Does urban tourism development impact urban housing prices?

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Abstract:

Purpose- The purpose of this study was to investigate the relationship between tourism development and urban housing prices in Chinese cities. Specifically, the study aimed to explore whether there is a relationship between the two variables in tourist and non-tourist cities and whether there is a non-linear relationship between them.

Design/methodology/approach-In this study, the entropy method was used to construct the China City Tourism Development Index, which provides a more comprehensive measure of the level of tourism development in different cities. In total, 45 major cities in China were studied using the panel data approach for the period of 2011 to 2019.

Findings-The empirical analysis conducted for this study found that tourism development affects urban house prices and that there is an inverted U-shaped relationship. However, this varies across cities, with house prices in tourist cities tending to be more influenced by tourism development than non-tourist cities. Also, foreign direct investment, population size, fixed asset investment and disposable income per capita were found to have an impact on house prices in both tourism and non-tourism cities.

Originality/value-There are significant differences in tourism development and urban house prices in different cities in China. This study considers these differences when examining the impact of tourism on house prices in 45 major cities in China by dividing the sample cities into tourist and non-tourist cities.

Key words: housing prices; tourism; tourism cities; non-tourism cities; fixed effect; China

JEL: R21, Z32

1. Introduction

The tourism industry is an important engine of growth in China. In 2019, the tourism industry in China contributed 6.72% to the GDP and created 516.14 million jobs. In fact, tourism booms have been shown drive economic growth in cities, boosting job opportunities and population movement (Naseem, 2021; Rasool et al., 2021; Azam et al. 2022). However, the influx of more people into an area can lead to an increase in the prices of goods and services (Azam and Rashid, 2015; Azam and Khan, 2022) as well as house prices. To illustrate, Figure 1 shows the number of tourists and housing prices in China from 2000 to 2019 where the number of tourists climbed by 234% between 2008 and 2019, and housing prices increased by 308% between 2008 and 2019. This demonstrates the potential of the tourism industry as a factor that influences housing prices in China.

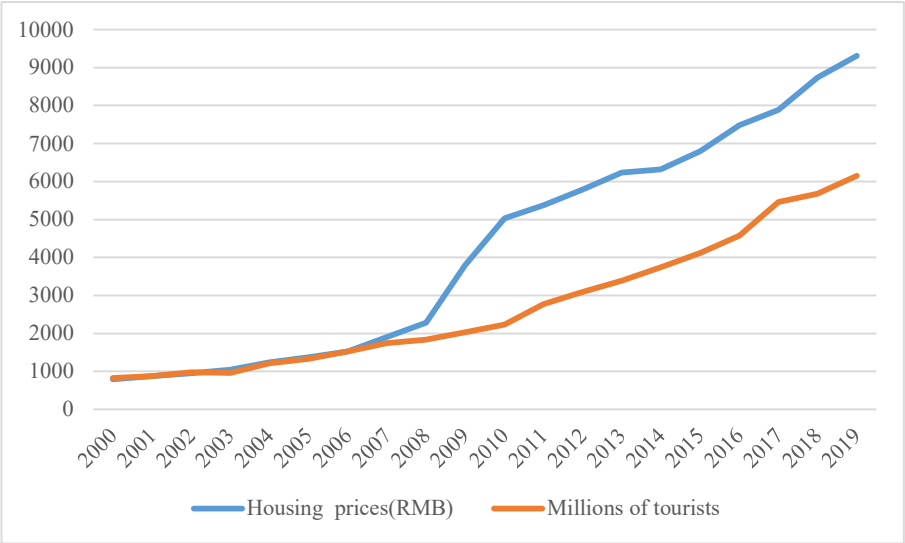

Figure 1 Average housing prices and tourist numbers in China, 2000-2019

(Data resources**:** China Statistics Yearbook)

As China is a densely populated country with limited natural resources, the development of tourism may increase population density and crowd out the land and resources available for housing development, which is one of the key factors that determine house prices (Wittowsky et al., 2020). High land costs, well-located areas, and abundant resources will drive up house prices; as a result, locations with scarce supply or limited resources may see significant house price increases. Tourism development boosts regional economies, where some land resources are used to promote tourism. This means that house prices will rise and people's cost of living increases. However, as cities become crowded and the living experience becomes less enjoyable, people will leave and house prices will fall. Therefore, it is crucial to study the relationship between tourism and urban house prices. Such research can assist policy makers, urban planners, and investors in making strategic decisions to achieve the goals of economic prosperity and sustainable social development.

To examine the possible impact of tourism on urban house prices in China, we examined balanced panel data for 45 major Chinese cities from 2011-2019 using both static and dynamic estimates. In addition, a series of robustness tests were conducted to ensure the robustness of the estimation. Unlike in existing literature, we constructed a comprehensive measure of tourism development in Chinese cities by constructing a tourism development index to provide a basis for testing the relationship between tourism and house prices in Chinese cities. We also divided the full sample into two subsamples of tourist and non-tourist cities to conduct heterogeneity analysis.

The remaining sections of this paper are organized as follows: a literature review that synthesizes existing research on influencing factors affecting house prices in cities and the impact of tourism on housing prices; a description of the research methodology, including data collection and analysis procedures; presentation of results from empirical analysis; and finally, a concise conclusion summarizing main findings and potential policy implications of the study.

2. Literature Review

2.1 Theoretical literature

Understanding the factors that drive housing demand and housing supply is of paramount importance in housing studies. For instance, Maisel's (1949) work delved into the exploration of variables that shape housing demand, laying a foundation for subsequent research in this domain. Hence, following Maisel (1949), this study emphasises on the demand factor rather than the supply factor because when the supply curve is elastic, demand becomes the main determinant of price. Meanwhile, Stevenson (2008) uses a reverse demand function to explain house prices. When an area has a booming tourism industry that attracts more tourists and travellers, the demand for retail and services in the area also increases. The increase in demand for commercial outlets in turn has a positive impact on house prices. Specifically, a boom in tourism often leads to more consumer traffic and demand for shopping. Visitors may look for local specialties, souvenirs, and gifts, which may lead to growth in retail sales. This may lead to an increase in demand for commercial outlets, which in turn may have a positive impact on house prices. Tourism growth will also increase the demand for services such as restaurants, cafes, travel services, and entertainment venues. This could lead to an increase in demand for service sector shops, which in turn could have a positive impact on house prices.

2.2 Factors influencing urban housing prices

Housing prices have been a hot topic of interest for many scholars. Feng and Han (2021), Kok et al. (2018), Wang et al. (2018), and Chen (2018) found that land prices influence the spatial differences of housing prices and concluded that land prices are the main driver of housing prices. Meanwhile, Azam Khan et al. (2022), Wang and Tsai (2021), and Xu et al. (2018) found that the age of the house affects housing prices, where the older the house, the higher the housing price. Yiu and Cheung (2022), Ding (2018), and Miles (2012) measured the contribution of population growth and population shocks to housing prices and found that population size affects house prices, while population shocks have a smaller impact on house prices. Thus, land price, housing age, and population size are among the factors

influencing house prices.

