3. Changes in foreign exchange regimes

	LYS_5		
	mean	minimum	maximum
balanced panel	24%	0%	67%
unbalanced panel	22%	0%	80%

	IMF_5		
	mean	minimum	maximum
balanced panel	10%	0%	24%
unbalanced panel	10%	0%	30%

	RR_6		
	mean	minimum	maximum
balanced panel	13%	0%	27%
unbalanced panel	13%	0%	50%

Note: Each figure is calculated as the number of changes in foreign exchange regime over the total number of observations, for: a) mean: the whole sample; b) minimum: the country with the lowest number of changes; c) maximum: the country with the highest number of changes.

Table 4. Unit root tests

Balanced panel - Annual data: 1990 -2006

	Levin-Lin & Chu H_0: A common unit root process		Im, Pesaran & Shin H_0: An individual unit root process	
	Statistic[(1)]	Probability[(2)]	Statistic[(1)]	Probability[(2)]
Inflation	-526.884	0.000	-195.544	0.000

[(1)] Exogenous variables included: individual effects and individual linear trends

[(2)] Probabilities are computed assuming asympotic normality

Table 5.1 Regressions on the balanced panel (LYS, annual data)

Levy-Yeyati and Sturzenegger classification - All IT countries
Dependent variable: Annual inflation rate (t)
Balanced panel - Annual data: 1990 - 2004

Variables	Regressors treated as exogenous		Regressors endogenous according to GMM style				Instrumental variables for ER			
	Difference GMM		Difference GMM		System GMM		Difference GMM		System GMM	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Inflation (t-1)	0.486	0.050	0.488	0.026	0.419	0.041	0.480	-0.005	0.483	0.019
	(0.000)	(0.000)	(0.000)	(0.032)	(0.000)	(0.198)	(0.000)	(0.747)	(0.000)	(0.000)
LYS_3_intermediate	0.0887	-0.016	0.0325	-0.026	0.027	-0.021	0.426	-0.106	-0.016	-0.041
	(0.305)	(0.137)	(0.503)	(0.050)	(0.463)	(0.101)	(0.371)	(0.001)	(0.864)	(0.050)
LYS_3_fix	0.00986	-0.008	-0.0298	-0.027	-0.010	-0.023	-0.094	-0.031	0.065	-0.004
	(0.775)	(0.421)	(0.326)	(0.250)	(0.756)	(0.125)	(0.877)	(0.665)	(0.609)	(0.823)
Δ LM1		0.133		0.170		0.197		0.165		0.179
		(0.000)		(0.007)		(0.001)		(0.000)		(0.000)
Δ LGDP		-0.175		-0.330		-0.180		-0.488		-0.237
		(0.065)		(0.197)		(0.071)		(0.204)		(0.156)
L(1+NIR)		0.689		0.626		0.601		0.710		0.682
		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
OPENNESS		0.141		0.568		0.049		0.353		0.057
		(0.006)		(0.205)		(0.045)		(0.226)		(0.027)
Constant						-0.037				-0.039
						(0.028)				(0.054)
F-test for exchange regime[a]	2.37 (0.306)	3.23 (0.200)	2.75 (0.253)	3.87 (0.145)	0.93 (0.409)	1.56 (0.235)	14.34 (0.000)	14.29 (0.000)	0.53 (0.597)	2.36 (0.120)
A-B test for AR(2) in first difference[b]	-1.00 (0.317)	-1.03 (0.303)	-0.98 (0.328)	-0.66 (0.509)	-1.01 (0.312)	-1.20 (0.230)	-0.67 (0.504)	-1.76 (0.078)	-1.02 (0.310)	-1.32 (0.185)
Hansen test of overid. restrictions[c]			4.38 (0.625)	0.63 (0.999)	3.59 (0.936)	4.18 (0.994)	2.79 (0.835)	2.32 (0.985)	4.54 (0.716)	0.06 (1.000)
C test for a subset of orthogonality conditions[d]							0.15 (0.997)	n.a.	n.a.	n.a.
Number of instruments	18	22	22	27	26	35	22	29	24	35
Countries	22	22	22	22	22	22	22	22	22	22
Number of obs.	282	251	282	251	304	273	252	231	274	253

Table 5.2 Regressions on the balanced panel, industrial countries (LYS, annual data)

Levy-Yeyati and Sturzenegger classification - Industrial IT countries
Dependent variable: Annual inflation rate (t)
Balanced panel - Annual data: 1990 - 2004

