An Empirical Analysis of Residential Property Flipping

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Abstract

Beginning with a time-dependent definition of a house flip, the analysis examines flipping activity in Las Vegas from 1994 through mid-2007. We find that flip homes tend to be older and smaller than non-flip homes. Moreover, as the residential property market in Las Vegas begins to take off, flip homes become a more significant percentage of total sales. At the height of the housing boom in 2004, a typical flip produces an annual rate of return exceeding 60%. Even after adjusting for opportunity costs, this translates to economic profits of nearly 20%. However, shortly thereafter, the frenetic pace of the market begins to subside, and by 2007, economic returns to a flip fall to 0.

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1. Introduction

A simple definition of flipping is the purchase of an asset with the intent of quickly reselling the asset at a higher price. In the residential real estate market, flipping might entail purchasing a property at a discount (perhaps due to its poor condition), renovating the house and then selling it at or near full market value. This is sometimes referred to as a "fix and flip," and provides the story line for several reality television shows. Alternatively, the property might be purchased at a discount due to forced circumstances such as relocation, divorce or pending foreclosure. Again, the flipper might find this a profitable opportunity if the property can be resold at market value in a relatively short time period. Flips may also be profitable on the back end of the transaction. In a market where information is costly to obtain, flippers might sell their property above market value to unwary homeowners who do not fully understand the local real estate market.

Prices above market value can also occur because of illegal activity. Artificially high prices sometimes occur when, unbeknownst to the buyer, the appraiser in collusion with the mortgage originator and the flipper's broker renders an inflated appraised value. With the exception of the buyer, all parties stand to gain financially from selling the property at a higher price. Inflated prices also arise if mortgage companies artificially stimulate demand by qualifying buyers for homes that are more expensive than they can afford. In large part to stop "predatory flipping," HUD issued a set of guidelines in 2004 (and amended in 2006) prohibiting FHA-insured mortgage financing for any property being sold in 90 days or less after acquisition by the seller. Properties sold between 91 and 180 days are eligible for an FHA-insured mortgage, but are subject to additional documentation to support the value of the property.

To date, there has been little written about property flipping and its effect on house prices. Cohen (2001) makes the case that any urban revitalization plan must address the problem of flipping. However, he provides no statistical estimates on flipping price effects. Moreover, his remarks cover only the case of illegal flips in which investors purchase a property, make cosmetic improvements and then resell the property at an inflated price with the help of fraudulent appraisals.

English (2005) considers homes sold in Collin County, Texas to estimate the long term price effects of flipping. He looks at all homes sold in Collin County in 2001 and denotes those homes resold within 2001 as flipped homes. English then finds homes sold in 2005 that were also sold in 2001. Using a hedonic model, he tests whether flips sell at a different price than comparable non-flip homes in 2005 and finds that there is no significant difference. English points out that the results may be specific to the time period and further concludes that his results cannot necessarily be generalized due to a relatively small sample (712 properties with 2% flips).

While English looks at the long term effects of property flipping, the literature is virtually silent about the front end (purchase) price paid for the flip as well as the back end (sales) price of the flip. Moreover, there is a paucity of research documenting the relation between flipping activity and house price appreciation in a local market. Rapid home price appreciation may lead to an increase in flips which in turn leads to increased demand for housing and even higher home prices. Indeed, it is possible that flipping may be one reason behind the "bubble" in certain housing markets argued by Shiller (2006) and empirically verified by Wheaton and Nechayev (2007) and Goodman and Thibodeau (2008).[1]

[1] Brunnermeier and Julliard (2008) largely side-step the use of the word bubble and instead refer to "implied mispricing" in the housing market. They develop an empirical proxy for the mispricing and show that it is significantly affected by changes in inflation.

To address the above issues, the following analysis compares flipped house prices in a metropolitan area to contemporaneous prices of homes that are not part of a flip. We then measure what, if any, discount there is on the purchase price of a flip, and similarly calculate any premium on a flip sale. The analysis also investigates flipping volume over time and correlates this activity with price appreciation in the local real estate market. In light of our findings, we then discuss implications for further analysis of vibrant residential markets with significant flipping activity.

2. Data

We examine home flipping activity in the Las Vegas metropolitan area and define a flip as simply a pair of transactions involving the same property that occur less than two years apart. We use two years as the relevant time frame based on the federal income tax code that excludes capital gains from taxable income if the seller has used the home as his/her primary residence for two of the last five years. This definition does not differentiate between types of flipping or the motivation of buyers and sellers, rather it only defines a short term investment horizon and the rapid resale of a property in light of tax considerations.

We consider home sales in the Las Vegas metropolitan area because it is a dynamic market that has undergone tremendous growth and experienced both a boom and bust over the last decade. To give the flavor of Las Vegas house prices for the period of analysis, 1994-2007q2, Figure 1 depicts the sample's median house price over time. In the early years, house prices increased at an annual rate of between 1 and 7 percent before the market began to heat up starting in 2002. In 2003, houses appreciated nearly 22%, gained a whopping 43% in 2004 and a still healthy 8% in 2005. The median house price peaked at $307,846 in 2006q1 and then began to fall at the end of the sample period. Largely the result of being a growing and vigorous

market, Case-Shiller calculate a repeat sales index for Las Vegas that forms the basis for one of ten city futures contract on the Chicago Mercantile Exchange (CME).[2]

Flips represent a significant portion of all transaction during our period of analysis. The sample is similar to the data in Bertus, et al (2008) and includes home sales in Clark County, Nevada encompassing seven tax districts: Las Vegas City (district 200), North Las Vegas (districts 250 and 254), Sunrise Manor (district 340), Spring Valley (district 417), Paradise (district 470) and Henderson (district 505).[3] The data comes from the Clark County tax records and includes up to the three most recent sales for each property. Our sample of 328,843 transactions contains 122,473 properties that sold only once during the period of analysis, 64,179 properties that sold twice and 26,004 properties that sold three times. The latter two categories lead to 116,187 *pairs* of transactions and form the universe of potential flips.

Table 1 lists the number of months between adjacent transactions and then tabulates the number of pairs within each category. Using the 2 year rule, flips comprise nearly 32% of all transaction pairs in the sample. If we were to use shorter time horizons to define a flip, there would still be 14.93% of transaction pairs that have 12 months or less between adjacent sales and 7.98% of the sample that have 6 months or less between sales.

Figures 2a and 2b illustrate the number of flips as a percentage of all transactions in each quarter. Since a flip is defined as a property that has been bought and sold within a two year

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[2] An explanation of the repeat sales methodology appears in a Standard and Poor's (2007) publication, while Labuszewski (2006) explains the CME's real estate futures contract.

According to Case-Shiller, housing prices continued to fall in a dramatic fashion beyond the sample period. Between March 2007 and March 2008, Las Vegas house prices fell nearly 26%, the steepest decline of all major metropolitan areas in the U.S.

[3] English (2005) points out that it is important to use tax record information as a significant number of flips are not registered on the Multiple Listing Service (MLS).

window, we need to differentiate between the buy side of the flip transaction (hereafter referred to as "buy flip") and the sell side (referred to as "sell flip"). Thus, each bar shows the percentage of *all* quarterly sales that are *sell* flips, i.e., transactions where the flipper is selling the property. The figures further delineate between short-term, medium-term and long-term flips by segmenting each bar into three sections.

While the collection of house price data begins in 1994, we can only observe long-term flips (12-24 months between transactions) after the first two years of our sample. Thus, Figure 2a and several subsequent graphs begin in 1996q1. In the first half of our sample, flips represent a modest proportion of all transactions. Quarterly flip shares range between 3.4% and 8.3%.

After 2001, the growth rate in house prices begins to escalate, and flips constitute a larger segment of total sales. Flips are more than 10% of all housing sales in 2002 and reach 13% by the end of 2003. Flips as a proportion of sales continue to climb and reach a peak of 22% in 2004q3. As prices begin to moderate in 2005, flips fall to just under 19% by the end of the year. In 2006q4, flips constitute 15.6% of all housing transactions.

The results in Figures 2a and 2b provide strong, anecdotal evidence that flipping activity is associated with price run-ups in a housing market; when housing prices appreciate at faster rates, flipping activity increases. Moreover, in Las Vegas, as prices escalated in 2004, short-term flips represented a larger portion of all flips. During this period, many flippers bought houses and then were able to resell them in less than a 6 month period.

