Banco Central de Chile
Documentos de Trabajo

Central Bank of Chile
Working Papers

N° 517

Junio 2009

DO EXCHANGE RATE REGIMES MATTER FOR INFLATION AND EXCHANGE RATE DYNAMICS? THE CASE OF CENTRAL AMERICA

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BANCO CENTRAL DE CHILE

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Documentos de Trabajo del Banco Central de Chile
Working Papers of the Central Bank of Chile
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Resumen

Este artículo hace una contribución empírica a la discusión sobre el régimen cambiario óptimo. Utilizando como caso de estudio la experiencia de los países centroamericanos, comparamos la dinámica del tipo de cambio real (TCR) así como de la persistencia inflacionaria entre países que han dolarizado y países que poseen un cierto grado de flexibilidad cambiaria. Nuestros resultados muestran que las dos economías dolarizadas de la región, El Salvador y Panamá, son bastante distintos en términos de la dinámica del TCR y la inflación. Mientras en El Salvador el TCR permaneció más tiempo alejado de su nivel de equilibrio, lo contrario se observa en el caso de Panamá. También encontramos que la persistencia inflacionaria de El Salvador es similar a la del resto de los países, pero en el caso de Panamá es menor. Esto nos lleva a concluir que un cierto grado de flexibilidad cambiaria ayuda a los países a tener un TCR más alineado con sus fundamentos. A pesar de lo anterior, una economía con un larga historia de dolarización y alta credibilidad, como Panamá, puede reducir la persistencia inflacionaria a un punto tal que los desalineamientos del TCR son de hecho menos frecuentes que en países con regímenes cambiarios más flexibles.

Abstract

This paper makes an empirical contribution to the discussion on the optimal exchange rate regime. Using as a study case the experience of the Central American countries, we compare the dynamics of the Real Exchange Rate (RER) and inflation persistence between dollarized economies and countries with some degree of exchange rate flexibility. Our results show that the two dollarized countries in the region, El Salvador and Panama, are quite different in terms of RER and inflation dynamics. While in El Salvador the RER spends more time away from the equilibrium level than the non-dollarized countries in the region, the opposite is true for Panama. We also find that inflation persistence in El Salvador is similar to that of the other countries, but smaller in Panama. This leads us to the conclusion that some degree of exchange rate flexibility helps countries to have a RER more aligned with its fundamentals. Nevertheless, a long-lived, highly credible dollarized economy, like Panama, can reduce inflation persistence to such an extent that RER misalignments are actually less frequent than in countries with more flexible exchange rate regimes.

Agradecemos a los participantes del workshop of Central Banks and Finance Ministries on April 22-23 por sus valiosos comentario. El paper se benefició también de valiosas conversaciones informales con miembros del staff de los Bancos Centrales de Guatemala, Honduras, Belize, Nicaragua, El Salvador, Costa Rica y República Dominicana. E-mail: rcaputo@bcentral.cl, ignacio.magendzo@uai.cl.

I. Introduction

The choice of exchange rate regime is still far from being a settled issue for economists and policy makers. Emerging economies continue to actively change regimes. In recent years, the global trend has been to move away from intermediate regimes towards the extremes. For instance, in the last decade in Latin America countries like Chile, Brazil and Mexico adopted relatively flexible exchange rate regimes in the context of inflation targeting, while Ecuador and El Salvador have dollarized. Despite the fact that the literature on exchange rate regimes and economic performance is vast, there is no clear consensus on the subject. Through time, arguments have fluctuated in favor of intermediate regimes, super-fixes or flexible exchange rates[2].

When there is theoretical disagreement, empirical evidence plays a particularly important role. But in this topic (as in many others in economics), empirical studies face multiple difficulties, mostly associated to the absence of anything close to a natural experiment: countries do not choose the regime in a random fashion (fortunately); many times they do not really choose their regimes but are rather imposed by economic circumstances; more often than not, *de jure* and *de facto* regimes are different; and for some regimes there are very few observations.

In the present paper we provide evidence of the consequences of exchange rate regimes for the dynamics of real exchange rates (RER) and inflation. In doing so, we use a sample of countries that share important similarities, but have chosen different exchange rate regimes: Central America. Hence, our paper is closer to a natural experiment than any other study we are aware of.

There is some agreement that hard pegs are associated with lower inflation. But there is much less agreement on the consequences for growth and even less for growth volatility. In particular, it is not evident at all that dollarized economies (e.g., El Salvador and Panama) have had a better performance in terms of both output growth and volatility (see Table 1) than similar countries using a currency of their own. Underlying this discussion is the behavior of the real exchange rate in the presence of

[2] Edwards (2000) has a good description of how support for intermediate regimes was stronger after the failure of inflation stabilization plans in emerging countries, but lost support after the East Asian, Russian and Brazilian crises.

either price stickiness or inflation persistence. As shocks hit the economy, the response of the real exchange rate, and in turn of the real economy, can be very different under different exchange rate regimes. If the nominal exchange rate is not allowed to adjust freely and prices are sticky, then the real exchange rate may deviate significantly from its flexible-prices equilibrium level. This is why in this paper we focus directly on the behavior of the real exchange rate. We study how the dynamics of the real exchange rate vary across similar countries that have chosen different exchange rate regimes.

Supporters of intermediate regimes have argued that with these regimes countries can achieve a lower and more stable inflation rate and, at the same time, avoid protracted deviations of the real exchange rate from its equilibrium or full employment level. Detractors of intermediate regimes base their argument mostly on the poor performance associated with these regimes. To many, emerging markets have limited choices, namely intermediate regimes or very hard pegs. Flexible exchange rates are difficult to implement. This is because of the fear of floating: countries may commit *de jure* to flexible exchange rates, but balance sheet effects, fear of inflation bursts, lack of credibility and political instability make it virtually impossible to hold on to the flexible regime in practice.

Indeed, Central America currently has cases of intermediate regimes and cases of very hard pegs, including dollarized countries. However, no cases of (relatively) flexible exchange rate regimes exist in the region. In that sense, our paper addresses the arguably more realistic question—at least for many emerging economies—of comparing the effects of intermediate regimes and a very hard peg. There are some authors (Corbo, 2001 and Dornbusch, 2001) that have suggested a hard peg (dollarization indeed) is the best exchange rate regime for Central American countries and the Dominican Republic (we will refer from now on to those countries as the CAD countries). According to this view, a fixed exchange rate regime has the benefits of stabilizing inflation. In this paper we assess the extent to which the empirical evidence supports this view.

Against the argument that more flexible exchange rate regimes are more appropriate to avoid undesired fluctuation in the real exchange rate due to price rigidities, Calvo (2003) shows, in the context of a simple model, that the fixed exchange rate if credible

can in itself reduce inflation persistence. That is, inflation persistence is not exogenous to the exchange rate regime. The reason is that when low and stable inflation is credible, economic agents set prices in a more forward-looking fashion. We also test this hypothesis using our sample of CAD countries.

In order to investigate the effect of exchange rate regimes on price dynamics, we proceed in two steps. First, we estimate open-economy New Keynesian Phillips curves (following Clarida, Galí and Gertler, 1999 and 2001). Those curves describe the inflation dynamics, as a function of past and future inflation, as well as marginal costs. In open economies, marginal costs are functions of the output gap and foreign inflation. Second, and based on these curves, it is possible to test various hypotheses regarding the inflation dynamics. In particular, we ask if the forward-looking component of inflation is bigger in very hard peg (dollarized) economies. Also, a successful fixed exchange rate regime should generate a higher correlation between foreign and domestic inflation and a lower correlation with the domestic output gap.