Variables	Regressors treated as exogenous		Regressors endogenous according to GMM style				Instrumental variables for ER			
	Difference GMM		Difference GMM		System GMM		Difference GMM		System GMM	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Inflation (t-1)	0.426	0.561	0.433	0.277	0.430	0.278	0.500	0.243	0.467	0.364
	(0.000)	(0.023)	(0.000)	(0.002)	(0.002)	(0.031)	(0.000)	(0.026)	(0.002)	(0.049)
LYS_3_intermediate	0.001	0.002	0.011	0.004	0.002	0.003	0.028	0.001	0.018	0.001
	(0.928)	(0.745)	(0.149)	(0.525)	(0.801)	(0.717)	(0.261)	(0.943)	(0.397)	(0.917)
LYS_3_fix	0.008	0.008	0.003	0.011	0.006	0.006	0.002	-0.002	-0.003	-0.005
	(0.000)	(0.000)	(0.541)	(0.033)	(0.197)	(0.068)	(0.860)	(0.722)	(0.328)	(0.159)
Δ LM1		-0.024		-0.031		-0.009		-0.016		0.011
		(0.427)		(0.168)		(0.723)		(0.500)		(0.712)
Δ LGDP		-0.038		0.066		-0.051		0.006		-0.023
		(0.637)		(0.583)		(0.519)		(0.959)		(0.739)
L(1+NIR)		-0.110		0.185		0.270		0.251		0.307
		(0.672)		(0.172)		(0.020)		(0.058)		(0.023)
OPENNESS		0.084		-0.130		-0.002		-0.070		-0.020
		(0.063)		(0.161)		(0.949)		(0.510)		(0.128)
Constant					0.004	0.002			0.007	0.009
					(0.454)	(0.918)			(0.311)	(0.446)
F-test for exchange regime[a]	13.35 (0.001)	15.58 (0.000)	2.61 (0.271)	4.69 (0.096)	0.36 (0.709)	2.94 (0.110)	1.78 (0.412)	0.13 (0.938)	1.07 (0.389)	1.30 (0.325)
A-B test for AR(2) in first difference[b]	0.59 (0.552)	0.66 (0.506)	0.69 (0.489)	0.68 (0.494)	0.77 (0.439)	1.04 (0.298)	0.34 (0.733)	1.18 (0.237)	0.71 (0.475)	1.14 (0.254)
Hansen test of overid. restrictions[c]			0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)
C test for a subset of orthogonality conditions[d]							n.a.	n.a.	n.a.	n.a.
Number of instruments	18	22	22	27	20	35	22	29	26	35
Countries	9	9	9	9	9	9	9	9	9	9
Number of obs.	117	108	117	108	126	117	99	98	108	107

The regressions presented refer to those from the one step.
All models include time dummy variables. P-values in parenthesis.
[a] *H0: The exchange regime has no effect on inflation.*
[b] *H0: There is no second-order serial correlation for the disturbances on the first difference equation.*
[c] *H0: The set of instruments is valid (evaluated on the second step).*
[d] *H0: The subset of instruments for ER is valid.*

Table 5.3 Regressions on the balanced panel, developing countries (LYS, annual data)

Levy-Yeyati and Sturzenegger classification - Developing IT countries

Dependent variable: Annual inflation rate (t)

Balanced panel - Annual data: 1990 - 2004

Variables	Regressors treated as exogenous		Regressors endogenous according to GMM style				Instrumental variables for ER			
	Difference GMM		Difference GMM		System GMM		Difference GMM		System GMM	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Inflation (t-1)	0.493	0.038	0.495	0.016	0.411	0.033	0.469	-0.021	0.469	0.010
	(0.000)	(0.000)	(0.000)	-(0.113)	(0.000)	(0.183)	(0.000)	(0.255)	(0.000)	(0.178)
LYS_3_intermediate	0.100	-0.028	0.025	-0.043	0.027	-0.036	0.557	-0.139	0.100	-0.065
	(0.314)	(0.141)	(0.656)	(0.006)	(0.499)	(0.065)	(0.333)	(0.000)	(0.467)	(0.006)
LYS_3_fix	0.006	-0.018	0.656	0.022	-0.036	-0.042	0.011	-0.070	0.142	-0.064
	(0.904)	(0.238)	(0.299)	(0.375)	(0.283)	(0.102)	(0.986)	(0.334)	(0.400)	(0.149)
Δ LM1		0.146		0.218		0.225		0.178		0.196
		(0.001)		(0.002)		(0.001)		(0.000)		(0.000)
Δ LGDP		0.305		-0.447		-0.326		-0.563		-0.301
		(0.055)		(0.011)		(0.022)		(0.014)		(0.017)
L(1+NIR)		0.674		0.586		0.583		0.699		0.671
		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
OPENNESS		0.168		0.556		0.078		0.443		0.059
		(0.017)		(0.040)		(0.017)		(0.285)		(0.077)
Constant					0.015	-0.049			-0.024	-0.027
					(0.317)	(0.048)			(0.621)	(0.409)
F-test for exchange regime[a]	3.01 (0.222)	2.18 (0.337)	1.65 (0.437)	8.20 (0.017)	1.05 (0.380)	2.33 (0.140)	15.68 (0.000)	18.13 (0.000)	0.53 (0.601)	5.70 (0.018)
A-B test for AR(2) in first difference[b]	-1.02 (0.307)	-1.02 (0.307)	-1.01 (0.312)	-1.02 (0.309)	-1.05 (0.295)	-1.24 (0.216)	-0.81 (0.417)	-1.60 (0.110)	-1.13 (0.259)	-1.25 (0.212)
Hansen test of overid. restrictions[c]			0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)
C test for a subset of orthogonality conditions[d]							n.a.	n.a.	n.a.	n.a.
Number of instruments	18	22	22	27	26	35	22	29	24	35
Countries	13	13	13	13	13	13	13	13	13	13
Number of obs.	165	143	165	143	178	156	153	133	166	146

Table 6.1 Regressions on the balanced panel (IMF, annual data)

IMF classification - All IT countries

Dependent variable: Annual inflation rate (t)

