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# Folk Customs and Home Improvement Decisions

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In this paper, we examine whether Chinese folk customs and taboos have impacts on the home improvement decisions of Taiwanese homeowners. Based on traditional Chinese culture, we choose the Year of the Dragon and Widow Year as indicators of auspicious (fortune) and inauspicious (taboo) periods, respectively. With the use of a Heckman two-stage estimation approach, our empirical results provide evidence that traditional Chinese folk customs and taboos indeed have important roles in decisions on home improvement. We find that the likelihood that a homeowner will make home improvements is significantly reduced in the so-called taboo period. Moreover, we find that expenditures on home improvements increase in the so-called auspicious period, particularly in areas outside the capital city region. In addition to considering the impacts of folk customs on home improvement decisions, this paper contributes to the literature by establishing a theoretical model that reflects the fact that homeowners have dual roles as both consumers and suppliers of housing.

**Keywords**

Folk Customs, Home Improvement and Maintenance, Heckman Two-stage Model

# 1. Introduction

The daily lives of Chinese people have been influenced by folk customs and taboos for thousands of years. Housing decisions are no exception. For instance, the Chinese traditionally hold superstitious beliefs about house street numbers or apartment floor numbers that end with the digit 4 or 8. The number 4 is considered unlucky because its pronunciation sounds like "death" in Chinese. On the other hand, the number 8 is considered lucky because its pronunciation is similar to the Chinese word for prosperity. Previous empirical literature has provided evidence of the effects of lucky numbers on house value in Chinese societies. Bourassa and Peng (1999) find that lucky house numbers are capitalized into the value of houses located in an area with a high percentage of Chinese households in Auckland, New Zealand. Chau et al. (2001) find that Cantonese people are willing to pay a premium for lucky numbers. Choy et al. (2007) find that an apartment located on a floor with an unlucky number in Hong Kong usually sells at a discount. Liu and Wong (2012) find that address numbers that end with a 4 or 8 affect the sale price of new apartments in Singapore. Shum et al. (2014) find that buyers with phone numbers that contain more 8s are more likely to purchase apartments on floors that end with an 8 in Chengdu, China. Fortin et al. (2014) explore the effects of house numbers that end with a 4 or 8 on house prices in an area of Vancouver, Canada, with a large population of Chinese immigrants. They find that houses with address numbers that end in a 4 (unlucky number) are sold at a 2.2% discount and those that end in an 8 (lucky number) are sold at a 2.5% premium in comparison to houses with other numbers. Antipov and Pokryshevskaya (2015) investigate the influence of western numerological superstitions on the buying behavior of Russian people in the apartment market by using actual sales data from the Saint Petersburg real estate market. They find a clear negative effect of the 13$^{th}$ (unlucky) floor on demand for apartments, and a significant effect of preference for the 7$^{th}$ (lucky) floor.

In addition to superstitious beliefs in lucky (and unlucky) numbers, the Chinese also believe in feng shui, which is a Chinese geomantic omen. They believe that if a house has the right location, building design, and indoor layout, then those who are living in the house will have good fortune and health. If the owners of a house find that it has bad feng shui, then they may relocate to another house with better feng shui or make improvements to the existing house. Relocation is relatively costly, so home improvement is a popular option. Of course, feng shui requirements are not the only motivation for home improvement. Other factors, such as family composition changes and poor house conditions, can also spur homeowners to improve their house.

Once Chinese households decide to engage in home improvement, they then typically consult the Chinese almanac to choose an appropriate time for the work.[1] In particular, they follow the folk taboo to avoid conducting these projects in inauspicious times. For example, they usually do not undertake housing improvements in the ghost month (July of the lunar calendar). Moreover, they prefer not to conduct this sort of construction during the lunar years that are perceived as bad. They prefer to wait until the right day in the right year as defined by the Chinese almanac. It can be quite complicated to define whether a day or a year is good or bad. This may vary across individuals depending on characteristics such as their time of birth. However, certain lunar years are widely perceived as good or bad. For instance, the Year of the Dragon has been considered to be a year with good fortune since ancient China. The dragon is a mysterious animal that is a symbol of power. The ancient Chinese people called their emperor the "dragon king". Therefore, the Chinese believe that the Year of the Dragon can bring good fortune and power to them. In particular, a child born in the Year of the Dragon, called a Dragon son or a Dragon daughter, will likely have good success in the future and bring good fortune to the family. On the other hand, the Widow Year is considered to be inauspicious. The Widow Year originated in Japan.[2] The belief is that people will very soon be widowed if they are married in a Widow Year. Chinese households will be more likely to undertake home improvement in a good year than a bad year, so we can hypothesize that the likelihood a Chinese person will make home improvements is reduced in a Widow Year, but increases in the Year of the Dragon, due to the impacts of the timing of preparations for marriage or to accommodate newborns.

Taiwan is a very unique society in the greater China region. It was historically a Spanish, Dutch, and Japanese colony. It has been significantly influenced by both the American and Japanese cultures. However, it is also a society that has preserved the most traditional Chinese styles of living.[3] Proponents of western cultures often argue that traditional customs and taboos are superstitious, irrational behaviors. However, customs and taboos still influence the daily lives of Taiwanese households to some extent. This makes Taiwan an interesting case for studying the roles of custom and taboo on decisions for home improvement.

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[1] The Chinese farmer's almanac is an annual publication that includes information such as the best and worst dates (or hours) for marriage, funerals, moving, and construction. Moreover, it also provides useful information for farmers, fishermen, and businesses, and serves the function of fortune telling based on time of birth.

[2] There are two types of Widow Years. The first type are the lunar years that have two spring commencements. The second type are the lunar years that have no spring commencement. In Taiwan, only the first type of Widow Years is considered.

[3] Taiwanese customs mainly originated from southern China (both the Guangdong and Fujian provinces). While China experienced the cultural revolution and Hong Kong and Macau are very westernized, both of those southern Chinese cities continue to share customs and taboos similar to those in Taiwan. Indeed, Chinese communities in other countries, such as New Zealand, have been shown to practice similar beliefs. Consequently, the behaviors documented in this paper may occur in Chinese communities elsewhere.

Our study contributes to the home improvement literature by taking these unconventional factors into consideration.

