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Pass-Through to Import Prices: Evidence From Developing Countries

Miguel Fuentes*

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In this paper I study the pass-through of nominal exchange rate changes to the price of imported goods in four developing countries. The results indicate that 75% of changes in the exchange rate are passed-through to the domestic currency price of imported goods within one quarter. Complete pass-through is attained within one year. There is no evidence that exchange rate pass-through to the price of imported goods has declined over time even in those countries that have managed to reduce inflation significantly and open their economies to foreign competition.

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1 Introduction

This paper studies the degree to which changes in the nominal value of a country's currency affect the price of imported goods quoted in domestic currency. The question of exchange rate pass-through (ERPT) is far from being a novel one in the international macroeconomics literature. Nevertheless, recent developments in the New Open Economy Macroeconomics have sparked a renewed interest in the pass-through issue. In effect, the policy prescriptions and the predictions made by those models depend critically on the assumption made regarding how the domestic currency price of traded goods reacts to changes in the nominal exchange rate. In the end the controversy must be settled by a careful analysis of the empirical evidence. This paper is an attempt to clarify that controversy from an empirical perspective.

Of course this paper is not the first one to study from an empirical point of view the issue of ERPT.[1] Nevertheless, the paper tries to make two contributions to the existing literature. First, it focuses on less developed or emerging market economies. As I will explain in more detail later, the vast majority of the papers that have studied the exchange rate pass-through to import prices have done so looking at evidence from industrialized or advanced economies. By analyzing directly the case of developing countries I will provide better information for the design of macroeconomic policy in those countries.

Next, I assemble here a database of prices of imported goods at the wholesale level to analyze the pass-through question in developing countries. This contrasts with the common practice of using consumer price indexes (CPI) to study exchange rate pass-through in less advanced economies. Using wholesale level data has several advantages. First, CPIs contain many items that are non-traded (like services). Also, since traded goods' prices are surveyed at the retail level they include a

[1] Recent contributions to the empirical literature are reviewed in Section 2 below.

significant amount of distribution costs that are also non-traded. [2] These issues indicate that there are reasons to be cautious when interpreting the results of exchange rate pass-through studies that use CPI indexes. Finally, some authors have highlighted the importance of looking at wholesale prices since it is possible that exchange rate pass-through is more significant at this level of the distribution chain. If this is the case, the low degree of exchange rate pass-through reported by some studies that use CPI data should not lead us to conclude that nominal exchange rate fluctuations have a negligible effect on the economy.

The next section of the paper presents a brief survey of the empirical literature on the exchange rate pass-through focusing on the papers more closely related to this one. Section 3 introduces the empirical methodology used in the paper. The data used in the paper is described in section 4. The results are presented and discussed in section 5. Next, in section 6 I perform some robustness checks on the empirical findings. Section 8 concludes.

2 Literature Review.

The renewed interest in the pass-through issue has been triggered by the recent innovations in the formal modeling of the open economy that fall under the New Open Economy Macroeconomics (NOEM) name. [3] The models in that literature highlight the importance of the assumption concerning the currency used by exporters to invoice the goods sold abroad. There are two canonical assumptions.

The first one is called Producer Currency Pricing (PCP) and assumes that the sale price of exports is denominated in the currency of the producer. The price paid by consumer of these

[2] There is also the possibility that traded goods included in the CPI are imperfect substitutes of imported goods (due, for instance, to quality differences) which will also muddle the pass-through of exchange rates to their domestic currency price.

[3] Obstfeld and Rogoff (2000) present a good introduction to the NOEM literature.

goods changes then one to one with exchange rate fluctuations. In this scenario of complete pass-through, exchange rates are capable of stabilizing the economy and countries should opt for pure floats. The alternative, and opposite, assumption is called Pricing to Market (PTM) and claims that exporters price their goods in the currency of the destination market. [4] Under this assumption exchange rate changes do not alter the prices faced by consumers in the economy. The incapacity of exchange rates to alter the economic equilibrium leads naturally to prescribe fixed exchange rate as the optimal policy option.

As explained earlier, the debate can only be resolved through a careful analysis of the empirical evidence. Consequently, there have been several papers that have analyzed the degree of pass-through to the price of traded goods. Since an exhaustive review of this literature is beyond the scope of this paper, I will concentrate my attention on papers that study the exchange rate pass-through looking at aggregate price indexes since those are the ones more closely related to this one. [5]

Goldfajn and Werlang (2000) study the pass-through of exchange rate changes to CPI using a panel of 71 countries during the period 1980-1998. Their paper is in the tradition of those that analyze exchange rate pass-through from a macroeconomic perspective. This explains their interest in CPI indexes (that contain mostly non-tradable goods) and the use of variables like initial inflation, real exchange rate overvaluation and output gap to explain the observed exchange rate pass-through. However, their results help us little to understand the effects of exchange rate changes on the price of imported goods or the relevance of PCP and LCP. Moreover, their models exhibit a mediocre performance in forecasting inflation outside the sample period. Nevertheless, the paper by these authors indicates that the pass-through of the nominal exchange rate to the consumer price index is the highest for countries in Latin America. This is important evidence

[4] This assumption is sometimes referred to as Local Currency Pricing (LCP).

[5] There is also a large literature that analyzes the ERPT using very disaggregated data on goods prices. Goldberg and Knetter (1997) present an excellent survey of this literature.

for the purpose of this paper since I analyze Latin American economies and find a pass through coefficient situated at the high end of the spectrum of estimations found for other regions.

The paper by Campa and Goldberg (2005) analyzes the ERPT to import prices in a sample of OECD countries. First, their results indicate that short run ERPT varies significantly across countries. In second place, for most of the countries it is not possible to reject that ERPT is complete over the course of one year. Then, in terms of the NOEM debate, the hypothesis of LCP is rejected while PCP appears to be a good description of the data. Interestingly, these authors also document a "weak tendency" of decline in the degree to which changes in the nominal exchange rate are passed through to the price of imported goods in domestic currency. Campa and Goldberg (2005) attribute the decline in the pass-through coefficient to several factors. The most important one is the increase in the share of manufactured goods in total imports. They also report that macroeconomic factors such as exchange rate volatility and inflation have a smaller role in explaining the decline in the exchange rate pass-through.

On evidence more specific to the experience of developing countries, recent papers by Belaisch (2003) and Miller (2003) have analyzed the dynamics of exchange rate and the local currency price of imported goods using aggregate price indexes for Brazil and Peru. The evidence reported by those authors indicates that exchange rate pass-through is complete within a year. The relatively short samples used in those papers prevent an appropriate study of the hypothesis of structural change in the pass-through in recent years. [6]

Frankel, Parsley, and Wei (2004) have recently made a contribution to the pass-through literature focusing especially in developing countries. These authors use very disaggregated product level data: they restrict their attention to eight goods during the period 1990-2001.[7] Their main

[6]Belaisch (2003) uses monthly data for the period 1999-2002 while Miller (2003) also uses monthly data for the period 1995-2002.

[7]The goods used are: Marlboro Cigarettes (pack of 20), Coca-cola (1 liter), Cognac French VSOP (700 ml), Gilbeys Gin (700ml), Time magazine, Kodak Color Film (36 exposures), Cointreau Liqueur (700 ml),and Martini &

finding is that exchange rate pass-through to the domestic-currency price of these goods has declined during this period. Although the sample used has several interesting features, it is not clear if the price dynamics of these goods is similar to the one of other imported goods in the economy.[8] In other words, Frankel, Parsley, and Wei (2004) is only an intermediate step to elucidate if the exchange rate pass-through has indeed declined in developing countries during recent years.

Another recent contribution to the literature on the relation between goods' prices and nominal exchange rate movements is the paper by Crucini and Shintani (2004). As Frankel, Parsley, and Wei (2004), they also use micro level price data but, instead of analyzing the exchange rate pass-through directly, their interest is on the empirical evidence for the law of one price. Their results indicate that deviations of the law of one price are eliminated in developing countries in under one year, faster than in more advanced economies. This result suggests then that pass-through to import prices is fast in developing countries.

3 Methodology

The study of the pass-through question will be based on a modified version of the law of one price expressed as:

$$P^M = (1 + \phi)\, X^{\$}\, E \tag{1}$$

which states that the price in domestic currency of an imported good (P^M) is equal to its price in the currency of the producer (X) times the domestic currency price of foreign currency (E) adjusted by a wedge ϕ that captures deviations form the canonical law of one price such as

Rossi Vermouth (1 liter).

[8] The use of individual goods allows, in principle, to measure with high precision the purchase price of each goods in foreign currency.

tariffs and transport costs. Equation (1) has a long history in International Economics and rests in the idea that the free trade of goods eliminates arbitrage opportunities. Hence the prices of the same good in different markets must be equal when they are expressed in the same currency after controlling for tariffs and transport costs.

Equation (1) is a good approximation for the long run behavior of prices. However, in the short run, domestic prices might react slowly to changes in fundamentals (i.e. the right hand elements of equation (1)), demand factors might make price deviate temporarily from their long run equilibrium and there might be changes to tariffs and transport costs. This suggests that (1) must be modified to accommodate all the mentioned factors in order to study the behavior of imports' prices more accurately.

Following directly the specification of Campa and Goldberg (2005), we express (1) in natural logarithms denoted by lower case letters:

$$p^M = \ln(1+\phi) + x^{\$} + e \tag{2}$$

and recognize as Campa and Goldberg (2005) suggest that the exporters' price $x^{\$}$ is driven by two factors:

1. The marginal cost in the foreign (exporter) country of producing the good. This quantity depends in turn on macroeconomic conditions of the exporter (e.g. nominal wages and other costs' shocks) and destination-specific items (e.g. transport costs and domestic demand).

2. A markup over the marginal cost of producing the good. This markup might in turn depend on the dynamics of the nominal exchange rate.

In light of these considerations I will use, as Campa and Goldberg (2005) the following regression specification to examine the different hypothesis regarding how import prices react to changes in the nominal exchange rate:

$$\Delta p_{jt}^{M} = \sum_{s=0}^{3} \alpha_s \Delta e_{jt-s} + \sum_{s=0}^{3} \beta_s \Delta x_{jt-s} + \Psi Z + \epsilon_{jt} \tag{3}$$

The indexes j and t correspond to country and time respectively and Δ denotes the first difference operator. p_{jt}^{M} corresponds to the domestic price of imported goods, e is the nominal exchange rate (units of domestic currency per unit of foreign currency), x is an indicator of the cost of the imported good and $\mathbf{Z}$ is a matrix of variables that influence the foreign producer's markup over marginal cost and hence the price of imported goods. The term ϵ_{jt} is a random shock to the domestic price of imported goods. The vector parameters to be estimated is $\begin{bmatrix} \alpha & \beta & \psi \end{bmatrix}'$ and I will focus especially in the pass-through coefficients α. The main interest is to examine the short and long run pass through coefficients that are given by α_0 and $\sum_{s=0}^{3} \alpha_s$ respectively.

Regression (3) will be estimated separately for each of the countries specified below so it should not be interpreted as a panel-data specification. Actually, the econometric methodology used in this paper draws heavily in time-series techniques with special attention to the stationarity properties of the data used. In particular, I will analyze if the series are stationary or not to rule out that the results presented are driven by spurious correlation among the variables. Later I will also study if dynamics of imports' prices and nominal exchange rate admits an error correction specification.

The regression described by (3) improves upon the previous studies on the pass-through to import prices in several aspects. First it controls explicitly for the evolution of foreign prices (measured by the variable x), an aspect omitted in the work of Belaisch (2003) and Miller (2003). The

studies by those authors use also a *structural VAR* approach which imposes certain identification assumptions that are not entirely obvious. From this perspective, this paper will indicate if the methodology used by those authors has any influence in the results they obtain.

4 Data Description

In this section I describe the data used to estimate equation (3). All the data is of quarterly frequency.

A. Imports' Price Data. I collected data for several Latin American economies of domestic price indexes of imported goods at the wholesale level. The data comes from different national statistics bureaus and is of monthly frequency. I averaged the monthly data to obtain each quarterly observation. The countries and period for which these data are available are: [9]

1. Argentina, 1956-2006.
2. Chile, 1986-2006.
3. Colombia, 1970-2006.
4. Uruguay, 1988-2002.

As can be seen, the sample period is not identical for all countries since local statistical agencies have compiled these data for different lapses of time. The data spans over a fairly long

[9]The reader might note that Brazil is excluded from the list. This is due to the fact that there is no data on the wholesale price of imported goods for this country. There is also data available for Paraguay although I excluded it from the empirical analysis because the time series is too short (1995-2003). In the case of Venezuela, there is import price data for a decent time period but the lack of measures of economic activity forced me to exclude it from the analysis.

period for all countries.[10] This will allow me to test the hypothesis of structural change, specially the eventual decline in the pass-through.

