Patience, persistence, and welfare costs of incomplete markets in open economies

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Abstract

We investigate the welfare implications of alternative financial market structures in a two-country endowment economy model. We obtain an analytic expression for the expected lifetime utility of the representative household when sovereign bonds are the only internationally traded asset, and we compare this welfare level with that obtained under complete asset markets. The welfare cost of incomplete markets is negligible if agents are very patient and shocks are not very persistent, but this cost is dramatically larger if agents are relatively impatient and shocks are highly persistent. For realistic cases in which agents are very patient *and* shocks are highly persistent, the welfare cost of incomplete markets is highly sensitive to the specific values of these parameters.
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1. Introduction

In recent years, numerical methods have been used to analyze a wide variety of open-economy dynamic general equilibrium models with incomplete asset mar-

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kets. In particular, Baxter and Crucini (1995) showed that the degree of persistence and spillovers of the exogenous shocks plays a critical role in determining the extent to which the behavior of the incomplete-markets economy diverges from that of the economy with complete asset markets.[1] Tesar (1995) obtained quantitative results regarding the welfare costs of financial market incompleteness under various model specifications.[2] However, there has been a relative scarcity of analytical results to elucidate these findings and to clarify the implications of the key structural parameters.

In this paper, we use analytical methods to determine the welfare implications of a two-country endowment economy in which sovereign bonds are the only internationally traded asset. We also assume that the two countries are completely symmetric, with no outstanding debt at the beginning of the initial period, and that each country is subject to a single endowment shock that decays at an exponential rate. Under these assumptions, we can obtain the exact non-linear rational expectations solution for the dynamic behavior of the economy; that is, the entire path of each country's consumption can be expressed in terms of the exogenous endowment process. Then we proceed to derive an analytic expression for the expected lifetime utility of the representative agent (using a second-order Taylor approximation around the steady-state growth path of the endowments), and we compare this welfare level with that obtained under complete markets and under autarky.[3]

We find that the welfare cost of incomplete markets increases linearly with the degree of relative risk aversion and with the variance of the country-specific component of the endowment shocks, whereas this welfare cost depends non-linearly on the persistence and spillovers of the endowment shocks and on the growth-adjusted discount factor (which is a simple function of the discount factor, the growth rate, and the intertemporal elasticity of substitution). In particular, the welfare cost of incomplete markets is negligible if agents are very patient and shocks are not very persistent, but this cost is dramatically larger if agents are relatively impatient and shocks are highly persistent. Furthermore, our analysis highlights potentially realistic cases in which the welfare of the incomplete-markets economy is quite sensitive to small changes in the structural parameters.[4]

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[1]Glick and Rogoff (1995) and Obstfeld and Rogoff (1996) have analyzed the implications of the degree of persistence of the exogenous shocks.

[2]Numerical results on welfare gains of incomplete markets have been obtained by Mendoza (1995), Tesar (1995), Kim (1997), and Kubler and Schmedders (2001). A relatively large literature has considered the welfare gains of complete asset markets over autarky using both analytical and numerical methods; cf. the summary and analysis in van Wincoop (1999). Lewis (2000) provides a broad survey of the literature on welfare gains from international risk-sharing.

[3]For more on the issue of approximation and welfare, see Woodford (2002), Kim and Kim (2002), and Kim et al. (2002).

[4]We have obtained virtually identical results in a stationary model in which endowment shocks occur in every period and internationally-traded bonds are subject to quadratic holding costs; see Kim et al. (2001) and Kim (2003).