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Exchange Rate Pass-through in Emerging Countries: Do the Inflation Environment, Monetary Policy Regime and Institutional Quality Matter?

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Highlights

- We estimate the exchange rate pass-through (ERPT) to consumer prices and assess its dynamics for a sample of 15 emerging countries over the 1994-2015 period.
- A declining ERPT is evidenced with more stable and anti-inflationary environment.
- Monetary policy regimes play a key role in explaining this diminishing ERPT.
- Transparency of monetary policy decisions reduces ERPT.

Abstract

In this paper, we estimate the exchange rate pass-through (ERPT) to consumer prices and assess its dynamics for a sample of 15 emerging countries over the 1994-2015 period. To this end, we augment the traditional bivariate relationship between the nominal effective exchange rate and inflation by accounting for the inflation environment, monetary policy regime, as well as domestic institutional factors. We show that both the level and volatility of inflation matter in the sense that declining ERPT is evidenced with more stable and anti-inflationary environment. Monetary policy also plays a key role since adopting an inflation target-especially de jure-leads to a significant reduction in ERPT for most countries. Adopting exchange rate targeting regime matters as well, contributing to a diminishing ERPT. Finally, we find evidence that transparency of monetary policy decisions clearly reduces ERPT, while this is not the case for central bank independence.

Keywords

Exchange Rate Pass-through, Inflation, Emerging Countries, Monetary Policy.

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E31, E52, F31.

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RESEARCH AND EXPERTISE ON THE WORLD ECONOMY

Exchange rate pass-through in emerging countries: Do the inflation environment, monetary policy regime and institutional quality matter?[1]

Antonia López-Villavicencio*, and Valérie Mignon†

1. Introduction

Traditional monetary theory regards high money creation as a common source of instability in both the exchange rate and the price level. Accordingly, in the presence of large monetary shocks, price inflation and exchange rate depreciation should be closely linked. Indeed, the relation between nominal exchange rate changes and price inflation—the exchange rate pass-through, ERPT from now on[2]—can be important in an unstable monetary environment in which nominal shocks fuel both exchange rate depreciation and high inflation.

However, the bulk of the empirical literature finds that prices do not fully reflect exchange rate movements, meaning that ERPT is incomplete or partial.[3] Two main approaches have been proposed to explain this phenomenon:[4] a macroeconomic approach (Monacelli (2003)) in which the incompleteness comes from nominal rigidities leading to unresponsiveness in prices in the short run, and a microeconomic approach linking the incomplete ERPT to an increasing degree of pricing-to-market behavior of firms (Betts and Devereux (2000)). This literature also argues that ERPT has been declining in many industrialized countries following a dramatic change in inflation environment during the 1990s. In particular, ERPT seems to be very low over the past decades for a broad group of countries that have pursued

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[2]Strictly speaking, ERPT corresponds to the degree to which changes in the nominal exchange rate impact trade prices—especially import prices—and, in turn, other domestic prices. The original definition has been extended to address the effects of exchange rate changes on consumer or producer prices. The level of transmission corresponding to the original definition is referred to as "the first-stage ERPT", while the one corresponding to the extended definition is referred to as "the second-stage ERPT".

[3]See Menon (1995) for a survey, and Campa and Goldberg (2005), Marazzi and Sheets (2007), Bouakez and Rebei (2008) or Gust, Leduc, and Vigfusson (2010) for more recent empirical studies.

[4]For more details, see Aron, MacDonald, and Muellbauer (2014) among others.

stable and predictable monetary policies.[5]

A common explanation for the declining ERPT is that expectations of inflation have become much more solidly anchored in recent years. In the context of a stable and predictable monetary policy environment, nominal shocks play a vastly reduced role in driving fluctuations in prices and in the exchange rate (Taylor (2000)). Thus, a stable monetary policy environment—supported by an institutional framework that allows the central bank to pursue a credible and independent policy—contributes to explaining why even sizeable depreciations of the nominal exchange rate have exerted small effects on consumer prices: when the inflation environment is more stable, firms resist passing exchange rate changes on to prices. A similar argument is developed in Devereux and Yetman (2010), where the size of pass-through is a function of the stance of monetary policy as it affects the degree of price stickiness. When firms can adjust their frequency of price changes, loose monetary policy (associated with high inflation) leads to higher ERPT. In this sense, ERPT would be endogenous to a country's inflation performance. Note, however, that low ERPT will persist only so long as monetary authorities continue with a credible monetary policy.

Falling into this strand of the literature, this paper aims at estimating ERPT to consumer prices and assessing its dynamics for a sample of 15 emerging countries over the 1994-2015 period. The case of emerging countries is particularly interesting since these economies have undergone major changes in the last two decades: adoption of inflation targeting, adoption of floating exchange rate regimes, elimination of capital controls, etc. Consequently, these countries may face higher imported inflationary pressures and exchange rate volatility. Besides, given that many of them have also reached low and quite stable inflation levels by the end of the 1990s, it is likely that they have experienced the declining ERPT observed for advanced economies. In their survey, Aron, MacDonald, and Muellbauer (2014) put forward the very different estimates obtained for ERPT, and emphasize that frequent misspecifications are at play in the empirical literature.

Being aware of this issue, we go further than previous literature by paying attention to various key elements in investigating ERPT in emerging countries. First, most of the empirical literature either relies on a single country or on a panel of economies by imposing country homogeneity.[6] Here, we consider country-by-country estimations and thus account for heterogeneity through not imposing the same ERPT coefficients for all countries. Second,

[5] See Gagnon and Ihrig (2004), Bailliu and Fujii (2004), Ihrig, Marazzi, and Rothenberg (2006), Marazzi and Sheets (2007), Bouakez and Rebei (2008), and Dong (2012) among others.

[6] For a survey, see Aron, MacDonald, and Muellbauer (2014).

we augment the usual bivariate relationship between inflation and change in the nominal exchange rate by including various variables and interaction terms. Specifically, in addition to control variables, we account for the inflation environment, monetary policy, and quality of institutions. Third, turning to methodological considerations, we do not impose restrictive lag structures in the ERPT equation but appropriately select the optimal number of lags to avoid ERPT underestimation. Fourth, we distinguish between the effects of having adopted a quantitative target (a *de jure* commitment) from the effects of hitting the target (a *de facto* target).

Our main results can be summarized as follows. First, we show that inflation environment matters in the sense that declining ERPT is evidenced with more stable and anti-inflationary environment. Second, adopting inflation targeting regime leads to a significant decline in ERPT for most countries, with a more important impact evidenced for *de jure* compared to *de facto* regime. Third, adopting exchange rate targeting regime matters as well, contributing to a diminishing ERPT. Finally, we find evidence that transparency of monetary policy decisions clearly reduces ERPT, while it is not the case for central bank independence.

The rest of the paper is organized as follows. Section 2 describes our various ERPT specifications, as well as the methodology. Section 3 presents the sample of countries and data, together with some stylized facts. Section 4 is devoted to the estimation results and related comments. Finally, Section 5 concludes the paper.

2. ERPT specifications and methodology

The baseline equation used to estimate ERPT relies on the generic specification proposed by Goldberg and Knetter (1997):[7]

$$\Delta p_t = \alpha + \gamma \sum_{j=1}^{n} \Delta p_{t-j} + \rho \Delta y_t + \lambda \Delta p_t^* + \theta \Delta e_t + \epsilon_t \quad (1)$$

where p_t denotes the consumer price index in period t, e_t is the nominal effective exchange rate, p_t^* corresponds to prices of competing goods, and the demand shifter is measured by the industrial production index y_t. ϵ_t is an independent and identically distributed error term.[8] All the variables are expressed in logarithms.

[7] The ERPT equation is usually specified in first differences because the underlying series are generally found to be integrated of order one and non-cointegrated (see, e.g., Campa and Goldberg (2005)).

[8] As previously mentioned, we do not impose an *ad hoc* restrictive lag structure. We include various lags of

2.1. Accounting for the inflation environment

As stressed above, various theoretical and empirical studies emphasize that the degree of ERPT may depend on inflation uncertainty and the conduct of monetary policy. Indeed, in his seminal work, Taylor (2000) proposes that the declining pass-through in industrialized countries is the result of the low inflation environment experienced by these economies during the 1990s, in contrast to the high inflation rates recorded for previous decades. Taylor (2000) explains the link between inflation and ERPT using a model of firm behavior based on staggered price setting and monopolistic competition. A key point in the model is how exchange rate shocks are perceived by importers and producers. If the increase in costs following a depreciation is perceived as transitory, agents can reduce temporarily their markups, save the menu costs of changing prices and simply wait until the shock reverts. On the contrary, if the shock is perceived as permanent or highly persistent, the price adjustment is inevitable. Since the economy will be subject to more persistent nominal shocks in high inflation regimes, the link between the level of inflation and the pass-through emerges. In the same line, importers and producers will find it easier to increase their prices more frequently in a high and unstable inflation environment (see Choudhri and Hakura (2006)).

