Economics Bulletin

Volume 32, Issue 3

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Abstract

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Citation: Chieh-hsuan Wang and Chien-ping Chung and Jen-Te Hwang, (2012) "Hedonic and GMM Estimates of the Relationship between House Prices and Rents in Taiwan", *Economics Bulletin*, Vol. 32 No. 3 pp. 2231-2245.
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Submitted: August 18, 2011. **Published:** August 06, 2012.

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Submission Number:EB-11-00571

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Abstract

Empirical results in this study demonstrate that house prices have limited influence over rents in Taiwan. In fact, the impact of house prices on rents is not as apparent as of other factors like the floor (high or low), area, and the interaction of multiple factors such as house attributes like traffic accessibility. This means that the correlation between house prices and rents is not as direct and close as theories or experience would suggest. The findings also imply that a direct causal relationship does not exist between rents and house prices. Apart from reflecting the phenomenon of the price disconnect, the difference between owner-occupied dwellings market and rental market could have also resulted from various factors such as affordability, relevant government policies, and the traditional association of land ownership with wealth. As a result, demographics of house renters have been separated from those of house owners, meaning that households make their tenure choices differently; those who remain in the rental market over the long run are usually the disadvantaged minorities, who can resolve their needs for shelter only through house rentals.

Submitted: Aug 18 2011. **Revised:** August 04, 2012.

1. Introduction

The intricate relationship between house prices and rents should be quite apparent. Those who need to rent houses choose houses in accordance with their financial capability. If one's financial capability have improved, or if a person or family's housing needs have changed, configuration of the house needed also changes. Theoretically speaking, the housing market and the rental market should be inter-replaceable to a certain extent.

Let us take a look at transactions in the US housing and rental markets. In the past, the rent multiplier for a house was approximately at 100, i.e. the price of a house should work out to about 100 times its monthly rent.[1] The rent multiplier for an apartment house was significantly lower at around 70. The *New York Times Magazine* (May 27, 2005) provided a list of annual rent multipliers for all major American cities, and the statistics showed that rent multiplier had fallen to the lowest point in Pittsburgh in 2000, at 10.5, while San Jose and California came in first at 14.1. Converted into a monthly rent multiplier, the figures would become 126 and 169.2, respectively. Incidentally, the value of rent multiplier also reveals the relationship between house prices and rents – the figure not only projects the relative cost of owning a house vis-à-vis renting a house, but can also be used to identify changes in demand and supply.

However, when it comes to inter-replaceability of the two markets, Jones (1995) believed that house ownership comes with incentives, such as the sense of security, privacy and freedom of house utilization, and these incentives encourage households to venture into the owner-occupied housing market. As a result, the replaceability between the owner-occupied housing market and the rental market would be quite limited. In addition, Cheung et al. (1995) used the Granger causality test to examine the relationship between house prices and rents for every quarter in four administrative districts of Hong Kong (Hong Kong proper, Kowloon, New Kowloon and New Territories), during the period 1982~1991. Results indicate that rents and house prices for many areas were quite independent of each other. From this, we could induce that the difference in demand structures of the two markets was caused by factors such as risk preference, affordability, policy orientations and the traditional association of land ownership with wealth. Cheung et al. also proposed the notion of differentiation between the two markets (owner-occupied and rental) and pointed out that the differentiation would render the interactive relationship less apparent.

From the literature on rent multipliers in Taiwan, most scholars have found that the monthly rent multiplier in Taiwan is significantly higher compared to the US, mainly due to expectations of capital gains on part of house owners. Estimates performed based on empirical data provided in this paper show that the average rent multipliers for Taipei City, Taipei County and the rest of northern Taiwan, during the period from 2000 to 2006, have been 458.63, 360.54 and 390.10, respectively. Based on what we have learnt from previous

[1] This is known as the 1%-rule.

studies, these figures are unreasonably high, compared to overseas markets, and reflect the fact that house prices are relatively high while rents are unreasonably low, in Taiwan.[2] The owner believe that capital gains from selling their houses later would be more than enough to compensate the loss incurred because of low rental income. This implies that house owners perceive rent as an extra income, which is in addition to capital gain from sale of houses later on. Therefore, lessors don't really care if the rent they receive will cover the cost of servicing the capital invested for house purchase.