With respect to real exchange rate dynamics, and following Faruqee (1995) and Clark and MacDonald (1999), we estimate behavioral equations for the real exchange rate (RER) in each country. Under this approach, the RER is a relative price that is consistent with internal and external equilibrium. The internal equilibrium corresponds to output being at its potential level in conjunction with a non-accelerating rate of inflation. A sustainable level of the current account, on the other hand, characterizes the external equilibrium. In this setup the RER is estimated as a function of fundamental variables, both internal and external. In particular, the RER is determined by the relative productivity *vis à vis* the trading partners (Balassa- Samuelson effect), the government expenditure, the terms of trade and the net asset position of the economy. Movements in those fundamentals may induce disequilibrium in the economy (either internal or external). In those circumstances the RER needs to move in order to restore equilibrium. If the nominal exchange rate is fixed, all the adjustment has to be done by changes in domestic inflation. Furthermore, if inflation is persistent, the RER is likely to deviate from its otherwise (flexible prices) equilibrium level, generating a RER misalignment. Once we have estimated RER misalignments, we ask the question whether there is any correlation between the exchange rate regime and the length and intensity of these misalignments.

The main results are as follows. First, our equations do a good job explaining long-run RER dynamics. We find evidence that in El Salvador since dollarization the RER has spent more time away from the neighborhood of its estimated equilibrium level than other countries in the region that have more exchange rate flexibility. Nevertheless, the opposite is true for Panama.

Second, we find that inflation is quite inertial in almost all countries, including those that have dollarized. Expected inflation, on the contrary, is not of much relevance to explain inflation dynamics. Taken together, the previous results suggest a low degree of credibility in a price stability policy (either because the monetary policy is not explicitly set to tackle inflation or because the central bank lacks credibility). We find that the output gap is, in general, an important determinant of inflation dynamics. This is independent of the exchange rate regime and is an indication that prices have some degree of stickiness (that varies across time and across countries). It also indicates that, independently of the monetary policy regime, shocks that affect the marginal costs are transmitted to the price level. Regarding foreign inflation, we conclude that it is an important determinant of inflation dynamics in almost all countries. The impact of foreign inflation is not different between the dollarized countries and the rest.

In summary, we have found evidence that: i) RER misalignment is more common in El Salvador than in non-dollarized CAD countries; ii) RER misalignment is less common in Panama than in non-dollarized CAD countries; iii) inflation persistence is not different in El Salvador than in non-dollarized CAD countries; iv) inflation persistence is lower in Panama than in non-dollarized CAD countries. We interpret our findings as follows: first, the case of El Salvador shows that a super fix nominal exchange rate (dollarization being the extreme case) induces more misalignment in the RER. Nevertheless, the case of Panama suggests that long-lived highly-credible super fixes can reduce the persistence of inflation to the point that the RER is in fact closer to its equilibrium level than in countries that have some exchange rate flexibility.

To our knowledge, this is the first attempt to investigate the price and relative price dynamics in this group of countries. Although there are some previous studies that assess the performance of Panama, the first dollarized economy in the region (see

Edwards, 2001), they examine the performance of the economy mainly on the basis of the evolution of output.

This paper is organized as follows. In section 2, we briefly review the theoretical arguments that support different exchange rate arrangements: fixed, freely floating and managed exchange rate regimes. In section 3, we describe the evolution of the exchange rate arrangements in the CAD countries from the 1980s to date. In section 4, we present the methodological approach to investigate both inflation and RER dynamics. This section also contains the empirical results. Finally, section 5 concludes.

II. Exchange Rate Regimes: Which one to Choose?

As noted by Agénor and Montiel (1999), since the collapse of the Bretton Woods system, the process of exchange-rate determination in developing countries has been fundamentally different from that in industrial economies. In particular, major industrial countries have followed a policy of managed floating, in which the exchange rate is largely determined by market forces, although there are sporadic central bank interventions. By contrast, the vast majority of countries in the developing world did not abandon the policy of determining an official exchange rate.

The Mexican *tequilazo* of 1994, the 1997-1998 Asian crises, the Russian and Brazilian crises in the first years of the 2000s, and the collapse of the currency board in Argentina in 2001, have provided evidence that defending a particular value for a currency may become a costly and risky process. As a result, many authors[3] have argued in favor of either letting the market determine the value of the currency or to abandon the currency altogether (full dollarization[4]).

Despite the fact that a flexible exchange rate regime is capable, in theory, of coping with different sources of shocks, there are some reasons why countries may be reluctant to tolerate much variation in their exchange rates. Emerging countries are said to suffer from "fear of floating". First, there are potential output costs of nominal exchange rate

[3] See, for example, Summers (2000).
[4] We refer here as dollarization to a monetary regime in which a country gives up its own currency and uses a convertible currency instead, not necessarily the US dollar (Edwards and Magendzo, 2003).

fluctuations. In particular, Lahiri and Vegh (2001) develop a model in which the exchange rate is a non-monotonic function of underlying shocks. In this context, small shocks can be accommodated with changes in the interest rates (and the exchange rate). However, larger shocks induce movements in interest rates that become too costly in terms of output. Second, the "fear of floating" may arise when the central bank lacks credibility (Calvo and Reinhart, 2002). In this setup, the monetary authority is perceived to move the interest rate to maximize a linear combination of both seignorage and inflation volatility (limited credibility). As a consequence, if the exchange rate fluctuates, households will expect a rate of inflation that is above the central bank target, even if the target is not modified. This increases the pass-through of the exchange rate to inflation and, therefore, the lack of credibility induces the central bank to avoid depreciations of the exchange rate. According to Calvo and Reinhart (2002), the "fear of floating" is likely to explain the fact that a vast majority of countries that claim to be free floaters are *de facto* managed floaters or some other kind of intermediate regime. Hence, the more realistic choice for most emerging markets that do not want to have an intermediate regime seems to be a very hard peg (dollarization) rather than a very flexible exchange rate.

As noted by Edwards and Magendzo (2003), there is wide agreement among economists that countries that give up their currency (dollarize) and delegate monetary policy to an advanced country's central bank have, on average, significantly lower inflation than countries that pursue an active domestic monetary policy. This regime seems to restore the credibility of the nominal anchor. Furthermore, according to Dornbusch (2001), Rose (2000) and Rose and van-Wincoop (2001), countries that give up their currencies should grow faster. This growth effect is supposed to take place through two channels. First, higher credibility of the nominal anchor will result in a lower interest rate, higher investment and faster growth. Second, by eliminating exchange rate volatility, this regime is supposed to facilitate international trade and, in turn, increase the rate of growth. Nevertheless, Edwards and Magendzo (2003) do not find evidence in favor of these hypotheses.

Fixed exchange rate regimes can, however, induce some problems. In particular, in the face of adverse external disturbances, like negative terms of trade shocks or higher

international interest rates[5], the nominal exchange rate cannot accommodate the required changes in relative prices. As a result, the only way to offset those shocks is through a contractionary macroeconomic (most likely fiscal, but in some cases even monetary) policy. This policy has to be used to induce changes in the domestic price-wage mechanism in order to generate the required adjustment in relative prices. In this context, the adjustment process may become problematic for two reasons. First, fiscal policy is not always as flexible as required and second, domestic prices and wages may be too sticky, slowing the adjustment process. If this is so, we might observe significant and protracted deviations of the real exchange rate from the (flexible prices) equilibrium level, likely to be followed by painful adjustments in GDP growth. Edwards and Magendzo (2003) show that countries that give up their currency exhibit more volatility of GDP growth, but they do not investigate the dynamics of the real exchange rate.