Given that many emerging economies have reached low and stable inflation levels by the end of the 1990s, it is likely that they have also experienced the decline in the pass-through observed in the industrialized world. Under this scenario, we start by analyzing the impact of the inflation environment on ERPT. For this purpose, we consider two variables. First, we use the 12-period backward moving average of the inflation rate (denoted as MA INF_t) to account for the level—high or low—of inflation environment.[9] Second, we rely on the standard deviation backward moving average of the inflation rate (denoted as SD INF_t) to capture inflation stability and persistence. If the variance of inflation declines, its persistence also decreases while high variance is associated with high inflation persistence. Specifically, the corresponding two equations are given by:

$$\Delta p_t = \alpha + \gamma \sum_{j=1}^{n} \Delta p_{t-j} + \rho \Delta y_t + \lambda \Delta p_t^* + \theta \Delta e_t + \theta^{MA} (\Delta e_t \times \text{MA INF}_t) + \epsilon_t \qquad (2)$$

the inflation rate to better capture the observed inertial behavior of inflation (inflation persistence) and to avoid underestimating ERPT. Considering a maximum of twelve, the optimal number of lags is chosen using the general-to-specific criteria (5% significance level).

[9] To avoid relying on a too short moving average length to characterize an inflationary environment, we also consider other lengths as robustness checks. The findings are very similar, as shown by the results reported in Table 9 in Appendix for a 36-period backward moving average of the inflation rate.

$$\Delta p_t = \alpha + \gamma \sum_{j=1}^{n} \Delta p_{t-j} + \rho \Delta y_t + \lambda \Delta p_t^* + \theta \Delta e_t + \theta^{SD}(\Delta e_t \times \text{SD INF}_t) + \epsilon_t \tag{3}$$

where MA INF_t and SD INF_t capture the past mean inflation and its stability, respectively. It is worth mentioning that we do not include directly—i.e., in a non-interactive fashion—those two variables in the previous equations since they are obtained from past inflation and, in turn, are correlated with the lagged dependent variable. In Equations (2) and (3), we interpret a positive and significant coefficient θ^{MA} and θ^{SD} as evidence that ERPT is more important when inflation is higher in the first case, and more unstable in the second case. ERPT depending on the inflation environment, the total effect of the exchange rate on prices is given by:

$$\text{Total ERPT}_t = \frac{\partial \Delta p_t}{\partial \text{MA INF}_t} = (\theta + \theta^{MA}\overline{\text{MA INF}})\Delta e_t \tag{4}$$

and

$$\text{Total ERPT}_t = \frac{\partial \Delta p_t}{\partial \text{SD INF}_t} = (\theta + \theta^{SD}\overline{\text{SD INF}})\Delta e_t \tag{5}$$

where $\overline{\text{MA INF}}$ and $\overline{\text{SD INF}}$ are the mean of the inflation rate and the mean of its standard deviation over the whole period, respectively. We calculate the total effect of a one-unit increase in the exchange rate obtained using the estimates from the considered regression model (Equations (2) and (3)).

2.2. Accounting for monetary policy

An important monetary policy implication, especially for emerging markets, is that if the central bank manages to establish a credible low inflation regime, then ERPT should decline quickly. This hypothesis seems particularly relevant in countries that have adopted a monetary target (see, e.g., Taylor (2000)). Fatás, Mihov, and Rose (2007), for instance, identify transparent targets for monetary policy with quantitative targets. These targets are easily measured. Moreover, quantitative targets are transparent since they can be assessed without (much) debatable personal judgment. A formal commitment to a quantitative target is expected to influence (improve) the formation of inflation expectations and (reduce) inflation uncertainty (Mishkin (2007)).

In practice, central banks have used three types of quantitative monetary targets (with varying degrees of success): inflation, exchange rates, and money growth rates. In the first case, the adoption of an inflation targeting regime is supposed to contribute to reductions in both the level and volatility of inflation (Vega and Winkelried (2005)). The basic underlying idea is that adopting inflation targeting leads to credibility gains that are responsible for keeping low inflation expectations following an exchange rate appreciation. Consequently, opting for an inflation target is a means to reduce ERPT since under this regime, (i) inflation is expected to be diminished and stabilized, and (ii) central banks are expected to gain credibility as inflation-fighters. In addition, as shown by Reyes (2007), under inflation targeting regime, central banks respond to an exchange rate appreciation by increasing the interest rate to impede that exchange rate changes feed into inflation. The exchange rate dynamics is in turn affected, weakening the ERPT to inflation.

Regarding exchange rate targets, there is an extensive literature which compares the merits of fixed and floating exchange rate regimes both theoretically and empirically,[10] and the macroeconomic effect of the exchange rate regime is still an open question. We follow Fatás, Mihov, and Rose (2007) and identify exchange rate targeting countries as those that have adopted fixed exchange rates. The underlying idea is that these regimes correspond to well-defined monetary policies and are, therefore, transparent, contrary to floating regimes.[11] In countries for which the exchange rate acts as a nominal anchor to inflationary anticipations, an exchange rate change tends to be quickly incorporated into expectations and, in turn, into prices. As a consequence, ERPT is expected to be higher for such economies. In the case of no exchange rate intermediary target, the pass-through tends to decrease as expectations are not strongly linked to the exchange rate. In a floating regime with inflation targeting, the influence of exchange rate changes on non-tradable prices is expected to be weak: in that case, ERPT tends to decline as the adoption of inflation targeting shifts inflation anticipations from the exchange rate to the inflation target.

Along these lines, we investigate the link between ERPT and monetary policy behavior. To this end, we add to the baseline regression the exchange rate variation interacted with two variables that capture quantitative monetary targets: (i) a dummy variable that takes the value of one if the country has adopted inflation targeting, zero otherwise; and (ii) a dummy variable that takes the value of one if the country has adopted an exchange rate target, zero otherwise.[12] The corresponding estimated models are the following:

[10] See, e.g., Eichengreen (1994), Devereux (1999), Edwards (2001) and Frankel (2003) among others.

[11] We do not analyze the effects of money growth rate target since most of our considered countries have abandoned this objective long before our sample period.

[12] Fatás, Mihov, and Rose (2007) suggest that inflation targeting is far more durable than exchange rate

- For inflation targeting (IT):

$$\Delta p_t = \alpha + \gamma \sum_{j=1}^{n} \Delta p_{t-j} + \rho \Delta y_t + \lambda \theta p_t^* + \theta \Delta e_t + \theta^{IT} (\Delta e_t \times IT_t) + \phi IT_t + \epsilon_t \quad (6)$$

- For exchange rate targeting (ERT):

$$\Delta p_t = \alpha + \gamma \sum_{j=1}^{n} \Delta p_{t-j} + \rho \Delta y_t + \lambda \theta p_t^* + \theta \Delta e_t + \theta^{ERT} (\Delta e_t \times ERT_t) + \phi ERT_t + \epsilon_t \quad (7)$$

In Equations (6) and (7), IT_t and ERT_t represent inflation and exchange rate target, respectively. Thus, the coefficients on these interaction terms capture any change in pass-through that occurs as a result of a transition to a new monetary regime. For instance, in Equation (6) there are two coefficients of interest: the coefficient on the rate of change in the exchange rate (i.e., θ) and the coefficient on the interaction term described above (i.e., θ^{IT}). The former captures the average rate of short-run ERPT, whereas the latter captures any incremental effect due to a move to an inflation targeting regime. For instance, a non significant coefficient on the dummy variable implies that ERPT in the presence of an inflation target is not statistically different from the overall ERPT. The total effect in this case is:

$$\text{Total ERPT}_t = \frac{\partial \Delta p_t}{\partial \text{IT}_t} = (\theta + \theta^{IT}) \Delta e_t \quad (8)$$

Similarly, the total effect in the case of exchange rate targeting is given by:

$$\text{Total ERPT}_t = \frac{\partial \Delta p_t}{\partial \text{ERT}_t} = (\theta + \theta^{ERT}) \Delta e_t \quad (9)$$

2.3. Accounting for domestic institutional quality

Finally, there is also a large literature that has investigated the role of domestic institutions in the conduct of monetary policy, most of which focuses on the effects of central bank independence and transparency (e.g., Alesina and Summers (1993), Eijffinger and Geraats (2006), and Dincer and Eichengreen (2014)).[13] Generally, good institutional quality is associated with a low level of inflation (see Cukierman (1992) and Aisen and Veiga (2008)

regimes.

