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Evaluating international consumption risk sharing gains: An asset return view ☆

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ABSTRACT

International consumption risk sharing studies often generate counterfactual implications for asset return behavior with potentially misleading results. We address this contradiction using data moments of consumption and asset returns to fit a canonical international consumption risk sharing framework. Introducing persistent consumption risk, we find that its correlation across countries is more important for risk sharing than that of transitory risk. To identify these risk components, we jointly exploit the comovement of equity returns and consumption. This identification implies high correlations in persistent consumption risk, suggesting a strong degree of existing risk sharing despite low consumption correlations in the data.

1. Introduction

International consumption risk sharing studies often ignore asset return implications. Indeed, their assumptions about risk and intertemporal substitution in consumption usually generate counterfactual implications for the behavior of asset returns.[1] This contradiction is important because risk sharing gains depend directly upon how agents value consumption risk, a value inherently observable through asset prices. Therefore, ignoring asset return implications may lead to incorrect assessments of international risk sharing gains.

The counterfactual asset return behavior in risk sharing studies originates from different approaches toward risk in the macroeconomic and finance literatures. On the one hand, many international risk sharing studies are based upon macroeconomic models that implicitly treat shocks to consumption as temporary deviations from a deterministic trend. These shocks are insufficiently volatile to explain equity returns and the resulting gains implied from risk sharing tend to be small. On the other hand, the gains from risk sharing in the empirical finance literature are measured from equity returns that are much more volatile, suggesting much higher risk sharing gains. However, these financial studies tend to focus on equity returns alone and ignore the connection to consumption behavior.

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[1] Surveys that discuss the literature on international risk sharing welfare gains include van Wincoop (1994), Tesar (1995), Lewis (2011), and Coeurdacier and Rey (2013). On the counterfactual implications of asset returns in this literature, see Obstfeld (1994b) and Lewis (2000).

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In this paper, we begin to bridge the gap between these two approaches using a canonical international consumption risk sharing framework calibrated to match features of asset returns. For this purpose, we draw from research that generates asset return implications that are closer to the data by allowing for persistence in the marginal utility of consumption.[2]

Specifically, we incorporate persistent consumption risk by introducing a small autoregressive component in consumption growth following Bansal and Yaron (2004), hereafter BY.[3] Given this consumption process, our approach in this paper proceeds in the following steps. First, use a Simulated Method of Moments (SMM) analysis to find the parameters that best fit the model to consumption and asset return data moments. Then calculate the world consumption allocation that would implement full risk sharing. Finally, measure the potential welfare gains of moving to this optimally diversified economy.

While persistent consumption risk improves the ability for the consumption-based model to match asset returns, its behavior also carries significant implications for risk sharing. Indeed, our results below show that the magnitude of risk sharing gains depends critically upon how much persistent risk can be diversified. Therefore, understanding risk sharing requires identifying the international correlation in the transitory versus persistent components separately, rather than the simple consumption correlations typically studied. To decompose each of these two types of risk, our analysis develops an identification strategy using the relationship between international equity return and consumption correlations. This relationship implies that the persistent risk correlations are very high and near one across our sample of advanced economies. The intuition behind this result is straightforward. In the data, international correlations of equity returns are higher than those of consumption. In the model, equity returns are more sensitive to persistent shocks than are consumption variations. As disciplined by the data, therefore, the model implies that this persistent risk is strongly correlated.

This result highlights a key finding of our paper. Since the persistent risk component of consumption is already highly diversified, the potential for international risk sharing gains arises primarily from diversifying the transitory shocks. As a result, these gains are quantitatively closer to macro-based studies that ignore asset pricing considerations. Importantly, this result stands in contrast to a conventional view that disciplining consumption-based models to match the equity premium will necessarily generate very high welfare gains, at times exceeding 100% of permanent consumption.[4]

Our finding that important consumption risk is already diversified is reminiscent of a related theme in exchange rate-based studies. Brandt et al. (2006) show that the lower volatility of exchange rates compared to equity returns implies a high degree of risk sharing. They pose this observation as a puzzle because low consumption correlations in the data suggest the opposite. By contrast, we show that high risk sharing and low consumption correlations are mutually consistent and need not present a puzzle in a one good economy with identical preferences. Similarly, in a two good economy with differing preferences across countries, Colacito and Croce (2011) and Stathopoulos (2012) generate low consumption correlations under full risk sharing. However, these papers assume complete markets, while we do not.[5]

The structure of the paper is as follows. Section 2 describes the basic risk sharing framework and identification of the benchmark economy assuming equity pays out realizations from the consumption process. Section 3 develops the full risk sharing economy and reports the implied risk sharing gains. Consistent with the literature, we find that this version of the equity model cannot adequately fit asset return moments. Consequently, Section 4 considers the BY model based upon dividend data, providing a better fit. Section 5 extends the analysis to include differing means, population sizes and a wider set of countries. Section 6 gives concluding remarks. On-line appendices provide details for all of the analysis and empirical methods.

2. The consumption asset benchmark

We begin by describing a canonical framework for evaluating international risk sharing gains. For this purpose, define C_t^B and W_t^B, respectively, as consumption and wealth at time t under our "benchmark economy," or the current level of risk sharing implied by data, and C_t^* and W_t^* as their counterparts in the fully diversified economy. Relationships for variables without the superscript B and $*$ throughout the paper hold in either equilibrium. Further, we specify the lifetime utility, or value function, in the benchmark economy and fully diversified economy to be given by $V(C_t^B, W_t^B)$ and $V(C_t^*, W_t^*)$, respectively. The welfare gain, Δ, is then the percentage increase to the benchmark consumption and wealth that achieves the lifetime utility of the full risk sharing economy at some initial time 0:

$$V((1+\Delta)C_0^B, (1+\Delta)W_0^B) = V(C_0^*, W_0^*). \tag{1}$$

These value functions depend crucially upon the utility function of investors. The time-additive constant relative risk aversion (CRRA) preferences often assumed in risk sharing studies create two significant problems for our purposes, however. First, they imply counterfactual asset pricing behavior. In particular, the equity premium is too low (Mehra and

[2] For example, Campbell and Cochrane (1999) employ habit persistent preferences, Bansal and Yaron (2004) assume that consumption growth has a persistent "long run risk" component, and Barro (2006) considers disaster risk.

[3] Our analysis is based upon this approach because it both matches important asset features and naturally nests the transitory-only risk case, as discussed below.

[4] For example, see the discussions in Obstfeld (1994b), Lewis (2000), and, more recently, Coeurdacier and Rey (2013).

[5] As another important difference, we consider a general multiple country world economy with differing income processes, while these papers restrict their analysis to a two country world with identically symmetric stochastic processes.

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