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Liquidity and crude oil prices: China's influence over 1996–2011 ☆

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ABSTRACT

Movement in China's money supply is shown to drive the movement in world money supply over the last fifteen years. Structural shocks to G3 (U.S., Eurozone and Japan) real M2 and to China's real M2 are both large over 1996:1–2011:12. The cumulative impact of real G3 M2 shocks on real oil prices is small and statistically insignificant. In contrast, the cumulative impact of China's real M2 on the real price of crude oil is large and statistically significant. Following a sharp fall in real oil price in the last half of 2008, the cumulative impact of China's real M2 on the real price of crude oil is particularly substantial in the recovery of oil price during 2009 from a low of $41.68 for January 2009. The analysis sheds light on the causes of movement in oil prices over the last fifteen years and in assessing the relative importance of China in the upsurge of the real price of crude oil.

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1. Introduction

The importance of oil price shocks for the functioning of the real economy is well attested. Hamilton's (1983) seminal work connecting oil price shocks with recession and economic slowdown in the U.S. has been substantiated and further investigated by Lee et al. (1995), Hamilton (1996, 2003) and Kilian (2008a, 2009) for the U.S., and by Cologni and Manera (2009), Kilian (2008b), Jimenez-Rodriguez and Sanchez (2005) and Cunado and Perez de Garcia (2005) for other countries.[2] In recent years the significance of real oil prices for real activity and the high levels real oil prices have attained increased interest on the determinants of movement in real oil prices.

This paper introduces the influence of liquidity in China and in the G3 (U.S., Eurozone and Japan) for changes in the real oil price. In the literature increases in global liquidity have been linked with increases in aggregate demand and with increases in asset and in commodity prices.[3] In parallel with analysis of the effect of rising liquidity, demand from emerging market countries is identified as an important factor influencing oil prices. Hamilton (2011) notes a 6.3% compound annual growth rate for petroleum consumption by China since 1998.[4] Kilian and Hicks (forthcoming) connect real oil price increases with strong growth forecasts in emerging economies over 2003–2008 and the decline in real oil prices after mid 2008 with forecasts of decline in global growth.

This paper examines the effect of liquidity in China and in developed economies on the real oil price by building on the framework of Kilian (2009) which identifies the supply and demand side factors driving oil prices. Barsky and Kilian (2002, 2004) argue that the channels through which monetary policy exerts its impact on commodity prices are expectations of stronger economic growth.[5] The analysis sheds light on the causes of movement in oil prices over the last fifteen years and in assessing the relative importance of China in the

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[2] Reviews of the literature on the effect of oil shocks on the aggregate economy are provided by Hamilton (2008) and Kilian (2008b).

[3] See for example Darius and Radde (2010) and Brana et al. (2012). Relaxed U.S. monetary policy conditions have been linked with high levels of global liquidity (Economist, 11 August 2005) and with domestic asset price appreciation (Taylor (2009)).

[4] Hamilton (2011) provides a review of the oil industry and analyses events influencing oil price and identifies 1997–2010 as a "new industrial age" characterized by billions of people making the transition from agricultural to industrial activity with increases in real income beyond subsistence levels. Mu and Ye (2011) do not find that China's oil imports have a significant effect on oil prices. Hamilton (2009) shows that the oil price increases during 2007 and 2008 were due to strong global demand for oil.

[5] Barsky and Kilian (2004) show that the substantial increase in industrial commodity prices that preceded the increase in oil prices in 1973–1974 is consistent with the view that rising demand based on increased global liquidity (measured by money growth in ten industrial economies) drove oil prices higher. Alquist et al. (2011) also discuss this thesis and confirm the Gillman and Nakov (2009) findings that monetary factors Granger cause oil prices in the post-war period up until 1997. Gillman and Nakov (2009) speculate that Chinese real demand caused the real price of oil to increase at that point onwards. Easy monetary policy has been linked to higher commodity prices in Barsky and Kilian (2002) and Frankel (2008), although others find no empirical support for such a relationship; see, Frankel and Rose (2010). The latter find that the oil price is determined by supply and demand for both stocks and flows of oil. The potential role for oil stocks is formally modelled by Alquist and Kilian (2010).

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upsurge of the real price of crude oil. Positive innovations to U.S., Japanese and Eurozone liquidity have an insignificant effect on the real oil price. In contrast, unanticipated increases in China's liquidity cause large statistically significant increases in real oil prices that persist. Following a sharp fall in the last half of 2008 connected with the Global Financial Crisis, real oil price rose strongly over 2009–2010. This rise is associated with shocks from China's liquidity (especially during 2009) and global demand for all industrial commodities (especially during 2010).

Results are found to be robust to a number of considerations, including whether China's real M2 continues to drive real oil price in the presence of China's real output. Incorporating country-specific industrial production into our system does not change the finding is that the G3 real M2 has a small shock effect on oil prices, while China's real M2 has a much bigger, dominating, effect on oil prices.

