



Arbitrage pricing and the stochastic inflation tax in a multisector monetary economy

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Abstract

A dynamic general equilibrium multifactor asset pricing model for a monetary economy with capital accumulation and multisector production is constructed. Equilibrium Clower constraints on some investment goods and some consumption goods are imposed. An equilibrium APT model is constructed where the covariance between the inflation tax, distorted equilibrium investment returns, and fundamental forcing processes are important in determining equilibrium risk prices. The model is used to address issues concerning the relative importance of real and nominal factors in asset pricing raised in recent papers by Chen, Roll, and Ross (1986) and Cochrane (1991, 1992).

Key words: Asset pricing; Monetary business cycles

JEL classification: D92; E44; E50; G12

1. Introduction

In a series of papers by Brock (1982) and Cochrane (1991, 1992), a theoretical foundation for the importance of real macroeconomic variables such as investment and technological innovations in the theory of equilibrium arbitrage pricing theory (EAPT) has been explored. Brock (1982) maps the Arrow–Debreu primitives of taste and technology into equilibrium risk prices in a multifactor asset pricing model without equilibrium distortions. Cochrane (1991) uses

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a production-based asset pricing model with adjustment costs to show the importance of both lagged real macroeconomic variables and standard financial measures in forecasting current stock returns, and conversely the importance of many of the same real macroeconomic variables and stock returns in forecasting future real economic activity over the business cycle. Cochrane (1992) has generalized the test of production-based asset pricing to the context of multi-factor arbitrage pricing models in the spirit of Ross (1976).

In a complimentary line of research, empirical evidence seems to point to the importance of nominal variables in arbitrage pricing models. Specifically, stock returns are negatively correlated with measures of anticipated and unanticipated measures of inflation.¹ A particularly interesting paper is Chen, Roll, and Ross (1986). Their research isolates both key nominal and real macroeconomic variables that include the spread between long and short interest rates, expected and unexpected inflation, industrial production, and a measure of the risk premia that all appear to be correlated with asset returns. They find empirical support for the depressing effect of innovations in inflation on stock returns. Cochrane (1992) places the model of Chen, Roll, and Ross (1986) to a cross-sectional dynamic test. He finds that investment return factors are dominant in factor models such as Chen, Roll, and Ross (1986), thereby reasserting the fundamental importance of real factors in explaining asset returns.

In this paper, we describe the role of both real and nominal macroeconomic variables in an EAPT model using an approach that differs from either Chen, Roll, and Ross (1986) or Cochrane (1991, 1992). Following Brock (1982), we explore the theoretical foundations of APT from the perspective of a dynamic general equilibrium with multisector production in the spirit of Arrow and Debreu.² Unlike Brock (1982) and Cochrane (1991, 1992), we include a meaningful role for equilibrium distortions in explaining asset returns. Specifically, we suggest that innovations in nominal magnitudes (such as money and prices) interact with market trading frictions to create a potential for equilibrium distortions to affect asset prices in a multifactor equilibrium asset pricing model. This interaction creates a wedge of inefficiency for distortionary monetary policies in the valuing of investment returns via the equilibrium risk premia, thereby affecting asset returns in EAPT.

Specifically, a multisector monetary economy is described that incorporates a simple friction in the acquisition of some consumption and investment goods.

¹ Examples of such empirical findings include Fama (1981, 1983), Geske and Roll (1983), Kaul (1987), Pearce and Roley (1988), and Marshall (1992). Marshall (1992) also offers a theoretical explanation for the stock return–inflation correlation in the context of an exchange economy with transactions costs.

² Other papers in the Arrow–Debreu tradition include Conner (1984) and Milne (1988).

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