The characteristics of flip houses compared to houses not part of a flip (non-flips) appear in the next two graphs. In Figure 3a, the median flip house is older than the median non-flip house in every quarter. In the first few years, the median non-flip house is sold in the same year that it is built. Thus, in the early years, the typical non-flip house is a new home. In contrast, the

representative flip house is approximately 2-3 years old when it is sold. For example in 1998q4, the median non-flip house was built in 1998, whereas the median flip was built in 1996. As late as 2000q4, the median non-flip sale was a new home while the typical flip was built in 1995. By 2004q3, when flipping activity was at its peak, the representative non-flip house was built in 1998 in contrast to the median flip home built in 1997. Consequently, at the height of flipping activity, flippers began to dig deeper into the existing housing stock and purchase older homes for resale.

In the subsequent analysis, the age of the house is an important issue in calculating profits to the flip. Specifically, estimating flip profits as the sell flip price minus the buy flip price does not take into account any repairs and improvements the flipper might make on the property. However, Figure 3a shows that in our sample, while flip homes tend to be older than non-flips, the representative flip house is still relatively new. Thus, it appears that based on age, many Las Vegas flips needed little more than cosmetic work to freshen the appeal of the house, and calculating profits as the difference between buy and sell prices may yield a reasonable estimate. Nevertheless, the additional cost of any repair or improvement necessarily means that our profit estimates are an upper bound for the actual profits of the flipper.

Comparing the size of homes reveals that flips tend to be smaller than non-flip houses. Figure 3b illustrates the differences in square footage from 1996 – 2007. Through 2004q3, the median flip house is smaller than the typical non-flip by an average of 51 square feet. However, as flipping activity begins to reach its apex and then decline (2004q4-2006q3), flip homes are, on average, 138 square feet smaller than their non-flip counterparts. In part, this is consistent with the real estate maxim that from an investment standpoint, it is often best to be the smallest home

in the neighborhood. Additionally, this result reflects the fact that flip homes are older than non-flips, and over time, houses have grown in size.

In the next section, we consider the returns to flips in the Las Vegas market. Given that flip homes appear to differ in size and age, a natural question that arises is whether flip homes differ in value from otherwise similar non-flip houses. To investigate the next set of questions, we estimate quarterly hedonic models for house prices and examine whether flip homes are bought at a discount or sold at a premium to their non-flip counterparts. Any additional return on a flip home above the opportunity cost of holding a similar property yields a measure of the economic profits of flipping.

3. Hedonic Modeling and the Effect of Flipping on Price

To estimate the returns to flipping, we employ a set of hedonic price equations that follow the seminal work of Rosen (1974) and Goodman (1978). The general hedonic model specification takes the form:

$$P_{i,q} = \alpha_q + \beta_q X_{i,q} + \gamma_q FB_{i,q} + \delta_q FS_{i,q} + \varepsilon_{i,q} \qquad (1)$$

where, $P_{i,q}$ is the nominal selling price of property i in quarter q, X_i represents a vector of house i's structural and neighborhood characteristics, $FB_{i,q}$ is a dummy variable that equals 1 if the ith property is a buy side flip in quarter q, 0 otherwise, and $FS_{i,q}$ is a dummy variable that equals 1 if the ith property is a sell side flip in quarter q, 0 otherwise. We assume the error term, ε_i, follows a normal distribution with mean 0 and variance σ_ε^2.

The specification focuses on observed nominal prices as this preserves a straightforward interpretation of parameter estimates. The vector of β coefficients produces a set of "shadow prices" reflecting the nominal impact of the structural and neighborhood characteristics on house

price. As the primary focus of this study is on flipping, the estimated coefficients for *FB* and *FS* are of particular interest. The coefficient γ represents the separate effect on house price if the transaction is a buy side flip and δ denotes any price differential due to a flip sale.

We estimate a price equation for each quarter over the period 1996q1 through 2007q2.[4] The hedonic model contains a set of traditional structural variables that include size, design, age, and property level amenities. Also introduced is an additional set of variables to control for neighborhood quality differences.

The general fit of the model shows R^2 values ranging from a low of 56% to a high of 80%.[5] The size variable represents the total square feet of living area for each dwelling and provides a significant level of explanatory power in each regression. Of the estimated parameters for dwelling size, the values range from a low of $70.20 per square foot in the early quarters of analysis to a high of $137.47 per square foot in 2006q4. Further, all 46 quarterly regressions show significance in the square foot parameter estimates at the 95% confidence level.

Primary design variables include measures for the total number of bedrooms and full bathrooms. In the case of bedrooms, the estimated parameters are negative and significant in all years, indicating that smaller rooms are less valuable than larger rooms, holding square footage constant. In Las Vegas, the ratio of building size to lot area reveals a high density development

[4] It is sometimes observed that the housing market is seasonal in nature and presents the possibility that flippers may want to buy during quiet periods (e.g., winter) and sell during dynamic periods (spring and summer). By estimating hedonic models on a quarter by quarter basis, we sidestep this issue by estimating price differences *within* a season. As a further note, however, we find that during our period of analysis, there is no significant difference in monthly sales volume. This may be, in part, a result of the explosive growth enjoyed by Las Vegas for much of our period of analysis.

[5] Due to the significant number of parameter estimates for all the quarterly regressions, an exhaustive list is not provided in the paper. However, these estimates are available from the authors upon request.

wherein an additional bedroom (holding size constant) reduces the value of the property. The hedonic regression coefficients for bathrooms are generally statistically insignificant in the early years of the sample period, but from 2003 on, tend to be positive and significant.

To partially control for house quality, age and age-squared variables enter the hedonic model, following the methodology of Goodman and Thibodeau (1995) and Goodman and Thibodeau (1997). The linear measure of age indicates a negative and significant relationship throughout all quarters of analysis. As additional new housing relative to the stock of existing homes falls over the sample period, the model includes a non-linear age measure to capture any vintage effect on price. The estimated parameters for the squared age variable do not show statistical significance until the third quarter of 1999, at which point the parameter estimates are mostly positive and significant. Together the linear and non-linear effects imply that the typical Las Vegas house depreciates in value with age.

To measure construction quality, the regression includes a variable that indicates the presence of a built-in fireplace. Traditionally this is a proxy for construction quality as lower valued homes typically do not include a fireplace. With the exception of only one quarter, the fireplace coefficient is positive and statistically significant as expected.

Construction quality may also vary by neighborhood, and the hedonic model provides dummy variables for six tax districts as a way to control for intra-urban variation in housing quality. Straszheim (1974) and Goodman and Thibodeau (1998) present analysis illustrating the importance of submarket identification in hedonic models. The coefficients are consistently negative for districts 250/254 (North Las Vegas) and 340 (Sunrise Manor). These areas have

below average median household income according to the U.S. Census, and in general, the coefficients reflect a-priori expectations of neighborhood quality.

The principal purpose of the paper is to analyze the economic returns to flipping, and we have specified dummy variables that represent the presence of a buy-side or sell-side flip. Figure 4 illustrates the buy and sell flip dummy coefficients estimated each quarter for the period 1996-2007q2. The buy flip dummy measures the average difference in price a flipper pays from the market value of, $X_{it,}$ the house's observed vector of explanatory variables in time period t. In other words, the buy flip dummy reflects the difference in purchase price of a flip house compared to an otherwise identical property. As Figure 4 reveals, this difference is always negative, and it is statistically significant in 38 of 46 quarters (83%). Given the negative coefficient, we refer to the amount as a buy flip discount. Moreover, during the run-up in prices from 2004-2006, the discount becomes larger and peaks at -$31,411 in 2006q4.

The larger dollar discounts, in part, may simply be a function of higher house prices over time. However, at least two other (complementary) explanations are possible. First, in a booming market, some flippers may have been good at identifying individuals willing to sell their property at a discount, albeit still earning a healthy profit due to the marked rise in home prices. Second, during the market frenzy, some flippers may have purchased homes in poor condition, believing that virtually any home can be resold in a speculative environment. An important implication is that because the costs of home improvement cannot be observed, any estimated returns necessarily state the maximum profit of a flip.