Given the fact that the rent multiplier in Taiwan is significantly higher compared to many areas in the U.S., the rent multiplier surge upward shows the deviation between the house price and rent. This means that the relationship between house prices and rents is not as direct and close as theories predict. We would attempt to show that whether house prices and rents in northern Taiwan have a relationship as relevant as past researchers have claimed.

In terms of empirical investigations, Leung et al. (2006) indicated that price dispersion of non-durable goods has been studied extensively but the extensive housing price literature focuses on mean housing prices rather than price dispersion. They believed that housing units can differ in terms of attributes and are not homogeneous and, therefore, price dispersion exists in residential property market and hedonic pricing model can be used in the empirical investigation.[3] Leung et al. (2007) used a hedonic pricing model on more than 220,000 housing transactions in Hong Kong between 1992 and 2005 to model the time paths of different implicit prices as auto-regressive processes. Results indicate that a major financial crisis occurred and the aggregate housing price swung significantly.

In order to prevent deviations in the demand function, and rent multipliers derived from estimations in this study, we have chosen to use a linear hedonic price function to compute rent and house prices data,[4] with the same house attributes. In addition to examining Taiwan's current rent multiplier level, this research also further discusses the interaction, and the correlation, between rents and house prices. It is important to point out that authors of most of the aforementioned studies have overlooked the interaction between rents and house prices in their regression model analyses, and have separated discussions of rental and owner-occupied housing markets. As a result, they have neglected the impact of such interaction. In order to prevent deviation in the estimation, we have utilized the generalized method of moments (GMM) model to analyze the impact of house prices, [5]

[2] In comparison to the 1%-rule in the US.

[3] The hedonic pricing model decomposes the price of an item into separate components that determine the price.

[4] Cropper et al. (1988) examined how errors in measuring marginal attribute prices vary with the form of the hedonic price function. They found that if all attributes are observed, linear and quadratic Box-Cox forms produce lowest mean percentage errors. And if some attributes are unobserved or are replaced by proxies, linear and linear Box-Cox functions perform best.

[5] The advantage of using the GMM model for estimation lies in the fact that we could obtain reliable results without having to find out the exact distribution of residual terms, or applying excessive restraints. However, since house prices could be susceptible to the impact of rents, we must choose the appropriate instrumental

micro-architectural environment and macro economic variables on rents, by incorporating tenure choice and data with the same house attributes.[6]

Apart from examining the reasons that have driven up rent multipliers in Taiwan, we will also be looking at the inter-replaceability between Taiwan's owner-occupied housing market and rental market, given the high ratio of owner-occupied dwellings. The second section of this paper covers estimation and analysis of rent multiplier for northern Taiwan. The third section focuses on the estimation model, and the empirical method featured in this study. The empirical results are presented in the fourth section, which is followed by the conclusion.

2. Estimation model and empirical method

Rosen (1974) combined the consumer theory with the utility theory and the bid price theory to propose the notion that house prices are the combination of multiple attributes and characteristics. Under an open trade setting, consumers would strive for efficacy optimization, while producers would seek profit maximization, and when the two get balanced, the price is accepted by the market. The prices consumers are willingness to pay for houses reflects the implied market price, shaped by these attributes and characteristics, which define the structure of the hedonic price theory.

Since any household has to be either the buyer or the lessee of the house, the correct way to discuss the current market would be to combine the owner-occupied market and the rental market as one. Because of the difficulties involved in data acquisition, and in order to gather data from the same housing market, we would first compute house prices and rents using the hedonic price function, before further discussions.

In the first phase of the analysis, a linear model was adopted to utilize the data on house type of "apartments" and "buildings with elevators." Micro architectural environment of houses, i.e. factors such as traffic accessibility (Z_t), area (G_t), floor (F_t), square of floor (F_t^2), the interaction of house type and location $(F \times D_t)$, these will affect supply and demand for houses, have been considered in construction of the model. Among these factors, traffic accessibility is calculated on the basis of the number of stops made by Tze Chiang Train; if the train makes more than 15 north bound and south bound stops on a daily basis, we would assign a dummy variable of 1, representing high traffic accessibility. If the house is an apartment, then also we would assign a dummy variable of 1 as its representation. The hedonic price function used in this study is shown below:

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variable to prevent inconsistencies in parameters for the estimation. In other words, the instrumental variable must be highly correlated to house prices and yet be almost unrelated to the error term.

