The Role of House Flippers in a Boom and Bust Real Estate Market

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Abstract: The single-family house transactions data of the Chicago Metropolitan Statistical Area during the 1995-2010 period revealed that the peak flipper participation in the housing market occurred between 2004 and 2006 and they realized a higher return than long-term house holders, especially between 2000 and 2006 when the housing market boomed. However, flippers had higher risk than long-term holders. The estimation results of the multilevel mixed regression model showed that when more flippers entered the housing market, they created a positive upward movement in home price. The multivariate adaptive regression splines (MARS) model revealed a nonlinear relationship between housing prices and the fixed and variable effects of flipper participation in the housing market. Multiple knots indicated that flippers impacted the market differently as the frequency and magnitude of flipper participation in the housing market changed.

JEL Classification: R11, R21, R30, C31, C41
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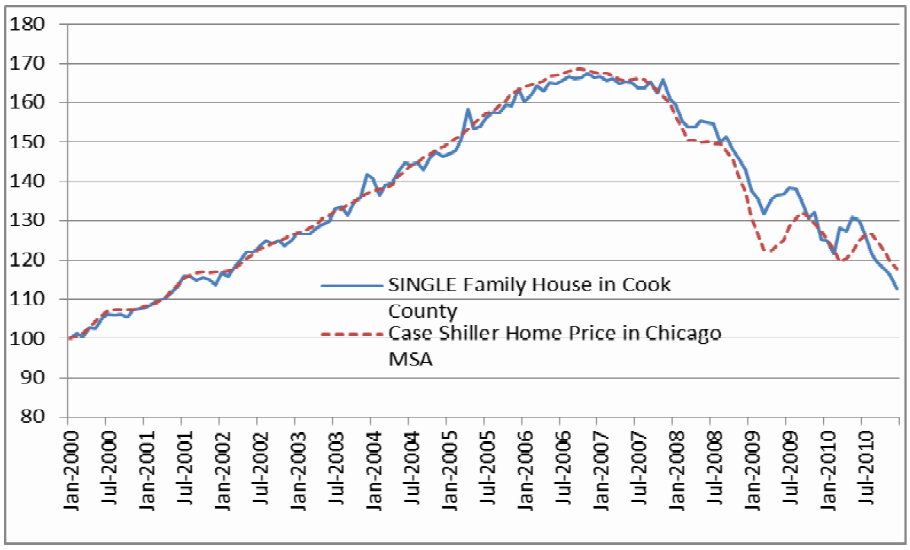
1. Introduction

After a boom in the real estate market between 2000 and 2006, U.S. housing prices experienced a steep decline for 5 consecutive years. The most recent boom and bust cycle in the real estate market has been a major concern for the stability of financial markets and overall economy. Numerous studies have tried to explain the causes of this cycle -- particularly the housing bubble burst beginning in 2007. One hypothesis suggests excessive credit availability in the financial market, resulting in historically low interest rates, caused the housing bubble to burst[2]. The low interest rates triggered excessive demand for assets, especially in the real estate market. Assuming this hypothesis was valid, there should have been an unusually large volume of real estate transactions during the boom period, particularly by the house flippers who were able to finance their frequent house purchases with low mortgage payments during the holding period. In addition, flippers would have been able to take advantage of the capital-gains tax-exemption afforded by the Taxpayer Relief Act of 1997[3], which encouraged their speculative behavior. However, the inability to accurately determine the ulterior motives of home buyers and sellers leaves us to

define a house flipper simply as a home buyer that purchased a house and then sold it back within 2 years[4]. In this study, we examine the roles of these flippers in the recent boom and bust housing market.

The high demand for houses, due to capital-gains tax-exemption provision and low financing costs driven by historically low mortgage rates in the early 2000s, created a perfect environment for house flippers. From 2000 to 2005, the U.S. housing market experienced an average increase of 12 percent per year according to the Case-Shiller home price index. The Chicago Metropolitan Statistical Area (MSA), for example, which includes eight counties surrounding the City of Chicago, experienced about an 8.6 % increase per year from 2000 to 2005. Similarly, the housing prices in Cook County, which has 66% of the Chicago MSA's total population, also increased about 8.7 % per year for the same period. Since then, like other cities in the U.S., Cook County and the Chicago MSA experienced very steep home price decreases as shown in Figure 1.

Figure 1: Case-Shiller Home Price Index in Chicago MSA Calculated via the Repeat Sale Method



The bust in the housing market originates from the subprime loan crisis in 2007-- a crisis which turned into a worldwide financial catastrophe. The subprime crisis is often blamed on those individuals who purchased homes despite their inability to sustain monthly mortgage payments. However, the real culprit in the crisis may be house flippers who aided artificially inflating home prices, which eventually hurt subprime borrowers; that is, subprime borrowers were, conceivably, lured into purchasing an unaffordable home because they paid an inflated price. Therefore, we

examine the role played by house flippers who engaged in speculative purchases of homes during the recent boom and bust cycle in the real estate market.

Many studies attempted to find the sources of the instability in the housing market using various econometric techniques. Crawford and Frantaton (2003) employ a Markov switching model to explain the threshold behavior, while Miles (2008) shows that the housing market is subject to boom and bust cycles via the Generalized Autoregressive (GAR) model that utilizes quadratic, cubic, and multinomial functions of the lagged dependent variable. Miles finds the GAR model works well given a history of housing bubbles and crashes.