In addition to analyzing the impacts of these unconventional factors, we also link our study to the line of traditional literature that examines the decisions of whether home improvements should be made and, if so, the amount that should be invested (e.g., Mendelsohn 1977; Boehm and Ihlanfeldt 1986; Ziegert 1988; Potepan 1989; Montgomery, 1992; Reschovsky 1992; Baker and Kaul 2002). Following this literature, which mainly uses data from the United States, we link the home improvement decisions of Taiwanese homeowners to their demographic characteristics and housing conditions, macroeconomic conditions, and folk customs.

The annual Survey of Family Income and Expenditure (SFIE) of the Statistical Bureau of Taiwan began to collect information on the annual expenditures of households on housing maintenance and improvement in the 1990s. The SFIE is a series of cross-sectional surveys; however, we know that dynamic changes, especially family composition changes, are important with respect to home improvement decisions.[4] We address this issue in the context of a cross-sectional analysis by including a dummy variable that indicates when there is a newborn baby in the family. Moreover, in order to cover both Widow Years (taboo) and the Year of the Dragon (fortune), we use pooled data that combine cross-sections from 1998 to 2007. The year 2000 was a Year of the Dragon, while the Widow Years were 2001, 2004, and 2006.

Home improvement decisions are complicated by the fact that homeowners have dual roles as both consumers and suppliers of housing. A homeowner may be motivated to make a housing improvement if the existing housing unit does not meet current housing consumption needs. On the other hand, a homeowner with investment motives will engage in home improvement if doing so can increase the likelihood of higher expected capital gain when the house is sold. However, most studies focus on one of these motives or the other (e.g., Mendelsohn 1977 and Boehm and Ihlanfeldt 1986 on consumption motive and Montgomery 1992 on investment motive). Very few studies, such as Ziegert (1988), try to determine whether households are primarily motivated by potential investment or consumption demand for housing improvement services. Ziegert (1988) finds that unmet housing consumption needs play a more important role in the demand for housing additions (improvement).

Much of the earliest literature has not clarified the differences between home improvement and home maintenance. The term home improvement has been generally used to cover both improvement and maintenance activities (e.g., Mendelsohn 1977 and Boehm and Ihlanfeldt 1986). However, a later stream of research tries to provide more clear definitions of both activities. Potepan (1989)

[4] Both Ziegert (1988) and Baker and Kaul (2002) use panel data to incorporate the dynamic element into home improvement decision modeling.

clearly defines home improvements as activities which increase the stock of housing capital without constructing new dwellings.[5] In contrast, home maintenance activities aim to offset physical deterioration in housing capital. He points out that home improvement generally involves construction activities, whereas home maintenance does not. Moreover, Reschovsky (1992) made a distinction between home upkeeping activities and improvements.[6] However, some studies, such as Montgomery (1992), argue that the basis for the conventional separation of maintenance from major improvement is somewhat arbitrary.[7] In order to avoid the possible confusion of home improvement with home maintenance activity, Ziegert (1988) focuses solely on housing additions that are unambiguously home improvements.

Home improvement and maintenance involve diverse types of activities that may reflect a broad range of motivations. For example, Baker and Kaul (2002) suggest that replacement projects help to maintain the structural integrity or basic functioning of the home, while discretionary projects are motivated by the desire to enhance the use of the home.[8] They believe that replacement projects are likely to be primarily determined by the conditions of the home, whereas discretionary projects are likely to be greatly influenced by the characteristics of the occupying household. These imply that different categories of improvement activities may be influenced by different factors.[9]

Home improvement decisions should be influenced simultaneously by both potential benefits and costs. However, the former are not easy to measure in practice because they combine both consumption and investment benefits. Gyourko and Saiz (2004) argue that the present value of the stream of combined consumption and investment benefits is presumably capitalized into house value. They hypothesize that if the physical replacement costs of housing structures are below the value of the homes, rational homeowners should reinvest in their housing stock. Their empirical evidence shows that renovation effort falls sharply when house prices fall below replacement costs.

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[5] Home improvement examples given in Potepan (1989) include adding a room, building a second story, and replacing a smaller kitchen with a larger one.

[6] Upkeeping activities are defined as those that affect the quality of the existing capital configuration of the home. Improvements are activities that result in a change to the capital stock of the dwelling.

[7] For instance, a major renovation is usually classified as an improvement rather than maintenance, even though it may simply return the dwelling to a former, less dilapidated state (Montgomery 1992).

[8] Replacement projects include replacing the roof, siding, heating system, plumbing, electrical system, and exterior windows and doors. Discretionary projects include room additions, kitchen and bathroom remodels, and structural alterations.

[9] Some studies (e.g., Pollakowski 1988 and Bogdon 1996) that focus on the decision of a household to hire someone to undertake improvements have estimated the different categories of improvements identified in the American Housing Survey separately. They find differences across the categories.

Our research strategy is as follows: First, we provide an extended home improvement model that offers insights into the motives of both housing consumption and investment. The model helps us to derive a more complete home improvement decision function. Second, in order to differentiate home improvement from maintenance, we classify home improvement activities as those that cost more than a certain threshold. Third, as mentioned earlier, replacement projects are likely to be determined primarily by the conditions of the home, whereas discretionary projects are likely to be greatly influenced by the characteristics of the occupying households. Therefore, we simultaneously include both characteristics of the occupying households and condition of the home as our independent variables in our estimation of total home improvement activity. Lastly, we use imputed rent as a proxy for house value because the data include an estimate of the former but no information about the latter. We also control for housing variables that are related to construction costs. These include the county in which the home is located, whether the location is urban or rural, building type, and floor area.

Selection bias is a potential problem in studying home improvement expenditure outcomes. Therefore, we follow previous empirical studies by applying the Heckman two-stage process (Heckman 1979) to estimate both the likelihood of making home improvements and the value of home improvements. We apply the selection bias model to Taiwan as a whole and, to check the robustness of those results, we also estimate models for Taipei City versus the rest of Taiwan and for Greater Taipei versus the rest of Taiwan.

The existing literature which has used cross-sectional data typically argues that the likelihood or the value of home improvement is influenced by the current characteristics of the occupants and the current condition and characteristics of the house.[10] Following the previous literature, we include household and dwelling characteristics as explanatory variables in the equation for propensity to engage in home improvement as well as in the equation for home improvement expenditures. In addition, we include macroeconomic variables and folk custom variables. Our regression results provide evidence that the home improvement decisions of Taiwanese homeowners are affected by folk customs, although the impacts appear to be affected by demographic conditions in different locations.

