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Fertility rate, inter-generation wealth transfer and housing price in China: A theoretical and empirical study based on the overlapping generation model

Eddie Chi-Man Hui [a], Xin-Rui Wang [a, b, *], Sheng-Hua Jia [b]

[a] Department of Building and Real Estate, The Hong Kong Polytechnic University, China
[b] Department of Business Administration, Zhejiang University, China

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ABSTRACT

The objective of this paper is to investigate how fertility rates impact on housing price in the mechanism of inter-generation wealth transfer in China. With a new framework consisting of the altruistic behaviors in China, an enhanced overlapping generation model is established in the paper. It attempts to figure out the yet-to-explore mechanism of the inter-generation wealth transfer and the effect of the fertility rates of different generations on housing price. The theoretical model indicates for the first time that inter-generation wealth transfer has a positive effect on housing price, and such transfer is affected by both fertility rate and housing consumption of the previous generations. An empirical study is further conducted for verifying the theoretical thinking. The results provide solid evidence that a decrease in fertility rate of the middle age generation by 1%, which in turn fuels the inter-generation wealth transfer to the younger generation, drives up housing price by 0.391%. Likewise, the fertility rate of the older generation has a similar impact, a 1% increase resulting in an increase in housing price by 0.072%.

1. Introduction

Since the overall market-oriented housing system established in 1998, the housing price in China has kept increasing year by year. The rapidly increasing housing price in China has led to extensive discussions, in aspects such as economic fluctuations (Chow & Niu, 2010), institutional changes (Hui, Liang, Wang, Song, & Gu, 2012a), regional sensitivities (Hui, Liang, Zhong, & Ip, 2015), insufficient land supply (Kuang, 2006), irrational investment (Shiller, 2015), and others. However, it is rarely mentioned that the possible effect of the behavior of early home purchase, which has become a common phenomenon in China. It was reported in 2010 by the business institutions in China that the average age of the group who had applied the housing mortgage loans for purchasing the first personal house was 27 years old in Beijing.[1] The average age in Beijing was relatively low compared to other countries or regions, such as Japan, Australia, and Canada, in which the average ages were above 30 years old.[2]

There are at least two motivations for the Chinese to purchase houses earlier than their overseas counterparts. One is the expectation of the rapid increase in housing prices. The other is marriage. The young couples in China prefer purchasing to renting houses when they get married, not only because of the cultural background in China, but also because of the so called “mother-in-law economics” and marriage squeeze (Wei & Zhang, 2011). That makes the single men with a house more competitive in the marriage market. As a result, the family with a son usually helps him with home purchase before marriage as far as possible. The behaviors of early home purchase are all the more common in China, but the housing expenses, even the down payments, are often too much to be afforded by the young couples. In this situation, most of the parents choose to help their children purchase houses with some financial assistance. Thus, an inter-generation wealth transfer happens when younger generations purchase houses. Besides, the elderly people have already built up their social network and tend to stay in their current homes (Hui, Wong, Chung, & Lau, 2014).

* Corresponding author. Department of Business Administration, Zhejiang University, China.
E-mail addresses: eddie.hui@polyu.edu.hk (E.C.-M. Hui), Sinroy@icloud.com (X.-R. Wang), jsh@zju.edu.cn (S.-H. Jia).

[1] Data source: http://gzdaily.dayoo.com/html/2013-01/22/content_2128441.htm.

[2] Data source: http://money.163.com/13/0122/07/8LQBKMG800253B0H.html.

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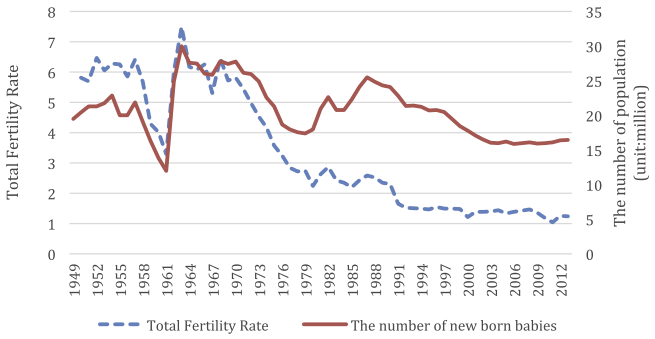

Fig. 1. The TFR and the number of new born babies in China.
Source: China Population Statistical Yearbook.

They are less likely to purchase new houses for themselves. Instead, the parents would spend more on their children's down payments. It is with this special altruistic behavior in China that the wealth of the previous generations will pass down to the housing market, thereby driving up housing price.

