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Financial integration and international risk sharing ☆

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ABSTRACT

Conventional wisdom suggests that financial liberalization can help countries insure against idiosyncratic risk. There is little evidence, however, that countries have increased risk sharing despite widespread financial liberalization. We show that the key to understanding this puzzling observation is that conventional wisdom assumes frictionless international financial markets, while actual markets are far from frictionless: financial contracts are incomplete and contract enforceability is limited. When countries remove official capital controls, default risk is still present as an implicit barrier to capital flows. If default risk were eliminated, capital flows would be six times greater, and international risk sharing would increase substantially.

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1. Introduction

Over the last two decades, the world has witnessed widespread removal of capital controls in both developed and developing countries. Consequently, countries have become more financially integrated over time. In particular, debt as the major form of international capital flows has risen substantially: in a cross section of 43 countries, the ratio of net debt position to GDP has more than doubled from 8% in 1970–1986 to 18% in 1987–2004.[1] Conventional wisdom predicts that countries can better insure macroeconomic risk when they are more financially integrated. Puzzlingly, an extensive empirical literature finds little evidence that countries increased consumption smoothing and risk sharing despite widespread financial liberalization.[2]

This paper argues that the key to understanding this puzzling observation is that conventional wisdom assumes frictionless international financial markets, while actual markets are far from frictionless. In particular, international financial contracts are incomplete and have limited enforceability. These frictions endogenously constrain capital flows across countries, even when countries remove capital controls. Thus, the observed increase in capital flows under financial liberalization is too limited to significantly improve consumption smoothing and risk sharing.[3]

We study a dynamic stochastic general equilibrium model with a continuum of small open economies and production. Countries experience idiosyncratic total factor productivity (TFP) shocks and share risk through international financial markets that have two frictions. The first is incomplete contracts, which take the form of non-contingent bonds. The other is limited enforceability of contracts, where countries have the option to default on their debt but lose access to financial markets and suffer from drops in output for some period if they default. We focus on debt contracts because debt accounts for the majority of foreign asset positions across countries: over 70% in terms of gross positions and over 60% in terms of net positions for our 43 countries.[4] Recurrent episodes of sovereign default in the

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[1] The sample consists of 21 developed countries and 22 more-financially-integrated developing countries, based on Prasad et al. (2003) For details, see Data Appendix 1.

[2] For a detailed discussion, see Kose et al. (2009).

[3] Henceforth we use the word "risk sharing" to stand for both risk sharing and consumption smoothing.

[4] Kraay et al. (2005) also document that roughly three-quarters of net north–south capital flows take the form of net lending. Equity and FDI flows are rather limited, as reflected by the well-established equity home bias puzzle (Tesar and Werner, 1995) and the fact that equity markets in emerging economies remain relatively underdeveloped.

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data motivate us to study default risk and to model default as an equilibrium phenomenon.

To proxy a wide class of capital controls in the data, we impose a tax on foreign asset holdings[5] and calibrate the tax to match the observed capital flows in the less-integrated period. We model financial liberalization as an exogenous elimination of this tax. In response to financial liberalization, the model generates an increase in capital flows of similar magnitude to that found in the data from the less-integrated to more-integrated period. The model also reproduces many salient features of sovereign default in the data. Default tends to occur in bad and volatile times, and defaulting countries have higher debt to output ratios than non-defaulting countries.

Given its success in producing observed financial integration and sovereign default, we use this model to assess the quantitative implications of financial liberalization on international risk sharing. We measure the degree of international risk sharing with the coefficient on output growth (henceforth *risk sharing coefficient*) in a panel regression of consumption growth rates on output growth rates, as is prevalently used in the empirical literature. The smaller the risk sharing coefficient, the higher the degree of international risk sharing. The model produces limited international risk sharing in both the less-integrated and more-integrated period: 0.64 and 0.63. More importantly, even though capital flows double across these two periods as in the data, international risk sharing improves little.

Financial frictions are the key to understanding limited risk sharing in both periods. When only non-contingent bonds are available, countries have limited access to insure against risk. Default risk on these bonds further restricts risk sharing. Though equilibrium default helps complete markets by making non-contingent repayments somewhat contingent,[6] default risk greatly constrains ex-ante borrowing, especially in bad times when countries need insurance the most. Borrowing is constrained because creditors never offer debt contracts that will be defaulted upon with certainty, and they charge an interest rate premium on debt that carries a positive default probability. Countries in bad times face a higher interest rate schedule because with persistent shocks they are more likely to stay in bad times tomorrow, and so they are more likely to default tomorrow.