Under fixed exchange rates, the nominal exchange rate is used to provide a nominal anchor for the economy, and relative price adjustments rely on the domestic wage-price mechanisms. As noted by Agénor and Montiel (1999), in this case as well as in the pure flexible case, the exchange rate is not actively managed and thus ceases to function as a policy instrument. An intermediate regime, on the other hand, is one in which countries actively manage the nominal exchange rate to preserve some degree of exchange rate flexibility while retaining the role of the exchange rate as a nominal anchor. In this latter case, the nominal exchange rate becomes a policy instrument.

Compared to fixed exchange rates, intermediate regimes, in principle, facilitate temporary relative price adjustments while preserving some degree of monetary autonomy. On the other hand, relative to completely flexible rates, intermediate regimes can provide a nominal anchor to the economy and can limit the range of fluctuations of the exchange rate. As showed by Krugman (1991) an (explicit or implicit) exchange rate band—one way to characterize intermediate regimes—that is perfectly credible is stabilizing in the face of shocks that affect the exchange rate. In particular, when the exchange rate is near the top edge of the band (above the central parity), the probability of intervention is higher. In this context, the probability that the exchange rate will

[5] If the cycle of the dollarized economy and the economy whose currency is being used are perfectly correlated, this shock could be minimized (the optimal currency area argument in Mundell, 1961). But this is not necessarily the case, and shocks can even get amplified by lack of synchronization.

depreciate further is smaller than the probability that it will *appreciate*. Thus, market participants will bid the exchange rate down to a level *below* the one that would have prevailed in the absence of the band. A similar argument can be given in the case in which the exchange rate is approaching the lower end of the band.

One of the main conclusions of Krugman's model is that *within* the band the exchange rate will react less to shocks. The fact that exchange rate bands (or target zones) are inherently stabilizing is known as the "honeymoon" effect and is documented (as well as tested) in Svensson (1992). If this is so, compared to the dollarized case, the real exchange rate should spend more time close to its (flexible prices) equilibrium level. This is the main hypothesis we test in this paper. In other words, we test if when choosing an intermediate regime, the loss of credibility of the nominal anchor is compensated to some extent with a real exchange rate that is closer to its (flexible price) equilibrium value.

The above hypothesis might not hold, in practice, for two reasons. First, the credibility of the nominal anchor that results from dollarization, can substantially reduce inflation persistence. We test this hypothesis separately by estimating expectations-augmented Phillips curves. Second, lack of credibility of the intermediate regime in a situation of capital mobility can induce extra volatility of the real exchange rate (see Calvo, 2003).

III. Exchange Rate Regimes in CAD Countries: a nearly natural experiment

There are several studies that look at evidence on economic performance under different exchange rate regimes[6]. But in this topic, empirical studies face multiple difficulties, mostly associated to the absence of anything close to a natural experiment. As mentioned before, *de jure* and *de facto* regimes more often than not are different; and for some regimes there are very few observations.

In the present paper we provide evidence of the consequences of exchange rate regimes for the real economy using a sample of countries that is closer to a natural experiment than any other sample we are aware of: Central America. Central American countries

[6] For recent examples, see Levy-Yeyati and Sturzenegger (2003) and Edwards and Magendzo (2003).

are very similar among them but have chosen different exchange rate regimes. Their regimes are well identified and we have managed to collect a good deal of data.

From the point of view of the variables of interest to the present study, CAD countries (Central America and the Dominican Republic) are very similar among them. These are small, very open, low income countries. Their trade structure is highly dependent on the United States. CAD exports are relatively concentrated on manufactures (*maquila*) as well as some primary goods (foodstuffs), while most commodities are imported, as are machinery and equipment. Also, remittances from the U.S. are relatively important for these countries. Growth rates have been positive, but not "miraculous" (see Table 1). In recent years, inflation has been most of the time relatively low (at least compared to the rest of Latin America), and there have been no hyper-inflation experiences (see Table 2). One striking difference among these countries is GDP volatility. Another is real exchange rate volatility. Yet another is exchange rate regimes.

Table 1. GDP Growth and Volatility

	Costa Rica	Dominican R.	Guatemala	Honduras	Nicaragua	Panama	El Salvador
Average GDP Growth							
1995-2000	4.8%	6.6%	4.1%	3.2%	5.2%	4.2%	3.7%
2001-2006	4.9%	4.8%	3.4%	4.9%	3.3%	5.1%	2.6%
Variance of GDP Growth							
1995-2000	9.4%	1.1%	0.7%	6.7%	1.8%	4.8%	2.9%
2001-2006	6.8%	18.6%	1.1%	2.0%	2.3%	9.4%	0.8%

Source: IMF

Table 2. Inflation across Periods

	Average 2004-2007	Average 2008**	Difference
Costa Rica	11.7%	12.7%	0.9%
Dominican R*	6.1%	11.5%	5.4%
Guatemala	7.5%	11.5%	3.9%
Honduras	7.4%	11.3%	4.0%
Nicaragua	9.6%	20.8%	11.2%
Panama	2.4%	8.9%	6.5%
El Salvador	4.4%	7.7%	3.2%
CAD	7.0%	12.0%	5.0%
Emerging	5.3%	8.6%	3.2%
USA	3.0%	4.2%	1.2%
World	3.6%	5.7%	2.0%

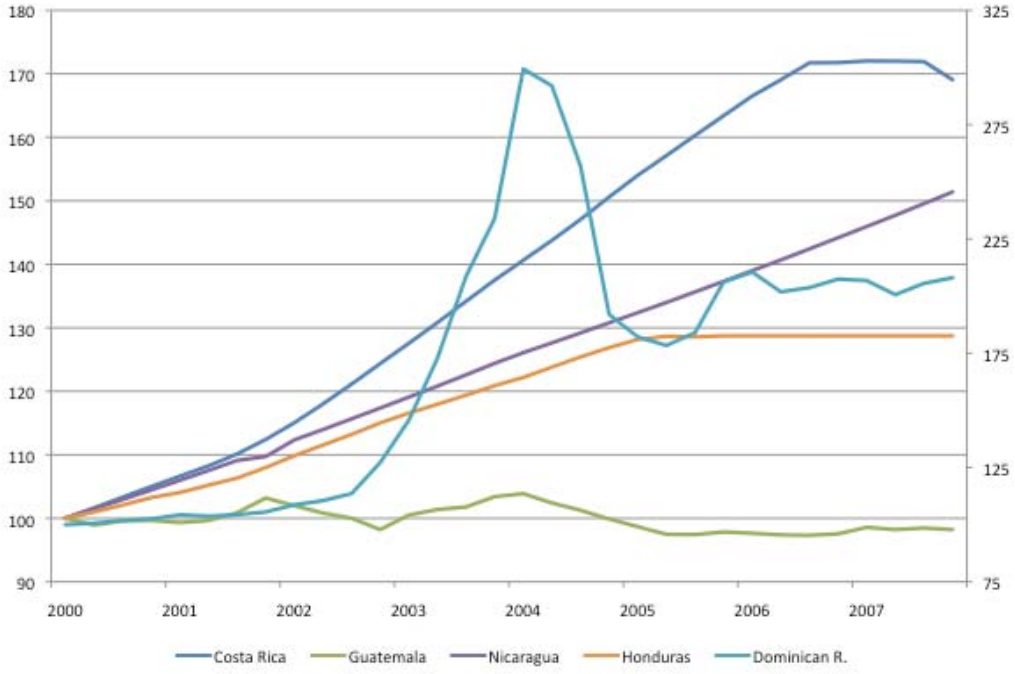
* For the Dominican Republic corresponds to the average of the years 2005-2007.