The sell flip dummy represents the average difference in price a flipper receives when selling a house compared to an otherwise identical home. With the exception of the last quarter, the flip dummy is positive, and we therefore refer to this sale price difference as a premium. The

sell flip dummy is positive and statistically significant in 39 of 46 quarters (85%).[6] However, in 2007q2, the sell flip coefficient is -$5,761 indicating that flip houses sold in that quarter below the price of similar non-flip homes. This difference may be due to the market conditions in Las Vegas where home prices were falling and could have led flippers to accept a discount in order to exit the market so as to mitigate any losses.[7]

Before turning to the next section, we briefly examine whether the discounts and premiums differ between short-term flippers (holding period 1 year or less) and long-term flippers (between 1 and 2 year holding period). Looking across all quarters between 1996 and 2007q2 reveals that the median difference between short-term and long-term flippers is -$1524 on the purchase price and $1314 on the sale end. However, the differences are statistically significant in only 6 of 46 (13%) quarters on the buy side and 8 of 46 (17%) quarters on the sell side. Thus, the evidence only mildly suggests that, ceteris paribus, short-term flippers buy homes at a slightly larger discount and sell homes at a marginally higher premium compared to long-term flippers.

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[6] The negative sign for the buy flip coefficient is persistent throughout the time period of analysis. Similarly, with the exception of 2007q2, the sell flip coefficients are always positive. Moreover, during the run-up period of 2003-2006, both sets of coefficients are statistically significant for every quarter.

[7] In a related matter, we investigate whether the federal tax code influences the returns to flipping by examining sales that occurred 25-27 months after their purchase. Because primary residences are exempt from capital gains taxes (up to a $500,000 profit for a married couple) if lived in for at least two of the last five years, there exists the possibility that some owners delay their sale until just after the two year holding period. These "delayed flips" might be priced similar to sale flip prices if homeowners are trying to take advantage of a "hot market" and holding out for a buyer willing to pay a higher price. Conversely, sellers of delayed flips might share their tax break with the new owner resulting in a transaction below the sales flip price.

On a quarterly basis, we find that generally there is no statistical difference between the sell flip dummy variable and a dummy variable for delayed flips. However, we do find that delayed flips of 25-27 months as a percentage of all sales in the quarter increases from less than 1% in the 1990s to 4.1% in 2006q3. This suggests that as the Las Vegas market experienced a large run-up in prices, a growing number of homeowners were willing to put their home on the market to capture the significant appreciation of its value.

4. Returns to Flipping

The estimation results from the previous section provide insight into the price dynamics of the Las Vegas housing market from 1996 through the second quarter of 2007. Specifically, the buy side discount is relatively stable until early 2004 after which the dollar discount paid by house flippers increases dramatically. On the sale end of the flip, the premium is relatively small initially, but jumps in early 2004. The premium declines throughout the last half of 2004 and early 2005 but then increases again in early 2006 before falling considerably. Together, the discounted price paid and premium sale price later received determine the profits of the flip.

Figure 5 suggests the *nominal* profits of the flip. We define nominal profit as simply the difference between the flip's purchase price and its sale price. Figure 5 first graphs the median sale price of a flip for each quarter. After matching a flip sale with its earlier buy price, Figure 5 then charts the median of the corresponding buy transactions. The difference between these two curves gives an approximation of nominal profits. Visual inspection of Figure 5 reveals that nominal profits peak in the first half of 2004 before dropping precipitously at the end of the sample period.

The nominal profit is an upper-bound measure of the flip's return as it does not take into consideration three elements: i) the transaction cost of a house flip, i.e., realtor fees; ii) any costs incurred in improving the property; and iii) the opportunity cost of the particular house flipper. Even so, the nominal profit provides a noisy signal to other actual and potential house flippers

that "profits" are available in the market.[8] While the first two elements cannot be directly calculated from the data, it is possible to impute opportunity costs from the hedonic regressions.

Putting aside realtor's fees and costs of improving the property, economic profit equals the nominal profit less opportunity costs of investing in an asset of similar risk. In the case of house flipping, opportunity cost can be measured by estimating the change in value of an otherwise identical non-flip home. Suppose, for example, a house at 123 Happy Lane sells for a nominal profit of $50,000 after being held for one year. At the same time, the change in the value of a similar house at 125 Happy Lane is $35,000. In that case, the opportunity cost of investing in the flip is $35,000 and implies an economic profit equal to $15,000.

The hedonic results from the previous section can be used to estimate economic profit on a property-by-property basis. Adjusting the return for opportunity costs implies that two components comprise the economic profit of a flip: i) the discount a flipper pays from the value of a comparable house and ii) the premium the flipper receives for the property relative to the worth of a similar non-flip home. These two elements can be obtained from the hedonic model estimated in the previous section.

To see this, consider a flip house with structural and neighborhood characteristics, $\boldsymbol{X_i}$. If the flipper pays P' in quarter q, then subtracting the value of a comparable non-flip home ($=\beta_q X_i$) yields the buy flip discount $\gamma_q+\varepsilon_{i,q}$. Similarly, if the flip is sold in quarter $q+k$, the premium

[8] In essence, the nominal profits are what most individuals observe and make flips look so inviting as an investment opportunity. Nominal profits are also at the center of the popular television shows that suggest huge returns to the flipper. While television programs about flipping may subtract the costs of material and some labor, they typically do not adjust "profits" for the flipper's time or for any transaction costs (realtor fees).

equals $\delta_{q+k}+\varepsilon_{i,q+k}$. Thus, the flip's economic profit over time period k equals $(\delta_{q+k}+\varepsilon_{i,q+k})$-$(\gamma_q+\varepsilon_{i,q})$.

As can be seen in Figure 6, house flippers average around $5,000 in economic profit until late 2003. After that, economic profits increase dramatically until the third quarter of 2004, at which point the estimated median economic profit of house flips is approximately $26,000. After its peak in 2004q3, economic profits fall approximately 54% by the second quarter of 2005. The median economic profit rebounds to roughly $19,000 by 2006q4, but falls dramatically over the last two quarters of the sample. Nevertheless, the median estimated economic profit never falls below zero during our period of analysis.

The profits in Figure 6 do not account for the length of time between the buy-side and the sell-side of a house flip. One way to normalize the estimated profits across various transactions of different durations is to calculate the *annualized* returns of each flip.[9] Annualized returns may be calculated from both nominal as well as economic profits.

Figure 7 depicts the time-series of the two sets of annualized returns. Initially, annualized returns based on nominal and economic profits are fairly similar. However, starting in 1999, the two return series begin to diverge, with the difference becoming more pronounced in the first part of this decade. In 2004, annualized returns (both nominal and economic) reach their peak, a result driven by the fact that the median duration between the buy and sell-side transactions of a flip dropped dramatically, as shown in Figure 8. Towards the end of the sample period, even as nominal returns are falling, economic returns do not fall as quickly. However, by

[9] Annualized return, r_a, equals $(1 + r_t)^{(1/t)} - 1$, where r_t is the flip return over time period t.

2007q2, nominal annualized returns and economic annualized returns from house flipping approach zero.

As noted above, the median duration between the buy and sell-side of a house flip changes dramatically during the most active period of house flipping during the sample period. Early in the sample period, the typical duration of a house flip is approximately 1.2 years. However, in late 2003, turnover of a house flip becomes more rapid and and the flip holding period falls to a minimum of 0.75 in the fourth quarter of 2004. In other words, for flips sold in 2004q4, the median duration of a house flip is only 9 months. As flipping activity begins to subside, the median duration of a house flip returns to approximately 1.2 years, the same as in the beginning of the sample period.

Coming full circle, the analysis reveals that as the property market heats up, flipping activity increases and turnaround time of a flip diminishes. At some point, the market begins to cool and flip duration begins to lengthen. Figure 9 illustrates the dynamics of flipping and shows that short-term flips as a percentage of total sales peaks in 2004q3, the period of greatest house price appreciation. Then as price appreciation moderates, medium-term flips reach their zenith in 2005q1, and finally in 2005q3, the ratio of long-term flips to total sales attains its maximum value. Taken as a whole, the evidence suggests that flipping activity, the duration of a flip and the price appreciation of all residential property are inextricably linked together.

Finally, to get some idea of the relationship between the degree of flipping, house price movements and turnover in the market, we consider tests of Granger Causality. Variable X is said to "Granger Cause" Y if the past values of X are able to improve the prediction of the current value of Y over using only past values of Y (Granger, 1969). Rather than being a true test

for causal relationships, the Granger Causality test indicates whether a variable Y can be considered "endogenous" to the extent that the values of another variable helps predict the current value of Y.

We analyze Granger Causality using a four quarter lag structure for each pair-wise combination of three variables: total flip sales, quarterly percentage change in median sale price and total house sales. Pair-wise tests suggest that each variable Granger causes the other with p-values equal to or less than .016. (Full results are available from the authors upon request.) Consequently, the results are consistent with the notion that house price appreciation leads to increased flipping due to increased profit expectations, and this, in turn, leads to greater turnover and possibly contributes to increased house price appreciation itself.

