Does Inflation Targeting Reduce Exchange Rate Pass-Through ?

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Abstract

The research works presented in this thesis tests whether the adoption of Inflation Targeting, which became a popular monetary policy framework starting in the early 1990's, contributes to the decline of Exchange Rate Pass-Through (ERPT) that many OECD countries have witnessed in the last decades. The empirical analysis presented in this paper shows that both on the aggregate and on the country-specific level, once we account for a number of factors (such as the inflation environment prior to the adoption of Inflation Targeting), such a monetary policy framework is associated with a reduction of ERPT. That reduction is particularly important for emerging market countries, where Inflation Targeting is associated with a reduction of ERPT by more than a half.

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1 Introduction

Inflation Targeting is a monetary policy framework that has gained remarkable attention in the last decades. As its name suggests, it consists in focusing monetary policy on the attainment of a certain stable path of inflation, over a given duration of time. The attractiveness of this policy is often motivated by its successful experiences in fulfilling its objective. In fact, through stabilizing inflation and its expectations, it represents a strategy that has proven to support sustainable economic growth.

In the last decades, many countries, and, in particular, OECD countries, witnessed a reduction of Exchange Rate Pass-Through (ERPT)–that is a reduction of the transmission of exchange-rate variations to import prices. The rationale behind this paper is to understand whether those two dynamics affect each other and, in particular, to explore whether the implementation of Inflation Targeting strategies has reduced, through the stabilization of price levels and of inflation expectations, the degree of pass-through of exchange rate shocks to import prices.

After (i) the introduction, this thesis begins by (ii) a literature review of the main research works on the subject. Which is followed by (iii) the explanation of a simple model to understand the rationale behind Inflation Targeting and its possible interactions with ERPT. Next, (iv) an empirical strategy is developed to test the research hypothesis. The last parts present (v) the results of the empirical strategy and (vi) the conclusion of this work. All the tables and the figures are provided in (vii) the appendixes at the end.

The empirical findings of this paper seem to be in line with the research hypothesis: the adoption of Inflation Targeting is associated with a substantial reduction of ERPT. Such a reduction is particularly important for Emerging Market countries, where Inflation Targeting is associated with a reduction of ERPT by more than a half.

In addition, this paper also provides a brief analysis of the dynamics that are specific to each country taken into consideration in the study. The analysis shows that, once we account for a number of country-specific factors, such as the inflation environment, central bank accountability and exchange rate regime antecedent to inflation targeting, the country-level analysis is also in line with the research hypothesis.

Finally this paper tries to address the challenge of the endogeneity of Inflation Targeting by providing an empirical argument concerning the ERPT dynamics previous to the monetary policy adoption. In fact, countries that adopted Inflation Targeting seem to show limited ERPT variations prior to the announcement of the new monetary policy framework.

2 Literature Review

2.1 What is Exchange Rate Pass-Through ?

The study of the relation between currency exchange rate changes and inflation is certainly not new to economic research. In this domain, the notion of "Exchange Rate Pass-Through" (from now on, ERPT) is used to describe the change in import prices due to a 1% variation in the exchange rate between the importing and the exporting countries' currencies. In their 1997 article, Goldberg and Knetter have formalized and standardized the evaluation of ERPT with this often reported specification (Goldberg & Knetter, 1997):

$$\Delta p_t = \alpha + \beta \Delta e_t + \gamma \Delta c_t^* + \delta \Delta d_t + \epsilon_t \tag{1}$$

Where "Δ" represents a percentage change, p is the import price for the country into consideration, e is the exchange rate expressed as "foreign" currency per "home" currency unit (thus, an increase in e is an appreciation), c^* is a measure of marginal costs in the foreign country and d includes a series of demand controls such as home competition.

Hence, ERPT is assessed by β, it is "complete" if $\beta = -1$ and "incomplete" if $\beta > -1$: a complete ERPT implies that a depreciation has a 1-for-1 effect on increasing inflation.

Thus, it is easy to understand that the degree of ERPT has important economic implications. For example, while determining monetary policy, it is fundamental to have an idea of how responsive import prices are to currency exchange rate: with a very low ERPT, even a large devaluation might have limited inflationary consequences—and, conversely, with a high ERPT inflation is more exposed to currency shocks. Therefore, the level of ERPT also has considerable implications for the international transmission of economic shocks: in a low ERPT environment, price level is more "immune" to large changes in the foreign exchange market (Campa & Goldberg, 2005).

That being said, the stability of ERPT over time has received a lot of attention in the macroeconomic debate. In their 2005 paper, Marazzi & al. have shown that the ERPT to US import prices has declined from 0.5 in the 1980s to 0.2 in the late 1990s, in absolute value (Marazzi, et al., 2005). In fact, the declining trend of ERPT over time does not seem to be limited to the American case: OECD countries show a tendency towards a reduction of ERPT since the 1980s (Campa & Goldberg, 2002).

Understanding the motive behind this trend is surely not an easy task: many different forces at play affect both the measurement and the degree of ERPT. For example, standard economic models often assume that the currency used is an "exogeneous" component and, therefore, should not affect the level of ERPT. However, empirical works have shown that the currency used plays a significant role in determining import price rigidities: goods' prices tend to have a lower pass-through if they are in local currency as compared to foreign currency (Gopinath, Itskhoki & Rigobon, 2010). The decline of commodity-intensive supplies in imports over time can be a factor of ERPT reduction since commodity-intensive goods generally have a higher ERPT (Marazzi, et al., 2005). In addition, the structure of markets also affects the transmission of foreign exchange dynamics: in a context of imperfect competition, through "pricing to market", firms can affect the degree of ERPT by absorbing exchange rate changes in the adjustment of markup on prices (Krugman, 1986). Finally, the ERPT estimation itself suffers of downward bias since standard measures do not usually account for product replacement which often "hide" price changes (Nakamura & Steinsson, 2012).

A further element of complexity arises from the fact that the inflation environment affects ERPT through expectations. In fact, in a low inflation environment, low future inflation rate expectations reduce ERPT since the nature of expectations itself affects the intensity and the duration of inflation's deviation from its natural level (Taylor, 2000). That element is a main driver of higher ERPT in emerging countries: there, a higher inflation environment makes devaluation shocks more persistent (Choudhri & Hakura, 2016).

Therefore, this paper contributes to the existing literature by exploring whether the adoption of Inflation Targeting contributes to the reduction of ERPT. It does so by testing this hypothesis to both industrialized and emerging-market countries in the OECD.

2.2 What is Inflation Targeting ?

As the expression suggests, "inflation targeting" is a monetary policy strategy that consists, for a central bank, in focusing all its efforts on reaching a certain level of stable inflation. Inflation targeting is not a "rule" but rather a "framework" for monetary policy: such a framework implies a central bank to communicate and to comply to a quantitative level of inflation over a certain period of time (Bernanke, et al., 1999). Hence, inflation targeting also requires a central bank to be independent and transparent since, in such a situation, the accountability of the a central bank affects inflation expectations (Svensson, 2010).

