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Revisiting the role of inflation environment in exchange rate pass-through: A panel threshold approach

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ABSTRACT

This paper sheds new light on the role of inflation regimes in explaining the extent of exchange rate pass-through (ERPT) into import prices. In order to classify the 24 developing countries included in his study, Barhoumi (2006) chose an arbitrary threshold of 10% to split the sample between high and low inflation regimes. For more accuracy, our study uses a panel threshold framework where a grid search is used to select the appropriate threshold value. In a larger panel-data set including 63 countries over the 1992–2012 period, we find that there are two threshold points identified by the data, allowing us to split our sample into three inflation regimes. When estimating the ERPT for each group of countries, we point out a strong regime-dependence of pass-through to inflation environment, that is, the class of countries with higher inflation rates experiences the higher degree of ERPT.
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1. Introduction

The study of the degree of Exchange Rate Pass-Through (ERPT) into import prices is an issue of key importance for several economic policy issues, mainly, those related to inflation dynamics and the ongoing build-up of global external imbalances. On the one hand, policymakers must be able to gauge the impact of currency changes on domestic prices, in order to determine the persistence of underlying inflation pressures and, hence, the appropriate monetary policy responses to deal with them. A successful implementation of monetary policy presupposes that central bankers have not only a good understanding of inflation dynamics, but that they are also relatively successful at predicting the future path of inflation. Thus, the monetary authorities' forecasts of the future path of inflation must factor in the changing behavior of ERPT. On the other hand, the extent of exchange rate pass-through is a key input for determining the path of external adjustment. The extent of ERPT will influence domestic demand for real imports and thus contribute to the adjustment (or non-adjustment) of the real domestic trade balance. When the degree of pass-through to tradable prices is found to be high, exchange rate changes will affect the relative prices of tradables and non-tradables, so that the adjustment in the current account balance will be relatively prompt. However, if prices respond sluggishly to changes in exchange rates and if trade flows respond slowly to relative price changes, this does not help the external adjustment of the economy.

A large body of empirical and theoretical literature has examined the underlying relationship between the exchange rate and import prices more closely. A recent strand of literature has underlined the substantial role of inflation regimes in explaining decreasing rates of pass-through across industrialized countries (see e.g. Gagnon and Ihrig, 2004; Bailliu and Fujii, 2004; Choudhri and Hakura, 2006). This intriguing outcome was popularized by Taylor (2000): it explains that the shift towards more credible monetary policy and thus, a low-inflation regime, would reduce the transmission of fluctuations in exchange rates to domestic prices. This assumption is very appealing and has received strong empirical support in the recent literature. In a large database that includes 1979–2000 data for 71 countries, Choudhri and Hakura (2006) provide strong evidence of a positive and significant association between pass-through and the average inflation rate across countries. According to the authors, the inflation environment dominates other macroeconomic variables in explaining cross-regime differences in the pass-through. This outcome was achieved by classifying their different countries according to their inflation regime. In other words, they classified countries into three groups: low inflation (less than 10%), moderate inflation (between 10 and 30%), and high inflation (more than 30%), with classification based on the average of the rate of inflation (mean annual inflation). In a similar vein, Barhoumi (2006) divided a sample of 24 developing countries into high and low inflation regimes, depending on whether the inflation rate was lower or higher than 10%. Thus, the author divided countries into two regimes: countries characterized by a mean annual inflation of less than 10% are considered to be low inflation countries, while countries characterized by a mean annual inflation higher than 10% are considered high inflation countries.

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Nevertheless, the country classification used in the mentioned studies is somewhat arbitrary, in the sense that the authors used an ad hoc method to select their sample splits. In this paper, we have chosen to use panel threshold techniques, introduced by Hansen (1999), to deal with the sample split problem. This methodology allows us to divide our sample into classes based on the value of inflation levels. For more accuracy, a grid search is used to select the appropriate threshold value within a panel threshold framework. Therefore, in a larger panel-data set including 63 countries over the 1992–2012 period, we propose to test for the number of inflation thresholds and to estimate the threshold levels. For the purpose of our analysis, we use the estimated threshold to divide our sample of countries into different groups based on their macroeconomic environment, namely the inflation regime. We then estimate ERPT elasticity for each class of countries in order to compare the different groups. To the best of our knowledge, the present paper is the only study that applies the panel threshold method in this context.

It is important to note that our paper is a contribution to the study of Barhoumi (2006) in that it focuses on the sensitivity of import prices to exchange rate movements.[2] As a matter of fact, the distinction between the ERPT to import prices and the ERPT to consumer prices is crucial in terms of policy relevance. A higher pass-through to import prices is desirable, since domestic currency depreciation could help in correcting external imbalances. While, a lower pass-through to consumer prices is preferred as it avoids external inflationary pressure to the domestic economy. It is important that monetary policy is conducted with knowledge of this distinction. Therefore, our paper deals with the ERPT to import prices for different country-inflation regimes. This represents a key element in understanding the ongoing build-up of external imbalances in several countries.