B. Nominal exchange rates. These data comes from the International Monetary Fund's International Financial Statistics (IFS) database. It corresponds to the end period series (line AE.ZF) and I averaged it over each quarter to obtain observations of quarterly frequency.

C. Cost of imported goods. The variable x in regression (3) is the one for which it is more difficult to obtain an adequate measure in practice. Ideally one would like to use a measure of the price in foreign currency of the goods imported by each country j. As explained below, if available at all, those type of price indexes span over short periods of time and often with gaps in the information reported. Campa and Goldberg (2005) get around this data problem using the numerator of the effective real exchange rate (ERER) index available in the IFS. For developed countries this variable is a trade-weighted measure of the unit labor costs in the trading partners of country j.

In contrast, the IFS-ERER index for less developed countries is constructed using consumer price indexes instead of unit labor costs. Since consumer price indexes include themselves imported goods and retail distribution costs, using the IFS-ERER numerator will likely introduce measurement error in the variable x. With these caveats in mind I will use the numerator of the IFS-ERER as a proxy for x since it still provides information on the costs of goods produced in the countries from which j is importing goods.

Since then the numerator of the ERER is an imperfect measure of the true cost in foreign currency of a country's imports, I will use two other variables as proxies of x. The use of these two additional variables also helps to examine the robustness of the results with respect to the measure

[10] In contrast the sample used by Frankel, Parsley, and Wei (2004) extends from 1991 to 2000. The ones by Belaisch (2003) and Miller (2003) start in 1999 and 1995 respectively.

of the cost of imports used. The first proxy of x is the United States Producer Price Index (PPI). This data is also taken from the IFS database (line 63). [11] The US PPI can be a good proxy for the cost of imports of these countries since US goods are a significant share of these countries trade.

As a final robustness check I will also use the unit value of imports (IVUM) index as another measure of the cost of imports of each country. It is important to note that the IVUM measures the cost of imports in U.S. dollars "at the dock" or "port of entry". This data is also taken from the IFS database (line 75) and from local statistical agencies when the information is not available in the IFS database. Although this series is in principle an excellent proxy for the cost of imports, it is not available for every country over the entire sample period.[12]

D. Other controls. The variables I include in matrix **Z** of equation (3) are basically the same ones included by Campa and Goldberg (2005). The first of these is the quarterly change of the natural logarithm of GDP. [13] This variable is included to capture shocks to the domestic price of imports that are also correlated with changes in the nominal exchange rate. Finally I also controlled for the price of oil since all the import price data includes this product and its price has exhibited significant changes during the sample period. The oil price data is also taken from the IFS database and corresponds to the dollar price of the U.K.-Brent barrel. [14]

[11] I also examined two other U.S. price indexes that could proxy the price of these countries imports: the price index for industrial goods (line 63A in the IFS database) and the wholesale price index for finished goods (line 63B). The results reported below are not sensitive to the use of either index.

[12] In order to include the IVUM variable in the regressions the gaps in the IFS data were filled using data from national statistics agencies. The details of the sources and procedures used are available upon request to the author.

[13] Both the seasonally adjusted and unadjusted series of GDP were used. I used a very simple two step seasonal adjustment procedure. First, I ran a regression of GDP (log) on a time trend and quarterly dummies. In the second step I used the estimated coefficients of the quarterly dummies to eliminate the seasonal component of the GDP series.

[14] The series code from the IFS database is 11276AAZZF.

5 Results

5.1 First Look at the Data

The basics trends of the relation between nominal devaluation and the domestic price of imported goods can be seen in Figures 1 through 4. Two noteworthy phenomena emerge from the inspection of those figures. First, the pass-through of nominal devaluation appears to be remarkably fast for all the economies studied. Second, the data give scant support to the idea that exchange rate pass-through has declined over time. In fact the figures suggest that the relation between nominal devaluation and the change in the domestic-currency price of imported goods has remained constant.

Both facts are at odds with the findings of both Campa and Goldberg (2005) and Frankel, Parsley, and Wei (2004) commented above. It is specially interesting to note that the economies studied in this paper have shown very different paths of inflation, exchange rate regimes and openness to trade. From this perspective, the high and fast pass-through of the nominal depreciation to the domestic price of imported goods appears to be a remarkably resilient phenomena in these economies. [15] In the following section I will analyze using formal econometric methods the relation between the nominal exchange rate and the domestic price of imported goods

5.2 Unit Root Tests

The first step in the econometric analysis is to test the order of integration of the variables used in the regressions. The unit root tests results are presented in Tables 1 to 4. As can be seen the first difference of all the series are integrated of order zero which rules out the possibility of spurious correlations driving the results of estimating equation (3).

[15] The case of Argentina (Figure 1) is specially interesting: imported goods prices remained virtually unchanged during the currency board years but start to increase one to one with the nominal exchange rate after the crises of late 2001.

5.3 Regression Results

Tables 5 to 8 present the results of the estimation of regression (3) for each of the countries listed above. The different columns of each table correspond to the different proxies for the cost in foreign currency of imported goods which was denoted by x in equation (1). There are several conclusions that can be drawn from these results. The first is that the choice of the proxy for x has important implications for the estimation of the pass-through coefficient. The general trend is that the short run pass-through coefficient is lower when the numerator of the real exchange rate is used. Moreover in some cases the short term pass-through coefficient obtained with this proxy is negative which seems very unlikely in light of the basic trends of the data discussed earlier. As explained in Section 4 this variable is constructed from the CPI indexes of each country's trading partners. Given the significant weight of non-traded goods in CPI, it is likely that the numerator of the effective exchange rate is not a good proxy for the cost of imports. If we add to this consideration the odd results for the ERPT when this variable is used as a proxy for x, the evidence suggests then that the use of this proxy might not be appropriate.

In contrast the short term pass-through estimated when either the US PPI or the IVUM are used shows a much higher short term pass-through coefficient. These point estimates are situated in the higher end of the distribution of estimations reported by Campa and Goldberg (2005).

With respect to the long term pass-through, again the estimated coefficient is lower when the numerator of the effective real exchange rate is used as a proxy of x. Nevertheless, the estimated long run coefficient is almost always statistically equal to one. Therefore the pass through of the nominal exchange rate to import prices is complete within one year. The data then gives strong support for the prevalence of PCP over LCP.

5.4 Has the Pass-Through Coefficient Declined Over Time?

The next step is to analyze if the exchange rate pass through has declined over time. As was discussed earlier, several papers have suggested that the ERPT has decreased in recent years and we want to test this hypothesis here. On the other hand economic theory also provides arguments in favor of the idea that the ERPT might not be constant over time. This line of reasoning is well summarized in Taylor (2000) and is based on the idea that in a scenario of increased competition and lower inflation rate it is more difficult for firms to transfer costs increases to final prices. [16] The Latin American economies under study in this paper underwent during the sample period (with different degrees of success and intensity) reforms aimed to increase competition (most notably trade reform) and reductions in aggregate inflation. It is interesting to see then if these changes had any effect on the pass-through of exchange rate to prices.

To examine these questions I used the standard Chow test of structural change. This test is implemented using the following regression:

$$\Delta P_{jt}^{M} = \phi D^{CH} + \sum_{s=0}^{3} \alpha_s \Delta e_{jt-s} + \sum_{s=0}^{3} \theta_s D^{CH} \Delta e_{jt-s} \sum_{s=0}^{3} \beta_s \Delta x_{jt-s} + \Psi Z + \epsilon_{jt} \tag{4}$$

where D^{CH} is a dummy variable equal to one in the second half of the sample period. This is the same methodology used by Campa and Goldberg (2005) and Frankel, Parsley, and Wei (2004) so my results are entirely comparable to theirs.

The results are presented in the bottom lines of Tables 5 to 8 where I report the p-value of the null-hypothesis of no change in the long run exchange rate pass-through. As can be seen it is not possible to reject this hypothesis. More interestingly, the estimate of the θ_s is almost always

[16] Taylor (2000) presents this idea in a formal theoretical model.

positive which indicates that exchange rate pass-through appears to have increased over time. [17] Only in the case of Chile, arguably the country that exhibits the largest decline in macroeconomic volatility in this sample, there is some weak evidence that the long term ERPT has declined. As Table 6 shows only in the case when x is proxied by the numerator od the ERER the hypothesis of no structural change is rejected but the opposite happens when more appropriate measures of foreign price are used.

As an additional test of an eventual change in the pass-through coefficient, I use the *rolling regression* technique. This consists in the iterative estimation of the pass-through coefficient where in each iteration and additional observation is added to the sample period.[18] The results for the case the long term pass-through are presented in figures 5 to 8 and confirm the absence of structural change in this coefficient.[19] , [20]

6 Robustness Checks

In this section I present three robustness checks of the results. First, I test the cointegration of the long term relation and then modify the estimation of the pass-through equation to include an error correction term. Next, I examine eventual simultaneity issues that could introduce bias in the estimation of equation 3. The final robustness check consists in examining if the pass-through estimates are affected by the existence of "one shot" depreciations that have been observed in these countries during the sample period.

[17] These results are also available upon request.

[18] The calculations were done using the procedure *rollreg* in STATA.

[19] The confidence bands are omitted to preserve the clarity of the graphs but including them does not alter the conclusion of no change in the long term ERPT.

[20] The results for the *short term* pass-through coefficient also give no indication indication of a significant change in that parameter. Those results are omitted for brevity but are available from the author upon request.

6.1 Cointegration and Error Correction Representation

Here, I test if the long run relation described by equation (1) is also a cointegration relationship among the variables. If this is the case I will augment equation (3) to include an error correction term:

$$\Delta p_{jt}^{M} = \sum_{s=0}^{3} \alpha_s \Delta e_{jt-s} + \sum_{s=0}^{3} \beta_s \Delta x_{jt-s} + \Psi Z + \theta y_{t-1} + \epsilon_{jt} \tag{5}$$

Where y_{t-1} is the residual of the the cointegration relation[21]:

$$y_{t-1} = p_{t-1}^{M} - (\tau x_{t-1}^{\$} + \upsilon e_{t-1}) \tag{6}$$

Equation (6) follows directly from the long run relation described by equation (1) with coefficients τ and υ equal to one. The procedure used to test for cointegration consists in testing for the presence of a unit root on the residual of equation (6). The results of this test are presented in Table 9 and they show that, in most cases, there is a stationary linear combination of the variables in equation (1). Hence, there is an error correction representation as the one described in 5.

The error correction representation is also used by Frankel, Parsley, and Wei (2004) so its estimation will allow me to make my results more comparable to theirs. The results are presented in Tables 10 to 13 and they confirm the findings obtained with the base specification: exchange rate pass-through is fast in the short run and complete in the lapse of one year.[22] Next I study the hypothesis of structural change in the pass-through coefficient using the Chow's test as explained

[21] Lower case letters denote natural logarithm of each variable

[22] The results in Tables 10 to 13 also corroborate the poor performance of the numerator of the effective real exchange rate as a measure of the foreign-currency price of imported goods.

above. The results, presented in the bottom lines of Tables 10 to 13 also indicate that there has been no change in the pass-through coefficient for the economies studied in this paper.

6.2 Endogeneity: An Instrumental Variable Solution

The presence of endogeneity in equation (3) is another element that could introduce biases in the estimation of the pass through coefficient. The concern is that the error term in equation (3) (ϵ_t), is correlated with contemporaneous exchange rate depreciation Δe_t. This might be caused, for instance, by intervention of the Central Bank in the foreign exchange market after an unexpected positive shock to the domestic price of imported goods not captured by the other controls included in equation (3). A scenario like this is plausible given the increasing focus of Central Banks on inflation as revealed in the adoption of inflation targets in some of the countries studied here.

The appropriate econometric solution to deal with endogeneity is to use an instrumental variable for the endogenous regressor. Two different variables will be used as instruments for the exchange rate depreciation: the uncovered interest rate differential and the change in the price of the commodities exported by each country. Next I discuss the merits of each instrument and then I will present the results obtained with the use of each set of instruments.

