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The implications of monetary expansion in China for the US dollar☆

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ABSTRACT

We examine the influence of rapid growth in China's money supply on the US dollar within a framework of monetary models of exchange rates. We develop out-of-sample forecasts of the US dollar exchange rate using US and global data on price level, output, and interest rates, and money supply data for the US, China, and the rest of the world for the period 1996–2013. Monetary model forecasts significantly outperform a random walk forecast in terms of mean squared forecast error in the long run. A monetary error correction model with sticky prices performs best. Rolling sample analysis indicates changes over time in the influence of Chinese money supply in forecasting the US dollar. The expectation is that rapid money growth in China would increase the demand for dollars thus raising the value of the dollar, yet our forecasts are to the contrary for the mid 2000s. This is consistent with anticipation of renminbi appreciation under China's managed exchange rate, which made holding renminbi more attractive. With the break from a dollar peg in 2005 and subsequent currency appreciation, the distortion was alleviated and the forecast direction for the dollar became as expected.

1. Introduction

In this paper we examine how rapid growth in China's money supply has affected the value of the US dollar. We pursue this inquiry within a framework of monetary models of exchange rates.[1] Our focus on China is motivated by China's outsized role since the 1990s in global monetary expansion. The growing importance of China's money aggregates for global money supply is illustrated in Fig. 1. The figure shows the monthly log of M2 money supplies expressed in US dollars for China, the

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[1] Sarno and Taylor (2002) provide an authoritative review of the economics literature on exchange rates. Rossi appraises the literature on forecasting exchange rates. Chinn (2012, Chp. 2) reviews macroeconomic methods in modelling the determinants of exchange rates. Aizenman, Chinn, and Hutchison (2009) review work that considers the connections between global liquidity defined in terms of international reserves, global imbalances and reserve management.

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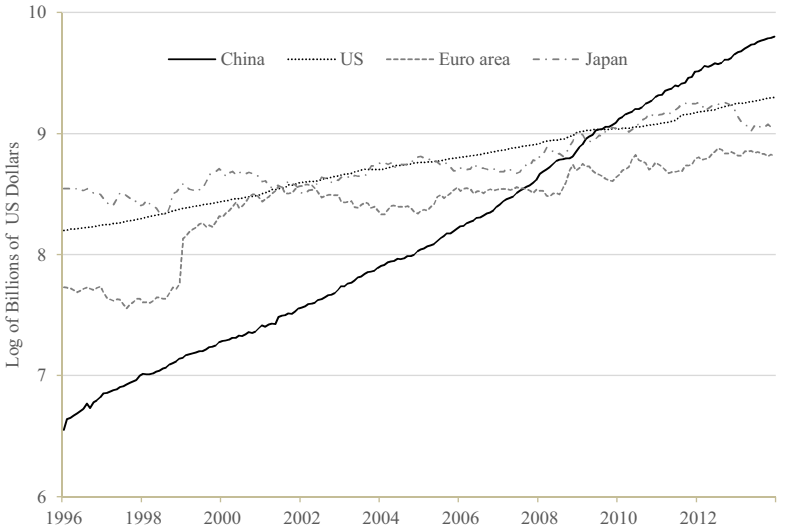

Fig. 1. M2 Money Supply, January 1996-December 2013.
Notes: The figure presents the natural logarithm of M2 money supplies expressed in US dollars in China, US, Euro area, and Japan over 1996:01-2013:12

US, the Euro area, and Japan for the period 1996:01-2013:12. By August 2009, M2 in China exceeded that of the US, the Euro area, and Japan. China's nominal M2 (in USD) increased by an average 19.6% per year from 1996 to 2013.[2]

Some of China's money growth has been absorbed by rapid growth in output and some by financial deepening. An increase in nominal GDP of 15% per year (in US dollar terms) between 1996 and 2013 certainly required monetary accommodation. However, money growth not so absorbed would be expected to push down the nominal value of the renminbi due to both increased Chinese demand for foreign goods and capital outflows as Chinese investors sought to diversify asset holdings into other currencies. The counterpart of this would to some extent be a rising nominal value of the US dollar.

Our focus is on the value of the US dollar relative to the currencies of the rest of the world rather than on a bilateral exchange rate between the US and any other country. The value of the US dollar relative to the world's other currencies is of major importance to the US and the rest of the world. Emerging economies have companies with large US dollar denominated debt. The US dollar denomination is a high fraction in international bonds (Goldberg (2011) and Lo Duca, Nicoletti, and Vidal Martinez (2014). Bruno and Shin (2015) and McCauley, McGuire, and Sushko (2015) associate appreciation of the US dollar with a decrease in bank capital flows and effective monetary tightening around the world.

Our work examining the forecast performance of monetary models of the overall US dollar exchange rate is facilitated by the availability of non-US global data in a new database, the Database of Global Economic Indicators (DGEI) of the Federal Reserve Bank of Dallas. We develop out-of-sample forecasts of the US dollar exchange rate value using US and non-US global data on price level, output, interest rates, and money supply in the US, China, and the non-US/non-China rest of the world. A monetary model with sticky prices framework significantly outperforms a random walk model in terms of out-of-sample forecasts in the long run. The best forecast from the model for the US dollar exchange rate is 60 months ahead. Monetary error correction models (ECM) with sticky prices achieve lower mean square forecast errors (MSFE) than a random walk model at horizons of 1-month ahead and beyond. The monetary model with sticky prices generates much lower MSFE than the monetary models with flexible prices.

In an extensive survey of macroeconomic models, Bauwens, Koop, Korobilis, and Rombouts (2014) show that recognition of the presence of structural changes is of crucial importance for forecasting most macroeconomic time series. For instance, Mumtaz and Sunder-Plassmann (2013) show evidence suggesting a closer business cycle co-movement of the US exchange rate and fundamentals over time. An evolving structural relationship of potential relevance in our work involves China's exchange rate management policy. Frankel (2009) shows a de-emphasis on the renminbi/US dollar value in shaping the overall value of the renminbi after mid-2007. Yoshino, Kaji, and Asonuma (2016) in this volume find sharp breaks in the imputed weight on the US dollar in a currency basket between 2005 and 2012.

Our rolling sample analysis confirms changes in the structure of the forecasting relationship. For the period 2004–2007, rapid money growth in China relative to the US forecasts decreases in the dollar at 1-month to 60-months ahead, contrary to

[2] Much recent research has concentrated on the influence of global liquidity (measured by monetary aggregates) on commodity, goods and asset prices. Beckmann, Belke, and Czudaj (2014) demonstrate that global liquidity factors influence commodity prices. D'Agostino and Surico (2009) show that change in global liquidity has predictive power for the US inflation rate. Belke, Orth, and Setzer (2010) document that increases in global liquidity since 2001 raises the price of assets inflexible in supply. Ratti and Vespignani (2015) find that unanticipated increase in emerging countries' liquidity has a much greater influence on commodity prices than does that of developed economies.

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