Some researchers have highlighted various factors have a non-linear impact on urban housing prices. Tan et al. (2018) have concluded that there is a non-linear relationship between house prices and interest rates. Mathur (2022) found a non-linear relationship between school quality and house prices. Geok and Lean (2020) found that housing supply and house prices are non-linearly related. Arbel et al. (2017) concluded that there is a non-linear relationship between the effect of highway noise on house prices. Gan et al. (2021) concluded that there is a non-linear relationship between the impact of public services on urban housing prices. Similarly, Chen et al. (2022) found that both rail and road accessibility exhibit a non-linear relationship with house prices. Furthermore, Jin et al. (2022) also discovered a similar non-linear relationship between public transport accessibility and house prices. These findings collectively emphasize house prices in a city are influenced by many factors, therefore, it is essential to thoroughly study the influencing factors affecting house prices in order to have a healthy and stable development.

2.3 Tourism and housing prices

Tourism is one of the drivers of economic growth in cities (Manzoor et al., 2018). Tourism development can attract more population migration and increase employment, thus contributing to the economic growth of cities (Nguyen, 2021). As tourism grows, the impact of tourism on house prices becomes increasingly apparent. As a result, many scholars have put forward their views on the impact of tourism on house prices. Biagi et al. (2015), Paramati and Roca (2019), and Wu et al. (2021) found that tourism development significantly contributes to house price growth. Kavarnou and Nanda (2018) found that tourism promotes house prices when studying the relationship between tourism and house prices through principal component analysis, however, there exists heterogeneity across regions. Alola et al. (2020), Yang et al. (2023), and Yıldırım and Karul (2022) found a negative association between tourism and house prices. On short-term rentals and house prices, Schäfer and Braun (2016), Brotman (2020), Shokoohyar et al. (2020), and Brotman (2021) measured the impact of short-term rentals on house prices and found that tourists may opt for short-term rentals that have a similar impact on urban house prices.

2.4 Hypothesis

Based on the study by Liu et al. (2020), we believe that there are two main ways in which tourism may affect house prices: firstly, tourism affects house prices by influencing business investment; and secondly, tourism affects resources and the environment, which then affects house prices.

Firstly, tourism can increase the visibility and attractiveness of a city and attract more business

investment. For example, a city with a famous tourist attraction can attract more investment in commercial facilities such as hotels, restaurants, and shopping centres, which cater to the needs of tourists and serve the local residents. The construction and operation of these commercial facilities require significant capital and resources, so their presence boosts the city's economy, which in turn drives up house prices. When house prices rise to a certain level, however, commercial investors may begin to prudently consider market risks, especially as tourism development increases the price of commercial housing (shops, stores etc.) and increases risk. Therefore, these investors may reduce their commercial investments to reduce risk. Commercial investors may be more inclined to choose other cities or regions to invest in or reduce the number of new commercial facilities being built instead of focusing on maintaining and improving existing commercial facilities. This could lead to a reduction in the supply of commercial facilities, which could drive down house prices. In addition, when house prices rise to a certain level, homebuyers may start to hesitate or give up buying homes, resulting in a drop in home sales and possibly a drop in house prices. At this point, commercial investors may realise that the market has changed and may therefore reduce their commercial investments. According to Ding et al. (2022), some residents may give up buying a home in the area and go to other cities to buy a house at a price that is relatively suitable for them because of the negative sentiment, which leads to a decrease in demand in the area. At the same time, tourism may also lead to an acceleration in the construction of new residential buildings, thus increasing the supply to a level higher than the demand which cause prices to fall. As a result, when the demand for houses decreases, house prices will also fall. Based on these observations, this study suggests that there may be an inverted U-shaped relationship between tourism development and housing prices.

The second way in which tourism affects house prices is through its impact on resources and the environment (Biagi et al., 2016). The price of housing varies at different stages of tourism development. In the early stages of tourism development, based on the rich natural resources and geographical advantages of the destination, the number of consumers buying tourist housing may gradually increase to improve quality of life and gain better access to tourism resources (Gan and Ouyang, 2022). This increases the demand for housing, leading to an increase in its price. The impact of tourism on the rising cost of house prices in the region is greatest when the rise in housing prices is at its peak and natural resource and environmental advantages are maximised. When the impact of tourism development on the resources and the environment exceeds the limits of what the destination can sustain, the resource and

environmental advantages of the destination will gradually diminish, which will lead to a slowdown in the demand for housing; as a result, house prices will fall (Baloch et al., 2023). Thus, there may be an inverted U-shaped relationship between the impact of tourism development on house prices.

Hypothesis 1: There is an inverted U-shape relationship between tourism development and urban house prices.

3. Data and Research Method

3.1 Dependent variable

China urban housing prices (*CUHP*): *CUHP* is the explanatory variable in this study. Based on related studies on house prices in China by Chin and Li (2021), Liu et al. (2018), and Li and Chiang (2012), we likewise chose the average annual sales price of housing at the city level as a proxy for house prices. Data on commodity house prices were obtained from the Macroeconomic and Real Estate Database of the State Information Centre of China[1].

3.2 Independent variable

China urban tourism development (*Tourism)*: .—

In this study, we constructed the Tourism Development Index for Chinese cities by combining data from three components. We opined that this index could provide a comprehensive measure of urban tourism performance. Based on Zaman et al. (2016), Anguera-Torrell et al. (2021), Mikulić et al. (2021), and Tam et al. (2022), we selected urban tourism revenue and urban tourism headcount as elements of the indicator for construction. Taking into account national and regional heterogeneity and the actual tourism situation in China, we selected the number of urban A-class scenic spots in cities as one of the elements of the construction indicator. The classification of scenic spots into different categories, such as A-class scenic spots, were assessed by the China National Tourism Scenic Area Quality Rating Committee. The term "urban A-class scenic spot" typically refers to a highly regarded tourist destination located within an urban area that offers exceptional scenic beauty, cultural significance, and tourist facilities. These spots are often well-developed and attract a large number of visitors due to their unique attractions and experiences. They are also more representative as a measure of tourism development in Chinese cities[2]. This paper used the entropy value method to construct the tourism development index

[1] China Real Estate Information. http://www.crei.cn/file/index.aspx?type1=%B7%BF%B5%D8%B2%FA%CA%FD%BE%DD&op=lgfc&b=1&k=3

[2] A-grade scenic spots generally refer to China's national A-grade tourist scenic spots. China's tourist scenic quality rating is divided into five levels, from highest to lowest, AAAA, AAA, AAA, AA and A tourist scenic areas.

for Chinese cities. Teixeira et al. (2021) used the entropy value method to evaluate innovative tourism practices. Andria et al. (2021) also ranked sustainable tourism destinations using the entropy method. Therefore, based on the research methods of the aforementioned scholars, we also used the entropy value method to construct the China City Tourism Development Index. The Entropy Weight Method is a multi-criteria decision analysis method for determining the weight of different factors or criteria in the decision-making process. It was developed based on the concept and calculation of information entropy (Qu et al., 2022). A higher entropy value indicates higher uncertainty of the factor or criterion and a lower weight; a lower entropy value indicates lower uncertainty of the factor or criterion and a higher weight. The entropy method has outstanding advantages in constructing a tourism development index for Chinese cities. It offers comprehensive consideration of several key factors, quantitative analysis based on data, accurate measurement of factor importance, consistency test to ensure reasonable and stable weights, and flexibility to adapt to the needs of different cities (Mahmoodi et al., 2023). The scientific and objective assessment method provides reliable results for decision-makers and promotes sustainable development and scientific decision-making in China's urban tourism industry.