Coleman IV, LaCour-Little and Vandell (2008), while having studied home price fluctuation during the 1998-2006 period, conclude that subprime activity has a marginal influence on the price run-up. They attribute the reason for home price increase to the combined effects of changing institutional, political, and regulatory environments observed after late 2003. Similarly, Clark and Coggin (2011) examine the existence of a U.S. house price bubble applying unit root, cointegration, and error corrections models. They find that that the U.S. home price movement is unrelated to many commonly suggested variables in the literature.

Bayer, Geissler, and Roberts (2011), however, specifically examine the role of flippers in the housing market. They identify the role of flippers as middlemen who provide liquidity to the market, investors who improve a community via gentrification, and speculators who create huge run-ups in home prices and thus, an increase in price volatility. As speculators, the flippers tend to enter the housing market very promptly as prices rise. They earn more than an average return by selling back in the declining market after a short-term holding of the houses. Thus, Bayer, Geissler and Roberts conclude that the entry of speculative house flippers is strongly associated with volatile housing price movements. Unlike previous studies, however, this paper specifically examines and measures the magnitude of the house flippers' impacts during the recent boom and bust in housing prices by applying two different econometrics tools, each based on detailed house transactions data from the Chicago MSA.

We organize this paper as follows: In Section 2, we identify and describe four different types of house flippers based on their transactions behavior shown via the single-family house transactions data from the Chicago MSA between 1995 and 2010. Section 3 presents the theoretical structure of two econometrics models - the Multilevel Mixed Regression Model and the Multivariate Adaptive Regression Splines. Their estimated results are described in Section 4. Finally, in Section 5, we present the summary and conclusions of the study.

2. Data, Flipper Types, and Descriptive Statistics

This study uses the data on single-family housing transactions among individual home owners[5] from the Cook County Recorder of Deeds for the Chicago MSA observed between 1995 and 2010. Initially, we identified all houses in which a purchase-and-sale transaction was made during the study period[6]. In the Chicago

MSA, there were 247,880 such transactions. Among these transactions, we further identified 45,016 transactions to have belonged to house flippers whose definitions are discussed next.

2.1. Types of House Flippers

Based on the data set, we broadly identified individuals as house flippers when they bought houses and sold them back within 2 years from the date of purchase. The reason why the two-year limit is chosen is based on the two-year minimum residence requirement for the capital-gains tax-exemption as specified in the Taxpayer Relief Act of 1997. Also, we identified individuals who bought and sold houses more than once, possibly due to their profit motive instead of residence motive, within any 2-year period. Because anyone who buys houses with such a frequency and a short-term holding period can be considered to have a speculative motive in the housing market, we identified them as house flippers and grouped them into the four types as follows:

Type 1 flipper: A person who sold a house once within two years from its purchase date.

Type 2 flipper: A person who owned multiple houses and sold at least two of them within two years from their respective purchase dates.

Type 3 flipper: A subset of Type 2 flippers whose house sales are identified and matched up with those of Type 1 flippers.

Type 4 flipper: A person who is identified as either Type 1 or Type 2 flippers.

In Type 1 flippers, we include any house transaction whose holding period is less than or equal to 2 years. This may include many sellers who did not intend to flip houses for an immediate profit, such as those who needed to sell their homes due to unexpected job changes or any other personal reasons. However, because their transactions formed a part of the aggregate house prices prevailing during the study period, we consider them flippers and examine their role in the housing market. Type 2 flippers are those who owned more than one house and actively participated in trading houses. For example, an owner of three houses who sold at least two of them in different two-year periods belongs in this group[7]. This group can be considered the core group of flippers in the broader sense of definition. Type 3 flippers are a subset of Type 2 flippers whose transacted houses are identified in Type 1 flippers. This group is, therefore, the identified true flippers who owned multiple houses and actively sold them within a two-year period. Their success or failure in profiting from housing trade can yield the clearest picture of how much impact they have had on the housing bubble. Therefore, this group can be considered the core group of flippers in the narrowest sense of definition. Type 4 flippers are those who belong in either the Type 1or Type 2 flipper groups, except those who are in Type 3 flipper group. That is, Type 4 flippers belong in the broadest definition of flippers who had any sale of houses within a two-year period.

2.2. Summary of Data

As shown in Table 1, there were a total of 247,880 transaction pairs[8] of single-family houses in the Chicago MSA between 1995 and 2010. Among these, 202,864 transactions – 81.8% of the total – were identified as participating in non-flipper activity, where homeowners sold their houses after a holding period greater than 2 years. The remaining 45,016 transactions – 18.2% of the total – were identified as house flippers. Of these 45,016 flipper transactions, we further classified 65.8% of them to be attributed to Type 1flippers; 34.2%, to Type 2 flippers; 5.1%, to Type 3 flippers; and 94.9%, to Type 4 flippers.

Table 1: Number of Transactions by Flipper Type

Type of Flippers	Number of Transaction Pairs	Fraction of Flipper Type per Total Transactions	Fraction of Flipper Type per Total Flipper Transactions
Type 1	29,617	11.9%	65.8%
Type 2	15,399	6.2%	34.2%
Type 3	2,291	0.9%	5.1%
Type 4	42,725	17.2%	94.9%
Total Flipper Transactions	45,016	18.2%	100%
Total Transactions	247,880	100%	NA

The presence and activity of house flippers strongly reflect the underlying economic conditions. For example, when large returns are possible in the real estate market, relative to other alternative investments such as savings accounts, stocks, bonds, and financial derivatives, house flippers will be very active in the real estate market. Alternatively, when expected returns from the real estate market are low, the flipper activity, as measured as a share of the total transaction pairs, declines. In fact, Table 2 clearly illustrates these patterns for the four types of flippers. First, we note that there was a growing participation trend by them from 2000 to 2006. Type 1 flippers' share of transactions increased from 15.1% in 2000 to its peak of 19.6% in 2006. Similarly, type 2 flippers increased from 5.23% to 8.13% during the same period. Second, we note that in all four types of flippers, respective shares of the housing transactions exceeded all categories of averages during the period between 2001 and 2007 when interest rates were low in the U.S. Therefore, it can be reasonably concluded that there was a rapid increase in flipper activity during the 2000-2006 period, possibly peaking between 2004 and 2006.