[13]Obviously, the construction of independence and transparency indicators involves debatable personal judgment.

among others). For instance, Cukierman (1992) underlines that central bank independence tends to decrease inflation volatility, while Aisen and Veiga (2008) put forward the role of political instability and low level of democracy and institutional environment in explaining inflation volatility.

However, it should be mentioned that the findings are far from being unanimous. Campillo and Miron (1997) do not find evidence of a robust link between central bank independence and low inflation. These results are consistent with Posen (1995) showing that in countries characterized by a high level of inflation, an improvement in the quality of institutions is not associated with a decrease in the inflation rate.

Aiming at explaining the conflicting results found in the literature, Acemoglu, Johnson, Querubin, and Robinson (2008) investigate the relationship between central bank independence and inflation performance. They emphasize a negative link between the two variables only in the case of "average" degrees of the political and institutional environment, but no clear-cut relationship emerges when this environment is good—which is the case for most advanced countries—or bad. The underlying idea is that economies characterized by good political environment also have good institutions and low levels of inflation. In countries characterized by the absence of mechanism for controlling Government's action, inflation is determined irrespective of the central bank and, in turn, of its independence. Between these two extreme cases, the quality of institutions may play a key role.

Turning to methodological issues, one important concern relates to the relatively short time sample for which data on central bank independence and transparency are available. To maintain a maximum number of observations, we thus consider a panel data methodology more relevant than a country-by-country approach in that case. Moreover, since transparency and independence of the central bank of an individual country is in general quite stable over time, a panel data set approach increases the number of observations significantly, which allows us to formally estimate the role of the policy regime. Within this framework, we use three estimators to ensure the robustness of our findings. Specifically, we consider pooled, fixed effect and dynamic GMM panel-data estimators in equations where we interact the change in the effective exchange rate with either transparency or independence (see Equations (10) and (11) below). Although the GMM estimator does appear to be the most appropriate choice in our context, it should be mentioned that, as with any instrumental variable approach, it suffers from large finite-sample biases if the instruments are weak. Thus, if the lagged values of the endogenous variable are only weak instruments for subsequent first differences, the GMM estimator could be poorly behaved.

We acknowledge this potential drawback and address it by reporting estimation results for the pooled OLS and fixed-effect estimators. The corresponding two equations are given by:

$$\Delta p_{i,t} = \alpha_i + \beta_t + \gamma \sum_{j=1}^{n} \Delta p_{i,t-j} + \rho \Delta y_{i,t} + \lambda \theta p^*_{i,t} + \theta \Delta e_{i,t} + \theta^T (\Delta e_{i,t} \times T_{i,t}) + \phi T_{i,t} + \epsilon_{i,t} \quad (10)$$

and

$$\Delta p_{i,t} = \alpha_i + \beta_t + \gamma \sum_{j=1}^{n} \Delta p_{i,t-j} + \rho \Delta y_{i,t} + \lambda \theta p^*_{i,t} + \theta \Delta e_{i,t} + \theta^I (\Delta e_{i,t} \times I_{i,t}) + \phi I_{i,t} + \epsilon_{i,t} \quad (11)$$

where $i = 1, ..., 15$ denotes the country, α_i and β_t are individual and time fixed effects, respectively, and T_t and I_t represent transparency and independence of the central bank.

3. Data and stylized facts

We consider a sample of 15 emerging countries that have adopted an inflation targeting regime between January 1994 and July 2015: Brazil, Colombia, Czech Republic, Hungary, Indonesia, South Korea, Mexico, Peru, Philippines, Poland, Romania, Slovak Republic, South Africa, Thailand and Turkey. We use monthly data, allowing us to better account for changes in monetary policy regimes.

We rely on the following variables: (i) the consumer price index (P, source IMF-International Financial Statistics (IFS)), (ii) the nominal effective exchange rate defined as domestic currency per unit of foreign currency (E, source BIS), (iii) the index of industrial production (Y, source IFS), and (iv) trade-weighted foreign prices (P^*).[14] This last variable is derived using the definition of real effective exchange rates (rer) adopted by the BIS ($rer = E \times \frac{P}{P^*}$) as:

$$P^* = \frac{(E \times P)}{rer} \quad (12)$$

[14] An increase in the nominal exchange rate implies a depreciation. Therefore, a positive relationship is expected between exchange rate change and inflation, since a depreciation of the currency should be followed by an increase in inflation.

All the series are seasonally adjusted. We work with the year-to-year differences of the variables expressed in logarithmic terms.

MA INF_t and SD INF_t are computed as the 12-period backward moving average and standard deviation of the inflation rate, respectively. Table 1 displays the averages over the January 1994-July 2015 period of these two variables for the different countries. As seen, Turkey is clearly the country which exhibits the highest level of inflation over the whole period. This country has indeed experienced high and chronic inflation until the beginning of the 2000s, despite the several disinflation efforts backed by international organizations such as the IMF. Inflation has then registered a sharp decline since that period due to various reasons such as the commitment of the central bank to fight inflation, the adoption of an inflation target and tight fiscal policy implemented in 2001. However, despite those efforts, inflation still remains high in Turkey due to several factors as political instability, high public sector budget deficits, increasing money supply, etc.[15] Turning to the group of Latin-American countries, Brazil, Colombia and Mexico display quite comparable inflation levels; Peru exhibiting a lower inflation rate due to the major disinflation programme followed by the Peruvian central bank that brought inflation down from hyperinflation at the beginning of the 1990s to single-digit levels in 1997 and even to international levels in 1999. The group of Central and Eastern European Countries (CEECs) is quite heterogeneous, with Romania reporting a two-digit mean inflation rate around 20%, while being around 3.5% in the Czech Republic. In this regard, an important feature in Romania is that it presents a high share of administered prices in the consumption basket, a fact that may also explain the high volatility characterizing the evolution of inflation in this country. Finally the group of South Asian countries exhibits one-digit mean inflation rates, ranging from 3 (Thailand) to 9.7% (Indonesia). Those cross-country differences regarding mean inflation values and their corresponding volatility could be attributed to various factors, among which the type of monetary regime or central banks' practices, as we will investigate further.

Regarding the variables related to the monetary policy regime, we are interested not only in the effects of having adopted a quantitative target, but also in the effects of hitting the target. For this purpose, we distinguish between *de jure* inflation target (e.g., the effect of having formally declared an inflation target) and *de facto* target (i.e., successfully hitting the declared target). In the first case, the dummy variable ITJ_t takes the value 1 for countries that adopted an inflation target and 0 otherwise.[16] In the second case, the dummy variable ITF_t takes the value 1 if inflation is either below the inflation objective of the central bank

[15] See Kibritcioglu (2004) for a detailed study about the causes of inflation in Turkey.

[16] In other words, the dummy variable takes on the value one starting in the period in which the country adopted this monetary target (and for all subsequent years), and zero otherwise (source: Fatás, Mihov, and Rose (2007)).

Table 1 – Inflation environment

Country	Mean of inflation	S.D. of inflation
Brazil	7.46	1.87
Colombia	7.55	0.69
Czech Republic	3.49	0.91
Hungary	7.60	0.99
Indonesia	9.73	3.08
Korea	3.14	0.86
Mexico	8.54	1.10
Peru	3.83	0.78
Philippines	4.83	0.92
Poland	5.56	0.93
Romania	19.82	3.79
Slovak Republic	4.86	1.06
South Africa	2.15	0.68
Thailand	3.06	1.07
Turkey	25.73	1.19

Notes: "Mean of inflation" refers to the mean backward moving average inflation, and "S.D. of inflation" to the standard deviation backward moving average inflation over the whole period (January 1994-July 2015).

or between the inflation target band if it exists. Table 2 presents the default start date for the adoption of *de jure* inflation targeting for each country in our sample. Figure 1, in turn, depicts the evolution of the inflation rate after the adoption of the target *vis-à-vis* the inflation target. As shown, the adoption of the target has generally led to a reduction in the effective inflation rate in most countries, with however important heterogeneity across economies. Starting in the early 2000s, many countries indeed reduced their inflation rates and entered a period of relative price stability—inflation variability indeed decreasing. It is worth mentioning that the two countries exhibiting the highest mean levels of inflation, namely Romania and Turkey, are also those which have adopted inflation targeting regime later. Although several factors are thought to have contributed to this declining trend, it is generally agreed that a shift towards more credible monetary policy regimes played an important role.