5. Concluding Thoughts

At one level, the empirical analysis presents the anatomy of a flip. Starting with a simple definition of a flip transaction, we chart the flipping activity in Las Vegas, a residential property market that experienced tremendous building and sales growth over the last two decades. The results show that flip homes tend to be older and smaller than non-flip homes. Moreover, flippers appear to purchase the flip home at a discount and the sell flip home at a premium to otherwise similar properties. At the height of the housing boom, flippers earned annualized rates of return exceeding 60%. Even after adjusting for opportunity costs, economic returns to flipping were nearly 20% and provided a seemingly attractive investment opportunity. However, not long after reaching these heights, the market frenzy began to die down and economic profits eventually declined to 0.

Our definition of a house flip is simply a time dependent characterization and does not differentiate between types of flipping or the motivation of buyers and sellers. Recent news stories, however, suggest that fraud played a significant role in the amount of flipping activity in Las Vegas. Thus, one avenue of future research might be to examine the nature of flipping, isolate the amount of fraudulent activity that took place and estimate the damages caused by this illegal activity. To the extent that some flipping was, in fact, fraudulent, we might expect to find some properties purchased at an inflated price to other similar houses, or perhaps, some properties that sold in an extremely short time frame.

Finally we note, the discussion about economic profits, and by extension the annualized returns on house flipping, has been mainly descriptive in nature. To our knowledge, this is the first attempt to estimate the dynamic evolution of economic profits from house flipping in a given market, and in this way provides a contribution to the literature. However, between 2000 and 2006 there was a confluence of increasing median sale prices, an increase in house flipping activity, increases in the nominal and economic profits from house flipping, and increases in the annualized returns (both nominal and economic) from house flipping. Thus, for future research, there remains the examination of economic and statistical relationships between these variables. As a prelude to this work, we have shown pair-wise Granger Causality between flips, sales and changes in median home prices. However, future work might appeal to time series techniques such as vector autoregression analysis (VAR) to extricate short-run and long-run impacts of transitory and permanent shocks to price and volume variables, and ultimately determine the role of flipping in the frenetic Las Vegas real estate market.

References

Bertus, Mark; Harris Hollans; and Steve Swidler. 2008. Hedging House Price Risk with CME Futures Contracts: The Case of Las Vegas Residential Real Estate. *Journal of Real Estate Finance and Economics*. 37(3), pp. 265-279.

Brunnermeier MK, Julliard C. 2008. Money illusion and housing frenzies. *Review of Financial Studies*. 21(1), pp. 135-180.

Cohen JR. 2001. Abandoned housing: Exploring lessons from Baltimore. *Housing Policy Debate,* 12(3), pp. 415-448.

English, W. 2005. The Impact of Property Flipping on Single Family Detached Home Prices. Masters of Science in Real Estate Thesis, University of Texas at Arlington, December.

Goodman, Allen C., (1978) "Hedonic Prices, Price Indexes, and Housing Markets". *Journal of Urban Economics* 5(4), pp. 471-484.

Goodman, Allen C., Thomas G. Thibodeau (1995). "Age-related heteroskedasticity in hedonic house price equations." *Journal of Housing Research*, 6(1), pp.25.

Goodman, Allen C., Thomas G. Thibodeau (1997) "Dwelling-age-related heteroskedasticity in hedonic house price equations: An extension" *Journal of Housing Research,* 8(2), pp. 299-318.

Goodman, Allen C. and Thomas G. Thibodeau (1998) "Housing market segmentation" *Journal of Housing Economics*, 7, pp. 121-143.

Goodman, A. and T. Thibodeau. 2008. Where Are the Speculative Bubbles in US Housing Markets.? *Journal of Housing Economics*, forthcoming.

Granger, C., 1969. Investigating causal relations by econometric models and cross spectral methods. *Econometrica*, 37(3), pp. 424-438.

Labuszewski, J. 2006. Introduction to CME Housing Futures and Options, *Chicago Mercantile Exchange Strategy Paper*, 1-28.

Shiller, R. 2006. Long-Term Perspective on the Current Boom in Home Prices. *The Economists' Voice*, Berkeley Electronic Press, 3(4), 4 pages.

Rosen, Sherwin (1974) "Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition," *Journal of Political Economy*, 82(1), pp. 34-55.

Standard and Poor's, 2007. *S&P/Case-Shiller® Home Price Indices: Index Methodology*, macromarkets.com/csi_housing/documents/tech_discussion.pdf.

Straszheim, Mahlon (1974) "Hedonic estimation of housing market prices: A further comment". *The Review of Economics and Statistics*, 56(3), pp. 404-406.

Wheaton, W. and G. Nechayev. 2008. The 1998-2005 Housing "Bubble" and the Current "Correction": What's Different This Time? *The Journal of Real Estate Research*, 30(1), pp. 1-26.

Table 1
Months Between Adjacent Transactions

Months	Sales	% of All Sales	Cumulative Sales
0	52	0.04	0.04
1	965	0.83	0.88
2	1,591	1.37	2.24
3	1,833	1.58	3.82
4	1,798	1.55	5.37
5	1,593	1.37	6.74
6	1,439	1.24	7.98
7	1,313	1.13	9.11
8	1,286	1.11	10.22
9	1,301	1.12	11.34
10	1,341	1.15	12.49
11	1,289	1.11	13.6
12	1,546	1.33	14.93
13	1,592	1.37	16.3
14	1,664	1.43	17.73
15	1,590	1.37	19.1
16	1,629	1.40	20.5
17	1,728	1.49	21.99
18	1,612	1.39	23.38
19	1,572	1.35	24.73
20	1,600	1.38	26.11
21	1,592	1.37	27.48
22	1,564	1.35	28.82
23	1,533	1.32	30.14
24	1,915	1.65	31.79
24+	79,251	68.21	100