6.2.1 Instrument: Uncovered Interest Parity

The uncovered interest parity states that:

$$e_{t+1} - e_t = \alpha + \beta(i - i^*)_t + \xi_t \tag{7}$$

where e_{t+1} and e_t denote the natural logarithm of the nominal exchange rate in $t+1$ and t,

$(i - i^*)_t$ corresponds to the interest rate differential paid for deposits in domestic currency (i) and foreign currency (i^*) held between periods t and $t+1$ and ξ_t is a stochastic error.[23]

The uncovered interest parity is then an obvious candidate to serve as an instrument for nominal depreciation: there is an evident theoretical relation between the interest rate differential and the change in the nominal exchange rate. Hence, the first requisite of an instrumental variable is fulfilled: the instrument is *relevant* meaning that it is correlated with the endogenous variable.[24]

The second criteria is that of *exogeneity*: the proposed instrument must itself be uncorrelated with the error term (ϵ_t) of the equation of interest. This condition could easily be violated by the UIP condition. The reason for this is that it is very likely that the domestic interest rate is going to be correlated with shocks to the domestic currency price of imported goods. This can happen, for instance, if the monetary authority fears that a shock to the price of imported goods might trigger an increase of inflation. Hence, in order to avoid this surge in inflation monetary policy might be tightened. In light of this, I will then use only the foreign interest rate as an instrument for nominal depreciation since the UIP still indicates that both variables should be correlated. Since I will use the U.S. interest rate as my measure of i^*, the exogeneity condition will also hold.[25]

6.2.2 Instrument: Commodity Prices

The other set of instruments used to correct for the endogeneity of the nominal devaluation is a price index of the commodities exported by each country. The use of this variable is inspired by the recent work in *commodity currencies* like the papers by Cashin, Cespedes, and Sahay (2002)

[23] The stochastic error ξ_t is also assumed to be uncorrelated with all the information available in period t.

[24] The predictive power of the uncovered interest parity for nominal devaluation has been tested previously by Flood and Rose (2001). They report that its predictive capacity, although far from perfect, has improved during the 1990s and that it also works for developing countries.

[25] Of course the foreign interest rate i^* could also be correlated with the shock ϵ. This could happen for instance if the domestic currency price of imports is affected by shocks to world output that can also be correlated to i^*. Notwithstanding, the lag -especially at the quarterly frequency- with which foreign monetary policy affects world output implies that this endogeneity is not likely to be severe.

and Chen and Rogoff (2003). Those papers study empirically the effect of terms of trade changes, especially of export goods in a country real exchange rate. Both papers find a significant negative correlation between the country's terms of trade and its real exchange rate. I'll use this finding plus the well known fact that changes in *nominal* exchange rates explain the bulk of changes in *real* exchange rates to justify the relevance of movements in commodity prices as an instrument for nominal devaluation.

In more formal terms, the instrumental variable strategy is based on the following theory of the real exchange rate:

$$\frac{EP^*}{P} = f(P_c, W) \tag{8}$$

where the left hand side of (8) is the standard definition of the real exchange rate which is assumed to depend on the prices of the commodities exported by the country (P_c) and other factors (W).[26] Cashin, Cespedes, and Sahay (2002) test equation (8) for a sample of developing countries for which commodities represent a significant share of their exports.[27] All of the four economies included in this paper satisfy that criteria and exhibit a strong association between commodities prices and the real exchange rate.

The only additional assumption is that when the determinants of the real exchange rate change, the transition to the new equilibrium is done through changes in the nominal exchange rate (E). This result is well established in many papers like the ones of Mussa (1986) and Goldfajn and Valdes (1999). Hence, one can state that changes commodities prices are a good candidate to serve as an instrument for nominal depreciation.

[26] Cashin, Cespedes, and Sahay (2002) provide a detailed derivation of equation (8)

[27] In contrast, Chen and Rogoff (2003) focus on three OECD countries where commodities also represent a high fraction of exports: Australia, Canada and New Zealand.

Having established the relevance of commodities prices as an instrument for nominal depreciation, I still need to argue that the exogeneity condition of the proposed instrument holds. The main concern is that the goods included in the P_c index are also included in the imported price index. This concern can be easily dismissed by the fact that commodities are not imported back by these countries.[28]

In order to control for the dynamics of the real exchange adjustment to changes in the prices of commodities I will introduce four lags of changes in the log of the commodities price index as instrument of nominal devaluation. Hence the first stage regression of the instrumental variable estimation has the following form:

$$\Delta e_{jt} = \sum_{s=0}^{4} \gamma_s \Delta p_c + \Lambda \Pi + \sigma_{jt} \tag{9}$$

where lower case letters denote natural logarithm of variables, Π includes all the other variables not being instrumented and σ_{jt} is a stochastic error. In the next section I discuss the results obtained from the estimation of the pass-through regression using each one of the instruments examined here.

6.2.3 Results of Instrumental Variables Estimation

The results of the instrumental variables estimation are presented in Tables 15 to 22. In general, the IV estimations confirm the results obtained with the OLS and error-correction specifications: ERPT is high in the short run and complete within a year. Only in the case of Chile the point estimates

[28] Nevertheless, it is likely that the dynamics of the dollar price of imports and of the commodities exported are driven by some common factors. For instance, it is well known that fluctuations in the value of the US dollar against other major currencies has a non-negligible impact on the dollar-price of all goods traded in international markets. The presence of this effect diminishes the quality of the instrument but does not invalidate completely its use.

of the IV regressions are smaller than those discussed earlier but, given the bigger standard error of the IV estimations, this difference is not statistically significant.

6.3 A Closer Look at the Timing of Depreciation and Imported Goods Inflation

The suspected endogeneity of nominal depreciation can also be addressed by examining the extent to which the results are affected by the exclusion of this variable. For this I run the following regression:

$$\Delta p_{jt}^{M} = \sum_{s=1}^{4} \alpha_s \Delta e_{jt-s} + \sum_{s=0}^{3} \beta_s \Delta x_{jt-s} + \Psi Z + \epsilon_{jt} \tag{10}$$

Equation (10) differs from (3) only in the exclusion of contemporaneous depreciation (the Δe_{jt} term) which is replaced by an additional lag of that same variable. The idea is to test if the estimates of the short run and long run pass-through coefficient change when this variable is excluded from the estimation equation.

The results of the estimation of equation (10) are presented in tables 23 to 26. As can be seen, both the short and long term pass-through coefficients decline for all the countries except Uruguay [29]. This indicates that contemporaneous depreciation of the nominal exchange rate has indeed an independent effect on the inflation of imported goods. Moreover, the significant decline in the R^2 coefficient indicates that the contemporaneous depreciation should not be excluded from the regressions that estimate the exchange rate pass-through.

The fact that exchange rate depreciation has an immediate effect on the domestic currency price of imported goods can be attributed in part to the fact that in this paper I use quarterly

[29] Even though the point estimates for Uruguay are higher they are not statistically different than the ones obtained when estimating equation 3. See table 8 for the results.

data. In this sense, although if there is a lag of one or two months between changes in the nominal exchange rate and the price of imported goods, this can not be detected using quarterly data.[30] I will discuss other explanations for the rapid pass-through of nominal depreciation to imported goods' inflation in section 7 below.

6.4 Are Pass-Through Estimates Dependent on Big Depreciations?

As is well known, the countries included in this paper have experienced periods of significant depreciation of the nominal exchange rate. Indeed, some of those periods can be classified as currency crises. Recent papers by Burstein, Eichenbaum, and Rebelo (2002) and Burstein, Eichenbaum, and Rebelo (2003) have documented that domestic inflation is significantly below the rate of depreciation of the nominal exchange rate in the aftermath of large depreciations of a country's currency. That result is explained in part by the fact that consumers substitute away from imported goods whose price increase during this depreciation episodes. This implies that sellers of imported goods might be less willing to pass-through changes in the nominal exchange rate to avoid losing market share and sales in a scenario of extraordinarily high depreciation. All these suggests that it is important to consider explicitly the presence of these periods when estimating the pass-through equation.

In order to do this I will extend equation (3) in the following way:

$$\Delta p_{jt}^{M} = \sum_{s=0}^{3} \alpha_s \Delta e_{jt-s} + \sum_{s=0}^{3} \rho_s \Delta e_{jt-s} * BIG + \sum_{s=0}^{3} \beta_s \Delta x_{jt-s} + \Psi Z + \epsilon_{jt} \tag{11}$$

Where BIG is a dummy variable that is equal to one when the nominal depreciation exceeds the 95^{th}

[30] The lag between the change in the nominal exchange rate and the price of imported goods is very likely to exist in practice given that imports are usually invoiced using the value of the exchange rate in the previous month.

percentile of the distribution of monthly depreciations.[31] The results of the estimation are presented in Table 27.[32] As can be seen in the row that reports the sum of the α_s and ρ_s coefficients, there is strong evidence for Argentina and Chile that the pass-through of the exchange rate is significantly lower during periods of extreme depreciation. On the other hand, in the case of Colombia and Uruguay there is no evidence that the pass-through changes in those periods.

These results can be rationalized when one considers the different histories of the exchange rate regime in these countries. As is well known, during the period under study Argentina has experienced various currency crises and other sharp depreciations of the nominal exchange rate, often accompanied by severe downturns in economic activity. In this scenario it is very likely that sellers of imported goods are going to restrain from passing through the change in the exchange rate to the price of their good.

In contrast to Argentina, the evolution of the Chilean economy during has not been characterized by such significant depreciations of the nominal exchange rate or changes in the monetary policy framework. Indeed, Chile has moved in recent years towards a scheme of increased floating flexibility and explicit inflation targets after having used an increasingly wider target zone since the mid 1980s. In this context it is likely that economic agents assign a higher probability of reversal to an unusually high depreciation of the nominal exchange rate. Then, if big depreciations are perceived mainly as a transitory phenomenon, it is less likely that sellers of imported goods are going to adjust the price of their good in that scenario. Indeed the results presented in Table 27 indicate that there is no pass-through in periods of extraordinarily high nominal depreciation.

In turn, the cases of Colombia and Uruguay represent a midpoint with respect to the polar experiences of Argentina and Chile. Contrary to Argentina, Colombia and Uruguay have not ex-

[31] The non-interacted variable BIG is also included as an additional control in the matrix Z.

[32] In all the analysis that follows I use the index of unit value of imports (IVUM) as the proxy for x since the previous results indicate that it is the best proxy of the cost of imported goods in foreign currency.

perienced such devastating exchange rate crises and, in contrast to Chile, their monetary policy framework has not moved towards a higher degree of nominal exchange rate flexibility. This factors might explain then why the pass-through in these countries doesn't change when there is a significantly severe depreciation of the domestic currency.

It should be noted that the estimation of the long run pass-through (the sum of the α_s coefficients) for these countries using equation (11) is essentially the same than the one obtained in the base specification described by equation (3). In other words, the pass-through of the nominal exchange rate to the domestic currency price of imported goods is still complete in one year.

7 Why is the Exchange Rate Pass-Through so High and Constant Over Time?

The empirical evidence provided thus far indicates two distinct facts: (1) ERPT to import prices is high and complete within a year, and (2) There is no evidence of decline in the extent to which changes in the nominal exchange rate affect the domestic price of imported goods. Both results are to some extent at odds with the evidence presented by other authors. In light of this, in this section I will provide some additional evidence to explain the economic factors behind both results.

Before examining the reasons that might explain the peculiar characteristics of my results, especially with respect to the paper by Frankel, Parsley, and Wei (2004), it is important to remember that I use aggregate price indexes instead of detailed good-level prices as those authors. As was explained before, the use of microeconomic evidence has some benefits but also some shortcomings. Among these, one of the most important is the degree to which those goods are informative about the price dynamics of other imported goods. This is specially important to consider in light of the results of Burstein, Eichenbaum, and Rebelo (2002) that indicate that consumers substitute

away from high quality imported goods when the exchange rate depreciates significantly. Since Frankel, Parsley, and Wei (2004) use only high quality imported goods [33], it seems likely that the decline in the pass-through reported by those authors can be explained in part by the "flight from quality" described by Burstein, Eichenbaum, and Rebelo (2002). On the contrary, I use a much more comprehensive measure of the price of imported goods for which the degree of substitution is more limited.

Another consideration that must be made when analyzing the results presented is that, more than extraordinary high, they are similar in the high end of the distribution of the estimates of the pass-through coefficient reported for other economies and time periods. In this respect, even some OECD countries included in the paper by Campa and Goldberg (2005) exhibit long run pass-through coefficient similar to the ones estimated for the countries in this paper. The question then is why is the pass-through coefficient to the domestic currency price of imported goods relatively (but not extraordinarily) higher in developing than in industrial countries.

To answer this one needs to analyze the theoretical determinants of the frequency with which price setters (in this case sellers of imported goods) adjust the price of the good they sell when their costs change. This question is an old (and much discussed) one in macroeconomics and I will adopt the framework of Taylor (2000) to study it. According to Taylor's model the volatility and level of nominal variables are important to determine the extent to which changes in costs are passed through to the price of the good sold. Hence, in Taylor's framework, in a low inflation environment firms are going to be less willing to increase the price of their product to avoid the possibility of seeing a decrease in their sales. This decrease in sales would be the consequence of the firm being the only one to increase its price, a likely scenario in periods of low inflation.