In order to examine whether there exists an inverted U-shaped relationship between tourism development and urban house prices in China, we include the tourism and squared term of tourism in the estimation model. If the inverted U-shape exists, the coefficient for tourism is positive and the coefficient for the squared term of the tourism is negative.

3.3 Control variables

Referring to Gholipour Fereidouni (2012), Zhang et al. (2022), Wilhelmsson et al. (2022), Nurkhayat and Fitrady (2023), and Pilatin et al. (2023) on the factors influencing house prices, we chose foreign direct investment, urban population, urban fixed asset investment, urban per capita disposable income, and urban loans as the control variables, which are explained as follows:

Foreign direct investment in Chinese cities *(CFDI):* FDI is positively related to house prices (Wen, 2021; Kim and Lee, 2022). Therefore, we used the amount of foreign direct investment in each city as well as data on the amount of foreign direct investment used that was obtained from the China City Statistical Yearbook. An increase in foreign direct investment will attract more people to the city for employment, and with an increase in population, demand for housing will expand, which in turn will cause house prices to rise. The sign was expected to be positive.

The population of Chinese cities *(CCP)*: The size of the urban population is one of the factors

contributing to the rise in urban house prices (Lin et al., 2018; Zheng, 2017). We used data on the total population of a city as a proxy for population size, where the larger the population size, the higher the demand and the higher the house price. Data on total population was obtained from the China Urban Statistical Yearbook and the expected sign was positive.

The amount of fixed asset investment in Chinese cities *(CFAI)*: A house is a fixed asset investment. Therefore, when fixed asset investment is made, urban house prices are also affected (Li et al., 2018). Investment in fixed assets includes both buildings and machinery, means of transport, and others. Therefore, if fixed asset investment is in the construction of houses, especially housing, the supply of houses will increase and the price of houses will fall with it; conversely, if fixed asset investment is used more in machines and means of transport, etc., the supply of houses will decrease, and the price of houses will fall with it. We used the total annual fixed asset investment in cities as a proxy for urban fixed asset investment, with data from the China Urban Statistical Yearbook, and the expected sign can be positive or negative.

The per capita income of Chinese cities *(CPC)*: Disposable income per capita is one of the factors influencing urban house prices, and the level of people's income affects the demand for houses, which in turn affects house prices (Özmen et al., 2019). The higher the people's income, the higher the demand and the higher the house price (Zou and Chau, 2015; Wong et al. 2015; Wong et al., 2019; Wong and Aralas 2019). Data on disposable income per capita were taken from the China Urban Statistical Yearbook and was expected to have a positive sign.

The year-end loan balance of financial institutions in Chinese cities *(CLB)*: Total urban lending is one of the factors affecting house prices. Bank lending behaviour directly affects urban house prices (Chin and Li, 2021; Li et al., 2022). Loans can increase the purchasing power of home buyers, thus increasing the demand for home purchases, which increases the demand for homes and consequently the price of homes. At the same time, property developers will take out loans from banks to ease financial pressure, thus contributing to an increase in the supply of homes and house prices will fall. Therefore, we chose city year-end loan balances as a proxy for city lending, with data from city statistical bulletins and an expected positive or negative sign.

3.4 Data description

The balanced panel data used in this study related to 45 major cities in China from 2011 to 2019. The cities are listed in A1 in the Appendix. Due to the impact of the COVID-19 pandemic, the tourism

industry was more severely affected in 2020 and 2021, so the data for 2020 and 2021 were not used as years for data selection. Table I shows the descriptive statistics for all the variables involved in this study. As shown in the table, all variables have a large range of values, except for tourism index where the values ranged between 0 and 1. In order to compress the scale, we take the logarithm for all the variables, except for tourism. In addition, a multicollinearity test was performed, and the results are presented in Table A1 in the Appendix. Based on the results, the VIF values obtained for all variables were less than 5, which excludes the possibility of estimation bias caused by multicollinearity.

Table I Descriptive statistics of full-sample

Category	Variable Name	Measurement	Observations	Mean	Standard Deviation	Min	Max	Expected Sign
Dependent variable	*CUHP*	Price	405	10687.85	6697.063	2999.62	54132	
Independent variable	*Tourism*	Index	405	0.71046	0.2305	0.02	1.003178	+/-
	CPFDI	US$ billion	405	401095	426411.3	751	3082563	+
	CCP	10,000 people	405	933.1709	565.1635	165	3416	+
Control variables	*CFAI*	10,000 RMB	405	4.47e+07	2.80e+07	6373858	1.97e+08	+/-
	CPC	RMB	405	38623.2	11192.56	15953	73849	+
	CLB	10,000 RMB	405	13555.3	12906.72	946.89	83761.3	+/-

3.5 Methodology

This study collected balanced panel data for 45 major cities in China from 2011 to 2019 to examine the possible impact of tourism on house prices. To test the nonlinear relationship between tourism and house prices, we included the squared term of tourism in the estimated model. In addition, to reduce the effect of heteroskedasticity, all variables except tourism were taken as logarithms (as the tourism index value was relatively small compared to other variables). Finally, we built a panel data model as shown in Equations (1) and (2). If the relationship between tourism and house prices in China is an inverted U-shape, then it should be α_1 positive and α_2 negative and statistically significant. If the inverted U-shaped relationship is ruled out, the squared term of tourism will be removed from the model and a new model, as shown in Equation (3), will be re-estimated. (Ding et al., 2022a).

$$Ln(CUHP_{it}) = \alpha_0 + \alpha_1(\text{Tourism}_{it}) + \alpha_2(Tourism_{it})^2 + \mu_i + \nu_t + \varepsilon_{it} \quad (1)$$

$$Ln(CUHP_{it}) = \alpha_0 + \alpha_1(\text{Tourism}_{it}) + \alpha_2(Tourism_{it})^2 + \beta Z_{it} + \mu_i + \nu_t + \varepsilon_{it} \quad (2)$$

$$Ln(CUHP_{it}) = \alpha_0 + \alpha_1(\text{Tourism}_{it}) + \beta Z_{it} + \mu_i + \nu_t + \varepsilon_{it} \quad (3)$$

In Equations (1) and (2), *Z* represents a series of control variables which have been discussed in

detail. μ_i and ν_t are the fixed effect for city and year respectively. ε_{it} is the error term. α_0, α_1, α_2 and β are the coefficients to be estimated.

To test the robustness of the benchmark estimation results, a series of robustness tests were conducted in this study. Due to unidentified limitations in the study design, the relationship between tourism development and urban house prices in Chinese cities derived from the benchmark regression results may only be a placebo effect. Therefore, once the relationship between urban tourism development and urban house prices in China was confirmed by the benchmark regression, a placebo test was implemented to test whether the relationship was only a placebo effect. Referring to Ding et al. (2022a), we first removed tourism data from all samples and then randomly assigned these data to each sample. Finally, we re-estimated equation (1) or (2). If the effect of tourism on urban house prices was only a placebo effect, then the results of the placebo test should be consistent with the results of the benchmark regression.