The first country to adopt inflation targeting was New Zealand, where the adoption was completed in 1990. It rapidly became a popular monetary policy tool: many industrialized and emerging-market countries adopted inflation targeting, especially in the OECD area (cf. Table 1 in Appendixes). Such a success is due to a number of advantages of Inflation Targeting. First, it is a strategy that allows to anchor inflation expectations and increase price stability which, in turn, sustains long-run economic growth (Bernanke, et al., 1999). Second, in contrast to other strategies–such as stabilizing the exchange rate, Inflation Targeting allows to adapt monetary policy to domestic goals (Mishkin, 2004). Third, by setting an objective mandate, it also improves the accountability of monetary institutions: this advantage is particularly important in emerging market countries where, often, central banks needs to prove their independence from political authorities.

The empirical research on Inflation Targeting usually focuses on its consequences on price stability and on its ability to act in response to exogenous shocks. In fact, while there is a broad consensus on the effectiveness of Inflation Targeting to keep prices stable, it is less clear whether focusing exclusively on inflation is the optimal strategy to respond to output shocks (Svensson & Woodford, 2003). Section 3 of this paper explores this aspect with further details building on a simple model to understand the rationale of Inflation Targeting.

Concerning the interaction between Inflation Targeting and ERPT, empirical works seem to show that such a monetary strategy seems to reduce ERPT for Emerging Market countries (Coulibaly & Kempf, 2010). However, this paper will develop a new framework to analyze this context in the broader context of the OECD and with updated data. In addition, this research work also tries to develop a different approach to disentangle the endogeneity of inflation targeting through an analysis of short-run inflation environment–this aspect is further developed in section (4.2.2). The idea that Inflation Targeting might reduce ERPT seems plausible to the extent that, as mentioned in the previous section, Inflation Targeting affects the price level environment and its expectations. Thus, it is reasonable to conjecture that the progressive adoption of Inflation Targeting in OECD countries has contributed to the progressive reduction of ERPT. Taking into consideration all the elements covered in this section, the aim of this paper is precisely to test this hypothesis.

3 A Simple Model of Inflation Targeting

Before analyzing the empirical relation between ERPT and Inflation Targeting, it is important to understand the conduct of monetary policy in an Inflation Targeting framework. For this reason, this section develops a simple model that helps to understand the rationale behind central banking when Inflation Targeting is adopted.

3.1 In a Closed Economy

Building on the work of Taylor (1993), Svensson (1996) and Eichengreen (2002) it is easy to build a model where monetary policy is constrained by an (accelerationist) Phillips Curve:

$$\pi_{t+1} = \pi_t + \alpha(y_t - \bar{y}) + \epsilon_{t+1} \tag{2}$$

and by an Aggregate Demand curve:

$$y_{t+1} - \bar{y} = \beta(y_t - \bar{y}) - \gamma(r_t - \bar{r}) + \eta_{t+1} \tag{3}$$

where π is inflation, y is output, r is the interest rate, ϵ and η are stochastic deviations and the superscript "$^-$" represent the "steady state" natural level. As in Eichengreen (2002), we consider that monetary policy is implemented to stabilize inflation at the end of the second period such that:

$$E[\pi_{t+2}] = \pi_{t+2} = \bar{\pi}$$

where $\bar{\pi}$ is the inflation target.

In that context, we can derive a version of the Taylor rule that is implemented by the central bank to achieve the inflation target by taking the expectation at $t+1$ of (2) for period $t+2$ and obtaining:

$$y_{t+1} - \bar{y} = \frac{1}{\alpha}\big(\bar{\pi} - \pi_{t+1}\big) \tag{4}$$

and then, substituting for π_{t+1} in (4) from (1) and plugging (4) in (3) to get:

$$r_t = \bar{r} + \delta(\pi_t - \bar{\pi}) + \theta(y_t - \bar{y}) \tag{5}$$

Where $\delta = \frac{1}{\alpha\gamma}$ and $\theta = \frac{1+\beta}{\gamma}$, assuming $E_t[\eta_{t+1}] = 0$.

This simple model allows to understand the mechanism of inflation targeting. It is easy to see that both situations $\pi_t < \bar{\pi}$ and $y_t < \bar{y}$ push r_t below $\bar{r}$, and, conversely, a situation below inflation target and a positive output gap drives the policy rate above its natural level. In his famous 1993 research paper, Taylor suggests that, at the time, the US case followed a situation where $\delta = \theta = 0.5$ (Taylor, 1993).

However, this model is somehow paradoxical: we obtain relation (5) because we assume a situation of "pure" inflation targeting where $\pi_{t+2} = \bar{\pi}$, but equation (5) suggests that, under a standard aggregate demand, even in a regime of pure inflation targeting the central bank needs to take into account the spread $y_t - \bar{y}$. In fact, in such a two periods model, adjusting for r_t to have $\pi_{t+1} = \bar{\pi}$ regardless of the output gap implies higher output fluctuation than adjusting r_t to have $\pi_{t+2} = \bar{\pi}$ (Svensson, 1996). This happens precisely because of the setting of the Phillips curve (2) and the Aggregate Demand curve (3) where output is affected by the interest rate and inflation is affected by the output gap. Hence in the first period the policy instrument r affects output and in the second period output affects inflation. As a result, even in a regime of pure inflation targeting, the $y_t - \bar{y}$ discrepancy matters for setting the central bank rates (Svensson, 1996, Eichengreen, 2002).

Now that we have formalized a model of inflation targeting, we can turn to its interaction with exchange rate.

3.2 In an Open Economy

In an open economy, a change in interest rate does not only affect investment and saving preferences (and thus output) but also the supply and the demand of a currency in the international financial market–that determines the exchange rate. In fact, to the extent that (i) we assume an "open economy" to have free capital flows and (ii) we assume that inflation targeting implies sovereign monetary policy, the Mundell-Fleming trilemma requires a floating exchange rate (Fleming, 1962, Mundell, 1963).

In this framework, the Phillips curve (2) and the Aggregate Demand curve (3) are now respectively (Ball, 1999):

$$\pi_{t+1} = \pi_t + \alpha(y_t - \bar{y}) - \phi(e_t - e_{t-1}) + \epsilon'_{t+1} \tag{2'}$$

$$y_{t+1} - \bar{y} = \beta(y_t - \bar{y}) - \gamma(r_t - \bar{r}) - \psi(e_t - e_{t-1}) + \eta'_{t+1} \tag{3'}$$

The crucial difference between the close economy and the open economy cases is that, now, there are two channels through which the interest rate affect π: one is the Aggregate Demand, the other is the exchange rate. The relation between interest rate and exchange rate is given by the relation of interest parity. In this model, I will consider, as in Ball (1999), a linear approximation of interest rate parity condition where interest rate and exchange rate move in the same time period, in the form:

$$e_t - E_t[e_{t+1}] = r_t - r_t^* \tag{6}$$

where, e is defined as in (1) (thus an increase in e is an appreciation), r is the interest rate for the "home" country while r^* is the interest rate for the "foreign" country.