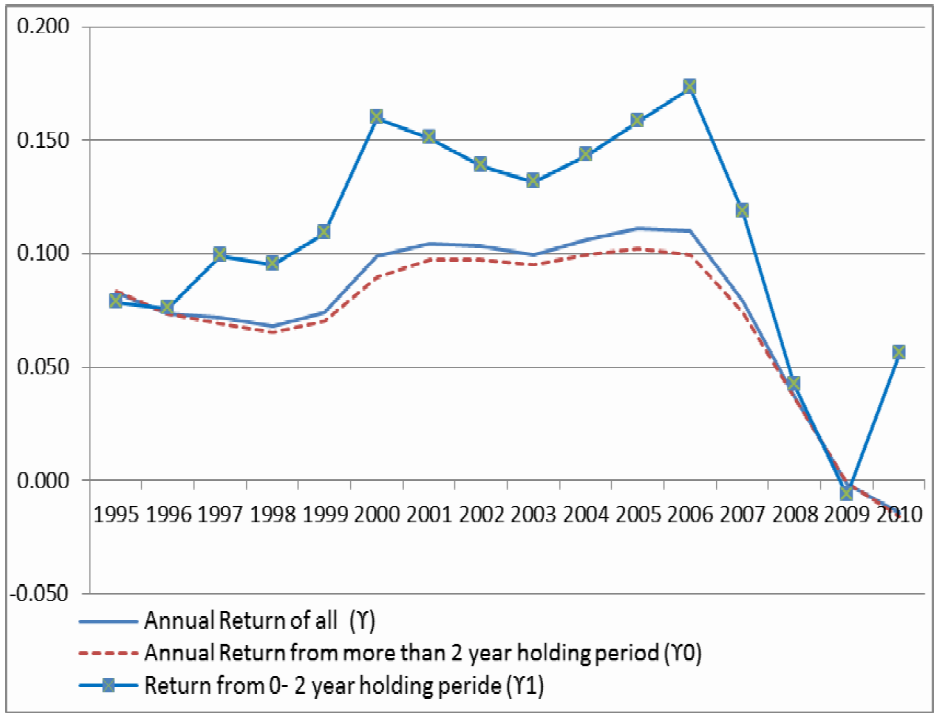
Table 2: The Annual Share (%) of Transactions by Flipper Type (Cook County Single Family Sales)

Year	Type 1	Type 2	Type3	Type 4
1995	8.1	4.13	0.38	11.61
1996	7.3	3.77	0.25	9.69
1997	11.2	4.41	0.45	13.57
1998	12.9	4.49	0.46	14.25
1999	13.1	4.99	0.63	15.12
2000	15.1	5.23	0.74	17.83
2001	17.5	5.59	0.97	18.83
2002	16.9	6.29	1.06	18.82
2003	16.2	7.01	1.07	19.21
2004	17.4	7.41	1.41	21.29
2005	18.3	7.7	1.34	21.62
2006	19.6	8.13	1.47	20.89
2007	15.7	7.11	0.81	17.08
2008	9.8	5.62	0.5	12.47
2009	4.8	4.13	0.2	7.31
2010	3.4	3.12	0.13	5.51
Average	12.96	5.57	0.74	15.32

2.3. Annualized Returns to Flippers

Profit motivation - that is, the opportunity to purchase a home at a low price and sell it at a higher price - may have caused flippers' increased participation in housing transactions during this time period. The question of interest is then to ask if a holding period mattered in determining the profit level during the study period. It is difficult know the base price of a house to calculate the exact net profit from a sale. However, based on the annualized gross rates of return from housing transactions data shown in Figure 2, short-term holders of less than two years realized much higher rates of return than long-term holders of more than two years, especially between 2000 and 2006 when the housing market boomed[9]. It is interesting to note that the capital-gains tax-exemption did not appear significant to these short-term holders, perhaps because they had realized adequate returns for the risk they took in the transactions. This may indicate that these short-term holders truly possessed the speculative spirit of house flippers. In fact, their highest annualized return of 17.3% was reached in 2006.