According to Ding et al. (2022b), a normal distribution among variables is an important limitation of the general panel fixed effects model. To test whether the effect of tourism development on house prices in China remains under the condition of diversified distribution, the Poisson model shown in equations (4) or (5) was used for robustness testing. All variables in equations (4) and (5) have the same meaning as in equation (1).

$$CUHP_{it} = \alpha_0 + \alpha_1(\text{Tourism}_{it}) + \alpha_2(Tourism_{it})^2 + \mu_i + \nu_t + \varepsilon_{it} \quad (4)$$

$$CUHP_{it} = \alpha_0 + \alpha_1(\text{Tourism}_{it}) + \alpha_2(Tourism_{it})^2 + \beta Z_{it} + \mu_i + \nu_t + \varepsilon_{it} \quad (5)$$

Although the fixed effects model can provide a reasonable range of static estimation results, the static estimates do not consider the possible endogeneity between tourism development and house prices, which may lead to biased estimation results. Therefore, following Ding et al. (2022c), we added the lagged value of the dependent variable as an instrumental variable to the model and then used the systematic GMM to estimate equations (6) or (7) to mitigate the potential endogeneity problem. In equations (6) and (7), $Ln(CUHP_{i,t-1})$ is the lagged value of the dependent variable, and the other variables have the same meaning as in equation (1).

$$Ln(CUHP_{it}) = \alpha_0 + \alpha_1 Ln(CUHP_{i,t-1}) + \alpha_2(\text{Tourism}_{it}) + \alpha_3(Tourism_{it})^2 + \varepsilon_{it} \quad (6)$$

$$Ln(CUHP_{it}) = \alpha_0 + \alpha_1 Ln(CUHP_{i,t-1}) + \alpha_2(\text{Tourism}_{it}) + \alpha_3(Tourism_{it})^2 + \beta Z_{it} + \varepsilon_{it} \quad (7)$$

4. Empirical Findings and Discussion

4.1 Baseline and robustness results

As shown in Table II, column I includes only one explanatory variable while column II includes all explanatory variables. The results show that there is a positive contribution of tourism to house prices. Column III contains only the explanatory variables of tourism and the squared term of tourism, and the results show that the coefficient of tourism is 0.5063, with a positive and significant coefficient at 1% level of significance, while the squared term of tourism has an effect on housing prices in Chinese cities of -0.1720, respectively, with a negative and significant coefficient at 5% level of significance. This suggests that there is a non-linear relationship between tourism development and housing prices, and possibly an inverted U-shaped relationship. Column IV adds control variables to the model and the results show that the coefficient of tourism is 0.5023, which also remains significant at 1% significance level, while the squared term of tourism is -0.1505, which remains significant at 5% significance level. This indicates that the relationship between tourism and housing prices is non-linear with or without the inclusion of the control variables and may be an inverted U-shaped relationship. To further verify whether there is an inverted U-shaped relationship, we added the U-test and the results are in Appendix Table A2, which shows that the extreme points fall within the interval and are significant at 1% level. Also, one of the slopes was negative in the interval. Therefore, the null hypothesis of the monotonic or U-shape was rejected and the existence of the inverted U-shaped relationship was confirmed. In addition, according to Appendix Table A2, the extreme value point of tourism was 0.427. This indicates that tourism development can promote house prices in cities when their combined tourism development index is below 0.427, while tourism development can suppress house prices in these cities when their combined tourism development index is above 0.427. As of 2019, 32 out of China's 45 major cities have a tourism development index above 0.427, indicating that tourism development has begun to curb house price inflation in these cities.[3]

Columns V and VI report the results of the placebo test, where the data for the explanatory variable of tourism were randomly assigned to the squared term of tourism and the placebo test was continued using the fixed effects model. The coefficients for tourism in the placebo test result were 0.0146 and

[3] The cities that have tourism development index greater than the extreme value point of 0.427 are Beijing, Changchun, Chengdu, Chongqing, Changsha, Changzhou, Donguan, Dalian, Foshan, Fuzhou, Guangzhou, Haerbin, Hefei. Hangzhou, Jinan, Kunming, Nanchang, Nanjing, Nanning, Qingdao, Shanghai, Shenyang, Shijiazhuang, Shenzhen, Suzhou, Tianjin, Wuhan, Wuxi, Xian. Xiamen, Zhengzhou, Zhuhai.

0.0081 and were not statistically significant, while the squared terms for tourism remained significant at 0.0581 and 0.0641, which was quite different from the positive and negative coefficients and significance in columns II and III. Therefore, the results of the baseline regression analysis obtained from the fixed effects model were considered robust.

In columns VII and VIII, Poisson regression models were used for robustness testing. According to the Poisson regression analysis model, the coefficients of tourism are 0.5630 and 0.5112 and remain significant at 1% significance level. The squared terms of tourism (-0.1447 and -0.1142) also remained significant at 1% significance level, i.e., tourism still has an inverted U-shaped relationship with urban housing prices in China. Hence, the results obtained are considered consistent with the results of the baseline regression analysis. This indicates that the results of the obtained baseline regression analysis are considered to be robust.

Robustness tests were conducted in columns IX and X using the SYS-GMM model. According to the GMM regression analysis model, the coefficients of tourism were positive and significant at 1.1746 and 0.6881 with or without the inclusion of control variables, while the coefficients of the squared terms of tourism were -0.5812 and -0.4997 and remained significant at 1% significance level. Thus, tourism was considered to exhibit an inverted U-shaped relationship with urban housing prices in China. These results are consistent with the results of the baseline regression analysis, therefore, the results of the study were considered robust.

In addition to tourism, the results of our main model (Column IV) showed that urban foreign direct investment, urban population size, urban fixed asset investment, and urban disposable income per capita were among the factors that influenced urban housing prices. In particular, foreign direct investment in cities was -0.0313 and has a negative effect on urban house prices, however, it is statistically not significant. The effect of the population of Chinese cities (CCP) on house prices was 0.1293 and was significant at 5% level of significance, indicating that the higher the population, the higher the house price. This finding is supported by Mussad et al. (2017) and Chin and Li (2021). In addition, the coefficient of fixed asset investment was -0.0066 and was significant at 5% level of significance, indicating that fixed asset investment inhibits the increase in house prices. When fixed asset investment is mainly in housing construction, the supply of new housing will increase, which may dampen the trend of rising house prices. It can be assumed that people have more choices and opportunities to find housing that meets their needs more easily and do not have to be impatient to buy a home when there is a relatively

adequate supply of housing, which reduces the pressure and demand for housing. In addition, an increase in housing supply may also lead to an increase in housing vacancy rates, as additional housing may not be fully utilised in a timely manner; this may further dampen the upward trend in house prices. Urban disposable income per capita (*CPC*) was 0.1559 and remained significant at 1% level of significance. An increase in disposable income per capita could potentially exert a positive impact on house prices, as it signifies greater purchasing power and demand among individuals to buy homes. This finding is supported by Wong et al. (2019). If the supply of housing is relatively stable and the demand for housing increases, this will lead to an increase in house prices. This is because prices in the housing market are determined by supply and demand, and prices will rise when supply exceeds demand.