**Data up to September 2008

Source: Central Banks and IMF

Although macroeconomic conditions are similar across CAD countries, their exchange rate regimes are not. According to the IMF[7], they range from dollarization in El Salvador and Panama to the managed floating regimes of the Dominican Republic and Guatemala. Costa Rica and Nicaragua have crawling pegs, while Honduras has a crawling band. The alternative *de facto* classification of Reinhart and Rogoff (2004), classifies Guatemala as a crawling peg. In fact, visual inspection of Figure 1 is near enough to determine the exchange rate regimes of Central American countries in recent years.

Figure 1. Nominal Exchange Rate Index
(2000=100)



Source: IMF

Until the 1980s, exchange rate regimes in CAD countries were dollar pegs. Subsequently, countries began to abandon this regime. Costa Rica abandoned the peg in 1981 adopting a free-floating regime, followed by a real exchange rate rule based on the inflation differential with the United States. The rule was modified in 1997 to take into account targeted rather than actual inflation. Today the rate of crawl of the *colón* is adjusted on the basis of the inflation differential between Costa Rica and its main

[7] We refer to the IMF classification, which combines quantitative and qualitative information, including the *de jure* regime. See Kim and Papi (2005).

trading partners. It is evident from Figure 1 that *de facto* Costa Rica has a crawling peg with infrequent adjustments to the rate of crawl.

The Dominican Republic had a very narrow *de facto* crawling band until 1982. Then it moved to a free-floating exchange rate. In 1992, it adopted a managed floating exchange rate regime that lasted until 2003. At that time, a severe banking crisis brought the economy back to a freely floating regime. According to the IMF classification, the Dominican Republic had a managed floating regime from 1991 to 2003 before moving to an independently floating arrangement in January 2004. Nevertheless, it is evident from Figure 1 that this country, with the exception of the turbulent period between 2003 and 2005, has had a managed float, allowing little variation in the exchange rate.

Guatemala abandoned the peg in 1984; afterwards it oscillated between free and managed floats. In 1991, the system converged to a *de facto* crawling peg; which is still the present regime. In the IMF classification, however, Guatemala had a managed float in the 90s and early 2000s, until it moved to an independent float in 2003 according to the IMF classification. Visual inspection of Figure 1 makes it evident that de facto Guatemala has allowed little variation in the value of its currency *vis à vis* the U.S. dollar, corresponding to a managed float with high degrees of intervention.

Honduras abandoned the peg in 1990 and had a *de facto* crawling band from 1991 to 1998 before converging to a de facto crawling peg. In the IMF classification, however, Honduras adopted a float in 1992 to 1994. It then moved to a crawling peg and finally to a crawling band in 1996. The rate of crawl is determined by the projected inflation differential with its main trading partners *vis-à-vis* the U.S. dollar. The band was widened from 1 to 7 percent in 1998, but movements within the band have been limited and the rate of crawl has been adjusted only two times since the year 2000. From 2005 the exchange rate to the U.S. dollar has been fixed.

Nicaragua spent a long period with a freely floating regime owing to hyperinflation. In 1991 the exchange rate was pegged and since 1993 it has been a crawling peg. The rate of depreciation is now preannounced by the central bank and has not been changed since 2001.

El Salvador abandoned the peg to the U.S. dollar in 1983, adopting a managed floating regime until 1990, when it moved to a *de facto* peg. However, this country followed a different path than its neighbors. In the early 90s after the cessation of the civil conflict, the exchange rate came under appreciating pressures which where resisted using sterilized interventions. Finally, it joined Panama and full dollarization was adopted in 2001. In summary, our sample is composed of 5 intermediate regime countries and 2 dollarized countries. The evolution of the exchange rate regimes in the region can be seen in Table 2.1.

Table 2.1. Exchange Rate Regimes in the CAD Countries

	1990	1995	2000	2001	2002	2003
Costa Rica	5	5	5	5	5	5
Dominican Republic	3	7	7	7	7	8
El Salvador	7	3	3	1	1	1
Guatemala	7	7	7	7	7	8
Honduras	3	5	6	6	6	6
Nicaragua	5	5	5	5	5	5
Panama	1	1	1	1	1	1

1: Not separate legal tender, 2: Currency board, 3: Conventional fixed peg
4: Pegged within a horizontal band, 5: Crawling peg, 6: Crawling band, 7: Managed floating
8: Independently floating
Source: Kim and Papi (2005).

IV. RER Dynamics and Inflation Persistence

4.2. Behavioral Equations for the RER

According to conventional economic theory, the RER, like any other relative price, is determined by a set of fundamental variables. If prices (including the nominal exchange rate) were fully flexible, the RER should be, by definition, the value determined by its fundamental variables. Nevertheless, price rigidities may interfere in the adjustment process and deviate the RER from the value implied by its fundamentals, producing what the literature has defined as an RER misalignment[8]. In this section we estimate the equilibrium RER for each of the CAD countries. Then we proceed to estimate the RER misalignment and try to figure out if these misalignments have been statistically

[8] One interpretation of the RER misalignment is that the relative price is deviated from its "equilibrium" level. An alternative interpretation is that the actual (equilibrium) RER is different from a theoretical (equilibrium) value for the RER under flexible prices.

different for different exchange rate regimes. The great advantage of our sample is that it is less subject to misspecification because the countries are very similar to one another (closer to a natural experiment).

Following Faruqee (1995), a convenient way of analyzing theories that differ from the PPP is to divide the RER fundamentals into two categories. The first one considers those fundamentals that affect the RER through the current account (trade flow), while the second one takes into account the fundamentals that impact the RER through the capital account (the net asset position of the economy).

Faruqee's (1995) approach can be characterized as a stock-flow one. In this framework: "the sustainable RER is broadly defined as a value or path consistent with internal and external balance. Internal balance corresponds to output being at its potential level in conjunction with a non-accelerating rate of inflation. External balance, on the other hand, requires a balance of payments position in which any current account imbalance is financed by a sustainable rate of capital flows. Since capital flows are simply international transfers of financial claims, sustainability of the capital account in turn rests upon the desired net holdings of assets and liabilities between nations. Thus, stock variables play and important role in the determination of real exchanges rates in addition to the conditions supporting flow equilibrium and macroeconomic balance" (Faruqee, 1995).

We consider four variables that affect the trade flow. The first one is the relative productivity between the traded and non-traded sector, denoted as *TNT*. This variable has a negative impact on the RER. In particular, with labor mobility and wage equalization across sectors, an increase in productivity in the traded goods sector raises the real wage in both sectors, leading to an increase in the relative cost and price of non-traded goods. As a result, the RER tends to appreciate. This is the Balassa- Samuelson hypothesis.

The second variable we consider is the terms of trade, *TOT*. This variable has a negative impact on the RER. In particular, an increase in *TOT* raises the disposable income and hence increases the demand for both traded and non-traded goods. Since tradable goods prices are given, an increase in *TOT* tends to increase the relative price of non-traded

goods, and hence appreciates the RER. The third variable is the composition of fiscal spending, between traded and non-traded goods. We use as proxy of this variable the government expenditure to GDP, *G/Y*. The last variable, reflecting flow considerations, we introduce is the level of tariffs. As noted by Edwards (1987) and Conolly and Deveraux (1997), an increase in tariffs may switch the demand from traded to non-traded goods, inducing a RER appreciation.

The stock variable we consider is the net asset position of the economy as a percentage of GDP, *NAP/Y*. This variable has a negative impact on the RER. In particular, an increase in *NAP/Y* implies higher net payments from abroad. This is coherent with a higher sustainable current account deficit, which can be induced with an RER appreciation.