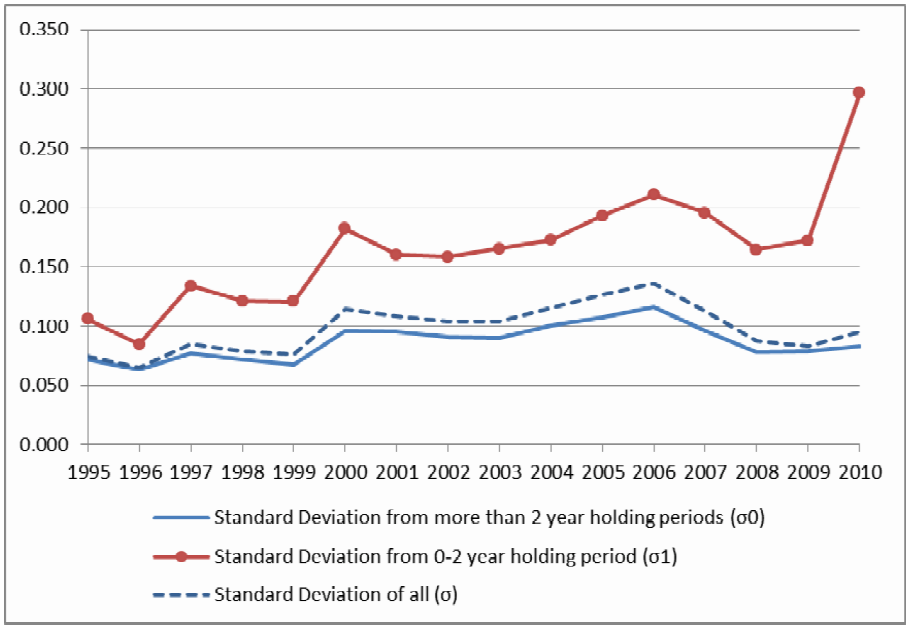
Figure 2: Annualized Rates of Return from House Transactions by Different Holding Periods



2.4. Risks to Flippers

Figure 3 shows the standard deviations of the annual returns corresponding to the annualized return data shown in Figure 2. These standard deviations, as a measure of investment risk, closely reflect the return patterns. Essentially, short-term holders had higher risk than the long-term holders during all 17 years of study, possibly supporting the modern portfolio theory of high return with higher risk. However, what is different from Figure 2 and thus, interesting, is the overall gradual upward trend in the standard deviations shown in Figure 3. Despite the length of holding periods, there was an upward tendency in standard deviations until the burst of the housing bubble in 2007. The explosive uptick in 2010, however, may reflect factors that were not present during previous years, such as increased transactions of foreclosed or underwater houses which might have added greater uncertainty in their profit opportunities.

Figure 3: Standard Deviation of Annualize Returns per Holding Period



3. Econometric Models

Based on repeat sales index values that we calculate for the Chicago MSA, we utilize the multilevel mixed regression model (MMRM) to estimate the specific role played by each of the four types of flippers between 1995 and 2010. We also use the multivariate adaptive regression splines (MARS) to estimate any natural break point(s) – known as knots or thresholds – in the data that identify when the nature of housing market changed due to the participation of flippers. A summary description of these two estimation models is presented here below.

3.1 Multilevel Mixed Regression Model (MMRM)

We initially construct a multilevel repeat sale index model, assuming that the quality attributes and the coefficients are constant in any two sale periods, as follows:

$$\ln(p_i) = \beta_0 + \beta_1 D_i + \beta_2 H_i + e_i \qquad (1)$$

where $\beta_1 D_i = \beta_{11} D_{1i} + \beta_{12} D_{2i} + \cdots + \beta_{1t} D_{ti}$;

$\beta_2 H_i = \beta_{21} H_{1i} + \beta_{22} H_{2i} + \cdots + \beta_{2k} H_{ki}$

and the subscript i represents the number of transactions in time period, t; k is the number of hedonic variables, H_i; p_i is the repeat sales index; β_i is the estimated coefficients; D_i is a repeat-sale time-dummy variable; and e_i is the regression error term with normality conditions. Using this model, we calculate a cumulative return per period and the repeat sale index, with January of 2000 as a base month for the study. We then construct a multilevel mixed regression model by adding, specifically, the role of house flippers to the repeat sale price model as follows:

$$\ln(p_{ij}) = \beta_0 + \beta_1 H_{ij} + \beta_2 D_{ij} + u_{0j} + u_{1j} F_{ij} + e_{ij} \tag{2}$$

where $u_{0j} + u_{1j} F_{ij}$ represents the effect of house flippers. By adding this term to the repeat sale index equation, we assume that flippers' impact has a constant or fixed portion, u_{0j}, and a variable portion of $u_{1j} F_{ij}$. That is, the estimated effect of flippers is defined as:

$$u_j = u_{0j} + u_{1j} F_{ij} \tag{3}$$

where

$$u_j = \begin{cases} u_{0j} + u_{1j} & \text{if } F_{ij} = 1 \text{ (Flipper)} \\ u_{0j} & \text{otherwise} \end{cases}$$

and $E(u_j) = E(u_{0j} + u_{1j} F_{ij}) = u_{0j} + w_j u_{1j}$ with the following assumptions: $\mathrm{E}(u_{0j}^2) = \sigma_0^2$, $\mathrm{E}(u_{1j}^2) = \sigma_1^2$, and $\mathrm{E}(u_{0j} u_{1j}) = \sigma_{01} \neq 0$. Note that w_j is the weight given to the flipper activity based on the number of flippers present in each period. Therefore, the model identifies the overall effect as the sum of the fixed effect present at the time of sale and the variable effect created by flippers. As the number of flippers increases, the influence by flippers will increase and thus, the value of w_j will increase. Of course, the opposite case of a decreasing influence of flippers will be observed when the number of flippers decreases. One important feature of this multilevel mixed regression model is that it can handle the heteroscedasticity nature of housing prices by utilizing each period's own mean and variance parameters. This property allows us to disentangle the impact of normal transactions and the impact of flippers as we incorporate these values in the second stage of estimation. The use of the flipper dummy variable, F_{ij}, also adds an extra dimension to understanding the marginal effects of flippers on the house price change.

