



# Capital mobility and international sharing of cyclical risk



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## ABSTRACT

This paper investigates whether the international globalization of financial markets allows for significant cross-country risk-sharing at the business cycle frequency. We find that cross-country risk-sharing is still limited and this is unlikely to be the result of financial frictions that limit state-contingent contracts. Part of the limited international risk sharing could be the consequence of frictions that *de-facto* reduce the short-term mobility of financial capital. But even with these frictions we find significant divergence between model predictions and the data.

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## 1. Introduction

The globalization of capital markets that started in the 1980s created a regime of high international capital mobility across industrialized countries and several emerging economies. Indicators of international capital mobility, both *de-jure* and *de-facto*, show that capital mobility increased significantly since the early 1980s.<sup>1</sup> For example, in the United States – the largest industrialized country – the stocks of gross foreign assets and liabilities have more than tripled during the last 30 years. Because income fluctuations remain unsynchronized across countries – with the exception, perhaps, of the most recent crisis – a natural question to ask is whether the global integration of financial markets has facilitated international risk-sharing, particularly by reducing the impact of country-specific income fluctuations on the consumption of tradable goods.

The fact that the cross-country ownership of foreign assets has increased dramatically does not necessarily imply that countries are capable of better smoothing their consumption of tradable goods relatively to their idiosyncratic income over the business cycle. Even if countries experience large international capital flows at low frequencies, which in turn lead to large stocks of foreign assets, the *cyclical* dynamics of these flows may not generate greater consumption smoothing at the business cycle frequency. Thus, the first goal of this paper is to document whether the canonical model of optimal consumption and savings with complete markets and full capital mobility is consistent with the high frequency dynamics of consumption observed in a set of industrialized and emerging economies.

The canonical model includes two countries, each one endowed with stochastic income processes for tradable and nontradable goods. In the empirical application of this model, the first country is the “focus” country (for example the U.S.) while the second represents the rest-of-the-world (the aggregation of all remaining countries). We put together a sample of 21 countries including 15 developed economies and six large emerging economies. The model is then solved for each of

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<sup>1</sup> See Chinn and Ito (2008), Gourinchas and Rey (2007), Lane and Milesi-Ferretti (2007), and Obstfeld and Taylor (2005).

these countries, treating each one as the focus country and pairing it with its corresponding rest-of-the-world aggregate. In line with the structure of the model, the observed income of each country is broken down into tradable and nontradable components. We then estimate joint stochastic processes for the various components of income in the focus country and its corresponding rest-of-the-world aggregate, and use them to calibrate the model. Finally, the model's numerical simulations are used to produce time series for consumption, which are then compared with their empirical counterparts.

Since the analysis focuses on the business cycle frequency, it abstracts from forces that drive international capital flows and consumption smoothing at longer horizons, such as cross-country differences in medium- and long-term growth. In this respect, this study differs in a complementary way from [Gourinchas and Jeanne \(2011\)](#), who focus on growth differences across countries. Despite the different focus, we reach a similar conclusion: the canonical model with complete markets and perfect capital mobility displays dynamics very different from the data.

The assumption of complete markets made in the canonical model is obviously very stylized and, at least in principle, raises the possibility that incomplete markets may bring the model closer to the data. In line with this argument, recent studies have emphasized the possible links between incomplete markets, frictions in financial markets and global imbalances (see [Angeletos and Panousi, 2011](#); [Caballero et al., 2008](#); [Fogli and Perri, 2006](#); [Mendoza et al., 2009](#)). Since these studies focus mostly on low-frequency movements in foreign asset holdings, it is natural to ask whether similar frictions can also be important for explaining the high-frequency comovement of tradable consumption and income within each country.