Background information on China's real M2 and the real M2 of other major countries is examined in Section 2. The structural vector autoregressive model for analysis of real crude oil prices and liquidity is discussed in Section 3. Data and variables are discussed in Section 4. The empirical results are presented in Section 5. Section 6 concludes.

2. China M2, global M2

The growing importance of China's money supply is illustrated in Fig. 1. In Fig. 1a the M2 money supplies in billions of U.S. dollars (USD) in China, U.S., Eurozone, Japan, the U.K. and Switzerland over

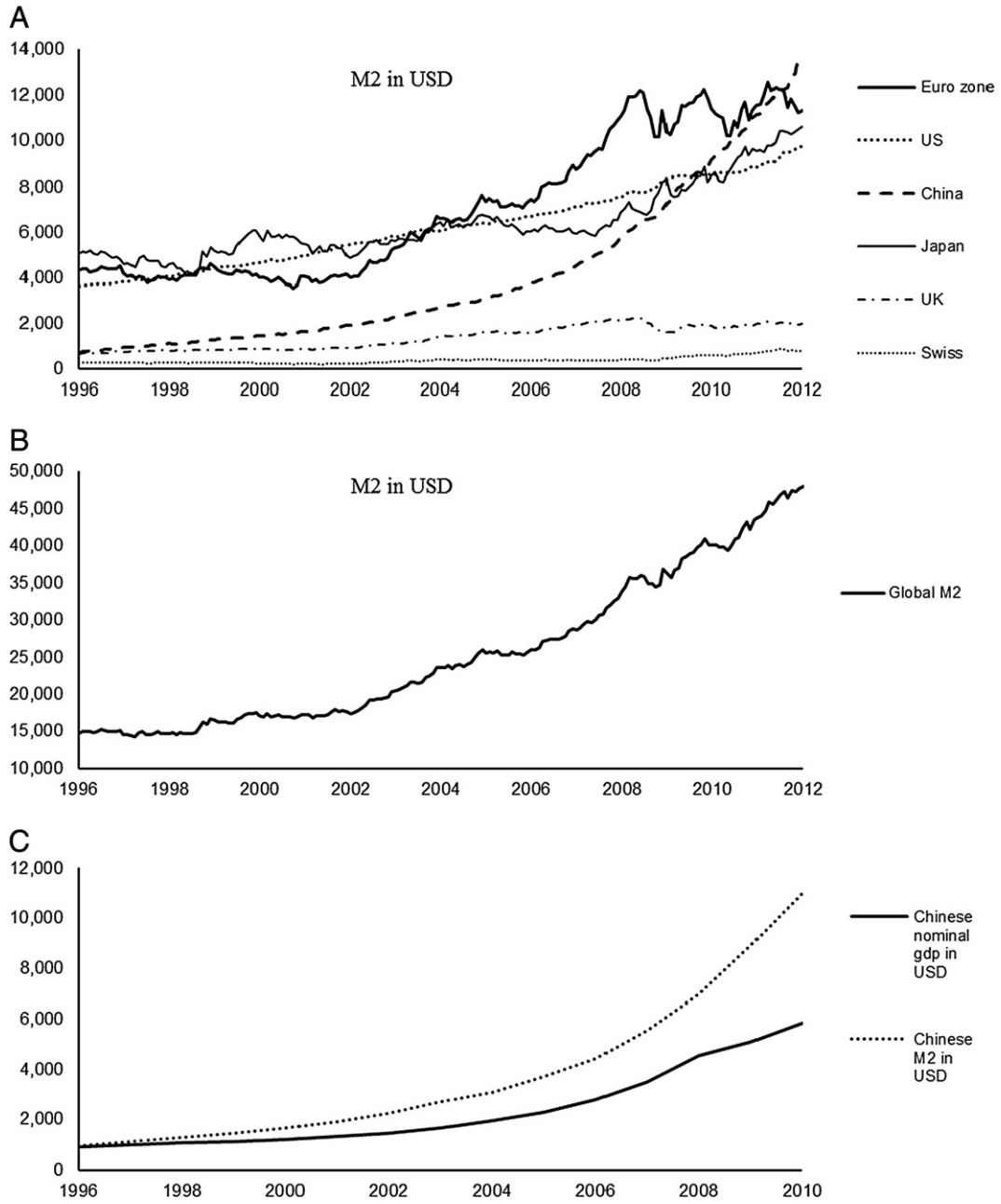

Fig. 1. A. Money supplies (billions of USD) in China, U.S., Eurozone, Japan, U.K. and Switzerland: 1996:01–2011:12. B. Global (G3 plus China) money supply in billions of USD: 1996:01–2011:12. C. China's nominal GDP (billions) and money supply (billions of USD): 1996:01–2011:12. D. Price of oil and G3 and China's money supplies (billions of USD): 1996:01–2011:12. E. G3 (U.S., Eurozone, Japan) and China Real M2: 1996:01–2011:12. Notes: Global M2 is taken to be the sum of the M2 in China and in the G3. The G3 is taken to be the U.S., Eurozone and Japan.

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