3.2 Multivariate Adaptive Regression Splines (MARS) Model

The second econometric model that we use is the Multivariate Adaptive Regression Splines (MARS) model[10]. This model is of great value in identifying a knot or threshold value(s) where a regression equation can be splined into two or more segments. Because the descriptive statistics of the data discussed in Section 2 seem to indicate an asymmetric behavior of home prices as the market goes through a boom-and-bust cycle, we can infer that the impact of flippers on the housing price can be nonlinear and may be identified with the existence of a knot(s). That is, the presence and magnitude of a knot(s) in the data can enable us to identify a critical role played by flippers.

Based on Friedman (1991) and Stokes (1997), we construct a standard MARS model as follows:

$$y = f(x) = \sum_{i=1}^{m} \beta_i M_i(x) \tag{4}$$

where β_i is a constant coefficient for the i-th basis function, $M_i(x)$, and x is a predictor variable. The basis function can be an intercept term or a hinge function that takes the form of max(0, $x - \tau^*$) or max (0, $\tau^* - x$) where τ^* is the fixed knot value. Therefore, it can alternatively be expressed as:

$$y = \beta_0 + \beta_1 (x - \tau^*)_+ - \beta_2 (\tau^* - x)_+ + e \tag{5}$$

which implies that $y = \beta_0 + \beta_1 x + e$ for $x > \tau^*$ and $y = \beta_0 + \beta_2 x + e$ for $x < \tau^*$. Also, $(\ )_+$ denotes a right truncated spline function that takes a positive value. Therefore, equation (5) allows a piecewise threshold regression model where the knot value can be identified. MARS automatically selects variables and their values to identify an optimal knot in a hinge function. A product of various combinations of these hinge functions, based on forward and backward passes, is ultimately obtained via a modified generalized cross validation (MGCV) process of the following form:

$$MGCV = [(1/N)\sum_{i=1}^{N} (y_i - f(x_i))^2] / [1 - (C(M)^*/N)^2] \tag{6}$$

where *N* is the number of observations and *C(M)* is a complexity penalty function represented as $C(M)^* = C(M) + \delta M$. The default complexity penalty function is set as a function of the effective number of parameters.

The important feature of this MARS model is its ability to identify the existence and magnitude of a knot or threshold value(s) via an optimal search routine that allows numerous iterations of various combinations of underlying functional relationships.

4. Empirical Results

4.1 Results from the Multilevel Mixed Regression Model (MMRM)

We summarize in Table 3 the estimation results of the multilevel mixed regression model specified in Equation (2). The variance of u_0, Var(u_0), which measures the fixed impact of house flippers are positive and significant at the 5% significance level for all 4 types of flippers. Also, their values, ranging between 0.0083 and 0.0085, are remarkably stable and indicate that they did play a constant and steady role in inflating housing prices during the study period. When the timing effect of flippers' entries to the house transactions was measured by the sign and magnitude of the variance of u_1, Var(u_1), it is once again noted that they are all positive and significant at the 5% significance level, except for Type 3 flippers whose statistical significance fails at the 5% significance level. Therefore, we can broadly conclude that when flippers enter into house transactions, they create a positive upward price movement. The interaction between u_0 and u_1, as measured by the covariance (u_0, u_1), shows a statistically significant negative relationship for Type 1 and 4 flippers, but not for Type 2 and 3 flippers. This indicates that the offsetting influence between fixed effect and variable effect can be found for the large sample cases of Type 1 and 4 flippers.

Table 3: The Estimation Results of the Multilevel Mixed Regression Model

Statistics	Flipper Type 1	Flipper Type 2	Flipper Type 3	Flipper Type 4
Var(u_0)	0.0084	0.0085	0.0083	0.0085
	(0.0010)*	(0.0010)	(0.0010)	(0.0010)
Var(u_1)	0.0029	0.0020	0.0001	0.0017
	(0.0005)	(0.0004)	(0.0002)	(0.0003)
Cov(u_0, u_1)	-0.0011	-0.0002	0.0010	-0.0008
	(0.0005)	(0.0004)	(0.0007)	(0.0004)
Var(e_{ij})	0.1118	0.1118	0.1120	0.1118
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Interclass correlation**	0.070	0.071	0.069	0.071
Log Restricted - likelihood	-81228.2	-81249.6	-81334.8	-81227.9
Wald Chi(192)	148643	157586.1	158605.3	151508.7

*The value in a parenthesis is the respective standard error.

**Interclass correlation = Var(u_0)/(Var(u_0) +Var(e_{ij}))

The variance of error terms from the first-level estimation of the repeat sales index, Var(e_{ij}), also shows stable values of 0.1118 and 0.1120, indicating that the underlying repeat sales index was calculated efficiently for all 4 types of flippers. Lastly, interclass correlation values, ranging between 0.069 and 0.071, show that the

contribution of the multilevel mixed regression model in explaining the repeat sales index variability was about 7%. This contribution is significant in determining the fixed and variable impact of house flippers.

When the information contained in Table 3 is presented graphically, we can better visualize the role played by flippers. As shown in Figure 4, when the fixed effect and the variable effect are separately plotted for all 4 types of flippers, we note that the fixed effect was relatively more volatile during the recent housing bubble period of 2007-2010. What is particularly interesting is the behavior of Type 2 flippers whose fixed and variable effects are together more volatile than the other types of flippers. Given that Type 2 flippers are frequent traders of houses, it demonstrates that they have had a major impact on the housing market since 2000, but with more fervor during the recent housing bubble period of 2007-2010.