Figure 1

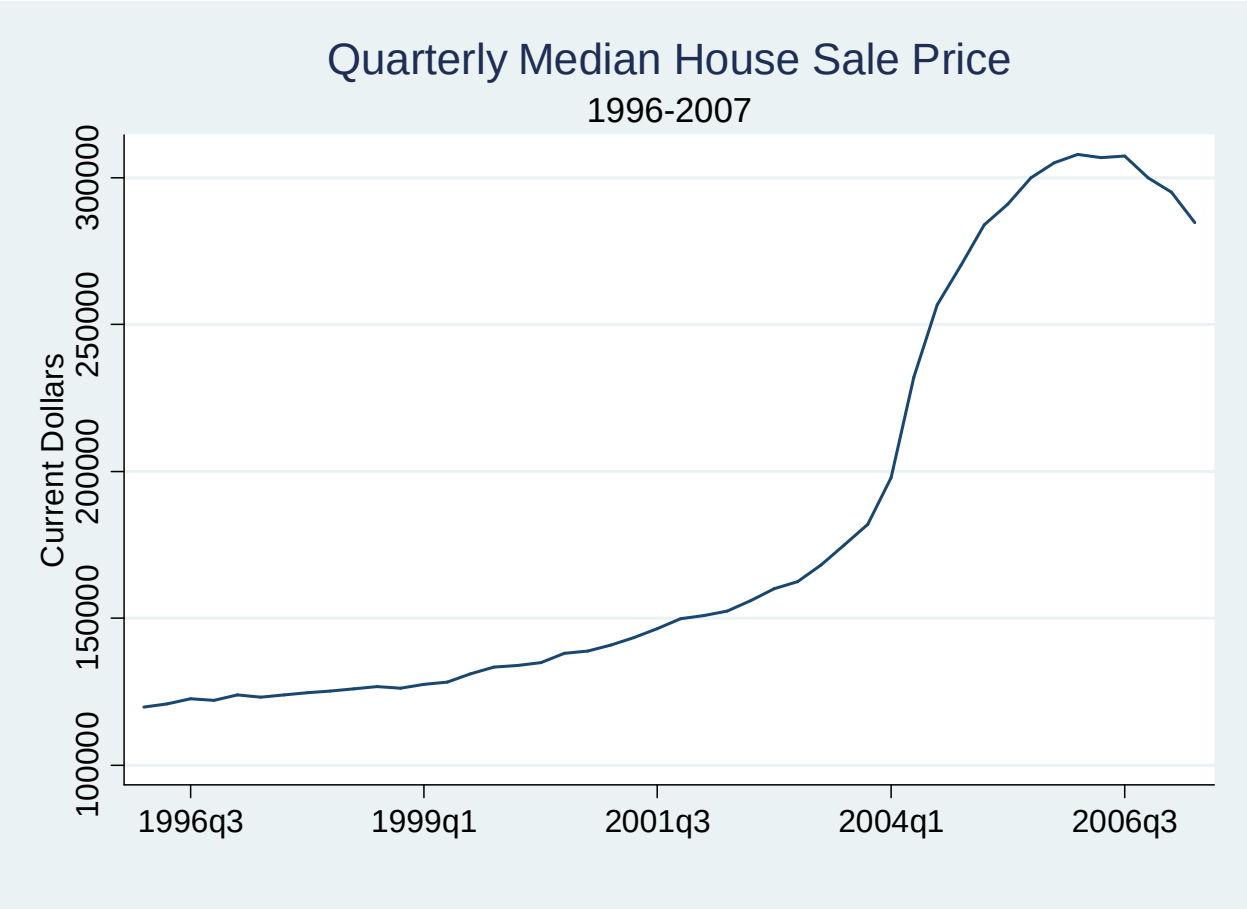

Quarterly Median House Sale Price
1996-2007
Current Dollars
100000
150000
200000
250000
300000
1996q3
1999q1
2001q3
2004q1
2006q3