The evolution of inflation in the countries analyzed in this paper has declined steadily during

[33] See footnote 2 for the list of goods studied by Frankel, Parsley, and Wei (2004)

the sample period according to what can be seen in Figures 9 to 12. According to Taylor's model this should have lead to a decline in the pass-through coefficient which, as I explained above, is not supported by the evidence. In order to test more formally the influence of average inflation on the pass-through coefficient, I run the following panel regression:

$$\Delta p_{jt}^{M} = \sum_{s=0}^{3} \alpha_s \Delta e_{jt-s} + \sum_{s=0}^{4} \beta_s \Delta x_{jt-s} + \sum_{s=0}^{3} \gamma_s \Delta e_{jt-s} \tilde{\pi}_{jt-1-s} + \Psi Z + \epsilon_{jt} \tag{12}$$

The term of interest is the interaction of nominal depreciation (Δe) and past inflation ($\tilde{\pi}$). Since according to Taylor's model the idea is to measure the influence of the inflation environment on the pricing decision of firms, I use the consumer price index (CPI) to calculate $\tilde{\pi}$. This because the change in the CPI is the more adequate measure of inflation in the economy. In order to eliminate endogeneity issues between Δp_t^M and $\tilde{\pi}$ this last variable is included with one lag in the interaction term with the nominal depreciation. Furthermore, I calculated $\tilde{\pi}$ over the previous 2,3,4 and 5 quarters to check the consistency of the results. The results of the estimation of regression (12) are presented in Table 28 and indicate that the influence of past inflation on the exchange rate pass-through is the reverse one predicted by Taylor: the sum of the γ_s coefficients is negative in most of the specifications. All this indicates then that a factor different from inflation needs to be considered to explain the absence of a decline in the pass-through.

In spite of the fact that the *path* of inflation is unable to explain the path of the pass-through coefficient, the *level* of inflation can help to explain the result of complete pass-through. By the same token, the high levels of money growth in developing countries relative to the ones observed in OECD countries is also consistent with a higher pass-through coefficient in the former group of economies. The intuition for these results is that in a scenario of greater nominal instability, prices are revised more frequently.

The evidence on this can be seen in figure 13 that plots money growth and inflation along with the long run pass-through coefficient for each country. As can be seen, developing countries exhibit higher values for both variables and hence their pass-through coefficient tends to be situated in the higher end of distribution.

Another factor that has been identified in the literature as one leading to a lower pass-through coefficient to the domestic price of imported goods is a change in the composition of imports. This element is in fact, according to Campa and Goldberg (2005), the main responsible for the decline in the pass-through coefficients observed in the OECD countries. The precise channel through which this occurs is the bigger share of manufactured goods and smaller one of energy and raw materials in those countries import bundles. The hypothesis behind this argument is that manufactured goods have lower pass-through coefficients so, as its importance in the country's import bundle increases, the aggregate pass-through coefficient declines as well.

Although a complete test of this hypothesis using the same methodology used by Campa and Goldberg (2005) is not possible due to data limitations, the available evidence indicates that this channel might be important to explain the absence of a decline in the pass-through coefficient.

For this one needs to consider the change in the share of manufactures in developing countries import bundles. This is presented in figure 14. As can be seen, the developing countries included in this paper show some of the lowest increases in the share of manufactures over the relevant period. In part this is due to the fact that manufactures represented a relatively high share of these countries' imports at the beginning of the period.[34] Nevertheless, the behavior of the share of manufactures in developing countries is consistent with no decline in the pass-through coefficient.

Notwithstanding, the high *level* of the share of manufactured goods in developing countries

[34]The high share of manufactures in developing countries' imports is entirely consistent with trade theory and has been widely documented before.

imports is an element that pushes towards *low* pass-through. This shortcoming in the trade-composition argument indicates that the dynamics of the pass-through coefficient in developing countries needs further analysis.

The next (and last) candidate explanation for the high and non-declining pass-through is the volatility of the nominal exchange rate. This hypothesis is based on the idea that consumers and producers prefer to trade in the currency that exhibits the smaller fluctuations. To measure the degree of volatility of each currency I use the same methodology of Calvo and Reinhart (2002). This consists in calculating the amount of time that the currency depreciates more than 2.5% per month. For this it is useful to define the following indicator function:

$$\mathbf{I}\{\|\Delta e\| > 0.025\} \tag{13}$$

The magnitude of currency volatility will be measured by the sample mean of the function **I**. The results are presented in Table 29 and indicate that the volatility of the nominal exchange rate is significantly higher in developing countries: the currencies of those countries spend a lower fraction of time inside the 2.5% band.

This result is not affected by the fact that developing countries have experienced currency crises. This is seen in the rightmost column of table 29 which presents the *trimmed mean* of the function **I**. The trimmed mean is calculated after eliminating all those observations in which the monthly depreciation of the exchange rate is:

1. Smaller than the second percentile of the distribution of monthly depreciations and,

2. Larger than the 98^{th} percentile of that distribution.

The next step is to analyze if the volatility of the nominal exchange rate has decreased over time. For this I repeat the same calculations of the sample mean and trimmed mean of the function **I** in the first and second half of the sample. The results are presented in Table 30 and indicate that, even though on average the volatility of the nominal exchange rate has declined over time for all countries, it remains higher for the developing group.[35]

To summarize and determine more precisely the effect of all the factors discussed in this section on the pass-through coefficient I will run the following regression combining Campa and Goldberg (2005) estimates for the OECD and the ones obtained here for developing countries:

$$\begin{aligned} PT = & \beta_1 \text{Money} + \beta_2 \text{Inflation} + \beta_3 \text{Square Depreciation} + \beta_4 \text{GDP} + \\ & \beta_5 \text{Manufactures} + \eta \end{aligned} \tag{14}$$

Where:

1. PT is the estimate of the long run pass-through.
2. Money is the average growth rate of money (in logs).
3. Inflation is the average annual inflation (in logs).
4. Square Depreciation is the average of the square depreciation of the nominal exchange rate.
5. GDP is GDP per capita in measured in constant US dollars of 1995.
6. Manufactures is the share of manufactured goods in each country's import bundle.

[35]The results reported here using Calvo and Reinhart (2002) methodology are opposite to what those authors report. The differences stem in large part from the different samples considered in each work. While Calvo and Reinhart (2002) focus only on those years before 1999 where countries declare to be floating their currencies, I use the entire period 1975-2003. The fact that the "fear of floating" phenomenon has diminished for some countries in recent years is documented by Obstfeld (2004).

7. η is a random error.

The results of the estimation are presented in Table 31. The first column corresponds to the sample of OECD countries used by Campa and Goldberg (2005) and the results are consistent with their estimates.[36] As can be seen, the results indicate that nominal exchange rate volatility is the variable associated more consistently with the pass-through coefficient. This result is robust to the exclusion of Argentina that exhibits and extremely high value for the volatility of the nominal exchange rate. The evidence presented in this table indicates then that macroeconomic factors are an important determinant of the pass-through coefficient.

8 Conclusions

According to the results presented in this paper the exchange rate pass-through to import prices in the sample of developing countries is fast in the short run and complete within one year. Moreover, there is no compelling evidence that exchange rate pass-through has declined over time. These results are different than the ones obtained by other researchers who have looked at developed and developing countries evidence.

There are several reasons that could explain the difference in behavior between both group countries. In first place, nominal exchange rate changes are more persistent in developing countries. This implies that it is more likely that economic agents in the countries in the sample infer that a nominal devaluation is going to be permanent. This will lead to a faster change in the prices of imported goods. In second place, inflation rates in developing countries have been higher than in richer economies and this is also likely to cause higher pass-through from exchange rate to prices. In this sense, it should be noted that even countries that have managed to accomplish significant

[36] Table 5 in Campa and Goldberg (2005) contains the estimation results.

reductions in inflation (Chile) have not seen a decline in the exchange rate pass-through. Finally, the data used in this paper covers a larger number of goods than the ones studied by Frankel, Parsley, and Wei (2004) that leads them to detect a decline in the exchange rate pass-through.

In the context of the NOEM debate, the high exchange rate pass-through estimated in this paper constitutes evidence favorable to the adoption of flexible exchange rate regimes. The high exchange rate pass-through indicates that changes in the exchange rate can lead to changes in relative prices helping to achieve a more efficient economic outcome. However the high exchange rate pass-through is by no means the unique criteria to decide upon the adoption of flexible exchange rates. In particular, the presence of potentially pervasive balance-sheet effect effects due to currency mismatches in the countries liabilities could decrease the merits of exchange rate systems that tolerate larger fluctuations in the value of the currency.

The paper suggests several new areas of research in order to provide more evidence to the exchange rate pass-through. In first place, it would be interesting to examine more disaggregated data of imported goods prices. This will permit to gauge the extent of aggregation bias in the results presented here. [37] Next, the sample of countries should be extended to include economies from other geographical areas. I leave both issues for future research.

[37] Otani, Shiratsuka, and Shirota (2003) present evidence that exchange rate pass-through dynamics is different across different goods using disaggregated data for Japan.

Table 1: Unit Root Tests for Argentina.‡

P-values of the Augmented-Dickey-Fuller Test .

	Level		First Difference	
	Constant	Constant and Trend	Constant	Constant and Trend
Domestic Price of Imports	0.991	0.945	0.000	0.000
Nominal Exchange Rate	0.972	0.849	0.000	0.000
Oil Price	0.990	0.973	0.000	0.000
Numerator of Real Exchange Rate	0.990	0.791	0.000	0.000
US PPI	0.997	0.694	0.000	0.000
Index of Unit Value of Imports	0.432	0.390	0.000	0.000
Commodities Prices	0.023	0.095	0.000	0.000
Foreign Interest Rate	0.134	0.254		
GDP (Seasonally Adjusted)	0.903	0.044	0.000	0.000

‡ Tests done for the natural logarithm of each variable unless noted.

† For the level of the variable.

Table 2: Unit Root Tests for Chile.‡

P-values of the Augmented-Dickey-Fuller Test .

	Level		First Difference	
	Constant	Constant and Trend	Constant	Constant and Trend
Domestic Price of Imports	0.919	0.291	0.000	0.000
Nominal Exchange Rate	0.905	0.617	0.000	0.000
Oil Price	0.991	0.975	0.000	0.000
Numerator of Real Exchange Rate	0.868	0.552	0.000	0.000
US PPI	0.997	0.694	0.000	0.000
Index of Unit Value of Imports	0.730	0.477	0.000	0.000
Commodities Prices	0.999	1.000	0.000	0.000
Foreign Interest Rate	0.142	0.225		
GDP (Seasonally Adjusted)	0.990	0.054	0.000	0.000

‡ Tests done for the natural logarithm of each variable unless noted.

† For the level of the variable.

Table 3: Unit Root Tests for Colombia.‡

P-values of the Augmented-Dickey-Fuller Test .

	Level		First Difference	
	Constant	Constant and Trend	Constant	Constant and Trend
Domestic Price of Imports	0.999	0.891	0.000	0.000
Nominal Exchange Rate	0.997	0.951	0.000	0.000
Oil Price	0.990	0.973	0.000	0.000
Numerator of Real Exchange Rate	0.980	0.816	0.000	0.000
US PPI	0.997	0.694	0.000	0.000
Index of Unit Value of Imports	0.100	0.723	0.000	0.000
Commodities Prices	0.000	0.000	0.000	0.000
Foreign Interest Rate	0.134	0.254		
GDP (Seasonally Adjusted)	0.991	0.000	0.000	0.000

‡ Tests done for the natural logarithm of each variable unless noted.

† For the level of the variable.

Table 4: Unit Root Tests for Uruguay.‡

P-values of the Augmented-Dickey-Fuller Test .

	Level		First Difference	
	Constant	Constant and Trend	Constant	Constant and Trend
Domestic Price of Imports	0.999	0.981	0.066	0.306
Nominal Exchange Rate	0.984	0.871	0.000	0.000
Oil Price	0.991	0.975	0.000	0.000
Numerator of Real Exchange Rate	0.846	0.551	0.000	0.000
US PPI	0.997	0.694	0.000	0.000
Index of Unit Value of Imports	0.037	0.101	0.000	0.000
Commodities Prices	0.103	0.460	0.000	0.000
Foreign Interest Rate	0.142	0.225		
GDP (Seasonally Adjusted)	0.287	0.006	0.000	0.000

‡ Tests done for the natural logarithm of each variable unless noted.

† For the level of the variable.