In Figure 5, we net out both fixed and variable effects from the repeat sale index to measure the specific role played by flippers. For all four types of flippers, the difference between the repeat sale indices with and without the impact of flippers starts increasing from 2004, reaches its peak in 2007 and remains high till early 2010. This indicates that the impact of house flippers was much more pronounced during the 2004-2010 period when there was a drastic boom-and-bust cycle in the Chicago housing market. It is remarkable to find that regardless of flipper types, their impact in the housing market was significant, especially between 2004 and 2010 when there was a boom-and-bust cycle.

4.2 Results from the Multivariate Adaptive Regression Splines (MARS) Model

The MARS model as specified in Equation (3) identifies and measures the knot values which indicate the timing impact of flippers. Intuitively, when we have a large number of flippers entering the housing market, we may observe a higher price movement than otherwise.

In Table 4, we present the summary results of the knot or threshold values that are chosen by the MARS process. First, we note that there are multiple knots, which indicate the nonlinearity of the relationship between changes in the repeat sales index and the flipper participation rate. Second, all coefficient values are significant at the 5% significance level, except the intercept term of the Type 1 flipper estimation. This gives a very strong support to the claim that the marginal additive impact of all types of flippers had measurable impact on housing prices. For example, the first model that estimated the impact of Type 1 flippers shows a knot value of 0.0238 and a corresponding coefficient value of 0.324. This means that if the participation effect of Type 1 flippers is greater than 0.0238, it will increase the repeat sale index by 0.324 percent given a one percent increase in Type 1 flippers' returns. However, if the participation effect of Type 1 flippers is less than 0.0238, it will still increase the

Figure 4: Fixed Effects and Random Effects by Flipper Type from MMRM

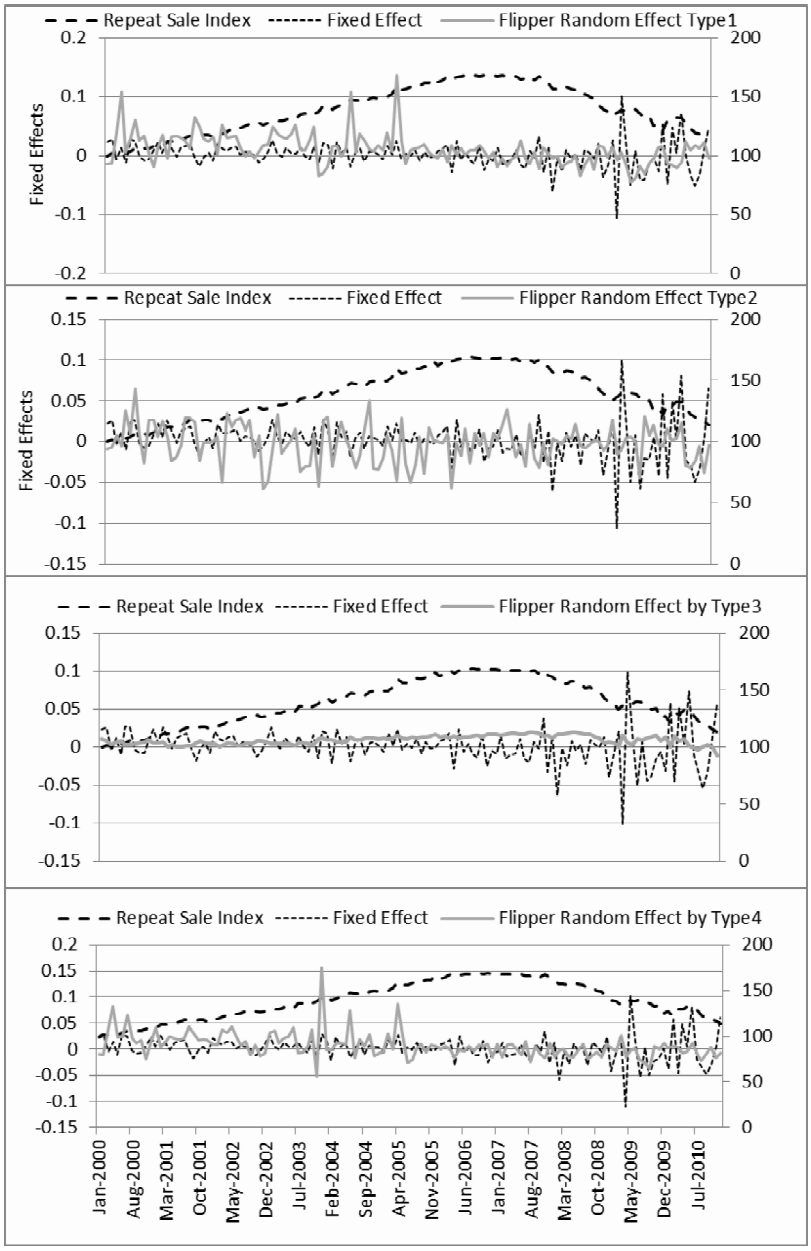
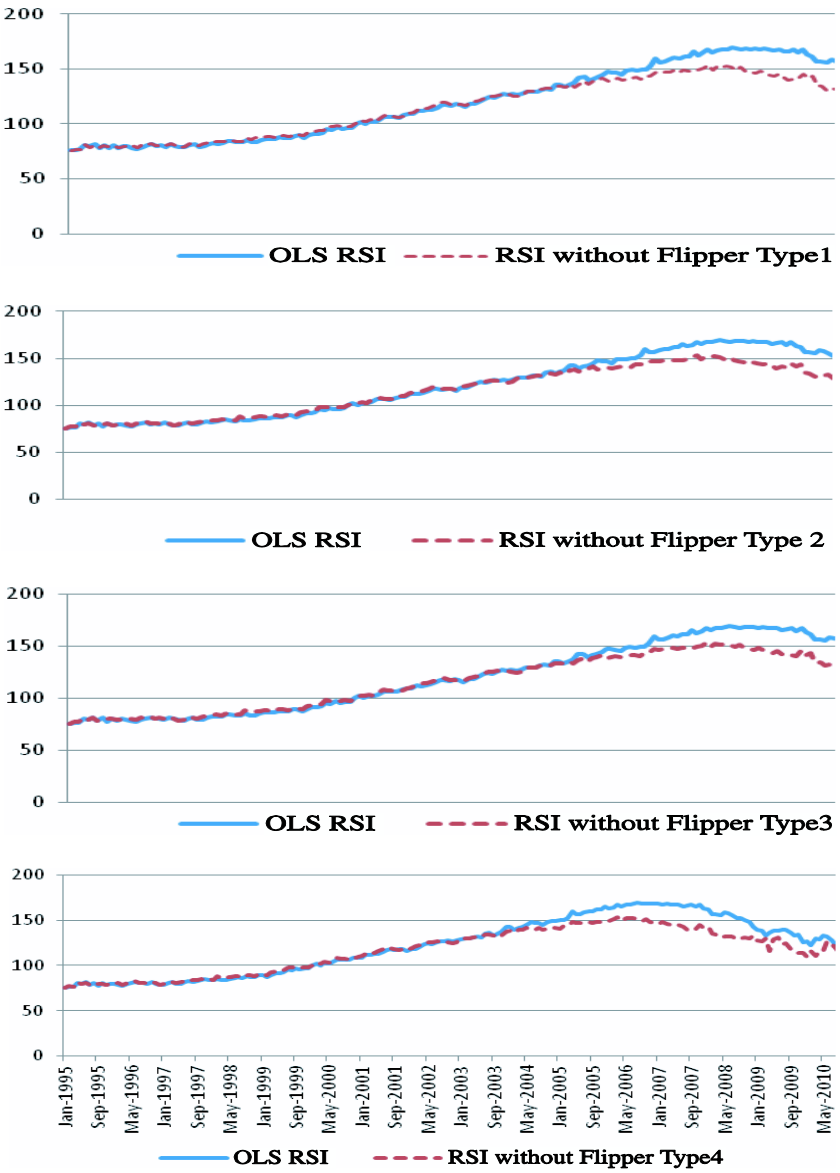