[6] Since the GMM estimation was first formalized by Hansen (1982), it has become a very popular tool among empirical researchers because it does not impose a specific parametric distribution on errors and also allows for a general form of serial correlation and conditional heteroscedasticity. Besides, the iterated efficient GMM estimator has the same asymptotic distribution as the two-step efficient estimator. And many standard estimators, including IV and OLS, can be seen as special cases of GMM estimators. Therefore, we use the GMM to conduct our analysis.

$$P_t = f(X_{1t}, X_{2t}) \quad (1)$$

In (1), P_t stands for house price, X_{1t} and X_{2t} represent various factors that would affect the supply and demand of the owner-occupied dwelling market,[7] respectively; and t denotes different point of time.

In the second phase of the analysis, in terms of demand for rented houses, Frew and Jud (1988) pointed out that the demand for the stock of rented housing is a function of rent and other factors (such as location, physical characteristics, amenities and services, occupancy restrictions and economic factors). In this paper, we assume that floor (F_t) and the interaction of house type and floor $(F \times D_t)$ represent the other factors, so rental demand is primarily affected by rent (R_t), floor (F_t) and the interaction of house type and floor $(F \times D_t)$.

When the value of interaction between house type and floor increases, its level of convenience would fall. We can naturally deduce that as the value representing the interaction between anticipated rent, floor, house type and area gets higher, the demand for rentals would decline.

In terms of supply of rented houses, Potepan (1996) assumed variables of rent, house price, interest rate of housing loans, tax rate and the anticipated capital gain. Peng et al. (2000) also believed that supply of rented houses is mainly affected by rent, house prices and anticipated business cycles. Since we were unable to observe the interest rate for housing loans that different households had to face, and considering the fact that the real estate tax rate is consistent across all municipalities in Taiwan, we have chosen rent and house price as the variables that would affect supply of rented houses. When the anticipated rent increases, house owners would be more inclined to offer their houses for rent, and that would increase the supply in the rented houses market. However, when house prices go up but rents stagnate, we can expect supply to fall since house owners would have to face increased costs. On a related note, since the anticipated capital gain is susceptible to the impact of anticipated business cycle fluctuations, we have chosen changes in money supply M2 (one of the components of the leading index, and is one of the business cycle indicators for the real estate market, as mentioned in previous paragraphs) to represent people's anticipation of the business cycle as a variable.[8] The cross-sectional data is used to perform a regression analysis in this study.

Based on the aforementioned variables, that affect supply and demand in the rental market,

[7] The factors include traffic accessibility (Z_t), area (G_t), floor (F_t), square of floor (F_t^2) and the interaction of house type and location $(F \times D_t)$.

[8] Chen et al. (2002) and have also used the change in money supply (M2) as one of the variables to represent real estate cycle indicators.

we can construct the model as follows:

$$R_t = Z_t'\alpha_0 + \varepsilon_t,\ t = 1,.....,n \tag{2}$$

In (2), R_t represents the rent for one ping of area, Z_t is a 6×1 vector of explanatory variables, α_0 is a vector of unknown coefficients, ε_t is a random error term allowed to be conditionally heteroskedastic as well as serially correlated. Z_t include P_t, F_t, $D_t \times F_t$, $M2_t$, $C1_t$ and $C2_t$. P_t stands for the house price, F_t represents the floor, $D_t \times F_t$ is the interaction between house type and floor, $M2_t$ represents the change in money supply and $C1_t$ and $C2_t$ represent Taipei City and Taipei County, respectively.[9] In addition, since we are trying to analyze data from different regions simultaneously in this paper, it is necessary to include regional factors in the function of house prices and rents to account for differences in rents in different regions. This is done by setting regional variables as dummy variables $C1_t$ and $C2_t$; if a dwelling is located in Taipei City, $C1_t$ will be assigned a value of 1. If the dwelling is in Taipei County, $C2_t$ will be assigned a value of 1. This will allow us to compare the two regions with the rest of northern Taiwan. Previous literature indicates that factors preferred by consumers of residential dwellings, such as traffic accessibility and comfort have significant impact on their inclination to purchase or rent houses and, by implication, on house prices and rents. Since daily life functions and traffic accessibility are the most important factors to consider when buying (or renting) a house, an easily accessible dwelling that offers comprehensive facilities will no doubt be highly preferred. Since dwellings with high rents do not imply traffic accessibility, but traffic accessibility imply higher rents for dwellings. We have chosen the variable that represents traffic accessibility as the instrumental variable for this study.