With respect to exchange rate targeting, the dummy variable takes the value of 1 if the country announced a fixed exchange rate regime and zero otherwise. This implies that if an exchange rate regime is classified as having a managed or freely floating exchange rate, we

Figure 1 – Evolution of actual inflation relative to official targets after the adoption of inflation targeting

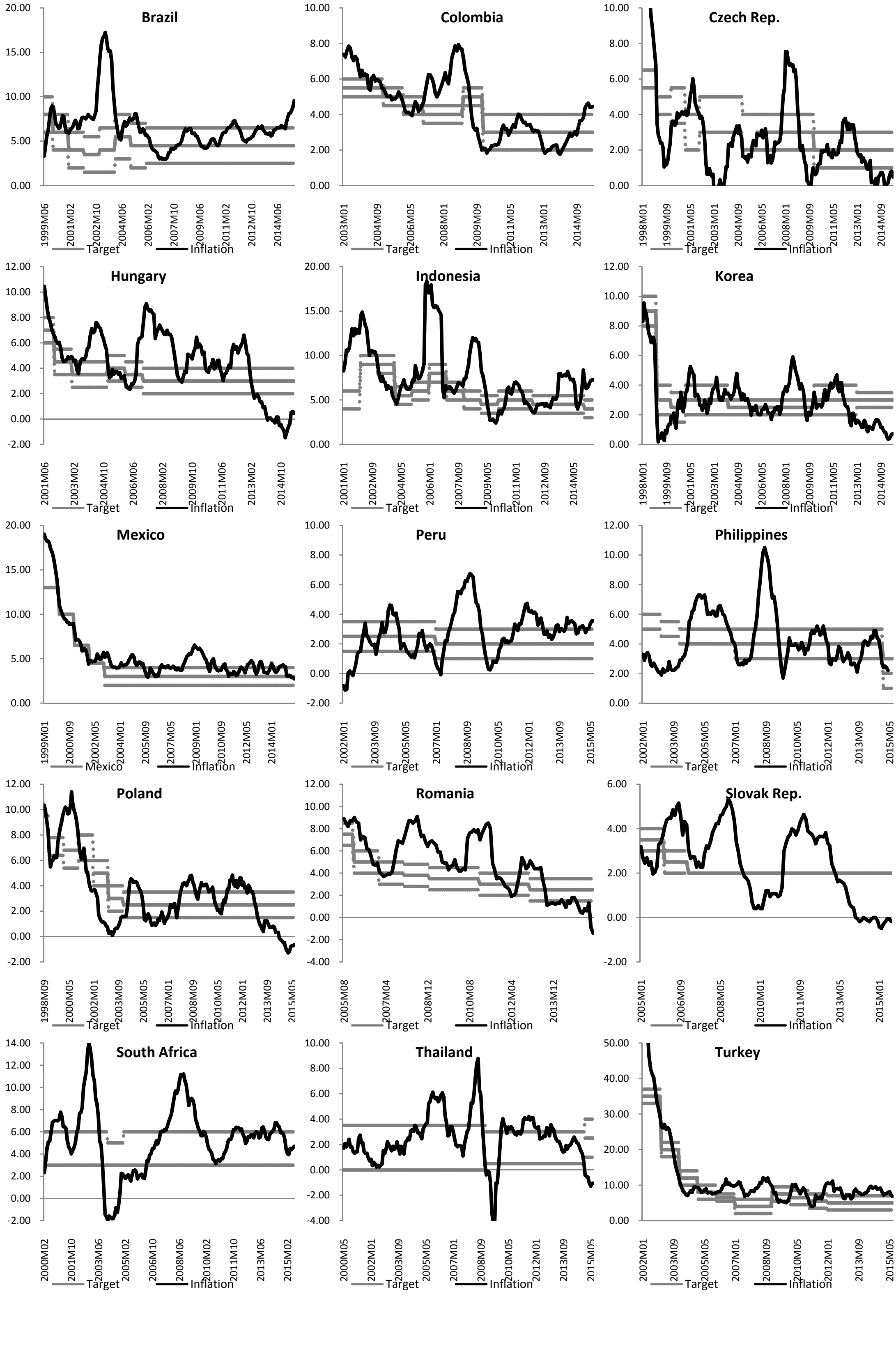

Table 2 – Inflation targeting countries. Default start date

Country	Date
Brazil	June, 1999
Colombia	September, 1999
Czech Republic	January, 1998
Hungary	June, 2001
Indonesia	July, 2005
Korea	April, 1998
Mexico	January, 1999
Peru	January, 2002
Philippines	January, 2002
Poland	September, 1998
Romania	August, 2005
Slovak Republic	January, 2005
South Africa	February, 2000
Thailand	May, 2000
Turkey	January, 2006

Notes: This table reports the default start date for the adoption of *de jure* inflation targeting. These dates are taken from Fatás, Mihov, and Rose (2007).

consider it to have no formal target.[17] However, it is well known that many countries that state they float actually intervene to smooth the exchange rate (a phenomenon known as "fear of floating"). Conversely, many countries that state they peg have a lot of inflation and capital controls so that their currencies are actually traded at deep discounts on black markets. Accordingly, *de facto* classifications make more sense in some cases than *de jure* ones. Therefore, we also consider the exchange rate regime classification proposed by Reinhart and Rogoff (2004) and updated on C. Reinhart's homepage. Their classification relies on the movements of market determined exchange rates, which often diverge from official ones when there are parallel or dual markets because of capital controls. Reinhart and Rogoff (2004) consider fifteen classification degrees that cover from pre-announced peg or currency board arrangement to freely falling.[18] Default dates for the end of exchange rate targeting are presented in Table 3.

Turning finally to the role of institutions, Eijffinger and Geraats (2006) develop a central bank transparency index, which is an aggregate of subindices relating to (i) political, (ii) economic, (iii) procedural, (iv) policy, and (v) operational transparency. This index has

[17] Our main source for the classification is Fatás, Mihov, and Rose (2007).

[18] We exclude "Dual market in which parallel market data is missing".

Table 3 – De jure and de facto exchange rate targeting regimes. Default end date

Country	De jure	De facto
Brazil	January, 1999	January, 1999
Colombia	October, 1999	July, 2009
Czech Republic	ERT throughout the period	ERT throughout the period
Hungary	February, 2008	ERT throughout the period
Indonesia	July, 1997	July, 1997-
		Between November, 2005-December 2010 ERT
Korea	November, 1997	November, 1997
Mexico	December, 1994	December, 1994
Peru	1991?	ERT throughout the period
Philippines	October, 1984	June, 1997
		Between December, 1999-December 2010 ERT
Poland	March, 2000	March, 2000
Romania	?	Between April, 2001 and December 2001, ERT
Slovak Republic	?	ERT throughout the period
South Africa	February, 2000	Not de facto ERT throughout the period
Thailand	June, 1997	June, 1997
		Between October, 1999-December 2010 ERT
Turkey	January, 2001	January, 2001
		Between August, 2007-December 2010 ERT

Notes: This table reports the default end date of exchange rate targeting regime. *De jure* classification is taken from Fatás, Mihov, and Rose (2007), and *de facto* classification from Reinhart and Rogoff (2004). Managed or free float are not considered as an exchange rate targeting regime.

recently been extended and updated for a large set of countries by Dincer and Eichengreen (2014). The data is annual and covers the period from 1998 to 2014. The resulting index is defined over a range from 0 to 15 (min = 0, max = 15). Equally, Dincer and Eichengreen (2014) present a central bank independence index that reflects the independence of the chief executive officer of the central bank, its independence in policy formulation, its objective or mandate, and the stringency of limits on its lending to public sector. This index, scoring from 0 (min) to 1 (max), is available for a large set of countries for the 1998-2010 period. Mean values over the available period are presented in Table 4.

