



Munich Personal RePEc Archive

The Nexus between Visitor Arrivals and Residential Property Rents in Hong Kong

Chong, Terence Tai Leung and Yiu, Alex Wing-Ho

The Chinese University of Hong Kong, The Chinese University of Hong Kong

1 July 2017

Online at <https://mpra.ub.uni-muenchen.de/80531/>
MPRA Paper No. 80531, posted 02 Aug 2017 09:34 UTC

The Nexus between Visitor Arrivals and Residential Property Rents in Hong Kong

1/4/2017

Terence Tai-Leung CHONG¹

Lau Chor Tak Institute of Global Economics and Finance and Department of Economics,
The Chinese University of Hong Kong
and

Alex Wing-Ho YIU

Department of Economics, The Chinese University of Hong Kong

Abstract

Cost of living in Hong Kong is among the highest in the world. This paper investigates the effect of tourist arrivals on the residential property market in Hong Kong. It is demonstrated that the soaring number of tourists from mainland China is pushing up property rents in Hong Kong. The substantial accommodation need generated by the increasing number of students from China is another contributing factor.

Keywords: Residential property rent; Retail property rent; Instrumental variable

¹ We would like to thank Travis Ng and Sunny Kwong for helpful comments. All the remaining errors are ours. Corresponding author, Terence Tai Leung CHONG, Department of Economics, The Chinese University of Hong Kong, Shatin, N.T., Hong Kong. Email: chong2064@cuhk.edu.hk
<http://www.cuhk.edu.hk/eco/staff/tlchong/tlchong3.htm>

1. Introduction

The high residential property prices and rents in Hong Kong have attracted worldwide attention.² The median price for a flat in Hong Kong is 17 times of its gross annual median household income, the highest recorded price in the survey's eleven-year history. The city has also topped the list for five consecutive years. This phenomenon motivates many researchers to examine the factors pushing up property prices in Hong Kong. In addition to housing prices, retail property rents have been increasing over the period from 1998 to 2014, which might be caused by the growth of retail sales attributed to the inflow of visitors. To better understand the residential property market in Hong Kong, this study helps to identify other factors that affect the movement of residential rents. We examine the effect of visitor arrivals on retail and residential rents, with a primary focus on property rents rather than property prices, as the latter are more likely to be influenced by speculative activities. In particular, we test the hypothesis that inflows of tourists have positive effects on retail rents, thereby increasing the value of land that accommodates both retail shops and residential suites.

The increased visitor arrivals may affect the residential rent in many ways. For example, flat owners might renovate flats for commercial use when commercial rental values of nearby properties have increased. In Hong Kong, this type of conversion is often permitted in the buildings with fewer floors. These retail stores are called "upstairs shops". Such conversion reduces the number of houses for dwelling purposes, increasing residential rents. Flat owners might also raise the residential rents directly to compensate for foregone income from not renting out the properties for commercial use. Property developers will purchase residential buildings for redevelopment, which also curtails residential supply. Moreover, official statistics reveal that more and more students from mainland China are crowded into Hong Kong. As a

² According to the *Demographia International Housing Affordability Survey* by Cox and Pavletich (2015), Hong Kong was classified as the most unaffordable city to buy a flat among 378 markets in nine countries.

result, students have to live off-campus since the number of hostels offered by universities is insufficient. Therefore, this paper will also examine the effects of the inflow of non-local students on private housing rentals.

In this paper, the relationship between the retail property market and the number of visitor arrivals is studied along with other influencing factors. The controlled variables are local consumption expenditure, interest rate, construction costs, and floor area of new commercial buildings. If the relationship is significant, then the number of visitor arrivals can be used as an instrument to study the effect of the retail property market on the residential property market. The causal relationship between retail rents and housing rents is studied through the number of visitor arrivals, with the variables of interest being the rents of small/medium-sized flats³. Luxury flats are not included because they are typically too far away from retail shops for land value to be reflected. The relationship with the controlled variables is tested with geographical considerations in Hong Kong.

The remainder of this paper is organized as follows: Section 2 reviews the literature. Section 3 presents the methodology and empirical results. Section 4 discusses the findings, and Section 5 concludes the paper.

2. Literature Review

The macro-determinants of residential property values in Hong Kong have been discussed in several studies. Peng (2002) suggests that macroeconomic and monetary conditions, demographic developments, government housing policies, and speculative activities influence property prices. Leung, Chow, and Han (2008) find that GDP per capita, real interest rate, land

³ In this paper, a small/medium-sized flat is defined as a flat with a saleable area less than 100 square meters, whereas a unit with a saleable area of 100 square meters or above is classified as a luxury flat.

supply, and the residential investment deflator are long-run determinants, whereas equity price is a short-run determinant. Craig and Hua (2011) mention that real incomes, real domestic credit, construction costs, land supplies, and real interest rates explain the rapid rise in property prices. Leung and Tang (2012) discuss how financial crises affect real estate markets in Hong Kong, along with Chang, Chen, and Leung (2013) showing that unexpected changes in the United States stock market can cause a significant impact on Hong Kong housing returns using a regime-switching model. Kwan, Leung, and Dong (2015) develop several consumption-based asset pricing models to improve the accuracy of predictions on housing returns. Leung and Tang (2015a) use Granger causality tests and vector autoregressive modelling techniques to demonstrate that initial public offerings (IPOs) of Chinese firms in the Hong Kong stock market influence property prices. Leung and Tang (2015b) suggest that short supply in both the public and private housing markets drives up property prices in Hong Kong. With regard to the macro-determinants of retail property values, Tsolacos (1995) and D'Arcy, McGough, and Tsolacos (1997) recognise the effects of GDP and consumer expenditure on retail rental values in the United Kingdom and some European cities. While the case in Hong Kong is seldom discussed, retail sales are widely believed to affect retail rental levels. Cheung (2013) argues that expenditure by Mainland visitors is a significant contributor to the retail sales in Hong Kong, which has led to the recent growth of shop rents⁴.