The model allows for the possibility that some or all elements of Z_t may be correlated with the error term ε_t; such element is called an endogenous variable. If Z_t contains endogenous variables then the least squares estimator of α_0 in Equation (2) is biased and inconsistent.

In accordance with Equation (2), it is assumed that there exists a 6×1 vector of instrumental variables X_t which may contain some of the elements of Z_t. The instrumental variables X_t satisfy the orthogonality conditions, i.e., $E\left[X_t\left(R_t - Z'\alpha_{0t}\right)\right] = 0$. In order to test if we have selected the right instrumental variable, we consider the Sargan test (Sargan, 1958) that examines the correlation between the residuals from the instrumental variables estimation and the instruments.

[9] Area of houses in Taiwan is usually calculated in the unit of "ping"; one ping is roughly equivalent to 36 square feet.

3. Data and Empirical results

3.1 Data Description

Transaction price data of the owner-occupied dwellings market used in the first phase of the analysis came from the *House Price Index* published by the Ministry of the Interior. The data, which spanned from 2000 to 2006, comprised 8,134 observations.

The rental market data used in the second phase of the analysis came from the *Panel Study of Family Dynamics* featured in the Program of Study of Chinese Families conducted by the Research Center for Humanities and Social sciences, Academia Sinica. The data, spanning from 2000 to 2006, offered a total of 265 observations.

3.2 Empirical Results

Figures in Tables I, II and III show the hedonic house price model in Taipei City, Taipei County and the rest of northern Taiwan from 2000 to 2006. Since estimation from the hedonic house price function basically predicts the reasonable house price for similar dwellings in the rental market, selection of data has to be made according to data available for the rental market. That is the reason why the hedonic house price function has not been applied to the rest of northern Taiwan for 2001 and 2002.

Area is the most fundamental factor that determines the price of a house since the offering price for houses is usually calculated based on the unit price per ping. From Tables I to III, we can see that at 1% significance level, the area of a house has positive and significant impact on house prices. When the area of a house increases by 36 square feet, its price would increase by a margin of NT$ 60,000-NT$ 260,000. In Taipei County, the change in prices is the largest, compared to the other two regions considered in this study. This is consistent with findings of Black et al. (1997), and Wolverton and Senteza (2000), according to which the area of a house has a boosting effect on its price.

With regard to the impact of traffic accessibility on house price, results from our research revealed that traffic accessibility is positively correlated to house prices for all the three regions (Taipei City, Taipei County and the rest of northern Taiwan). This goes to show that traffic accessibility is another factor that has an apparent boosting effect on house prices. In case of apartment buildings, empirical findings on the effect of interaction between floor and house attributes on house prices indicate that when the value of interaction between floor area and house attributes increases, house price would fall, and this is true for all three regions examined in this study. This is logical as the level of inconvenience is higher in case of higher floors of apartment buildings (i.e. getting in and out of the building will be more difficult and would take more time), and this would drag down rent considerably.

Table I: Results of estimation from the hedonic house price model for Taipei City — from 2000 to 2006

Variables	2000	2001	2002	2003	2004	2005	2006
Intercept	39.81	-91.40	46.13	-1.65	94.82	73.48	197.67
	(1.34)	(3.55)***	(2.09)**	(0.93)	(3.49)***	(3.31)***	(8.07)***
G	24.22	22.84	22.09	22.84	21.63	25.78	26.07
	(42.17)***	(46.02)***	(54.00)***	(67.54)***	(39.62)***	(61.62)***	(61.88)***
Z	87.56	120.45	127.91	81.52	83.97	127.16	152.02
	(4.13)***	(6.34)***	(7.25)***	(4.44)***	(3.94)***	(6.82)***	(7.47)***
F	-20.66	6.98	-31.38	-29.41	-19.51	-43.55	-61.89
	(2.48)**	(0.93)	(4.95)***	(5.30)***	(2.82)***	(7.49)***	(8.67)**
F^2	1.47	-0.50	2.29	1.83	0.93	2.82	3.55
	(2.29)**	(0.84)	(4.68)***	(4.81)***	(1.88)*	(6.86)***	(6.83)***
$D \times F$	-32.33	-18.97	-27.31	-21.72	-16.39	-15.78	-19.90
	(6.92)***	(4.93)***	(8.08)***	(6.39)***	(3.95)***	(4.35)***	(4.79)***
Adjusted R^2	0.74	0.76	0.75	0.82	0.60	0.73	0.70
Obs.	681	759	1182	1087	1153	1475	1702

Note: Figures in brackets are values of t-statistics; values of t-statistics under significance levels of 10%, 5% and 1% in *, **, and ***, respectively, are significant.

