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## The risk premium and long-run global imbalances

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## ABSTRACT

This study proposes that heterogeneous household portfolio choices within a country and across countries offer an explanation for global imbalances. We construct a stochastic growth multi-country model in which heterogeneous agents face the following restrictions on asset trade. First, the degree of US equity market participation is higher than that of the rest of the world. Second, a fraction of households in each country maintains a fixed share of equity in its portfolios. In our calibrated model, which matches the US net foreign asset position and the equity premium, the average US household loads up more aggregate risk than the average foreign household by investing in risky assets abroad and issuing risk-free assets. As a result, the US is compensated by a high risk premium and runs trade deficits even as a debtor country. The long-run average trade deficit in our model accounts for 50% of the observed US trade deficit.

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## 1. Introduction

In the literature, the debate on the sustainability of global imbalances is divided into three strands. First, [Obstfeld and Rogoff \(2000\)](#) argue that a reversal of the US trade deficit and a large dollar depreciation are inevitable. Second, [Engel and Rogers \(2006\)](#) propose that a future US GDP growth rate higher than the rest of the world (ROW) could justify global imbalances. The last strand of the literature is motivated by positive net investment income flows to the US, which suggest that US foreign assets perform better than US foreign liabilities, at least in terms of dividends. [Hausmann and Sturzenegger \(2006\)](#), [Gourinchas and Rey \(2007a,b\)](#) and [Pavlova and Rigobon \(2010\)](#) argue that the valuation of US net foreign assets has a stabilizing effect on the current account. The proposed causes of international differences in portfolio choices are the asymmetry of the supply of assets ([Caballero et al., 2008](#); [Pavlova and Rigobon, 2010](#)), the asymmetry of idiosyncratic shocks ([Mendoza et al., 2009](#); [Angeletos and Panousi, 2011](#)), and the asymmetry of credit constraints for financial intermediaries ([Maggiore, 2011](#)).

We contribute to the last strand of the literature by quantifying the valuation effect in a stochastic multi-country growth model with a focus on asymmetric international portfolios. Our focus is motivated by empirical evidence suggesting a wide range of portfolio heterogeneity across households both within a country and across countries ([Campbell, 2006](#); [Guiso and Sodini, 2012](#); [Christelis et al., 2010](#)). To emphasize the demand-side heterogeneity in portfolios, we assume that assets

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issued in every country are identical but that households face different restrictions on asset trade. Specifically, equity market participation is internationally asymmetric both in terms of the participation rate, or the extensive margin, and the portfolio share of equity, or the intensive margin.

These assumptions about equity market participation have real consequences for consumption dispersion. Due to the compensation for risk holding, households that take large (small) equity positions earn high (low) rates of return on their portfolios, accumulate large (small) amounts of wealth and enjoy high (low) levels of consumption. Hence, heterogeneity in households' portfolios induces consumption and wealth dispersion. Then, an aggregation of the household portfolios in each country translates into cross-country differences in portfolios. The model predicts that the country with higher equity holdings holds a larger amount of aggregate risk, earns higher average returns on its portfolio, consumes more than its output and runs trade deficits even in the long run.

In the quantitative part of our study, we consider two economies, the US and the ROW. The model is calibrated to match the US net foreign asset (NFA) position and the equity premium, using the equity share in household portfolios from international household finance data. The size of the equity premium and the asymmetric demand for risky and safe assets play important roles in our results. A high equity premium relies on the assumption of limited participation in the equity market, a global phenomenon supported by empirical studies. Of most importance, we realistically assume that equity market participation among US households is higher than among ROW households in terms of both the extensive margin and the intensive margin. In addition, in order to match the US NFA position resulting from asymmetric demand for risk-free assets, we rely on another type of asymmetry—international asymmetric idiosyncratic income risk. The importance of this assumption is first illustrated by [Mendoza et al. \(2009\)](#).

Our benchmark model generates a 6.31% equity premium and a 2.32% risk-free return; these values are quite close to the estimates in the asset-pricing literature. Our quantitative result predicts that the US accumulates a positive net foreign equity (NFE) position despite its negative NFA position. The positive NFE position, combined with a high risk premium, allows the US to run trade deficits in the long run. The long-run average US trade deficit is 2.65% of output, which is half the average US trade deficit in 2000–2011. The trade deficit is highly countercyclical, as documented in the data. Furthermore, our finding is consistent with the empirical literature that documents a positive returns differential between US foreign assets and liabilities over the past few decades ([Obstfeld and Rogoff, 2005](#); [Meissner and Taylor, 2006](#); [Lane and Milesi-Ferretti, 2007](#); [Gourinchas and Rey, 2007a](#)). We consider the documented returns differential as evidence suggesting that US investors have loaded up more aggregate risk in foreign assets than in foreign liabilities. Moreover, [Gourinchas and Rey \(2007a\)](#) find that the US has financed risky investment abroad by issuing low-risk, short-run liabilities to the ROW over the past two decades.

Our main contribution to the literature is the integration of household finance into an explanation for global imbalances. Our model successfully matches both stock and flow characteristics of global imbalances. While [Gourinchas et al. \(2010\)](#) similarly offer a rare disaster model to account for global imbalances, their predicted scale of imbalances is small. Furthermore, we contribute to the theoretical literature on international portfolio choices. Specifically, we demonstrate the importance of household portfolio heterogeneity in open economies, while the majority of open-economy macroeconomic models rely on a representative agent framework. Therefore, our model is suitable to answer questions related to wealth and consumption dispersion across countries.

The rest of the paper is organized as follows. [Section 2](#) discusses our main assumptions and the related literature. [Section 3](#) describes the model. [Section 4](#) contains the quantitative results from our benchmark model. We turn off some features to inspect the model mechanism in [Section 5](#). [Section 6](#) concludes our study.

## 2. Portfolio heterogeneity and related literature

This section presents our main assumptions about household portfolio heterogeneities and their empirical motivation. Although these assumptions are in reduced form in our model, they are justified by micro-founded theories. In addition, recent studies have found that these assumptions help explain other facts about portfolio choices.

First, we assume that a large fraction of households does not participate in the equity market. This assumption is well motivated by the observed data from the US Survey of Consumer Finance (SCF). Historically, the participation rate from the SCF has not exceeded 50% ([Campbell, 2006](#)). The presence of a large amount of non-participants is likely due to participation costs resulting from the monetary costs of financial advisors or brokerage fees and the time costs of information acquisition (see the survey by [Guiso and Sodini, 2012](#)).

Second, we assume that most equity market participants are inactive and under-participate in the sense that their portfolio equity share is relatively small and constant over time. A small equity position is supported by the data. For example, [Campbell \(2006\)](#) shows that equities occupy 10% of the median household's portfolio and 20% of the 80th percentile household's portfolio by using the 2001 SCF. Moreover, [Vissing-Jørgensen \(2003\)](#) is the first to present compelling evidence that less sophisticated investors tend to deviate from the optimal portfolio. Subsequent studies have confirmed that a large fraction of equity market participants adjusts its portfolio shares only infrequently, even after large changes in asset returns ([Ameriks and Zeldes, 2004](#); [Brunnermeier and Nagel, 2008](#); [Calvet et al., 2009](#)). We conceptualize this fact by assuming that most market participants do not adjust their equity share in response to changes in the market price of risk.

Third, we assume that the equity market participation rate and the share of equity holdings among US households are higher than those among ROW households, as in the data. According to [Guiso et al. \(2001\)](#), in 1998 the equity market participation rate in the US was 49%, whereas the rates in Italy, the Netherlands and the UK in the same year were 19%, 35% and 31%, respectively. In

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