Balanced panel - Annual data: 1990 - 2006

Variables	Regressors treated as exogenous		Regressors endogenous according to GMM style				Instrumental variables for ER			
	Difference GMM		Difference GMM		System GMM		Difference GMM		System GMM	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Inflation (t-1)	0.492	0.054	0.498	0.037	0.440	0.043	0.416	0.034	0.480	0.026
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.134)	(0.001)	(0.000)	(0.000)	(0.001)
IMF_3_intermediate	0.00643	-0.011	0.0385	0.015	0.023	0.022	-1.002	-0.046	-0.035	-0.014
	(0.550)	(0.242)	(0.266)	(0.294)	(0.344)	(0.199)	(0.028)	(0.277)	(0.758)	(0.573)
IMF_3_fix	0.0132	0.021	0.0742	0.027	0.119	0.024	0.433	0.114	0.167	0.063
	(0.741)	(0.143)	(0.409)	(0.270)	(0.370)	(0.209)	(0.835)	(0.119)	(0.564)	(0.527)
ΔLM1		0.125		0.177		0.204		0.168		0.184
		(0.001)		(0.002)		(0.000)		(0.001)		(0.000)
Δ LGDP		-0.134		-0.187		-0.150		-0.141		-0.130
		(0.094)		(0.330)		(0.068)		(0.302)		(0.375)
L(1+NIR)		0.691		0.626		0.594		0.672		0.663
		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
OPENNESS		0.137		0.346		0.049		0.157		0.036
		(0.003)		(0.289)		(0.096)		(0.012)		(0.109)
Constant						-0.056				-0.039
						(0.011)				(0.020)
F-test for exchange regime[a]	0.37 (0.836)	6.27 (0.043)	1.24 (0.538)	1.61 (0.448)	0.57 (0.576)	2.19 (0.136)	8.47 (0.015)	2.45 (0.294)	0.20 (0.822)	0.23 (0.794)
A-B test for AR(2) in first difference[b]	-0.97 (0.331)	-1.21 (0.227)	-0.96 (0.336)	-0.85 (0.393)	-1.01 (0.311)	-1.35 (0.178)	0.83 (0.407)	-1.36 (0.174)	-1.11 (0.267)	-1.01 (0.310)
Hansen test of overid. restrictions[c]			3.57 (0.735)	2.60 (0.920)	3.85 (0.921)	0.00 (1.000)	1.21 (0.976)	1.16 (0.999)	4.06 (0.773)	0.00 (1.000)
C test for a subset of orthogonality conditions[d]							n.a.	n.a.	n.a.	n.a.
Number of instruments	20	23	24	28	28	36	24	30	26	36
Countries	22	22	22	22	22	22	22	22	22	22
Number of obs.	326	268	326	268	348	290	281	247	303	269

The regressions presented refer to those from the one step.

All models include time dummy variables. P-values in parenthesis.

[a] *H0: The exchange regime has no effect on inflation.*

[b] *H0: There is no second-order serial correlation for the disturbances on the first difference equation.*

[c] *H0: The set of instruments is valid (evaluated on the second step).*

[d] *H0: The subset of instruments for ER is valid.*

Table 6.2 Regressions on the balanced panel, industrial countries (IMF, annual data)

IMF classification - Industrial IT countries
Dependent variable: Annual inflation rate (t)
Balanced panel - Annual data: 1990 - 2006

Variables	Regressors treated as exogenous		Regressors endogenous according to GMM style				Instrumental variables for ER			
	Difference GMM		Difference GMM		System GMM		Difference GMM		System GMM	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Inflation (t-1)	0.410	0.490	0.381	0.374	0.410	0.264	0.514	0.213	0.429	0.380
	(0.000)	(0.040)	(0.000)	(0.011)	(0.004)	(0.018)	(0.000)	(0.042)	(0.013)	(0.021)
IMF_3_intermediate	0.00521	0.006	0.0116	0.023	0.003	0.010	-0.008	0.017	0.001	0.008
	(0.360)	(0.348)	(0.218)	(0.232)	(0.555)	(0.066)	(0.673)	(0.161)	(0.911)	(0.129)
IMF_3_fix	0.0105	0.011	0.0104	0.020	-0.007	0.015	0.012	0.001	-0.013	0.000
	(0.341)	(0.327)	(0.401)	(0.432)	(0.388)	(0.135)	(0.823)	(0.952)	(0.160)	(0.961)
Δ LM1		-0.015		-0.102		0.009		-0.025		0.006
		(0.573)		(0.091)		(0.729)		(0.399)		(0.828)
Δ LGDP		-0.030		-0.361		-0.006		-0.032		-0.006
		(0.718)		(0.350)		(0.941)		(0.824)		(0.947)
L(1+NIR)		-0.036		0.107		0.256		0.208		0.231
		(0.895)		(0.407)		(0.013)		(0.197)		(0.041)
OPENNESS		0.083		0.366		-0.035		-0.041		-0.030
		(0.086)		(0.362)		(0.261)		(0.699)		(0.126)
Constant					0.023	0.022			0.019	0.017
					(0.005)	(0.154)			(0.001)	(0.028)
F-test for exchange regime[a]	0.95 (0.623)	1.05 (0.593)	2.15 (0.341)	1.67 (0.434)	1.77 (0.231)	2.43 (0.150)	0.64 (0.725)	2.92 (0.232)	1.38 (0.306)	1.44 (0.292)
A-B test for AR(2) in first difference[b]	1.11 (0.268)	0.97 (0.334)	1.00 (0.317)	1.22 (0.221)	0.87 (0.382)	-1.01 (0.313)	0.90 (0.368)	0.91 (0.362)	0.67 (0.501)	0.95 (0.344)
Hansen test of overid. restrictions[c]			0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)
C test for a subset of orthogonality conditions[d]							n.a.	n.a.	n.a.	n.a.
Number of instruments	20	23	24	28	28	36	24	30	26	36
Countries	9	9	9	9	9	9	9	9	9	9
Number of obs.	135	112	135	112	144	121	107	101	116	110