Table 5: Base Regression Results for Argentina

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	-0.621	0.742	0.742
	(0.153)***	(0.026)***	(0.019)***
Long Term Pass-Through	-1.364	0.959	0.948
	(0.381)###	(0.03)	(0.021)##
Foreign Prices			
Short Term Pass Through	0.789	1.464	-0.223
	(0.087)***	(0.674)**	(0.294)
Long Term Pass-Through	1.162	1.628	1.810
	(0.193)	(0.751)	(0.602)
Adjusted R^2	0.984	0.926	0.980
F Test p-value	0.000	0.000	0.000
Chow Test p-value	0.533	0.410	0.800
Sample Period	1981-Q1–2002-Q1	1970-Q2–2006-Q2	1987-Q1–2006-Q2

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, ## and # indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 6: Base Regression Results for Chile

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	0.486	0.729	0.806
	(0.202)**	(0.066)***	(0.062)***
Long Term Pass-Through	0.506	0.829	0.984
	(0.308)	(0.108)	(0.11)
Foreign Prices			
Short Term Pass Through	0.141	0.217	0.300
	(0.104)	(0.282)	(0.078)***
Long Term Pass-Through	0.098	0.402	0.510
	(0.155)###	(0.405)	(0.174)###
Adjusted R^2	0.789	0.766	0.810
F Test p-value	0.000	0.000	0.000
Chow Test p-value	0.085	0.109	0.163
Sample Period	1986-Q2–2006-Q2	1986-Q2–2006-Q2	1986-Q2–2006-Q2

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, ## and # indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 7: Base Regression Results for Colombia

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	0.080	0.411	0.820
	(0.090)	(0.037)***	(0.03)***
Long Term Pass-Through	-0.262	0.671	1.006
	(0.197)###	(0.045)###	(0.027)
Foreign Prices			
Short Term Pass Through	0.177	0.326	0.885
	(0.045)***	(0.139)**	(0.054)***
Long Term Pass-Through	0.47	0.790	0.950
	(0.096)###	(0.146)	(0.052)
Adjusted R^2	0.815	0.774	0.960
F Test p-value	0.000	0.000	0.000
Chow Test p-value	0.191	0.517	0.292
Sample Period	1981-Q1–2006-Q2	1977-Q2–2006-Q2	1977-Q2–2006-Q2

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, $^{\#\#}$ and $^{\#}$ indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 8: Base Regression Results for Uruguay

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	1.004	0.715	0.740
	(0.305)***	(0.113)***	(0.09)***
Long Term Pass-Through	0.156	1.088	1.031
	(0.776)	(0.131)	(0.111)
Foreign Prices			
Short Term Pass Through	-0.088	-0.372	0.506
	(0.159)	(0.65)	(0.131)***
Long Term Pass-Through	0.405	-0.460	0.700
	(0.339)#	(0.827)#	(0.275)
Adjusted R^2	0.874	0.861	0.910
F Test p-value	0.000	0.000	0.000
Chow Test p-value	0.704	0.948	0.151
Sample Period	1988-Q2–2002-Q3	1988-Q2–2002-Q3	1989-Q1–2002-Q3

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
$^{\#\#\#}$, $^{\#\#}$ and $^{\#}$ indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 9: Cointegration Tests

P-values of the Augmented-Dickey-Fuller Test .

	Measure of Imports Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Chile	0.332	0.000	0.011
Colombia	0.028	0.616	0.000
Uruguay	0.024	0.004	0.039
Argentina	0.080	0.136	0.000

Table 10: Error Correction Representation for Argentina

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	-0.622	0.745	0.753
	(0.154)***	(0.026)***	(0.021)***
Long Term Pass-Through	-1.407	0.961	0.935
	(0.393)###	(0.030)	(0.023)###
Foreign Prices			
Short Term Pass Through	0.791	1.557	-0.115
	(0.088)***	(0.683)**	(0.303)
Long Term Pass-Through	1.187	1.839	1.910
	(0.201)	(0.790)	(0.604)
Error Correction Coefficient	-0.039	-0.026	-0.109
	(0.082)	(0.030)	(0.082)
Adjusted R^2	0.984	0.926	0.981
F Test p-value	0.000	0.000	0.000
Chow Test p-value	0.581	0.481	0.638
Sample Period	1981-Q1–2002-Q1	1970-Q2–2006-Q2	1987-Q1–2006-Q2

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
$^{###}$, $^{##}$ and $^{#}$ indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 11: Error Correction Representation for Chile

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	0.384	0.666	0.788
	(0.186)**	(0.065)***	(0.058)***
Long Term Pass-Through	0.102	0.743	0.941
	(0.301)###	(0.104)##	(0.105)
Foreign Prices			
Short Term Pass Through	0.202	0.359	0.339
	(0.096)**	(0.268)	(0.074)***
Long Term Pass-Through	0.302	0.232	0.460
	(0.151)###	(0.382)##	(0.165)###
Error Correction Coefficient	-0.183	-0.271	-0.218
	(0.049)***	(0.085)***	(0.072)***
Adjusted R^2	0.824	0.795	0.830
F Test p-value	0.000	0.000	0.000
Chow Test p-value	0.549	0.198	0.918
Sample Period	1986-Q2–2006-Q2	1986-Q2–2006-Q2	1986-Q2–2006-Q2

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, ## and # indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 12: Error Correction Representation for Colombia

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	0.080	0.389	0.813
	(0.090)	(0.037)***	(0.019)***
Long Term Pass-Through	-0.253	0.644	0.871
	(0.196)###	(0.046)###	(0.020)###
Foreign Prices			
Short Term Pass Through	0.183	0.309	1.013
	(0.045)***	(0.136)**	(0.035)***
Long Term Pass-Through	0.469	0.865	1.120
	(0.096)###	(0.146)	(0.035)###
Error Correction Coefficient	-0.031	0.053	-1.434
	(0.026)	(0.022)**	(0.117)***
Adjusted R^2	0.816	0.785	0.984
F Test p-value	0.000	0.000	0.000
Chow Test p-value	0.246	0.611	0.249
Sample Period	1981-Q1–2006-Q2	1977-Q2–2006-Q2	1977-Q2–2006-Q2

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, ## and # indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 13: Error Correction Representation for Uruguay

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	1.015	0.736	0.761
	(0.298)***	(0.110)***	(0.089)***
Long Term Pass-Through	0.356	0.981	0.971
	(0.767)	(0.137)	(0.116)
Foreign Prices			
Short Term Pass Through	-0.102	0.442	0.450
	(0.155)	(0.743)	(0.135)***
Long Term Pass-Through	0.295	0.105	0.490
	(0.337)##	(0.845)	(0.305)
Error Correction Coefficient	-0.144	-0.286	-0.143
	(0.082)*	(0.140)**	(0.097)
Adjusted R^2	0.880	0.871	0.911
F Test p-value	0.000	0.000	0.000
Chow Test p-value	0.944	0.405	0.338
Sample Period	1988-Q2–2002-Q3	1988-Q2–2002-Q3	1989-Q1–2002-Q3

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, ## and # indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 14: Main Commodities Exported
Share of total exports in parenthesis

Argentina	Soy Meal (18%)	Wheat (13%)	Maize (11%)
Chile	Copper (70%)	Fish (9%)	Fishmeal (6%)
Colombia	Coffee (48%)	Coal (19%)	Bananas (18%)
Uruguay	Beef (36%)	Rice (27%)	Fish (13%)

Table 15: Argentina IV Results
Instrument: Foreign Interest Rate

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	0.980	0.704	0.781
	(2.258)	(0.070)***	(0.074)***
Long Term Pass-Through	1.599	0.944	0.962
	(4.154)	(0.035)	(0.039)
Foreign Prices			
Short Term Pass Through	-0.116	1.190	-0.233
	(1.275)	(0.497)**	(0.321)
Long Term Pass-Through	-0.321	2.251	1.607
	(2.086)	(0.626)##	(0.476)
Adjusted R^2	0.958	0.965	0.979
F Test p-value	0.000	0.000	0.000
First Stage Regression			
Coefficient on Foreign Interest Rate	0.0012	0.0291	0.0458
	(0.0014)	(0.0107)***	(0.0202)**

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, ## and # indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 16: Argentina IV Results
Instrument: Commodity Price Index

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	-0.987	0.779	0.724
	(0.561)*	(0.061)***	(0.053)***
Long Term Pass-Through	-2.001	0.972	0.942
	(1.08)###	(0.041)	(0.035)#
Foreign Prices			
Short Term Pass Through	0.996	1.152	-0.219
	(0.318)***	(0.516)**	(0.315)
Long Term Pass-Through	1.486	2.236	1.898
	(0.542)	(1.154)	(0.667)
Adjusted R^2	0.983	0.968	0.98
F Test p-value	0.000	0.000	0.000
First Stage Regression			
Summ of Commodities Coefficients	-0.206	0.334	0.552
	(0.113)*	(0.998)	(1.080)
Sargan Test p-value	0.219	0.102	0.091

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
$^{\#\#\#}$, $^{\#\#}$ and $^{\#}$ indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 17: Chile IV Results
Instrument: Foreign Interest Rate

	Measure of Foreign Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	-2.715	0.462	0.572
	(5.543)	(0.209)**	(0.195)***
Long Term Pass-Through	-2.009	0.608	0.739
	(4.377)	(0.218)#	(0.265)
Foreign Prices			
Short Term Pass Through	1.714	0.094	0.211
	(2.706)	(0.342)	(0.131)
Long Term Pass-Through	1.122	0.325	0.297
	(1.773)	(0.412)	(0.271)###
Adjusted R^2	-0.031	0.706	0.766
F Test p-value	0.000	0.000	0.000
First Stage Regression			
Coefficient on Foreign Interest Rate	0.0004	0.006	0.0053
	(0.0007)	(0.0019)***	(0.0018)***

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, ## and # indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 18: Chile IV Results
Instrument: Commodity Price Index

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	0.817	0.849	0.836
	(0.368)**	(0.241)***	(0.162)***
Long Term Pass-Through	0.766	0.929	1.016
	(0.386)	(0.224)	(0.213)
Foreign Prices			
Short Term Pass Through	-0.021	0.272	0.311
	(0.176)	(0.288)	(0.112)***
Long Term Pass-Through	-0.008	0.437	0.532
	(0.165)###	(0.376)	(0.233)##
Adjusted R^2	0.78	0.754	0.808
F Test p-value	0.000	0.000	0.000
First Stage Regression			
Summ of Commodities Coefficients	-0.072	-0.073	0.006
	(0.028)**	(0.11)	(0.094)
Sargan Test p-value	0.698	0.567	0.495

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, ## and # indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 19: Colombia IV Results
Instrument: Foreign Interest Rate

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	1.684	0.682	0.814
	(0.529)***	(0.083)***	(0.087)***
Long Term Pass-Through	1.62	0.786	1
	(0.561)	(0.053)###	(0.028)
Foreign Prices			
Short Term Pass Through	-0.561	0.022	0.859
	(0.244)**	(0.133)	(0.153)***
Long Term Pass-Through	-0.383	0.693	0.921
	(0.259)###	(0.147)##	(0.068)
Adjusted R^2	0.138	0.678	0.958
F Test p-value	0.000	0.000	0.000
First Stage Regression			
Coefficient on Foreign Interest Rate	0.001	0.0039	0.0017
	(0.0004)**	(0.0011)***	(0.0007)**

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, ## and # indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 20: Colombia IV Results
Instrument: Commodity Price Index

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	-0.477	0.657	0.974
	(0.400)	(0.32)**	(0.175)***
Long Term Pass-Through	-0.565	0.774	1.032
	(0.487)###	(0.09)##	(0.050)
Foreign Prices			
Short Term Pass Through	0.435	0.057	1.116
	(0.188)**	(0.306)	(0.285)***
Long Term Pass-Through	0.609	0.830	1.003
	(0.229)#	(0.199)	(0.146)
Adjusted R^2	0.661	0.697	0.943
F Test p-value	0.000	0.000	0.000
First Stage Regression			
Summ of Commodities Coefficients	-0.056	0.025	-0.011
	(0.044)	(0.108)	(0.062)
Sargan Test p-value	0.753	0.236	0.224

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
$^{###}$, $^{##}$ and $^{#}$ indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 21: Uruguay IV Results
Instrument: Interest Rate Differential

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	4.321	1.161	0.689
	(5.015)	(0.511)**	(0.225)***
Long Term Pass-Through	2.049	1.078	1.03
	(2.876)	(0.140)	(0.087)
Foreign Prices			
Short Term Pass Through	-1.690	-0.430	0.514
	(2.418)	(0.710)	(0.148)***
Long Term Pass-Through	-0.360	0.172	0.704
	(1.183)	(0.944)	(0.271)
Adjusted R^2	0.528	0.811	0.908
F Test p-value	0.000	0.000	0.000
First Stage Regression			
Coefficient on Foreign Interest Rate	0.00174	0.0111	0.0057
	(0.00108)	(0.0032)***	(0.0046)

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, ## and # indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 22: Uruguay IV Results
Instrument: Foreign Interest Rate