Figure 2a

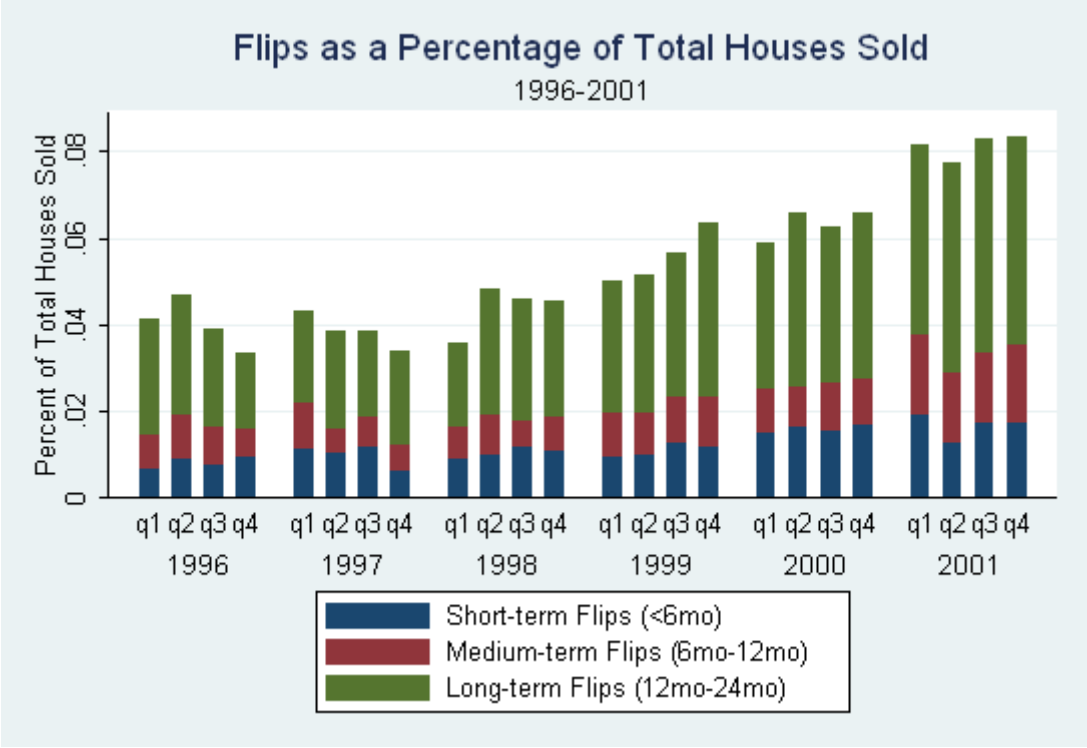


Figure 2b

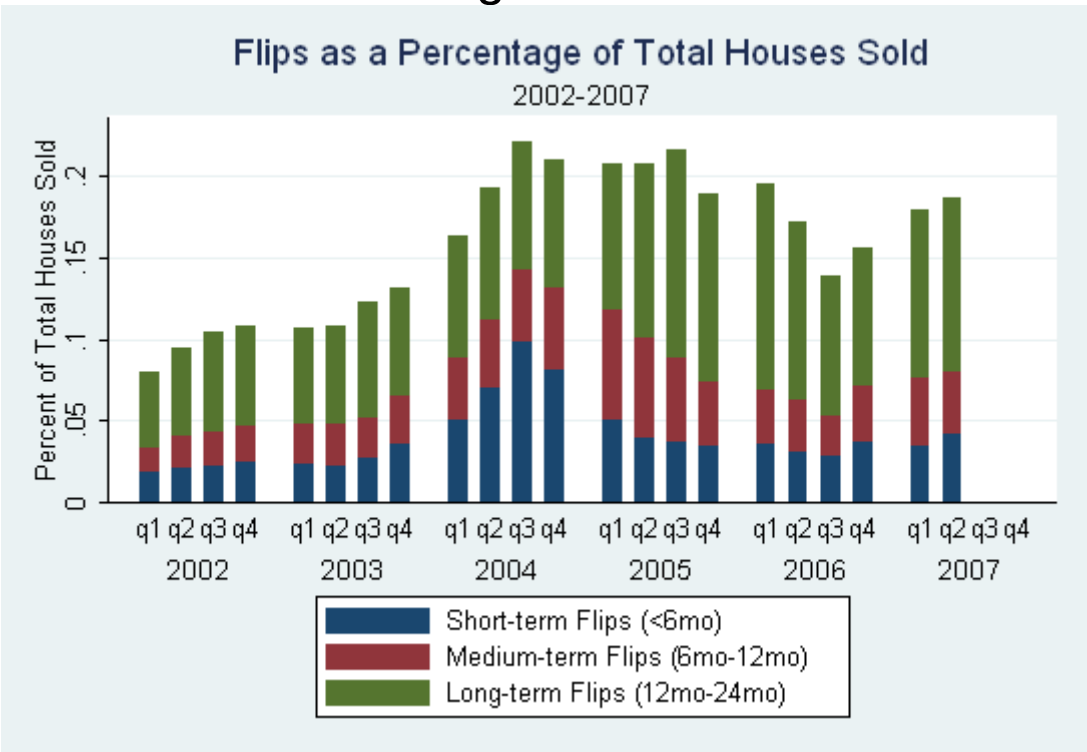


Figure 3a

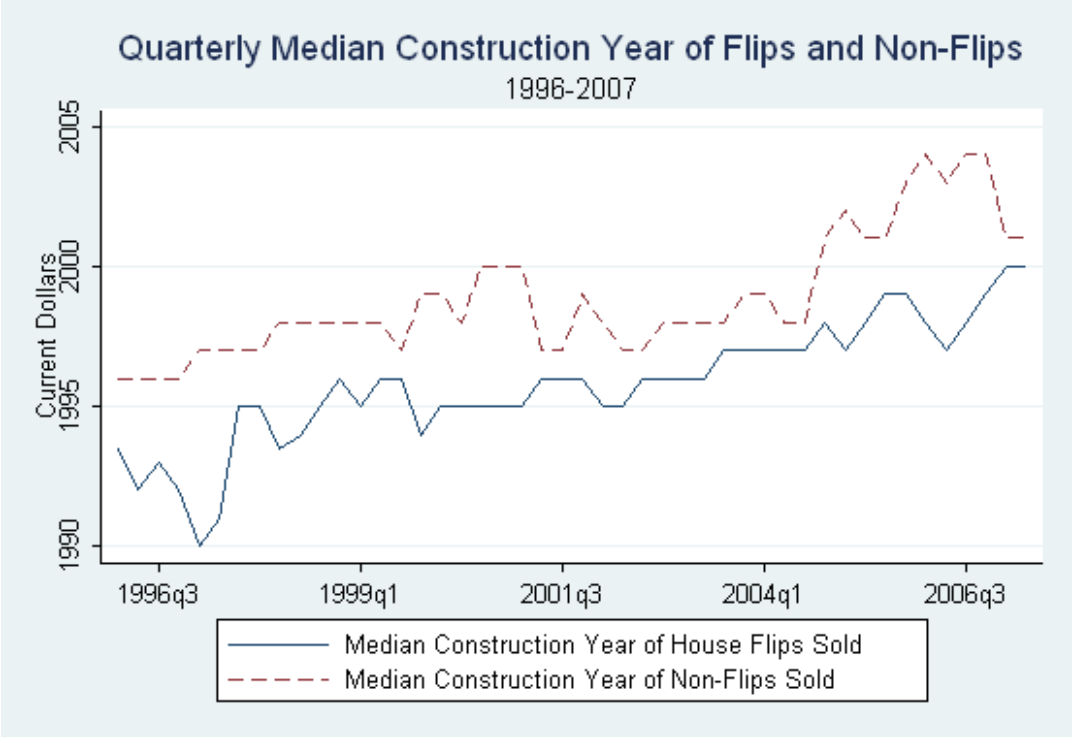


Figure 3b

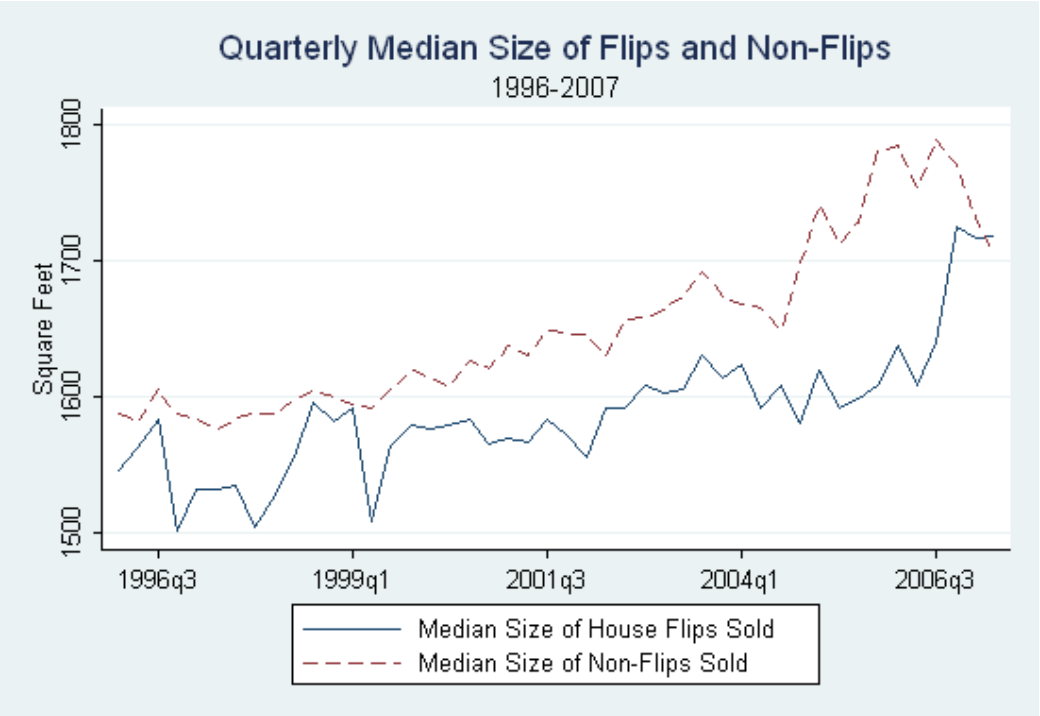


Figure 4

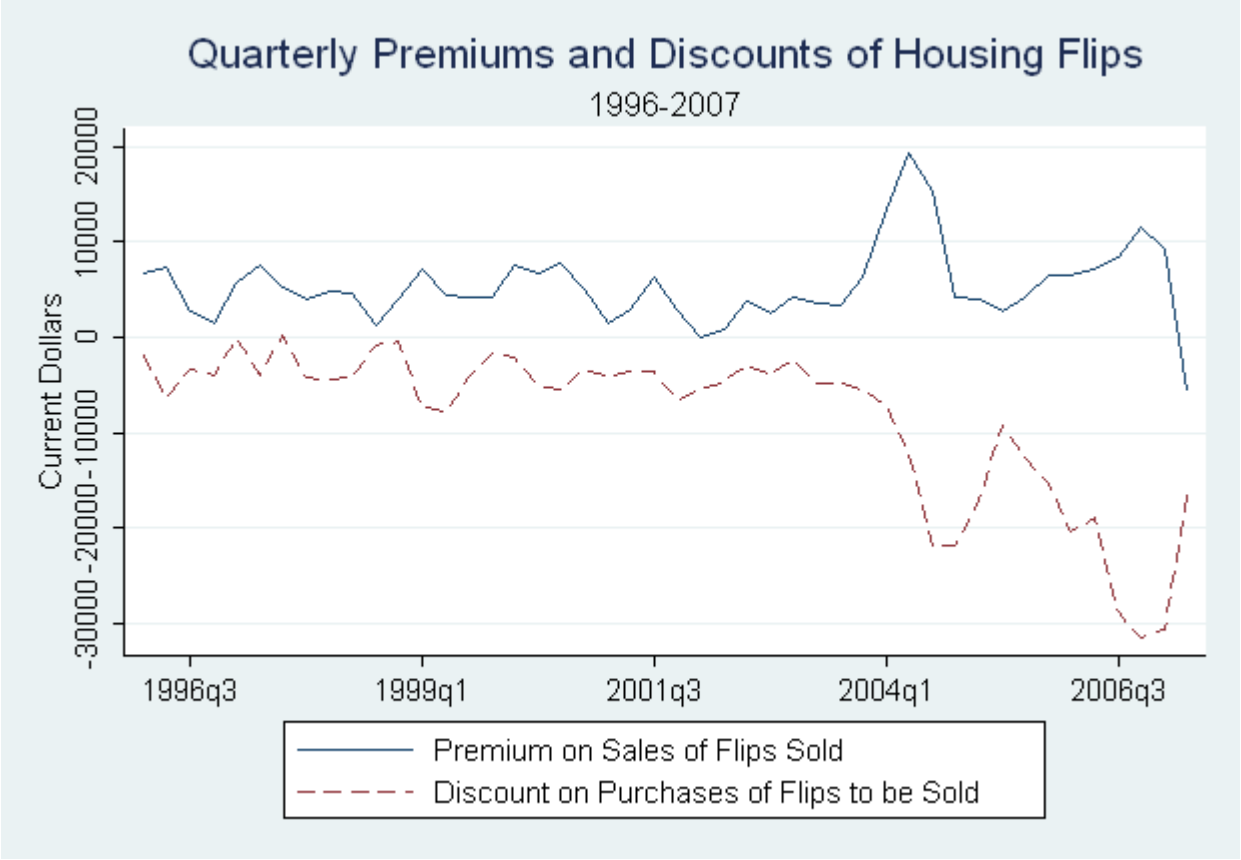

Quarterly Premiums and Discounts of Housing Flips
1996-2007
Current Dollars
-30000
-20000
-10000
0
10000
20000
1996q3
1999q1
2001q3
2004q1
2006q3
Premium on Sales of Flips Sold
Discount on Purchases of Flips to be Sold