Table II Baseline regression results and robustness checks

	Baseline regression				Robustness checks					
	Fixed effect				Placebo effect		Poisson model		SYS-GMM	
	I	II	III	IV	V	VI	VII	VIII	IX	X
$Tourism_{it}$	0.1851***	0.1977***	0.5063***	0.5023***	0.0146	0.0081	0.5630***	0.5112***	1.1746***	0.6881***
	(2.7611)	(2.8871)	(3.9954)	(3.6855)	(0.6903)	(0.3810)	(34.0624)	(30.1056)	(4.5663)	(5.0795)
$Tourism_{it}^2$			-0.1720**	-0.1505**	0.0581*	0.0641**	-0.1447***	-0.1142***	-0.5812***	-0.4997***
			(-2.1896)	(-2.5494)	(1.8505)	(2.0191)	(-18.8156)	(-14.4921)	(-3.5242)	(-4.3651)
$Ln(CFDI_{it})$		-0.0306**		-0.0313		0.0302**		-0.0361***		-0.0110
		(-2.2175)		(-2.2755)		(2.1739)		(-26.8081)		(-0.9250)
$Ln(CCP_{it})$		0.1936***		0.1293**		0.1575		0.2125***		0.1469*
		(2.6454)		(2.4892)		(1.1893)		(18.3001)		(1.8359)
$Ln(CFAI_{it})$		0.0014		-0.0066**		-0.0082		-0.0069**		-0.0099
		(0.0458)		(-2.2175)		(-0.2713)		(-2.3703)		(-0.2781)
$Ln(CPC_{it})$		0.9253***		0.1559***		-0.1822		0.2442***		0.2709***
		(14.760)		(3.1816)		(-1.3698)		(19.7149)		(3.7548)
$Ln(CLB_{it})$		0.1004***		0.0091		0.0222		0.0107***		0.0924***
		(2.9297)		(0.2694)		(0.6601)		(3.4063)		(3.8329)
$Ln(CUHP_{i,t-1})$									2.0247***	0.941***
									(14.2031)	(27.411)
Constant	8.7210***	8.9828***	8.5728***	8.7273***	8.8272***	9.2199***				
	(135.1440)	(5.1719)	(84.4138)	(95.0219)	(236.4818)	(198.2495)				
Observations	405	405	405	405	405	405	405	405	360	360

R-squared	0.802	0.806	0.803	0.807	0.799	0.803		
city FE	YES	YES	YES	YES	YES	YES		
year FE	YES	YES	YES	YES	YES	YES		
Sargan test							0.117	0.146
AR(1)							0.017	0.029
AR(2)							0.950	0.955

Notes: t-statistics in parenthesis, ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

4.2 Heterogeneity analysis

To further verify whether there is an inverted U-shaped effect of urban tourism development on urban house prices, we divided the 45 major Chinese cities in our sample into tourist and non-tourist cities. The selection of tourist and non-tourist cities was based on the Fourteenth Five-Year Plan for Tourism Development issued by the State Council of China[4] and this selection of cities has been employed by Tang et al. (2022) in studying digital economy and tourism development in Chinese cities. The list of specific tourist and non-tourist cities is given in Appendix A1.

We also used the fixed effects regression model in equation (1) and (2) or validation and excluded the control variables in the odd columns and included them in the even columns. The specific results are shown in Table III. According to Table III, Columns I and II are for tourist cities and the Columns III and IV are for non-tourist cities. With or without adding control variables, the coefficients of tourism in tourist cities were 0.5054 and 0.5080 and remained significant at 1% significance level. Meanwhile, the squared term coefficients of tourism were -0.1872 and -0.1427 and remained significant at 5% significance level, proving that there may be an inverted U-shaped effect of tourism in tourist cities on urban house prices. To further verify this possibility, we added the U-test, with the results shown in Appendix Table A2. The results show that there was indeed an inverted U-shape between tourism and urban house prices in tourist cities, with an inflection point of 0.501. This means that the development of tourism can increase house prices in tourist cities with an integrated level of tourism development below 0.501. However, at a level above 0.501, further development may lead to a decrease in house prices. Meanwhile, the effect of tourism on house prices in non-tourist cities is not significant, proving that tourism is not a factor that affects house prices in non-tourist cities. The U-test results also show that there is no inverted U-shape between tourism and city house prices in non-tourist cities.

[4] Notice of the State Council on the issuance of the 14th Five-Year Plan for Tourism Development. https://zwgk.mct.gov.cn/zfxxgkml/ghjh/202201/t20220121_930613.html

The effects of other variables on house prices also differ between tourist and non-tourist cities. The effect of loan (*CLB*) on house prices is insignificant for tourist cities but significant for non-tourist cities. This suggests that bank loan is not an important factor that influences housing prices in tourist cities. This may be because the residents in tourist cities may have more business opportunity and funding options; thus, they may not rely on bank loan as the source of funding in purchasing houses. Other than that, foreign direct investment was not statistically significant for either tourist or non-tourist cities, suggesting that foreign direct investment is not a key factor that affects house prices in both tourist and non-tourist cities. At the same time, fixed asset investment had a negative effect on house prices in both tourist and non-tourist cities. This suggests that an increase in fixed asset investment reduces housing price in both cities. It is also worth noting that the negative effect is greater in tourist cities. This may happen if the fixed asset investment is utilised to build new housing development to accommodate the influx of people and businesses that tourism attracts. Hence, this may increase the overall supply of housing in tourist cities, which drives down the housing prices.

Table III Heterogeneity analysis

	Tourist Cities		Non-tourist cities	
	I	II	III	IV
$Tourism_{it}$	0.5054***	0.5080***	0.5016	0.5005
	(4.8529)	(4.9136)	(1.3655)	(1.1126)
$Tourism_{it}^2$	-0.1872**	-0.1427**	-0.1292	-0.1584
	(-2.3662)	(-2.4545)	(-1.6792)	(-1.1679)
$Ln(CFDI_{it})$		-0.0406		-0.0184
		(-0.0364)		(-0.6977)
$Ln(CCP_{it})$		0.1324**		0.1152***
		(2.1417)		(2.9509)
$Ln(CFAI_{it})$		-0.0083**		-0.0054***
		(-2.2235)		(-2.8942)
$Ln(CPC_{it})$		0.2083***		0.0963***
		(12.8975)		(6.0541)
$Ln(CLB_{it})$		0.0092		0.0088***
		(0.2349)		(3.3764)
Constant	10.6767***	9.7031**	8.1177***	8.3778***
	(78.7064)	(2.4090)	(27.6069)	(0.1949)
Observations	288	288	117	117

R-squared	0.848	0.834	0.823	0.820
city FE	YES	YES	YES	YES
year FE	YES	YES	YES	YES

Notes: t-statistics in parenthesis, ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

5. Conclusion

The study is motivated by the fact that tourism is a pillar industry that makes an important contribution to the development of the local economy and social progress. A thriving tourism industry can also have a spill over effect on the local property market. The impacts of the development of tourism industry on property prices are multifaceted. Firstly, a booming local tourism industry attracts more tourists to the area, thereby stimulating local economy growth and potentially leading to population growth and increased demand for housing, which may have a positive impact on local house prices. In addition, tourism development may also have an impact on the local property market in terms of supply and demand dynamics. For example, rapid tourism growth may necessitate an increase in the supply of accommodation facilities such as hotels, which may lead to a relatively tight supply in the rental housing market, thereby affecting rents and house prices. Additionally, in some cities with strong tourism industry, the practice of using residential properties for short-term rentals may drive up house prices. In addition, the growth of tourism may also prompt property developers to invest in tourism-related facilities such as resorts and luxury hotels, thereby reducing the supply of residential housing and leading to increasing in local house prices. However, rising house prices can also have adverse effects. Increased cost of living, coupled with the need to allocate more disposable income towards purchasing a house, can create financial stress for individuals, potentially leading to a negative psychological perception of buying a home and this in turn leads to a decrease in demand in the area.