From this parity condition (6), it is easy to understand that, holding $E_t[e_{t+1}]$ and r^* constant, r and e_t will move into the same direction: an increase in r_t will be met by a increase in e (that is an appreciation) and, conversely, an decrease in r will be met by a depreciation. Of course, relation (6) is an oversimplification but it captures the idea that, through capital flows, the interest rate affects the exchange rate. Thus, taking together (2') and (6), the model now allows for r to have an effect on π_{t+1} through e_t. The transmission of the effect of e_t on π_{t+1} happens mainly through import prices: to this respect, ϕ in (2') captures ERPT, that is how much π_{t+1} is affected by movements of e_t.

Now that we have formalized the relation between inflation and Exchange Rate Pass-Through, we can assess ERPT and design an empirical strategy to test the research hypothesis of this paper.

4 Empirical Strategy and Data

4.1 Pass-Through Assessment

The measure of ERPT in this paper builds on the standard specification from Goldberg & Knetter (1997) that appears as equation (1) in section (2):

$$\Delta p_t = \alpha + \beta \Delta e_t + \gamma \Delta c_t^* + \delta \Delta d_t + \epsilon_t$$

We can consider this expression as the data generating process of the dynamics of interest in this paper. However, it would be challenging to test the hypothesis using this regression model. In fact, it poses a number of challenges, not least the measure of marginal costs c and the measure of "demand controls" d. For this reasons, in this paper I will assess ERPT building on an adaptation of model (1) that was elaborated in Campa & Goldberg (2002). The baseline specification that I adopt is:

$$\Delta p_{j,t} = \alpha_{j,t} + \sum_{k=0}^{K} \beta_{j,k} \Delta e_{j,t-k} + \sum_{k=0}^{K} \gamma_{j,k} \Delta c_{j,t-k} + \delta_j \Delta y_{j,t} + u_{j,t} \qquad (7)$$

Where, again, all "Δ" represent a percentage change, p_t^j is the import price for country j at time t, e is the exchange rate expressed as in (1) (an increase in an appreciation, y is real GDP for country j at time t, i accounts for the desired number of lagged terms and c is used as a proxy that accounts for the shifts in marginal costs of the trading partners. In particular, c is constructed as follows:

$$c_{j,t} = \frac{n_{j,t}}{r_{j,t}} p_{j,t}$$

Where n is the nominal effective exchange rate (NEER) for country j at time t, r is the real effective exchange rate (REER) for country j at time t and p is the import price index for country j at time t. Thus, c is used as a proxy for the trading partner's costs since the calculation of effective exchange rates accounts for the importance of trading partners for a given country (Campa & Goldberg, 2002). As we can see, in this model, ERPT for country j is assessed by $\sum_{k=0}^{K} \beta_{j,k} \Delta e_{j,t-k}$.

4.2 Empirical Strategy

4.2.1 Regression Specifications

The model described by expression (7) in section (4.1) allows to develop a regression estimation of ERPT. Building on this estimation, I develop a baseline regression model that allows to take into account the adoption of inflation targeting. This model takes the form:

$$\Delta p_{j,t} = \sum_{k=0}^{4} \beta_{j,k} \Delta e_{j,t-k} + \sum_{k=0}^{4} \phi_{j,k} \left(\Delta e_{j,t-k} \times D_{j,t} \right) + \sum_{k=0}^{4} \gamma_{j,k} \Delta c_{j,t-k} + \sum_{k=0}^{4} \delta_{j,k} \Delta y_{j,t-k} + \alpha_j + \lambda_t + u_{j,t} \quad (8.1)$$

Which is very similar to the specification described in (7) with the addition of the interaction term:

$$\Delta e_{j,t} \times D_{j,t}$$

where $D_{j,t}$ is a simple binary variable that is equal to 1 if country j has adopted inflation targeting at time t and 0 otherwise.

In addition, this model also considers country fixed effects (α_j), time fixed effects (λ_t) and lagged terms of output as regressors (rather than only the simultaneous term y_t). This last assumption seems coherent with the idea that, as "cost push shocks", the temporal dynamics of output affect import prices on the medium term. This regression baseline considers 4 lagged terms: since my dataset is composed of quarterly data (cf. section 4.3), such a length enables to have a sufficient estimation of medium-term effects.

However, this baseline regression specification does not consider many aspects that should be taken into consideration for the assessment of ERPT. A first important control that might be added to this specification (8.1) is a "Crisis" component: the idea that if a country incurs into unusually large exchange rate variations (such as ones that happens with currency crisis), financial distortions (as speculation) and changes in expected inflation can severely alter the level of both e and p, thus biasing the measurement of ERPT. For this reason, a second regression model that I will consider in my analysis is:

$$\Delta p_{j,t} = \sum_{k=0}^{4} \beta_{j,k} \Delta e_{j,t-k} + \sum_{k=0}^{4} \phi_{j,k} \big(\Delta e_{j,t-k} \times D_{j,t-k}\big) + \sum_{k=0}^{4} \psi_{j,k} (\Delta e_{j,t-k} \times Crisis_{j,t-k}\big) + \sum_{k=0}^{4} \gamma_{j,k} \Delta c_{j,t-k} + \sum_{k=0}^{4} \delta_{j,k} \Delta y_{j,t-k} + \alpha_j + \lambda_t + u_{j,t} \quad (8.2)$$

That is very similar to (8.1) with the addition of the dummy *Crisis* that is equal to 1 if country j experiences an abnormal and significant change in the exchange rate (the threshold is set at 10%) over the lag (here it is a quarter) into consideration.

A third element that should be controlled for is whether the country taken into consideration is country from “emerging market”. In fact, as I discussed in section (2), there are reasons to believe that “emerging markets” countries display a greater ERPT than “industrializedized countries” since they have a higher inflatinon environment (Calvo & Reinhart, 2002, Taylor, 2000). Hence, we can further expand regression (8.2) adding a control for whether country j is an “emerging market” or “industrializedized” country, using the dummy *Emerg* (equal to 1 if the country is considered as “emerging market” at timt t) in the form:

$$\begin{aligned}\Delta p_{j,t} = &\sum_{k=0}^{4}\beta_{j,k}\Delta e_{j,t-k} + \sum_{k=0}^{4}\phi_{j,k}\big(\Delta e_{j,t-k}\times D_{j,t-k}\big) + \sum_{k=0}^{4}\psi_{j,k}(\Delta e_{j,t-k}\times Crisis_{j,t-k}\big)\\ &+\sum_{k=0}^{4}\chi_{j,k}\big(\Delta e_{j,t-k}\times D_{j,t-k}\times Emerg_{j,t-k}\big)\\ &+\sum_{k=0}^{4}\gamma_{j,k}\Delta c_{j,t-k} + \sum_{k=0}^{4}\delta_{j,k}\Delta y_{j,t-k} + \alpha_j + \lambda_t + u_{j,t}\end{aligned} \tag{8.3}$$

with to regression, we can measure whether inflation targeting is associated with a different change in ERPT for emerging market and industrializedized countries thanks to the interaction of 3 terms:

$$\big(\Delta e_{j,t}\times D_{j,t}\times Emerg_{j,t}\big)$$

The three regressions allow to understand the relation between e movements and p movement. In all cases, the sum of the coefficients on the lagged terms of e represent ERPT and the sum of the coefficient ϕ represent the alteration of ERPT due to inflation targeting adotpion.