4. Estimation results

Estimates of the baseline pass-through from exchange rate to consumer prices (Equation (1)) for our 15 emerging market countries are presented in Table 5. As seen, incomplete ERPT to consumer prices is a general result, confirming the findings obtained for advanced countries. In addition, abstracting away the effects of the inflation environment on the average pass-through, in twelve out of the fifteen countries, the results show that the pass-through estimates present the expected positive and significant sign: an increase

Table 4 – Average independence (1998-2010) and transparency (1998-2014) indexes

Country	Independence	Transparency
Brazil	NA	7.86
Colombia	0.29	6.26
Czech Republic	0.65	12.29
Hungary	0.71	10.24
Indonesia	0.73	7.24
Korea	0.32	8.53
Mexico	0.63	5.50
Peru	0.56	7.35
Philippines	0.29	8.62
Poland	0.32	7.97
Romania	0.70	5.68
Slovak Republic	NA	5.13
South Africa	0.15	8.44
Thailand	0.14	7.65
Turkey	0.56	8.15

Notes: (a) The central bank transparency index ranges from 0 (min) to 15 (max). (b) The central bank independence index ranges from 0 (min) to 1 (max). Data source: Dincer and Eichengreen (2014).

in the nominal effective exchange rate translates into a depreciation of the currency and should normally be followed by an increase in consumer prices. These findings, obtained at a country-by-country level, are also observed in a panel context, as shown by the panel estimates reported in Table 5: whatever the retained method, the ERPT is found to be incomplete, and the estimated coefficients are significantly positive, confirming the positive relationship between currency depreciation and increasing consumer prices. The notable exceptions are Colombia, Peru and South Africa for which no significant ERPT is detected. As shown in Table 1, these three countries are characterized by a quite low and stable inflation environment, as illustrated by (i) international-comparable mean levels of inflation for Peru and South Africa, and (ii) the lowest inflation volatility levels reached by the three economies. On the contrary, comparing country-by-country estimates to panel results, ERPT is particularly high in Romania and Turkey—the two countries exhibiting the highest mean inflation rates—and, to a less extent, in Indonesia and the Czech Republic. As for advanced countries, the ERPT to consumer prices is thus quite heterogeneous across individual emerging market countries. However, despite this heterogeneity, the general result that emerges from our analysis is that countries which have experienced high levels of inflation even after the end of the 1990s are those for which ERPT is found to be higher, as expected. This suggests that the inflation environment matters in explaining the size of

ERPT. Let us now address this hypothesis.

Table 5 – ERPT coefficients, January 1994-July 2015

	θ Coeff. (t-stat)
Brazil	0.011 (6.34)
Colombia	0.003 (1.45)
Czech Rep.	0.033 (5.58)
Hungary	0.017 (3.34)
Indonesia	0.043 (10.02)
Korea	0.024 (7.73)
Mexico	0.013 (4.16)
Peru	0.001 (0.02)
Philippines	0.015 (4.03)
Poland	0.013 (4.22)
Romania	0.102 (7.02)
Slovak Rep.	0.026 (2.82)
South Africa	0.001 (0.51)
Thailand	0.014 (3.13)
Turkey	0.071 (7.75)
Panel estimates	
Pooled	0.030 (21.63)
Fixed effects	0.029 (21.59)
GMM	0.045 (3.16)

Notes: This table reports the estimated value of θ in Equation (1). Corresponding t-statistics are given between parentheses.

4.1. ERPT and the inflation environment

The main question addressed is whether the exchange rate pass-through has changed over time and, if so, what is the role played by the inflation environment. To verify first whether ERPT has declined, we assess the model's stability over time through a rolling analysis with windows of 100 observations. Figure 2 reports the corresponding rolling estimation results, and illustrates significant time variation in the estimated ERPT that is coherent with the conjecture that prices have become less sensitive to exchange rate variations. Our hypothesis is that this phenomenon of a declining ERPT could be linked to the inflation environment, i.e. the fact that many emerging market economies have experienced a dramatic decline in inflation. Specifically, as shown in Figure 2, in many countries, ERPT was relatively high at the beginning of our sample period, after which we observe a decline toward an insignificant impact in the last windows.

Some typical cases deserve however specific comments. Even though smaller in magnitude than at the beginning of the sample, ERPT is still significant for the latest windows in Korea, Mexico, and the Philippines which are three countries that have officially adopted flexible exchange rates earlier than the other economies of our sample. In Hungary and Poland—two countries that have experienced a huge decrease in their inflation rate since the end of 2012, reaching even negative values—ERPT passed from not significant to significantly positive at the end of the period. Even though the range of results obtained in the previous literature dealing with transition economies is quite broad, the existence of a significant ERPT for Hungary and Poland is globally in line with other studies on CEECs (see, e.g., Beirne and Bijsterbosch (2011)). The wide range of conclusions regarding CEECs could be attributed to the fact that the degree of ERPT may depend on several factors that have evolved during the transition process such as the stage of economic development, credibility of national central banks, nature of the exchange rate regime, etc. Finally, ERPT in South Africa appears to be quite stable and insignificant throughout the period. This country is characterized by a relatively long experience with both inflation targeting and flexible exchange rate, features that might explain that inflation expectations are more strongly influenced by the central bank's inflation target than by exchange rate anticipations.

On the whole, this decreasing size of pass-through to consumer prices that we observe for most of our countries is in line with the findings obtained in advanced economies (see, e.g., Baqueiro, de Leon, and Torres (2003)) and could be notably attributed to a credible, low inflation environment (Taylor (2000)). Let us now address this hypothesis more deeply. To this end, Table 6 reports the estimation results of Equations (2) and (3).[19]

Regarding first the backward mean inflation (Equation (2)), the results show that, in general, the higher the inflation, the higher the ERPT. Indeed, for most countries, a significant

[19] Recall that these results are based on the 12-period backward moving average of the inflation rate. As a robustness check, Table 9 in Appendix reports the estimation results using a 36-period mowing average length. As shown, the obtained results are very similar, confirming the robustness of our findings to the choice of the moving average length.

