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World food prices and monetary policy ☆

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ABSTRACT

How should monetary policy respond to large fluctuations in world food prices? We study this question in an open economy model in which imported food has a larger weight in domestic consumption than abroad and international risk sharing can be imperfect. A key novelty is that the real exchange rate and the terms of trade can move in opposite directions in response to world food price shocks. This exacerbates the policy trade-off between stabilizing output prices *vis a vis* the real exchange rate, to an extent that depends on risk sharing and the price elasticity of exports. We characterize implications for dynamics, optimal monetary policy, and the relative performance of practical monetary rules. While CPI targeting and expected CPI targeting can dominate PPI targeting if international risk sharing is perfect, even seemingly mild departures from the latter make PPI targeting a winner.

1. Introduction

Inflationary bursts worldwide have been long associated with spiralling food prices. Granger-causality tests on post-1970 data corroborate this old-standing regularity, as global food commodity prices tend to lead rather than lag global CPI changes.[1] That food price shocks greatly matter for aggregate inflation has become particularly important to many inflation targeting countries over the past decade: a burst of food commodities inflation in 2007–2008 led to widespread overshooting of inflation targets; this was followed by considerable undershooting of the targets once food prices receded. This evidence may not seem surprising, since food weighs heavily in most consumption baskets and is not easily substitutable by other goods. The surprise is that the monetary policy literature has given little attention to its implications.

To help filling the gap, this paper addresses the related questions of how far monetary policy should accommodate food price shocks and which policy rules, among those that are practically implementable, are best suited to shore up welfare.

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[1] This is so even after controlling for oil prices. These claims readily follow from regressing changes in the GDP weighed world CPI on changes in the log of the IMF price indices of global food and of oil commodities over the period 1970–2011. The F-statistic on the exclusion of lagged food inflation is significant at 1%. In contrast, the significance of Granger-causality F-statistics on oil prices is generally weaker and of varying significance across sub-periods.

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We model a small open economy that is a net food importer and where food weighs more heavily in domestic consumption than in world consumption. Faced with unexpectedly high world food prices, this economy experiences a terms of trade deterioration, higher CPI inflation, and a real exchange rate appreciation. This combination poses particularly stark policy trade-offs between domestic and external stabilization objectives. We characterize the transmission dynamics of exogenous shocks underlying these trade-offs under various degrees of international financial integration, and examine the implications for welfare and monetary policy choices.

In doing so, this paper relates to a rapidly growing literature on monetary policy in open economies, usefully surveyed by Corsetti et al. (2010). As emphasized by these authors, recent dynamic New Keynesian open economy models can yield different monetary policy prescriptions from their closed economy counterparts. In the latter, as summarized by Woodford (2003) and Galí (2008), optimal monetary policy is typically geared towards replicating a flexible price or natural outcome, suitably attainable through the stabilization of producer prices. Further, in the absence of mark-up/cost-push shocks and/or real wage rigidities, these models also imply that PPI stabilization is conducive to output stabilization. In contrast, consumption and production openness introduce additional policy trade-offs. In particular, small open economies can gain from steering the real exchange rate and the terms of trade. These "terms of trade externality" (Corsetti and Pesenti, 2001) imply that the flexible price equilibrium is not generally optimal, hence raising the question of whether PPI stabilization remains the best policy. Several studies of the model developed by Galí and Monacelli (2005) have provided a basically affirmative answer (e.g. Faia and Monacelli, 2008; Di Paoli, 2009). However, these studies have placed severe restrictions on the model environment, especially perfect international risk sharing.

This paper extends the environment of these previous studies in several ways. We model "food" as a key import, traded in flex-price competitive markets, and which enters as a distinct commodity in the home consumption basket with possibly a very low elasticity of substitution *vis a vis* other goods. Other extensions include (i) global food prices can vary widely relative to the world price index; (ii) food expenditure shares at home and the rest of the world can differ significantly; (iii) the export price elasticity of the world demand for home exports can differ from the intratemporal elasticity of substitution of home and imported goods in consumption; (iv) international risk sharing can be incomplete.

Extensions (i) and (ii) allow our model to capture a much overlooked empirical regularity, already mentioned but still worth emphasizing: with shocks to the world relative price of food, the terms of trade and the real exchange rate can move in opposite directions. Such a negative covariance is ruled out by previous models. Empirically however, and as shown in Fig. 1, a negative covariance is often found in economies that are net food importers and that export sticky price high elasticity goods (as allowed by extension (iii)). Extension (iv), that international risk sharing can be imperfect, hardly needs justification. But departing from the assumption of perfect risk sharing introduces several technical difficulties, which may explain why the assumption is ubiquitous. In this paper we follow Schulhofer-Wohl (2011) in assuming complete financial markets but also a costly wedge in the transferring of resources in and out of the domestic household. This formulation implies that domestic consumption is a combination of the polar cases of perfect risk sharing and portfolio autarky, leading to a specification that is parsimonious, intuitive, and relatively easy to calibrate. As such, it is of independent interest.

In the resulting setting, we provide a complete characterization of Ramsey and natural allocations, as well as of optimal feasible optimal policy, extending the analysis of Faia and Monacelli (2008) and Di Paoli (2009). We combine both analytical approaches with extensive numerical calibrations to flesh out the role of the degree of international risk sharing and of structural elasticities for optimal policy and welfare-based comparisons of policy rules.

Main findings include: first, in the presence of shocks to world food prices, the relative desirability of home inflation vs. output gap stabilization varies significantly depending on the extent of risk sharing and on the export price elasticity. In particular, if the latter is sufficiently but also realistically high (that is, as the economy is "smaller" in export markets), less international risk sharing implies that optimal policy places a heavier weight on domestic price stabilization. Second, when the variance of imported food price shocks is calibrated to be as large as in the data, international risk sharing is perfect, and the home economy's export price elasticity is not too low, CPI targeting can deliver higher welfare than PPI targeting. But targeting "expected" or forecast CPI is even superior. The reason is that expected CPI targeting exploits more heavily the terms of trade externality, resulting in more stable real exchange rate and consumption; in doing so, it delivers a better approximation to the optimal allocation than the competing rules. Third, the welfare-superiority of PPI targeting is easily restored if international risk sharing is less than complete: for a wide range of the other parameters, even small values of the financial transfer cost wedge imply that PPI dominates other rules. In this sense, the conditions for PPI stabilization to be the optimal policy are broader than highlighted in previous work, which relied on perfect risk sharing and the domestic good substitution elasticity being the same as the export good elasticity. Fourth, an optimal feasible policy can be characterized by a "flexible targeting rule", a linear combination of domestic inflation and deviations of output from a target. The output target is a function of exogenous shocks, with coefficients that depend on elasticities of demand and the degree of risk sharing.

The remainder of the paper proceeds as follows. Section 2 lays out the basic framework. Section 3 discusses the model's linearized representation and dynamic responses to world food price shocks. Section 3 characterizes optimal policy. Numerical calibrations and welfare ranking of policy rules are presented in Section 4. Section 5 concludes the paper. To preserve space, a Technical Appendix (available from http://dx.doi.org/10.1016/j.jmoneco.2014.12.010) gathers several formal expressions and derivations.

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