Table 6.3 Regressions on the balanced panel,developing countries (IMF, annual data)

IMF classification - Developing IT countries
Dependent variable: Annual inflation rate (t)
Balanced panel - Annual data: 1990 - 2006

Variables	Regressors treated as exogenous		Regressors endogenous according to GMM style				Instrumental variables for ER			
	Difference GMM		Difference GMM		System GMM		Difference GMM		System GMM	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Inflation (t-1)	0.486	0.041	0.500	0.030	0.431	0.040	0.302	0.021	0.456	0.025
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.102)	(0.000)	(0.000)	(0.000)	(0.001)
IMF_3_intermediate	-0.0335	-0.028	0.002	-0.013	0.006	0.012	-0.928	-0.077	-0.115	0.007
	(0.244)	(0.106)	(0.970)	(0.643)	(0.827)	(0.462)	(0.003)	(0.156)	(0.484)	(0.652)
IMF_3_fix	-0.194	-0.038	0.001	-0.016	0.065	-0.009	-2.385	-0.345	-0.052	-0.048
	(0.183)	(0.376)	(0.990)	(0.760)	(0.590)	(0.737)	(0.110)	(0.368)	(0.835)	(0.395)
Δ LM1		0.138		0.229		0.224		0.194		0.202
		(0.008)		(0.014)		(0.002)		(0.008)		(0.000)
Δ LGDP		-0.172		-0.372		-0.286		-0.096		-0.167
		(0.078)		(0.128)		(0.032)		(0.203)		(0.200)
L(1+NIR)		0.672		0.550		0.574		0.616		0.640
		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
OPENNESS		0.152		0.762		0.088		0.243		0.094
		(0.002)		(0.153)		(0.019)		0.047)		(0.022)
Constant					0.017	-0.080			-0.639	-0.088
					(0.094)	(0.007)			(0.000)	(0.004)
F-test for exchange regime[a]	1.79 (0.410)	4.14 (0.126)	0.00 (0.999)	0.22 (0.897)	1.04 (0.383)	0.46 (0.645)	12.38 (0.002)	2.07 (0.355)	0.55 (0.596)	0.40 (0.677)
A-B test for AR(2) in first difference[b]	-1.00 (0.316)	-1.43 (0.152)	-1.02 (0.309)	-0.78 (0.437)	-1.06 (0.290)	-1.75 (0.079)	-0.04 (0.969)	0.02 (0.984)	-1.24 (0.214)	-0.83 (0.408)
Hansen test of overid. restrictions[c]			0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)
C test for a subset of orthogonality conditions[d]							n.a.	n.a.	n.a.	n.a.
Number of instruments	20	23	24	28	22	25	24	30	26	36
Countries	13	13	13	13	13	13	13	13	13	13
Number of obs.	191	156	191	156	204	169	174	146	187	159

The regressions presented refer to those from the one step.
All models include time dummy variables. P-values in parenthesis.
[a] *H0: The exchange regime has no effect on inflation.*
[b] *H0: There is no second-order serial correlation for the disturbances on the first difference equation.*
[c] *H0: The set of instruments is valid (evaluated on the second step).*
[d] *H0: The subset of instruments for ER is valid.*

Table 7.1 Regressions on the balanced panel (RR, annual data)

Reinhart and Rogoff classification - All IT countries
Dependent variable: Annual inflation rate (t)
Balanced panel - Annual data: 1990 - 2004

Variables	Regressors treated as exogenous		Regressors endogenous according to GMM style				Instrumental variables for ER			
	Difference GMM		Difference GMM		System GMM		Difference GMM		System GMM	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Inflation (t-1)	0.383	0.055	0.443	0.036	0.400	0.046	0.295	0.027	0.264	0.026
	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.094)	(0.013)	(0.000)	(0.202)	(0.000)
RR_6_peg	-0.137	0.002	-0.303	0.041	-0.056	-0.022	5.948	-0.104	1.762	0.131
	(0.113)	(0.787)	(0.168)	(0.613)	(0.146)	(0.221)	(0.515)	(0.418)	(0.381)	(0.140)
RR_6_crawling_peg	-0.226	-0.003	-0.241	0.040	-0.075	-0.020	4.510	-0.043	0.215	0.010
	(0.149)	(0.643)	(0.248)	(0.595)	(0.312)	(0.378)	(0.501)	(0.662)	(0.776)	(0.779)
RR_6_managed floating	-0.095	0.006	-0.208	0.034	-0.010	0.010	4.441	-0.044	0.524	0.027
	(0.082)	(0.258)	(0.263)	(0.630)	(0.610)	(0.252)	(0.502)	(0.643)	(0.383)	(0.286)
RR_6_freely falling	0.150	-0.018	-0.064	-0.001	0.041	0.027	5.591	-0.057	1.034	-0.073
	(0.173)	(0.159)	(0.582)	(0.986)	(0.518)	(0.573)	(0.447)	(0.609)	(0.373)	(0.152)
RR_6_parallel market data missing	-0.048	0.012	-0.086	0.045	-0.033	0.059	4.480	0.047	1.336	0.146
	(0.523)	(0.307)	(0.566)	(0.366)	(0.691)	(0.029)	(0.509)	(0.652)	(0.484)	(0.032)
Δ LM1		0.116		0.147		0.197		0.110		0.196
		(0.000)		(0.007)		(0.001)		(0.000)		(0.032)
Δ LGDP		-0.151		-0.270		-0.105		-0.047		-0.355
		(0.082)		(0.327)		(0.440)		(0.778)		(0.158)
L(1+NIR)		0.704		0.661		0.583		0.732		0.685
		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
OPENNESS		0.152		0.469		0.054		0.094		0.069
		(0.014)		(0.176)		(0.028)		(0.429)		(0.087)
Constant					0.033	-0.057			-0.297	-0.071
					(0.089)	(0.003)			(0.457)	(0.031)
F-test for exchange regime[a]	4.65 (0.461)	6.49 (0.261)	3.63 (0.603)	17.38 (0.004)	0.76 (0.587)	5.00 (0.004)	4.14 (0.530)	20.94 (0.001)	0.47 (0.793)	4.30 (0.008)
A-B test for AR(2) in first difference[b]	-1.04 (0.298)	-1.04 (0.267)	-1.99 (0.364)	-0.82 (0.413)	-1.04 (0.297)	-1.34 (0.180)	-0.02 (0.982)	-1.12 (0.264)	-0.88 (0.381)	-1.17 (0.242)
Hansen test of overid. restrictions[c]			1.77 (1.000)	0.00 (1.000)	4.28 (1.000)	0.00 (1.000)	1.11 (0.774)	0.00 (1.000)	0.24 (0.993)	0.00 (1.000)
C test for a subset of orthogonality conditions[d]							n.a.	n.a.	n.a.	n.a.
Number of instruments	21	25	31	33	38	44	22	29	24	35
Countries	22	22	22	22	22	22	22	22	22	22
Number of obs.	282	251	282	251	304	273	252	231	274	253