Taking into account the stock and flow of fundamental variables, an empirical equation for the RER can be expressed as:

$$LRER_t = \beta_0 + \beta_1 LTNT_t + \beta_2 LTOT_t + \beta_3 (G/Y)_t + \beta_4 (NAP/Y)_t + \beta_5 TARIFF_t + u_t \quad (1)$$

where *L* indicates variables in logarithm. This approach has been applied to various countries, including China (Dunaway, Leigh and Li, 2006), Costa Rica and Brazil (Paiva, 2001 and 2006), Chile (Calderón, 2004; Caputo and Dominichetti, 2005, among others), South Africa (Frenkel, 2007) and a set of developed economies in Bayuomi, Faruqee and Lee (2005). As far as we know, this approach has not been applied to most of the CAD countries and never applied systematically to all of them with the same methodological approach.

Following Calderón (2004) and Caputo and Dominichetti (2005), we use dynamic ordinary least squares (DOLS) to estimate (1). As noted by Calderon (2004), this methodology corrects one of the problems that arise when using the Engel and Granger (1987) approach. In particular DOLS corrects the reverse causality due to the eventual correlation between the disturbances to the RER in (1) and the fundamentals. This problem is address by including leads and lags of the first differences of the fundamental variables.

We use annual data from 1970 to 2007. Available data for 2008 is used to assess the degree of contemporaneous misalignment. We do not consider data on tariffs given the lack of consistent data. Most of the data come from the IMF or regional Central Banks. Data on the *NAP* are taken from Lane and Milesi-Ferreti (2006), we update the series until 2008 using data on the current account of each country (more details in the Appendix). We include Mexico in our estimations as a reference, given the fact that it is an inflation targeter with a free-floating regime.

4.2. Misalignment and exchange rate regime

The results from estimating (1) are presented in Table 3. We find that the RER elasticities to its fundamentals have the expected sign and are, in general, statistically significant. For some countries, México, Costa Rica and El Salvador, the model has a relatively good fit. For the rest of countries restricted versions of the model in (1) are better representation for the RER behavior.

Table 3. RER Elasticities to Fundamentals (Equation (1))
(estimation using DOLS)

Coefficient	Costa Rica	D.Republic	Guatemala	Honduras	Méxcio	Nicaragua	El Salvador	Panama
Constant	9.552***	3.148***	7.795***	9.060***	5.647***	1.53	8.125***	2.437***
	(0.89)	(0.82)	(1.30)	(0.52)	(0.30)	(4.01)	(1.06)	(0.33)
LTNT	-0.876***	-0.791**	-0.895***	1.008***	-0.691**	-4.034**	-0.077	-
	(0.24)	(0.36)	(0.16)	(0.12)	(0.31)	(1.69)	(0.14)	
LTOT	-0.518***	-	-0.768***	-0.167***	-0.051	-1.475***	-0.601***	-
	(0.15)		(0.31)	(0.07)	(0.15)	(0.47)	(0.16)	
G/Y	-0.039***	-	-	-0.042***	-0.133***	-	-0.117***	-0.024***
	(0.01)			(0.01)	(0.02)		(0.01)	(0.01)
NAP/Y [1/]	-0.127**	-1.119***	-	-0.428***	-0.489*	-	-0.213	-0.207**
	(0.07)	(0.24)		(0.07)	(0.24)		(0.20)	(0.08)
Adjusted R^2	0.723	0.521	0.614	0.903	0.791	0.815	0.880	0.881
Sample	1970-2007	1970-2007	1970-2007	1970-2007	1970-2007	1987-2007	1970-2007	1982-2007

Sample period: 1977.1-2007.1

Standard errors in parenthesis (Newey-West).

**** (**) * imply statistical significance at the 1% (5%) and 10%.

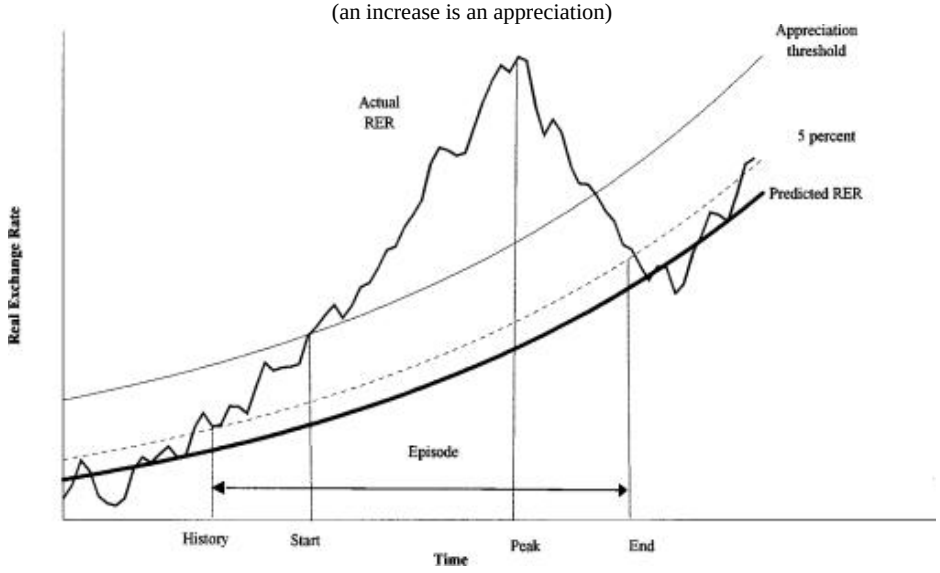
1/ NAP constructed with the net extenral postion in Lane and Milesi-Ferretti (2001).

In accordance to our null hypothesis, the dynamics of the "equilibrium" RER should not be affected by the exchange rate regime. We assume neutrality of the regime in the long

run[9]. The results validate the presumption that Central American countries are similar among theme, especially Costa Rica, the Dominican Republic, Guatemala and El Salvador. For instance, the effect of our relative productivity measure on the RER is not statistically different for the first three countries and the effect of terms of trades is not different for Costa Rica, Guatemala and El Salvador.

Based on the above results, it is possible to compute the contemporaneous RER misalignment. This is the difference between the actual RER level and the one predicted by equation (1) when evaluated at the contemporaneous values of the fundamentals. To see whether misalignments are relevant, one should define a metric. We follow Goldfajn and Valdés (1999) and define an episode of appreciation as the time elapsed between the moment in which the RER misalignment first reaches 5%, and then continues above certain threshold, and the moment in which the RER returns to an over-appreciation of 5% or less. Figure 2 shows the way in which an appreciation episode is defined in Goldfajn and Valdés (1999)[10].

Figure 2. Appreciation Episodes: Definition and Phases
(an increase is an appreciation)



Source: Goldfajn and Valdés (1999), pp.236.