This paper assesses the impact of tourism development on house prices in 45 large and medium-sized cities in China between 2011-2019 using fixed effects models, systematic GMM, placebo tests and Poisson models. Population, income, and other relevant indicators that may affect house prices were used as control variables in the model. The empirical results show that there is an inverted U-shaped effect of tourism development on house prices in tourist cities. In contrast, non-tourist cities do not experience this effect. This implied that tourism is one of the most important factors influencing house prices in tourist cities, whereas for non-tourist cities, tourism has a relatively small impact on house prices. Besides,

foreign direct investment, population size, fixed asset investment and disposable income per capita were found to have an impact on house prices in both tourism and non-tourism cities. This paper provides an important basis for studying the non-linear relationship between tourism development and urban house prices in China by measuring the existence of an inverted U-shaped relationship between tourism development and urban house prices in China. The same inverted U-shaped relationship exists between tourism and house prices in Chinese tourist cities, while no inverted U-shaped relationship exists in Chinese non-tourist cities. At the same time, this study provides a methodological reference for further comprehensive measurement of tourism development. Foreign direct investment, population size, fixed asset investment and disposable income per capita were also identified to have an impact on urban house prices.

Based on our findings that the impact of tourism development on house prices is varies across cities, with house prices in tourist cities tending to be more influenced by tourism development than non-tourist cities, it may be appropriate for the government to introduce policies that take into account the unique circumstances of tourist cities in order to promote sustainable tourism development while also ensuring that local residents can afford to live in their communities. Such policies may include regulations on short-term rentals, which can contribute to rising housing prices and reduced availability of rental units. The government may also consider incentives for developers to build affordable housing or to rehabilitate existing housing stock in tourist cities to maintain a mix of housing options and prevent displacement of lower-income residents.

References

Ahmed, R. and Jawaid, S.T. (2023), "Foreign capital inflow and housing prices in a developing country: an advanced econometric enquiry", *International Journal of Housing Markets and Analysis*, Vol. 16 No. 1, pp. 146-166.

Alola, A.A,. Asongu, S.A,. and Alola, U.V. (2020),“House prices and tourism development in Cyprus: A contemporary perspective", *Journal of Public Affairs,* Vol.20.

Andria, J. Tollo, G. and Pesenti, R. (2021),“Fuzzy multi-criteria decision-making: An entropy-based approach to assess tourism sustainability", *Tourism Economics*, Vol.27No. 1,pp. 168–186.

Anguera-Torrell, O. Vives-Perez, J. and Aznar-Alarcón, J.P. (2021),“Urban tourism performance index over the COVID-19 pandemic", *International Journal of Tourism Cities*, Vol.7No. 3,pp. 622-639.

Arbel, Y. Fialkoff, C. and Kerner, A. (2017),“Negative Externalities and Implicit Non-Linear Prices: Capitalization of Highway Noise into Housing Values", *Journal of Real Estate Literature*, Vol.25No. 2,pp. 335-364.

Azam Khan, M. Ali, N. Khan, H. and Yien, L.C. (2022),“Factors determining housing prices: empirical

evidence from a developing country's Pakistan", *International Journal of Housing Markets and Analysis*. Vol. ahead-of-print No. ahead-of-print.

Azam, M, and Khan, S. (2022),"Threshold effects in the relationship between inflation and economic growth: Further empirical evidence from the developed and developing world", *International Journal of Finance & Economics*. Vol.27,pp. 4224-4243.

Azam, M.,Mahdiat M.,Hafeez M. and Bakhtyar B. (2022),"Investigating the Role of Tourism in Economic Growth: Empirical Evidence from Pakistan", *Polish Journal of Sport and Tourism*, Vol.29 No.1, pp. 39-47. https://doi.org/10.2478/pjst-2022-0007

Azam, M. and Rashid, S. (2015),"The monetarist hypothesis of inflation in Pakistan - a critique", *Journal of the Asia Pacific Economy*, Vol.20 No.4, 559-576.

Baloch, Q. B., Shah, S. N., Iqbal, N., Sheeraz, M., Asadullah, M., Mahar, S., and Khan, A. U. (2023),"Impact of tourism development upon environmental sustainability: a suggested framework for sustainable ecotourism", *Environmental science and pollution research internationa*l, Vol.30No.3, pp.5917-5930.

Biagi, B., Brandano, M. G., and Caudill, S. B. (2016),"Tourism and house prices in Italy: A latent class approach", *Tourism Economics*, Vol.22No.5, pp.964-978.

Biagi, B. Brandano, M.G. and Lambiri, D. (2015),"Does Tourism Affect House Prices?", *Growth Change,* Vol.46,pp. 501-528.

Brotman, B.A. (2021), "Portland ordinances: tiny home and short-term rental permits", *International Journal of Housing Markets and Analysis*, Vol. 14 No. 1, pp. 124-136. https://doi.org/10.1108/IJHMA-02-2020-0012

Brotman, B.A. (2020), "San Francisco: rental restrictions and pre-restriction host listing motivation", *Journal of Property Investment & Finance*, Vol. 38 No. 2, pp. 147-155. https://doi.org/10.1108/JPIF-09-2019-0128

Chen, F. (2018),"Spatial Differentiation of Urban Housing Prices in Guangdong Province and Its Influencing Factors", *Modern Economy,* Vol.9, pp. 664-681.

Chen, K. Lin, H. Liao, L. Lu, Y. Chen, Y.J. Lin, Z. Teng, L. Weng, A. and Fu, T. (2022),"Nonlinear Rail Accessibility and Road Spatial Pattern Effects on House Prices", *Sustainability*, Vol.14No. 8, 4700.

Cheng, M.Y. Liu, Y.S. and Zhou, Y. (2019),"Measuring the symbiotic development of rural housing and industry: A case study of Fuping County in the Taihang Mountains in China", *Land Use Policy*. Vol.82, pp.307-316,

Chin, L. and Li, X. (2021),"House prices and bank credit in China: analysis of first- and second-tier cities", *International Journal of Housing Markets and Analysis*, Vol.14No. 4,pp. 779-795.

Ding, Y. (2019),"Housing prices and population dynamics in urban China", *Pacific Economic Review,* Vol.24,pp. 27– 45.

Ding, Y., Lee, C. and Lu, M. (2022a),"Does market sentiment push up China's housing prices? An empirical study based on the data of 45 mainstream cities in China", *Journal of Housing and the Built Environment*.

Ding, Y., Lee, C. Lu, M. and Deng, P.D. (2022b),"Do high housing prices crowd out young professionals?—Micro-evidence from China", *Economic Research-Ekonomska Istraživanja*.

Ding, Y., Chin, L., Li, F., & Deng, P. (2022c),"How Does Government Efficiency Affect Health Outcomes? The Empirical Evidence from 156 Countries", *International Journal of Environmental Research and Public Health*, Vol.19No.15.