Several studies examine the relationship between tourism and the economy. Balaguer and Cantavella-Jordá (2002) apply cointegration and causality tests to investigate the causal relationship between tourism development and economic growth in Spain. Kim, Chen, and Jang (2006), as well as Chen and Chiou-Wei (2009) study this relationship in Taiwan. Tugcu (2014) analyses this relationship in European, Asian, and African countries that border the

⁴ See Financial Secretary's Office (2013).

Mediterranean Sea. Narayan, Sharma, and Bannigidadmath (2013) examine the forecasting capacity of number of visitor arrivals on macroeconomic variables in Pacific islands.

3. Empirical Analysis

3.1 Variables and Methodology

The data used in the study covers from 1998 Q3 to 2014 Q2. Equation (1) shows the model of the relationship between the number of visitors and real retail rent. Equation (2) shows the model of the relationship between real retail rent and real residential rents. The controlled variables are factors affecting demand and supply for retail property and residential property respectively.

$$\begin{aligned}
 &RetailRent_t \\
 &= \alpha_0 + \alpha_1(Visitor_t) + \alpha_2(Consum_t) + \alpha_3(InterestRate_t) \\
 &+ \alpha_4(BuildingCost_t) + \alpha_5(NewRetailArea_t) + \varepsilon_t
 \end{aligned} \tag{1}$$

where

RetailRent denotes real retail rent.

Visitor denotes number of visitors.

Consum denotes real household consumption expenditure.

InterestRate denotes real best lending rate.

BuildingCost denotes real building works tender price.

NewRetailArea denotes new retail internal floor area.

$$\begin{aligned}
 &Y_t \\
 &= \beta_0 + \beta_1(RetailRent_t) + \beta_2(Payroll_t) + \beta_3(InterestRate_t) \\
 &+ \beta_4(Household_t) + \beta_5(NewHouseArea_t) + \beta_6(BuildingCost_t)
 \end{aligned} \tag{2}$$

+ ϵ_t

where

Y denotes *FlatRentMassHK*, *FlatRentMassKL*, or *FlatRentMassNT*.

FlatRentMassHK denotes real residential rent in the mass segment⁵ of Hong Kong Island.

FlatRentMassKL denotes real residential rent in the mass segment of Kowloon.

FlatRentMassNT denotes real residential rent in the mass segment of the New Territories.

Payroll denotes real payroll index.

Household denotes number of domestic households.

NewHouseArea denotes new residential usable floor area.

In Equation (2), the number of visitors is treated as an instrumental variable for real retail rent.

A valid instrumental variable should satisfy the following conditions:

Condition 1: It is correlated with the endogenous variable, real retail rent.

Condition 2: Its effect on the dependent variable should work exclusively through the endogenous variable.

Since the number of visitors might affect the dependent variable via other channels, the following variables are controlled for in addition to the variables suggested in Equation (2).

Real average achieved hotel room rate for all hotels (*HotelRoomRate*);

Hotel room occupancy rate for all hotels (*HotelOccRate*);

Real office rent (*OfficeRent*);

⁵ The residential units categorized in the mass segment have saleable areas less than 100 square meters, whereas the units with saleable areas of 100 square meters or above are categorized in the luxury segment.

Real factory rent (*FactoryRent*);
Real oil price (*OilPrice*);
Real effective exchange rate index for the Hong Kong dollar (*ExchangeHKD*);
Hang Seng Index in real term (*HSI*);
MSCI All Country World Index in real term (*MSCI*);
Real GDP in China (*ChinaGDP*).

The Phillips and Perron test results show that most variables are not stationary. Thus, they are transformed by either log-difference or first-difference. This modification is shown in Equations (3) and (4), where “ Δ ” is the first difference operator and “ \ln ” is the natural logarithm operator.

$$\begin{aligned}
& \Delta \ln(RetailRent_t) \\
& = \alpha_0 + \alpha_1 \Delta \ln(Visitor_t) + \alpha_2 \Delta \ln(Consum_t) + \alpha_3 \Delta(InterestRate_t) \\
& + \alpha_4 \Delta \ln(BuildingCost_t) + \alpha_5 \Delta \ln(NewCommArea_t) + \varepsilon_t
\end{aligned} \tag{3}$$

$$\begin{aligned}
& \Delta \ln(Y_t) \\
& = \beta_0 + \beta_1 \Delta \ln(RetailRent_t) + \beta_2 \Delta \ln(Payroll_t) \\
& + \beta_3 \Delta(InterestRate_t) + \beta_4 \Delta \ln(Household_t) + \beta_5 \Delta \ln(NewHouseArea_t) \\
& + \beta_6 \Delta \ln(BuildingCost_t) + \beta_7 \Delta \ln(HotelRoomRate_t) \\
& + \beta_8 \Delta \ln(HotelOccRate_t) + \beta_9 \Delta \ln(OfficeRent_t) \\
& + \beta_{10} \Delta \ln(FactoryRent_t) + \beta_{11} \Delta \ln(OilPrice_t) \\
& + \beta_{12} \Delta \ln(EffectiveExchangeHKD_t) + \beta_{13} \Delta \ln(HSI_t) \\
& + \beta_{14} \Delta \ln(MSCI_t) + \beta_{15} \Delta \ln(ChinaGDP_t) + \varepsilon_t
\end{aligned} \tag{4}$$

where Y denotes *FlatRentMassHK*, *FlatRentMassKL*, or *FlatRentMassNT*.