Figure 5

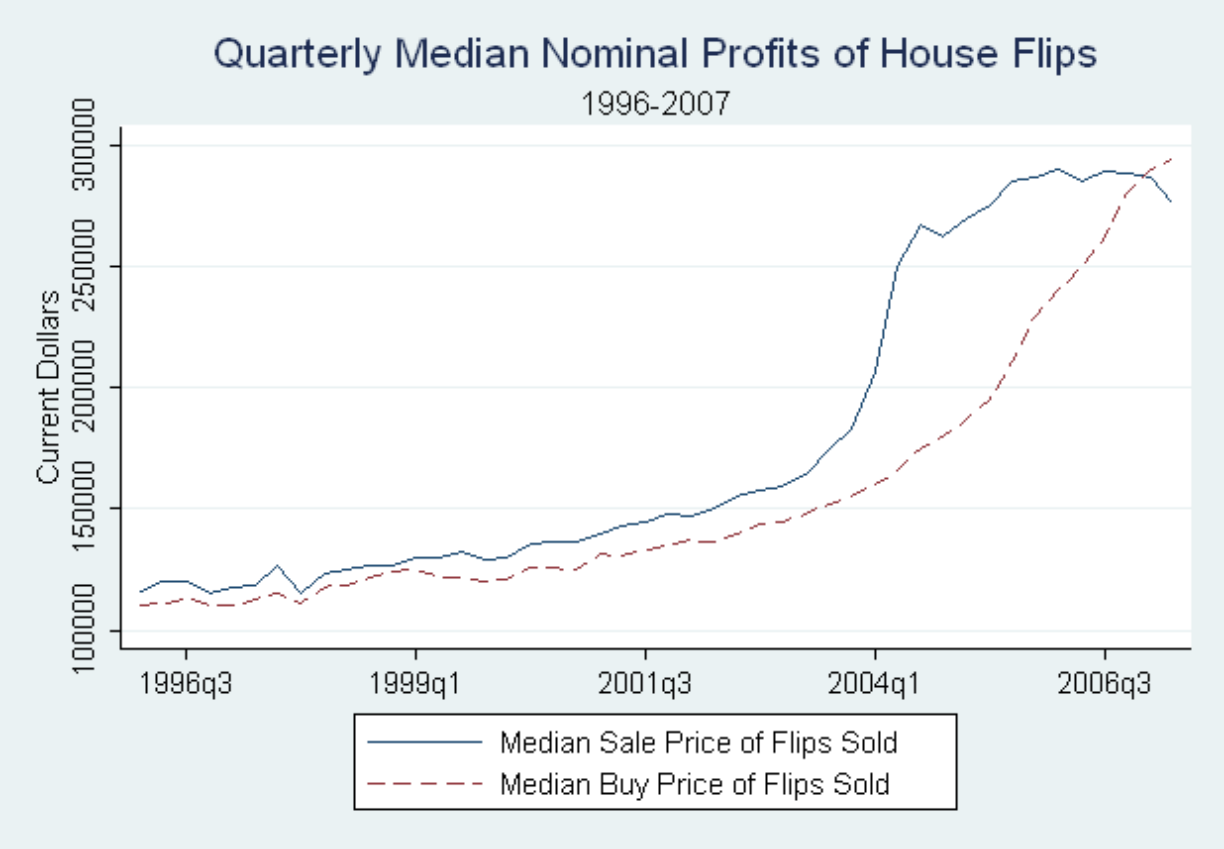

Quarterly Median Nominal Profits of House Flips
1996-2007
Current Dollars
100000
150000
200000
250000
300000
1996q3
1999q1
2001q3
2004q1
2006q3
Median Sale Price of Flips Sold
Median Buy Price of Flips Sold

Figure 6

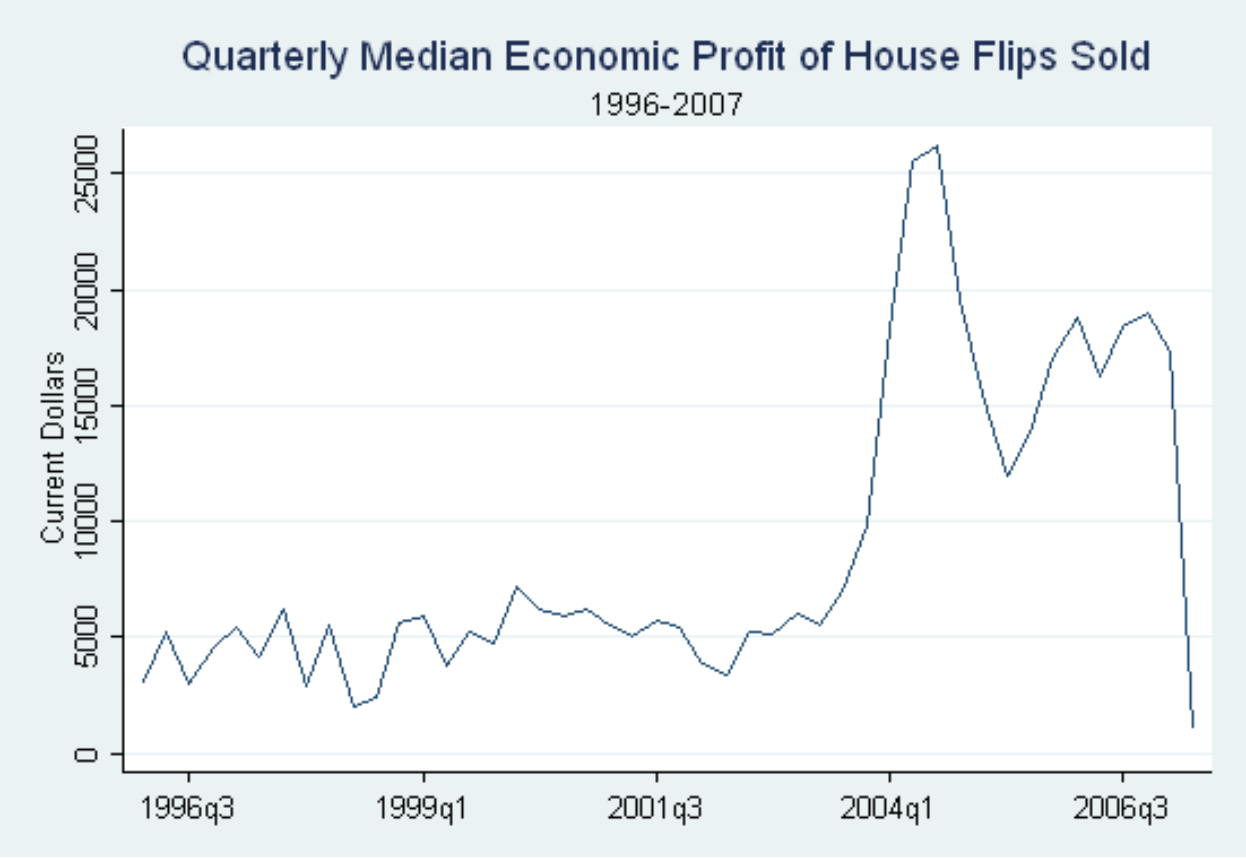

Quarterly Median Economic Profit of House Flips Sold
1996-2007
Current Dollars
0
5000
10000
15000
20000
25000
1996q3
1999q1
2001q3
2004q1
2006q3

Figure 7

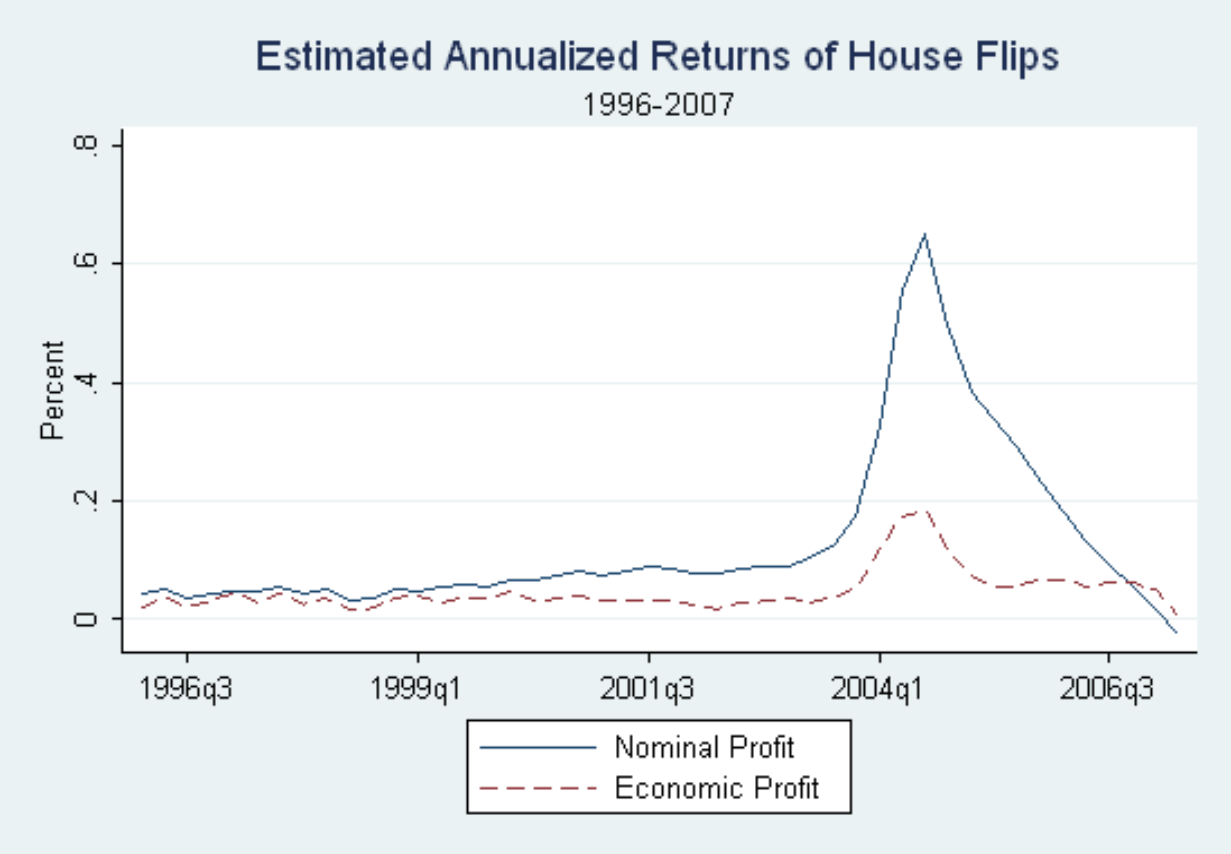

Estimated Annualized Returns of House Flips
1996-2007
Percent
0
.2
.4
.6
.8
1996q3
1999q1
2001q3
2004q1
2006q3
Nominal Profit
Economic Profit