Table II: Results of estimation from the hedonic house price model for Taipei County — from 2000 to 2006

Variables	2000	2001	2002	2003	2004	2005	2006
Intercept	53.47	13.05	19.39	134.60	7.27	32.93	91.44
	(4.78)***	(1.23)	(1.37)	(10.43)***	(0.59)	(3.49)***	(8.86)***
G	11.62	11.95	11.03	6.02	11.74	10.96	10.10
	(48.18)***	(46.10)***	(33.36)***	(21.26)***	(37.93)***	(54.72)***	(45.17)***
Z	38.86	39.10	47.03	69.94	103.03	159.65	109.54
	(6.58)***	(5.46)***	(3.40)***	(6.28)***	(9.44)***	(17.32)***	(11.92)***
F	-10.54	-7.57	-5.54	-1.36	-10.12	-6.38	-6.77
	(2.04)**	(3.53)***	(1.93)*	(0.45)	(3.62)***	(3.17)***	(3.18)***
F^2	11.11	0.53	0.37	0.23	0.67	0.53	0.50
	(1.96)*	(4.74)***	(2.42)**	(1.27)	(4.06)***	(4.87)***	(4.79)***
$D \times F$	-2.24	-0.77	-3.34	-2.50	1.06	-5.97	-9.03
	(1.57)	(0.58)	(1.66)*	(1.36)	(0.89)	(4.06)***	(5.96)***
Adjusted R^2	0.73	0.75	0.77	0.39	0.63	0.74	0.58
Obs.	999	847	404	883	968	1311	1717

Notes: Same as Table I.

Table III: Results of estimation from the hedonic house price model for northern Taiwan (excluding Taipei City and Taipei County) — from 2000 to 2006

Variables	2000	2003	2004	2005	2006
Intercept	51.89	5.11	9.89	-22.39	-48.62
	(2.76)***	(0.59)	(0.82)	(1.69)*	(3.80)***
G	10.00	8.39	8.88	9.86	11.43
	(22.09)***	(38.60)***	(31.61)***	(33.83)***	(45.70)***
Z	-32.53	0.99	7.50	18.96	22.25
	(2.54)**	(0.16)	(0.87)	(2.25)**	(3.00)***
F	-12.99	1.04	-6.75	-4.05	-6.42
	(2.31)**	(0.49)	(1.80)*	(0.90)	(1.72)*
F^2	1.57	0.09	0.38	0.35	0.48
	(3.49)***	(0.65)	(1.30)	(0.97)	(1.73)*
$D \times F$	-7.94	-11.70	-8.50	-11.30	-14.09
	(2.48)**	(7.91)***	(4.26)***	(4.91)***	(6.87)***
Adjusted R^2	0.48	0.71	0.61	0.61	0.71
Obs.	615	734	720	862	1033

Note: Same as in Table I.

Figures in Table IV reveal the results of estimation performed with the GMM model constructed for this study. Results of the regression analysis show that (1) although rent will increase when house prices go up, the boost in rent is not apparent. This might be due to the difference in owner-occupied dwellings market and rental market in Taiwan; (2) when the value that represents the interaction of floor and house attributes becomes larger, due to the level of inconvenience for residents (to enter and leave the building), it would lead to a significant negative impact on rent. This is consistent with findings of Ozanne and Malpezzi (1985) and shows that lessees still consider the level of convenience involved in entering and leaving their dwellings; (3) when a dwelling is located in Taipei City, the location would have a significant impact on rent. However, when the dwelling is located in Taipei County, the impact of location on rent would be consistent with the rest of northern Taiwan. This shows that the trend of high rent only occurs in Taipei City; (4) the impact of increase in money supply on rent is insignificant. This might be due to the difference between owner-occupied dwellings market and rental market in Taiwan; when expectations about the business cycle become optimistic, more households would turn to owner-occupied dwellings market and their investments in the rental market would weaken. In Taiwan, renting a house is usually perceived as a short term consumption decision, prior to house purchase, and in the long run, households tend to prefer house ownership. Those who remain in the rental market over the long run are usually the disadvantaged minorities, and this explains why the change in the

anticipated business cycle fails to have a significant impact on rents. Results of the Sargan Test (the final row in Table IV) fail to reject the null hypothesis, and this goes to prove that we have selected the right instrumental variable for the study.