Equation (3) is estimated by ordinary least squares (OLS) regressions, whereas Equation (4) is estimated by two-stage least squares (2SLS) regressions. Heteroskedasticity and autocorrelation consistent (HAC) standard errors of Newey and West (1987) are used in both regressions. The instrumental variable $\Delta \ln(Visitor)$ is proposed to study the effects of $\Delta \ln(RetailRent)$ on the explained variables in Equation (4). To verify if the instrument is weak in each case, the F-statistics of the instrument reported in the first stage of 2SLS regressions are compared with the Staiger-Stock (1997) rule of thumb. An F-statistic of a value greater than 10 indicates that the instrument is strong. For weaker instruments, the Anderson-Rubin (1949) test, which adequately captures instruments strength, is conducted to test the statistical significance of the effects. To study the effect of the number of non-local students on real residential rents, the following regression is estimated:

$$\begin{aligned}
& \Delta \ln(Y_t) \\
& = \gamma_0 + \gamma_1 \Delta \ln(NonlocalStudent_t) + \gamma_2 \Delta \ln(Payroll_t) \\
& + \gamma_3 \Delta \ln(InterestRate_t) + \gamma_4 \Delta \ln(Household_t) + \gamma_5 \Delta \ln(NewHouseArea_t) \\
& + \gamma_6 \Delta \ln(BuildingCost_t) + \gamma_7 \Delta \ln(ChinaGDP_t) + \gamma_8 \Delta \ln(MSCI_t) \\
& + \gamma_9 \Delta \ln(RetailRent_t) + \xi_t \tag{5}
\end{aligned}$$

where

Y denotes *FlatRentMassHK*, *FlatRentMassKL*, or *FlatRentMassNT*.

NonlocalStudent denotes the number of non-local students in Hong Kong.

MSCI and *ChinaGDP* are controlled because they might be confounding factors that correlate with the number of non-local students and residential value. *MSCI* and *ChinaGDP* are variables used to predict global economic outlook and the income of Chinese citizens. When the economy is doing well, foreign families are more willing to let their children study abroad, and might result in more foreign funds flowing into the Hong Kong property market.

3.2 Results

The number of visitors should positively affect the real retail rent. As shown in Table 1, their correlation is significant. The result remains unchanged after controlling other variables, including real domestic consumption, real interest rate, real building cost, and newly completed retail area. On average, a 1% growth of visitor arrivals increases real retail rent by about 0.05%. The results of 2SLS regressions are presented in Tables 2 to 5. Table 2 shows the first-stage regression results of the 2SLS regressions. With many controlled variables, the first-stage F-statistic of $\Delta \ln(\text{Visitor})$ against $\Delta \ln(\text{RetailRent})$ is 9.39, which is on the margin of the Staiger-Stock (1997) rule of thumb. This finding means $\Delta \ln(\text{Visitor})$ is neither a too weak nor a too strong instrument for $\Delta \ln(\text{RetailRent})$. Table 3 shows the regression results of mass residential property market on Hong Kong Island. On average, a 1% growth of real retail rent increases real residential rent in the mass segment of Hong Kong Island by about 2.35%. The instrument is not strong. Thus, the p-value of weak-instrument-robust Anderson-Rubin Wald test is calculated to investigate the significance level of the effect of real retail rent on real residential rents. The p-value shows that the result is statistically significant at 5% level. For other controlled variables, the growth in the number of domestic households is positively related to real residential rent, whereas real hotel room rate is negatively related to real residential rent. This finding can be explained by the possibility that increase in room rates are caused by more advertisements and services provided by hotels or hostels, which worsen the environment of the vicinity and decrease residential rents.

Table 4 shows the regression results of the mass residential property market in Kowloon. Although the estimated value of the effect of real retail rent on real residential rent is positive, it is not significant. The weak-instrument-robust Anderson-Rubin Wald test also shows a consistent result. For other controlled variables, the growth of real payroll, the number of

domestic households, real building costs, real oil price, and real Chinese GDP have positive correlation with real rents of small/medium-sized flats in Kowloon. Table 5 shows the regression results of mass residential property market in the New Territories. The estimated value of the effect of real retail rent is marginally significant at about 10% significance level. The weak-instrument-robust Anderson-Rubin Wald test shows that this value is significant at the 5% significance level. Therefore, there is moderate evidence for the effect of real retail rent on real residential rent in the New Territories. For other controlled variables, similar to the case of Kowloon, the fluctuation of real payroll and real Chinese GDP positively correlate to real residential rent in the New Territories. Negative correlation appears between the growth of real interest rates, newly completed residential area in one quarter, hotel room occupancy rate and real residential rent in the New Territories. Lower real interest rates imply lower mortgage costs, generating heavier demand for property. Less residential area completion implies decreases in housing supply. Higher hotel room occupancy rates might indicate larger inflow of visitors, which might bring disturbance to nearby residents. Table 6 indicates a significant effect of the inflow of non-local students on real residential rents of small/medium-sized flats on Hong Kong Island and in Kowloon. The relationship is not significant in the mass segment of the New Territories as it is not the central position of Hong Kong.

3.3 Robustness

Table 2 shows that the first-stage F-statistic for $\Delta \ln(\text{Visitor})$ in the regression against $\Delta \ln(\text{RetailRent})$ in the period from 1997 Q2 to 2014 Q2 is almost 10. According to Staiger-Stock (1997) rule of thumb, the statistic proves that $\Delta \ln(\text{Visitor})$ is a non-weak instrument that satisfies the relevance conditions. However, the instrument is not strong. Weak-instrument-robust Anderson-Rubin tests are also carried out and show consistent results.

To examine the robustness of our result, a dummy variable that indicates the outbreak of severe acute respiratory syndrome (SARS) in Hong Kong is added as a control variable. *DummySARS* equals 1 for 2003 Q1 and 2003 Q2, and 0 for other periods. The impacts of SARS epidemic of 2003 inflicted heavy damage on the tourism industry in Hong Kong from 2003 Q1 to 2003 Q2. SARS also undermined investment appetite and local asset prices. Thus, *DummySARS* is introduced to check the robustness of the estimated coefficients of *RetailRent*. In addition, during the studied period, the Renminbi has appreciated a lot against Hong Kong dollar. Because Hong Kong is one of the favourite destinations for investment by Chinese investors, the currency appreciation may induce investment demand for residential property in Hong Kong. For this reason, exchange rate of Renminbi against Hong Kong dollar (*ExchangeCNY*)⁶ is also introduced to check the robustness of estimated coefficients of *RetailRent*.

