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Global slack and domestic inflation rates: A structural investigation for G-7 countries

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ABSTRACT

Recent papers have argued that one implication of globalization is that domestic inflation rates may have now become more a function of "global", rather than domestic, economic conditions, as postulated by closed-economy Phillips curves.

This paper aims to assess the empirical importance of global output in determining domestic inflation rates by estimating a structural model for a sample of G-7 economies. The model can capture the potential effects of global output fluctuations on both the aggregate supply and the aggregate demand relations in the economy and it is estimated using full-information Bayesian methods.

The empirical results reveal a significant effect of global output on aggregate demand in most countries. Through this channel, global economic conditions can indirectly affect inflation. The results, instead, do not seem to provide evidence in favor of altering domestic Phillips curves to include global slack as an additional driving variable for inflation.

1. Introduction

The degree of global integration in goods, factor, and financial markets has substantially increased over the last two decades. This process of globalization is likely to have induced significant changes in the behavior of macroeconomic variables in most countries. Among other things, several observers have argued that globalization may have altered the dynamics of inflation. First, many have recognized that globalization may have been a contributing factor in reducing inflation rates around the world, although the size of its effect is controversial.[1] But others have offered the more radical argument that, in a globalized economy, the popular closed-economy Phillips curves, which relate current inflation rates to expected inflation and current domestic resource utilization, may no longer be an appropriate description of inflation behavior. Borio and Filardo (2007), in fact, provide empirical evidence that shows how measures of "global", rather than domestic, economic conditions may have now become the relevant measure of unused capacity that drives inflation. An ensuing paper by Ihrig et al. (2007), however, finds that global output is unimportant following a similar empirical strategy.

The aim of this paper is to evaluate the empirical importance of global output as a driver of domestic inflation rates. But, while empirical work in this area has focused on single-equation regressions, this paper uses a structural model, derived

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[1] Several researchers (e.g., Rogoff, 2003, 2006; Ball, 2006), policymakers (e.g., Fisher, 2005; Kohn, 2006; Bernanke, 2007), and the business press (e.g., *The Economist*), have debated the hypothesis that globalization has led to lower worldwide inflation.

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from microfounded behavior by households and firms, and estimated using full-information techniques, to assess the relevance of global measures of output in the sample of G-7 countries.

The use of a structural model is motivated by the need to disentangle the different channels through which global slack can play a role in the economy. Single equation estimations may have difficulties controlling for the effect of global output on domestic output, for the influence of monetary policies, for the effect of expectations, and, at least in the case of the US, for the possible endogeneity of measures of global output to US business cycle developments. These factors can all be taken into account in the general equilibrium estimation.

The paper adopts the model derived in Clarida et al. (2002, hereafter CGG) and Woodford (2007) to capture the potential effects of foreign output fluctuations on domestic macroeconomic behavior. Foreign output affects both the aggregate supply and demand relations in the economy. It affects domestic output through the assumption that consumers in the Home country consume a bundle of domestically-produced and foreign-produced goods. Foreign output can, therefore, affect inflation both indirectly, through its effect on aggregate demand, and directly, through its effect on firms' marginal costs and hence on the specification of the Phillips curve. In a globally-integrated economy, in fact, the decisions of domestic firms to change their prices depend not only on domestic factors, but also on foreign (or global) factors.

The model is estimated using Bayesian methods on quarterly data for the United States, Japan, Germany, France, the United Kingdom, Italy, and Canada. The sample begins in 1985, to focus on the period in which the pace of globalization has accelerated (the starting date follows the choices by Borio and Filardo (2007) and Ihrig et al. (2007)). The relevant global slack measure for each country is calculated as the weighted average of the output gap series of a large set of its main trading partners, where the weights are given by the magnitude of the country's trade with each partner as a fraction of its total trade.

The main objective in the empirical analysis will be to check whether global output is a significant factor in the domestic supply and demand equations. By revealing the channels through which global output can affect domestic variables, the estimates can also shed light on the benefits of alternative monetary policies. If global output plays a large role, in fact, central banks may consider actively monitoring and responding to global macroeconomic conditions. Moreover, as shown by Clarida et al. (2002), if strong spillovers from foreign output to domestic marginal costs and inflation rates exist, there will be non-trivial gains from international monetary policy coordination.

The estimates reveal that measures of global slack have a sizeable influence on aggregate demand in most countries. The empirical results, however, do not provide much support for the relevance of a direct channel through which foreign output affects domestic inflation rates by entering as an additional driving variable in the Phillips curve. The estimated sensitivities of inflation to foreign output gaps are often negative and typically close to 0.

The best-fitting specifications for all countries, in fact, are those that include an effect of global output on domestic output, but not a direct effect on domestic inflation. There is, however, some uncertainty about the role of global slack in the Phillips curves for Italy and France. In these cases, the specifications with and without global slack in the Phillips curve are both assigned significant posterior probabilities.

Overall, mainly through the effect on domestic demand, global output can still affect domestic inflation rates. From the variance decomposition, shocks to global conditions account for a non-negligible share of output fluctuations in France, Germany, Canada, Italy, and the UK, while they are less central in the US and Japan. The spillovers to inflation are limited, as global output shocks account for 13% of fluctuations in inflation in France, less than 10% in the US, Italy, Canada, and the UK, and they are unimportant in Germany and Japan.

The paper aims to contribute to the literature on the effects of globalization on inflation. Various papers evaluate the relationship between openness and average inflation rates using a cross-section of countries. Romer (1993), in a seminal paper, finds a robust negative relationship: average inflation is lower in more open economies. This paper is, however, more closely related to the debate on whether global slack has become an important determinant of inflation rates, and therefore, to the work by Borio and Filardo (2007), which provides empirical evidence in favor of the global slack hypothesis, and by Ihrig et al. (2007), which finds opposite conclusions.[2] This paper shares their main scope, but it uses a different modeling and empirical approach. The paper adopts a structural model of inflation and output dynamics and full-information Bayesian methods to take the model to the data. Among other things, the general equilibrium model makes it possible to identify two channels through which global output can influence inflation: a spillover effect of global output on domestic output, which seems to matter in most countries, and a direct effect of global output on inflation, which is, instead, unimportant in most countries.

The paper is also related to the recent efforts by Sbordone (2007) and Guerrieri et al. (2008) to model other channels through which globalization may affect inflation. Sbordone (2007) is mainly interested in analyzing how the increased competition that may be induced by globalization affects the slope of the Phillips curve, i.e. the sensitivity of inflation to domestic economic activity or real marginal costs. The effect is a matter of dispute, as previous papers have argued that globalization may either lead to a flattening of the Phillips curve (e.g., Razin and Yuen, 2002; Razin and Loungani, 2005; Razin and Binyamini, 2007) or to its steepening (Rogoff, 2003). Sbordone relaxes the assumption of constant elasticity of substitution among differentiated goods, by allowing it to vary with the firm's relative market share. It is through its effect on market shares and hence on the elasticity of demand that globalization may affect the slope of the Phillips curve in her closed-economy model.

[2] The evidence from other papers is also mixed: Gamber and Hung (2001) and Wynne and Kersting (2007) find that measures of foreign capacity utilization seem to affect US inflation, while Tootell (1998) and Castelnuovo (2010) find a more limited role; Calza (2008) repeats Borio and Filardo's (2007) analysis on aggregate Euro-area data and he does not find much support in favor of a role for global slack.