In this paper, I perform those regression in two different settings, the first one is the "pooled model", that is taking a panel of the data of interest for different OECD countries across time and running the regressions without the country specification. In that sense, the "pooled model" considers a general averaging of the coefficients of interest for all the countries in the panel–that includes, also, countries that are not inflation targeters.

A second framework for implementing those regressions is by running them clustering the data by country, this "country specific model" allows me to obtain an estimation of the parameters of interest that is individual to each countries. However, it is worthwhile noting that since the value of $Emerg_{j,t}$ is constant across time for each country j in my dataset, regression (8.3) cannot be performed in this "country specific" setting.

Finally, those three regressions allow to decompose ERPT over the different terms after an exchange rate variation: in fact, I assess ERPT by the summation of the lagged terms (the contemporaneous term and 4 lags) on a coefficient of interest (either e alone, either e interacted). Hence, I can decompose this summation over 5 quarters and have an average estimation of ERPT after an exchange rate variation for each quarter. This procedure allows to obtain a graphical visualization that is similar–both in construction and in representation–to an Impulse Response Function decomposition of ERPT.

4.2.2 The Endogeneity of Inflation Targeting

Regressions (8.1), (8.2) and (8.3) are the core of this paper and allow me to evaluate the statistical association between Inflation Targeting adoption and Exchange Rate Pass-Through variation. However, they do not allow to measure the causal effect of the adoption of Inflation Targeting. In fact, the implementation of this monetary policy framework is not exogeneous. Thus, the ϕ coefficient in the regression estimates does not disentangle the effect of Inflation Targeting adoption from the condition that allow Inflation Targeting to be adopted. In other words, if I was to estimate a ϕ coefficient that points at a lower ERPT in times of Inflation Targeting, I would not be able to say if such an observation is due Inflation Targeting or to economic conditions that enable the adoption of Inflation Targeting itself.

Overcoming this problem is not an easy task. A possible option would be to perform the regressions on a restricted time window (such as a limited number of quarters), arguing that, over such a time period, the "structural economic changes" that might bias the regression observations are limited. However, this procedure would not provide enough observations to run my regressions in a significant way.

However, there might be another option to make an argument concerning the endogeneity of inflation targeting: that is to empirically test endogeneity itself. In other words, since the threat to the validity of the regression estimations comes from the fact that underlying structural economic conditions might cause both ERPT to decrease and Inflation Targeting to be adopted, I can test whether, prior to Inflation Targeting adoption, ERPT was reduced or not. If I was to find that, over a certain period *before* the adoption of Inflation Targeting, ERPT has not significantly moved from its long run average, I would be able to make an argument that any observed change in ERPT *after* the adoption might be linked to the implementation of Inflation Targeting. In order to perform this test, I build on the same regression specification (7) from section (4.1) rearranged in the form:

$$\begin{aligned}\Delta p_{j,\tau} = \sum_{k=0}^{4} \beta_{j,k} \Delta e_{j,\tau-k} + \sum_{k=0}^{4} \zeta_{j,k} \big(\Delta e_{j,\tau-k} \times T_{\theta,\tau-k}\big) + \sum_{k=0}^{4} \psi_{j,k} (\Delta e_{j,\tau-k} \times Crisis_{j,\tau-k}) \\ + \sum_{k=0}^{4} \chi_{j,k} \big(\Delta e_{j,\tau-k} \times \ Emerg_{j,\tau-k}\big) + \sum_{k=0}^{4} \gamma_{j,k} \Delta c_{j,\tau-k} \\ + \sum_{k=0}^{4} \delta_{j,k} \Delta y_{j,\tau-k} + \alpha_j + \lambda_t + u_{j,\tau} \qquad (9)\end{aligned}$$

This specification is very similar to regression specification (8.3) in the sense that it measures ERPT controlling for both whether country j is from the emerging market and whether there is an abnormal fluctuation in e at time t–that is the interaction of the binary variable $Crisis$. However, this regression is now run on a setting where the time period is assessed in a different way: I select only the countries that adopted Inflation Targeting at a given point in time (those are countries for which, at a certain period t in my dataset, $D_{j,t} = 1$). For those countries, I set the last period before the adoption of inflation targeting as period $\tau = 0$ and I drop all the observations for which $\tau > 0$. Now, $\sum_{k=0}^{4} \beta_{j,k} \Delta e_{j,\tau-k}$ measures the "average" ERPT from $\tau = -60$ to $\tau = 0$ (that is an observation of ERPT over the 15 years before the adoption of Inflation Targeting, since I select my data accordingly). On the other hand, I create the binary variable $T_{\theta,\tau}$ that is equal to 1 if $\tau > \theta$ for a predetermined constant level of θ that is the same for all countries: for example, in order to isolate the exchange rate variation froma period starting 1 year before the adoption of inflation targeting, I set

$\theta = -4$, hence $T = 1$ if $\tau > -4$. Here, the element

$$\sum_{k=0}^{4} \zeta_{j,k} \big(\Delta e_{j,\tau-k} \times T_{\theta,\tau-k} \big)$$

measures the change in average ERPT 1 year before the adoption of inflation targeting compared to the 15 years average. This test can be performed for different values of θ. If I was to find a value of ζ that is not significant, I would be able to say that, over a certain period before the adoption of Inflation Targeting, ERPT did not experience a significant variation. Thus, any potential variation in ERPT after inflation targeting adoption might be related to the new monetary policy framework.

Of course, such an empirical test does not provide an exact assessment of endogeneity. Neither does it make Inflation Targeting adoption exogenous. However, it can help understanding the relation between ERPT and Inflation Targeting to the extent that a "negative" result (that would point at a significant ERPT reduction before the adoption of Inflation Targeting) would be a further element in the direction of "reverse causality"– that is the idea that low ERPT and low inflation environment allow Inflation Targeting adoption–while a positive result (that would result in an small or not significant ERPT reduction before Inflation Targeting adoption) might point at a stronger argument in favor of our initial research hypothesis.

4.3 Dataset

In order to perform the empirical strategy described in section (4.2), my dataset includes the following observations:

1. Import price indexes quarterly data, from the OECD statistical database ;
2. Real GDP quarterly data, from the OECD statistical database ;
3. Nominal and Real Effective Exchange Rate indexes quarterly data, from the IMF International Finance database ;
4. Information concerning the adoption of Inflation Targeting policies for the countries into consideration, that is summarized in the table below.

In fact, in order to construct dummy $D_{j,t}$ that is equal to 1 when the country j adopts inflation targeting at time t, I use the data provided in the study "Inflation Targeting and the IMF" prepared by the IMF Research department (2006, updated to 2017). This paper provides a baseline for assessing the actual implementation of inflation targeting. For the variables that I consider (that are the variables that I can have access to from the OECD database), this study provides the information summarized in Table 1 (cf. Appendixes).

The constitution of the dataset requires further explanation. First, one could ask why I am limiting my observations to OECD countries. The answer to this first question is mostly for practical reasons: in fact, the OECD database provides a coherent and complete source of the data I need (with the exception of the data from the IMF International Financial Statistics Database) where all the measurements are done in the same way. Using other statistics of import price indexes or GDP growth (from, say, national statistics or combined databases) would present the risk of measurement differences. However, this is certainly a shortcoming of my paper: OECD countries may share similarities that cause inflation targeting to have a particular impact in those economies. In addition, for the variables I am using, the OECD database ends in the first quarter 2013. Thus, I cannot measure the impact of inflation targeting for, for example, Japan, which adopted inflation targeting in the same year. Implementing this analysis for more countries and for a more recent time period would be a possible continuation of this paper.