Figure 2 – Rolling estimation of ERPT. January 1994-July 2015

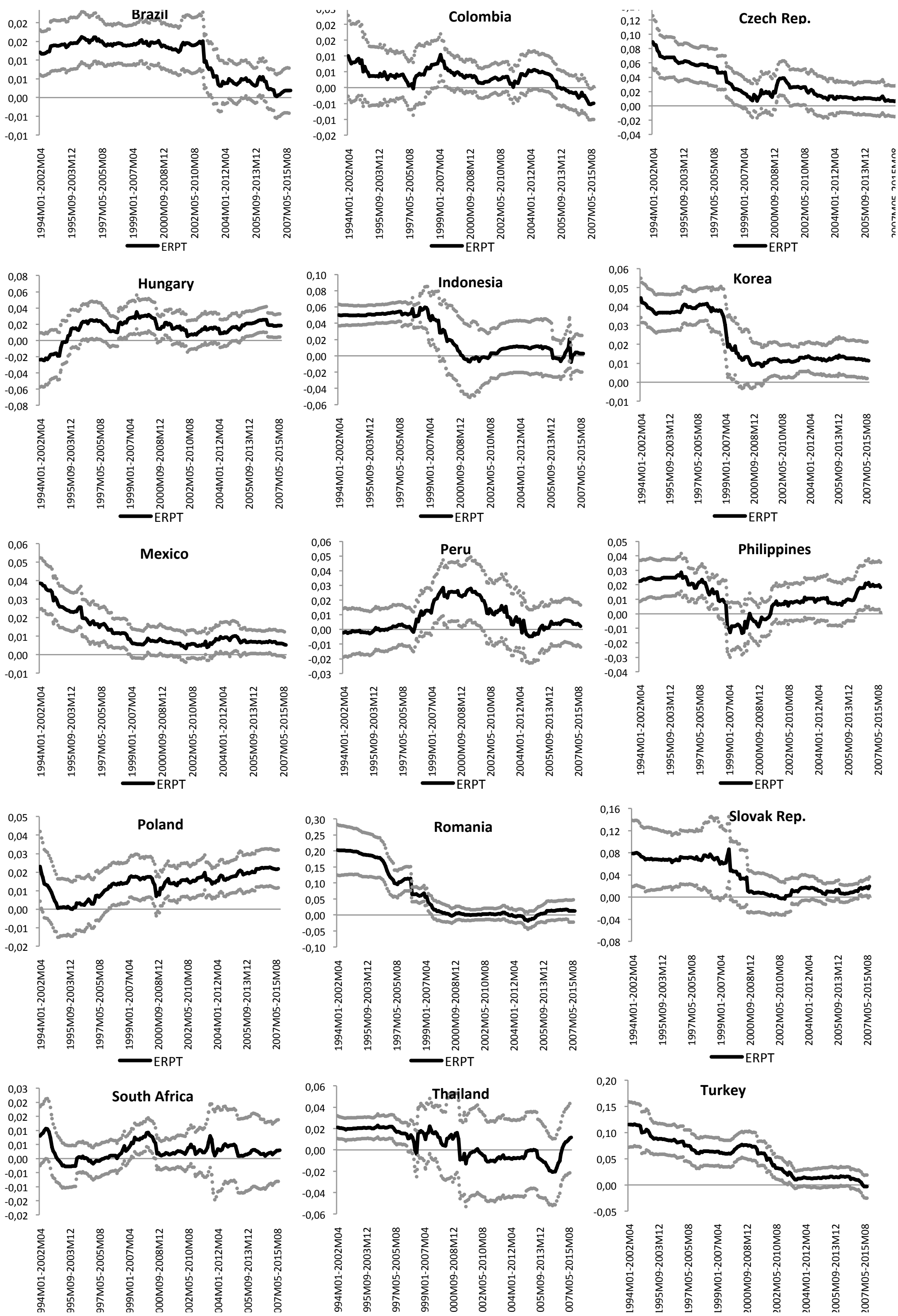

Table 6 – ERPT coefficients and inflation environment, January 1994-July 2015

	Mean inflation Equation (2)			S.D. inflation Equation (3)		
	θ Coeff. (t-stat)	θ^{MA} Coeff. (t-stat)	Total effect $\theta + (\theta^{MA} \times \overline{MA})$ Coeff. (t-stat)	θ Coeff. (t-stat)	θ^{SD}	Total effect $\theta + (\theta^{SD} \times \overline{SD})$
Brazil	0.002 (0.52)	0.002 (2.96)	0.014 (6.94)	0.008 (4.06)	0.003 (2.37)	0.013 (6.64)
Colombia	−0.005 (−1.11)	0.001 (2.12)	0.003 (1.54)	0.006 (1.74)	−0.003 (−1.05)	0.004 (1.70)
Czech Rep.	0.008 (0.70)	0.005 (2.67)	0.026 (4.13)	0.019 (1.60)	0.010 (1.30)	0.029 (4.34)
Hungary	0.026 (2.97)	−0.001 (−1.41)	0.017 (3.37)	0.022 (2.06)	−0.006 (−0.64)	0.016 (3.23)
Indonesia	0.036 (6.29)	0.001 (1.89)	0.037 (6.57)	0.032 (5.11)	0.001 (2.54)	0.039 (8.07)
Korea	0.007 (0.82)	0.004 (2.16)	0.020 (5.25)	0.015 (2.81)	0.010 (2.24)	0.024 (7.54)
Mexico	0.004 (0.83)	0.001 (2.71)	0.014 (4.53)	0.011 (3.15)	0.003 (1.62)	0.015 (4.44)
Peru	0.023 (1.96)	−0.005 (−2.22)	0.003 (0.47)	0.002 (0.143)	−0.002 (−0.153)	0.000 (0.06)
Philippines	0.009 (0.78)	0.001 (0.49)	0.014 (3.83)	0.008 (1.09)	0.008 (1.05)	0.016 (4.19)
Poland	0.009 (1.65)	0.001 (1.00)	0.014 (4.32)	0.012 (2.01)	0.002 (0.30)	0.013 (4.18)
Romania	0.065 (3.90)	0.002 (3.97)	0.098 (6.98)	0.110 (8.47)	0.006 (7.40)	0.133 (9.75)
Slovak Rep.	−0.040 (−1.73)	0.013 (3.10)	0.025 (2.67)	−0.003 (−0.20)	0.029 (2.37)	0.027 (2.99)
South Africa	0.004 (1.39)	−0.001 (−1.74)	0.001 (0.42)	−0.001 (−0.14)	0.003 (0.63)	0.001 (0.57)
Thailand	0.008 (0.66)	0.001 (0.46)	0.011 (1.80)	0.011 (1.06)	0.002 (0.23)	0.013 (2.64)
Turkey	0.016 (1.79)	0.002 (6.23)	0.063 (9.34)	0.053 (6.34)	0.001 (0.54)	0.055 (7.38)

Notes: (a) This table reports the estimated ERPT coefficients from Equation (2) (Column "Mean inflation") and Equation (3) (Column "S.D. inflation"). (b) Corresponding t-statistics are given between parentheses.

interactive effect between exchange rate changes and mean inflation is detected, implying that the effects of exchange rate movements on consumer prices increase as the mean inflation rises. In other words, ERPT appears to be endogenous to the country's inflation performance, in line with previous findings obtained on industrialized countries (see, e.g., Choudhri and Hakura (2006)). This result is interpreted as evidence supporting that a lower inflation environment determines a lower pass-through than a high inflation regime. Turning to the total effect of a one-percent increase in the exchange rate, calculated using the estimates from the regression model evaluated at the average inflation rate, its corresponding estimate is always positive, as expected. It is significant in most countries (11 out of 15), and higher than the estimated value of θ, confirming that the inflation environment strongly matters: a higher level of inflation is associated with a larger ERPT. An illustration is given by Turkey and Romania, the two countries of our sample exhibiting the highest mean level of inflation rates which are also characterized by the largest sizes of ERPT. Similarly, the lowest ERPT degrees—even non-significant—are observed for Colombia, Peru and South Africa, the three economies of our panel of countries marked by the most anti-inflationary environment.

Consider now the effect of the inflation environment in terms of stability and persistence (Equation (3)). As seen, the total effect is significant in all countries but Colombia, Peru and South Africa. As previously mentioned (see Table 1), these three countries are those which exhibit the lowest inflation volatility, confirming the relevance of the inflation environment in impacting ERPT. Apart from these three countries, the total effect is higher than the ERPT abstracting from the inflation environment, i.e. $\theta + \theta^{MA}\overline{\text{MA INF}} > \theta$, meaning that ERPT tends to be higher in more unstable periods. Inflation volatility is thus positively associated with a higher ERPT, in line with Bussiere (2013). Again, the most striking illustration is provided by Romania, a country characterized by a highly volatile inflationary environment, which displays the most sizeable ERPT. It is followed by Turkey and Indonesia which are also high-volatile inflationary countries.

Overall, two main conclusions can be deduced from this analysis. First, our results show that once the inflation environment is accounted for, the difference between advanced countries and emerging economies regarding the ERPT dynamics tends to weaken. Indeed, our findings are consistent with those generally obtained for industrialized countries, underlining a declining ERPT with more stable and anti-inflationary environment. Second, the inflation context strongly matters in explaining the degree of ERPT: countries which exhibit higher inflation level and volatility are those characterized by the most sizeable ERPT.

4.2. ERPT and monetary policy regimes

As previously mentioned, it is commonly accepted that a policy regime that clearly commits to a nominal anchor can help promote price stability and stabilize inflation expectations, and should therefore help to lower inflation uncertainty (Mishkin (2007)). Accordingly, the degree of ERPT is expected to be lower in a monetary policy regime with an explicit nominal anchor. As described above, we consider two different quantitative targets, namely inflation target and exchange rate target. The results of the estimation of Equations (6) and (7) are reported in Table 7.

Table 7 – ERPT coefficients, de jure and de facto inflation and exchange rate targets, January 1994-July 2015