Tables A.7, A.8, A.9, and A.10, which can be found in the Unpublished Appendix, present the results with the dummy variables. All the estimated coefficients and their corresponding significance levels are virtually unaffected. However, we notice that the F-statistic of the instrumental variable reduces from 10 to below 8. The decrease in F-statistics indicates that the instrument is not strong. Therefore, we perform the weak-instrument-robust Anderson-Rubin test for the estimated coefficients of $\Delta \ln(RetailRent)$. The p-values of the test, which show its effects on residential rents in the mass markets on Hong Kong Island, in the Kowloon Peninsula, and the New Territories, are about 0.0415, 0.765, and 0.0275, respectively. The significant results in the cases of Hong Kong Island and the New Territories are consistent with the previous results.

⁶ Data are sourced from International Monetary Fund. According to Phillips and Perron test, *ExchangeCNY* is not stationary (p-value: 0.99) so it is transformed to $\Delta \ln(ExchangeCNY)$ (p-value: 0.02) for model estimation.

4. Discussion

4.1 Discussion of Empirical Results

A significant correlation between the number of visitors and real retail rent appears in the period from 1998 Q3 to 2014 Q2. Property owners may adjust retail rents based on expected future retail sales values and the ability of retailers to pay rent, with a greater number of visitors raising their expectations. Visitor expenditure contributed around 40% of retail sales value in 2013. Figure 1 shows that the increase in visitor expenditure on shopping brought by the increase in number of visitor arrivals contributes to domestic retail sales. Furthermore, Figure 2 shows a possible correlation between retail sales and retail rents. Stipulation of a turnover rent⁷ in a retail property rental agreement is quite common.

The causal relationships between real retail rent and real residential rents on Hong Kong Island and in the New Territories are observed by using the number of visitors as an instrument for real retail rent. Tourist consumption supports the growth of real retail rent. Thus, this effect should be more significant in major tourism areas in Hong Kong, where tourists spend a lot of money on shopping. Central and Western District on Hong Kong Island and Yau Tsim Mong District in Kowloon have long been shopping centres. In the New Territories, North District is close to Lo Wu Control Point, whereas Yuen Long District and Tuen Mun District are near the Shenzhen Bay Control Point. These districts are usually the first stops for some Mainland visitors who enter Hong Kong overland. Together with Sha Tin District, which has well-developed shopping facilities, these districts are popular shopping destinations in the New Territories. A higher real retail rent indicates a higher real land value in these districts. Table A.11, listed in the Unpublished Appendix, shows that major tourist shopping districts on Hong Kong Island account for almost 50% of the total private residential stock on Hong Kong Island, and those in

⁷ Turnover rent is a rental cost proportional to the tenant's turnover. Tenants need to pay a higher rent if they have a higher sales value.

the New Territories have more than 50% of the total private residential stock in the New Territories. However, shopping districts in Kowloon have only about 30% of the total private residential stock in that area. The compilation of rent statistics by the government is based on rental transaction records. Thus, the lower probability of transactions in major shopping districts might be the reason for the insignificant results in the case of Kowloon.

North District, Tai Po District, Tuen Mun District, and Yuen Long District are areas adjacent to land boundary control points. In these districts, parallel trading is common, where traders purchase a large amount of goods, such as daily necessities, for resale on the Mainland. Massive demand for goods supports retail sales in these areas. Furthermore, according to the Legislative Council (2012), “some parallel trade syndicates have rented and used residential units as warehouses and for distribution of goods.” Renting residential units to store inventory is practical for traders and retailers because rentals of residential accommodation are lower than the commercial rents. Retailers might rent a residential unit as a warehouse to ensure that their goods supply can meet the substantial demand, thereby reducing the supply of residential units. This change of use is a possible way of capturing land value growth.

Another possible way of increasing land value is by converting a residential unit into a retail unit. Hong Kong has a number of tenement buildings and composite buildings that have aged considerably. Their approximate number is listed in Table A.12, provided in the Unpublished Appendix. Some parts of these buildings, especially the lower floors, are opportunities for both residential and commercial activities. Kowloon district is a major shopping destination for foreign visitors and local citizens in Hong Kong. The heavy demand results in renovation of many flats inside tenement and composite buildings in Kowloon for commercial use. By contrast, such renovation is not popular in New Territories and on Hong Kong Island. Conceivably, higher retail rents would encourage flat owners to lease their dwellings as retail

stores for higher returns if they were allowed to do so. This conversion from a flat to a shop would lower the supply of flats for residential rental, thereby boosting residential rents.

Hong Kong is a small place with a dense population, where land is a highly demanded resource. Aside from tendering for construction projects from government land auctions, real estate developers sometimes purchase aged buildings for redevelopment. For instance, a batch of old residential buildings might be redeveloped and converted into a large shopping mall. Higher retail rents would induce the demand for redevelopment projects, reducing supply of flats for residential use. The location of the redevelopment site hinges on the planning of the developers. Undoubtedly, Kowloon is packed with shopping malls. Except for the central business districts, the New Territories and Hong Kong Island have high potential for the development of more shopping centres.