Table 7.2 Regressions on the balanced panel, industrial countries (RR, annual data)

Reinhart and Rogoff classification - Industrial IT countries
Dependent variable: Annual inflation rate (t)
Balanced panel - Annual data: 1990 - 2004

Variables	Regressors treated as exogenous		Regressors endogenous according to GMM style				Instrumental variables for ER			
	Difference GMM		Difference GMM		System GMM		Difference GMM		System GMM	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Inflation (t-1)	0.512	0.639	0.346	0.249	0.436	0.251	0.476	0.193	0.561	0.336
	(0.001)	(0.085)	(0.000)	(0.069)	(0.000)	(0.058)	(0.008)	(0.083)	(0.034)	(0.035)
RR_6_peg	0.010	0.012	0.0441	0.033	0.004	0.012	0.102	0.031	0.013	0.022
	(0.428)	(0.364)	(0.330)	(0.487)	(0.566)	(0.109)	(0.261)	(0.478)	(0.325)	(0.126)
RR_6_crawling_peg	-0.004	-0.004	0.041	0.029	0.007	0.019	0.115	0.014	-0.007	0.021
	(0.634)	(0.756)	(0.406)	(0.535)	(0.319)	(0.047)	(0.204)	(0.814)	(0.555)	(0.069)
RR_6_managed floating	0.007	0.008	0.0214	0.012	0.003	0.013	0.090	-0.001	0.001	0.012
	(0.239)	(0.368)	(0.641)	(0.761)	(0.491)	(0.148)	(0.235)	(0.984)	(0.828)	(0.132)
Ξ LM1		-0.021		-0.049		0.006		-0.026		0.006
		(0.422)		(0.222)		(0.836)		(0.371)		(0.860)
Ξ LGDP		-0.063		-0.077		-0.008		-0.101		0.039
		(0.464)		(0.573)		(0.906)		(0.520)		(0.686)
L(1+NIR)		-0.111		0.112		0.326		0.239		0.244
		(0.688)		(0.518)		(0.004)		(0.277)		(0.047)
OPENNESS		0.097		-0.049		-0.058		0.003		-0.060
		(0.019)		(0.568)		(0.052)		(0.969)		(0.013)
Constant					0.004	0.018			0.008	0.020
					(0.419)	(0.114)			(0.407)	(0.089)
F-test for exchange regime[a]	3.85 (0.278)	3.77 (0.287)	32.70 (0.000)	3.05 (0.384)	0.55 (0.660)	2.19 (0.167)	1.99 (0.574)	2.50 (0.475)	1.01 (0.438)	2.12 (0.176)
A-B test for AR(2) in first difference[b]	0.92 (0.358)	0.92 (0.356)	0.41 (0.679)	1.11 (0.269)	0.80 (0.424)	0.99 (0.324)	0.39 (0.698)	1.24 (0.216)	0.86 (0.391)	0.95 (0.340)
Hansen test of overid. restrictions[c]			0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)
C test for a subset of orthogonality conditions[d]							n.a.	n.a.	n.a.	n.a.
Number of instruments	19	23	25	29	30	38	22	26	24	35
Countries	9	9	9	9	9	9	9	9	9	9
Number of obs.	117	108	117	108	126	117	99	98	108	107

The regressions presented refer to those from the one step.
All models include time dummy variables. P-values in parenthesis.
[a] *H0: The exchange regime has no effect on inflation.*
[b] *H0: There is no second-order serial correlation for the disturbances on the first difference equation.*
[c] *H0: The set of instruments is valid (evaluated on the second step).*
[d] *H0: The subset of instruments for ER is valid.*

Table 7.3 Regressions on the balanced panel, developing countries (RR, annual data)

Reinhart and Rogoff classification - Developing IT countries
Dependent variable: Annual inflation rate (t)
Balanced panel - Annual data: 1990 - 2004

