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An empirical investigation of the relationship between the real economy and stock returns for the United States

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Abstract

US asset prices are modelled in the short- and long-run with the use of a seemingly unrelated system using monthly data over the time period, 1983–2004. Once the shocks of 1987, 1997 and post-"9·11" have been accounted for, then volatility only affects the consumption and inflation equations. In the long run excess returns and inflation are driven by consumption growth. Money growth impacts excess returns and inflation via consumption. Income is super exogenous implying that policy can be made conditional on this variable and that in the long run investors are primarily concerned with income growth.

JEL classification: C52; E44; G12

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1. Introduction

Campbell and Shiller (1987, 1988a, 1988b) have used Vector-Autoregressive (VAR) models to explain stock returns. Campbell and Ammer (1993), and Lund and Engsted (1996) have more recently reconsidered this analysis. However, VAR models do not directly account for volatility. Non-normality is also important when analysing finance data and the estimated models have often used a narrow set of variables.

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In this article, we consider the interaction of consumption growth, money growth, income growth and inflation with excess returns. Furthermore, a typical short-interest rate appears indirectly in the system as a component in the calculation of the excess return. The sample selected, 1983:1–2004:12, is to allow the financial variables to act as a hedge for inflation and to consider the period that follows the Volker reforms. The latter is important as excess returns can be viewed as a real variable and the inflation series can be viewed as being stationary. Returns are then viewed as covering inflation and giving the holder of the asset, subject to a correction for long-run inflation, an excess return equivalent to the underlying growth rate in the economy. Dummy variables explain the extreme events associated with the Stock Market Crash in 1987, the Asian Crisis, 9/11 and the anniversary of 9/11. Once this correction is made, excess returns are no longer volatile.

Here we find that income growth and money growth can both be considered to be weakly exogenous and income super exogenous. In the light of our requirement to capture Generalized Auto-regressive Conditional Heteroscedasticity (GARCH) in the consumption and inflation equations, we feel more confident in assuming that the remaining four equations are invariant to the behaviour of the parameters in the income model and can be thus conditioned on income growth. In the long run, we can treat money and income growth as the forcing variables, though the tests imply that policy can only be conditioned on income.

The restricted polynomial distributed lag (PDL) model is a reduced form capturing the impact of short-run costs of adjustment, expectations formation and habit preferences (Sims, 1980). A theoretical interpretation can be derived from the long-run solution to the model that defines an estimate of long-run conditional expectations of growth rates, inflation and returns. This model is Keynesian, giving a primary role for income and a secondary role for money as the variables forcing long-run average behaviour. In line with Keynes (1936, pp. 91–95), the propensity to consume is positively affected in the long run by personal disposable income, financial wealth as captured by windfalls and real money balances. There is also a roll for price misperceptions (Deaton, 1977) and the interest rate enters indirectly with a negative coefficient via excess returns. Persistence is embodied in the models via the difference formulation, so income and money as may be expected have a small effect on shifting the long-run consumption growth path of the economy. However, any policy to stimulate income and real money growth in the long run will shift consumption growth.

Real money growth in the long run, increases with a decline in long-run expected inflation, increases in balanced growth and a reduction in the extent to which income and consumption growth are out of line. Inflation is reduced by an increase in long-run excess returns and a decline in consumption growth, while the monetary transmission mechanism is Keynesian as the primary impact of money feeds through consumption growth. Following Dornbusch (1976), the change in long-run stock returns may well reflect information associated with price movements that are sluggish. Then, the long-run pricing formula is driven by the risk free rate with a unit coefficient and the long-run correlation of returns with consumption growth. The latter is consistent with a long-run multifactor or arbitrage pricing explanation of asset pricing.

The four-variable model is conditioned on income and where appropriate, corrected for the primary influence of volatility using univariate GARCH models. All the models satisfy conventional specification tests and are consistently and efficiently estimated by a feasible Seemingly Unrelated Regression (SUR) estimator corrected for volatility.

In Section 2 we provide a brief literature review. Section 3 contains a discussion of data. Section 4 discusses the design of our methodology. Section 5 the SUR model and Section 6 summarizes the main findings.