Figure 5: Net Impact on the Repeat Sale House Price Index by Flipper Type, 1995-2010



repeat sale index but by a smaller magnitude of 0.227 percent. This illustrates that the impact of Type 1 flippers on the repeat sale index is not uniformly the same. In fact, their impact is larger when more of them participate in the housing market and less when less of them participate in it. Also important is the role of the fixed effect. When the fixed effect is greater than 0.0183, the repeat sale index decreases by -0.663 whereas it increases by 0.436 when the fixed effect is greater than -0.0265.

Table 4: MARS Estimation Results for Flippers' Impact on the Repeat Sale Index

Threshold Variables	Coefficients	Standard Error	Approximate Adjusted R Square
A. Model for Type 1 Flippers			
Constant	-0.002	0.004	0.198
MAX(TYPE1- 0.0238, 0.0)	0.324	0.097*	
MAX(0.0238 - TYPE1, 0.0)	0.227	0.092*	
MAX(FIXED - 0.0183, 0.0)	-0.663	0.212*	
MAX(FIXED + 0.0265, 0.0)	0.436	0.104*	
B. Model for Type 2 Flippers			
Constant	-0.008	0.003*	0.148
MAX(FIXED - 0.019, 0.0)	-3.061	1.172*	
MAX(FIXED + 0.025, 0.0)	0.313	0.126*	
MAX(FIXED - 0.014, 0.0)	2.336	1.143*	
C. Model for Type 3 Flippers			
Constant	-0.005	0.002*	0.252
MAX(0.004 - TYPE3, 0.0)	-3.487	0.821*	
MAX(FIXED - 0.018, 0.0)	-0.965	0.251*	
MAX(FIXED + 0.006, 0.0)	0.828	0.157*	
D. Model for Type 4 Flippers			
Constant	-0.032	0.010*	0.211
MAX(TYPE4 - 0.012, 0.0)	0.234	0.081*	
MAX(FIXED - 0.018, 0.0)	-1.135	0.308*	
MAX(0.018 - FIXED, 0.0)	0.395	0.175*	
MAX(FIXED + 0.026, 0.0)	0.894	0.246*	

* indicates a significance at the 5% significance level.