To address this question, we extend the model by introducing incomplete markets. In this alternative environment, labeled the *Bond economy*, countries can trade only non-state-contingent assets, subject to a lower bound (or borrowing limit). The results show that the dynamics of consumption in this economy are very similar to the dynamics predicted by the model with complete markets. This implies that, given the observed characteristics of income fluctuations, countries should achieve a high degree of risk sharing even if non-contingent bonds are the only assets traded in world asset markets. This result is reminiscent of results obtained in previous studies showing that non-contingent bonds already provide significant consumption insurance (see [Baxter and Crucini, 1995](#); [Heathcote and Perri, 2002](#)).<sup>2</sup> This result also implies, unfortunately, that the high-frequency dynamics of consumption predicted by the Bond economy are quite different from the dynamics observed in the data because, as observed above, the latter differ sharply from the dynamics predicted by the complete markets model.

The Bond economy model shares some of the features of the model proposed by [Bai and Zhang \(2012\)](#) to study the effect of financial integration on international risk sharing. They consider a global economy with a continuum of heterogeneous small open economies trading non-state-contingent bonds exposed to default risk, and with country income fluctuations purely idiosyncratic. The Bond economy can be thought of as a two-agent variant of their model without default but enriched to include uninsurable risk in the form of nontradable goods and aggregate (global) shocks.<sup>3</sup> Moreover, our work also differs in that we focus on the time-series behavior of consumption, instead of the cross-country panel elasticity of consumption with respect to income in a stochastic stationary equilibrium.

Since the Bond economy with borrowing limit can be considered one of the most restrictive forms of financial structure, these results cast doubt on the hypothesis that financial market frictions limiting state-contingent contracts can explain the low degree of international risk sharing at the business cycle horizon.<sup>4</sup> Notice that this does not imply that market incompleteness cannot explain low-frequency movements in foreign assets and international portfolio composition, or that financial frictions are not relevant for the transmission mechanism at work during global financial crises.<sup>5</sup>

The second type of frictions proposed in this paper as a potential mechanism to reconcile the empirical dynamics of consumption with the theory are international portfolio rigidities. Starting from the Bond economy as described above, we add a convex cost of changing the stock of foreign assets. This cost can be interpreted as capturing actual portfolio adjustment costs at the individual level and/or rigidities that limit the international mobility of financial investments.<sup>6</sup> With this friction, the ability of the model to replicate the empirical dynamics of consumption improves significantly, although there is still a sizable divergence between the predictions of the model and the data. Effectively, portfolio adjustment costs bring the economy closer to financial autarky. Thus, an interpretation of this result is that, although formal barriers to the mobility of capital have been lifted in most countries, international financial markets remain intrinsically segmented in the short term.

This paper is related to the large literature on international risk sharing and international real business cycles (IRBC). In particular, our findings are in line with the empirical work by [Lewis \(1996\)](#). She concluded that neither non-separability in

<sup>2</sup> An earlier study in the finance literature by [Telmer, 1993](#) showed that trade in riskless bonds could approximate well complete-markets equilibria in closed-economy models with heterogeneous agents, and that the model does poorly at accounting for observed asset returns. The model we propose in the next section can be interpreted as a version of Telmer's model if we remove nontraded goods and re-label countries as agents.

<sup>3</sup> Considering nontradable goods and global shocks can be potentially important. The imperfect risk sharing captured in Bai and Zhang's estimate of the cross-country consumption elasticity of about 0.6 may reflect the combined effects of nontradable goods, aggregate shocks, and goods and assets trading costs, in addition to default risk.

<sup>4</sup> See [Kehoe and Perri \(2002\)](#) for a more sophisticated model of financial frictions that restrict cross-country risk sharing.

<sup>5</sup> See the recent literature on global imbalances by [Angeletos and Panousi \(2011\)](#), [Caballero et al. \(2008\)](#), [Fogli and Perri \(2006\)](#), [Mendoza et al. \(2009\)](#), and the recent literature on the global crisis by [Dedola and Lombardo \(2010\)](#), [Devereux and Yetman \(2010\)](#), [Enders et al. \(2011\)](#), [Mendoza \(2010\)](#), [Mendoza and Quadrini \(2010\)](#), [Perri and Quadrini \(2011\)](#).

<sup>6</sup> Rigidities in international asset trading or capital controls have also been considered in [Backus et al. \(1992\)](#) and [Mendoza \(1991a\)](#).

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