Variables	Regressors treated as exogenous		Regressors endogenous according to GMM style				Instrumental variables for ER			
	Difference GMM		Difference GMM		System GMM		Difference GMM		System GMM	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Inflation (t-1)	0.378	0.049	0.459	0.028	0.395	0.044	0.284	0.031	0.356	0.024
	(0.000)	(0.000)	(0.000)	(0.011)	(0.000)	(0.104)	(0.000)	(0.011)	(0.001)	(0.001)
RR_6_peg	-0.189	-0.009	-0.221	0.035	-0.076	-0.044	1.469	-0.029	0.546	0.107
	(0.107)	(0.421)	(0.090)	(0.712)	(0.216)	(0.053)	(0.781)	(0.757)	(0.720)	(0.189)
RR_6_crawling_peg	-0.298	0.007	-0.139	0.024	-0.097	-0.009	0.477	0.015	0.017	0.035
	(0.130)	(0.403)	(0.263)	(0.755)	(0.372)	(0.731)	(0.886)	(0.835)	(0.935)	(0.371)
RR_6_managed floating	-0.109	0.004	-0.113	0.036	0.007	0.008	1.299	0.077	0.006	0.036
	(0.062)	(0.593)	(0.286)	(0.650)	(0.751)	(0.570)	(0.691)	(0.347)	(0.958)	(0.304)
RR_6_freely falling	0.108	-0.027	-0.002	-0.005	0.042	0.019	1.543	0.057	0.596	0.045
	(0.210)	(0.069)	(0.980)	(0.925)	(0.532)	(0.636)	(0.667)	(0.521)	(0.304)	(0.691)
RR_6_parallel market data missing	-0.145	-0.005	-0.0723	0.023	-0.035	0.043	1.089	0.203	0.026	0.199
	(0.300)	(0.663)	(0.585)	(0.627)	(0.688)	(0.048)	(0.777)	(0.038)	(0.951)	(0.012)
Ξ LM1		0.114		0.203		0.192		0.128		0.235
		(0.000)		(0.013)		(0.003)		(0.010)		(0.041)
Ξ LGDP		-0.264		-0.411		-0.151		0.163		-0.078
		(0.054)		(0.120)		(0.356)		(0.598)		(0.675)
L(1+NIR)		0.703		0.596		0.593		0.699		0.636
		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
OPENNESS		0.183		0.657		0.073		0.127		0.090
		(0.013)		(0.085)		(0.056)		(0.290)		(0.048)
Constant					0.024	-0.069			0.018	-0.112
					(0.189)	(0.020)			(0.827)	(0.015)
F-test for exchange regime[a]	5.15 (0.398)	23.38 (0.000)	4.29 (0.509)	4.56 (0.472)	1.03 (0.443)	4.37 (0.017)	4.70 (0.454)	19.08 (0.002)	0.63 (0.683)	5.18 (0.009)
A-B test for AR(2) in first difference[b]	-1.09 (0.277)	-1.11 (0.266)	-1.02 (0.306)	-0.84 (0.403)	-1.08 (0.281)	-1.52 (0.127)	-0.63 (0.529)	-0.92 (0.359)	0.82 (0.411)	-1.21 (0.226)
Hansen test of overid. restrictions[c]			0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)	0.00 (1.000)
C test for a subset of orthogonality conditions[d]							n.a.	n.a.	n.a.	n.a.
Number of instruments	21	25	31	33	38	44	22	29	24	35
Countries	13	13	13	13	13	13	13	13	13	13
Number of obs.	165	143	165	143	178	156	153	133	166	146

The regressions presented refer to those from the one step.
All models include time dummy variables. P-values in parenthesis.
[a] *H0: The exchange regime has no effect on inflation.*
[b] *H0: There is no second-order serial correlation for the disturbances on the first difference equation.*
[c] *H0: The set of instruments is valid (evaluated on the second step).*
[d] *H0: The subset of instruments for ER is valid.*

Table 8. Summarized results – 3-way classifications – balanced panel

Foreign Exchange Regime three way classifications: float, intermediate and fix(1)					
Balanced panel for the models with macroeconomic controls					
	Regressors treated as exogenous	Regressors endogenous according to GMM style		Instrumental variables for ER	
	Difference GMM	Difference GMM	System GMM	Difference GMM	System GMM
All IT countries(2)		LYS_inter = -0.026**	LYS_inter = -0.021*	LYS_inter = -0.106***	LYS_inter = -0.041**
IT Industrial countries(2)	LYS_fix = 0.008***	LYS_fix = 0.011**	LYS_fix = 0.006* IMF_inter = 0.010*		
IT Developing countries(2)		LYS_inter = -0.043***	LYS_inter = -0.036* LYS_fix = -0.042*	LYS_inter = -0.139***	LYS_inter = -0.065***

(1) In all regressions the omitted variable is the float classification.
(2) ***, **, * represent significance at 1%, 5% and 10 % levels.

