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journal homepage: www.elsevier.com/locate/chiecoChina and international housing price growth[☆]Yuk Ying Chang^{a,*}, Hamish Anderson^a, Song Shi^b^a School of Economics and Finance, Massey University, New Zealand^b Faculty of Design, Architecture and Building, University of Technology Sydney, Australia

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ABSTRACT

We document Chinese effects on international residential property price growth. We show that faster growth of the housing prices is associated with larger declines in recent past growth of China's GDP, larger increases in China's savings rate, or stronger rise in China's risks. These results are consistent with the notion of Chinese investing in overseas property markets when faced with less promising investment opportunities at home and when they have the means to invest offshore. These effects are stronger for countries where English is the primary spoken language, with better tertiary education quality, and that exhibit lower correlations between local property market price growth and China's interest rate.

1. Introduction

Chinese investment in overseas property markets is widely covered in the media¹ and draws attention from governments (e.g. the Australian, Canadian, and Singaporean governments have imposed restrictions on overseas property buyers). Anecdotal evidence suggests Chinese investment is significant² and affects other countries' real estate markets, economies, and societies. It has been considered as a potential external source of turbulence (Reserve Bank of Australia, 2016) as well as a stabiliser (Rapoza, 2016 in Forbes). In 2015, the estimated global residential real estate value of US\$163 trillion is approximately double the world's gross domestic product (GDP) and comprises roughly 45% of mainstream global assets (Savills, 2016). Therefore, even a relatively small Chinese impact on other countries' real estate would represent a very large change on global asset values (see also "Maple grief", 2017 in Economist).

Real estate studies typically focus on a single country (e.g. Lai & van Order, 2010; Mian, Sufi, & Trebbi, 2015), while multi-

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* Corresponding author at: School of Economics and Finance, Massey University Manawatu, Private Bag 11 222, Palmerston North 4442, New Zealand.

E-mail addresses: Y.Chang@massey.ac.nz (Y.Y. Chang), H.D.Anderson@massey.ac.nz (H. Anderson), Song.Shi@uts.edu.au (S. Shi).

¹ For example, *Bloomberg* ("China's army of global homebuyers is suddenly short on cash", 27 January 2017), *The Economist* ("A roaring trade", 18 June 2016), *Forbes* ("The flipside of China's love for American real estate", 16 May 2016), *The Wall Street Journal* ("Chinese investors pour money into U.S. property", 25 May 2016), *Reuters* ("Why Chinese investment in overseas real estate has more than doubled", 18 August 2016), *Financial Times* ("Beijing clampdown slows China spending spree on US property", 16 May 2016), and *Bloomberg* ("Chinese buyers hungry for Canadian homes with inquiries up 134%", 14 April 2016).

² According to Juwai, a leading international real estate broker specializing in Chinese investors, Chinese spent US\$52 billion on foreign property in 2015, up from US\$10 billion three years ago. This amount is predicted to hit US\$220 billion by 2020 (see <https://list.juwai.com>).

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country studies primarily examine country-specific factors (e.g. Burnside, Eichenbaum, & Rebelo, 2016; Hott & Monnin, 2008), although general developments or global factors are also examined (e.g. Favilukis, Kohn, Ludvigson, & Nieuwerburgh, 2013). However, to our knowledge, no internationally systematic study examining the Chinese impact has been undertaken. This motivates us to explore how China affects housing markets of other countries. In particular, we investigate (a) whether China affects international housing markets, (b) which countries are more strongly affected, (c) and what conditions influence the effects.

Based on quarterly data of 23 countries primarily from 1993 to 2015, we find the real residential housing price indices' growth is significantly negatively associated with the average growth of China's real GDP in the past four quarters. In addition, it is significantly positively associated with contemporaneous changes in China's savings rate (investible funds) in the same year after controlling for common real estate explanatory variables. On average, the international housing prices increase approximately 0.23% following a 1% decrease in the China's past GDP growth. Further, a 1% increase in the China's savings rate is associated with a 1% increase in the international housing prices on average. Given the massive global value of residential real estate (Savills, 2016), even a 0.23% increase plausibly represents a very large impact on the local economy.³ Further, it is economically significant as, on average, a 1% decrease in China's GDP growth has the equivalent housing price impact as a 0.89% increase in the local country's GDP.