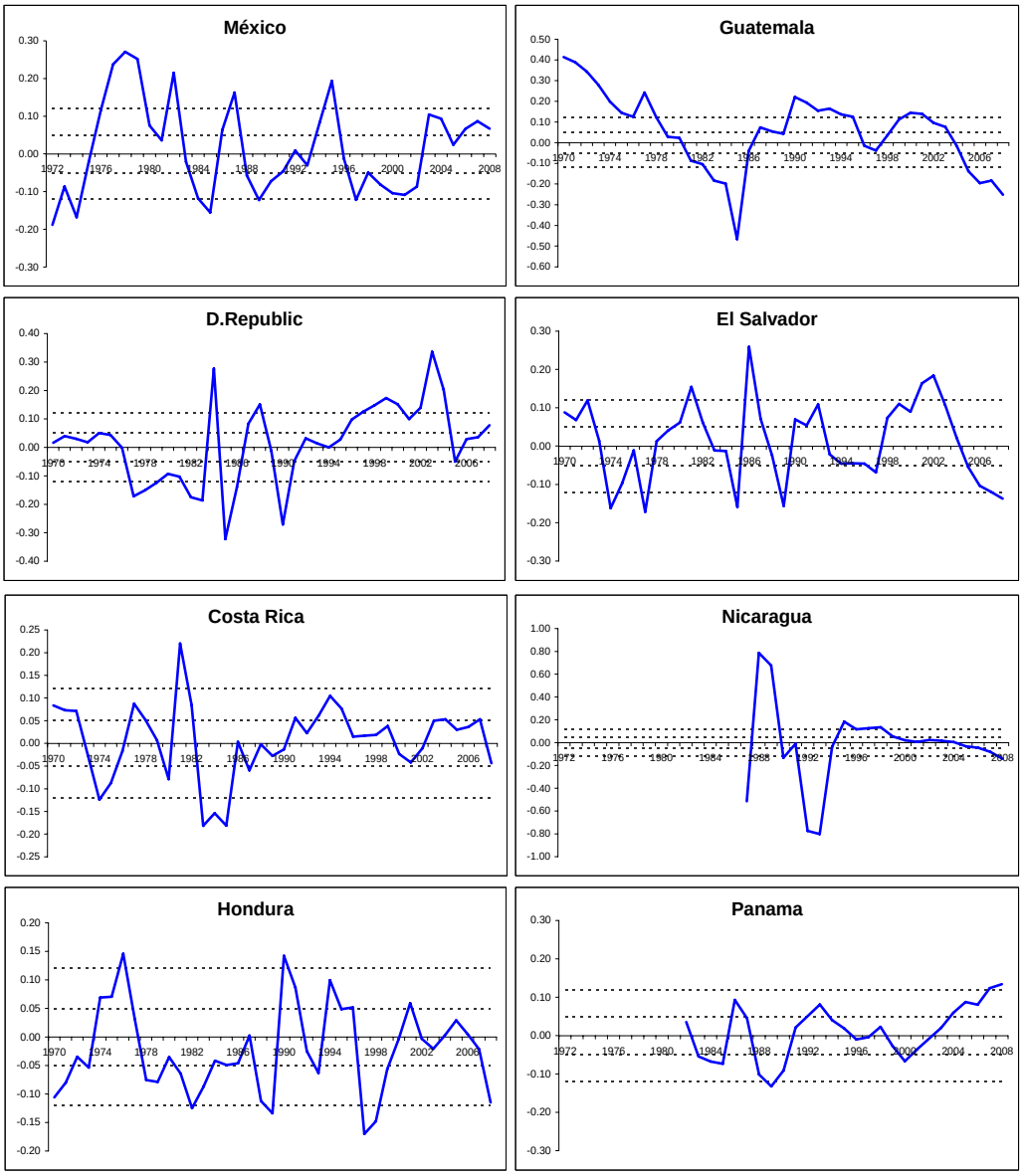
[9] We estimate the model for El Salvador between 1970 and 2000 and the results are not statistically different from those obtained using the whole sample.
[10] In Goldfajn and Valdés (1999) an appreciation is an *increase* in the RER. Because we use a different definition of the RER, an increase in this variable should be interpreted as a depreciation.

Our threshold level is 12% and the duration of the appreciation (and depreciation) episode is defined as the time between the *history* point and the *end* point in Figure 1. We present the evolution of the RER misalignment for each country along with the +/- 5% line and the threshold line of +/-12% in Figure 3. The last point is the misalignment computed with data available the first quarter of 2008. In Figure 3 a misalignment above zero is an over-depreciation and below zero an over-appreciation.

Results are coherent with causal information about countries. For example, in the case of Mexico, the RER depreciates substantially after the Tequila crisis (1994). In particular the RER was undervalued by nearly 20% in 1995 a year after the crisis hit the Mexican economy. After this, the RER appreciated until 2003, and then it has been above the value predicted by the fundamentals.

Figure 3. RER Misalignments

(percentage deviation from equilibrium level, dotted line at +/-12% and +/- 5%)



In the case of the Dominican Republic, the RER depreciated substantially after the abandonment of the peg in 1982. A year later, the RER was undervalued by nearly 30%. On the other hand, in 2003 after a severe currency crisis the RER depreciated substantially and was above the value predicted by its fundamentals. Today the misalignment is not very important.

Guatemala abandoned the peg in 1984 after years in which the RER was overvalued. As shown in Figure 3, the abandonment of the peg may be explained by RER

misalignments that became unsustainable. After 1984 this misalignment tends to be corrected, although the RER had been, from 1988 to 2004, slightly above its equilibrium level. Today the RER is importantly overvalued (25%), which indicates that a nominal depreciation and/or an increase in inflation are needed to correct this misalignment.

In El Salvador, the RER depreciated importantly some years after the abandonment of the peg in 1983. In particular, the RER was undervalued nearly 25% in 1986. After the dollarization in 2001, the RER has been converging to its equilibrium level. Today there is an overvaluation of 13%.

Costa Rica abandoned the peg in 1981. That year the RER depreciated substantially, showing an undervaluation of 22%. Since 1988 the RER has been fluctuating around its equilibrium level with small degree of misalignment. Today the RER is slightly overvalued (4,4%).

Before 1991, Nicaragua spent a long period with free falling regime. Perhaps as a consequence of this, the RER was severely undervalued from 1988 to 1990 (nearly 60%, as shown in Figure 3). In 1991 the exchange rate was pegged. This and the fact that inflation was still high may have contributed to an important appreciation of the RER which lasted until 1994 a year after a crawling peg regime was introduced. This may have contributed to stabilize the RER around its equilibrium level. Today the RER is overvalued in nearly 14%.

In the case of Honduras, after the abandonment of the peg in 1990, the RER depreciated importantly. Then it fluctuated around its equilibrium. Today the RER is undervalued by nearly 10%.

Panama has experienced a comparatively small degree of RER misalignment since 1982. Today the RER is undervalued in nearly 14%. This means that some inflation is required to restore the equilibrium.

In Table 3 we present the duration and the average size of misalignment episodes. The duration of the misalignment episode is defined as the distance between the *history* and *end* points in Figure 2. Appreciation episodes tend to last between 1.5 years (Nicaragua)

to 4.5 years (Guatemala). The average size of appreciations fluctuates between -38.7% (Nicaragua) to -10.8% (Panama). For all countries, depreciation episodes tend to last for longer than appreciation ones. In particular, these episodes last between 2.0 years (Nicaragua) to 6.7 years (Guatemala). On the other hand, the average size of misalignment in these cases tends to be, in general, below the size of the appreciation episodes.

The above evidence suggests that, in general, appreciation episodes tend to be reverted faster than the depreciation ones. This asymmetry can be explained by the fact that appreciations tend to end abruptly once a certain level of nominal exchange rate can not be sustained any longer. This is in line with the findings in Goldfajn and Valdés (1999) showing that in most cases large and medium appreciations are reverted in short time with nominal devaluations. On the other hand, the fact that depreciations tend to last longer may be due to the existence of *free falling* episodes (i.e. continuous depreciations in a high inflation environment), associated to a non credible monetary policy. In this case, if policy is not credible, and prices are sticky, the depreciation episodes can last for longer given the fact that the lack of credibility *does not* set an upper bound for the nominal exchange rate. In such a case, the RER may deviate from its long run level persistently.