Table 9. Summarized results – 5/ 6-way classifications – balanced panel

Foreign Exchange Regime: 5 or 6 way classifications(1) (2)					
Balanced panel for the models with macroeconomic controls					
	Regressors treated as exogenous	Regressors endogenous according to GMM style		Instrumental variables for ER	
	Difference GMM	Difference GMM	System GMM	Difference GMM	System GMM
All IT countries(3)	IMF_bands= -0.013* IMF_peg= 0.026*	LYS_dirty= -0.032**	LYS_dirty= -0.037**	LYS_dirty= -0.261** LYS_dirty/crawling peg= -0.102*	LYS_dirty= -0.099** LYS_dirty/crawling peg= -0.035**
IT Industrial countries(3)	LYS_fix= 0.007***	LYS_dirty/crawling peg= 0.015* LYS_fix= 0.010*	IMF_managed floating= 0.016*** RR_crawling peg= 0.019**		RR_crawling peg= 0.021*
IT Developing countries(3)		LYS_dirty= -0.056* LYS_dirty/crawling peg= -0.037***	LYS_dirty= -0.057* LYS_fix= -0.043* RR_peg= -0.044**	LYS_dirty= -0.344** LYS_dirty/crawling peg= -0.173***	LYS_dirty= -0.116** LYS_dirty/crawling peg= -0.057*** LYS_fix= -0.072*

(1) See Annex for details of each classification
(2) In all regressions the omitted variable is the float classification
(3) ***, **, * represent significance at 1%, 5% and 10 % levels

Table 10. Summarized results – 5/ 6-way classifications – unbalanced panel

Foreign Exchange Regime: 5 or 6 way classifications[1] [2]					
Unbalanced panel for the models with macroeconomic controls					
	Regressors treated as exogenous	Regressors endogenous according to GMM style		Instrumental variables for ER	
	Difference GMM	Difference GMM	System GMM	Difference GMM	System GMM
All IT countries[3]	LYS_dirty= -0.012*** IMF_managed floating= -0.010** IMF_bands= -0.016*** IMF_horizontal bands= 0.019*** RR_peg= -0.034**	RR_peg= -0.193**	LYS_dirty= -0.018* LYS_dirty/crawling= 0.012** RR_peg= -0.018*	RR_peg= -0.064***	LYS_dirty/crawling= 0.035** RR_peg= -0.032**
IT Industrial countries[3]	LYS_fix= -0.007* IMF_horizontal_bands= 0.018***	LYS_fix= -0.022*			LYS_fix= -0.006*
IT Developing countries[3]	LYS_fix= -0.016** IMF_managed floating= -0.015*** RR_managed floating= -0.014*** RR_peg= -0.034***	LYS_dirty= -0.041** RR_peg= -0.061***	LYS_dirty= -0.031***	RR_peg= -0.076***	LYS_dirty= -0.029** LYS_fix= 0.019* RR_peg= -0.053**

(1) See Annex for details of each classification

(2) In all regressions the omitted variable is the float classification

(3) ***, **, * represent significance at 1%, 5% and 10 % levels

Table 11. Summarized results – flexibility indices – balanced panel

Foreign Exchange Regime as flexibility index(1) Annual data				
Balanced Panel for the models with macroeconomic controls				
	Static models	**Static model with instrumental variables for exchange regime**	**Dynamic models: regressors treated as exogenous**	**Dynamic GMM models: regressors treated as endogenous**
All IT countries(2)	LYS_5 = -0.006*** RR_6 = -0.014*** RR_15 = -0.003***	RR_6 = -0.023**	RR_6 = 0.004*	RR_6 = -0.031*
IT Industrial countries(2)	LYS_5 = -0.001** RR_6 = 0.003** RR_15 = 0.001**		LYS_5 = 0.003* RR_6 = 0.007*** RR_15 = 0.002**	RR_6 = 0.012* RR_15 = 0.003*
IT Developing countries(2)	LYS_5 = -0.012*** RR_6 = -0.015*** RR_15 = -0.005**	RR_6 = -0.030** RR_15 = -0.009**	RR_6 = 0.004*	LYS_5 = -0.054* RR_6 = -0.029* RR_15 = -0.011**

(1) All indices range from the most flexible to the most rigid foreign exchange regime
(2) ***, **, * represent significance at 1%, 5% and 10 % levels

Table 12. Summarized results – flexibility indices – unbalanced panel

Foreign Exchange Regime as flexibility index(1) Annual data				
Unbalanced Panel for the models with macroeconomic controls				
	Static models	**Static model with instrumental variables for exchange regime**	**Dynamic models: regressors treated as exogenous**	**Dynamic GMM models: regressors treated as endogenous**
All IT countries(2)	LYS = -0.002** RR_6 = -0.003*	IMF = 0.007*	RR_6 = -0.023** RR_15 = -0.004**	RR_6 = -0.050**
IT Industrial countries(2)	LYS = -0.002*** IMF = 0.004*	IMF = 0.006***	LYS = -0.005* IMF = 0.005*** RR_6 = -0.018*** RR_15 = -0.005***	
IT Developing countries(2)	RR_6 = -0.007***		IMF = -0.007** RR_6 = -0.036*** RR_15 = -0.005*	RR_6 = -0.009** RR_15 = -0.002*

(1) All indices range from the most flexible to the most rigid foreign exchange regime
(2) ***, **, * represent significance at 1%, 5% and 10 % levels

Note to tables 11 and 12. "Static models" refers to OLS and fixed effects; "Static model with instrumental variable" refers to fixed effects with instrumental variables; "dynamic models" refers to Anderson-Hsiao and difference GMM; "dynamic GMM models" refers to system and difference GMM.

Annex

Data sources and definitions

Unless otherwise noted, all data runs from 1989 to 2006, on an annual and a quarterly basis.

Consumer Price Index: Data were obtained from the IMF, *International Financial Statistics* (IFS), except for Australia, Brazil, Chile, Czech Rep. and New Zealand. Data for these countries were respectively obtained from the Reserve Bank of Australia, IPEA, Central Bank of Chile, Czech National Bank and Reserve Bank of New Zealand.