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	0.665	0.888	0.787
	(0.727)	(0.420)**	(0.182)***
Long Term Pass-Through	-0.037	1.084	1.031
	(0.709)	(0.137)	(0.088)
Foreign Prices			
Short Term Pass Through	0.075	-0.394	0.500
	(0.354)	(0.650)	(0.160)***
Long Term Pass-Through	0.483	-0.214	0.689
	(0.296)#	(0.983)	(0.283)
Adjusted R^2	0.871	0.854	0.908
F Test p-value	0.000	0.000	0.000
First Stage Regression			
Summ of Commodities Coefficients	0.000	0.503	0.893
	(0.083)	(0.279)*	(0.440)**
Sargan Test p-value	0.364	0.470	0.748

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, ## and # indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 23: Estimation without contemporaneous depreciation: Argentina

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	-0.035	0.512	0.499
	(0.168)	(0.071)***	(0.095)***
Long Term Pass-Through	-0.027	0.661	0.685
	(0.406)##	(0.081)###	(0.105)###
Foreign Prices			
Short Term Pass Through	0.437	1.303	-0.075
	(0.010)***	(1.839)	(1.525)
Long Term Pass-Through	0.492	1.609	5.580
	(0.205)##	(2.046)	(3.029)
Adjusted R^2	0.980	0.449	0.500
F Test p-value	0.000	0.000	0.000
Chow Test p-value	0.667	0.424	0.859
Sample Period	1981-Q1–2002-Q1	1970-Q2–2006-Q2	1987-Q1–2006-Q2

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, ## and # indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 24: Estimation without contemporaneous depreciation: Chile

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	-0.058	0.388	0.387
	(0.202)	(0.118)***	(0.120)***
Long Term Pass-Through	-0.079	0.247	0.179
	(0.302)###	(0.166)###	(0.181)###
Foreign Prices			
Short Term Pass Through	0.393	-0.108	-0.006
	(0.034)***	(0.477)	(0.141)
Long Term Pass-Through	0.34	0.210	-0.190
	(0.155)###	(0.688)	(0.315)###
Adjusted R^2	0.778	0.323	0.310
F Test p-value	0.000	0.000	0.000
Chow Test p-value	0.124	0.344	0.366
Sample Period	1986-Q2–2006-Q2	1986-Q2–2006-Q2	1986-Q2–2006-Q2

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, ## and # indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 25: Estimation without contemporaneous depreciation: Colombia

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	0.035	0.382	0.648
	(0.090)	(0.058)***	(0.092)***
Long Term Pass-Through	-0.368	0.548	0.799
	(0.175)###	(0.070)###	(0.08)##
Foreign Prices			
Short Term Pass Through	0.213	0.598	-0.342
	(0.018)***	(0.204)***	(0.093)***
Long Term Pass-Through	0.517	0.739	0.590
	(0.085)###	(0.218)	(0.154)###
Adjusted R^2	0.814	0.501	0.620
F Test p-value	0.000	0.000	0.000
Chow Test p-value	0.101	0.458	0.806
Sample Period	1981-Q1–2006-Q2	1977-Q2–2006-Q2	1977-Q2–2006-Q2

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, ## and # indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 26: Estimation without contemporaneous depreciation: Uruguay

	Measure of Import Prices		
	Numerator of Real Exchange Rate	US PPI	Index of Unit Value of Imports
Nominal Exchange Rate			
Short Term Pass Through	0.432	1.161	1.545
	(0.482)	(0.360)***	(0.297)***
Long Term Pass-Through	-0.391	1.013	0.952
	(0.844)	(0.185)	(0.181)
Foreign Prices			
Short Term Pass Through	0.381	-0.234	0.585
	(0.072)***	(0.874)	(0.207)***
Long Term Pass-Through	0.615	-1.257	0.820
	(0.371)	(1.098)##	(0.436)
Adjusted R^2	0.844	0.750	0.770
F Test p-value	0.000	0.000	0.000
Chow Test p-value	0.300	0.110	0.246
Sample Period	1988-Q2–2002-Q3	1988-Q2–2002-Q3	1989-Q1–2002-Q3

Standard errors in parenthesis.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
$^{\#\#\#}$, $^{\#\#}$ and $^{\#}$ indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Table 27: Controlling for Big Depreciation

	Argentina	Chile	Colombia	Uruguay
Nominal Depreciation	0.698	0.776	0.817	0.777
	[0.039]***	[0.071]***	[0.032]***	[0.224]***
L. Nominal Depreciation	0.288	0.239	0.262	0.205
	[0.041]***	[0.073]***	[0.036]***	[0.286]
L2. Nominal Depreciation	0.005	-0.102	-0.119	0.164
	[0.040]	[0.071]	[0.034]***	[0.305]
L3. Nominal Depreciation	0.114	0.025	0.043	-0.176
	[0.036]***	[0.072]	[0.031]	[0.268]
Nominal Depreciation*BIG	-0.082	-0.792	-0.033	-0.109
	[0.085]	[0.863]	[0.098]	[0.309]
L. Nominal Depreciation*BIG	-0.135	0.058	-0.031	-0.08
	[0.036]***	[0.135]	[0.027]	[0.173]
L2. Nominal Depreciation*BIG	-0.120	0.090	0.069	0.095
	[0.036]***	[0.126]	[0.025]***	[0.222]
L3. Nominal Depreciation*BIG	-0.036	-0.008	-0.063	0.155
	[0.037]	[0.075]	[0.026]**	[0.196]
BIG	0.285	0.072	0.002	0.033
	[0.140]**	[0.067]	[0.012]	[0.067]
Long Term Exchange Rate Pass-Through	1.11	0.94	1.00	0.97
$\sum_{s=0}^{3} \alpha_s$	[0.04]###	[0.13]###	[0.02]###	[0.15]###
Long Term Exchange Rate Pass-Through*BIG	0.73	0.29	0.95	1.03
$\sum_{s=0}^{3} \alpha_s + \sum_{s=0}^{3} \rho_s$	[0.09]***	[0.82]	[0.11]***	[0.38]***
$R^2 2$	0.99	0.85	0.97	0.94

Standard errors in brackets.

***, *** and * indicate significant at 1%, 5% and 10% confidence level respectively.
###, ## and # indicate null hypothesis of complete pass through can be rejected at 1%, 5% and 10% confidence level respectively.

Note: $LN.X$ corresponds to the N^{th} lag of variable X

Table 28: The Influence of the Inflation Environment on the Pass-Through

	Past Inflation calculated over n quarters			
	n=1	n=2	n=3	n=4
Nominal Depreciation	0.651	0.735	0.709	0.676
	[0.023]***	[0.012]***	[0.014]***	[0.017]***
L. Nominal Depreciation	0.32	0.349	0.312	0.311
	[0.024]***	[0.015]***	[0.015]***	[0.018]***
L2. Nominal Depreciation	-0.087	-0.077	-0.064	-0.199
	[0.027]***	[0.025]***	[0.029]**	[0.018]***
L3. Nominal Depreciation	0.047	0.086	0.113	0.187
	[0.024]**	[0.021]***	[0.022]***	[0.022]***
Long Term Exchange Rate Pass-Through	0.931	1.094	1.069	0.975
	[0.044]###	[0.031]###	[0.036]###	[0.032]###
$\sum_{s=0}^{3} \Delta e_{jt-s} \tilde{\pi}_{jt-s}$	0.849	-0.275	-0.283	-0.474
	[0.276]***	[0.046]***	[0.055]***	[0.061]***
Observations	324	324	324	324
R-squared	0.99	0.98	0.98	0.98

Table 29: Nominal Exchange Rate Volatility, 1975-2005
Fraction of Time inside the 2.5% band (%)

	Mean	Trimmed Mean
Australia	73.7	76.5
Austria	100.0	100.0
Belgium	99.2	100.0
Canada	89.8	93.3
Czech Republic	85.8	89.3
Denmark	98.9	100.0
Finland	93.3	96.9
France	96.2	98.9
Germany	61.6	64.0
Greece	87.9	91.3
Hungary	74.5	77.4
Iceland	72.6	75.4
Ireland	92.2	95.8
Italy	91.4	95.0
Japan	61.6	64.0
Netherlands	100.0	100.0
New Zealand	71.8	74.6
Norway	89.2	92.7
Poland	61.5	64.0
Portugal	89.2	92.7
Spain	89.8	93.3
Sweden	86.6	89.9
Switzerland	91.7	95.3
United Kingdom	73.1	76.0
Argentina	56.7	58.9
Chile	72.0	74.9
Colombia	85.5	88.8
Uruguay	58.1	60.3
Mean OECD Countries	84.7	87.3
Mean Developing Countries	68.1	70.7

Table 30: Nominal Exchange Rate Volatility in Two Periods
Fraction of Time inside the 2.5% band (%)

	1975-1989		1990-2005	
	Mean	Trimmed Mean	Mean	Trimmed Mean
Australia	77.2	79.9	70.3	72.6
Austria	100.0	100.0	100.0	100.0
Belgium	98.9	100.0	99.5	100.0
Canada	92.2	95.4	87.5	90.3
Czech Republic			85.8	89.3
Denmark	98.3	100.0	99.5	100.0
Finland	91.1	94.3	95.3	98.4
France	92.2	95.4	100.0	100.0
Germany	60.0	62.1	63.0	65.1
Greece	80.0	82.8	95.3	98.4
Hungary	65.6	67.8	82.8	85.5
Iceland	56.7	58.6	87.5	90.3
Ireland	90.0	93.1	94.3	97.3
Italy	90.0	93.1	92.7	95.7
Japan	60.0	62.1	63.0	65.1
Netherlands	100.0	100.0	100.0	100.0
New Zealand	71.7	74.1	71.9	74.2
Norway	87.2	90.2	91.1	94.1
Poland	53.3	55.2	68.8	71.0
Portugal	82.2	85.1	95.8	98.4
Spain	83.3	86.2	95.8	98.9
Sweden	88.9	92.0	84.4	87.1
Switzerland	87.2	90.2	95.8	97.8
United Kingdom	68.9	71.3	77.1	79.6
Argentina	27.2	27.7	84.4	87.1
Chile	69.4	71.3	74.5	76.9
Colombia	93.3	94.9	78.1	80.6
Uruguay	44.4	45.4	70.8	73.1
Mean OECD Countries	81.5	83.9	87.4	89.5
Mean Developing Countries	58.6	59.8	77.0	79.4

Table 31: Determinants of the Pass-Through Coefficient

	(1) Campa and Goldberg	(2) OECD	(3) Full Sample	(4) Exclude Argentina	(5) Full Sample	(6) Exclude Argentina
Money Growth (log)	0.120	0.151	0.124	0.096	0.156	0.069
	[0.223]	[0.229]	[0.216]	[0.231]	[0.206]	[0.211]
Inflation (log)	-0.338	-0.34	-0.091	-0.113	-0.136	-0.233
	[0.195]	[0.197]	[0.155]	[0.168]	[0.150]	[0.162]
Square of Depreciation	77.879	76.914	1.94	21.774	0.343	70.525
	[50.850]	[51.399]	[5.352]	[49.744]	[5.164]	[50.067]
GDP per Capita	-0.002	-0.001	0.000	-0.002	0.004	0.001
	[0.009]	[0.009]	[0.009]	[0.010]	[0.009]	[0.009]
Manufactures' Share		-0.381	-0.548	-0.563	-0.390	-0.385
		[0.489]	[0.485]	[0.496]	[0.469]	[0.458]
Developing Country					0.381	0.522
					[0.209]*	[0.227]**
Constant	-0.040	0.222	1.049	0.939	0.785	0.298
	[0.457]	[0.570]	[0.424]**	[0.511]*	[0.429]*	[0.543]
Observations	24	24	28	27	28	27
R^2	0.21	0.23	0.09	0.07	0.22	0.26