The paper is organized as follows. The next section reviews the existing literature related to home improvement decisions. An extended model of housing improvement decisions is developed in the third section. The following section introduces the econometric specifications and our identification strategies. The fifth section summarizes the SFIE data and discusses its

[10] The most often used characteristics of the occupants are age, income, marital status, family type, race, education, household composition, and household size. Widely used characteristics of the house include location, house age, duration of residence, value or quality of house, house size, and neighborhood quality.

strengths and weakness for our analysis. In addition, the sample selection process is discussed in the same section. We define our variables in the sixth section. The penultimate section covers the descriptive statistics and empirical results. The last section concludes.

## 2. Literature Review

Mendelsohn (1977) provides the earliest research on the determinants of homeowner improvement activity. Based on a national sample of residential alterations and repairs collected by the U.S. Census Bureau, he employs a model of the probability of a nonzero expenditure and a model of the conditional amount spent. His principal explanatory variables are characteristics of the occupants. He finds that higher income increases both the frequency of nonzero expenditures and their amount. A few housing characteristics, such as age, value, and location, are also taken into consideration. Both housing age and value are found to have positive and significant impacts on the probability of nonzero expenditures.

In addition to the characteristics of the homeowners and their dwelling units, Boehm and Ihlanfeldt (1986) also include the neighborhood environment and the relative cost of improvement as measures in their expenditure equation. Using data from the Neighborhood Housing Services Project, they find that real income, crowdedness, housing age, number of rooms, house condition, crime, the percent of neighborhood properties with no exterior defects, and construction costs are significantly associated with home improvement expenditures.

By focusing solely on housing additions, Ziegert (1988) tries to avoid the possible confusion of home improvement with home maintenance activity. He employs a Heckman two-stage estimation process: the first stage analyzes the determinants of the probability of a housing addition, while the second stage focuses on the cost of the addition. He hypothesizes that the likelihood of constructing an addition is a function of household wealth, household consumption and investment demand for housing services, and demographic variables, such as the sex, age, race, and education of the household head, and changes in family composition. The Mills ratio is included in the second step to control for possible sample selectivity bias. For identification purposes, he assumes that household consumption and investment demand for housing services affect the probability, but not the cost of an addition, while the value of unmet housing demand affects the value, but not the probability. Using data from the Panel Study of Income Dynamics (PSID) conducted by the University of Michigan, he finds the primary force that influences both the probability and the value of a housing addition is unmet housing consumption demand.

Unlike previous studies, Potepan (1989) argues that homeowners face a choice between improving existing housing and moving to obtain additional housing. Two important factors are considered in his paper: a mortgage lock-in effect and a fixed capital constraint. Using cross-sectional data from the PSID, his empirical evidence suggests that the probability of making home improvements is positively associated with the current interest rate and negatively associated with income.

Montgomery (1992) follows Ziegert (1988) in using the Heckman two-stage estimation method. In the first stage, an ordered probability model is developed with four options: move down (to a lower cost home), do nothing, improve, or move up (to a higher cost home). In the second stage, an improvement expenditure equation is estimated. Variables included in the models are household characteristics, location, price, and dwelling and neighborhood characteristics. Using primary data from the American Housing Survey (AHS), he finds that income and dwelling age are positively associated with the likelihood and level of improvement, while duration of stay and age of head of household are negatively associated with the likelihood and level of improvement. He also finds that the purchase price of the house is positively associated with expenditures on improvement.

Reschovsky (1992) argues that there is no reason to believe that household behavior is identical with regard to home upkeeping activities and improvements, so he estimates these two types of activities separately. Using data from the Survey of Housing Adjustments, his estimation results find that household behavior differs significantly with respect to demand for upkeeping activities and improvements.

In most empirical studies on home improvement expenditures, the analysis has focused heavily on the static characteristics of the occupants and the housing unit. However, Baker and Kaul (2002) incorporate dynamic factors. Taking advantage of panel AHS data, they use a dynamic and multi-period model to take into consideration factors such as changes in household composition and prior spending on home improvement. A logit approach is used to estimate the probability of undertaking a home expansion project. Their results show a positive relationship between prior home expansion projects and undertaking a home expansion during the current period. Moreover, there is a positive relationship between increases in household size and undertaking home expansion.

Unlike other empirical studies that examine the home improvement decision from the demand side perspective, Gyourko and Saiz (2004) explore the role of construction cost, which is a supply side factor. The testable hypothesis in their study is that rational homeowners should reinvest in their housing stock if the physical replacement costs of the housing structure are below the value of their home. Using AHS data for the 1984-1994 period, their empirical results show that renovation effort falls sharply when house prices fall below construction costs.

Home maintenance and repair serve not only the function of providing combined consumption and investment benefits, but also that of smoothing the idiosyncratic earning variations of the homeowner over time (transitory income changes). Gyourko and Tracy (2006) empirically investigate how homeowners adjust their home maintenance decisions in response to transitory income fluctuations. Using AHS data, they find a statistically significant positive elasticity of maintenance expenditures to estimated transitory income changes. Such positive elasticities are particularly high for less well educated households who are more likely to be liquidity constrained.

## 3. Theoretical Model

As mentioned, home improvement decisions are complicated by the fact that homeowners play dual roles as both consumers and suppliers of housing. Their net benefits from the housing unit include both housing service consumption and the potential return on the housing investment. When a house is improved, both housing service values (current and future values) and resale value are increased. Therefore, it is important to take the dual nature of housing into consideration when establishing a theoretical model of home improvement. A few of the earlier studies (Mendelsohn 1977; Boehm and Ihlanfeldt 1986; Montgomery 1992) have incorporated this dual nature of housing into their theoretical models on the home improvement decisions of homeowners.

Mendelsohn (1977) develops one of the earliest models to provide a theoretical foundation for housing improvement decisions. In fact, most later empirical studies simply follow his theoretical framework. In his model, the utility of a household is defined as a function of housing services, numeraire consumption goods, assets, and leisure time. The household would choose the optimal housing improvement expenditure to maximize utility when budget and time constraints are given. Several empirical hypotheses are derived from his model. The first hypothesis is that people with higher incomes should spend more on housing improvements if improvements are considered to be normal goods. Secondly, given the assumption that utility from housing consumption over time is greater than that from the higher market value of the house when sold, homeowners with longer expected tenures spend more on housing improvements.

