Urban housing demand, permanent income and uncertainty: Microdata analysis of Hong Kong's rental market

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ABSTRACT

The sensitivity of housing demand to income changes has important implications for the evolution of housing affordability and the behavior of urban households. In Hong Kong, investigations into this issue have shown the increasing importance of the private rental housing market, which is regarded as suboptimal and to contribute to gentrification and inequality problems. Using microdata from four waves of Hong Kong census data between 1996 and 2011, this paper aims to estimate the income elasticity of demand for private rental housing. A permanent income model was adopted to isolate permanent income and transitory income at household level. Then, the Heckman two-stage procedure was used to correct selection bias and the quantile regression (QR) approach was used to investigate the heterogeneity of demand elasticities across different tiers of housing expenditure. The empirical results showed that the permanent income elasticities fell within a range of 0.536–0.698 and transitory income shock had a positive and significant impact on the demand for rental housing. Moreover, a U shape of permanent income elasticity across the whole distribution of housing expenditure was revealed. Households in both the upper and lower tiers were more sensitive to permanent income changes, with the higher tier of households being more sensitive to transitory income shocks. These findings not only shed light on the long-term movement and cross-sectional heterogeneity of housing demand in the private rental housing market, but also have implications for studies of the rental housing demand in other developed cities.

1. Introduction

The sensitivity of housing demand to changes in income is a crucial factor in the functioning of the housing market. It determines the extent to which households would adjust their housing consumption in responsiveness to income shocks. Typically, a change in housing consumption by households would relate to a shift in the market structure. For individual households, changes in housing consumption would result in changes in the consumption of non-housing goods, participation in local amenities, and investment in social capital (Teck-Hong, 2012). Thus, the income elasticity of demand has important implications for key outcomes from the housing market, including price dynamics (Tsai, 2013), housing affordability (Tsai & Peng, 2011), and the distribution of welfare (Zhou, 2011). Moreover, the income elasticity of demand also has been long recognized as an important policy parameter (Ahmad, Choi, & Ko, 2013; Friedman & Weinberg, 1981).

In Hong Kong, a combined analysis of the income elasticity of demand and the ordinary private rental housing (OPRH) market has shown their increasing importance. Over the past two decades the city

has developed rapidly and become more open to the outside world. This has been accompanied by the influx of higher-income households, escalation of rents and property values, economic transformations, and financial crises (La Grange & Pretorius, 2016). Several scholars have studied the role of OPRH in mediating the income variations and uncertainty facing households. Kemp (2011), Rosenthal (2014), and Kitzmann (2017) find that the OPRH markets in London and Berlin have functioned effectively in coping with the changing demand of households. Hulse, Reynolds, and Yates (2014) report that a quarter of Austrian households reside in the OPRH sector, and a considerable number of OPRH families are not from lower income groups. An emerging viewpoint is that the OPRH has become a more mainstream option to house both the urban poor and the insecure rich (e.g., new higher-income immigrants) (Yip & La Grange, 2006). However, in comparison with OPRH markets in other parts of the world, the Hong Kong OPRH market has been described as suboptimal or even residual in certain urban neighborhoods (La Grange & Pretorius, 2002, 2016). It is very probable that the low performing OPRH market in Hong Kong has contributed to problems such as gentrification and inequality (La

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Grange & Pretorius, 2016). The Hong Kong Government is trying to apply policy instruments to the OPRH market to meet the need for shelter and urban services, particularly for low and middle-income groups (Hui, Zhong, & Yu, 2015; Raco & Street, 2012). Nevertheless, any market intervention must be cautiously implemented and, ideally, informed by an understanding of the market traits and market behaviors of households (Friedman & Weinberg, 1981). Thus, information about the OPRH in Hong Kong is urgently needed to identify opportunities for improvement.

To demystify the OPRH in Hong Kong, in this study we aimed to determine the responsiveness of household demand for rental housing services with changes in permanent and transitory income. Based on long-term microdata from four waves of Hong Kong's population census taken in 1996, 2001, 2006, and 2011, we first decomposed household current income into a permanent and transitory income shock by regressing the current income against human capital (e.g., education level, experience) and non-human capital (e.g., mobility) variables, and used the predicted value and residual of household current income as proxies for permanent and transitory income, respectively. Then we estimated and compared different types of income elasticities, addressed the potential sample selection bias by the Heckman two-step selection method, and explored the heterogeneous effects of income on rental demand along different quantiles of housing expenditure.