Table IV: Results of regression estimation from the GMM model

Independent variables	Coefficient	t-statistic
Intercept	30935.40	1.94*
P	0.001	1.37
F	-4418.99	-2.75***
C1	18791.52	4.42***
C2	9816.00	1.32
D×F	-5667.22	-2.91***
M2	-742.03	-0.74
J-statistic	0.04	
p-value (Sargan test)	0.99	

Results of research conducted in the past show that rental market and the owner-occupied dwellings market were inter-replaceable due to tenure choice, and that an intricate relationship exists between rents and house prices. However, if we remove the unit of variables and examine the data with the β value of the standardized coefficient, we can see from Table V that the impact of house prices on rents is actually quite limited; it is less than the impact of other variables such as floor, area, house attributes and its interaction with floor have on rent. This also reveals the fact that the correlation between house prices and rents is not as direct and close as theories or experience would suggest.

Table V: β value of the standardized coefficient in the GMM model's regression

Independent variable	Coefficient
Intercept	0.00
P	0.04
F	-0.22
C1	0.15
C2	0.08
D×F	-0.05
M2	-0.01
J-statistic	0.04
p-value (Sargan test)	0.99

We have taken a step further in this study to determine the causal relationship between rents and house prices with the Granger causality test. Results in Table VI show that a direct causal relationship does not exist between house prices and rents, and this reflects the inadequacy of inter-replaceability between the two markets. Not only that, the results also suggest that there could be market differentiation and demographics of house buyers and house renters might not be the same in the long run. This means that those who consider their tenure choices simultaneously could be the minority. This conclusion differs from the notion that "house prices and rents are directly and intricately related," as proposed by traditional theories and experience. It is possible that factors such as households' financial strength, orientation of the government's housing policies and the traditional association of land ownership with wealth have resulted in market differentiation. Although rents are susceptible to influence of house prices in terms of supply, they are even more influenced by the general population's income levels. On the other hand, house prices are correlated to the cost of new houses and in terms of supply and demand, the cost is related to the owner-occupancy ratio and income levels. Another factor that determines house prices is the anticipation of capital gains from investments.

Table VI: Results of the Granger Causality Test

Dependent variable	Independent variable	F-statistics	p-value
House price (P)	Rent (R)	0.152	0.92
Rent (R)	House price (P)	0.145	0.93

For a long time in the past, rents in Taiwan have been low and the function of long-term equilibrium adjustment has been less than apparent. Despite the fact that household incomes were still unable to cover the high house prices and the available rent could not cover the capital cost of house ownership, most consumers were still willing to purchase houses with long term loans. This shows that the theory of tenure choice has not been working fully in the market and demand for rented houses has been relatively insufficient. This phenomenon has led to low dwelling rents in Taiwan, driving rent multipliers in Taipei City, Taipei County and the rest of northern Taiwan up.[10]

[10] The income from rents that some landlords receive is not sufficient to cover the monthly interest on loan and this fact reveals that rent alone could not cover the capital cost of house purchase. This can be illustrated by using Taipei County as an example where a landlord can expect to collect an annual rent of NT$ 360,000 (NT$ 30,000 per month) from a house that costs NT$ 10 million. Assuming the landlord paid 50% of the house price as down payment, he/she would lose NT$ 117,500 as opportunity interest a year for the remaining NT$ 5 million (calculated based on the average rate of 2.35% derived from the Weighted Average Interest Rates on Deposits & Loans - Domestic Banks published by Central Bank of the Republic of China (Taiwan) collected from 2000 Q1 through 2006 Q4). Supposing the loan of NT$ 5 million is to be cleared within the period of 20 years, the landlord would have to pay approximately NT$ 360,200 a year (calculated based on the PMT (payment per term) function and the average housing loan interest rate of 3.89% derived from the interest rate

Due to the high prices of land in Taiwan, costs of houses have remained high for a long time and yet demand for houses has remained strong because of investment considerations, i.e. expectations of appreciation of value. These two factors have contributed to high house prices, and their limited effect on rents. This, in turn, had led to a shortage of supply in the rental market. In the end, potential renters would have no choice but to purchase houses, and this would further stimulate demand for house ownership, which will drive house prices up even more, while further reducing supply in the rental market, thereby resulting in the unique phenomenon of high owner-occupied dwellings ratio, high vacancy rate, and shortage of rental dwellings in Taiwan.