	Inflation targeting Equation (6)						Exchange rate targeting Equation (7)					
	De jure			De facto			De jure			De facto		
	θ Coeff. (t-stat)	θ^{ITJ} Coeff. (t-stat)	Total effect $\theta+\theta^{ITJ}$ Coeff. (t-stat)	θ Coeff. (t-stat)	θ^{ITF} Coeff. (t-stat)	Total effect $\theta+\theta^{ITF}$ Coeff. (t-stat)	θ Coeff. (t-stat)	θ^{ERJ} Coeff. (t-stat)	Total effect $\theta+\theta^{ERJ}$ Coeff. (t-stat)	θ Coeff. (t-stat)	θ^{ERF} Coeff. (t-stat)	Total effect $\theta+\theta^{ERF}$ Coeff. (t-stat)
Brazil	0.008 (2.11)	0.005 (1.10)	0.013 (7.22)	0.015 (5.27)	−0.007 (−2.00)	0.007 (2.62)	0.011 (6.72)	−0.016 (−0.61)	−0.005 (−0.18)	0.031 (3.44)	−0.006 (−2.30)	0.014 (5.92)
Colombia	0.019 (3.06)	−0.019 (−2.72)	0.001 (−0.08)	−0.001 (−0.44)	0.004 (1.07)	0.003 (0.97)	0.000 (−0.09)	0.019 (2.65)	0.018 (2.99)	0.003 (0.65)	0.000 (0.04)	0.003 (1.26)
Czech Rep.	0.052 (2.64)	−0.023 (−1.10)	0.030 (4.57)	0.035 (5.26)	−0.015 (−0.98)	0.019 (1.28)	–	–	–	–	–	–
Hungary	−0.004 (−0.26)	0.025 (1.36)	0.021 (3.07)	0.024 (2.84)	−0.005 (−0.42)	0.019 (1.95)	0.024 (2.63)	−0.006 (−0.44)	0.019 (2.61)	0.069 (1.63)	−0.020 (−1.20)	0.024 (3.42)
Indonesia	0.047 (10.36)	−0.039 (−2.87)	0.008 (0.63)	0.008 (0.84)	−0.025 (−0.82)	−0.017 (−0.58)	0.044 (9.95)	0.040 (0.48)	0.083 (1.00)	0.051 (10.58)	−0.045 (−2.58)	0.007 (0.39)
Korea	0.029 (6.28)	−0.008 (−1.54)	0.022 (6.50)	0.021 (6.00)	0.004 (0.94)	0.025 (5.96)	0.026 (8.47)	−0.034 (−2.07)	−0.008 (−0.47)	0.026 (8.47)	−0.034 (−2.07)	−0.008 (−0.47)
Mexico	0.039 (4.41)	−0.030 (−3.30)	0.009 (2.71)	0.006 (2.01)	0.004 (0.72)	0.010 (1.97)	–	–	–	–	–	–
Peru	−0.003 (−0.43)	0.009 (0.79)	0.006 (0.70)	0.007 (0.67)	0.001 (0.04)	0.008 (0.60)	–	–	–	–	–	–
Philippines	0.019 (3.80)	−0.012 (−1.92)	0.007 (1.18)	0.008 (1.35)	−0.007 (−0.62)	0.001 (0.09)	–	–	–	0.021 (3.15)	−0.011 (−1.18)	0.011 (1.79)
Poland	0.009 (0.40)	0.005 (0.21)	0.013 (4.20)	0.014 (3.78)	−0.002 (−0.22)	0.012 (1.91)	0.012 (3.72)	0.019 (1.16)	0.031 (1.92)	0.012 (3.72)	0.019 (1.16)	0.031 (1.92)
Romania	0.130 (7.73)	−0.113 (−3.24)	0.016 (0.54)	0.005 (0.39)	0.002 (0.08)	0.007 (0.32)	–	–	–	0.212 (8.15)	−0.181 (−5.44)	0.031 (1.40)
Slovak Rep.	0.048 (3.59)	−0.054 (−2.64)	−0.006 (−0.40)	0.017 (2.10)	−0.009 (−0.49)	0.009 (0.51)	–	–	–	–	–	–
South Africa	0.001 (0.16)	0.001 (0.06)	0.001 (0.55)	0.001 (0.13)	0.001 (0.15)	0.001 (0.33)	0.002 (0.76)	−0.000 (−0.05)	0.002 (0.24)	–		
Thailand	0.016 (3.22)	−0.015 (−1.85)	0.001 (0.07)	0.011 (0.57)	−0.016 (−0.73)	−0.006 (−0.47)	0.015 (3.32)	0.004 (0.05)	0.019 (0.24)	0.017 (2.90)	−0.029 (−2.14)	−0.011 (−0.95)
Turkey	0.099 (9.36)	−0.078 (−4.74)	0.021 (1.50)	0.025 (3.22)	−0.019 (−1.05)	0.006 (0.36)	0.075 (8.15)	0.041 (2.36)	0.116 (6.23)	0.098 (8.34)	0.021 (1.84)	0.119 (7.51)

Notes: Notes: (a) This table reports the estimated ERPT coefficients from Equation (6) (Column “Inflation targeting”) and Equation (7) (Column “Exchange rate targeting”). (b) Corresponding t-statistics are given between parentheses. (c) −− implies than the country adopted or abandoned the ERT throughout the period.

Let us first consider the case of inflation targeting. The estimated ERPT in Table 7 tends to be lower than that reported in Table 5 for most countries, meaning that ERPT weakens when inflation targeting is accounted for. This is confirmed by comparing the values of $\theta + \theta^{IT}$ and θ in Table 7: after introducing *de jure* inflation targeting, ERPT declines in all countries but Brazil, Hungary and Poland, and becomes even insignificant for the majority of economies (Colombia, Indonesia, Philippines, Romania, Slovakia, Thailand and Turkey). The same decreasing tendency of ERPT is observed in the *de facto* case, the pass-through being effective for only two countries, namely Brazil and South Korea. Our findings are in line with Mendonça and Tostes (2015) showing that the pass-through to consumer prices is significant in the Brazilian economy after more than ten years of adoption of inflation targeting. In Brazil, inflation target is jointly decided by the Government and central bank, constituting a means for the Government to commit to the fiscal discipline necessary to achieve the target (Eichengreen (2006)). However, credibility of the economic policy is quite low in Brazil, particularly the fiscal policy. This reason may explain why ERPT is still significant in this country (see Mendonça and Tostes (2015)). Turning to South Korea, it is worth mentioning that it has adopted inflation targeting just after its main currency crisis in 1997-98, i.e. just five months after the Korean won devaluation. As a consequence, inflation targeting regime is characterized by a very high inflation variability, larger than pre-inflation targeting regime. In general, our findings clearly illustrate that adopting inflation targeting plays a key role in explaining the declining ERPT in emerging countries, and highlight that the *de jure* regime is more relevant than the *de facto* one. In other words, what matters is the adoption of inflation targeting, regardless of whether the central bank keeps its goal.

Turning now to exchange rate targeting, the adoption of such monetary regime also tends to lower the pass-through for most of our countries. *De facto* fixed exchange rates are known to exhibit less bilateral exchange rate volatility than floating rates (Klein and Shambaugh (2008)), contributing to pricing-to-market behavior from foreign exporters and invoicing in the destination country's currency. As a consequence, ERPT is expected to be lower under fixed exchange rate regimes, in line with our results displayed in Table 7. The main exception is Turkey, for which adopting exchange rate targeting has increased ERPT. It should however be mentioned that Turkey has experienced very high and volatile inflation levels, even in the 2000s and has adopted inflation targeting very late in that decade. This high-inflationary environment obviously contributes to a higher pass-through since the additional inflation coming from the exchange rate fluctuations is expected to persistently increase price levels and costs. In addition, the ending date of exchange rate targeting is quite late compared to the other countries. This result for the Turkish case is also consistent with the fact that in fixed regimes, agents tend to consider that a change in the exchange rate is permanent and will have a persistent impact of production costs. As a consequence, firms adjust selling prices more rapidly than in countries with flexible exchange rate regimes.

4.3. ERPT and central bank's practices

Finally, we address the relationship between ERPT and the inflation environment through central banks practices. As stressed above, we concentrate on two subjective indicators, namely transparency of monetary policy decisions and independence of the central bank.

To provide a first insight, Figure 3 in Appendix presents a scatter-plot of the ERPT coefficient in the benchmark equation and the mean value over the 1998-2010 period of our two subjective indicators. As seen, whereas transparency seems to be negatively related to ERPT, countries with important central bank independence degree present high ERPT coefficients.

We proceed to formally analyze the impact of institutional quality on ERPT by relying on panel data models that interact our two indicators with the rate of depreciation (Equations (10) and (11)). Results are presented in Table 8 below.

As seen, our estimation results confirm the previous graphical intuition since transparency clearly reduces ERPT, while central bank independence tends to increase it. As stressed above, the inflation environment strongly matters when investigating the link between quality of institutions and ERPT. As shown by Posen (1995), the assumption of exogeneity of monetary institutions is false in the sense that differences in the degree of central bank independence across countries has to be related to differences in financial sector opposition to inflation. Specifically, his main argument is that central bank independence has to be supported by the financial sector for being an effective means to decrease inflation: "*the granting of central bank independence where neither the financial sector nor some other political force is ready to defend it in times of costly disinflation is unlikely to have the intended counter-inflationary effect.*"

5. Conclusion

The recent literature on ERPT tends to show that sizeable depreciations of the nominal exchange rate exert fairly small effects on consumer prices. Moreover, these impacts have declined over the past two decades. This evidence of a weaker relationship between exchange rate fluctuations and prices is attributed to a more credible monetary policy that

Table 8 – ERPT, central bank transparency and independence (panel estimation)

	Transparency Equation (10)			**Independence** Equation (11)		
	θ	θ^T	Total effect $\theta + (\theta^T \times \overline{T})$	θ	θ^I	Total effect $\theta + (\theta^I \times \overline{I})$
	Coeff. (t-stat)	Coeff. (t-stat)	Coeff. (t-stat)	Coeff. (t-stat)	Coeff. (t-stat)	Coeff. (t-stat)
Pooled	0.058 (20.61)	−0.005 (−13.26)	0.053 (13.53)	0.002 (0.44)	0.055 (9.43)	0.027 (16.48)
Fixed effects	0.065 (18.71)	−0.006 (−11.55)	0.022 (13.20)	0.003 (0.72)	0.057 (9.37)	0.029 (16.22)
GMM	0.081 (6.37)	−0.007 (−3.44)	0.035 (5.49)	−0.003 (−0.39)	0.081 (5.54)	0.034 (4.30)
Sargan test	0.120			0.168		
AR(2)	0.389			0.246		

Notes: (a) This table reports the panel estimated ERPT coefficients from Equation (10) (Column "Transparency") over the January 1998-December 2014 period, and Equation (11) (Column "Independence") over the January 1998-December 2010 period. (b) Corresponding t-statistics are given between parentheses. (c) The fixed effects and the GMM models include both cross-section and period fixed effects. (d) GMM refers to estimations carried out with the Arellano-Bond one-step dynamic panel-data robust estimator using lagged values of the dependent variable, dummies and lagged values of the rate of depreciation as instruments. (e) The number of lags of the dependent variable is selected according to a general-to-specific approach. (f) The Sargan test reports the p-value of the over-identifying restrictions. The null hypothesis is that the over-identifying restrictions are valid. (g) AR(2) is the second-order serial correlation test of the differenced residuals. The null hypothesis is no second-order autocorrelation in the errors of the equation in first differences.

has focused on stabilizing inflation. However, little is known about the role of the inflation environment in emerging economies.

