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Monetary policy and the cyclicality of risk ☆

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ABSTRACT

A dynamic general equilibrium model to study the relationship between monetary policy and movements in risk is developed. Variation in risk arises because households face fixed costs of transferring cash across financial accounts, implying that some households rebalance their portfolios infrequently. Accordingly, prices for risky assets respond sharply to aggregate shocks because only a relatively small subset of consumers are available to absorb these shocks. The model can account for both the mean and the volatility of returns on equity and the risk-free rate and generates a decline in the equity premium following an unanticipated easing of monetary policy.

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1. Introduction

Monetary policy primarily affects the macroeconomy through its effect on financial markets. In standard monetary models, this interaction between the financial and real sides of the economy primarily occurs through short-term interest rates, as changes in monetary policy affect the conditional mean of the short-term interest rate which in turn affects macroeconomic variables such as output, employment, and inflation. Researchers using these models typically abstract from another channel through which monetary policy affects financial markets and the macroeconomy. In particular, they do not explicitly study how monetary policy affects the conditional variances of variables or the perceived riskiness of the economy.

Interestingly, recent evidence suggests that monetary policy does affect risk, implying that standard monetary models are potentially missing an important channel through which monetary shocks propagate from the financial to the real economy. Ehrmann and Fratzscher (2004) find that an unanticipated 50 basis point tightening of the federal funds rate reduces a broad index of stock returns by 3%. Bernanke and Kuttner (2005) also find similar effects.[1] Moreover, they decompose the response of stock prices into changes in current and expected future dividends, changes in current and expected future real interest rates, and changes in equity premium. They conclude that an unanticipated easing of monetary policy that lowers real short-term interest rates has a significant effect on stock prices mainly through a reduction in the equity premium.

In this paper, we develop a DSGE model consistent with the evidence presented in Bernanke and Kuttner (2005). In particular, monetary policy affects the economy (and equity prices) not only through the standard interest rate channel, but also through its effect on economic risk. The key feature of our model is that asset and goods markets are segmented, because it is costly for households to alter a predetermined plan, allocating funds between these markets. In order to alter

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[1] Additional evidence reinforcing the influence of monetary policy shocks on equity prices include Ammer et al. (2008), and references therein.

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her plan a household has to pay a fixed cost and the optimal decision to do so is state-dependent. The presence of the fixed cost induces a range of inaction in which households do not alter their predetermined plan, and we refer to such households as inactive. Households are heterogeneous in this fixed cost, and only those households that rebalance their portfolios during the current period matter for determining asset prices (i.e., active households). Because the fraction of active household changes over time in response to both real and monetary shocks, risk in the economy endogenously varies over time.[2]

In the benchmark model, a household plan is chosen once-and-for-all at date 0. By incurring her fixed cost at date t, a household is only able to change her current transfer without updating the entire plan. This modelling approach was chosen for simplicity, since it implies that the decision to alter the plan can be represented as a static one and does not introduce additional endogenous state variables. We also consider an alternative version of the model in which the portfolio decision is a dynamic one involving a revision to current and future transfers and hence a household's entire financial plan. In this version of the model, there is lagged dependent portfolio inertia, as a household's current transfer will depend on her transfer in the previous period.

This paper is related to the literature on limited participation in financial markets in monetary economies and especially models with endogenous market segmentation such as Alvarez et al. (2002). Our framework is most closely related to Alvarez et al. (2009) who also develop a segmented market model in which exchange-rate risk moves endogenously in response to monetary policy shocks. Instead, our paper focuses on how real and monetary shocks affect risk in equity markets and how a segmented market model can deliver quantitatively reasonable implications for the equity premium and the risk-free rate.

A key element to account for these facts – and an important difference with these earlier papers – is that we allow households to set up a plan specifying the allocation of funds across their brokerage and checking accounts at future dates. Our rationale for this plan is twofold. First, for some households, it creates portfolio inertia. A household with a relatively large fixed cost will keep her transfer fixed according to a predetermined amount in response to small and average-sized shocks and only modifies her transfer in response to large shocks. Second, we show having access to the plan substantially reduces the transfer cost to the marginal household, who is indifferent between being active or inactive. Such a household has a strong desire to use the proceeds from equity markets available in her brokerage account for consumption purposes, and without access to the predetermined plan, a very large fixed cost is necessary from preventing her from doing so.

The model is consistent with evidence coming from the recent household finance literature that investors only infrequently rebalance their portfolios. In addition, there is considerable heterogeneity across households in transferring funds across accounts: Most of the households infrequently rebalance their portfolios, while a small fraction frequently rebalance. Such a heterogeneity is consistent with the evidence in Vissing-Jorgensen (2003), Ameriks and Zeldes (2004) and Calvet et al. (2009), and recently Alvarez et al. (2012). Surveys conducted by the Investment Company Institute (ICI) and the Securities Industry Association (SIA) suggest that the majority of households do not change their security holdings on a frequent basis. In addition, Brunnermeier and Nagel (2008) conclude that inertia is an important feature of household portfolio allocation.

To capture the infrequent rebalancing of portfolios, it is assumed that there are fixed costs of altering the predetermined plan. In the absence of such a plan, a traditional interpretation of these costs is that they represent brokerage fees and taxes on withdrawals from financial accounts. As emphasized in the "rational inattention" literature, infrequent adjustment could arise due to the costs of processing information about asset values and how to respond to this information. While the cost of re-optimizing and responding to new information is not explicitly modelled, we interpret the presence of the fixed transfer cost as reflecting time spent on such activities, and the predetermined plan as reflecting the savings that households stick to unless a relatively big shock occurs.[3] An example of such a plan used in practice is an automatic investment plan set up by a household to invest a fixed amount of funds in financial securities on a predetermined basis such as once a month or once a quarter.

The presence of predetermined household planning in the model reduces the consumption volatility of inactive households. By doing so, the relatively small subset of households that frequently rebalance their portfolios has to absorb most of the shocks; and hence they demand higher compensation to hold risky assets. Without predetermined plans, aggregate risk is more evenly spread out across households, resulting in average equity premium that is too small relative to the data. With the financial plan, the model has reasonable implications for the average risk premium and risk-free rate and it also generates a sizeable decrease in the equity premium following a monetary expansion. This implication is in line with the previous evidence of Bernanke and Kuttner (2005): We show that an important part of the initial response of stock prices to a monetary policy shock is due to changes in the equity premium.

[2] See Bonaparte and Cooper (2009) and Chien et al. (2012) for alternative ways of introducing costly portfolio adjustment into asset pricing models. Bonaparte and Cooper (2009) use adjustment costs on transactions and a time cost of trading that is proportional to a household's level of income to study differences between risk aversion and intertemporal substitution, while Chien et al. (2012) generate intermittent portfolio adjustment in an exogenously time-dependent manner to study the market price of risk.

[3] For models in which there is an explicit fixed cost to observing information about asset values, see Abel et al. (2009), Alvarez et al. (2012), Reis (2006), and references therein. Using household survey data, Alvarez et al. (2012) find that both an observation and a fixed transfer cost are important in accounting for the frequency at which survey participants trade securities. Finocchiaro (2011) proposes a model with infrequent planning in which consumption of attentive households is more volatile than inattentive household and this leads to more volatile asset prices. However, she does not study equity prices or monetary policy.