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Asset pledgeability and international transmission of financial shocks



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ABSTRACT

This paper studies the international transmission of pledgeability shocks, as the recent crisis involved a negative shock to the pledgeability of assets. The paper develops a two-country portfolio model, with leveraged investors, that incorporates this type of shock and a solution approach for the corresponding portfolio choice problem. This approach captures the effect of pledgeability on asset risk premiums. The paper finds that the equilibrium portfolios play a heightened role as transmission channels. Moreover, by complementing the effect of productivity shocks under borrowing constraints, the pledgeability shocks improve the fit of an otherwise standard international macroeconomic model for the G7 countries, especially during crises.

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1. Introduction

The 2007 financial debacle and its subsequent unfolding involved a major credit event that led to a severe drop in real economic growth in most countries in the world. Started in the U.S., the crisis propagated to the rest of the world, and the propagation was fostered by the contraction of investors' balance sheets. Since international investors hold diversified portfolios and use financial assets as collateral for borrowing, their balance sheets shrank under falling asset prices and decreasing market liquidity of financial securities.

In this paper, I study the international transmission of pledgeability shocks, that refer to changes in the liquidity properties of assets that serve as collateral. I develop international portfolio models where investors face borrowing constraints and pledge multiple assets as collateral, and the pledgeability of

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each asset is subject to shocks. I examine the implications of these shocks for the portfolio choice problem of international investors, the corresponding transmission mechanism and the contribution of pledgeability shocks to explaining the international business cycles observed in the data.

The available evidence suggests that changes in the pledgeability of assets are an important dimension of worldwide credit market freezes. [Gorton and Metrick \(2010\)](#) document that subprime-related assets connected with the U.S. housing sector lost their market liquidity more quickly and more remarkably than non-subprime-related assets. The increase in haircuts on subprime-related assets began immediately during the second half of 2007. By the end of 2008 market participants had placed these assets outside the pool of pledgeable securities (haircuts of 100 percent), while other assets had lost only some of their pledgeability. A survey conducted by the 'Committee on the Global Financial System' in various financial centres of the G7 countries confirms this pattern ([BIS, 2010](#)). The June 2007 survey points out that private banking business units, asset managers, central counterparties and prime brokers were accepting various types of collateral—though clearly some of them were accepting assets others did not. Examples of assets that were accepted as collateral are high-grade bonds, blue chip equities and asset-backed securities. Yet, according to the June 2009 survey, intermediaries and traders reacted to the crisis raising the haircuts on their transactions and ceasing to accept asset-backed securities and structured products.

Following [Devereux and Yetman \(2010\)](#), the baseline model is a two-country symmetric model where investors borrow from savers and invest in the equity shares of domestic and foreign firms, whose productivity is subject to shocks. The purchased equities are collateral for the loans, depending on their pledgeability. Since international integration often proceeds in step in all financial markets (this was the case before the crisis), the markets for secured debt also are financially integrated. The degree of equity market integration is however restricted by a transaction cost that partly erodes the returns on foreign assets ([Tille and Van Wincoop, 2010](#)), justifying home equity bias as the one seen in the data. The simple model abstracts from both physical capital accumulation and variable labour supply, which I introduce in an extended framework following the international real business cycle (IRBC) models and financial accelerator literature.

I model the borrowing constraints distinguishing the liquidity of domestic collateral assets from that of foreign collateral assets. In particular, I assume that domestic collateral assets obey a specific loan-to-value (LTV) ratio, and so do foreign collateral assets.¹ As a result, the form of the borrowing constraints is consistent with the one discussed by [Aiyagari and Gertler \(1999\)](#) for models with multiple risky collateral and similar to that used by [Garleanu and Pedersen \(2011\)](#) in an asset-pricing model.² The idea of these models is that the extent to which investors can relax their borrowing constraints by unloading an asset depends on the margin requirement attached to that asset. Therefore, assets display *heterogeneous pledgeability*. In the model this arises from idiosyncratic shocks to the LTV ratio of domestic or foreign assets, as a way to capture the change in margin requirements observed during periods of crisis. LTV shocks offer the opportunity for a first examination of the non-trivial implications of heterogeneous pledgeability for international portfolio choice.

Heterogeneous pledgeability influences the international portfolio choice because investors realize that, after an LTV shock, there is a trade-off between expected return and pledgeability. This trade-off stems from the fact that assets that have a high degree of pledgeability impose lower constraints on current borrowing—and leveraged investors thus expect them to yield lower returns—than assets that have a low degree of pledgeability. I develop an approach to incorporate this trade-off between pledgeability differentials and expected return differentials into the existing local solution methods for

¹ From a theoretical standpoint, these asset-specific LTV ratios are in line with the notion of partial pledgeability. Firms and households hold private assets, but they can effectively liquidate only a fraction of the value of these assets when they need funds ([Holmström and Tirole, 2011](#)). Put it otherwise, the partial pledgeability measures the portion of the value of an asset that creditors can effectively seize in the event of default. Interpreting the pledgeability of each given asset this way, [Venkateswaran and Wright \(2013\)](#) propose a monetary model where agents use collateral assets that have different degree of pledgeability, so that the composition of agents' wealth affects their borrowing for trading in the goods market and, thus, macroeconomic dynamics.

² [Garleanu and Pedersen \(2011\)](#) specify the borrowing constraints directly in terms of margin requirements for both short and long positions. As it is standard in macroeconomics, the model here does not involve constrained short positions.

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