Figure 1: Nominal Devaluation and Imported Goods Inflation for Argentina

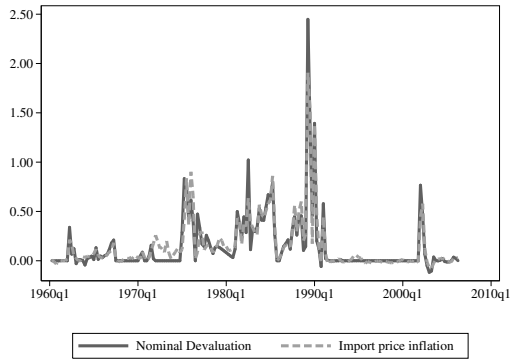


Figure 2: Nominal Devaluation and Imported Goods Inflation for Chile

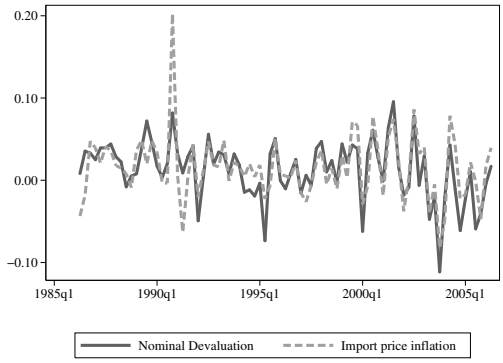


Figure 3: Nominal Devaluation and Imported Goods Inflation for Colombia

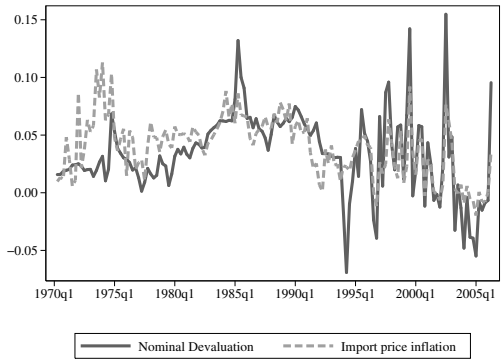


Figure 4: Nominal Devaluation and Imported Goods Inflation for Uruguay

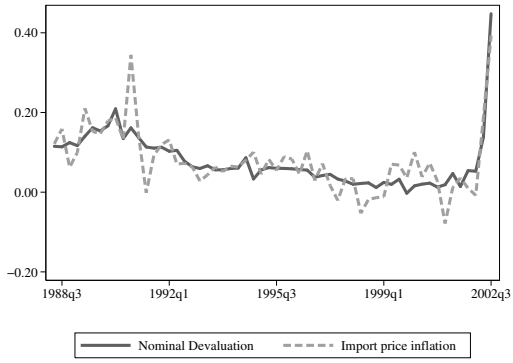


Figure 5: Rolling Long Term Pass Through Coefficient for Argentina

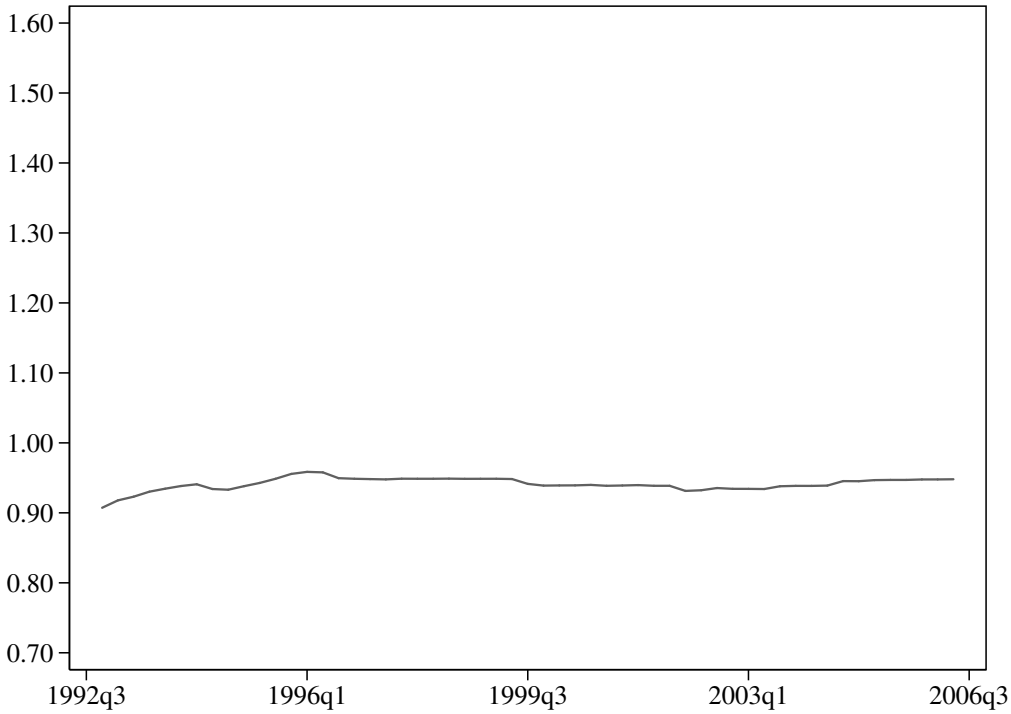


Figure 6: Rolling Long Term Pass Through Coefficient for Chile

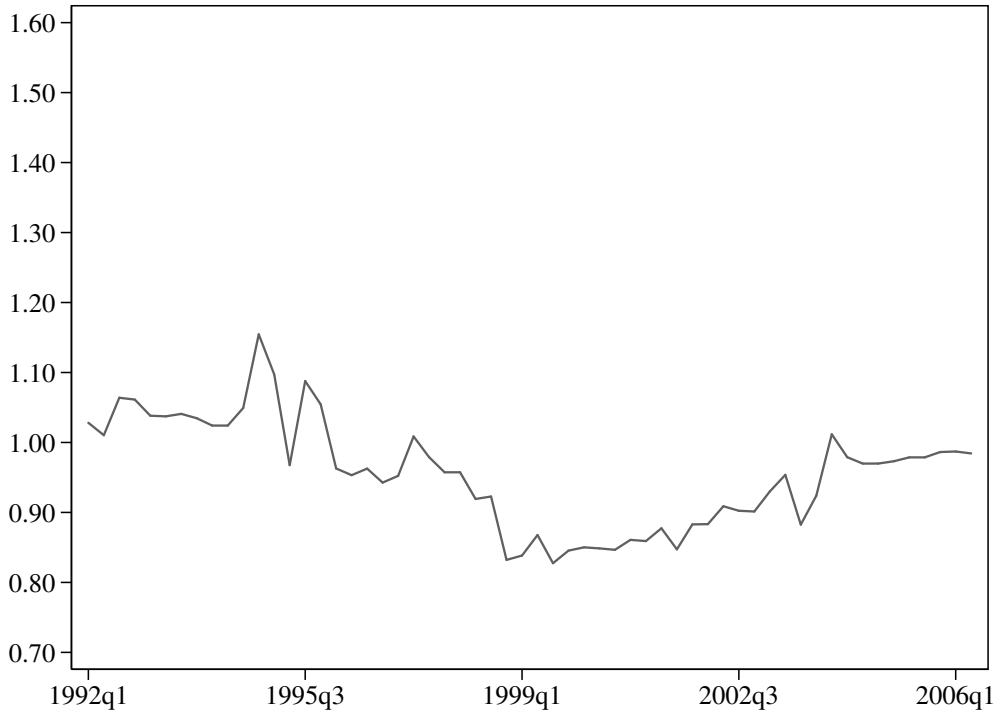


Figure 7: Rolling Long Term Pass Through Coefficient for Colombia

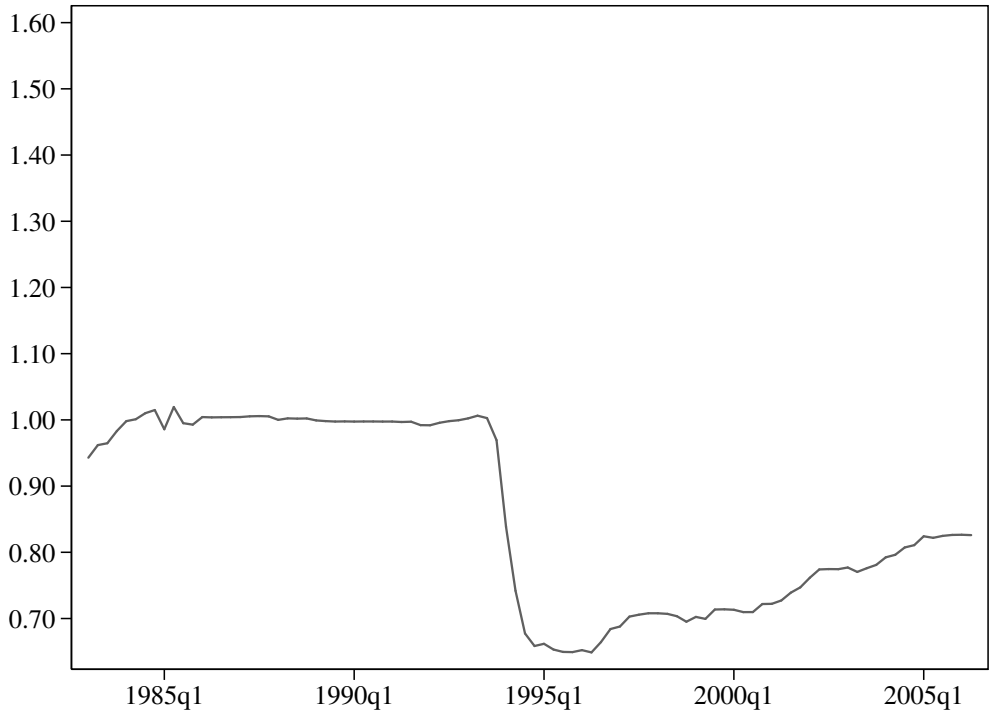


Figure 8: Rolling Long Term Pass Through Coefficient for Uruguay

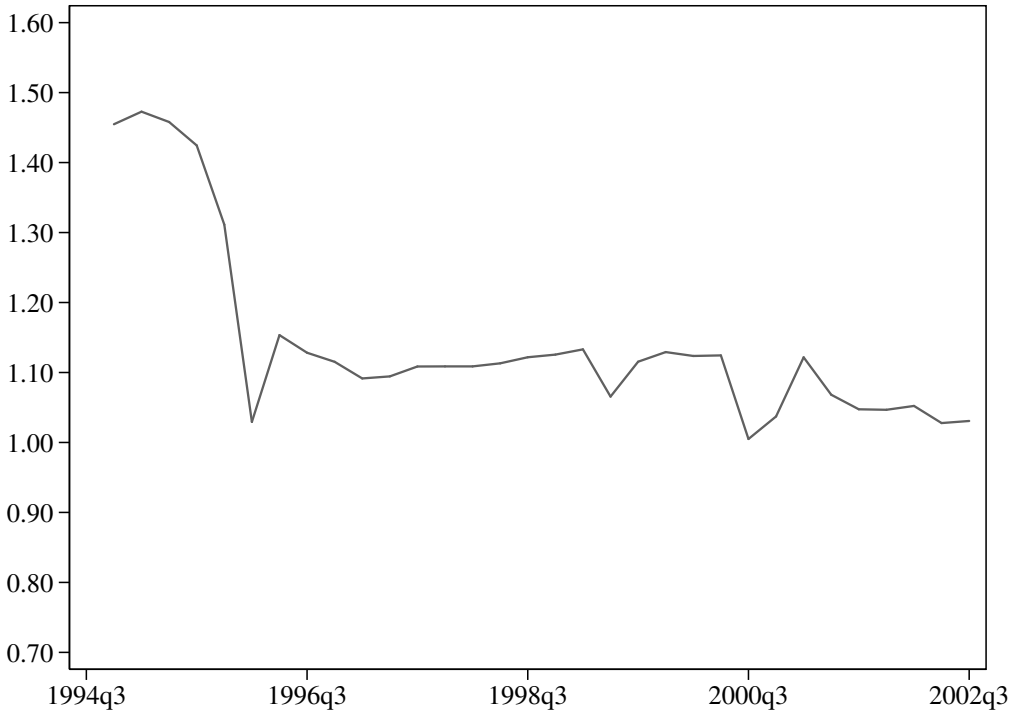


Figure 9: Argentina: Annual Average Inflation (%)

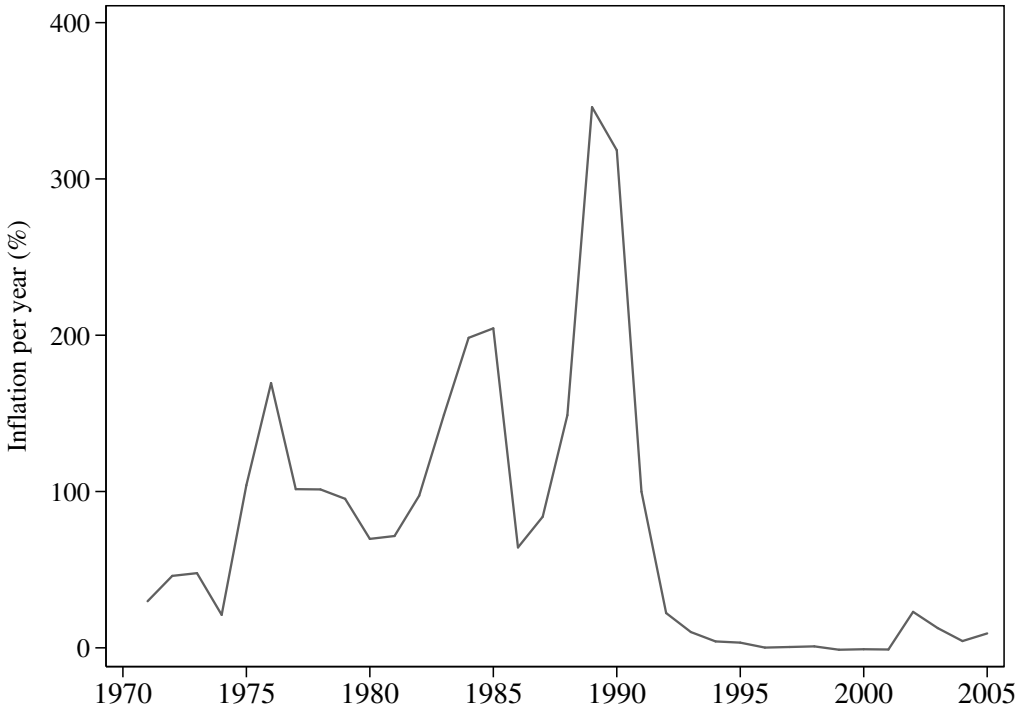


Figure 10: Chile: Annual Average Inflation (%)

