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# External Habit and the Cyclicality of Expected Stock Returns*

We estimate an equilibrium asset pricing model in which agents' preferences have an unobserved external habit using the efficient method of moments (EMM). Given the estimated structural parameters, we examine the cyclical behavior of expected stock returns in the model. We find that the estimated structural parameters imply countercyclical expected stock returns as documented in existing empirical studies. The model, however, is still rejected at the 1% level. Detailed examination of the moment conditions in our estimation indicates that the model performs reasonably well in matching the mean of returns, but it fails to capture the higher-order moments.

## I. Introduction

Expected stock returns are related to the business cycle, as shown in papers by Fama and French (1989), Fama (1990), Kandel and Stambaugh (1990), Harrison and Zhang (1999), and others. In fact, expected returns are countercyclical: higher in recessions and lower in booms. Much of this research focused on identifying the cyclicality of expected returns without attempting to explain it. "Standard" models, with time-separable utility and exogenous endowment processes, tend to generate procyclical returns. This finding is reported in Kandel and Stambaugh (1990). This result is robust to a variety of extensions. Balvers, Cosimano, and McDonald (1990) introduce production, and Zhang (1997) introduces heterogeneous agents and incomplete markets with short-sale constraints into

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the model examined by Kandel and Stambaugh (1990), both finding that expected stock returns remain procyclical.

Campbell and Cochrane (1999) show that relaxing time separability in preferences can generate countercyclical returns. The mechanism they propose is a slow-moving, nonlinear external habit. The representative agent's utility is now a function of current private consumption as well as current and past aggregate consumption. Since the habit is external, individual agents do not consider the effects of current consumption on future utility. The setup is similar in spirit to Abel's (1990) ''catching up with the Joneses'' framework. The habit process moves more slowly than consumption so that, in a downturn, consumption falls faster than the habit, resulting in an increase in local risk aversion. In an expansion, the opposite happens. The countercyclical effect on risk aversion results in a countercyclical pattern for risk premia and therefore countercyclical expected returns. This explanation is consistent with Black (1990), who argues that risk aversion should be higher in recessions when wealth is low. However, Ljungqvist and Uhlig (1999) show that the Campbell and Cochrane specification implies consumption bunching. This is the result of the habit moving negatively with consumption with these preferences when consumption is endogenous. More standard ''catching up with the Joneses'' preferences have consumption and habit moving together. In a Campbell and Cochrane world, a benevolent government counteracts the externality by inducing cycles, while in a more standard catching-up world, the benevolent government stabilizes the economy (Ljungqvist and Uhlig 2000).

In this paper, we estimate the model proposed by Campbell and Cochrane (1999). We use the efficient method of moments (EMM) proposed by Gallant and Tauchen (1996). The EMM is in the same spirit as the indirect inference method proposed by Gourieroux, Monfort, and Renault (1993) and Smith (1993). This allows us not only to pin down the structural parameters of interest but alsoperform a detailed assessment of the performance of the economic model in matching observed stock returns. The estimation method is based on simulation and allows us to handle the unobserved external habit with relative ease. In a similar situation, Eichenbaum and Hansen (1990) propose that an initial guess for the unobserved variable be used and then the Generalized Method of Moments (GMM) be applied. Following this approach in our case may lead to poor estimates and statistical inference. In particular, the external habit is extremely persistent. Given the small sample size, initial conditions have a strong effect on the estimates of the other parameters. Since the EMM estimator is simulation based, we can remove the effect of initial conditions on the persistent habit process by discarding a long series of simulated realizations of returns before we start to collect the observations used in our EMM estimation. Specifically, for numerical tractability, we take a two-step approach. First, we estimate the exogenous