In addition, the basic guidelines and implementation of the government's housing policies for the past several decades have always been focused on the concept of "those in need of a shelter shall be able to afford a house," which is another factor that has driven up the owner-occupied dwellings ratio in Taiwan.[11] Coupled with the fact that the government has established different house tax rates for owner-occupied dwellings and rental dwellings, the nature of the regulation would encourage lessors to transfer the higher taxes to the lessees, not to mention that those who own their own houses could enjoy a higher income, compared to those who have to rent their dwellings.[12] In other words, the tax regime allows house owners to enjoy a concession, and can be perceived as discrimination against those who have no choice but to rent their dwellings.

With policies introduced by the government in Taiwan to encourage house purchases and low interest rate housing loans, once consumers cross the financial threshold for house purchase, they are inclined to make their house purchase decisions directly, rather than deliberating on their tenure choice under the influence of traditional beliefs and values. Therefore, those who remain in the rental market in the long run are usually people with lower financial means and this in turn affects the interactive relationship between the rental market and the owner-occupied dwellings market, thus weakening the inter-replaceability between the two markets.

The empirical results show that in addition to the impact of government policies and the influence of traditional values, this phenomenon is primarily caused by poor quality of dwellings and service available to tenants, which has impeded demand and investment in the rental market, resulting in the imbalance between rents and house prices, leading to high rent

on new loans by the five leading banks collected from 2000 Q1 through 2006 Q4). Without even considering tax rate and the relevant processing fees, the landlord would lose up to NT$ 117,700 a year.

[11] The government in Taiwan offers different subsidies for people of different demographics (military personnel, civil servants, teachers and laborers). Households of middle-low income groups get subsidies for down payments against their house purchases. The number of low-income households receiving subsidy for rent is, however, a mere 4,500; they rent government apartments and modestly priced houses in Taipei City, and across the entire island of Taiwan. The figure constitutes a mere 0.5% of the total number of households in Taipei City, and less than 0.07% in the nation's entire household population.

[12] Pursuant to Article Five of Taiwan's House Tax Regulations, residents of owner-occupied dwellings are required to pay a tax of 1.2% on the value of their houses, which is lower than the 1.5% applicable to premises used by professionals and the 3% charged for business premises.

multipliers in Taiwan. Therefore, the government of Taiwan should increase the supply of affordable rental housing like the NRAS,[13] offer tax incentives to help landlords improve the quality of their dwellings and services and implement a rent subsidy mechanism to increase its efficacy and fairness in the housing rental market, thus enhancing the inter-replaceability between the two markets.

4. Conclusion

In order to balance Taiwan's house market structure, which is currently characterised by a strong preference for house ownership, in order to let the rental market thrive, the government could offer discounts and concessions on operational costs in the rental market through policy measures, such as introducing professional operations knowledge, increasing incentives for investments in the rental market, and educating landlords to perceive rent income as the return from a long-term investment, rather than an extra income prior to the sale of the house. In addition, the government should also conduct a comprehensive review of subsidies for different house types, integrate available resources, and thoroughly reform existing subsidies mechanism to enhance its efficacy and fairness. The government should give households earning minimum income and those in the disadvantaged minorities priority in subsidies and offer assistance to landlords to help them improve the quality of their dwellings and services. Adjustments in government policies would not only assist the disadvantaged minorities, who have to rent dwellings for extended periods of time, but would also make tenure choice more replaceable, affording more diverse choices for households in meeting their basic need for shelter.

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[13] The National Rental Affordability Scheme (NRAS) is an Australian Government initiative, delivered in partnership with the State and Territory governments, to increase the supply of affordable rental housing by 50,000 dwellings across Australia by June 2014. The NRAS is designed to encourage large-scale investment in affordable housing. The NRAS offers tax and cash incentives to providers of new dwellings on the condition that they are rented to low and moderate income households at 20% below market rates.

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