The results presented in Section 3 might also be a combination of the following effects. First, from the viewpoint of asset pricing, the value of a retail property increases with the present value of its future return: higher rental revenue increases retail property value. Real estate investors might favour speculation in private housing rather than retail property because of higher retail property values. Moreover, retailers might invest in the housing when their retail properties provide them with high cash inflows and collateral values. High collateral values stimulate demands for residential properties because high collateral value allows retail property owners to finance at lower costs. This idea is similar to that of Aoki, Proudman, and Vlieghe (2002), who state that the value of the collateral stimulates consumption and housing investment, which may cause housing prices to grow. Triggered by these additional demands, higher housing prices might hinder individuals or families with constrained budgets from purchasing a flat. Residential rents would increase as buyers raise their demand for rental flats. As shown in Figure 3, the residential rents of the mass segment in the New Territories are

generally lower compared with other districts, which attracts individuals on a tight budget. After the implementation of the IVS, more large retailers expanded their brands in the New Territories to capture the spending of Mainland visitors coming overland via land boundary control points such as Lo Wu and Lok Ma Chau. The opening of these retail shops, which new towns relatively lack, is a possible cause of the growth in real retail rents in the New Territories. These retail shops provide easier access to a wider range of goods, which improves the living standards in the New Territories and hence raises the demand for flats. Flat owners might also increase rents when they believe that their properties possess geographical advantages as retail stores. Furthermore, the presence of popular stores might attract individuals who are willing to accept higher rents to live in nearby units.

Some may argue a portion of mainland visitors are likely to be investors purchasing a significant chunk of flats in Hong Kong and leaving them empty, thereby putting pressure on rental rates in the property markets. However, since Figure A.5, presented in the Unpublished Appendix, shows very little correlation between the number of visitor arrivals and approximate number of sale and purchase agreements, or approximate total consideration amount, made by mainlanders in the domestic residential market, it offers certain grounds to exclude the discussion of this factor in this paper.

4.2 Implications

The effect of the inflow of non-local students on residential rents is observed on Hong Kong Island and in Kowloon. This effect should be taken into account in any government policies that concern the cost of living in Hong Kong. Although the effect is not significant in the New Territories, it would still depend on the number of students that various universities admit and that the housing market accommodates. For instance, when schools in the New Territories admit more non-local students, the housing market might face a higher demand from students

who need to live off-campus. The market supply and market prices of rental flats could also alter where non-local students prefer to live in. Therefore, more halls of residence are required to meet the larger demand for accommodation if schools continue to increase admission of non-local students.

Illegal parallel trading is also one of the contributing factors to the growth of retail rents. Combating illegal traders could help lower the burden on residential rents. For other controlled variables, a negative relationship exists between new housing areas completed and residential rents. The government should consider increasing the supply of housing to reduce residential property prices. Moreover, a positive relationship between construction costs and residential rents is observed. Higher construction costs, which are partly caused by the shortage of construction labour, are eventually passed on to buyers. Importation of workers from other countries/regions is a short-term remedy. In the long run, the government should increase its effort in attracting local labour to the construction industry.

5. Conclusion

This paper explores a significant relationship between the number of visitors and real retail rent in Hong Kong. With the launch of the IVS in 2003, the influx of Mainland visitors has increased domestic retail sales and retail rents. Using the number of visitors as an instrumental variable, the effects of real retail rent on real residential rents are found to be significant in the small/medium-sized flat market in Hong Kong, specifically on Hong Kong Island and in the New Territories. The possible reasons for this finding are as follows: (i) notable portions of flats are located in major shopping districts; (ii) the popular trend of flat conversion from residential use to commercial use; (iii) the locations of the flats could be redeveloped; and (iv) potential tenants have budgets and location preferences. Furthermore, the inflow of non-local students

contributes to the residential rental growth on Hong Kong Island and in Kowloon, because of their geographical convenience to students. Tourism is a mainstay of Hong Kong. While policies that strengthen this industry should be supported, their effects on the real estate market cannot be ignored. The government should seek break-even point between local livelihoods and growth of tourism. To soothe the upward pressure on residential rents, the government should spend more effort on combating illegal parallel trading activities, increasing the housing supply, and lowering construction costs.

References

- Anderson, T. W., and Rubin, H. (1949). Estimation of the parameters of a single equation in a complete system of stochastic equations. *The Annals of Mathematical Statistics*, 20(1), 46–63.
- Aoki, K., Proudman, J., and Vlieghe, G. (2002). Houses as collateral: Has the link between house prices and consumption in the U.K. changed? *Economic Policy Review - Federal Reserve Bank of New York*, 8(1), 163–177.
- Balaguer, J. and Cantavella-Jordá, M. (2002). Tourism as a long-run economic growth factor: The Spanish case. *Applied Economics*, 34(7), 877–884.
- Chang, K. L., Chen, N. K., and Leung, C. K. Y. (2013). In the Shadow of the United States: The International Transmission Effect of Asset Returns. *Pacific Economic Review*, 18(1). 1–40.
- Chen, C. F. and Chiou-Wei, S. Z. (2009). Tourism expansion, tourism uncertainty and economic growth: New evidence from Taiwan and Korea. *Tourism Management*, 30(6), 812–818.
- Cheung, C. M. C. (2013). *Changing Landscape of Hong Kong's Retail Sales*. Retrieved from <http://www.statistics.gov.hk/wsc/CPS003-P4-S.pdf>
- Cox, W., and Pavletich, H. (2015). *11th Annual Demographia International Housing Affordability Survey: 2015*. Retrieved from <http://www.demographia.com/dhi.pdf>.
- Craig, R. S. and Hua, C. (2011). Determinants of property prices in Hong Kong SAR: Implications for policy. *IMF Working Paper No. 11/277*.
- D'Arcy, É., McGough, T., and Tsolacos, S. (1997). An empirical investigation of retail rents in five European cities. *Journal of Property Valuation and Investment*, 15(4), 308–322.
- Financial Secretary's Office (2013). *First Quarter Economic Report 2013*. Hong Kong: Government Logistics Department.
- Kim, H. J., Chen, M. H., and Jang, S. S. (2006). Tourism expansion and economic development: The case of Taiwan. *Tourism Management*, 27(5), 925–933.
- Kwan, Y. K., Leung, C. K. Y., and Dong, J. (2015). Comparing consumption-based asset pricing models: The case of an Asian city. *Journal of Housing Economics*, 28, 18-41.