Default risk is the key to generating little improvement in international risk sharing across the two periods. When the tax on foreign asset holdings is eliminated, the model generates an increase in the debt-output ratio from 8% to 18% as observed in the data. The increase, however, is limited by default risk, and so the model produces little improvement in international risk sharing.[7] If default risk were also eliminated in the more-integrated period, the debt-output ratio would be 110%, six times larger than the observed ratio. Consequently, international risk sharing would improve substantially even with only non-contingent bonds; the risk sharing coefficient would be lowered to 0.53 instead of 0.63.

Consistent with our finding of little improvement in risk sharing, the implied welfare gain from the removal of capital controls is small; permanent consumption increases by 1.2%. In contrast, if default risk were also eliminated in the more-integrated period, permanent consumption would increase by 42% even with only non-contingent bonds. If, in addition, a full set of assets were also available in the more-integrated period, permanent consumption would increase by 68%. Thus, relative to the potential welfare gains, the welfare gain from the removal of capital controls is small when international financial markets are characterized by limited enforceability of debt contracts.

We also evaluate the model performance in replicating capital flow and risk sharing for emerging market economies and OECD countries. In the data, the OECD countries have less volatile TFP processes than the emerging markets. We calibrate a two-regime shock process to capture this feature: a high-volatility regime and a low-volatility regime. The model predicts that countries in the low-volatility regime have lower asset-output ratios and better risk sharing than those in the high-volatility regime in both periods, which is consistent with the data for the OECD and emerging market countries. Moreover, the model predicts that risk sharing improves little for countries in both regimes in response to removal of capital controls. This observation is also consistent with the empirical finding.

Our paper contributes to the sovereign debt literature[8] in three dimensions. First, our paper studies production economies and addresses the common criticism of this literature: a pure exchange economy allows no consumption smoothing in autarky or after default. This criticism is particularly severe when one aims to quantify the impact of financial integration on risk sharing: a quantitative model will attribute any consumption smoothing to financial integration. In contrast, a production economy allows consumption smoothing even in autarky. Second, we examine the world interest rate that comes out of the general equilibrium model, while previous works take the world interest rate as given. The production framework and the general equilibrium aspect make the model much more difficult to compute. Third, our paper provides a theory explaining the phenomenon of lack of improvement in risk sharing after financial integration in both emerging markets and developed economies through the presence of default risk and the general equilibrium effect. In contrast, the existing works focusing on emerging markets are silent on developed countries.

This work is related to the international business cycle literature on the impact of financial integration. With a small open economy model and incomplete markets, Mendoza (1994) finds that consumption variability is not sensitive to a calibrated change in exogenous borrowing constraints. Our work endogenizes borrowing constraints and points out that default risk is the key to the limited increase in capital flow in response to financial liberalization. Heathcote and Perri (2004) study why consumption co-movement between the United States and Europe declines as cross-border equity flow rises over time. Complimentary to their work, our paper studies why risk sharing between developed and emerging market economies improves little as international debt flow rises over time.

The default model in this paper is close to the bond-enforcement model in Bai and Zhang (2010). Both models assume that the asset market is incomplete and that countries can renege on their debt. In Bai and Zhang (2010), default never occurs in equilibrium under the implicit assumption that competitive lenders cannot discriminate between borrowers. Thus, only risk-free borrowing and lending arise in equilibrium. In this paper, we instead assume that competitive lenders can discriminate borrowers. Thus, country-specific interest rates and default arise in equilibrium. In the absence of equilibrium default, the bond-enforcement model in general produces tighter borrowing constraints and worse risk sharing than the default model.

Our model abstracts from relative prices across countries. Cole and Obstfeld (1991) show that theoretically changes in relative prices can provide risk sharing across countries. This raises the concern whether our empirical finding is robust to movements in relative prices. We find that even after controlling for changes in relative prices, our measure of international risk sharing still barely improves in the more-integrated period. This finding is consistent with Corsetti et al. (2008), who document empirically that movements in relative prices are not in the direction required to enhance insurance.

[5] See Neely (1999) for a detailed discussion.

[6] For detailed arguments, see Grossman and van Huyck (1988).

[7] Kraay et al. (2005) show that default risk is important for understanding the limited North–south capital flow in a framework with exogenous default.

[8] Pioneered by Eaton and Gersovitz (1981), the sovereign debt literature has been advanced more recently in the quantitative dimension by Aguiar and Gopinath (2006), Arellano (2007), Yue (2010), Benjamin and Wright (2009), Chatterjee and Eyigungor (2010), Hatchondo and Martinez (2009), and many others.

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