Unlike the utility maximization assumption in Mendelsohn (1977), Boehm and Ihlanfeldt (1986) assume that the homeowner chooses an optimal improvement expenditure to maximize the present value of the stream of future benefits (housing consumption benefits and resale values) yielded by the house. In particular, they include the prices of improvement inputs in their model. Their model hypothesizes that home improvement expenditures are positively associated with the investment return to improvement, increase in consumption benefit from a marginal unit of improvement, and marginal valuation of housing services, and are negatively associated with the effective property tax rate and the price of improvement inputs.

In the models of Mendelsohn (1977) and Boehm and Ihlanfeldt (1986), homeowners can only choose between doing nothing and increasing their housing stock by improving. However, Potepan (1989) and Montgomery (1992) propose theoretical models to reflect the fact that homeowners may adjust their holding of housing stock by moving. Potepan (1989) discusses utility maximization problems given the options of moving or improving. His model demonstrates that the probability of making home improvements (rather than moving) should be negatively related to increases in income. Montgomery (1992) criticizes Potepan's model and argues that a household should be able to simultaneously choose among moving, doing nothing, and improving. His model describes the behavior of the homeowner in choosing how much to invest in housing and whether to make adjustments by improving the existing stock or moving. As noted in the preceding section, he assumes that the household faces a choice of four mutually exclusive options: move down, do nothing, improve, or move up. His model demonstrates that an increase in wealth has a nonnegative impact on investment in housing. Moreover, an increase in moving cost increases the probability of improvement.

We only focus on homeowners who state that they are not planning to relocate. In other words, these homeowners would simply make a choice between doing nothing and improving. Therefore, our model basically follows the approach of Mendelsohn (1977) and Boehm and Ihlanfeldt (1986). By combining the utility maximization problem in Mendelsohn (1977) and the present value maximization of net benefits in Boehm and Ihlanfeldt (1986), we develop a new and simple model to describe the behavior of individual homeowners in deciding whether they will make home improvements and how much they will spend.

We express the additional current housing consumption service obtained from home improvement as $s(M)$, where $M$ stand for home improvement expenditure. Total additional values of future housing services obtained from improvements, defined as the present value of future streams of additional housing service values, are expressed as $S(d,\delta;M)$, where $d$ and $\delta$ are the discount rate and the depreciation rate, respectively. We express the present value of the expected gain from improvement when the house is sold as $G(\delta,d;M)$. Finally, the present value of benefits from home improvement is defined to include the current value of housing services, present value of future housing services, and potential return:

$$B(M) = s(M) + S(\delta,d;M) + G(\delta,d;M) \tag{1}$$

The utility of a household is defined as a function of numeraire good consumption ($C$), housing services of the existing housing stock ($h$), and the present value of benefits from housing improvement ($B(M)$):

$$U(C,h,B(M)) = U\left(C,h,s(M)+S(\delta,d;M)+G(\delta,d;M)\right) \tag{2}$$

To simplify the model, we assume that the homeowner has no accumulated debt and no savings for the current period. Satisfying the basic needs of the household is the priority for spending previously accumulated wealth and current income. We assume that two sets of expenditures are required to maintain basic needs. One is the basic consumption expenditures of the household, which is a function of the family structure. Another is the cost of the household in maintaining existing housing services. If the household budget still has a surplus after paying for basic expenditures, then the household can spend the rest of the budget on consumption of other goods and housing improvement. The budget constraint of the household is shown below:

$$W_0 + Y(D) - E(f) - P_h = P_c C + P_M M \tag{3}$$

where $W_0$ is the initial wealth, $Y$ is the income that is a function of household demographic characteristics $D$, $E$ stands for basic expenditures that are a function of the family composition $f$, and $P_h$ is the cost of existing housing services. Lastly, $P_c$ and $P_M$ are the prices of consumption goods and home improvements, respectively. The left-hand side of the equation represents the disposable budget after paying for basic expenditures.

By maximizing the total utility subject to the budget constraint, we find that the condition for optimal home improvement can be expressed as follows:

$$\frac{U_C}{U_M} = \frac{U_C}{U_B * B_M} = \frac{U_C}{U_B * [s_M + S_M + G_M]} = \frac{P_c}{P_M} \tag{4}$$

The ratio of the marginal utility of consumption to the marginal utility of home improvement should be equal to the relative price. Equations (3) and (4) allow us to derive the optimal home improvement expenditure:

$$M_E = M_E(W_0, Y(D), f, P_h, P_c, P_M) \tag{5}$$

where $M_E$ is the optimal amount of home improvement expenditure subject to the budget constraint. It is a function of wealth, income, family composition, the cost of existing housing services, price of home improvement, and so on and so forth. Moreover, we can derive the optimal amount of consumption $C_E$. Thus, the maximum utility given the budget constraint is equal to $U_E(C_E, h, B(M_E))$.

The home improvements of a household are made for certain functional purposes. For instance, they are made to meet the need created by family composition changes, solve the problem of poor housing conditions, or satisfy the requirements of folk customs. When a household faces composition changes such as getting married and having children, it is more likely to redesign the structure of the house and incur home improvement expenditures. Moreover, if housing conditions are bad, the household may improve them by elevating the security of the living environment. Furthermore, if the current house situation does not meet the requirements of good feng shui, the household may spend money to rectify that. We define the home improvement expenditures caused by these functional factors as follows:

$$M_F = M_F(\Delta f, HC, FCT) \tag{6}$$

where $M_F$ is defined as functional home improvement expenditures, and $\Delta f, HC,$ and $FCT$ are family composition changes, housing conditions, and folk customs and taboos, respectively. The utility derived from satisfying certain functions is expressed as $U_F(M_F)$.

Thus, total home improvement expenditures are a function of both optimal expenditures in (5) and functional needs in (6):

$$\begin{aligned} M^* &= M_F\left(\Delta f, HC, FCT\right) + M_E\left(W_0, Y(D), f, P_h, P_c, P_M\right) \\ &= M^*(FCT, X) \end{aligned} \tag{7}$$

where $FCT$ is a folk custom variable, which is the variable of main interest in our study, and $X$ is a vector of exogenous non-folk custom variables. Moreover, the total utility $U^*$ with home improvement can be written as:

$$U^* = U\left(C^*, h, B(M_E)\right) + U_F(M_F) = U^*\left(h, FCT, X\right) \tag{8}$$

The home improvement decisions include both whether to make home improvements and how much to spend on the improvements. If the total utility with home improvement $U^*$ exceeds the utility without home improvement, then an individual household would decide to make home improvements. Once an individual household decides to make home improvements, it will spend $M^*$.

