

The role of oil price shocks on China's real exchange rate

Ying HUANG ^{a,*}, Feng GUO ^b

^a *Department of Economics and Finance, School of Business, Manhattan College, Manhattan College Parkway, Riverdale, NY10471, USA*

^b *Economics Program, The Conference Board, 845 3rd Ave. New York NY10022, USA*

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Abstract

This paper investigates to what extent the oil price shock and three other types of underlying macroeconomic shocks impact the trend movements of China's real exchange rate. By constructing a four-dimensional structural VAR model, the results suggest that real oil price shocks would lead to a minor appreciation of the long-term real exchange rate due to China's lesser dependence on imported oil than its trading partners included in the RMB basket peg regime and rigorous government energy regulations. The real shocks, as opposed to nominal shocks, are found to be dominant in the variations of the real exchange rate.

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1. Introduction

China recently depegged the renminbi (RMB) from the US dollar and shifted to the system, which allows its currency to float within a very narrow band against a mixed basket of currencies from the country's major trading partners.¹ The breakdown of the fixed exchange rate system marked a watershed in the perception that maintaining a stable and competitive trade-weighted

* Corresponding author. Tel.: +1 718 862 7458; fax: +1 718 862 8032.

E-mail address: ying.huang@manhattan.edu (Y. Huang).

¹ In July 2005, The People's Bank of China announced that RMB would be kept within the fluctuation band that limits daily changes to 0.3% while allowing the operating range, and thus the frequency and extent of repositioning of that band to depend more heavily on market conditions.

real effective exchange rate (REER, real exchange rate hereafter) is a perennial policy target since its large fluctuations could be detrimental to international trade and the smooth operation of financial markets. Over the years, the RMB is widely envisioned to have been heavily regulated so that the actual path of the bilateral exchange rate would provide little information in identifying a systematic pattern, or relationship with other macroeconomic variables. Therefore, investigating the underlying forces driving real effective exchange rate variations could be particularly informative and contain practical implications for the central bank to conduct policies on its path to the next phase of currency reform in China.

At the outset, mainly two distinct sources are used to interpret the real exchange rate fluctuations: one arising from financial markets and the other from the real economy. The financial markets view is a direct implication of the “disequilibrium approach” of [Dornbusch \(1976\)](#), in which money market shocks induce excessive exchange rate volatility in an environment of sluggish price adjustment. [Chen \(2004\)](#), [Evans and Lothian \(1993\)](#), and [Frankel and Rose \(1996\)](#) echo the same argument that the transitory shocks play a significant role in driving real exchange rates. On the other hand, the real economy view expounded in the work of [Stockman \(1980\)](#) argues that real exchange rate movements are equilibrating responses to disequilibria in output markets caused by factors such as productivity, government spending, and labor supply. Several studies, such as [Bjornland \(2004\)](#), [MacDonald \(1998\)](#), and [Zhou \(1995\)](#) also document that the changes in real exchange rate are primarily due to these shocks.

However, in this vein of literature, less attention has been paid to the relationship between the real exchange rate and the real price of oil. [Amano and Norden \(1998\)](#) find a stable linkage exists between oil price shocks and the US real effective exchange rate over the longer horizon. Their findings indicate that oil prices have been the dominant source of persistent shocks on real exchange rate. [Chaudhuri and Daniel \(1998\)](#) obtain similar results, asserting that the main source of US real exchange rate fluctuations comes from the real price of oil. Other studies confirming the significant impacts on real exchange rates in developed countries from oil price shocks include [Dibooglu and Koray \(2001\)](#) and [Zhou \(1995\)](#).

The real exchange rate movements in China would actually appear to involve a complex structure, as the country moves rapidly towards a higher degree of economic integration with the world. In particular, China was the world’s second largest oil consumer as of 2004 and accounted for one third of the world incremental oil demand over 1995–2004. Looking ahead, the amount of net oil import in China is expected to grow near three-fold in the next 20 years.² Large oil price shocks could very well be the principal external factor that contributes to the variation of the real exchange rate movements.

In contrast to a large body of literature on valuation of the RMB relative to its equilibrium (e.g., [Huang & Wang, 2004](#); [Zhang, 2001](#); [Zhang & Pan, 2004](#)), no empirical work has yet been conducted explicitly so far to disentangle the role of oil price shocks from other underlying determinants driving real exchange rates in China. Hence, distinguishing oil price shocks from other macroeconomic shocks and analyzing the relative contributions of these shocks is an important task, which helps to gain further insight into the sources of past RMB movements and monitor future economic risks associated with the basket peg regime in China.

Many of previous studies explaining the effects of macroeconomic shocks on real exchange rate have relied on traditional vector autoregression (VAR) models that correspond to particular policies (e.g., [Amano & Norden, 1998](#); [MacDonald, 1998](#)), whereas the underlying sources of real exchange rate fluctuations are generally unobservable. Under the framework of [Blanchard](#)

² See US Energy Information Administration website.

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