Full length article

How strong are the linkages between real estate and other sectors in China?

Steven Chan, Gaofeng Han[*], Wenlang Zhang

Research Department, Hong Kong Monetary Authority, 55/F, 2 IFC, 8 Financial Street, Central, Hong Kong, Hong Kong

A B S T R A C T

International experience points to the critical role of stable property markets in maintaining financial stability. This paper investigates the real and financial linkages between real estate sector and other sectors. The real linkage based on input–output analysis shows that the linkages have strengthened. The financial linkages in terms of credit risk spillovers across sectors are studied by using DAG method and SVAR. We find that that credit risk in the real estate sector has large-scale spillover effects onto other sectors. Consequently, shocks to the property market could have much larger impact on the Chinese economy than suggested by headline figures.

© 2015 Elsevier B.V. All rights reserved.

1. Introduction

The real estate sector has become increasingly important to the Chinese economy. Real estate fixed asset investment (FAI) has been consistently high, accounting for around 25% of the economy's total FAI, while the share of value added generated from housing services in total value added has risen steadily from less than 4.5% in 2002 to over 5.5% in 2010 (Fig. 1). On the financial side, mortgage loans and loans to developers have accounted for an increasing share of total bank loans (Fig. 2), while the shadow banking system's exposure to the real estate sector is sizeable. For instance, real estate trusts have accounted for over 30% of total trust products in the past couple of years, while a survey by Morgan Stanley for 64 small-scale credit intermediaries including pawn shops in 2012 suggests close to 20% of credit was extended to real estate developers[1].

However, such evidence likely understates the importance of the real estate sector primarily because intersectoral linkages are not taken into account. Against this backdrop, this paper attempts to shed some light on this issue by looking at real estate sector's linkages with other sectors through real and financial channels[2]. Real linkages can be explored through

---

* Corresponding author. Tel.: +852 93819025.
E-mail addresses: swwchan@hkma.gov.hk (S. Chan), ghan@hkma.gov.hk (G. Han), wzhang@hkma.gov.hk (W. Zhang).
[1] See "Asia Insight: Informal Lending—Low Risk to the Financial Sector: Limited Impact on the Real Economy", 11 January 2012, Morgan Stanley Research.
[2] On the 3rd April 2014, the Guardian reported that, China puts railway and houses at the heart of its new stimulus measures (see "http://www.theguardian.com/world/2014/apr/03/china-railways-new-economic-stimulus-measures"). Thus, understanding the linkages between the real estate and other sectors in China is important in estimating the effectiveness of the overall "new stimulus measures".
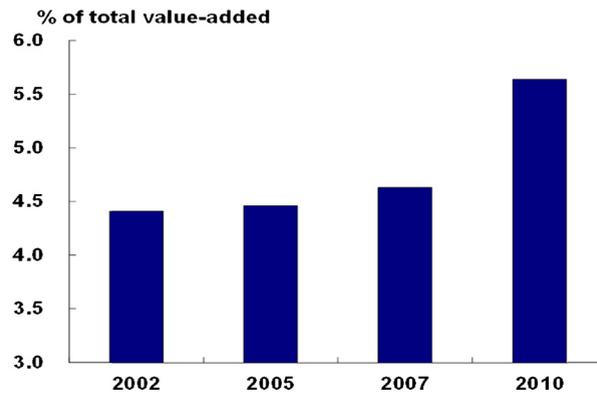
% of total value-added

Fig. 1. Share of housing service value added in total value added. *Sources:* CEIC and authors' estimates.
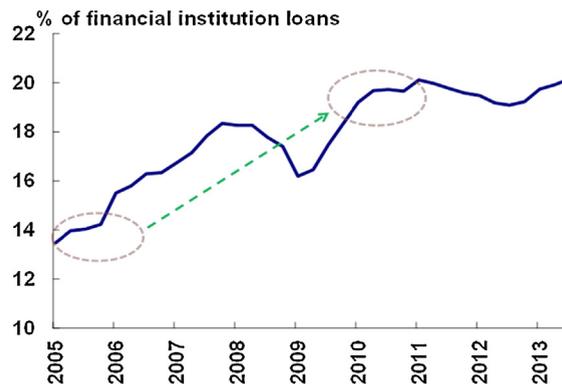
% of financial institution loans

Fig. 2. Share of property-related loans in total bank loans. *Sources:* CEIC and authors' estimates.

input–output (*I–O*) analysis, while financial linkages are more complicated[3]. There are at least three financial channels through which the real estate sector is linked with others.

First of all, shocks to the property market would affect the profitability of any sector that is vertically integrated with it and weaken its debt servicing capacity. Second, due to the fact that it is common for firms to use property as collateral to borrow, any adjustment in the property market could affect collateral values and hence debt quality. According to the International Monetary Fund (IMF), 30–45% of loans extended by the five largest Mainland banks have been backed by collateral in recent years, the majority of which is real estate[4]. Thirdly, local government debt in China has been in part supported by land sales revenue, suggesting that any property market adjustment would affect the quality of local government debt as well.

The real economy linkages are examined in a way similar to Song et al. (2008). While there are various *I–O* models and related methods that could be used to conduct such analysis, the method used here is straightforward and easy to be implemented[5]. By contrast, data constraints make it difficult to quantify the financial linkages across sectors, and we attempt to shed some light on this issue by studying the spill-overs of credit risks across sectors. There are two main approaches to modeling credit risks. One is the structural approach and the other is the reduced form approach. The former is based on option theory pioneered by Black and Scholes (1973) and Merton (1974) (henceforth the BSM model). The basic idea of the

---

[3] Financial linkages largely depend on the financial contracts being signed. In the economic literature there are several ways to model financial contracts. For instance, Hart (1995) advocates the "limited enforcement contract" (LEC) approach. Kiyotaki and Moore (1997) embed LEC in a dynamic, stochastic general equilibrium model (DSGE) and demonstrate how the fluctuations of collateral values will increase both the magnitude and persistence of business cycles. Cooley et al. (2004) show how LEC amplifies productivity shocks when firms repudiate contracts in a general equilibrium model. An alternative is the "costly state verification" (CSV) approach developed by Townsend (1979). Williamson (1987) and Bernanke et al. (1999). Both apply CSV in their general equilibrium models to simulate the effects of financial intermediation on business cycles.

[4] See "People's Republic of China: Financial system Stability Assessment", the IMF, 2011, page 17.

[5] As an application of standard *I–O* analysis to China, Yuan et al. (2010) estimate the energy consumption structure and the impact of export changes on energy consumption respectively. Extensions of a standard Leontief model include: *I–O* price models by Sharify and Sancho (2011) and Sharify (2013) which studies the effect of price shocks originating from taxation and subsidies on general prices; the *I–O* variable model by Liew and Liew (1988) applied to gauge the impact of primary input prices on industrial prices and outputs. In addition, Rose (1995) explains how *I–O* table is related to CGE models. More discussion and various applications of *I–O* table to CGE models can be found, for instance, in Dixon and Jorgenson (2012), Kehoe and Serra-Puche (1983), and Elekdag and Muir (2013). Liu et al. (2010) and Horridge and Wittwer (2008) are examples of applying such CGE models to evaluate the impact of the agricultural sector on general prices, and the regional impacts of region-specific shocks in China respectively.