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Noisy news and exchange rates: A SVAR approach

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ABSTRACT

This paper introduces noisy news shocks into a model of exchange rate determination to measure the impact of these shocks using a SVAR. Agents in the foreign exchange market make decisions with imperfect information about economic fundamentals driving interest rate differentials between countries in that they must rely on a noisy signal of future interest rates. I apply the framework to the USD/GBP nominal exchange rate for the period 1986–2013. Results show that noisy-news explains approximately one fifth of the forecast error variance in the nominal exchange rate, with noise accounting for double (12%) that of news (6%). A historical decomposition of the exchange rate indicates that noise shocks are especially important during periods of changing monetary policy, e.g. the 1990 easing and 2001 tightening of U.S. monetary policy and the unconventional monetary policies surrounding the financial crisis of 2008.

1. Introduction

A large empirical literature exists on explaining the movements in exchange rates based on shocks to macroeconomic fundamentals (see, for example Eichenbaum and Evans, 1993; Chari et al., 2002; Scholl and Uhlig, 2008). There is, however, strong evidence that exchange rates are not driven by the same shocks that drive other macroeconomic variables: exchange rates lack the cyclical pattern of macro variables (Baxter and Stockman, 1989), have a surprisingly weak relationship with those variables'

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past and present values (Flood and Rose, 1995) and, famously, are forecast more reliably by a random walk than a model based on economic fundamentals (Meese and Rogoff, 1983, Rossi, 2013). Recent theoretical work has addressed this exchange rate disconnect puzzle by focusing on the kind information that agents use to make decisions in asset markets and in particular on news about macroeconomic conditions.

Duarte and Stockman (2005) deliver a model where news shocks lead agents to rationally update their beliefs about risk premia, leading to exchange rate behaviour that is independent of changes in macro variables. Ilut (2012), building on the models of Gourinchas and Tornell (2004) and Bacchetta and Van Wincoop (2006), models agents as ambiguity averse investors who receive noisy news about productivity. His model is consistent with the empirical regularities of delayed appreciation following an interest rate shock, a higher likelihood of large rapid depreciation or "crash risk", and momentum trading profits. While news based models of exchange rates are theoretically appealing, they entail two difficulties in identifying news shocks in the data.

News entails that agents' decisions depend on an unobservable state variable – the time lapse from when news arrived to when the shock is realised. This anticipation will be reflected in the data that agents generate. For example, pound sterling may appreciate prior, and respond less on impact, to an increase in U.K. interest rates if agents receive news. An econometrician using the set of observable macroeconomic variables, such as interest rates, exchange rates, GDP, prices and so on, will not be able to distinguish the anticipatory effects from the direct effects of shocks. This informational gap between the agents and the econometrician can be closed by increasing the information set of the econometrician using, for example, a Factor Augmented VAR (Bernanke et al., 2005).

Noise in the signal of future shocks deepens the problem: agents make decisions without knowing whether innovations will be realized (news) or not (noise). Thus even the information set of the agents is not sufficient to identify news and noise shocks. The solution pursued in this paper uses the fact that agents learn in subsequent periods whether a signal received in the past is borne out (news) or not (noise) and correct their behaviour using the signal. This correction, reflected in observables, then distinguishes past news from noise. In this way news and noise shocks are identified using past, present and future values of observables.

In the structural VAR (SVAR) literature, identification problems due to anticipation are a subset of well known problems due to insufficient information leading to non-invertible moving average representations (Sargent and Hansen, 1990; Lippi and Reichlin, 1994; Fernandez-Villaverde et al., 2007). Identification problems due to noisy news have been addressed by resorting to estimation of a fully specified DSGE model as pursued by Blanchard et al. (2009) and Barsky and Sims (2012) who, respectively, find evidence of noise and news in driving the business cycle. However, a significant cost to this estimation strategy, especially given the shortcomings of DSGE models of exchange rate determination, is the sensitivity to modelling assumptions.

The aim of this paper is to study an alternative, less restrictive, scheme to identify noisy-news shocks affecting exchange rates. I pursue a SVAR using the a scheme recently proposed by Forni et al. (2013b) to identify the impact of noisy news about interest rates on the USD/GBP exchange rate. This identification procedure involves two steps. First, SVAR identification based on standard methods to identify shocks using the agents information set.[1] Second, restrictions are imposed on the relationship between the shocks identified in the first step and noise and news shocks. These restrictions are derived from a simple model of exchange rate determination under noisy news. The restrictions are expressed as dynamic rotations of the shocks identified in the first step. This dynamic rotation makes use of Blaschke factors (Lippi and Reichlin, 1994) which result in news and noise shocks that are linear combinations of the past, present and future values of shocks from the first step. The restrictions imposed by the theory are sufficient to identify the autoregressive relationship between news and interest rates at the first step allowing identification of the appropriate Blaschke factor to use in

[1] This first step will suffer from the non-invertibility problems mentioned above given anticipation by agents. A factor augmented VAR is pursued in the empirical section to ensure sufficient information to identify shocks to the agents information set. This is tested using the procedure of Forni and Gambetti (2014) see section 5.2.