## 4. Econometric Strategies

Whether a home improvement is made and the amount that is to be spent are two interdependent but separate decisions. These two decisions should be studied jointly. However, several of the previous studies have only examined one of these decisions. Some empirical work, such as Potepan (1989) and Baker and Kaul (2002), have focused only on factors that influence the decision of whether to make a home improvement or expansion. On the other hand, Boehm and Ihlanfeldt (1986) study only the determinants of housing maintenance and improvement expenditures.

The joint decisions could be modeled by using simultaneous equations based on the assumption that the two decisions are made simultaneously. Another approach is to assume that the two decisions are made sequentially. Mendelsohn (1977) uses a sequential model to estimate first the probability of a nonzero expenditure and then the conditional amount spent (given that an expenditure occurs). Ziegert (1988) examines the demand decision for housing additions in a Heckman two-stage estimation process: first, factors that influence the likelihood of a housing addition are determined and, second, the cost of the addition is analyzed. We apply the two-stage process here.

Let the unobserved latent variable $Y^*$ in the selection equation be defined as the difference between the total utility with home improvement $U^*$ and utility without home improvement $\bar{\mathrm{U}}$. The selection equation is specified as:

$$Y_t^* = \alpha_0 + \alpha_1 FCT_i + \alpha_2 h_i + \alpha_3 X_i + \varepsilon_i, \varepsilon \sim N(0, \sigma_\varepsilon^2) \tag{9}$$

where $FCT$ is a vector of folk custom and taboo variables, $h$ stands for housing services of the existing housing stock, and $X$ is a vector of explanatory variables related to household demographic characteristics and housing characteristics. The error term $\varepsilon$ is assumed to be independently and identically distributed. If the unobserved latent variable is greater than zero, then the individual household is observed to make a home improvement. The observed dichotomous variable IMP takes on a value of one if a home improvement is made.

$$\mathrm{IMP}_i = \begin{cases} 1 \text{ if } Y_i^* \geq 0 \\ 0 \text{ if } Y_i^* < 0 \end{cases} \tag{10}$$

The probability of an individual household making a home improvement is expressed as:

$$Prob(\mathrm{IMP}_t = 1) = \Phi\left[\frac{\alpha_0 + \alpha_1 FCT_i + \alpha_2 h_i + \alpha_3 X_i}{\sigma_\varepsilon}\right] \tag{11}$$

where $\alpha_1$ is our central parameter of interest, which captures the impact of folk custom variables on the likelihood of home improvement, and $\Phi$ represents a standard normal cumulative density function.

The outcome equation is specified as:

$$\mathrm{M}^* = \beta_0 + \beta_1 FCT_i + \beta_2 X_i + v_i, v \sim N(0, \sigma_v^2) \tag{12}$$

where the dependent variable, $M^*$, is the total desired amount spent on home improvements, $\beta_1$ is the other parameter of interest, which in this case measures the impact of folk customs on home improvement spending decisions, and $v$ is an error term that is independently and identically distributed.

The expected amount of home improvement expenditure given the selection condition in which the home improvement is made is expressed as follows:

$$E\left(M^* \mid \mathrm{IMP}_i = 1\right) = \beta_0 + \beta_1 FCT_i + \beta_2 X_i + \sigma_v \rho \lambda \left[ \frac{\alpha_0 + \alpha_1 FCT_i + \alpha_2 h_i + \alpha_3 X_i}{\sigma_\varepsilon} \right] \tag{13}$$

where $\rho$ stands for the correlation coefficient between the selection and outcome equations, and $\lambda$ represents the inverse Mills ratio.

We use a probit model to estimate the likelihood of making a home improvement shown in Equation (11). We obtain the estimated inverse Mills ratio, $\hat{\lambda}$, from the first stage estimation. We then specify the second stage equation as:

$$\ln M_i = \gamma_0 + \gamma_1 FCT_i + \gamma_2 X_i + \gamma_3 \lambda_\iota + \xi_i, \xi \sim N(0, \sigma_\xi^2) \tag{14}$$

where the dependent variable is the natural logarithm of the observed home improvement expenditure $M$. The estimated inverse Mills ratio is included as an explanatory variable to control for sample selection bias. Moreover, we exclude housing services provided by the existing house from the list of explanatory variables in the second stage estimation because it does not appear in the function of home improvement expenditure. By leaving out one of the independent variables used in the selection equation, our estimations satisfy exclusion restrictions for two-stage models.

# 5. Data and Sample

## 5.1 Data Source and Sample

As noted above, the data for this study are derived from the SFIE. About 15,000 randomly selected households are surveyed annually, but the selected ones vary across years. For each household, the interviewer records the basic demographics of each household member, including sex, age, education, occupation, marital status, and relationship with the head of the household. In addition, the interviewer records information about the facilities, equipment, and housing conditions of the household. Major housing variables recorded in the survey include housing tenure (rent or own), use of house (residential or mixed), type of structure (single-story or other), parking space (own or rent), size of the building, and so on and so forth. Lastly, the interviewer records the regular revenue sources and expenditure items of the household, which are the main focus of the survey. Housing maintenance and improvement expenditures are recorded in the category of consumption expenditures. They include spending on repair of doors, windows, roof, floor, kitchen range, electronic equipment, water and gas facilities, garden (or yard), as well as painting and wallpapering.

For the purpose of this study, we restrict the sample in several ways. We exclude those who live in either rental houses or houses with non-residential uses. Moreover, we restrict the sample to households with a house that is no larger than 660 square meters in floor area to exclude unusually large and atypical properties. As we need to include data for Widow Years, the Year of the Dragon, and other years, we pool data for the period from 1999 to 2006. Our total sample size is 92,979. Monetary values are converted into real terms (2006 NT$).

## 5.2 Variables

### *5.2.1* Dependent Variables

Our dependent variables are the probability of making home improvements in the selection equation (0 or 1) and the cost of home improvements in the outcome equation. The explanatory variables are classified into four main categories: variables of folk customs, demographic characteristics, housing attributes, and macroeconomic environment. In addition to these variables, we include dummy variables for counties to partially capture differences across locations.

### *5.2.2* Folk Custom Variables

We use a dummy for the Year of the Dragon as an indicator of a good (fortune) period to make home improvements, while we use dummies for a Widow Year as indicators of bad (taboo) periods for making home improvements. We expect that the likelihood of making home improvements increases in the Year of the Dragon, but decreases in a Widow Year. Once the owner decides to make home improvements, the amount of home improvement expenditures is not affected by whether it is a good or a bad period.