The remainder of the paper is organized as follows. Section 2 provides an overview of the literature on the relationship between the pass-through and inflation environment. In Section 3, we describe the analytical framework that underlies our empirical specification. In Section 4, the data set and their properties are discussed. In Section 5, we briefly discuss the econometrics of the panel threshold model. Section 6 presents the main empirical results and Section 7 is the conclusion.

2. ERPT and inflation environment

Although the degree of pass-through has played a central role in debates in international economics for a long time, the question of whether pass-through can be influenced by the macroeconomic environment, and in particular the role of monetary policy, is a more recent occurrence. This emerging literature has focused on the issue of the relative widespread and on-going decline in ERPT. A popular view in this regard has been put forward in particular by Taylor (2000). The author provides a model where lower pass-through is caused by lower perceived persistence of inflation. The more persistent inflation is, the less exchange rate movements are perceived to be transitory and the more firms might respond via price adjustments. Thus, countries with credible and anti-inflationary monetary policies tend to experience lower ERPT. It is worth noting that many empirical studies gave supportive evidence to Taylor's view using different techniques and approaches.

Within dynamic panel data model for 11 industrialized countries, Bailliu and Fujii (2004) construct two policy dummy variables indicating shifts in the inflation environment in the 1980s and 1990s, to check the impact of shifting towards a low-inflation regime on ERPT. Their results indicate that the decline in pass-through over time was brought about by the inflation stabilization episodes that took place in the 1990s rather than in the 1980s. Similarly, to test whether the adoption of inflation targeting has had an impact on the degree of ERPT to consumer prices, Edwards (2006) creates a dummy variable that takes the value of one at the time of the adoption of inflation targeting, and zero otherwise. Using quarterly data for the 1985–2005 period for seven countries — two advanced and five emerging — that have adopted inflation targeting, the author finds that in most cases pass-through declined since the adoption of the inflation target regime.

As well as this, a recurrent exercise used in the empirical literature consists of estimating ERPT over different subsample periods. For instance, Gagnon and Ihrig (2004) explore the relationship between pass-through to consumer prices and inflation stabilization in a sample of 20 industrialized countries over the 1972–2000 period. The authors estimate the transmission of exchange rate over two sub-sample periods, with break dates chosen based on the observed behavior of inflation. The first subsample period is considered a period of high inflation environment, while the second subsample is a period of both lower and more stable inflations. The authors found a strong decline in pass-through across the two time periods and conclude that this is due to an increased emphasis of monetary policy on stabilizing inflation.

Finally, the split-country-sample approach is also frequently used in this strand of literature. In their study, Choudhri and Hakura (2006) divide their panel of 71 countries into three groups according to their inflation rates, as follows: a low-inflation regime with less than 10% of inflation, a moderate-inflation regime with inflation levels between 10 and 30%, and a high-inflation regime with more than 30% of inflation. This classification was based on the average of the rate of inflation (mean annual inflation). According to the authors, inflation environment dominates other macroeconomic variables in explaining cross-regime differences in pass-through. In a similar vein, Barhoumi (2006) splits a sample of 24 developing countries into high and low inflation regimes, depending on whether the inflation rate was lower or higher than 10%. Thus, the author divides countries into two regimes: countries characterized by a mean annual inflation of less than 10% are considered to be low inflation countries, while countries characterized by a mean annual inflation higher than 10% are considered high inflation countries.

The major drawback of Choudhri and Hakura (2006) and Barhoumi (2006) is that the value of inflation selected to split the sample (10% or 30%) is somewhat arbitrary. For accuracy, these threshold points should be extracted from the data. Accordingly, our paper implements an alternative methodology to deal with the sample split problem. Therefore, we use panel threshold techniques, introduced by Hansen (1999), which consist of estimating a nonlinear regime-switching model where a grid search is used to select the appropriate threshold. This methodology allows us to divide our sample into classes based on the value of inflation levels.

3. The ERPT model

The standard specification used in the pass-through literature is based on the pricing behavior of exporting firms. To illustrate this point, we consider an imperfectly competitive foreign firm exporting its product to a given country (destination market) while facing competition from the producers in the same market. As a price setter, the firm solves the following profit maximization problem:

$$\max_{p} \Pi = e^{-1} p^{m} q\left(p^{m}, p^{d}, y\right) - c\left(q(.), w^{*}\right) \tag{1}$$

where e is the exchange rate measured in units of the importer's currency per unit of the exporter's currency, p^m is the import price of the product in the importing country, and $q(.)$ is the demand for the product that depends not only on original price but also on the price of the domestic competing product p^d and the income level y. The production cost $c(.)$ is determined by the level of the demand for the product and the input price w^* measured in the exporter's currency units.

[2] However, in Choudhri and Hakura (2006), the pass-through of exchange rate to consumer prices was under focus.

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