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Doing well by doing good? The case of housing construction quality in China☆

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ABSTRACT

Construction quality is a major problem in China's housing market. We investigate whether the housing market could provide incentives to encourage developers to promote construction quality beyond the compulsory, minimum standards by testing the financial viability of efforts made in this field by developers. This study takes place in the city of Beijing, where the "Great Wall Award", granted by the local construction bureau, is used as an indicator of excellent performance in construction quality. Our analysis shows that, from 2005 to 2010, the transaction price in the housing resale market of a unit that received the award can be up to 7.0% higher than a similar unit that did not receive the award. This difference is due to both the higher possible rent and a lower capitalization rate. However, we find no meaningful price premium at the presale stage, while developers with a record of winning the award cannot use such reputation to obtain price premiums in later projects either. These findings indicate a mismatch between the costs and benefits that residential developers face when deciding to enhance the quality of their construction. This mismatch partially explains the current housing construction quality problems in China, and may also discourage future improvements in this field. More efforts from the government are required to correct such market failures.

1. Introduction

China's urban housing sector has developed rapidly since housing reforms in the late 1990s. Today, the largest number of new housing units in the world is produced in China (Fig. 1). According to the National Bureau of Statistics of China, 10.73 trillion m^2 of housing was completed in urban areas in 2012 in terms of floor area, with 73.7% contributed by the private housing sector. Accordingly, the per capita living space for urban households in China has increased from about 20 m^2 in 2000 to over 32 m^2 in 2012.

However, despite the substantial increase in the quantity of housing units, the quality of housing, especially construction quality, remains a major concern in China. According to China's Consumer Association, construction quality complaints are the most common issue among complaints about real estate development. Although most of these complaints concentrate on relatively "minor" defects such as leaking roofs, they still have a significant effect on the quality of life of the residents. In addition, construction quality is one of the major factors that determine the resilience of residential buildings to accidents, such as fires or explosions, and natural disasters, like earthquakes. After the Wenchuan earthquake in 2008, many researchers pointed out that the losses and number of deaths in the earthquake could have been significantly reduced if the overall construction quality in that area had been of a higher standard.[1] Finally, in some extreme cases, shoddy construction might directly cause great damage. As a latest example, on April 4, 2014, a 5-story residential building in Ningbo, Zhejiang Province, which was completed in 1994, crumbled to the ground, killing one resident and badly injuring several others.[2]

In addition to its direct impact on individual residents, the overall quality of construction in China's housing sector could indirectly but severely affect global sustainability. According to official estimates by the Ministry of Housing and Urban–Rural Development, the average life expectancy of residential buildings in China is only 25–30 years,

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[1] Among others, see Chen and Qian (2008) as an example for reviews of related research.

[2] See the report from China Daily (http://www.chinadaily.com.cn/china/2014-04/04/content_17407305.htm) for more details about this accident, as well as a summary of recent building collapses in China since 2009 (http://europe.chinadaily.com.cn/china/2014-04/04/content_17409025.htm).

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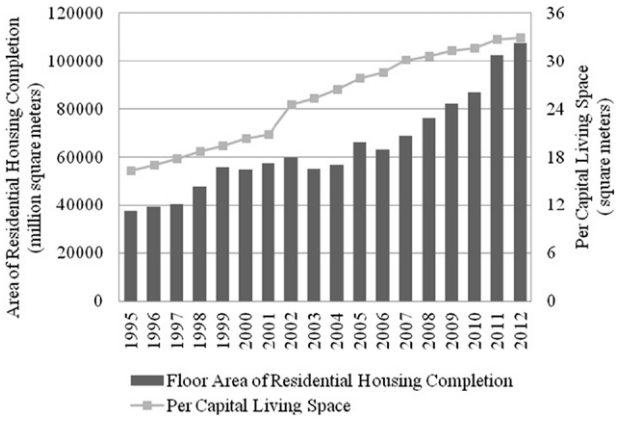

Fig. 1. Floor area of residential housing completions and per capita living space in urban China.
Source: National Bureau of Statistics.

less than half that of most developed countries.[3] Building construction and demolition consume a significant amount of raw materials and energy, and also substantially contribute to the production of carbon emissions and solid waste (Hendrickson & Horvath, 2000; Raymond & Kernan, 1996). The short life expectancy of the majority of Chinese residential buildings, which is at least partially due to poor construction quality, means that the environmental impact of building and demolishing them will largely offset China's other efforts in improving its sustainability.