### *5.2.3* Demographic Characteristics

The age, education, marital status, and income of the household head are commonly used as control variables in the previous empirical literature. Age is found to be negatively associated with probability of home improvement (Mendelsohn 1977; Shear 1986; Ziegert 1988; Potepan 1989; Montgomery 1992; Baker and Kaul 2002). However, age does not play a significant role with respect to improvement expenditure levels (Mendelsohn 1977; Ziegert 1988). A few papers, including Ziegert (1988), Montgomery (1992), and Baker and Kaul (2002), find that education increases both the probability of home improvement and amount spent on home improvement. Marital status is found to have no impact on expenditure in Chinloy (1980). However, marriage is associated with a higher probability of improvement in Montgomery (1992) and Baker and Kaul (2002). Home improvement is assumed to be a normal good, so higher income or wealth is believed to increase the probability of improvement and amount spent on improvement. Empirical evidence from papers such as Mendelsohn (1977) supports this argument. Moreover, home maintenance and repair expenditures can be considered as important tools for adjusting expenditures in response to idiosyncratic variations in earnings over time (Gyourko and Tracy 2006). Most existing studies do not take the gender of the household head into consideration but Chinloy (1980) and Ziegert (1988) find that gender does not have significant impacts on the probability of home improvement and expenditures on home improvement. We follow the existing literature to include these demographic variables as independent variables in our study. The age of the household head is represented by four age group dummies: young (under 35 years old), middle age (35 to 50), mature (51 to 64), and elderly (65 or above). We differ from the previous literature in using a dummy variable for outstanding mortgage loans as a proxy for the financial constraint of a household. We expect that a household with a mortgage loan is less likely to engage in home improvement.

Changes in family composition are important household characteristics that should be included as explanatory variables in models of home improvement decisions. However, due to data limitations, most previous studies that use cross-sectional data have excluded them. Only a very few studies that have used dynamic panel data (e.g., Ziegert 1988; Baker and Kaul 2002) take them into consideration. Ziegert (1988) includes both changes in the number of children and adults on the list of explanatory variables when estimating the probability of building an addition. He finds that changes in the number of children and adults significantly influence the probability that a household will add to their house. Baker and Kaul (2002) also find that both adding a child or an adult is positively correlated with the probability of undertaking an expansion project. Like most studies, we do not have information on family composition changes. Alternatively, we use an infant dummy variable as a proxy for adding a child. An infant is defined as someone who is under one year old.

The number of young children and the number of adults are also popular family composition variables. Potepan (1989) examines whether having young children affects the probability of home improvement. He finds that the impact is insignificant. Baker and Kaul (2002) find that the number of adults has an insignificant effect on the probability of improvement. We also include dummy variables for pre-school children (1 to 6 years old), young children (7 to 17), and adult children (18 and older), and the total number of family members. We expect that households with pre-school or young children would be less likely to make home improvements.

### *5.2.4* Housing Variables

Floor area, age, and value are three housing variables that are often used in previous studies. Our data include floor area, but not age or value. In lieu of age and value, we include housing type, location (dummies for counties as well as a dummy for urban versus rural locations), and imputed rent. We classify housing type into two categories: units in high rise buildings (six or more stories) and units in shorter buildings (five or fewer stories). As the majority of shorter buildings were built earlier than the high rise buildings in Taiwan, housing type can to some extent be a proxy for housing age. We predict that units in shorter buildings are more likely to be improved than those in high rise buildings. Baker and Kaul (2002) find that units in central cities are less likely to be improved because there are more regulations in those areas. In Taiwan, home improvement activity in apartment buildings has to be approved by the community management committee and follow various rules. In contrast, home improvement activity in single family houses does not need to go through an approval process. In the central cities (urban areas) of Taiwan, most households live in apartment buildings with community management committees. In small towns (rural areas) in Taiwan, most households live in single family houses. All else equal, we believe that it is more difficult to engage in home improvement activity in urban areas. Therefore, we specify the location variable as a dummy for urban areas (with rural being the default) based on the assumption that units in urban areas are less likely to be improved than those in rural areas. Imputed rent is used as a proxy for the flow value of current housing service of the existing house stock. We expect that higher imputed rent reduces the probability of home improvement, because the quality of current housing service is good enough. As shown in Equation (14), the current housing service value $h$ is excluded from the optimal home improvement expenditure function.

### *5.2.5* Macroeconomic Variables

As we use pooled data that span several years, we also have to control for time-varying macroeconomic factors that influence home improvement decisions. We include two macroeconomic variables in our estimation. The lag of real GDP growth is used to indicate macroeconomic performance in the previous year. We expect that economic performance in the previous year is positively related to the probability of home improvement and the amount of improvement expenditures. A dummy for periods of expansion in the real estate cycle is used to control for real estate market performance. People may tend to purchase houses instead of improving them when the real estate market is in expansion. However, they may also invest more in home improvements when home values exceed replacement costs. We define the period of expansion as having a positive house price growth rate.

# 6. Empirical Results

## 6.1 Descriptive Statistics

As shown in Table 1, approximately 23.7% of our full sample of households have conducted home improvement activities and their average expenditures on home improvement are around NT$34,292.[11] The average household head in our sample has 10 years of education. Some 80% of the household heads are male, whereas 89% of household heads are married. Our typical household has 3.6 members. Some 3.6% of the households have infant babies, 6% have children between the ages of 1 and 6, 12.5% have children between 7 and 17, and 11.1% have children over the age of 18. The average income of the households is NT$1,220,578 and 28% of them have mortgage loans. The average house is 43 pings.[12] Some 27% of the sample houses are located in high rise buildings, while 72% are located in urban areas. The average imputed rent is NT$137,099 per year.

## 6.2 Heckman Two-Stage Estimation Results

### *6.2.1* First-Stage Selection Equation Results

As shown in the first two columns of the results in Table 2, the results obtained from the first stage estimation suggests that a homeowner is less likely to make home improvements in a Widow Year. These findings are consistent with our folk taboo arguments. However, our estimation results do not provide statistically significant evidence that the likelihood of making home improvements would rise significantly in the Year of the Dragon, which is considered to be auspicious.