Taking all that into consideration, I can collect the observations of the variables of interest for: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, The Netherlands, New Zealand, Norway, Poland, Spain, Sweden, Switzerland, the United Kingdom and the United States. That yields a dataset with the summary statistics provided in Table 2 (cf. Appendixes).

5 Results and Discussion

5.1 The Pooled Model

The regressions results for the "pooled model" are presented in Table 3 (cf. Appendixes) where regression (1) corresponds to specification (8.1), regression (2) to specification (8.2) and regression (3) to specification (8.3). Variable $inter_{j,t}$ accounts for $\left(\Delta e_{j,t-k} \times D_{j,t-k}\right)$. Those results seem to be in line with the hypothesis tested. As we can see from table 3, in all 3 regressions, the estimated coefficient on e is negative and the estimated coefficient on $inter$ is positive (all are statistically significant at the 1% level, except for regression (3) where the estimated coefficient on $inter$ is significant at the 5% level). Those estimations suggest that a decrease in e (a depreciation) is statistically associated with an increase in dp (a rise in import prices) that is consistent with the theoretical framework of ERPT that was developed in this paper. However, the adoption of inflation targeting is associated with a reduction of ERPT: a positive coefficient on $inter$ means that the interaction between e and the dummy D positively affect the dependent variable of import prices. In other words, taking regression (1) in the pooled model results, without inflation targeting, ERPT is approximately -0.470, while, with inflation targeting, ERPT is approximately -0.246 (= -0.470 + 0.224).

Again, this result is consistent in the three models: in all cases, the regression results point at a significant reduction of ERPT (in absolute terms), from -0.470 to -0.246 in model (1), from -0.373 to -0.195 in model (2) and from -0.373 to -0.071 in model (3). As expected, adding controls for extreme e deviation (that is the variable $crisis$) and adding controls for whether the country is in the emerging market or not, also affects ERPT. In particular, controlling for *crisis* reduces both ERPT and ERPT with inflation targeting and, thus, the coefficient on the interacted variable *crisis* is negative. This result suggests that, during times of high exchange rate variability, import prices are more responsive to e deviations: as if large e deviations have a larger ERPT than smaller deviations of e. This result is, again, somehow coherent with the idea described in Section (2) that inflation environment affects ERPT: for example, in a time of currency crisis, expected devaluation drives higher inflationary expectations, which, in turn, increase ERPT. Thus such a coefficient confirms the importance of including this control while analyzing ERPT.

In addition, regression (4) suggests that the adoption of Inflation Targeting for emerging market countries is associated with a higher reduction of ERPT (in absolute value) compared to that of industrializedized countries. The regression estimates show that emerging market countries have a lower ERPT by 0.220 approximately. This means that in times of inflation targeting, while industrialized countries experience an ERPT increase (that is a reduction in absolute value) of 0.082 points, emerging market countries experience an increase of 0.302 (=0.082 + 0.220).

This finding is interesting because it points at a reduction of ERPT, in presence of Inflation Targeting, that is much higher for emerging market countries than for industrialized countries. The same pattern is found in the Impulse Response Decomposition: as we can see in Figures (1) and (2), while industrialized countries have a much lower ERPT than emerging markets countries *before* Inflation Targeting adoption, *after*, the two country groups demonstrate a similar level of ERPT (even though, it has a higher variance for Emerging Market countries). All those results are compatible with the initial hypothesis and confirm the empirical observation that, in the absence of Inflation Targeting, Emerging Market countries tend to have a higher ERPT than industrialized countries.

5.2 The Country-Specific Model

The "country-specific" model–of which the results are presented in Table 4 in Appendixes–is more difficult to interpret since each country has a different story behind the adoption of Inflation Targeting. For example, the New Zealand case might look surprising since, even though it is often reported as the "pioneer" of Inflation Targeting, once we control for *crisis*, the coefficient accounting for Inflation Targeting adoption is no more significant. In fact, before the adoption of that monetary policy framework, New Zealand experienced a period of pronounced foreign exchange and price instability. However, the adoption of Inflation Targeting in New Zealand followed a successful period of desinflation: Inflation Targeting was established as a further element to reinforce the anchoring of inflation expectations through independence and accountability (Bernanke, et al., 1999). Since the stabilization of inflation was successful before the adoption of Inflation Targeting, it is reasonable to assume that any effect of that monetary policy instrument was limited in terms of consequences on ERPT.

The estimation for the United Kingdom is also characterized by a particular story: the UK was a member of the European Monetary System (EMS), an arrangement between some European countries that constrained exchange rate fluctuations within a narrow band. This situation of semi-fixed exchange rate might explain the low ERPT that arises from the

UK regression estimation. The UK was forced to exit the EMS and to experience a substantial devaluation in 1992, after the well-known speculative attack against the Bank of England that caused a foreign exchange crisis. However, as in the New-Zealand case, the adoption of Inflation Targeting in the UK followed a successful period of disinflation (Bernanke, et al., 1999). Again, that characteristic might be a motive behind the limited consequences of Inflation Targeting that arise in the regression estimation.

A similar story can also be told about Canada, where, again, Inflation Targeting was adopted after a fruitful desinflation (Bernanke, et al., 1999). In addition, the Canadian example might be even more extreme in terms of limited "statistically testable" consequences of Inflation Targeting since the Central Bank of Canada did not even publicly pre-announced the policy shift to Inflation Targeting. In fact, in Canada, in contrast to other examples, such a monetary framework was not set after a collapse of an exchange rate peg. Rather, the adoption of Inflation Targeting was seen as a further formalization of the commitment to price stability, in a period where the Bank of Canada feared a rise in inflation expectations due to excessive demand pressures (Bernanke, et al., 1999). However, in reality, this period turned out to be subject to deflationary pressures because of the recession in which the Canadian Economy entered well before the adoption of Inflation Targeting, in 1990–even though that was not clear at the time (Bernanke, et al., 1999). That story, on the one side, made the inflation target easier to attain but, on the other, might explain why Canada shows such a low statistical association between Inflation Targeting and ERPT in my empirical analysis.

Australia also is a particular example of Inflation Targeting. There, the implementation of Inflation Targeting was particularly informal and gradual, initially it was not even met by a legislative change in terms of monetary policy authonomy and mandate. Yet, the

Reserve Bank of Australia, unlike almost all other monetary authorities considered in this study, did not emphasis the "accountability" dimension of Inflation Targeting, it has proven to be much more reluctant to act against short term deviation target and to be more "tolerant" than its New Zealand neighbor to react to wage increases (Bernanke, et al., 1999). For this reason, the Australian case of Inflation Targeting, which is quite the only of its kind, has often been qualified as "soft" and gradual. That could explain why Australia does not seem to show a significant statistical relation between ERPT reduction and inflation targeting in my regression analysis.