Therefore, improving the construction quality of new residential buildings has become a major priority in the future development of China's real estate and construction industries. So far, most efforts have emphasized ensuring minimum levels of construction quality, such as construction quality inspections by government-sponsored institutes, or surety bonds/insurance of construction quality. In this study, by contrast, we focus on whether the housing market itself can provide enough incentives and encourage developers to spend additional efforts to promote construction quality beyond the minimum, compulsory standards. The key issue here is the financial sustainability of developers in pursuing outstanding construction quality: if dwelling units with extraordinarily good construction quality could be recognized and rewarded with a statistically and economically meaningful price premium in the market, which is large enough compared with the additional costs that the developers incurred, then they will have enough financial incentives to continue doing so. This kind of market mechanism has been shown to be effective in several other fields. A well-known example is the positive expected return that is thought to have driven the rapid development of green buildings in the past few years in several major economies (Eichholtz et al., 2010; Kok et al., 2011). If we can find evidence of a positive return associated with outstanding construction quality in China's housing market, a continuous improvement in housing construction quality in the near future can be expected, which might be even more important than government mandates.

While it is difficult to get enough micro-level data to directly calculate and compare the return rates associated with residential buildings with different levels of construction quality, we choose to test two preconditions for the effectiveness of such market mechanisms. First, a reliable signal indicating the construction quality of residential buildings should exist and be widely accepted by market participants, thus guaranteeing a price premium. Housing is a typical example of an experience good, whose quality is difficult to be directly observed or investigated in advance, but can only be tested gradually upon consumption (Nelson, 1970; Shapiro, 1983). In particular, the effects of some aspects of housing construction quality can only be revealed after a long period of occupancy, via their performance during disasters like earthquakes, or thorough inspections by professionals. The literature has pointed out that, for such experience goods, consumers need to rely on market signals such as price distortions, certifications, advertising, or warranties to distinguish their quality; therefore, a positive signal would typically be granted with a substantial price premium (Palfrey & Romer, 1983; Tirole, 1988).

Kain and Quigley (1970) provided the first attempt in the context of housing to evaluate the quality of dwelling units based on survey data, and conclude that some factors have significant effects on housing rental prices. Wieand (1983) uses data from the Annual Housing Survey to calculate the probability-to-defect ratio as a proxy of housing quality, and shows that housing quality is important in affecting rentals. Chen and Rutherford (2012) suggest that time-on-market, or the length of time a house takes to be sold, can serve as a signal of housing quality, although they do not directly test its effect on housing prices. Ooi et al. (2014) used the CONQUAS scoring metric in Singapore to measure housing construction quality, and find a significant premium for good workmanship quality in the new sale, sub-sale and resale housing markets.

The second precondition is that the price premium, if it exists, should be large enough to offset the additional costs of increasing construction quality.[4] At the very least, the party that is burdened with the additional costs should be rewarded with benefits from the price premium; otherwise a mismatch problem could occur. A similar mismatch problem was documented in the green housing market in Singapore by Deng and Wu (2014). Their empirical analysis pointed out that while developers have to pay most of the additional costs, they only obtain a small portion of the associated benefits since the price premium mainly come from the resale stage, which substantially discourages further development of green housing in Singapore. A similar mismatch problem may also exist in China. Currently, most new dwelling units in China are presold before completion, when developers find it difficult to claim any construction quality premium since the buildings are still under construction and their quality cannot be directly assessed. Potential alternatives through which developers can enjoy the benefits include committing to outstanding construction quality in advance to seek a premium during the presale stage, or taking advantage of the reputation around good construction quality to build a premium into future development projects (Chau et al., 2007). However, the effectiveness of such strategies remains an open question and can only be tested via empirical tests.

In this study, we use the capital city of Beijing in China as the example to test these two preconditions. The Great Wall Award (GW award), which is awarded by the local housing and construction authority in Beijing, is adopted as a signal of outstanding performance in construction quality. This award was introduced in 1997, and has been granted annually since 1999 to recently-completed construction projects with extraordinarily good construction quality.[5] Taking advantage of several unique datasets, we are able to merge the award data with micro-level transaction data in both the presale and resale sectors,

[3] Source: speech of Baoxing Qiu, Vice Minister of Ministry of Housing and Urban–Rural Development, in the Sixth International Conference on Green and Energy-Efficient Building in 2010.

[4] In the literature of quality management of construction projects, it is widely accepted that, besides contractors and consultant engineers, owners also play a key role in achieving high construction quality, by choosing contractors with better records in quality performances, setting higher and more specific quality requirements in the contracts, providing more daily quality inspections on site, etc. The owners, or housing developers in our case, typically need to pay additional efforts or expenses accordingly. See the review of Gransberg and Molenaar (Gransberg & Molenaar, 2004) and Kagioglou, Cooper and Aouad (Kagioglou et al., 2001) for example for more details.

[5] The "Great Wall Award" was firstly introduced in 1997, but at the beginning there was no standard assessment criteria. The formal evaluation standard was issued in 1999, and the evaluation exercise and award have been conducted annually since then.