Regarding the impacts of demographic variables, we find that the age level variables are significantly associated with the probability of home improvement. In comparison with younger households, households with a middle age or older head are significantly more likely to make home improvements. Moreover, the probability of a household making a home improvement significantly increases with the education level of the head. Neither gender nor marital status is found to be significant. The estimated coefficient for the infant dummy is negative, but statistically insignificant. This insignificant effect might be explained by the combination of two opposite effects. On the one hand, having a newborn baby increases the need to make changes to the structure. On the other hand, having a newborn baby reduces the disposable income available for home

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[11] NT$1 is approximately equal to US$0.03.
[12] 1 ping is equal to about 3.3 square meters.

improvement. The estimated coefficients for the dummy variables for children are significantly negative, thus suggesting that a household with dependent children is less likely to make home improvements. The size of the household has an insignificant effect on the likelihood of home improvement. As expected, a household with a higher total household income or no mortgage loan is more likely to make home improvements.

**Table 1 Descriptive Statistics**

| | Full sample (*n* =92,979) | | Sub-sample (*n* =22,026) | |
|---|---|---|---|---|
| Variable | Mean | S.D. | Mean | S.D |
| *Dependent variable* | | | | |
| Improvement rate (%) | 23.70 | | | |
| Improvement expenditure ($NT) | | | 34,293 | 86,566 |
| *Folk Custom Variable* | | | | |
| Year of the Dragon (%) | 12.58 | | 14.61 | |
| Widow Year (%) | 37.69 | | 33.59 | |
| *Demographic Variable* | | | | |
| Head’s age 34 or less (%) | 17.50 | | 17.23 | |
| Head’s age 35-50 (%) | 43.57 | | 45.49 | |
| Head’s age 51-65 (%) | 24.92 | | 27.64 | |
| Head’s age 66 or above (%) | 14.00 | | 9.63 | |
| Education of head (years) | 10.61 | 4.28 | 11.48 | 4.01 |
| Male head (%) | 80.37 | | 83.48 | |
| Married (%) | 89.51 | | 94.08 | |
| Infant (%) | 3.69 | | 3.95 | |
| Child 1-6 (%) | 6.12 | | 6.47 | |
| Child 7-17 (%) | 12.54 | | 13.11 | |
| Child 18 and above (%) | 11.19 | | 13.13 | |
| Household size | 3.60 | 1.64 | 3.91 | 1.65 |
| Household income ($NT) | 1,220,578 | 817,301 | 1,521,865 | 946,534 |
| Outstanding mortgage (%) | 28.30 | | 28.66 | |
| *Housing variable* | | | | |
| Imputed rent of house ($NT) | 137,144 | 86,517 | 160,737 | 101,206 |
| Urban location (%) | 72.41 | | 74.16 | |
| Floor area (ping) | 43.64 | 22.76 | 46.69 | 24.01 |
| Tall building (%) | 17.61 | | 16.95 | |
| *Macroeconomic variable* | | | | |
| Real estate expansion (%) | 50.28 | | 45.73 | |
| Lag GDP growth (%) | 4.05 | 2.83 | 4.16 | 2.88 |

We also find that the likelihood of making home improvements is closely associated with housing characteristics. For instance, a smaller unit in a tall apartment complex building that is located in an urban area is less likely to be improved. However, we find that imputed rent is not significantly related to the probability of improvement. Furthermore, we find that homeowners are less likely to make home improvements during the period of real estate expansion. Homeowners may be more likely to sell the existing unit and purchase a new one at such time. It is relatively easy to sell the existing home in an expansion period, so households do not have to make home improvements to improve marketability. Lastly, we find that the economic performance of the previous year significantly increases the likelihood of home improvement.

### *6.2.2* Second-Stage Outcome Equation Results

The last two columns of Table 2 show the estimated results for the outcome (improvement value) equation. We find that the estimated coefficient of the inverse Mills ratio is statistically significant. This suggests that sample selection bias is an issue and provides support for use of a two-stage estimation process.

**Table 2 Heckman Two-Stage Estimation Results**

| Taiwan | Selection ($n$ = 92,980) | | Outcome ($n$ = 22,066) | |
|---|---|---|---|---|
| Variable | Coefficient | S.E. | Coefficient | S.E |
| Constant | -8.313*** | 0.179 | -11.354*** | 3.873 |
| *Folk custom variable* | | | | |
| Year of the Dragon | 0.009 | 0.015 | 0.081** | 0.033 |
| Widow Year | -0.090*** | 0.010 | -0.024 | 0.044 |
| *Demographic variables* | | | | |
| Head's age 36-50 | 0.032** | 0.015 | -0.025 | 0.035 |
| Head's age 51-65 | 0.090*** | 0.018 | 0.163*** | 0.053 |
| Head's age 66 and above | 0.121*** | 0.022 | 0.251*** | 0.067 |
| Education of head | 0.045*** | 0.011 | 0.063** | 0.032 |
| Male head | -0.001 | 0.013 | -0.048* | 0.029 |
| Married head | 0.039* | 0.022 | 0.054 | 0.055 |
| Infant | -0.036 | 0.027 | -0.103* | 0.059 |
| Child 1-6 | -0.140*** | 0.046 | -0.134 | 0.116 |
| Child 7-17 | -0.104*** | 0.035 | -0.046 | 0.089 |
| Child 18+ | -0.135*** | 0.035 | -0.274*** | 0.092 |
| Household size | -0.012 | 0.018 | -0.335*** | 0.040 |
| Household income | 0.538*** | 0.013 | 1.280*** | 0.219 |
| Outstanding mortgage | -0.081*** | 0.011 | -0.032 | 0.041 |
| *Housing variable* | | | | |
| Imputed rent | -0.010 | 0.015 | — | — |
| Urban location | -0.069*** | 0.020 | -0.011 | 0.054 |
| Floor area | 0.101*** | 0.014 | 0.189*** | 0.047 |
| Tall building | -0.146*** | 0.014 | -0.311*** | 0.068 |

***(Continue…)***

***(Table 2 Continued)***

| Taiwan | Selection ($n$ = 92,980) | | Outcome ($n$ = 22,066) | |
|---|---|---|---|---|
| Variable | Coefficient | S.E. | Coefficient | S.E |
| *Macroeconomic variable* | | | | |
| Real estate expansion | -0.112*** | 0.010 | -0.140*** | 0.051 |
| Lag GDP growth (%) | 0.010*** | 0.002 | 0.015*** | 0.006 |
| County dummies | Yes | | Yes | |
| Inverse Mills ratio | | | 1.834*** | 0.554 |

***Note:*** * 10% significance level; ** 5% significance level; *** 1% significance level.

We find that improvement expenditures are significantly higher in the Year of the Dragon than in other years. However, we do not find a statistically significant impact of the Widow Year on improvement expenditures. This implies that the expenditure amounts are not negatively affected by the taboo once households have already decided to make home improvements in a taboo year.