Figure 8

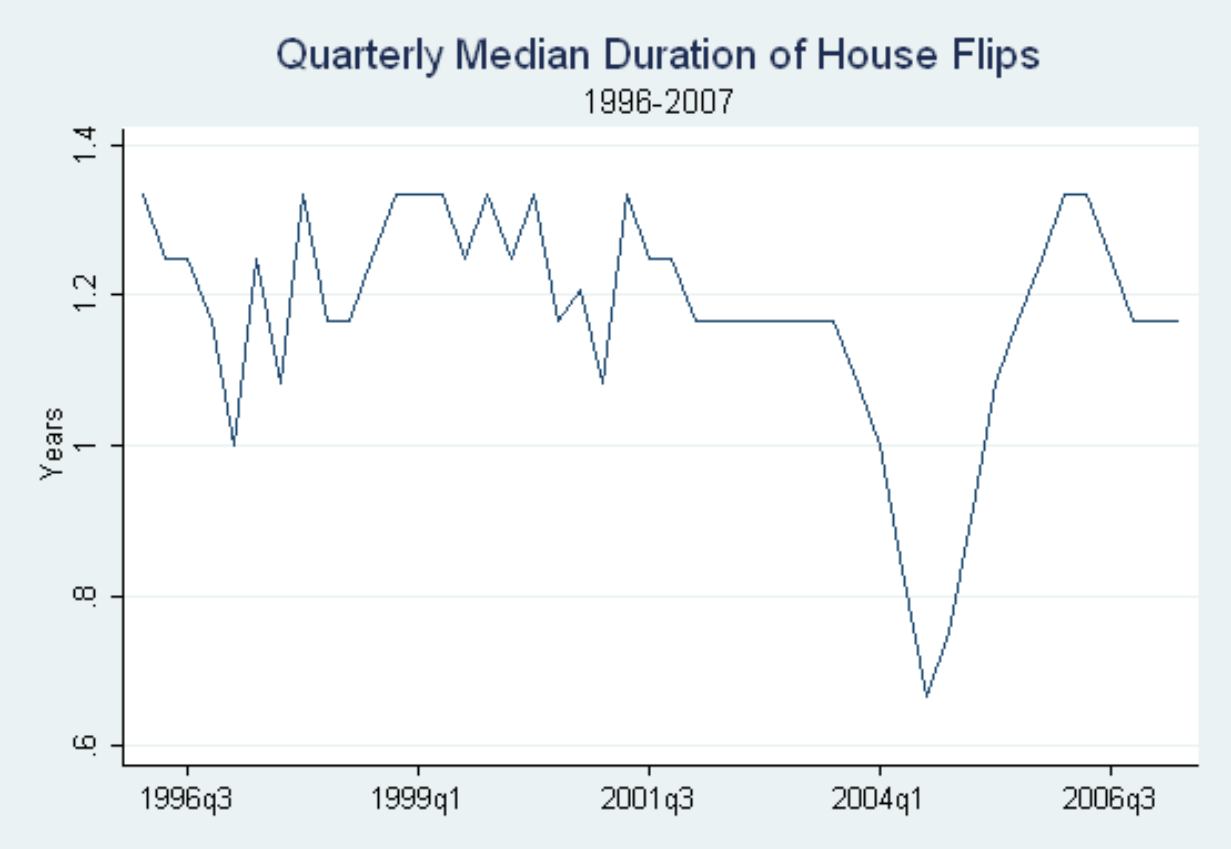
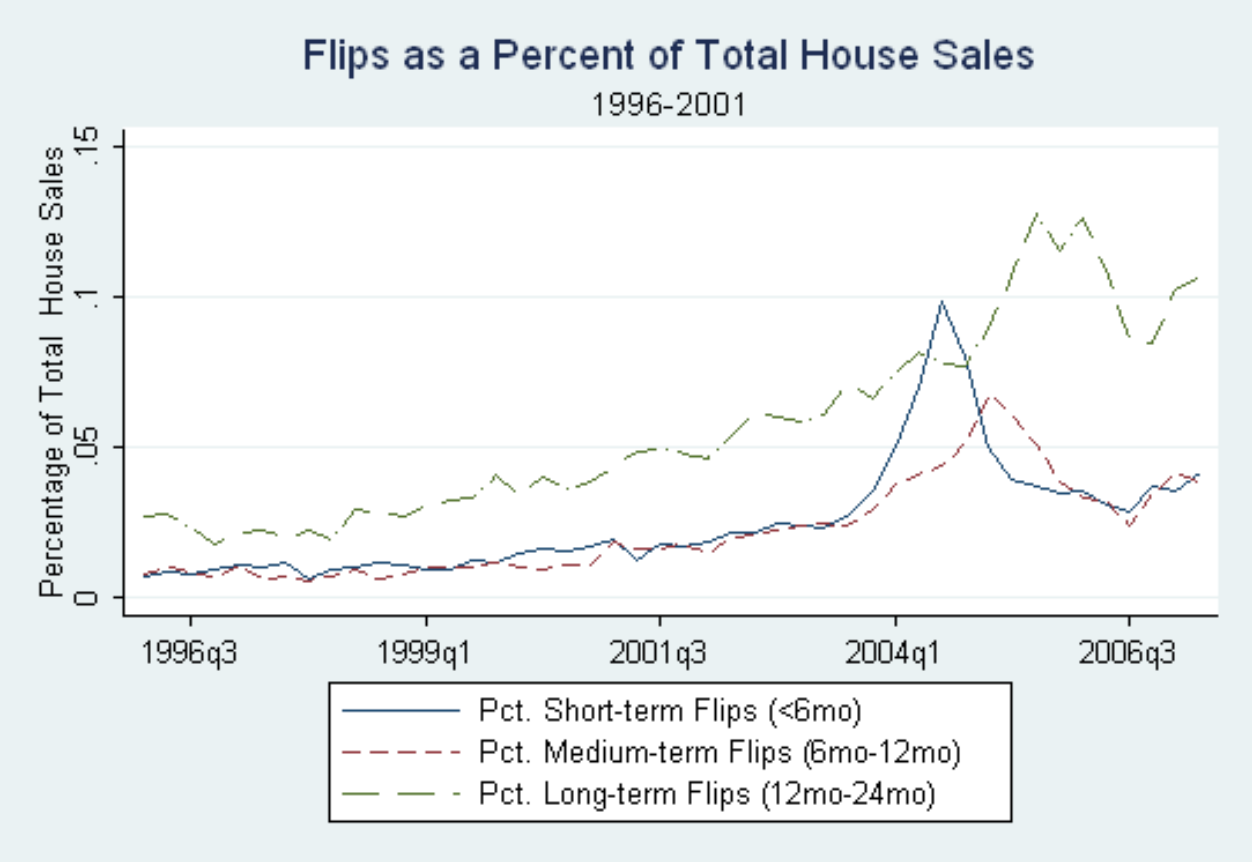

Quarterly Median Duration of House Flips
1996-2007
Years
1.4
1.2
1
.8
.6
1996q3
1999q1
2001q3
2004q1
2006q3

Figure 9


Flips as a Percent of Total House Sales
1996-2001
Percentage of Total House Sales
0
.05
.1
.15
1996q3
1999q1
2001q3
2004q1
2006q3
Pct. Short-term Flips (<6mo)
Pct. Medium-term Flips (6mo-12mo)
Pct. Long-term Flips (12mo-24mo)