We fill this gap by estimating ERPT and assessing its dynamics for a sample of 15 emerging countries over the 1994-2015 period. We show that inflation level and volatility matters in the sense that a declining ERPT is evidenced with more stable and anti-inflationary environment. With regard to the role of monetary policy, adopting inflation targeting regime leads to a significant decline in ERPT for most countries, with a more important impact evidenced for *de jure* compared to *de facto* inflation targeting regime. Adopting exchange rate targeting regime matters as well, contributing to a diminishing ERPT. Finally, we find evidence that transparency of monetary policy decisions clearly reduces ERPT, while it is not the case for central bank independence. Nevertheless, it is worth mentioning that despite the overall declining tendency of ERPT, exchange rate fluctuations can still have an effect on inflation in some countries.

On the whole, our findings show that emerging economies tend to share the characteristics observed for advanced countries in terms of declining pass-through once inflation is controlled for. Three main policy implications can be deduced from our results. On the one hand, as the exchange rate elasticity of trade prices determines the potential role of exchange rates in absorbing global imbalances, our findings imply that the use of the exchange rate as a means to improve the trade balance is expected to be less effective. On the other hand, the economies would be less concerned about the potential inflationary consequences of exchange rate fluctuations. Finally, the declining ERPT also has implications regarding the transmission of shocks across emerging countries which display high levels of intraregional trade.

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Appendix

Figure 3 – ERPT, inflation environment and central bank indicators

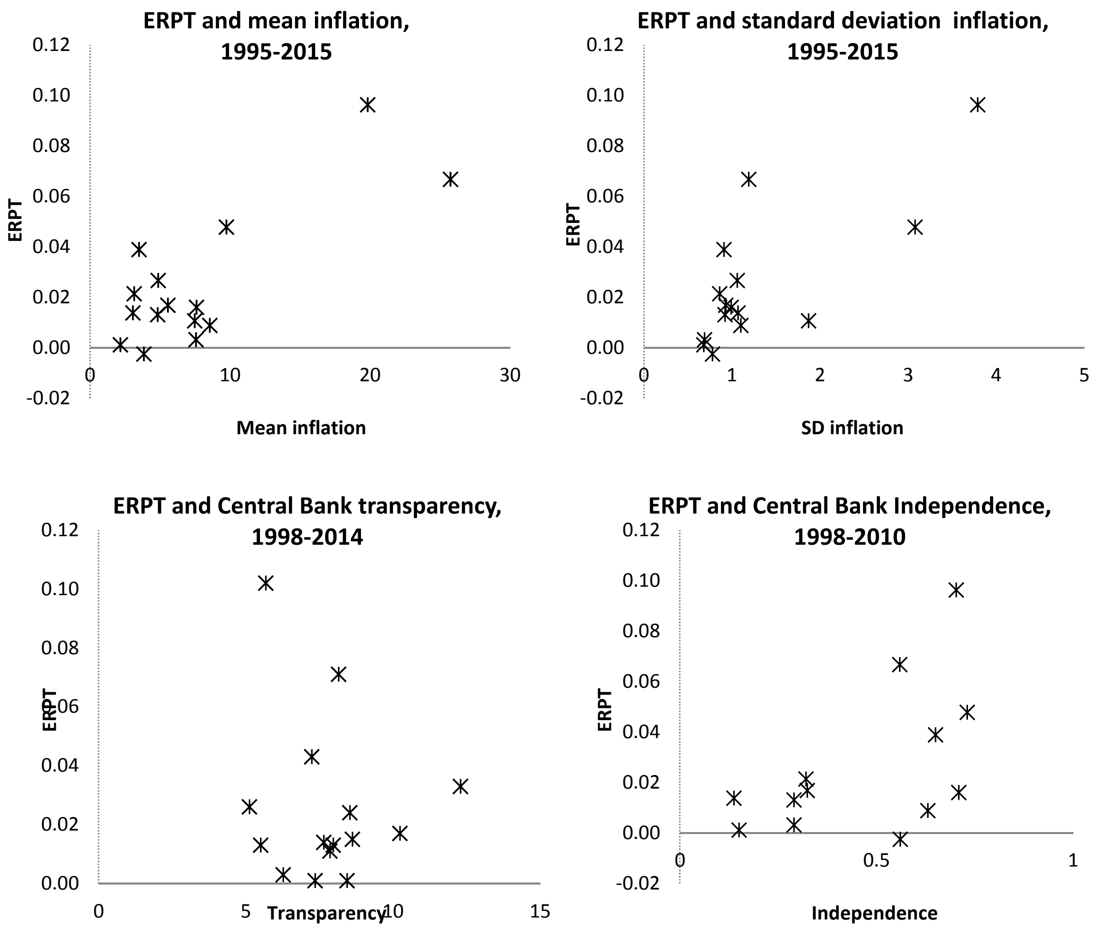

Table 9 – ERPT coefficients and inflation environment, January 1994-July 2015

	Mean inflation (3 years MA)			S.D. inflation (3 years MA)		
	Equation (2)			Equation (3)		
			Total effect			Total effect
	θ	θ^{MA}	$\theta + (\theta^{MA} \times \overline{MA})$	θ	θ^{SD}	$\theta + (\theta^{SD} \times \overline{SD})$
	Coeff. (t-stat)	Coeff. (t-stat)	Coeff. (t-stat)	Coeff. (t-stat)		
Brazil	0.006 (0.86)	0.001 (0.93)	0.012 (6.68)	0.015 (4.12)	−0.001 (−1.00)	0.012 (6.70)
Colombia	−0.008 (−1.36)	0.001 (1.86)	0.003 (1.13)	0.002 (0.55)	−0.001 (−0.12)	0.002 (0.90)
Czech Rep.	−0.001 (−0.04)	0.007 (2.91)	0.023 (3.57)	0.013 (0.77)	0.011 (1.19)	0.031 (4.76)
Hungary	0.048 (3.35)	−0.004 (−2.42)	0.017 (3.25)	0.051 (3.38)	−0.019 (−2.48)	0.014 (2.70)
Indonesia	0.028 (2.99)	0.001 (1.91)	0.043 (9.32)	0.036 (5.68)	0.001 (1.86)	0.042 (9.10)
Korea	−0.011 (−1.25)	0.010 (4.59)	0.020 (6.16)	0.017 (2.82)	0.009 (1.95)	0.028 (8.19)
Mexico	−0.008 (−1.13)	0.003 (6.05)	0.013 (4.44)	0.001 (0.24)	0.006 (5.35)	0.011 (3.90)
Peru	0.029 (2.33)	−0.006 (−2.76)	0.007 (1.08)	0.051 (2.31)	−0.032 (−2.47)	0.005 (0.74)
Philippines	−0.012 (−0.81)	0.005 (1.84)	0.011 (2.67)	0.009 (0.82)	0.004 (0.56)	0.015 (3.94)
Poland	0.008 (1.42)	0.001 (1.41)	0.015 (4.54)	0.011 (1.36)	0.002 (0.42)	0.014 (4.30)
Romania	0.024 (1.49)	0.002 (5.81)	0.064 (5.47)	0.056 (4.35)	0.003 (5.13)	0.076 (6.75)
Slovak Rep.	−0.021 (−0.63)	0.009 (1.44)	0.025 (2.60)	0.038 (1.86)	−0.009 (−0.75)	0.019 (1.85)
South Africa	0.003 (1.01)	−0.002 (−2.37)	−0.001 (−0.57)	0.008 (1.98)	−0.006 (−2.48)	0.001 (0.10)
Thailand	−0.005 (−0.28)	0.004 (1.08)	0.006 (0.68)	0.031 (2.48)	−0.011 (−1.51)	0.011 (2.06)
Turkey	−0.010 (−1.05)	0.002 (8.45)	0.052 (8.31)	0.031 (2.95)	0.004 (2.81)	0.049 (6.66)

Notes: (a) This table reports the estimated ERPT coefficients from Equation (2) (Column “Mean inflation”) and Equation (3) (Column “S.D. inflation”) using a 36-period backward moving average of the inflation rate. (b) Corresponding t-statistics are given between parentheses.