Gross Domestic Product: IFS, GDP volume data series (2000=100).

M1: IFS, Money data series. Annual data were constructed using the annual average of quarterly data. For some countries data series were incomplete so we used other sources and splicing. For Canada we used IFS data till 2001Q3 and completed the series till 2003Q1 with data from *IFS June 2003* (published issue).Then, from 2003Q1 to 2006Q3 series was spliced with the rate of change of IFS original series. For Finland, data series were obtained from Bank of Finland, Contribution to Euro area M1; we completed the data from 1995Q1 to 1989Q1 by splicing backwards with the rate of change of Currency in Circulation, also obtained from Bank of Finland. Other sources were used for South Africa (South African Reserve Bank, M1) and England (Bank of England, M1).

Nominal Interest Rate: IFS, Money Market Rates, except for Chile (Central Bank of Chile Interbank Rate), Hungary (Magyar Nemzeti Bank Overnight Deposit), Israel (from 1989-1995 the Actual Bank of Israel Rate of interest data series was used and from 1995-2006 Bank of Israel Interbank Rate data series), Peru (Central Reserve Bank of Peru Interbank Rate). Some data were missing from Chile (1989-1995), Colombia (1989-1994), Hungary (1989-1999), Iceland (2005, 2006), Peru (1989-1995), Poland (1989,1990), Sweden (2004-2006)

Openness : This variable was calculated for all countries by dividing the exports of goods plus the imports of goods by the GDP. The exports of goods and import of goods series are at current prices in dollars, while GDP was measured in local currency, so we converted it by dividing the GDP by the countries exchange rate. All series were taken from IMF, International Financial Statistics.

Exchange Rate Regimes' Classification. Annual data taken from *Classifying Exchange Rate Regimes: Deeds vs. Words.* (Levi-Yeyati and Struzenegger, 2003); IMF, *International Financial Statistics*, *Exchange Arrangements and Exchange Rate Restrictions* (IMF, annual publication) and from 2003 to 2006 data taken from *Classification of Exchange Rate Arrangements and Monetary Framework* at http: //www.imf.org/ external/ np/ mfd/er /index. asp. We also used Reinhart and Rogoff classification available at http://www.puaf.umd.edu.faculty/papers/reinhart/reinhart.htm.

Data frequency: LYS data are annual, whereas the RR data are annual and monthly; the IMF classification is annual until 2003, and semi-annual ever since. To work with our quarterly sample, we have assigned the LYS annual value to each quarter in a given year, the RR average quarterly value of monthly observations to each quarter; and we have assigned the IMF annual value to each quarter in the year from 1990 until 2003, and the semi-annual value to each quarter in the corresponding semester ever since.
The three different classifications divide exchange rate regimes in different categories. LYS have 5 different buckets, from "inconclusive" (1) to "peg" (5), and we take the values straight from their database, we apply the same methodology for the 3-way classification, which includes the categories "float", "fix", and "intermediate". The IMF criterion calls for some work on the part of the researcher in order to generate a single series that spans our sampling period: as published in International Financial Statistics, Exchange Arrangements and Exchange Rate Restrictions, exchange rate regimes were classified in ten different de jure categories until 1997, and in eight de facto ones from 1998 onwards. Needless to say, not all categories, either in the 1990-1997 or the 1998-2006 periods, are represented in our sample of IT or would-be IT countries; only five of them are, so we restrict the categories from 1 (most flexible regime, independent float) to 5 (absence of monetary autonomy). We also construct an alternative classification based on the IMF´s, that we call IMF 3-way classification, in which we rearrange the 5-way classification to fit in three different categories "independent floating" "intermediate" and "fix", we do this in order to make it compatible to IMF previous classification, which was available until 1997, where three different categories were distinguished "Pegged"(to a single currency or a composite of currencies), "flexibility limited" and "More flexible arrangements". Finally, the RR "natural" classification has two versions, a "fine" and a "coarse" one: the former includes 15 categories, increasing in flexibility, and the latter includes 6. We have used the values from the "fine" classification as they appear in the database. See the table below for details on the classifications.

Levy-Yeyati and Sturzenegger classification				IMF classification			
LYS_3		LYS_5		IMF_3		IMF_5	
		1	Inconclusive			1	Independent floating
1	Float	2	Float	1	Independent floating	2	Managed floating
2	Intermediate	3	Dirty	2	Managed floating / limited flexibility	3	Bands
3	Fix	4	Dirty/crawling	3	Peg	4	Horizontal Bands
		5	Fix			5	Peg

Reinhart and Rogoff classification			
RR_6		RR_15	
1	Peg	1	No separate legal tender
2	Crawling peg	2	Pre announced peg or currency board arrangement
3	Managed floating	3	Pre announced horizontal band that is narrower than or equal to +/-2%
4	Freely floating	4	De facto peg
5	Freely falling	5	Pre announced crawling peg
6	Dual market in which paralell market data missing	6	Pre announced crawling band that is narrower than or equal to +/-2%
		7	De factor crawling peg
		8	De facto crawling band that is narrower than or equal to +/-2%
		9	Pre announced crawling band that is wider than or equal to +/-2%
		10	De facto crawling band that is narrower than or equal to +/-5%
		11	Moving band that is narrower than or equal to +/-2%
		12	Managed floating
		13	Freely floating
		14	Freely falling
		15	Dual market in which parallel market data is missing

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