Table 3. RER Misalignments in Different Periods
(both, duration and misalignment are the episode average)

	Appreciation		Depreciation	
	Duration (years)	Misalignment (%)	Duration (years)	Misalignment (%)
México	2.3	-12.2%	2.5	16.4%
Guatemala	4.5	-20.0%	6.7	17.7%
D.Republic	3.3	-21.5%	4.0	22.1%
El Salvador	1.6	-14.7%	2.6	11.4%
Costa Rica	2.5	-13.9%	2.5	11.7%
Nicaragua	1.5	-38.7%	2.0	33.9%
Honduras	2.2	-11.0%	2.5	11.1%
Panama	3.0	-10.8%	5.0	9.7%

On average, in the analyzed period, CAD countries have spent 19% of the time in over-appreciation periods and 26% of the time in over-depreciated periods. In total, RER has bee significantly (and persistently) deviated from its equilibrium level 45% of the time.

Panama, the region's dollarized country *par excellence* has been much closer to equilibrium: only 22% of the time in misalignment zones.

In the case of El Salvador, since dollarization in 2001, the country spent 78% of the time within the RER misaligned zone respect to its fundamental level. The RER in El Salvador was over-depreciated from the year 2000 until 2003 and then over-appreciated from 2007 to the end of the sample (2008). This 78% is considerably more than the overall average and it is also more than El Salvador's own historical average of 57%. It is also more than the overall average of 39% for all other countries for the same period (2001 to 2008). Finally, it is also worth comparing the dollarized El Salvador with its more similar neighbors, i.e. to exclude Mexico, Panama and Nicaragua from the sample. The average for this reduced sample is 49% and for the 2001-2008 period is 39% (coincidently the same as for the complete sample of countries). We conclude that, even though Panama has had a RER closer to its equilibrium level than the average CAD country, this is not the case for El Salvador. This supports the idea that some flexibility of the RER allows this variable to be closer to its equilibrium level. In fact, the Costa Rican crawling peg strategy has been particularly successful in maintaining the RER close the its equilibrium level, it has been only 27% of the time in misalignment, 0% if we consider the 2001 – 2008 period.

With respect to the size of the misalignments, the evidence does not point in the same direction. In fact, the average size of over-appreciations and under-appreciations in El Salvador and Panama has been somewhat lower than the average for the other CAD countries. That means that, for the case of El Salvador, the RER has been more persistently deviated from the equilibrium RER, but the size of the misalignment is not necessarily larger.

4.2 Inflation Persistence

Against the argument that more flexible exchange rate regimes are more appropriate to avoid undesired fluctuation in the real exchange rate due to price rigidities, Calvo (2003) shows in the context of a simple model, that the fixed exchange rate if credible can in itself reduce inflation persistence. That is, inflation persistence is not exogenous

to the exchange rate regime. The reason is that when low and stable inflation is credible, economic agents set prices in a more forward-looking fashion.

Even in the extreme case in which dollarization is adopted, the fact that domestic prices are sticky means that the *foreign* monetary policy is not neutral. As a result, changes in the nominal foreign interest rate will have impacts over the real interest rate, affecting consumption, output and labor and, as a consequence, affecting the inflation dynamics. In particular, the New Keynesian literature (Christiano, Eichenmbaum and Evans, 2005, and Galí, 2008, among many others), have emphasized a relationship among inflation, the degree of price stickiness and marginal costs of the form:

$$\pi_t = E_t\left(\pi_{t+1}\right) + \lambda y_t \quad (2)$$

where π is the inflation rate, *y* is a measure of the output gap (which is supposed to be proportional to the marginal costs) and λ is a coefficient depending on the degree of price stickiness. In particular, if prices are stickier (i.e., they take longer to adjust, or are kept fixed for longer), the λ coefficient will be smaller, and vice versa. A direct implication of this is that in an environment of high degree of price stickiness, the output gap (marginal costs) will have to be adjusted in a large proportion to affect inflation. As a result, the *sacrifice ratio* will be larger the stickier the prices.

An open economy version of (2) that also includes some degree of inflation persistence[11] can be expressed as:

$$\pi_t = \alpha E_t\left(\pi_{t+1}\right) + \beta\pi_{t-1} + \lambda y_t + \delta\pi^*_t \quad (3)$$

where the lagged term in inflation captures the fact that some of the firms reset prices according to past inflation. As monetary policy becomes more credible, expected inflation will be more important in explaining current inflation. If credibility is low, current inflation will be mainly determined by past inflation. On the other hand, foreign inflation affects marginal costs and therefore has an impact on domestic inflation beyond that of the output gap.

We estimate this basic equation for all CAD countries to see the relative importance of each inflation determinant. We do so with quarterly data from 2001.Q1 to 2008.Q1 (see

[11] See Galí and Gertler (1999), Medina and Soto (2007), Lubik and Schorfheide (2007) and Caputo and Liendo (2005)

the Appendix for a detailed description of data sources). The output gap is computed using the Hodrick-Prescott filter and foreign inflation corresponds to the USA's PPI and is measured in domestic currency using each period's average nominal exchange rate. Based on (3) we can test the following hypothesis:

i) Dollarized economies exhibit a large response to foreign inflation (a large δ coefficient)

ii) Credibility is higher in dollarized economies (a smaller β and a larger α)

iii) Prices are stickier in dollarized economies (a smaller λ). In fact, more credible policies may lead to less frequent adjustments in prices, as pointed out by Fernandez-Villaverde and Rubio-Ramirez (2007).

Table 4 shows the main results.

Expected inflation is an important element behind inflation dynamics in Panama. In particular, the forward-looking coefficient is nearly 0.4 and it is not statistically different from the lagged one, 0.5. Of all CAD countries, Panama is the only one exhibiting both a more forward-looking behavior and less persistent inflation. Even when compared to a non CAD country, like Mexico—which follows an inflation targeting regime—, Panama's inflation dynamics is driven by inflation expectations. El Salvador has also a comparatively small degree of persistence; however, the impact of expected inflation is not different from zero and is smaller than in all other CAD countries except Honduras and Nicaragua.

The output gap elasticity is higher in Panama than in El Salvador. This suggests that price adjustments are less frequent in Panama (i.e., prices are stickier in Panama). Also, when compared to the rest of the countries where δ is different from zero (Costa Rica and Honduras), price stickiness is higher in Panama. When compared to Mexico, however, it seems that prices are adjusted more frequently in Panama. El Salvador, on the other hand, has output elasticity above those in other CAD countries and Mexico. In terms of the inflation response to foreign inflation, it is high in both Panama and El Salvador when compared to Mexico. This suggests that foreign goods may be important

in the consumption basket in both countries. When compared to the rest of CAD countries, however, the response in Panama and El Salvador is not statistically different.

The fact that Panama features more forward-looking and less persistent inflation, together with less sticky prices, suggests that this economy enjoys a comparatively high degree of credibility. This is perhaps not surprising given the fact that Panama's monetary policy has been delegated to the Federal Reserve for over a century. Inflation dynamics in El Salvador, on the other hand, is not very different from the rest of the CAD countries. This may owe to the fact that the regime is relatively recent and expectations are not fully anchored.