Legislative Council (2012). *Official Record of Proceedings, Wednesday, 17 October 2012*. Retrieved from <http://www.legco.gov.hk/yr12-13/english/counmtg/hansard/cm1017-translate-e.pdf>

Legislative Council (2014). *Official Record of Proceedings, Wednesday, 12 February 2014*. Retrieved from <http://www.legco.gov.hk/yr13-14/english/counmtg/hansard/cm0212-translate-e.pdf>

Leung, C. K. Y. and Tang, E. C. H. (2012). Comparing two financial crises: the case of Hong Kong Real Estate Markets. In A. D. Bardhan, R. H. Edelstein, and C. A. Kroll (Eds.), *Global Housing Markets: Crises, Institutions and Policies* (pp. 377-398). Hoboken, NJ: Wiley.

Leung, C. K. Y. and Tang, E. C. H. (2015a). Speculating China Economic Growth through Hong Kong? Evidence from the Stock Market IPO and Real Estate Markets. *International Real Estate Review*, 18(1), 45-87.

Leung, C. K. Y. and Tang, E. C. H. (2015b). Availability, Affordability and Volatility: The Case of the Hong Kong Housing Market. *International Real Estate Review*, 18(3), 383-428.

Leung, F., Chow, K., and Han, G. (2008). Long-term and short-term determinants of property prices in Hong Kong. *HKMA Working Paper No. 15/2008*.

Narayan, P. K., Sharma, S. S., and Bannigidadmath, D. (2013). Does tourism predict macroeconomic performance in Pacific Island countries? *Economic Modelling*, 33, 780-786.

Newey, W. K., and West, K. D. (1987). A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. *Econometrica*, 55(3), 703-708.

Peng, W. (2002). What drives property prices in Hong Kong? *HKMA Quarterly Bulletin*, (32), 19-33.

Staiger, D., and Stock, J. H. (1997). Instrumental variables regression with weak instruments. *Econometrica*, 65(3), 557-586.

Tsolacos, S. (1995). An econometric model of retail rents in the United Kingdom. *Journal of Real Estate Research*, 10(5), 519-529.

Tugcu, C. T. (2014). Tourism and economic growth nexus revisited: A panel causality analysis for the case of the Mediterranean Region. *Tourism Management*, 42, 207–212.

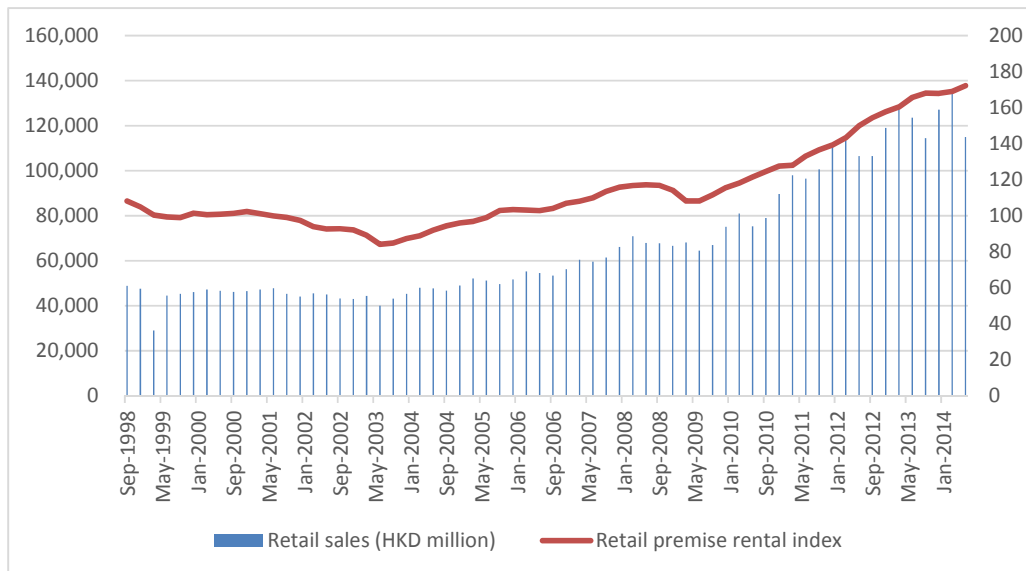
Appendix: Figures and Tables

Figure 1. Percentage of visitor spending on shopping against total retail sales in Hong Kong



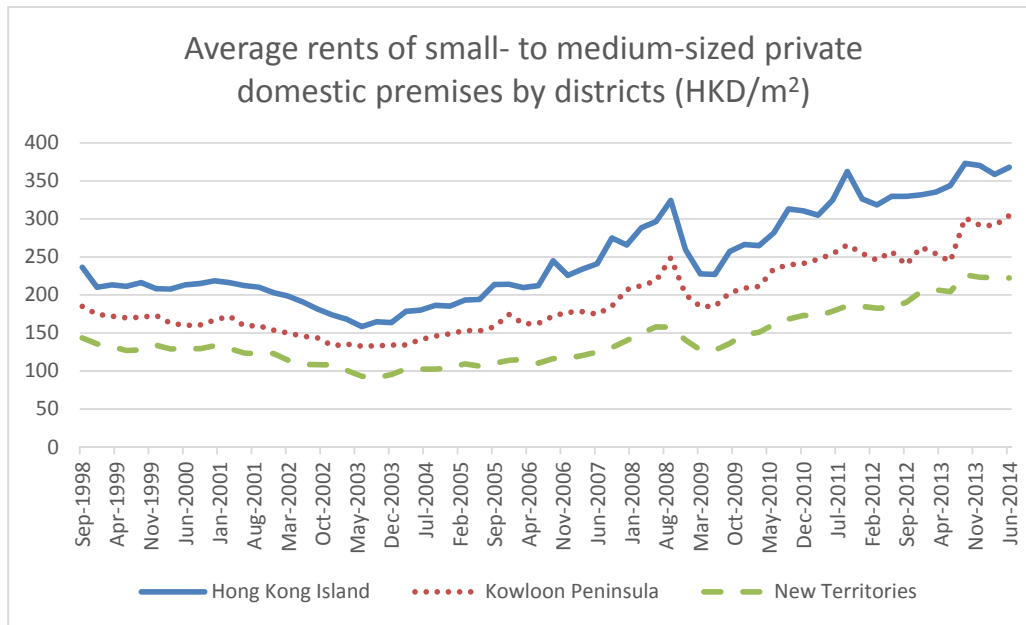
Source: CEIC Database, Census and Statistics Department