The model for Type 2 flippers shows that when the fixed effect of Type 2 flippers increases beyond 0.019, the index decreases by -3.061, whereas it increases by 0.313 and 2.336 percent as the fixed effect increases above 0.025 and -0.014, respectively. This also shows a strong impact that Type 2 flippers had in the housing market. The model for Type 3 and 4 flippers also show that given multiple knots, there are significant impacts on the repeat sale index as the fixed and variable effects of these flippers are incorporated. For example, when the fixed effect for Type 3 and 4 flippers exceeds 0.018, Type 3 flippers show a -0.965 percent impact, and Type 4 flippers show a -1.135 percent impact. These results indicate that additional participation by these types of flippers has had a dampening effect on the repeat price index. However, we also see the opposite case. When the fixed effects of Type 3 and 4 flippers increase beyond -0.006 and -0.026, respectively, we note that they increase the repeat sale index by 0.828 and 0.894 percent, respectively. Therefore, the estimated results show a strong influence of flippers on housing prices measured by the repeat sale index. The fact that there are many knot values suggests that the housing market is impacted by flippers by different degrees at different stages of the boom and bust cycle. Nonetheless, the impact on the housing market by flipper participation was undeniably significant, despite the different types of flippers examined.

5. Summary and Conclusions

Using the actual single-family house transactions data of the Chicago MSA during the 1995-2010 period, we examined if the house flippers with a speculative motive had a significant role in influencing the home price fluctuation. The descriptive statistics on returns show that there was a rapid increase in flipper activity during the 2000-2006 period, possibly peaking between 2004 and 2006. And short-term house holders of less than two years realized much higher rates of return than long-term holders of more than two years, especially between 2000 and 2006 when the housing market boomed. However, short-term holders had higher risk than the long-term holders during all 17 years of study. In particular, Type 2 flippers who are frequent traders of houses showed a stronger impact on the housing market than other types of flippers during the recent housing bubble period of 2007-2010. Overall, regardless of flipper types, their impact in the housing market was significant, especially between 2004 and 2010 when there was a boom-and-bust cycle.

These findings were substantiated by the estimation results of the multilevel mixed regression model (MMRM) and the multivariate adaptive regression splines (MARS) model. In addition, the MMRM result showed that when more flippers enter the housing market, they create a positive upward movement in house price whereas the MARS model revealed a nonlinear relationship between housing prices and the fixed and variable effects of flipper participation in the housing market. Multiple knots or threshold values indicated that flippers impacted the market differently as the frequency and magnitude of flipper participation in the housing market changed. The overall conclusion is that all four types of house flippers had a

significant impact on the Chicago housing market during the study period, particularly during the 2007-2010 period.

Notes

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2. There are many books and reports that provide hypotheses and detailed explanations of the various causes for the financial crisis. Among them are the Financial Crisis Inquiry Commission (2011), Sorkin (2009), and Wessel (2009).

3. The Act gave a capital gains tax exemption of $250,000 for a single person and $500,000 for a married couple if the owner(s) resided in the house for any 2 years out of the recent 5 year period.

4. This may include those who had no intention of being a flipper to take advantage of fluctuating prices such as someone who may be transferred out of the recent home he had just purchased.

5. We excluded from our sample any property that was converted from a multifamily unit to a single family unit such as a typical condo conversion and any institutional transaction of single-family houses on the assumption that institutions do not have a primary motive of flipping single-family houses for short-term gains.

6. We did not look for the possible transaction type that is equivalent to the typical short selling strategy of a stock or a bond, where a stock is sold first and then bought back later. This type of transaction cannot work for houses due to the very nature of a house not being a homogeneous product like stocks or bonds.

7. Within this group, some flippers were clearly more active than others. Therefore, this group could have been further divided into experienced and inexperienced flippers based on the number of trades made during a certain length of time. We chose not to examine the behavior of these subgroups in this study.

8. In this study, we use a transaction pair or a transaction to mean a purchase of a house matched with its sale at a later time.

9. One additional point of interest is the uptick movement of returns in 2010 for the short-term holders in relation to the long-term holders. This may be more closely related to the transactions of foreclosed houses whose prices were depressed initially and then, recovered via additional investments for gentrification.

10. A detailed description of this model can be found in the seminal work done by Friedman (1991) and other later works done by different scholars such as Lewis and Stevens (1991) and Stokes (1997).

References

Clark, Steven P, and Coggin, T. Daniel, "Was there a U.S. House Price Bubble? An Econometric Analysis Using National and Regional Panel Data", 2011, *The Quarterly Review of Economics and Finance*, 51, pp 189-200.

Clayton J, N. Miller, and L. Peng (2010), "Price-volume Correlation in the Housing Market: Causality and Co-movements", *Journal of Real Estate Finance and Economics*, Vol. 40, issue 1, 14-40.

Coleman IV, Major, LaCour-Little, Michael, and Vandell, Kerry D., "Subprime Lending and the Housing Bubble: Tail Wags Dog?", 2008, Journal of Housing Economics, 17, 272-290.

Crawford, G., & Fratantoni, M. (2003). "Assessing the forecasting performance of regime-switching, ARIMA and GARCH models of house prices", Real Estate Economics, 31, 223–243.

Financial Crisis Inquiry Commission (2011), *The Financial Crisis Inquiry Report: Final Report of the National Commission on the Causes of the Financial and Economic Crisis in the United States*, 2011.

Friedman, J.H. (1991). "Multivariate Adaptive Regression Splines", Annals of Statistics, 19(1): 1-67.

Milers W. (2008), "Boom-Bust Cycles and the Forecasting Performance of Linear and Non-Linear Models of Housing Prices", Journal of Real Estate Financial Economics, Vol. 36, 249-264.

Sorkin, Andrew Ross. (2009), *Too Big to Fail*, Viking, the Penguin Group.

Stokes, Houston H., *Specifying and Diagnostically Testing Econometric Models*, Second edition, Quorum Books, 1997.

Wessel, David. (2009), *In Fed We Trust*, Crown Business.