Feng, R.K. and Han, R.B. (2021),"Study on the Spatial Differentiation Pattern of Housing Prices in

Chengdu-Chongqing City Cluster", *Open Access Library Journal*, Vol.8,pp. 1-11.

Gan, L. Ren, H. Xiang, W. Wu, K. and Cai, W. (2021),“Nonlinear Influence of Public Services on Urban Housing Prices: A Case Study of China", *Land*, Vol.10No. 10,1007.

Gan, M., and Ouyang, Y. (2022),“Study on Tourism Consumer Behavior Characteristics Based on Big Data Analysis", *Frontiers in psychology*, Vol.13.

Gholipour Fereidouni, H. (2012), "The role of real estate agents on housing prices and rents: the Iranian experience", *International Journal of Housing Markets and Analysis*, Vol. 5 No. 2, pp. 134-144. https://doi.org/10.1108/17538271211225896

Jin, T.H. Cheng, L. Liu, Z.C. Cao, J. Huang, H.S. and Witlox, F. (2022),“Nonlinear public transit accessibility effects on housing prices: Heterogeneity across price segments", *Transport Policy*, Vol.117,pp. 48-59.

Kavarnou, D. and Nanda, A. (2018),“How does tourism penetration affect house prices? Evidence from Crete, Greece", *Journal of Tourism Analysis: an interdisciplinary journal*, Vol.23No. 3,pp. 289-301.

Kim, J.H. and Lee, S.Y. (2022),“Foreign direct investment and housing prices: evidence from South Korea", *International Economic Journal*, Vol.3No. 2,pp. 247-262.

Kok, S.H., Ismail, N.W., and Chin, L. (2018),“The Sources of House Price Changes in Malaysia", *International Journal of Housing Markets and Analysis*, Vol.11No. 2,pp. 335-355.

Li, J. and Chiang, Y. (2012),“What pushes up China's real estate price?", *International Journal of Housing Markets and Analysis*, Vol.5No. 2,pp. 161-176.

Li, S.Y.M., Suardi, S. and Wee, B.J.M. (2022),“Bank lending behavior and housing market booms: The Australian evidence", *International Review of Economics & Finance,* Vol.81,pp. 184-204.

Li, Z. Razali, M.N., Gholipour Fereidouni, H. and Mohd Adnan, Y. (2018),“Macro-economic index effect on house prices in China", *International Journal of Housing Markets and Analysis*, Vol.11No. 3,pp. 453-475.

Lin, H. and Liu, Y. (2021),“A Research on the Influence of Tourism Development on Urban Real Estate Price—A Case Study of Xiamen City. *MICE Prospects*, Vo1.2 No.1, pp.80-89.(In Chinsese)

Lin, Y. Ma, Z. Zhao, K. Hu, W. and Wei, J. (2018),“The Impact of Population Migration on Urban Housing Prices: Evidence from China’s Major Cities", *Sustainability*, Vol.10No. 9.

Liu, K.B., Wang, Y.C., and Lin, L. (2020),“Will Tourism Development Increase Housing Prices?——Based on the Empirical Analysis of Hainan Province, China", *International Journal of Frontiers in Sociology*, Vol.2No. 3.

Liu, R. Yu, C. Liu, C. Jiang, J. and Xu, J. (2018),“Impacts of Haze on Housing Prices: An Empirical Analysis Based on Data from Chengdu (China)", *International Journal of Environmental Research and Public Health*, Vol.15No. 6.

Mahmoodi, E., Azari, M., and Dastorani, M. T. (2023). Comparison of different objective weighting methods in a multi-criteria model for watershed prioritization for flood risk assessment using morphometric analysis. *Journal of Flood Risk Management*, Vol. 16 No. 2, e12894. https://doi.org/10.1111/jfr3.12894

Maisel, S.J. (1949), “Variables commonly ignored in housing demand analysis”, *Land Economics*, Vol. 25 No. 3, pp. 260-274.

Manzoor, F. Wei, L. Asif, M. Haq, M.Z., and Rehman, H. (2019),“The Contribution of Sustainable Tourism toEconomic Growth and Employment in Pakistan", *International journal of environmental research and public health*, Vol.16No. 19.

Mathur, S. (2022),“Non-linear and weakly monotonic relationship between school quality and house prices", *Land Use Policy*, Vol.113.

Mikulić, J. Vizek, M. Stojčić, N. Payne, J.S., Časni, C.A., and Barbić, T. (2021),“The effect of tourism activity on housing affordability", *Annals of Tourism Research,* Vol.90.

Miles, D. (2012),“Population Density, House Prices and Mortgage Design", *Scottish Journal of Political Economy* , Vol.59,pp. 444-466.

Mussa, A. Nwaogu, U.G. and Pozo, S. (2017),“Immigration and housing: A spatial econometric analysis", *Journal of Housing Economics*, Vol.35,pp. 13-25,

Naseem, S. (2021),“The Role of Tourism in Economic Growth: Empirical Evidence from Saudi Arabia", *Economies*, Vol.9No. 3.

Nguyen, Q.H. (2021),“Impact of Investment in Tourism Infrastructure Development on Attracting International Visitors: A Nonlinear Panel ARDL Approach Using Vietnam’s Data", *Economies*, Vol.9No. 3.

Ni, P.F. Zhang, Y.Z. and Cao, Q.F. (2019),'The Influence of Housing Prices on Urban Competitiveness: Review and Prospects'.*Chinese Journal of Urban and Environmental Studies*, Vol.7 No.3

Özmen, M.U., Kalafatcılar, M.K., and Yılmaz, E. (2019),“The impact of income distribution on house prices", *Central Bank Review*, Vol.19No. 2,pp. 45-58.

Paramati, S.R., and Roca, E. (2019),“Does tourism drive house prices in the OECD economies? Evidence from augmented mean group estimator", *Tourism Management,* Vol.74,pp. 392-395.

Pilatin, A., Hepşen, A. and Kayran, O. (2023), "The effect of social capital on housing prices: panel data analysis by province in Turkey", *International Journal of Housing Markets and Analysis*, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/IJHMA-11-2022-0170

Qu, W., Li, J., Song, W., Li, X., Zhao, Y., Dong, H., Wang, Y., Zhao, Q., and Qi, Y. (2022), " Entropy-Weight-Method-Based Integrated Models for Short-Term Intersection Traffic Flow Prediction", *Entropy (Basel, Switzerland)*, Vol. 24 No. 7, 849. https://doi.org/10.3390/e24070849

Radulescu, C.Z., Radulescu, M., and Boncea, R. (2022), " A Multi-Criteria Decision Support and Application to the Evaluation of the Fourth Wave of COVID-19 Pandemic. *Entropy,* Vol. 24 No.5, 642. https://doi.org/10.3390/e24050642

Rasool, H. Maqbool, S. and Tarique, M. (2021),“The relationship between tourism and economic growth among BRICS countries: a panel cointegration analysis", *Future Business Journal,* Vol.7No. 1.

