



# Labor immobility and the transmission mechanism of monetary policy in a monetary union



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## ABSTRACT

It is believed that a common monetary policy in a monetary union will have identical effects on different countries as long as these countries have identical fundamentals. We show that, when there is specialization in production, the terms of trade react to the shock. The transmission mechanism of a monetary shock has in this case an additional channel, the terms of trade. This is the case even if state contingent assets can be traded across countries. For a reasonable parametrization, the differential on the transmission across countries is quantitatively significant when compared with the effect on the union's aggregates. Monetary shocks create cycles with higher volatility in "poor" countries than in "richer" ones.

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## 1. Introduction

The widespread view in the profession is that homogeneous shocks in a set of countries or regions have no idiosyncratic effects if these countries or regions are identical. The standard hypotheses in the international macroeconomic literature imply that aggregate shocks do not affect the terms of trade when countries are identical. Therefore, relative consumptions, relative incomes and the current accounts do not change in response to such a shock. Instead, in this paper we want to stress the effects of common shocks in identical countries, by not closing the potential role of the terms of trade and of the current account in the transmission of common shocks, and therefore allowing for different outcomes across similar countries.

Countries in this paper are similar in the sense that they have identical preferences and technologies, but they are specialized in the production of aggregate tradable goods with different income elasticities. We do not explain formally how identical countries specialize in goods with different income elasticities to keep the model simple. But it is not difficult to devise setups that could originate such an outcome. A simple paradigm of such a situation would be equal production technologies for the goods, with increasing returns to scale, or with constant returns to scale and an initial sunk entry cost for each firm. Each country specializes in the production of a set of the goods, and the aggregate tradable goods, in which the

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countries specialize, will have in general different income elasticities. The number of firms in each of the countries, and the pattern of trade and specialization across countries would be indeterminate as in [Krugman \(1980\)](#).

The main result of this paper conveys more importance to monetary policy in a monetary union because – by impacting on the terms of trade and on relative allocations – it is more powerful than in the traditional view where a common monetary policy cannot affect similar countries differently. In this sense, this paper represents a step forward in trying to understand the transmission mechanism of monetary policy in a monetary union. We evaluate numerically the idiosyncratic effects of a monetary policy shock, in a simple model where countries have an identical nominal rigidity, and conclude that the asymmetric effects have the potential to be quantitatively significant. We focus on a monetary shock in a monetary union, but the conclusions extend to any other common shock.

Market completeness is an important assumption in the open macroeconomics literature. The effects of idiosyncratic shocks may change substantially when this hypothesis is dropped, and therefore the non-existence of markets has non-trivial implications. The empirical plausibility of this assumption, is associated with the importance of changes in the current account in the transmission of shocks across countries. Although this assumption is clearly identified as determinant in the analysis of idiosyncratic shocks, or different exogenous transmission mechanisms, its importance for common shocks and identical transmissions mechanisms has not yet been explored in the literature.<sup>1</sup>

Typically to avoid the indeterminacy of the aggregates in the steady-state when markets are incomplete, and the associated non-stationarity in the dynamics, it is necessary to introduce a modification to the standard models (see [Schmitt-Grohé and Uribe, 2003](#); [Correia et al., 1995](#) for further details). In this paper, even with incomplete asset markets, we maintain simplicity and tractability, because we consider a model that has well defined aggregates and is stationary at the union level, while it is non-stationary at the country level. That is, we have a particular form of aggregation even when asset markets are incomplete.<sup>2</sup> The existence of state-contingent asset markets across countries is qualitatively unimportant for our results. The crucial market incompleteness is the labor immobility across countries.

It is interesting that here the so much publicized role of the terms of trade as an insurance mechanism is reversed. It is exactly the endogenous response of the terms of trade to the common shock that leads to the asymmetric responses of the various economic variables across countries to the common shocks when labor is immobile. Usually, in response to an idiosyncratic productivity shock, the country whose productivity increased the most will produce relatively more but the relative price of the bundle of goods it produces will decrease also. Thus, the terms of trade reaction in response to idiosyncratic shocks will determine a smaller dispersion of the relative income of the countries. In the context of a simple model, [Cole and Obstfeld \(1991\)](#) demonstrated that the gains from completing the markets can be modest, as the terms of trade are a good insurance scheme for countries without state contingent asset markets. Even though, they provide full insurance only for a very small set of parameters, for a larger set of other realistic parameters they provide almost full insurance. Therefore, [Cole and Obstfeld \(1991\)](#) conclude that “the terms of trade may play an important role by automatically pooling national economic risks”. More recently [Ghironi \(2006\)](#) showed these results may not be robust. The terms of trade can be a poor substitute for a full insurance scheme since, in more complex models, the transmission of idiosyncratic shocks has effects in an incomplete market framework that can be quantitatively fairly different from the ones obtained in a complete market setup. Our analysis is just on aggregate shocks, and in an environment where the insurance provided by the terms of trade, to idiosyncratic shocks, would not be enough to replicate complete markets. We show that, due to labor immobility, the terms of trade react to the common shock and therefore the outcomes of the shock differ across countries.

To develop the intuition for the change in the terms of trade, and to introduce the aggregation results, we consider first an economy where firms have no restrictions on the way they choose prices. For the monetary shock to have real effects in the flexible price economy we assume that money has a role in transactions. Latter, to get an idea of the quantitative importance of this effect, we consider an alternative environment where firms set prices according to a [Calvo \(1983\)](#) mechanism. In this environment the model is solved numerically with log-linearization of the equilibrium equations. Unlike what happens in most closed economy models, where with the first order approximation the behavior of relative prices is lost, here there is a change in the terms of trade. This occurs because we impose labor immobility across countries and non-homothetic preferences. These are our crucial assumptions. If instead we had assumed homothetic preferences for the households, the same result could be obtained if government expenditures were introduced, identical across countries but whose composition across goods did not coincide with the one of the households. In this way total demand (private and public) would be again non-homothetic, and the result would be preserved.

The assumption of identical income elasticities across goods is clearly rejected by empirical microstudies. For example, [Blundell et al. \(1993\)](#) state that “In our sample of UK survey data for 15 years we find strong evidence of (...) the presence of nonlinearity in the micro-level Engel curves”. Another example, [Banks et al. \(1997\)](#) establish that Engel curves differ across goods, and that they depend on higher order income terms through coefficients which are price dependent.

These empirical facts are not relevant for macro-models if the assumption of homogeneity/nonhomotheticity is not central for the issues under study. Therefore, for convenience and tractability most macro-models use homogeneous

<sup>1</sup> The literature includes, among many others, [Benigno \(2004\)](#), [Benigno and Benigno \(2003, 2006\)](#), [Benigno and Thoenissen \(2008\)](#), [Carlstrom et al. \(2006\)](#), [Cole and Obstfeld \(1991\)](#), [Corsetti and Pesenti \(2001, 2005\)](#), [Corsetti et al. \(2008\)](#), [Dotsey and Duarte \(2008\)](#) and [Ghironi \(2006\)](#).

<sup>2</sup> See [Adão and Correia \(2009\)](#).

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