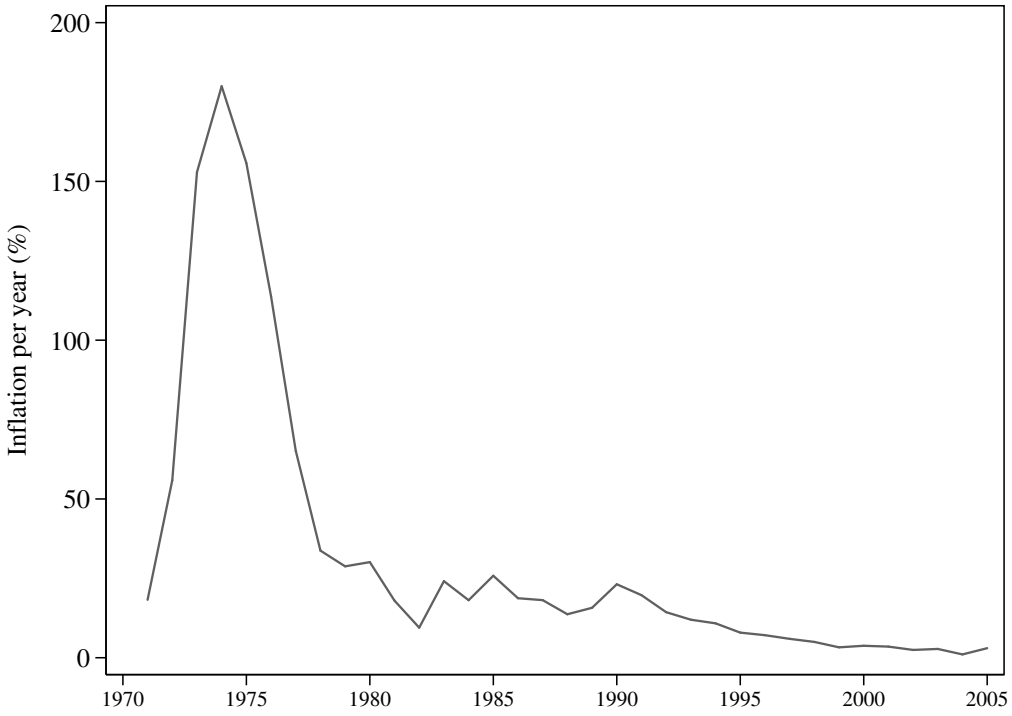


Figure 11: Colombia: Annual Average Inflation (%)

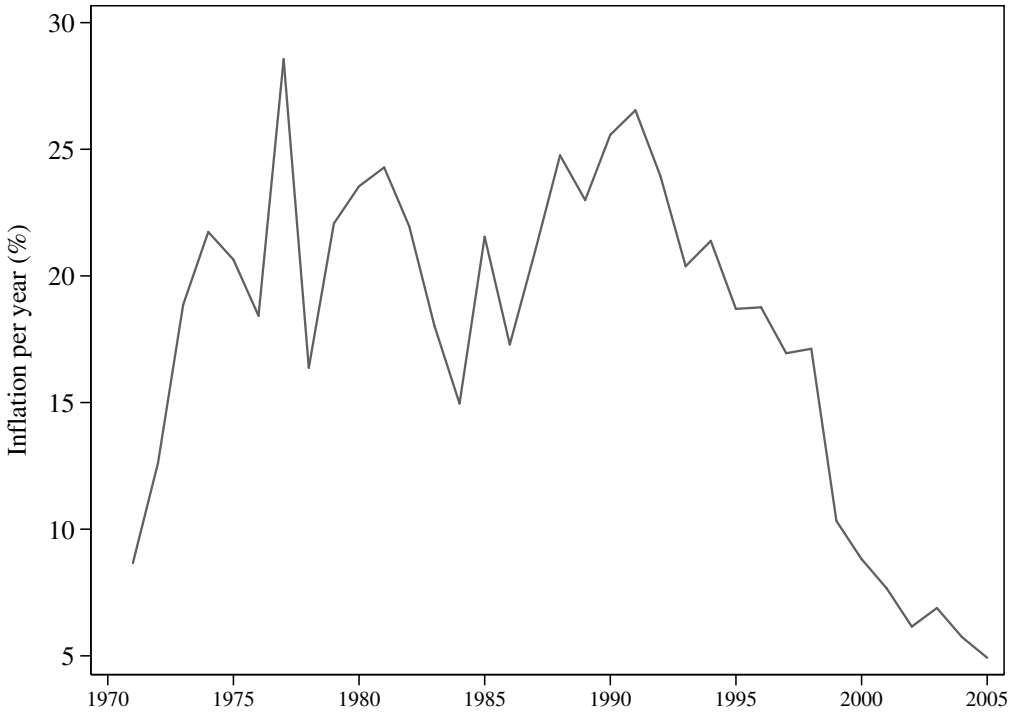


Figure 12: Uruguay: Annual Average Inflation (%)

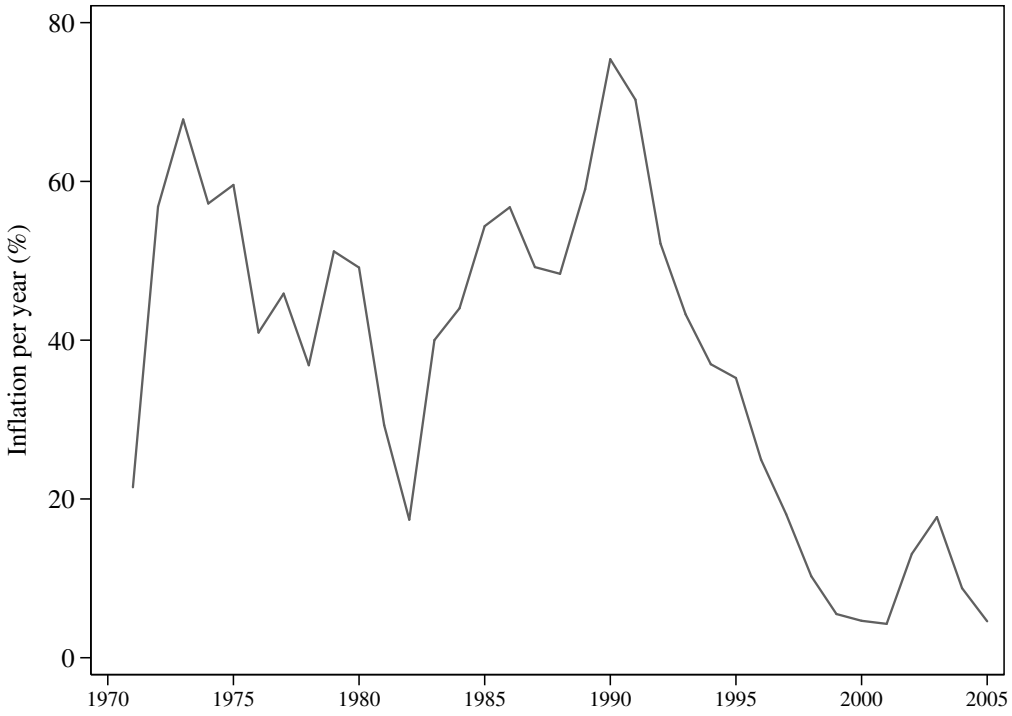


Figure 13: Determinants of Pass-Through: Inflation and Money Growth
Calculated over the period 1975-2003

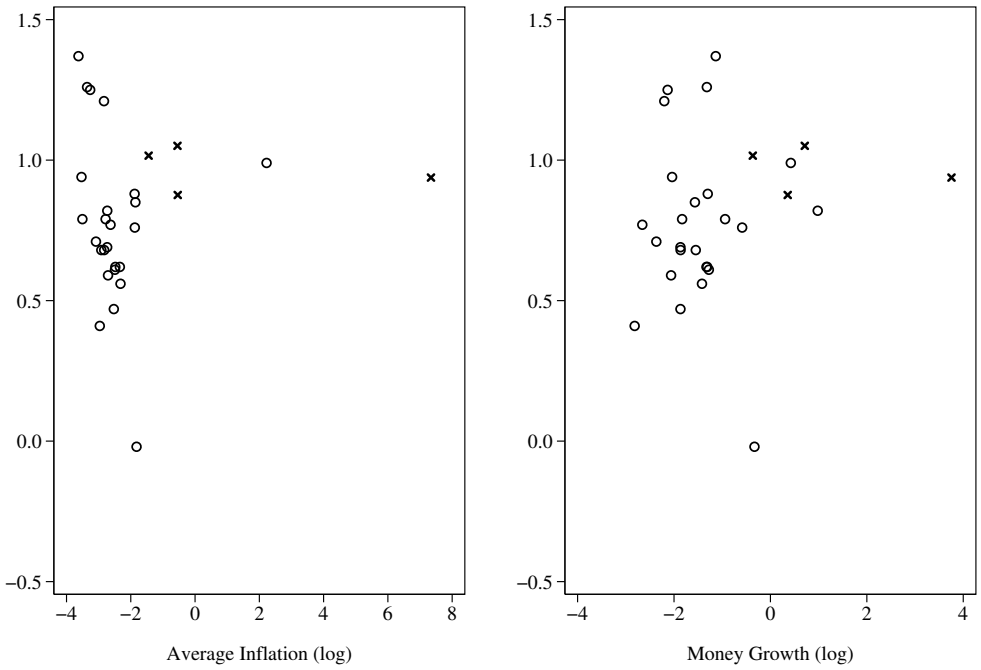
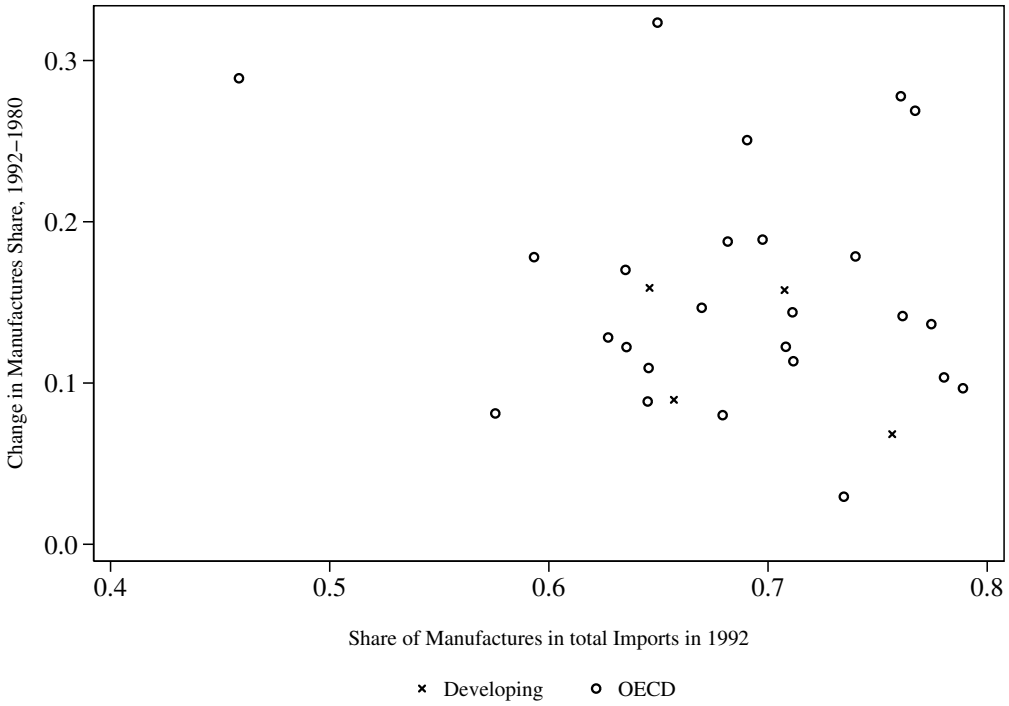


Figure 14: Determinants of Pass-Through: Share of Manufactures in Imports



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