Schäfer, P. and Braun, N. (2016), "Misuse through short-term rentals on the Berlin housing market", *International Journal of Housing Markets and Analysis*, Vol. 9 No. 2, pp. 287-311. https://doi.org/10.1108/IJHMA-05-2015-0023

Shokoohyar, S., Sobhani, A. and Sobhani, A. (2020), "Determinants of rental strategy: short-term vs long-term rental strategy", *International Journal of Contemporary Hospitality Management*, Vol. 32 No. 12, pp. 3873-3894. https://doi.org/10.1108/IJCHM-03-2020-0185

Stevenson, S. (2008), “Modeling housing market fundamentals: empirical evidence of extreme market conditions”, *Real Estate Economics*, Vol. 36 No. 1, pp. 1-29.

Tam, P.S., Lei, CK., and Zhai, T. (2022),“Investigating the bidirectionality of the relationship between residents’ perceptions of tourism impacts and subjective well being on support for tourism development", *Journal of Sustainable Tourism*.

Tan, C.T., Lee, C.Y., Tan, Y.T., and Keh, C.G. (2018),“A nonlinear ARDL analysis on the relation between housing price and interest rate: The case of Malaysia", *Journal of Islamic, Social, Economics and Development*, Vol.3No. 14, pp. 109-121.

Tang, H. Cai, C. and Xu, C. (2022),“Does the Digital Economy Improve Urban Tourism Development? An Examination of the Chinese Case", *Sustainability*, Vol.14No. 23.

Teixeira, S.J., Ferreira, J.J., Wanke, P. and Antunes, J.J.M. (2021),“Evaluation model of competitive and innovative tourism practices based on information entropy and alternative criteria weight", *Tourism Economics*, Vol.27 No. 1,pp. 23-44.

Wang, S. Wang, J. and Wang, Y. (2018),“ Effect of land prices on the spatial differentiation of housing prices: Evidence from cross-county analyses in China", *Journal of Geographical Sciences,* Vol.28, pp. 725-740.

Wang, W.K., and Tsai, I..C. (2022),“House age and housing prices: a viewpoint of the optimal time for land redevelopment", *International Journal of Strategic Property Management,* Vol.26No. 3, pp. 172-187.

Wen, T.P. (2021),“The Impact of Foreign Direct Investment on China's Housing Prices", *Advances in Economics, Business and Management Research*, Vol.178.

Wilhelmsson, M., Ismail, M. and Warsame, A. (2022), "Gentrification effects on housing prices in neighbouring areas", *International Journal of Housing Markets and Analysis*, Vol. 15 No. 4, pp. 910-929. https://doi.org/10.1108/IJHMA-04-2021-0049

Wittowsky, D., Hoekveld, J., Welsch, J., and Steier, M. (2020),“Residential housing prices: impact of housing characteristics, accessibility and neighbouring apartments – a case study of Dortmund, Germany. *Urban, Planning and Transport Research*, Vol. 8No.1, pp. 44-70.

Wong, V.K., and Aralas, S.B. (2019),“Macroeconomic variables and housing prices in Malaysia", *Proceedings of the International Conference on Economics*, pp. 23-34.

Wong, W.L., Chin, L. and Koong, S.S. (2019),“Housing Prices in Peninsular Malaysia: Supported by Income, Foreign Inflow or Speculation? ", *International Journal of Housing Markets and Analysis*, Vol.12No. 2,pp. 424-441.

Wong, W.L., Law, S.H., Said, R. and Chin, L. (2015),“Consumption and Housing Wealth: A Malaysian Case that Demonstrates a Negative Relationship", *International Journal of Economics and Management*, Vol.9No. S,pp. 163-180.

Wu, T.P., Wu, H.C., Wang, C.M., and Wu, Y.Y. (2021),“Causality between tourism and housing prices: a wavelet-based approach", *Journal of Policy Research in Tourism, Leisure and Events*.

Xu, Y. Zhang, Q. Zheng, S. and Zhu, G.Z. (2018),“House Age, Price and Rent: Implications from Land-Structure Decomposition", *The Journal of Real Estate Finance and Economics,* Vol.56,pp. 303-324.

Yang, L. Khaskheli, A. Raza, S.A., and Shah, N. (2023),“Panel smooth transition regression approach to analyzing tourism development - housing price nexus in G7 countries", *International Journal of Housing Markets and Analysis*, Vol.16No. 1,pp. 218-231.

Yıldırım, M.O., and Karul, C. (2022),“Does tourism affect house prices in Turkey? Evidence from smooth structural break tests", *International Journal of Housing Markets and Analysis*, Vol.15No. 5,pp. 1033-1052.

Yiu, C.Y., and Cheung, K.S. (2022),“The Age-Period-Cohort Problem in Hedonic House Prices Models", *Econometrics,* Vol.10No. 4.

Zaman, K. Shahbaz, M. Loganathan, N. and Raza, S.A. (2016),“Tourism development, energy consumption and Environmental Kuznets Curve: Trivariate analysis in the panel of developed and developing countries", *Tourism Management,* Vol.54,pp. 275-283.

Zhang, X., Lin, Z. and Maeng, J. (2022), "Investigating the impact of home-sharing on the traditional rental market", Internet Research, Vol. 32 No. 7, pp. 169-184. Zheng, Y. (2017),“The Impact of

Population Age Structure on Real Estates Price—Evidence from China Provincial Panel Data", *Open Journal of Social Sciences,* Vol.5,pp. 212-222.

Zhou, Q. Shao, Q.L. Zhang, X.L. Chen, J. (2020),"Do housing prices promote total factor productivity? Evidence from spatial panel data models in explaining the mediating role of population density", *Land Use Policy*,Vol.91.

Zou, G. and Chau, K. (2015),"Determinants and Sustainability of House Prices: The Case of Shanghai, China", *Sustainability*, Vol.7No. 4,pp. 4524-4548.

Appendix

List A1

The city list

Tourist Cities: Beijing, Changchun, Chengdu, Chongqing, Changsha, Dalian, Fuzhou, Guangzhou, Haerbin, Hefei, Hangzhou, Jinan, Kunming, Lanzou, Ningbo, Nanchang, Nanjing, Nanning, Qingdao, Guiyang, Shanghai, Shenyang, Shijiazhuang, Shenzhen, Suzhou, Tianjin, Wuhan, Wuxi, Xian, Xiamen, Zhengzhou, Zhuhai,

Non-Tourist Cities: Baoding, Changzhou, Donguan, Foshan, Huizhou, Jinhua, Jiaxing, Nantong, Shaoxing, Taizhou, Xuzhou, Yantai,Zhongshan

Table A1
Multicollinearity test

Variable Name	VIF	1/VIF
Tourism	3.81	0.262443
CPFDI	3.79	0.263889
CCP	3.75	0.266636
CFAI	2.87	0.348279
CPC	1.92	0.519700
CLB	1.87	0.535551
Mean VIF	3.00	

Table A2 U-test

	All cities		Tourist Cities		Non-tourist Cities	
Extreme point	0.427		0.501		0.353	
	Lower	Upper	Lower	Upper	Lower	Upper
Interval	0.124	0.674	0.129	0.674	0.124	0.573
Slope	2.23	-3.22	2.14	-2.97	1.89	-1.58
t-value	4.11	-6.23	2.43	-4.54	2.64	-3.92
P＞t	0.00	0.00	0.00	0.00	0.20	0.02
t-value	4.11		2.43		2.64	
P	0.00		0.00		0.20	

Test: H_1: Inverse U-shape vs. H_0: Monotone or U-shape.