Inattentive consumers and international business cycles

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ABSTRACT

This paper presents and studies the properties of a sticky information exchange rate model where consumers and producers update their information sets infrequently. Introducing inattentive consumers has important implications. Through a mechanism resembling the limited participation models, exchange rate volatility observed in the data can be addressed for reasonable values of risk aversion. The model generates more persistence in output, consumption and employment which brings us closer to the data. Impulse responses to monetary shocks are hump shaped, consistent with the empirical evidence. Forecast errors of inattentive consumers provide a channel to reduce the correlation of relative consumption and real exchange rate. The decline in the correlation is quantitatively small for our benchmark model. Model generates a substantial amount of consumer forecast errors when producers are attentive and productivity shocks are persistent. This specification results in a large decline of the correlation of real exchange rate and relative consumption due to consumer inattentiveness. When trade elasticity is set to values at the low end of macro estimates or at higher values consistent with sectoral estimates, the correlation is in the negative territory with inattentive consumers.

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1. Introduction

International cyclical fluctuations exhibit two distinctive features. First, empirical evidence indicates that nominal and real exchange rates have been excessively volatile relative to major economic

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aggregates during the post-Bretton Woods period.[1] Second, the correlation between the real exchange rate and relative consumption is low or negative. These facts are hard to reconcile with standard macroeconomic theory. This paper presents a two country model with the assumption of infrequent information updating for consumers and producers. We show that sticky information on the consumer side provides a new mechanism to generate volatile exchange rates and to explain the correlation of real exchange rates and relative consumption.

Most common approach in the literature to address the exchange rate volatility is proposed by Chari et al. (2002). They exploit the positive and strict link between the ratio of marginal utilities of consumption and the real exchange rate that characterizes economies with complete markets. If risk aversion is sufficiently high, the variability of the ratio of home to foreign consumption observed in the data can correspond to large equilibrium movements in the real exchange rate. Corsetti et al. (2008a) label this strategy as "Risk Aversion Approach". However, the necessary amount of risk aversion required to address real exchange rate volatility is on the high end of business cycle calibrations.[2]

Theoretical models produce large and positive correlations between the real exchange rate and relative consumption, as the real exchange rate is tightly linked to the ratio of marginal utilities of consumption. Standard theory implies that consumption is higher wherever it is cheaper, in stark contrast with the data.[3] Real exchange rates in the data appreciate when domestic consumption is higher than foreign consumption, leading to a low and often negative correlation between real exchange rates and relative consumption. Therefore, consumption is higher where it is more expensive. This anomaly is known as Backus–Smith puzzle, and the correlation is referred to as Backus–Smith correlation.

This paper proposes a new approach to address these anomalies. We present and study the properties of a sticky information exchange rate model where consumers and producers update their information sets infrequently.[4] In our model economy, real exchange rate is linked to the marginal utilities of representative consumers when the consumers update their information sets each period. This relation is a result of the no-arbitrage condition between domestic and foreign currency bonds. When we introduce inattentive consumers to the model, real exchange rate is linked to marginal utilities of the subset of consumers who updated their information set. These agents are active participants of the bond market as they can re-optimize their consumption plans due to the arrival of new information.

Intuitively, when we consider a shock which alters the supply side in this economy, consumption plans of agents who did not receive an information update remain unchanged. The goods market is cleared by the demand response of adjusting consumers. As the probability of receiving an information update decreases, fraction of consumers who would respond to the current shocks will become lower and magnitude of the demand response for market clearing relative to the size of supply shock needs to increase. This is the key mechanism which generates the real exchange rate volatility. We observe that consumption of adjusting consumers is more volatile than aggregate consumption, and gets more volatile as we decrease the frequency of information updating for consumers. Since real

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[1] We use data for the U.S. dollar and a synthetic aggregate of the Euro-zone to quantify exchange rate volatility. Similar patterns have been consistently uncovered between the US and other major OECD countries. See Chari et al. (2002).

[2] Chari et al. (2002) set the degree of risk aversion as 5, which corresponds to an elasticity of intertemporal substitution (EIS) of 0.2. Guvenen (2006) provides a comprehensive discussion on estimates of EIS, and the implications of EIS for real interest rates and consumption. Following a simple calculation through the Euler equation, a lower bound for the real interest rate can be calculated as the product of risk aversion and the growth rate of consumption. In the U.S. data, annual growth rate of consumption is around 2 percent. If risk aversion is set to 5, this implies a 10 percent lower bound for the annual real interest rate. This result is known as the "Risk-free Rate Puzzle". Furthermore, an upper bound for risk aversion is critical for calculations regarding the welfare costs of business cycles. By using consumption data, Lucas (2003) calculates an upper bound for risk aversion as 2.5.

[3] See Backus and Smith (1993) and Chari et al. (2002).

[4] Microfoundations of sticky information models rely on the *inattentiveness* framework proposed by Reis (2006a) and Reis (2006b). Agents are subject to an information processing and updating cost; therefore they optimally choose the duration between the updates in this setup. Once they update their information set, they learn all shocks and all variables up to that date. Sticky information models assume that information updating is exogenous. Micro evidence of inattentiveness is based on the data reported in public and professional forecaster surveys. Carroll (2003) shows that public expectations follow the forecasters' expectations with a lag. Mankiw et al. (2004) report that cross-section volatility of expectations is higher when the economy is hit by a large shock, consistent with inattentiveness.