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Land supply and money growth in China☆

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ABSTRACT

China has experienced several episodes of inflation in recent years. Popular arguments attribute these episodes to relatively high growth rates of money, which were then primarily explained by China's accumulation of foreign exchange reserves and the undervaluation of RMB. We attempt to explain China's high monetary growth rates through the supply of land. Under China's land system, the supply of land is controlled by the government and can be viewed as exogenous to the monetary system. An increase in the money supply stimulates bank loans and thereby monetary growth. Both an error correction model and a simultaneous equations model are developed to explore the effect of the land supply on monetary growth. The empirical results show that the effect of the land supply on the money supply is significantly positive and even exceeds that of foreign exchange reserves. The significance for monetary policy is that, under China's existing political economy, both the central bank and local governments should be responsible for monetary policy and price levels.

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1. Introduction

Since 2000, the average annual growth rates of M_1 and M_2 in China are 15.3% and 16.8%, respectively, both of which are much higher than the average GDP growth rate of 9.9%. The reasons for the rapid growth of the money supply in China have been discussed by many authors, and the most popular explanation focuses on China's accumulation of foreign exchange reserves. Starting in approximately 2002, China's international payment surplus climbed continuously, and foreign exchange purchases became one of the central bank's main channels for the supply of the monetary base. The rapid growth of China's foreign exchange reserves led to the expansion of the money supply and substantially changed its mechanisms. Many scholars believe that the substantial increase in the monetary base triggered by funds outstanding for foreign exchange is the major cause of the excess money supply in China, which is exacerbated by expanding bank credit (Chen, 2010). Yan and Wang (2011) argue that, before 2007, the large scale of foreign exchange greatly promoted the expansion of the money supply, while after 2007, fiscal and credit policies were the primary driving forces of credit expansion and monetary growth. Zhang (2013) examines the passive characteristic of the central bank issuing money and concludes that the continuous growth in the land supply has led to government investments and increased revenue, causing more commercial bank loans to be generated and therefore more money to be created. Deng and E (2010) also argue that bank loans, as the primary financing tool, still play an important role in the supply of money.

Nevertheless, in their research on the impact of land on the macroeconomy, Liu (2007) claim that bank credit is closely related to the land supply. Bank credit is involved in each stage of land supply and real estate development, providing banking funds for

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land, real estate development funds, and funds for housing purchases for local governments, companies, and consumers. Other researchers find that the land supply can increase the capital of institutions and individuals and can mobilize more bank credit, particularly land mortgage loans, while reductions in the supply of construction land exert a contractionary impact on bank credit.

These authors suggest that the land supply may have significant impacts on China's money growth. However, they only discuss the land supply as an idea, and no author has developed and tested hypotheses based on a formal theoretical framework or a serious econometric model to explore the role of the land supply in the growth of money. In addition, we do not know whether the land supply still plays a significant role in the growth of money when we control the channel of funds outstanding for foreign exchange. Therefore, this paper explores the following two questions on the basis of theoretical analyses: First, does the land supply in China influence the amount of money even when forex purchase amounts are controlled? Second, how does the land supply impact the amount of money in China? To answer these questions, we first use an error correction model framework to explore the long-run and short-run relationships between land supply and money supply. Furthermore, we develop a simple, formal model to explain the mechanism through which the land supply impacts China's money supply, and we stress the role of land as collateral in money creation under China's particular land system. A simultaneous equations model is then used to more carefully examine the effect of land supply on the money supply. We find that there is a long-run, positive relationship between land supply and the money supply in China. In addition, the land supply may even contribute more to the money supply than the accumulation of foreign reserves, which has been considered the heart of China's money creation mechanism.

This paper is organized as follows. We first review the land supply mechanism in China, and we analyze the relationship between the land supply and the money supply in Section 2. Then, we explore the effect of the land supply on the money supply using an error correction model and a simultaneous equations model in Section 3 and Section 4, respectively. Section 5 concludes.

2. Preliminary analysis

Before 1978, land market transactions were banned in China. Companies, organizations, and individuals could only acquire land use rights from the government through non-market-oriented land allocations (Du, Ma, & An, 2011). Over the past 30 years, however, China's land system has experienced significant change. The current system can be described as a semi-market system. The Chinese government classifies land into two main categories: farm land and construction land. Farm land is used for agricultural activities, and only construction land can be used in the industrial and service sectors. The government ultimately owns the land and controls the supply of the amount of the land, primarily construction land, in the market. In China's land system, the Ministry of Land and Resources is in charge of approving the transformation of agricultural land to non-agricultural construction land for local governments and distributing quotas of construction land among the provinces (World Bank, 2005). Municipal governments then put land on the market through a tender/auction/listing system based on their plans for land supply (Peng & Thibodeau, 2011). Manufacturing firms, real estate companies, or other organizations buy the land from the government and conduct business. Thus, China's land system implies that the land supply is actually an instrument of the government to control economic growth, similar to other fiscal policy tools. Therefore, it is reasonable to treat the land supply as an exogenous variable when we explain the money supply.

Based on the land use purpose, construction land can be divided into industrial land, real estate land, and infrastructure land. In the first three quarters of 2014, industrial land accounted for approximately 28.35% of all construction land supply, which was less than real estate land at 28.87% and infrastructure land at 42.78%. An increase in the land supply will increase the total amount of bank credit, and real estate land provides the most prominent boosting effect.

Using real estate land as an example, the supply of real estate land has important impacts on the real estate market. First, real estate investment and real estate sales are closely related to the supply of real estate land. An increase in real estate land leads to higher expenditures on land acquisition and exploitation by real estate enterprises. In addition, as a result of the always significant demand in Chinese housing market, a greater supply of real estate always triggers more sales. Second, the main source of funding for real estate investment is bank loans, which is even more important. Among all of the funding sources for real estate investment, direct or indirect bank loans account for approximately 60% (CBRC, 2005). Direct bank loans consist of land reserve loans, real estate development loans, and mortgage loans, while indirect bank loans include other funds such as equity funds and advanced project money for real estate developers. As shown in Fig. 1, during the period from 2005 to 2014, the growth rates of the land supply and real estate loans demonstrate similar trends; thus, it can be extrapolated that an increase in the supply of real estate sites can promote an increase in real estate loans.

The endogenous money theory tells us that the money supply is partly driven by credit. Rochon (2001) concludes that money is a result of the demand for credit, which allows firms to implement their spending plans, and the supply of credit is determined by the decisions of commercial banks. When financial institutions and particularly commercial banks expand their loans, more deposits are created, and the money supply increases (Tang, 2006). Thus, after the government, which is the monopolistic supplier in the land market, increases the supply of land to the market, a new round of development and investment by industrial and real estate firms takes place, and real estate purchases begin, which promote the expansion of bank loans and accordingly the creation of deposits, thus resulting in a greater money supply. As shown in Fig. 2, from 2005 to 2014, it appears that increases in the land supply were usually accompanied by increases in the money supply.

When implementing its monetary policy, China's central bank is not very effective at controlling the money supply. For example, the growth rate of M_2 always varies a certain amount from the projected target. The average deviation was 1.51% from 2000 to 2013. In addition to monetary policy, the central government also uses its land policy to regulate the economy by adjusting the construction land supply. Based on the above analysis, we hypothesize that an increase in the land supply will increase the money

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