Finally, Korea represent an extreme case of a country that showed a particularly low ERPT well before the adoption of Inflation Targeting (Ghosh and Rajan, 2008). Hence, it seems coherent to assume that such a monetary framework had limited consequences to this respect in this country.

Indeed, as we explored in this section, telling a story by country requires a deeper understanding of country-specific dynamics. However, once we account for those elements, the results shown in Table 4 (cf. Appendixes) seem to be in line with the following trends: (i) countries seem to have a lower statistical relation between Inflation Targeting and ERPT reduction when they adopt Inflation Targeting after abandoning a fixed exchange rate ; (ii) countries seem to have a lower statistical relation between Inflation Targeting and ERPT reduction when they adopt Inflation Targeting after a successful disinflation; (iii) once we account for those two elements, the results are by and large compatible with the initial research hypothesis of this paper both in terms of statistical significance and in terms of magnitude.

A final note should me made on the significance of the coefficient on *crisis* for this estimation. In fact, with some exceptions such as New Zealand or Mexico, usually the countries considered in this study do not count a significant amount of periods in which the binary variable *crisis* is positive. For this reason, the estimation of this coefficient is based on a very limited number of observations for many countries (to that extent, an emblematic case is Sweden). Hence, while the assessment of the *crisis* component might be very relevant in the "pooled model" estimation, the same thing cannot be said for the "Country Specific" model where, by taking countries separately, this variable loses a considerable explanatory power.

5.3 Empirical Endogeneity Assessment

Therefore, the regression results are compatible with the tested hypothesis that Inflation Targeting reduces ERPT. However, as described before in this paper, this condition is certainly not sufficient to assert the validity of my research hypothesis. For this reason, the result of the "endogeneity test" described in Section (4.2.2), that are reported in Table 5 (cf. Appendixes), deserve more explanation.

The results show that for a bandwidth around $\tau = 0$ up to 3 years before inflation targeting adoption (that is $\theta = 12$), ERPT shows a very small reduction (in absolute value) that is not statistically significant. With a bigger bandwidth (up to 4 and 5 years before Inflation Targeting adoption), there is a statistically significant reduction of ERPT that is, however, relatively "small"–it is smaller than almost any ERPT reduction observed in the regressions results in Table 3.

Those results are in line with the idea that there is a general trend of ERPT reduction that goes well beyond the possible consequences of Inflation Targeting. However, having a small and not statistically significant change of ERPT up to 3 years before Inflation Targeting adoption suggests that, over the medium term, as far as Inflation Targeting adoption is concerned, the elements that might affect ERPT reduction to such a high degree as observed in Table 3, might be limited.

In a nutshell, the regression results presented in Table 3 suggest a substantial reduction of ERPT (in absolute value) after the adoption of Inflation Targeting and the results presented in Table 5 seem to show that, on average, countries which adopted Inflation Targeting did not experience any substantial change in ERPT up to 3 years before the setting of the new monetary policy framework. Therefore, the combination of those two results suggests that the research hypothesis of this paper might be valid: it seems reasonable, even though not certain, to believe that Inflation Targeting may reduce Exchange Rate Pass-Through.

6 Conclusion

The scope of this paper was to investigate whether Inflation Targeting reduces Exchange Rate Pass-Through. In this framework, building on the existing literature and and expanding standard assessment methods of ERPT, we set an empirical strategy to test this hypothesis. The results of both the regressions and the impulse response decompositions are in line with the initial hypothesis: the adoption of Inflation Targeting is associated with a substantial reduction (in absolute value) of ERPT. Such a reduction is particularly important for Emerging Market countries, where Inflation Targeting is associated with a reduction of ERPT by more than a half.

In addition to the analysis of ERPT dynamics in the "pooled" OECD perspective, this paper also explored the relation between Inflation Targeting and ERPT on a country basis. To this extent, despite remarkable differences between the countries into consideration, apart from the cases where Inflation Targeting is adopted after a disinflation and the cases where it is adopted after a period of fixed exchange rates, when this monetary framework is met by central bank accountability, it is associated with an ERPT reduction.

Finally, the last part of this paper was dedicated to the assessment of ERPT movements before the adoption of Inflation Targeting for countries that chose this monetary framework. In this regard, the analysis finds that countries that adopted Inflation Targeting usually experience a very limited reduction of ERPT before the policy adoption. Even though, as previous literature has shown, there seems to be a general trend in favor of ERPT reduction for all OECD countries, this results suggests that Inflation Targeting might contribute to this trend, by reducing the size of ERPT.

Therefore, further research in the area could test the relevance of the research hypothesis for a broader panel of countries that goes beyond the OECD and might experiment different methods to disentangle the endogenous component of Inflation Targeting.

7 Appendixes

7.1 Tables

Table 1: Inflation Targeters

	Inflation Targeting adoption date	Inflation target (%)
*Emerging market countries**		
Czech Republic	1998Q1	3 (+/-1)
Hungary	2001Q2	3.5 (+/- 1)
Mexico	2001Q1	3 (+/- 1)
Poland	1998Q4	2.5 (+/- 1)
Korea	2001Q1	2.5 - 3.5
*industrialized countries**		
Australia	1993Q2	2-3
Canada	1991Q1	1-3
Finland**	1993Q1	2
New Zealand	1990Q1	1-3
Norway	2001Q1	2.5
Spain**	1994Q4	3
Sweden	1993Q1	2 (+/- 1)
United Kingdom	1992Q4	2

Notes: * The distinction between "Emerging market" and "industrialized" countries is done by the IMF. ** Finland and Spain abandoned Inflation Targeting to join the Euro in 1998Q2, when the official parities of the European Monetary Union were set.

Table 2: Summary statistics

Variable	Label	Obs	Mean	Std. Dev.	Min	Max
dp	Cange in import price	3,321	0.0089	0.0351	-0.2274	0.4007
dy	Change in GDP	4,032	0.8023	1.4016	-7.6200	14.8677
n	NEER index	3,400	563.6971	3637.3690	20.2556	41865.9400
r	REER index	3,278	97.5425	14.0787	38.1561	155.0333
e	Exchange rate change	3,375	-0.0025	0.0378	-0.6941	0.2086
c	Marginal costs proxy (foreign)	2,760	195.3458	1166.4080	29.3637	19266.7600
D	Adoption of IT (binary)	4,324	0.1778	0.3824	0	1
crisis	Excessive change in e (binary)	4,324	0.0146	0.1198	0	1
emerg	Emerging market (binary)	4,324	0.2000	0.4001	0	1

Table 3: Baseline Pooled Model

	Dependent variable		
	dp (1)	*dp* (2)	*dp* (3)
$\sum_{t=0}^{4} e_t$	-0.470***	-0.373***	-0.373***
	(0.043)	(0.063)	(0.059)
$\sum_{t=0}^{4} inter_t$	0.224***	0.178***	0.082**
	(0.064)	(0.063)	(0.035)
$\sum_{t=0}^{4} crisis_t \times e_t$		-0.187***	-0.184***
		(0.070)	(0.066)
$\sum_{t=0}^{4} emerg_t \times inter_t$			0.220***
			(0.077)
ERPT without IT for all countries	-0.470***	-0.373***	-0.373***
ERPT with IT for all countries	-0.246***	-0.195***	-0.291***
ERPT with IT for Emerging Markets			-0.071***
Other Controls	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes
R-squared	0.9472	0.9501	0.9509
Number of observations	2,579	2,579	2,579
			*p<0.1; **p<0.05; ***p<0.01

Note: Regressions (1), (2) and (3) correspond to regressions (8.1), (8.2) and (8.3) described in section (4.2.1). Variable *dp* accounts for the change in import price index, variable e accounts for the change in nominal exchange rate (increase in e is an appreciation), variable *inter* is the interaction variable between e and D, where D is a binary variable equal to 1 if inflation targeting is adopted and to 0 otherwise, *crisis* is a binary variable equal to 1 if $| e |> 0.1$ and to 0 otherwise, *emerg* is a binary variable equal to 1 if the country is considered an "emerging country" in the IMF database. All the regressions include controls for GDP and marginal cost variations. All regressions include time and country fixed effects. The panel of data includes observations for the countries into consideration from 1970Q1 to 2013Q4.