This study contributes to the existing body of housing demand literature by investigating the income elasticity of the Hong Kong OPRH market. Compared with owner-occupied housing and OPRH in western cities and mainland China, the OPRH in Hong Kong has not been as well researched (Yip & La Grange, 2006). While previous researchers (La Grange & Pretorius, 2002 and, 2016; Yip & La Grange, 2006) have studied OPRH and the associated gentrification in Hong Kong, their studies suffer from an absence of quantitative analysis. Earlier studies (Chou & Shih, 1995; Tse & MacGregor, 1999; Tse & Raftery, 1999) describe the Hong Kong OPRH market empirically, but are somewhat dated and do not go very far in demystifying the OPRH market to contemporary policymakers and interested researchers. Additionally, most of these studies use aggregated time-series data rather than a population census survey to estimate rental housing demand, which might not fully reflect the cross-sectional features and distribution of renters.

The remainder of the paper includes the following sections: a review of the literature; a longitudinal overview of OPRH development in Hong Kong; the theoretical framework; a description of the empirical strategy and presentation of the results; and a discussion of the research implications and conclusions.

2. Literature review

2.1. Permanent income, transitory income, and housing consumption

The relationship of "income to consumption" is a critical issue in economics. The traditional view is that consumers would rapidly translate changes in their current income to changes in consumption (Hall & Mishkin, 1980). Therefore, housing consumption is not very susceptible to observed changes in current income. Friedman (1957) argues that consumers would maximize utility over their lifetime and hypothesizes that in relation to "income to consumption", the concept of income should be represented as permanent income rather than current income. According to this theory, households would estimate their long-term consumptive ability and then set the current housing consumption level at a level appropriate to that estimation. The observed current income and housing consumption consist of both the permanent and the transitory components (Lee, 1968).

Since the 1960s, the use of current income in an analysis of housing consumption has become open to the criticism that current income

might not reflect the long-term resources of a household for consuming housing services. Instead, the permanent income theory has become a widely accepted theoretical foundation for problems relating to housing consumption (Mayo, 1981). In these analyses, researchers have endeavored to measure permanent income or its appropriate proxies. The methods used include the use of lagged income as instrumental variables (Lee, 1968), the use of an average income over several years (Friedman & Weinberg, 1981), the use of auxiliary regression (Mayo, 1981), and the regression of presumed determinants of permanent income (Goodman & Kawai, 1982).

In some housing consumption studies, only the permanent component of income has been emphasized. Researchers adopting this view have attempted to remove bias from the transitory income using the median values for specific cities, which average out the transitory components (de Leeuw, 1971) or by grouping neighborhood observations as proxies for permanent income (Wilkinson, 1973). Carliner (1973) also focuses on permanent income, but argues that an actual measure of individual household income would be far preferable to the use of grouped data.

In contrast, Goodman and Kawai (1982) propose that the transitory income could also have an impact on housing consumption and should be included in the housing consumption function along with the permanent income. Goodman and Kawai (1982) argue that an important reason why households might maximize lifecycle utility from intertemporal housing consumption is the perfection of capital markets; however, the capital market is not that perfect and households are not always able to borrow against their expected lifetime earnings. In this case, transitory income might be used to meet the current housing demand that otherwise cannot be fulfilled by permanent income.

Moreover, the separation of transitory income from permanent income has been used by many researchers to capture the income uncertainty facing households (e.g., Blundell & Preston, 1998; Chamberlain & Wilson, 2000). Income uncertainty is known to influence housing consumption factors, such as the probability of owing, lifecycle home-purchase decisions, and preferences for housing attributes. Robst, Deitz, and McGoldrick (1999), Diaz-Serrano (2005), Zhou (2011) and many other researchers all report significant effects of income uncertainty on housing demand. Given the impact and importance of both permanent income and transitory income, we consider these two income components jointly in this paper.

2.2. Income elasticity of housing demand

Research on the income elasticity of housing demand has a distinguished history, starting from estimations of the demand elasticity with respect to current income before the 1950s. Lee (1968), who is among the earliest researchers to test Friedman's (1957) permanent hypothesis against housing market data, obtains the cross-sectional elasticities, ranging from 0.458 to 0.892, based on a successive survey in the U.S market between 1960 and 1962, in which renters have lower permanent income elasticities than owners. Following Lee (1968), many researchers are conducting research on permanent income and housing demand. The research, empirical for the most part, covers a wide geographical area including the western democracies, Eastern Europe (prior to 1989), and Asia. Both housing demand and permanent income are subjects of disagreement, principally centering around problems of how statistical variables are defined, the functional form of equations (linear, log-linear, or non-linear), the unit of observation (e.g., individual households or averages of grouped households), and the analytical techniques used (Diaz-Serrano, 2005; Haurin & Gill, 1987; Wilkinson, 1973; Zabel, 2004).

With so many methods used for measuring the permanent income and housing demand, it is not surprising to find many inconclusive or even contradictory results (Chen & Jin, 2014). Despite the divergence of