Figure 2. Retail sales and retail premise rental index



Source: Census and Statistics Department, Rating and Valuation Department

Figure 3. Average rents of small- to medium-sized private domestic premises by districts (HKD/m²)



Sources: Rating and Valuation Department

Table 1. Regression results of the relationship between the number of visitor arrivals in Hong Kong and real retail rents

Data for the period from 1998 Q3 to 2014 Q2

VARIABLES	$\Delta \ln(\text{RetailRent})_t$
$\Delta \ln(\text{Visitor})_t$	0.0522*** (0.0108)
Constant	0.00398 (0.00268)
Observations	63
R-squared	0.209

Heteroskedasticity-autocorrelation consistent (HAC) standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

VARIABLES	$\Delta \ln(\text{RetailRent})_t$
$\Delta \ln(\text{Visitor})_t$	0.0475*** (0.00772)
$\Delta \ln(\text{Consum})_t$	0.0701* (0.0371)
$\Delta \ln(\text{InterestRate})_t$	-0.0169 (0.198)
$\Delta \ln(\text{BuildingCost})_t$	0.141*** (0.0543)
$\Delta \ln(\text{NewRetailArea})_t$	-0.000352 (0.000721)
Constant	0.00284 (0.00196)
Observations	63
R-squared	0.342

Heteroskedasticity-autocorrelation consistent (HAC) standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Table 2. First-stage regression results of the 2SLS regression for the relationship between real retail rents and real residential rents in Hong Kong

Data for the period from 1998 Q3 to 2014 Q2

(Continued)			
VARIABLES	$\Delta \ln(\text{RetailRent})_t$	VARIABLES	$\Delta \ln(\text{RetailRent})_t$
$\Delta \ln(\text{Payroll})_t$	-0.000675 (0.0288)	$\Delta \ln(\text{FactoryRent})_t$	0.491*** (0.124)
$\Delta \ln(\text{InterestRate})_t$	0.207** (0.0840)	$\Delta \ln(\text{OilPrice})_t$	0.00180 (0.0144)
$\Delta \ln(\text{Household})_t$	0.171 (0.339)	$\Delta \ln(\text{ExchangeHKD})_t$	0.0357 (0.0457)
$\Delta \ln(\text{NewHouseArea})_t$	0.000462 (0.00110)	$\Delta \ln(\text{HSI})_t$	0.0399** (0.0193)
$\Delta \ln(\text{BuildingCost})_t$	-0.0352* (0.0203)	$\Delta \ln(\text{MSCI})_t$	-0.00551 (0.0335)
$\Delta \ln(\text{HotelRoomRate})_t$	-0.0485*** (0.0124)	$\Delta \ln(\text{ChinaGDP})_t$	0.0233** (0.0112)
$\Delta \ln(\text{HotelOccRate})_t$	-0.0884*** (0.0320)	$\Delta \ln(\text{Visitor})_t$	0.130*** (0.0426)
$\Delta \ln(\text{OfficeRent})_t$	0.142** (0.0675)	Constant	-0.00121 (0.00153)
Observations	:	63	
First-stage F-stat for $\Delta \ln(\text{Visitor})$:	9.39	

Heteroskedasticity-autocorrelation consistent (HAC) standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3. Second-stage regression results of the 2SLS regression for the relationship between real retail rents and real residential rents in the mass segment of Hong Kong Island

Data for the period from 1998 Q3 to 2014 Q2

VARIABLES	$\Delta \ln(\text{FlatRent MassHK})_t$	(Continued) VARIABLES	$\Delta \ln(\text{FlatRent MassHK})_t$
$\Delta \ln(\text{RetailRent})_t$	2.348* (1.172)	$\Delta \ln(\text{OfficeRent})_t$	-0.0270 (0.269)
$\Delta \ln(\text{Payroll})_t$	0.0781 (0.104)	$\Delta \ln(\text{FactoryRent})_t$	-0.314 (0.588)
$\Delta(\text{InterestRate})_t$	-0.605 (0.524)	$\Delta \ln(\text{OilPrice})_t$	0.0280 (0.0634)
$\Delta \ln(\text{Household})_t$	3.922* (2.084)	$\Delta \ln(\text{ExchangeHKD})_t$	-0.201 (0.371)
$\Delta \ln(\text{NewHouseArea})_t$	-0.0153* (0.00881)	$\Delta \ln(\text{HSI})_t$	-0.139 (0.132)
$\Delta \ln(\text{BuildingCost})_t$	0.211 (0.130)	$\Delta \ln(\text{MSCI})_t$	0.206 (0.143)
$\Delta \ln(\text{HotelRoomRate})_t$	-0.249** (0.110)	$\Delta \ln(\text{ChinaGDP})_t$	0.0593 (0.0645)
$\Delta \ln(\text{HotelOccRate})_t$	-0.00424 (0.0243)	Constant	-0.0217*** (0.00806)
Observations	:	63	
R-squared	:	0.607	
p-value of Anderson-Rubin Wald test for $\Delta \ln(\text{RetailRent})$ under F-Distribution	:	0.0406	