Table 4: Country-specific model

		Dependent variable	
		dp	dp
Country		(1)	(2)
Australia	$\sum_{t=0}^{4} e_{j,t}$	-0.445***	-0.412***
		(.041)	(0.043)
	$\sum_{t=0}^{4} inter_{j,t}$	0.0003	-0.070
		(0.062)	(0.069)
	$\sum_{t=0}^{4} crisis_{j,t} \times e_{j,t}$		-0.185**
			(0.081)
Canada	$\sum_{t=0}^{4} e_{j,t}$	-0.149**	-0.139*
		(0.062)	(0.071)
	$\sum_{t=0}^{4} inter_{j,t}$	0.046	0.042
		(0.029)	(0.025)
	$\sum_{t=0}^{4} crisis_{j,t} \times e_{j,t}$		-0.163
			(0.127)
Czech Republic	$\sum_{t=0}^{4} e_{j,t}$	-0.676***	-0.514***
		(0.175)	(0.145)
	$\sum_{t=0}^{4} inter_{j,t}$	0.202***	0.184***
		(0.080)	(0.080)
	$\sum_{t=0}^{4} crisis_{j,t} \times e_{j,t}$		-0.178***
			(0.060)
*Finland**	$\sum_{t=0}^{4} e_{j,t}$	-0.676***	
		(0.175)	
	$\sum_{t=0}^{4} inter_{j,t}$	0.202***	
		(0.080)	
Hungary	$\sum_{t=0}^{4} e_{j,t}$	-0.870***	-0.860***
		(0.071)	(0.073)
	$\sum_{t=0}^{4} inter_{j,t}$	0.736***	0.719***
		(0.116)	(0.112)
	$\sum_{t=0}^{4} crisis_{j,t} \times e_{j,t}$		-0.160*
			(0.084)

Country		*Dependent variable* dp (1)	dp (2)
Korea	$\sum_{t=0}^{4} e_{j,t}$	-0.079	-0.172
		(0.58)	(0.092)
	$\sum_{t=0}^{4} inter_{j,t}$	0.039	-0.124
		(0.046)	(0.087)
	$\sum_{t=0}^{4} crisis_{j,t} \times e_{j,t}$		0.276
			(0.267)
Mexico	$\sum_{t=0}^{4} e_{j,t}$	-0.357***	-0.314***
		(0.043)	(0.054)
	$\sum_{t=0}^{4} inter_{j,t}$	0.297***	0.279***
		(0.067)	(0.068)
	$\sum_{t=0}^{4} crisis_{j,t} \times e_{j,t}$		-0.092***
			(0.034)
New Zealand	$\sum_{t=0}^{4} e_{j,t}$	-0.811***	-0.416***
		(0.100)	(0.137)
	$\sum_{t=0}^{4} inter_{j,t}$	0.513***	-0.110
		(0.114)	(0.162)
	$\sum_{t=0}^{4} crisis_{j,t} \times e_{j,t}$		-0.831***
			(0.151)
Norway	$\sum_{t=0}^{4} e_{j,t}$	-0.480***	-0.483***
		(0.122)	(0.126)
	$\sum_{t=0}^{4} inter_{j,t}$	0.387***	0.374**
		(0.144)	(0.165)
	$\sum_{t=0}^{4} crisis_{j,t} \times e_{j,t}$		0.540
			(0.650)
Poland	$\sum_{t=0}^{4} e_{j,t}$	-0.963***	-0.980***
		(0.141)	(0.147)
	$\sum_{t=0}^{4} inter_{j,t}$	0.832***	0.866***
		(0.151)	(0.162)
	$\sum_{t=0}^{4} crisis_{j,t} \times e_{j,t}$		-0.108
			(0.065)

		Dependent variable	
		dp	dp
Country		(1)	(2)
*Spain**	$\sum_{t=0}^{4} e_{j,t}$	-0.308***	
		(0.046)	
	$\sum_{t=0}^{4} inter_{j,t}$	0.313***	
		(0.077)	
Sweden	$\sum_{t=0}^{4} e_{j,t}$	-0.145**	-0.087
		(0.048)	(0.112)
	$\sum_{t=0}^{4} inter_{j,t}$	0.120**	-0.062
		(0.055)	(0.117)
	$\sum_{t=0}^{4} crisis_{j,t} \times e_{j,t}$		-0.077
			(0.142)
United Kingdom	$\sum_{t=0}^{4} e_{j,t}$	-0.150	-0.149
		(0.099)	(0.102)
	$\sum_{t=0}^{4} inter_{j,t}$	0.197	0.188
		(0.115)	(0.124)
	$\sum_{t=0}^{4} crisis_{j,t} \times e_{j,t}$		-0.071
			(0.062)
	Other Controls	Yes	Yes
	Country fixed effects	Yes	Yes
	Time fixed effects	Yes	Yes
	R-squared	0.9466	0.9494

*p<0.1; **p<0.05; ***p<0.01

Note: Regressions (1) and (2) correspond to regressions (8.1) and (8.2) described in section (4.2.1). Variable *dp* accounts for the change in import price index, variable e accounts for the change in nominal exchange rate (increase in e is an appreciation), variable *inter* is the interaction variable between e and D, where D is a binary variable equal to 1 if inflation targeting is adopted and to 0 otherwise, *crisis* is a binary variable equal to 1 if $| e |> 0.1$ and to 0 otherwise. All the regressions include controls for GDP and marginal cost variations. All regressions include time and country fixed effects. The panel of data includes observations for the countries into consideration from 1970Q1 to 2013Q4. *For Spain and Finland there is no estimation of the coefficient on interacted *crisis* since this variable is constantly equal to 0 for those countries.