The GDP growth of the United States, the United Kingdom, or the aggregate of France, Germany, and the United Kingdom does not have such pervasive effects as those of China's GDP growth. We obtain qualitatively the same results when we replace China's past GDP growth with China's GDP growth forecasts, consumer confidence expectations or interest rates and China's savings rate with wealth growth. These results are consistent with the notion of Chinese investing in overseas property markets when China has less promising domestic investment opportunities and they have the means (savings and wealth) to do so. These significant relations persist when recent economic downturns are excluded or when separating the differential effect of the post-2007 period. We also obtain similar results when controlling for bubbles in China's stock and property markets. The relation with China's GDP is prevalent, but relatively stronger for residential property markets in the United States, the United Kingdom, Ireland, Australia, the Netherlands, France, Sweden, Luxembourg, South Korea, and South Africa. In addition, we find more pronounced Chinese effects when the economic risk is higher in China or when the media reports more Chinese risk/uncertainty stories.

Concerning the conditions under which these relations are stronger, we obtain the following findings. First, the relations are stronger for housing markets located in English-speaking countries. Second, there are more apparent Chinese effects in countries with quality tertiary education and local country real estate prices grow faster for China's top destinations for tertiary student migration when China is politically riskier. Finally, the investible funds effect is more pronounced in local property markets with a lower correlation with China's interest rate.

The above results primarily focus on the “incentives” for Chinese to invest in international residential property. We also consider the “feasibility” of such investment by examining the main changes to Chinese capital outflow regulations and regimes, as well as major changes to a country's real estate inflow regulations. In general, we find that the international residential housing price growth is stronger when there is major regulatory relaxation on Chinese capital inflows into overseas housing markets, and vice versa.⁴ However, we are cautious in interpreting our findings as clear evidence of the regulatory influence on the feasibility of Chinese overseas housing investments. Other confounding contemporaneous events during the regulatory changes are also likely to influence housing price growth. In addition, changes to capital flow regulations may not have desired outcomes, especially in the longer run, as flows are largely determined by underlying economic forces, for example, people will find alternative methods to circumvent those restrictions if it is in their interest to do so (Gunter, 2017).

Our work is related to two strands of research. First, we add to the literature on the effects of external factors on local property markets. Previous studies have examined immigration (e.g. Saiz, 2003), exchange rates (e.g. Rodríguez & Bustillo, 2010), foreign capital flows (e.g. Aizenman & Jinjark, 2009), foreign direct investment (e.g. Farrell, 1997), and tourism (e.g. Rodríguez & Bustillo, 2010) on local property prices. However, our study examines the impacts of investment opportunities, investible funds and the risks of a single country, China, on international housing markets.

Second, we follow the mainstream finance literature in examining factors affecting Chinese overseas property investment. In the Markowitz (1952) portfolio selection model, risk, returns, and correlations⁵ (for diversification) are the major determinants of an optimal portfolio. Numerous studies consider these determinants, including housing risk (e.g. Yao & Zhang, 2005), housing returns (e.g. Meyer & Wieand, 1996), and whether housing risk can be diversified (e.g. Cotter, Gabriel, & Roll, 2015). The literature also suggests investors prefer politically stable environments (e.g. La Porta, Lopez-De-Silanes, Shleifer, & Vishny, 1997). In addition, studies find people are inclined to invest in assets for which they have more information and with which they are more familiar (e.g. Coval & Moskowitz, 1999; Grinblatt & Keloharju, 2001; Huberman, 2001; Ivković & Weisbenner, 2005; Massa & Simonov, 2006). Economists have also long recognized the importance of information about products on consumer behaviour (Nelson, 1970).⁶ In this study, we examine the above-mentioned factors. In addition, we study whether the attractive attributes of countries matter, including quality tertiary education. Real estate studies find premiums are paid for houses in areas with quality educational institutions such as

³ In this paper, the term *local* refers to one of the 23 countries we examine.

⁴ The evidence comes from analyses of a relaxation of capital outflows for Chinese residents in 2007, a relaxation in regulations for foreigners purchasing properties in Australia in December 2008, a restriction for foreigners buying properties in Australia in April 2010, an imposition of a capital gains tax for overseas investors buying UK residential property in April 2015 and China's stricter overseas currency transfer rules in 2017.

⁵ While people may not actually make complex calculations related to theories (i.e. portfolio theory), they act as if they do (McEachern, 2011). Markowitz (1999) argues that investment diversification was well established in practice long before his seminal work in 1952 and highlights this by quoting from Act 1, Scene 1 of the *Merchant of Venice* as evidence that Shakespeare was not only conversant with diversification but also intuitively understood covariance.

⁶ Properties are also consumption products and property buyers are therefore concerned about the environments associated with properties as well.

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