Heteroskedasticity-autocorrelation consistent (HAC) standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4. Second-stage regression results of the 2SLS regression for the relationship between real retail rents and real residential rents in the mass segment of Kowloon

Data for the period from 1998 Q3 to 2014 Q2

VARIABLES	$\Delta \ln(\text{FlatRent MassKL})_t$	(Continued) VARIABLES	$\Delta \ln(\text{FlatRent MassKL})_t$
$\Delta \ln(\text{RetailRent})_t$	0.410 (1.079)	$\Delta \ln(\text{OfficeRent})_t$	-0.0732 (0.417)
$\Delta \ln(\text{Payroll})_t$	0.288*** (0.107)	$\Delta \ln(\text{FactoryRent})_t$	0.547 (0.546)
$\Delta(\text{InterestRate})_t$	-1.042 (0.712)	$\Delta \ln(\text{OilPrice})_t$	0.0948* (0.0561)
$\Delta \ln(\text{Household})_t$	4.044* (2.037)	$\Delta \ln(\text{ExchangeHKD})_t$	0.257 (0.332)
$\Delta \ln(\text{NewHouseArea})_t$	-0.00412 (0.0104)	$\Delta \ln(\text{HSI})_t$	0.0324 (0.0951)
$\Delta \ln(\text{BuildingCost})_t$	0.200*** (0.0703)	$\Delta \ln(\text{MSCI})_t$	0.00867 (0.144)
$\Delta \ln(\text{HotelRoomRate})_t$	-0.231*** (0.0736)	$\Delta \ln(\text{ChinaGDP})_t$	0.156*** (0.0579)
$\Delta \ln(\text{HotelOccRate})_t$	-0.0338 (0.0338)	Constant	-0.0183** (0.00791)
Observations	:	63	
R-squared	:	0.462	
p-value of Anderson-Rubin Wald test for $\Delta \ln(\text{RetailRent})$ under F-Distribution	:	0.714	

Heteroskedasticity-autocorrelation consistent (HAC) standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5. Second-stage regression results of the 2SLS regression for the relationship between real retail rents and real residential rents in the mass segment of the New Territories

Data for the period from 1998 Q3 to 2014 Q2

VARIABLES	$\Delta \ln(\text{FlatRent})_{\text{MassNT}}_t$	(Continued) VARIABLES	$\Delta \ln(\text{FlatRent})_{\text{MassNT}}_t$
$\Delta \ln(\text{RetailRent})_t$	1.205 (0.740)	$\Delta \ln(\text{OfficeRent})_t$	-0.0730 (0.189)
$\Delta \ln(\text{Payroll})_t$	0.196*** (0.0570)	$\Delta \ln(\text{FactoryRent})_t$	0.272 (0.384)
$\Delta(\text{InterestRate})_t$	-0.772* (0.388)	$\Delta \ln(\text{OilPrice})_t$	0.0429 (0.0299)
$\Delta \ln(\text{Household})_t$	0.690 (0.977)	$\Delta \ln(\text{ExchangeHKD})_t$	-0.110 (0.0884)
$\Delta \ln(\text{NewHouseArea})_t$	-0.00679** (0.00297)	$\Delta \ln(\text{HSI})_t$	-0.0796 (0.0612)
$\Delta \ln(\text{BuildingCost})_t$	0.0805 (0.0589)	$\Delta \ln(\text{MSCI})_t$	0.119 (0.0875)
$\Delta \ln(\text{HotelRoomRate})_t$	-0.0601 (0.0660)	$\Delta \ln(\text{ChinaGDP})_t$	0.0796** (0.0331)
$\Delta \ln(\text{HotelOccRate})_t$	-0.0242* (0.0139)	Constant	-0.00904* (0.00520)
Observations	:	63	
R-squared	:	0.707	
p-value of Anderson-Rubin Wald test for $\Delta \ln(\text{RetailRent})$ under F-Distribution	:	0.0226	

Heteroskedasticity-autocorrelation consistent (HAC) standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6. Regression results for the relationship between non-local students and real residential rents in Hong Kong

Data for the period from 1998 Q3 to 2014 Q2

VARIABLES	$\Delta\ln(\text{FlatRent MassHK})_t$	$\Delta\ln(\text{FlatRent MassKL})_t$	$\Delta\ln(\text{FlatRent MassNT})_t$
$\Delta\ln(\text{NonlocalStudent})_t$	0.173* (0.101)	0.113** (0.0540)	-0.00735 (0.0484)
$\Delta\ln(\text{Payroll})_t$	-0.0665 (0.0629)	0.124** (0.0574)	0.149** (0.0578)
$\Delta(\text{InterestRate})_t$	-0.543 (0.404)	-1.224** (0.527)	-1.018*** (0.218)
$\Delta\ln(\text{Household})_t$	4.216*** (1.349)	4.778** (2.304)	1.511* (0.815)
$\Delta\ln(\text{NewHouseArea})_t$	-0.0170* (0.00981)	-0.00823 (0.0103)	-0.00864* (0.00456)
$\Delta\ln(\text{BuildingCost})_t$	0.320*** (0.0983)	0.344*** (0.0781)	0.159** (0.0733)
$\Delta\ln(\text{MSCI})_t$	0.111** (0.0539)	0.130* (0.0708)	0.0887*** (0.0291)
$\Delta\ln(\text{ChinaGDP})_t$	-0.0528 (0.0320)	0.0461 (0.0383)	0.0442** (0.0173)
$\Delta\ln(\text{RetailRent})_t^8$	1.071*** (0.268)		1.052*** (0.186)
Constant	-0.0237*** (0.00735)	-0.0205*** (0.00753)	-0.00929** (0.00409)
Observations	63	63	63
R-squared	0.654	0.378	0.677

Heteroskedasticity-autocorrelation consistent (HAC) standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

⁸ $\Delta\ln(\text{RetailRent})$ is not controlled in the case of Kowloon because of its insignificant result found in Table 4.