Table 5: Endogeneity test

	Pooled observations				
ERPT	-0.359***	-0.360***	0.354***	-0.401***	-0.359***
($\tau = -60$ to $\tau = 0$, 15 years)	(0.080)	(0.082)	(0.090)	(0.045)	(0.080)
ERPT difference	0.061				
($\theta = 4$, 1 year to $\tau = 0$)	(0.039)				
ERPT difference		0.060			
($\theta = 8$, 2 years to $\tau = 0$)		(0.041)			
ERPT difference			0.047		
($\theta = 12$, 3 years to $\tau = 0$)			(0.047)		
ERPT difference				0.111**	
($\theta = 16$, 4 years to $\tau = 0$)				(0.054)	
ERPT difference					0.112**
($\theta = 20$, 5 years to $\tau = 0$)					(0.053)
Other Controls	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes
Time fixed effects	Yes	Yes	Yes	Yes	Yes
R-squared	0.9232	0.9232	0.9233	0.9253	0.9254

*p<0.1; **p<0.05; ***p<0.01

Note: This estimation corresponds to model 9 in section (4.2.2). The regressions are done for $\theta = 4, 8, 12, 16, 20$ in addition to the estimation for the whole period. In the first row, ERPT is assessed over all the time periods into consideration, from $\tau = -60$ to $\tau = 0$. The four following rows show the difference in ERPT between the average level in the first row and the θ period preceding $\tau = 0$.

7.2 Figures

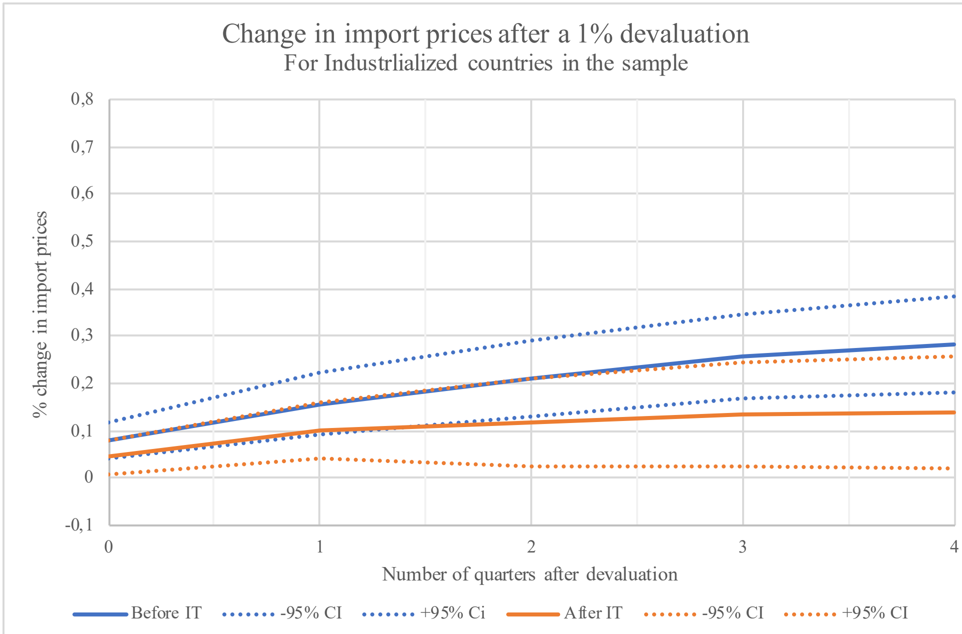

Figure 1: Impulse Response Decomposition of ERPT for industrialized countries

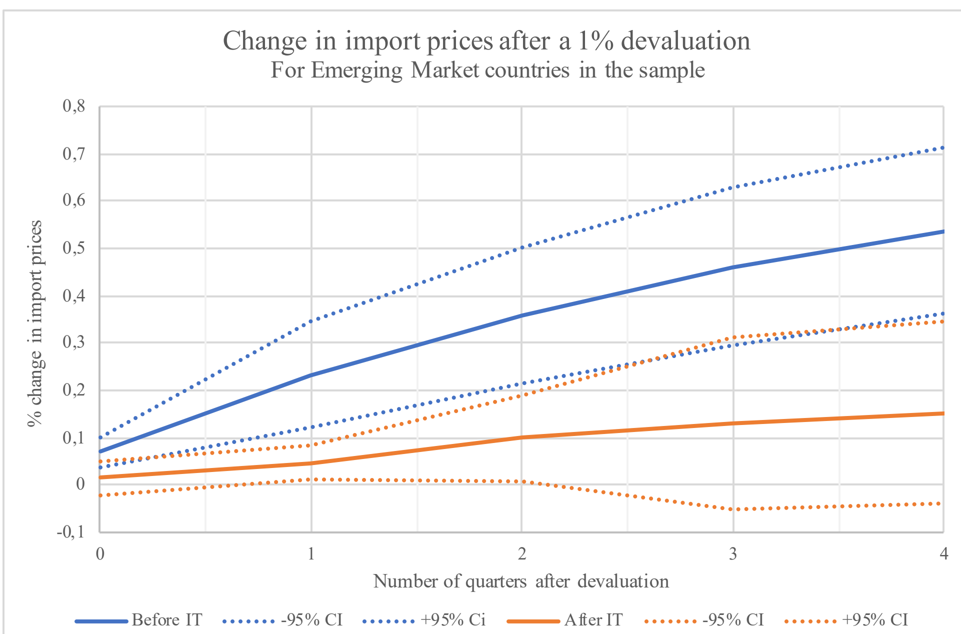

Figure 2: Impulse Response Decomposition of ERPT for Emerging Market countries

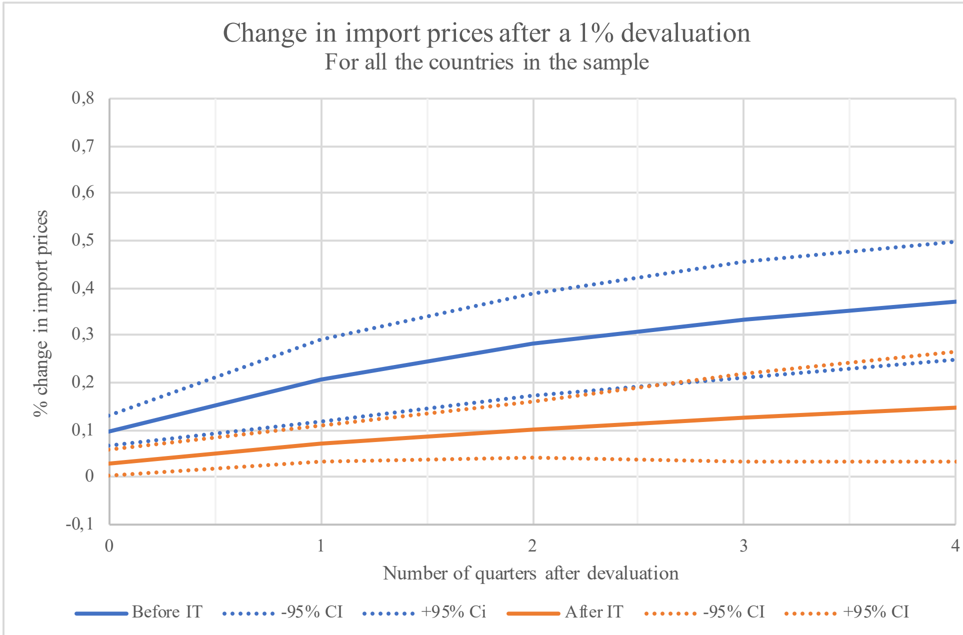

Figure 3: Impulse Response Decomposition of ERPT for All the countries in the sample

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