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Globalization and inflation: A threshold investigation

Saad Ahmad, Andrea Civelli[1,*]

University of Arkansas, Walton College of Business, Department of Economics, Business Building 402, Fayetteville, AR 72701, United States

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ABSTRACT

We use a threshold methodology to investigate the importance of non-linear effects in the analysis of the inflation globalization hypothesis. Accounting for potential non-linearities in the Phillips Curve, we show that trade openness is not rejected as a threshold variable for the effects of domestic and foreign slack on inflation in many advanced economies, and we find a switch of the output gap slopes from one regime to the other that is consistent with the key predictions of the inflation globalization hypothesis. For some countries the threshold Phillips Curve model also leads to improvements in out-of-sample forecast over the linear Phillips models, especially at longer horizons. Contrary to most of the previous literature which ignores such non-linearities, our new approach provides some interesting empirical evidence supportive of the effect globalization has on a country's inflation dynamics.

1. Introduction

The view that highly interconnected markets will allow global factors to replace domestic determinants of inflation, also known as the inflation globalization hypothesis, has received a substantial level of attention, in part due to its significant policy implications. One of the main predictions of the inflation globalization hypothesis is that the role of the foreign output gap in the determination of domestic inflation will increase at the expense of the domestic output gap as the country's economic integration increases. This prediction typically has been examined in the context of the Phillips Curve model; however, due to mixed empirical findings, there is little consensus on the importance of the foreign output gap, and thus globalization, in a country's inflation process. Borio and Filardo (2007) show that including a measure of foreign slack in a reduced Phillips Curve framework is appropriate for every country in their sample. However, their findings have come under considerable skepticism with Ihrig et al. (2010) illustrating that these results do not hold when a more traditional approach to inflation expectations is employed in the empirical analysis. More recently, Bianchi and Civelli (2015) show the importance of accounting for time variations in the investigation of inflation dynamics, and they find that in a time-varying VAR framework the impact of the foreign output gap on domestic inflation is positively related to trade openness.

In this paper, we continue this line of inquiry but depart from the standard framework by explicitly allowing a country's level of trade openness, used as a proxy for the degree of globalization of a country, to have a non-linear role in the Phillips

* Corresponding author. Tel.: +0014795756589.
E-mail address: andrea.civelli@gmail.com (A. Civelli).

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Curve.[2] Our goal is to show the existence and empirical relevance of a threshold effect of trade openness on the relation between inflation and the domestic and foreign output gaps, such that inflation responds to external factors only after a country achieves a certain level of openness.[3] A number of economic factors can motivate this type of non-linear behavior. For instance, Sbordone (2007) shows that one of the ways globalization can affect the structural determinants of inflation is by reducing the market power of domestic sellers through increased competition; however, it may be the case that domestic companies start to pay attention to foreign competitors only after they have captured a significant market share. This non-linearity should not be omitted from the analysis of the inflation globalization hypothesis, and exploring it in a systematic manner could lead to greater insight on the relationship between inflation and openness and assist policy makers to better deal with some of the challenges of globalization.

Applying Hansen's (1997, 2000) threshold estimation methodology, we are able to examine the non-linear effects of openness on inflation at the individual-country level for a sample of 16 OECD economies. Considering possible threshold effects of trade openness in a Phillips Curve framework is a simple way to assess directly the effects of globalization on inflation. We follow a two-stage empirical strategy to document some interesting new evidence in favor of the use of the threshold approach in evaluating the inflation globalization hypothesis. In the first stage of the analysis, we identify the countries for which the non-linearity is statistically meaningful. It is quite possible that some countries just do not reach a level of openness to experience a shift in their inflation dynamics. In such instances the threshold methodology does not give us any additional insight in the relationship between inflation and globalization. In the second stage of the analysis, we examine the countries that do pass the test for a significant threshold and determine whether the switch of the output gap slopes from one regime to the other is consistent with the key predictions of the inflation globalization hypothesis.

The results show that for most of our sample countries the level of trade openness is a statistically significant threshold variable for the analysis of the effects of domestic and foreign slack on inflation. In the first stage, we find that openness is not a meaningful threshold in our preferred specification of the Phillips Curve for only four countries; these are typically the economies with the lowest degrees of openness, like the U.S. or Japan. In the second stage, we find a broad support of the inflation globalization hypothesis from all the remaining countries after accounting for the non-linear relationship. For half the countries the estimated output gap responses in the two regimes are fully consistent with the theoretical predictions of the hypothesis. For the other half we find a switch of the coefficient of either foreign or domestic gap that is in line with the hypothesis. Finally, we also find interesting variation in the estimated thresholds across countries, which reflect the structural differences embedded in the level of openness across economies.

Our baseline non-linear model is deliberately simple. For robustness we conduct a number of checks for this choice of specification. In particular, we find no significant impact from allowing inflation to have a downward trend; we also find that our main results are robust to the use of different definitions of inflation and to the inclusion of oil prices, real exchange rates, and import prices as additional controls. Finally, we assess the out-of-sample forecast performance of our model in comparison to its linear alternatives, finding an improvement in the forecast fit for some of the countries, especially at longer horizons.

The remainder of the paper is organized as follows. Section 2 discusses the related literature. Section 3 and 4 respectively describe our data and the linear Phillips Curve results for our sample of countries. In Section 5, we move to the threshold analysis and examine the role of openness in a country's inflation dynamics. Section 6 illustrates the robustness checks to the baseline specification of the model. Finally, in Section 7 we examine some of the policy implications of our results and conclude.

2. Related literature

The traditional approach in modeling inflation dynamics has been to focus on country-specific factors, such as domestic output, while leaving a limited role for external factors that were usually captured in the form of supply shocks. However, the increased level of globalization that has taken place through higher levels of trade, financial integration, and movement across factor markets might have changed the very nature of the inflation process. It may now very well be the case that a country's prices are more influenced by events happening in the global rather than the domestic markets.

A theoretical justification to focus on external factors in the inflation process is also provided by Gali and Monacelli (2005), who extend the micro-founded New Keynesian Phillips Curve to the open-economy case. Their key insight is that inflation depends on the weighted average of the domestic and foreign output gaps, where the weights represent some preference for home goods. The inclusion of the foreign output gap in the Phillips Curve shows that along with the direct effects of trade, such as import prices or real exchange rates, there is also a need for some measure of excess global demand, since low demand in one country could be countered by high demand in another.[4] Similarly, Engel (2013) investigates how the Phillips Curve for the consumer price inflation in a country is affected by openness. He compares a model that assumes

[2] Similarly, trade openness has been found to exert non-linear effects on growth rates. See, for example, in this respect Cuaresma and Doppelhofer (2007), El Khoury and Savvides (2006) and Papageorgiou (2002).

[3] Most of the empirical evidence against the inflation globalization hypothesis ignores potential non-linearities that might affect inflation dynamics. See Section 2 for a review of these studies.

[4] In the extreme, as pointed out by Borio and Filardo (2007), this implies that excess demand should be aggregated at the product rather than the country level.