The inter-generation wealth transfer is related to the fertility rates of different generations. Here, we define the fertility rate of one generation as the average number of children that would be born to a woman of this generation, which can also reflect the average number of children one family has. Although China is the most populous country, the total fertility rate (TFR)[3] of all the generations has kept decreasing since the 1970s (Fig.1) because of the birth control policy. Changes in the fertility rates shaped China's demographic structure. According to Fig.1, baby boom has happened twice in China, one is undoubtedly the generation in the1960s with the highest TFR and the largest number of new born babies during the same decade, the other is the generation in the 1980s. Although the average TFR in the 1980s is relatively low, the number of new born babies during that time, especially in the period of 1985–1991, is relatively large. The form of baby boom in the 1980s indicates that the number of family is larger while the size of each family is smaller. What will such changes impact on inter-generation wealth transfer? Emery (2013) figured out that family size would influence the inter-generation financial transfers in Europe, and an only child was more than four times as likely to receive financial assistance as someone in a four-child family. That means in the case where one family has fewer children, even more wealth will be passed down to the children. Let's amplify the effect of one family to one generation. If the fertility rate of the generation is relatively low, the transferred wealth to the following generation will be larger, which builds a bridge between fertility rates of different generations and inter-generation wealth transfer. Suppose that inter-generation wealth transfer is related to housing market, thus changes in fertility rates of different generations may have an effect on housing price under this mechanism and a relatively low fertility rate may likely entail each child to obtain more money (or wealth) and bolster home purchase power. However, previous studies on demographic impacts have showed that fertility rates can influence housing price in isolation, and a higher fertility rate can generate a larger future housing demand (Mankiw & Weil, 1989; Liu, Wu, & Deng, 2011). The opposite effects are interesting but yet to explore. The role of inter-generation wealth transfer in explaining housing price should also be clearly investigated. To fill the research gap, we will build an overlapping generation model (OLG model) with the altruistic behavior of inter-generation wealth transfer and analyze the relationship between fertility rate and housing price in China. The layout of the paper is as follows. Section 2 gives a brief review of the OLG model and its application in the context of this study. Section 3 introduces a new theoretical model. Section 4 demonstrates the empirical study and its main findings. Section 5 is the conclusion.

[3] The total fertility rate measures the average number of children that would be born to a woman aged 15–49. Generally, total fertility between 2 and 2.2 means an equal from generation to generation. The population of the following generation will decrease once the total fertility rate is below 2.

2. Literature review

The idea of overlapping generations was put forward by Samuelson in 1958. Samuelson (1958) introduced an inter-temporal consumption loan model to explain the social contrivance of money. His model brought the neoclassical general equilibrium theory into the studies of macroeconomics and became one of the most important theories of modern macroeconomics. In Samuelson's model, generations overlapped at any time and lasted indefinitely into the future. Each generation lived through different periods with different endowments. One simple example was that an individual would experience two periods: the young period endowed with a perishable commodity and the old period with nothing. Due to the inter-temporal trades happened between different generations, it was feasible to build an inter-temporal general equilibrium model. Samuelson's idea sparked the following studies, for example. Diamond (1965) added production employing a durable capital good into the model to examine the optimal consumption and the capital stock in the economy with an infinitely long life. The studies of Samuelson (1958) and Diamond (1965) built the foundations of the overlapping generation model (OLG model). Since then, a vast number of studies had been conducted based on the OLG model, and the OLG model was widely used in many fields of macroeconomics, such as the studies of the business cycle (Bernanke & Gertler, 1986), the income distribution (Galor & Zeira, 1993) and the endowment insurance (Aaron, 1966).

The OLG model can be used to analyze the effects of demographic transition as well. For example, some studies focused on how population aging influenced national savings (Fougere & Mérette, 1999; He, 2006), some tried to figure out how changes in demographic structures influence the demand of assets and asset prices. Abel (2001) built an OLG model with two periods and proved that asset prices would decrease when the “baby boom” generation retired. Likewise, Geanakoplos, Magill, and Quinzii (2004) analyzed variations of demographic fluctuations and stock prices. Thus, the OLG model is a good tool to analyze the effects of demographic structure on consumptions, savings and even asset prices. Housing is not only a consumption commodity, but also an important asset in the portfolio of wealth. Researchers applied the OLG model to explain housing market as well (Ortalo-Magné & Rady, 2006; Černý, Miles, & Schmidt, 2010). Ortalo-Magné and Rady (2006) employed the OLG model to analyze the trade-up behaviors of families in different life cycles and the corresponding housing market. Cerný et al. (2010) calibrated the standard OLG model with some uncertain factors to figure out how demographic change impacted housing choices. Recently, Chinese researchers have paid much attention to this field (Shi, Fei, & Zhu, 2010; Liu et al., 2011; Chen, Li, & Zhou, 2013). Liu et al. (2011) added the demographic impact into the OLG model. The result suggested a positive effect of exogenous fertility rate shock on housing demand and then housing prices. Chen et al. (2013) believed that population aging in China would change the supply-demand relation and housing prices would decrease in the future.

When discussing the relationship between demographic transition and housing price, studies from the perspective of inter–generation wealth transfer are beneficial to better understand family behaviors (Sugawara, 2010; Coeurdacier, Guibaud, & Jin, 2014). Some researchers mentioned the effect of inter–generation wealth