Table 4. Estimation of the NKPC (2)
(sample 2000.Q1-2008.Q1)

	Costa Rica	D. Republic	Guatemala	Honduras	México	Nicaragua	El Salvador	Panama
$E(\pi_{t+1})$	0.192**	0.112**	0.248*	-0.413**	0.011	-1.099***	0.048	0.337**
	(0.09)	(0.04)	(0.13)	(0.17)	(0.01)	(0.40)	(0.09)	(0.17)
π_{t-1}	0.740***	0.658***	0.740***	1.263***	0.757***	0.706***	0.590***	0.544**
	(0.10)	(0.06)	(0.13)	(0.15)	(0.04)	(0.17)	(0.11)	(0.24)
y_{t-1}	16.017**	0.051	5.473	21.247***	6.678*	-10.163	21.087*	15.888**
	(7.26)	(13.80)	(9.76)	(4.10)	(4.16)	(6.74)	(10.67)	(7.35)
π^{*}_{t}	0.077***	0.191***	0.034	0.119***	0.019*	0.275***	0.155***	0.104**
	(0.00)	(0.02)	(0.04)	(0.03)	(0.01)	(0.06)	(0.04)	(0.06)
MA (4)	-0.965***	-0.902***	-0.902***	-0.900***	-0.937***	-0.843***	-0.894***	-0.925***
	(0.00)	(0.03)	(0.04)	(0.06)	(0.03)	(0.12)	(0.05)	(0.03)
R^2	0.87	0.98	0.80	0.93	0.98	0.90	0.89	0.93
Adjusted R^2	0.85	0.98	0.77	0.92	0.97	0.88	0.87	0.92

Standard errors in parenthesis.
**** (**) * imply statistical significance at the 1% (5%) and 10%.

Some additional elements that may impact the inflation dynamics are related to foreign supply shocks: the price of oil and the price of food. Those elements have been at the center of the global inflation outburst in 2007 and 2008. To quantify the relative importance of those elements, we re-estimate (2) but we now introduce those additional elements. In addition, we incorporate data before 2000 to see the extent to which individual countries may have behaved differently in the past. The results of this estimation are presented in Table 5.

Table 5. Estimation of the NKPC with Supply Shocks (eq.3)

	Costa Rica	D. Republic	Guatemala	Honduras	México	Nicaragua	El Salvador	Panama
$E(\pi_{t+1})$	0.370***	0.068**	0.148	0.022	0.125**	-0.723**	0.130*	0.337**
	(0.09)	(0.03)	(0.09)	(0.18)	(0.05)	(0.31)	(0.08)	(0.17)
π_{t-1}	0.640***	0.472***	0.831***	0.797***	0.747***	0.868***	0.788***	0.544**
	(0.07)	(0.04)	(0.09)	(0.22)	(0.04)	(0.09)	(0.07)	(0.24)
y_{t-1}	12.433**	-	6.974	11.212**	40.671***	-14.274*	19.850**	15.888**
	(5.22)		(5.88)	(4.98)	(9.07)	(7.39)	(9.55)	(7.35)
π^{*}_{t}		-	-	-	-	-	0.185**	0.104**
							(0.04)	(0.06)
π^{*}_{t-1}	-	0.167***	-	-	0.147***	0.142	-	-
		(0.03)			(0.02)	(0.09)		
$\pi^{*}_{t-1, oil}$	-	-	-	0.013***	-	-	-	-
				(0.00)				
$\pi^{*}_{t-1, food}$		0.064**	0.028**	-	-	-	-	-
		(0.03)	(0.01)					
$\pi^{*}_{t-2, food}$	0.065***	-	-	-	-	-	-	-
	(0.02)							
MA (4)	-0.982***	-0.940***	-0.921***	-0.934***	-0.746***	-0.746***	-0.784***	-0.925***
	(0.04)	(0.02)	(0.04)	(0.01)	(0.12)	(0.05)	(0.10)	(0.03)
R^2	0.94	0.98	0.86	0.95	0.98	0.80	0.95	0.93
Adjusted R^2	0.93	0.97	0.85	0.95	0.98	0.78	0.95	0.92
Sample begins	1992.Q1	1992.Q1	1996.Q2	1998.Q2	1992.Q1	1995.Q2	1992.Q1	2000.Q2

Standard errors in parenthesis.

**** (**) * imply statistical significance at the 1% (5%) and 10%.

Once supply shock elements are introduced and the sample is extended (the exception is Panama for which we do not have additional data), the main results presented in Table 3 do not change substantially. In particular, inflation in Costa Rica reacts mainly to lagged inflation and to the output gap. Expected inflation is of less importance although its impact is different from zero. Once the price of food is introduced, the U.S. producer price inflation is no longer relevant in explaining Costa Rica's inflation. The same is true for Guatemala. In the case of the Dominican Republic ,the only difference with the previous specification is that both foreign and food inflation are relevant in the Phillips curve. In the case of Honduras, the only difference is that the relevant foreign price is oil. In the case of Nicaragua there are no substantial changes from expanding the sample: inflation is mainly determined by its lagged value.

For Mexico there are two important changes. First, the inflation elasticity to output increases substantially. This may be due to the fact that the extended sample considers a high inflation period that may have induced more frequent price adjustments, thus increasing λ. Second, the impact of foreign (U.S.) inflation is also higher than in recent years. This may be due to the fact that, although the U.S. is still Mexico's main trading partner, China and other countries have stronger trading links now than in the past.

In the case of El Salvador, the results are virtually unchanged. This suggests that inflation dynamics, in terms of its determinants, has not been modified (so far) by adopting the dollar as the official currency.

V. Conclusions

The present paper makes an empirical contribution to the discussion on the optimal exchange rate regime. It provides evidence to what might be the closest thing to a natural experiment that we can get in a cross-country comparison. We compare the dynamics of the RER and inflation persistence between dollarized countries and countries with some exchange rate flexibility in Central America and the Dominican Republic. One of the contributions of the paper is the dataset: we have gathered the relevant data for seven countries (including Mexico) since 1970.

To our knowledge, this is the first paper to provide systematic estimates for the RER and inflation equations for this group of countries. The results are satisfactory in two senses. First, we find that theoretically fundamental variables correlate with the RER and inflation with the right sign and reasonable magnitudes. Second, we are able to explain a large part of the variance with equations that are relatively standard in the economic literature.

Our results show that the two dollarized countries in the region, El Salvador and Panama, are quiet different in terms of RER and inflation dynamics. While in the case of El Salvador the RER spends more time away from the equilibrium level than the non-dollarized countries in the region, the contrary is true for Panama. We also find that inflation persistence is similar in El Salvador to that in the other countries, but smaller in Panama. This leads us to the conclusion that some degree of exchange rate flexibility

helps countries to have a more aligned RER. Nevertheless, a long-lived, highly credible dollarized economy, like Panama, can reduce inflation persistence to such an extent that RER misalignments are in fact less frequent than in countries with more flexible exchange rate regimes.

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DATA APPENDIX

Inflation: CPI inflation (International Financial Statistics, IMF CD August 2008), Core Inflation based on Central Bank and National Statistical Offices in each country.

International Oil Price: wti oil price (WTI), IMF.

Real Exchange Rate (RER): Constructed as the ratio between the Nominal Exchange Rate times the CPI USA index and the producer price inflation in each country (International Financial Statistics, IMF CD August 2008). When producer price inflation is not available, we use Wholesale Price Inflation or CPI inflation.

Government Expenditure (G/Y): Constructed as a percentage of the GDP. Source: World Development Indicators, World Bank.

Terms of Trade (ToT) : Is the ratio between the export price index (Px) and import price index (Pm). Source: World Development Indicators, World Bank.

Relative Productivity between Tradable and Non Tradable sectors (TNT): As a proxy of this variable we use the ratio between the per capita GDP in each country, to the per capita GDP in the USA. Source: World Development Indicators, World Bank.

Net Foreign Asset Position (NAP/Y): Is the ratio between the Net Foreing Asset Position in each economy (in US$) and the GDP (also in US$). Source: Lane, P. and G.M. Milesi-Ferretti (2006).

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