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by

John Heaton and Deborah Lucas

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The Effects of Incomplete Insurance Markets and Trading Costs in
a Consumption-Based Asset Pricing Model

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Abstract

Incomplete financial markets, coupled with undiversifiable
idiosyncratic shocks, have the potential to explain a number of
asset pricing puzzles. We study a model in which agents have
access to a limited set of securities markets, while facing
aggregate and individual uncertainty. Trade is limited by the
presence of transactions costs, borrowing constraints, and short
sales constraints. We find a systematic relation between the
extent and type of market frictions, and their implications for
asset prices and consumption policy. With trading costs or binding
borrowing constraints, the riskfree rate falls and the risk premium
rises relative to the complete markets case, and the term structure
exhibits a positive forward premium. However, with costless access
to either the stock or bond market, agents effectively smooth out
transitory income shocks, and equilibrium asset prices resemble
those in the complete markets case.

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1. Introduction

The problem of predicting consumption patterns in an environment of random income fluctuations and incomplete insurance markets has traditionally been the domain of macroeconomists. Friedman's (1957) permanent income hypothesis provided the insight that transitory income disturbances should be smoothed through capital market transactions. In the extensive literature that develops this idea, it is generally assumed that consumers face an exogenous and constant interest rate. Starting from the perspective of the consumption-based asset pricing model of Lucas (1976), a number of authors have recently asked the related question of how income fluctuations and incomplete insurance markets influence predicted rates of return (Aiyagari and Gertler (1991), Constantinides and Duffie (1991), Heaton and Lucas (1991), Huggett (1991), Ketterer and Marcet (1990), Lucas (1991), Telmer (1991), Marcet and Singleton (1991)). Essentially, these recent papers imbed a permanent income type model in an infinite horizon general equilibrium setting.

There are a number of motivations for studying the implications of incomplete markets for asset pricing models. The failure of simple versions of the representative consumer consumption-based asset pricing model to predict the observed statistical properties of asset returns can be attributed in part to the low variability of aggregate consumption growth rates.[1]

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[1]   Hansen and Singleton (1983) and Mehra and Prescott (1985), among others, identified the asset pricing puzzles in empirical investigations of the Lucas (1976)

Market incompleteness breaks the link between individual and aggregate consumption, and in particular allows for the possibility that individual consumption growth is more volatile than in aggregate. Furthermore, with incomplete markets agents engage in trade. Thus one can address questions about trading volume, the impact of transactions costs, and the nature of liquidity trading.

These models have several drawbacks as well. Critics argue that the ability to arbitrarily close markets results in a loss of discipline; small changes in assumptions can produce qualitatively different conclusions. Complexity is also an issue. The models can only be solved numerically, and very few general results have been derived. Finally, the data requirements for testing or calibrating the models are often escalated by the fundamental heterogeneity.

The purpose of this paper is to provide clearer intuition about the predictions of these models, with an emphasis on showing which implications are robust and which are not. To do this we study a relatively simple, three period, two person model in which a large number of cases can be easily analyzed and interpreted. We are particularly interested in comparing the impact on asset prices of different types of trading frictions, including borrowing constraints, short sales constraints, quadratic costs and proportional costs. Our analysis suggests that with trading frictions, this class of models has the potential to help resolve

model. Hansen and Jagganathan (1991) cleanly characterize the connection between consumption volatility and asset prices.

the equity premium and low risk-free rate puzzles and to explain the forward premium in the term structure. Calibration results, however, are likely to be quite sensitive to the assumed market structure.

The paper is organized as follows. In Section 2 we present the frictionless model, and explain why the assumed timing of markets is critical. Section 3 introduces various trading frictions. We show that: (1) If trading in some markets is costless, agents substitute almost entirely towards trading in these markets. Hence trading costs influence prices only if they are present in all asset markets; (2) The assumed market structure has a large and systematic impact on predicted asset prices. In particular, the equity premium is larger and the risk-free rate lower when only borrowers pay trading costs in the bond market, or when there is a binding borrowing constraint; (3) The implications of proportional costs are similar to those of quadratic costs. In Section 4 we demonstrate that the model with trading frictions predicts a positive forward premium in the term structure. Section 5 concludes.

2. Asset Pricing with Incomplete Markets and Frictionless Trade

This section presents two simple models that illustrate how small changes in assumed market structure can significantly affect predicted asset prices and consumption allocations when income shocks are uninsurable. The first model is in the spirit of Mankiw (1986), while the second captures the idea behind the infinite