Our results show that, once a household has decided to make home improvements, a household with an older or more educated head is willing to spend more money on improvements than one with a younger or less educated head. Having adult children at home or a larger household is found to reduce home improvement expenditures. As expected, total household income has a positive impact on housing improvement expenditures.

We find that home improvement expenditures are lower in high rise buildings (proxy for newer units) than in shorter buildings (proxy for older units). This is consistent with the findings in the estimation of likelihood of home improvement. Moreover, a larger house requires more improvement spending than a smaller house. We find that the homeowners spend less money on home improvements during periods of real estate expansion. We also find that better macroeconomic conditions significantly increase the amount of home improvement expenditures.

### *6.2.3* Robustness Checks

To explore the possibility of different impacts of the Year of the Dragon and Widow Year in different parts of Taiwan, we also estimate the models for Taipei City versus the rest of Taiwan and for Greater Taipei (Taipei City plus New Taipei City) versus the rest of Taiwan. The results for the Year of the Dragon and Widow Year variables are shown in Table 3. With respect to the selection model, the results are all consistent with those for Taiwan as a whole: the Year of the Dragon does not have an impact on the likelihood of home improvement, while Widow Years have a significantly negative impact. With respect to the outcome model, the Year of the Dragon has a significantly positive effect on home improvement expenditures outside of Taipei City and Greater Taipei, consistent with the results for Taiwan as a whole. Also consistent with the results for Taiwan, Widow Years have an insignificant impact on expenditures in Taipei City and Greater Taipei. The only anomalous impacts are the positive and significant impacts of Widow Years on expenditures outside of Taipei City and Greater Taipei.

**Table 3 Robustness Checks**

| Variable | Coefficient | S.E. | Coefficient | S.E. |
|---|---|---|---|---|
| Taipei City only | Selection (*n* = 13,455) | | Outcome (*n* = 4,987) | |
| *Folk custom variable* | | | | |
| Year of the Dragon | 0.029 | 0.035 | 0.003 | 0.051 |
| Widow Year | -0.118*** | 0.025 | -0.052 | 0.074 |
| Inverse Mills ratio | | | 0.103 | 0.804 |
| Non-Taipei City only | Selection (*n* = 79,525) | | Outcome (*n* = 17,079) | |
| *Folk custom variable* | | | | |
| Year of the Dragon | 0.018 | 0.017 | 0.082*** | 0.031 |
| Widow Year | -0.087*** | 0.011 | 0.155*** | 0.050 |
| Inverse Mills ratio | | | -0.281*** | 0.692 |
| Greater Taipei only | Selection (*n* = 23,630) | | Outcome (*n* = 6,894) | |
| *Folk custom variables* | | | | |
| Year of the Dragon | 0.034 | 0.028 | 0.057 | 0.052 |
| Widow Year | -0.094*** | 0.020 | -0.072 | 0.058 |
| Inverse Mills ratio | | | 1.238* | 0.686 |
| Non-Greater Taipei only | Selection (*n* = 69,350) | | Outcome (*n* = 15,172) | |
| *Folk custom variables* | | | | |
| Year of the Dragon | 0.016 | 0.018 | 0.081** | 0.033 |
| Widow Year | -0.092*** | 0.012 | 0.153*** | 0.054 |
| Inverse Mills ratio | | | -0.108 | 0.707 |

***Note:*** * 10% significance level; ** 5% significance level; *** 1% significance level. The models are specified in the same manner as for Taiwan as a whole (Table 2), but only the folk custom variables and inverse Mills ratios are shown for comparison purposes. The estimated total population for Taiwan as of the end of 2017 was about 23.6 million, with about 4 million in New Taipei City and 2.7 million in Taipei City. Greater Taipei includes Taipei City and New Taipei City (see Taiwan Ministry of the Interior, https://www.moi.gov.tw).

## 6.3 Interpretation

The selection estimations are consistent across all geographic areas. In the Year of the Dragon, couples are more likely to have newborn babies, so the likelihood of making home improvements could hypothetically increase to provide new or improved space for their newborn. However, it is not necessary to provide this new or improved space right away and there is no evidence that the likelihood of home improvement increases significantly in the Year of the

Dragon. In Widow Years, the number of newly wedded couples decreases significantly. According to tradition, when a couple decides to get married, the bedroom for the newly wedded couple should be renovated and redecorated. Therefore, the likelihood of making home improvements drops significantly in Widow Years.

The outcome estimations vary and may be related to the demographic characteristics of the geographic areas. While families are not more likely to invest in home improvements in the Year of the Dragon, those who do invest spend more than would normally be the case. This may be evident outside of Taipei City or Greater Taipei because fertility rates tend to be higher outside the capital. In Widow Years, young couples typically avoid having a wedding, and wait until the following year. However, they may invest in home improvements in anticipation of an upcoming wedding (there would be typically more weddings in the year following a Widow Year). Again, this may be evident in places outside the capital due to demographic factors, specifically higher marriage rates in those locations.

## 7. Conclusions

This paper contributes to our understanding of housing markets by exploring the impacts of folk customs on home improvement decisions. We apply a two-stage estimation method that controls for selection bias to estimate the likelihood of home improvement in the first stage and, conditional on investment in home improvement, the size of the expenditure in the second stage. We use the Year of the Dragon and Widow Year as proxies for auspicious and inauspicious periods, respectively. Our empirical results find that the likelihood of home improvement falls significantly during Widow Years. However, we find that the taboo factor no longer plays an important role once households decide to make home improvements. On the other hand, our results do not find that the likelihood of home improvement increases significantly in the Year of the Dragon. However, we do find that expenditures on home improvement are significantly higher during the Year of the Dragon. The first-stage selection equation results for auspicious and inauspicious years are consistent across various geographic areas in Taiwan, while the second-stage selection equation results somewhat vary. We speculate that these differences are due to demographic variations between the capital city region and less developed parts of Taiwan.

Consistent with previous studies on the impacts of folk customs on real estate decisions, we find that beliefs about auspicious and inauspicious years have impacts on the decisions of households towards home improvements. Real estate industry practitioners and policy makers need to be cognizant of the impact of these kinds of factors to fully understand the investment behavior of households.

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