University of Pennsylvania
ScholarlyCommons

Wharton Research Scholars Journal | Wharton School

4-1-2004

The Effect of Changes in Housing Wealth on Retail Sales

Ruby Majumdar
University of Pennsylvania

This paper is posted at ScholarlyCommons. http://repository.upenn.edu/wharton_research_scholars/12
For more information, please contact repository@pobox.upenn.edu.

The Effect of Changes in Housing Wealth on Retail Sales

By – Ruby Majumdar
Advisor – Todd Sinai
Wharton Undergraduate Research Scholars WH-299-301
April 2004

I. Introduction

The effect of the housing market on the macro economy is a very important area of study. In the past several decades we have witnessed a steady rise in the number of housing units, owner occupied homes and house prices nationwide. The 2000 census reports over 116 million housing units in the U.S., which represents a 14 percent increase since 1990. Additionally, the number of owner-occupied units rose 18 percent between these two decades. The home ownership rate in the US during the 2000 census was 66.2 percent, which reflects a tremendous rise over rates of 43.6 percent in 1940. With such a large concentration of homeowners and the rise in owner-occupied units in the United States, an unexpected increase in housing wealth could have a significant impact on the US economy, conditional on the behavior and spending patterns of the typical homeowner.

During the past two decades, the value of owner occupied homes has indeed increased significantly. The median value of owner occupied homes in the U.S. increased 18 percent from 1990 to 2000, after adjusting for inflation, with the Midwest region obtaining the greatest price increase of 33 percent in median home value. Following the life cycle hypothesis, if homeowners accounted for this increase in housing equity by increasing current consumption, the rise in house prices could lead to significant growth in national consumption.

Furthermore, evidence shows that the number of home refinancings have increased, indicating that individuals are more likely to realize the benefits of a house price increase within their lifetime. In fact, in 2002 the amount of home refinancings

reached a record $200 billion[1]. However, to date, there is little evidence on individuals' propensity to spend out of housing wealth. As housing becomes s a large and growing segment of most individuals' asset portfolios, its effect on consumer spending behavior is an important area of analysis.

Thus, my research studies the effects of house price changes on local area consumption to find the average marginal propensity to consume out of housing wealth. My basic methodology involves measuring the simultaneous movements in house prices and retail consumption across 163 Metropolitan Statistical Areas (MSAs) and Primary Metropolitan Areas (PMSAs) over two time periods, 1987-1992 and 1992-1997. Additionally, I administer the data over several other tests to examine the model's robustness, as well as regress different components of retail sales on house prices to distinguish which categories within retail sales are most affected by house price changes. This analysis serves to 1) discover any connections between housing wealth increases and retail consumption patterns 2) distinguish between the possible reasons for the correlation between house prices and retail sales and 3) identify which areas within retail consumption are most affected by housing wealth increases (i.e. on which areas, if any, individuals spend unexpected increases in housing wealth).

My research tackles the housing wealth dilemma in a new angle by using retail sales data as a proxy for consumption, as this provides a consistent and objective measurement of changes in spending over time. Additionally, measuring data across MSAs instead of over households provides a more macro economical view of the effect of housing wealth changes across US urban areas. Finally, I design my tests to discern the marginal propensity to consume out of housing wealth from other possible explanations

[1] CBSNews.com, July 29, 2003.

for the correlation between housing wealth movements and changes in consumption. Though, my work takes on a new approach to an established topic, it still leaves a few issues unresolved. While my data can support a positive marginal propensity to consume out of housing wealth, it cannot prove its existence without further tests. Additionally, while providing a more macro economical view over previous studies, my research falls short of presenting an adequate behavioral representation of more rural, less populated cities across the US.

Findings from my study indicate a significant and positive relation between housing wealth changes and retail sales changes over the specified time periods. This relationship survives through various model specifications, indicating a marginal propensity to consume out of housing wealth of around .3 to .35. The remainder of my paper is organized into five sections. Section 2 will provide a review of the previous theories and literature surrounding this area. Section 3 will provide information on the data sets utilized to conduct my analysis. Section 4 will go over model specification for the basic regression and Section 5 will cover additional tests to evaluate the robustness of the model. Finally Section 6 will conclude with further questions stemming from my analysis.

II. Past Literature and Theories

The life cycle hypothesis is a classic theory used to explain homeowner responses to wealth increase. The theory assumes that individuals will smooth consumption over their lifetime. Thus, it predicts that people save during their working life and accumulate wealth in order to be able to live comfortably in old age after retirement when their

disposable income is exhausted. If individuals want to save a particular amount before retirement, an unexpected increase in house prices means they now have more accumulated wealth. Rationally, people would then be able to save less and spend more out of their disposable income due to this increase. The life cycle theory in essence is the wealth effect applied to houses. As wealth grows, individuals are more inclined to spend a greater portion of disposable income towards current consumption. Unless a larger percent of disposable income was spent, individuals would not be able to realize the additional utility from the increase in wealth and thus, would not be any better off than before. It is this basic wealth effect theory that studies on the real result of house price changes are based upon.

However, several reasons exist as to why these expected outcomes from housing wealth changes might be reduced or extinguished. Housing wealth differs from more typical financial assets such as stocks or bonds in a number of ways that might prevent the wealth effect from holding (Poterba and Samwick, 1997). One reason might be the illiquidity of housing wealth due to the high moving costs associated with downsizing to a more inexpensive establishment or the difficulty in obtaining reverse mortgages on one's housing equity due to poor credit conditions. Thus, increases in housing equity might not be spent due to its lack of liquidity, even if individuals desired to spend from their additional wealth. Secondly, a bequest motive to pass on additional housing equity to one's children might reduce or negate positive spending effects associated with such an increase. Thirdly, housing differs from other forms of wealth in its 'fungibility', or in the way individuals perceive it as a spending account (Thaler, 1990). Individuals might view housing wealth as a non-fungible asset and therefore will categorize it in a different

mental account than other assets, which would suggest holding on to it as savings rather than spending from it. Finally, homeowners do not know the exact value of their home until is it sold or appraised and thus, might be disinclined to spend from uncertain and unrealized capital gains.

Although several authors have devised theories and tests to measure the real consequences of a rise in house prices, the difficulty in measuring consumption and distinguishing a link between house price growth and consumption has hindered the formation of precise results. Thus, no clear conclusions to the house price quandary have been found so far. Skinner (1989) developed a simulation model that showed savings declining substantially if homeowners follow life cycle theories and spend their housing wealth increases. However, a modification to the model that allows for homeowners to leave their homes to their children (i.e. a bequest motive) negates the effects of housing wealth increases on current consumption. Additionally, Venti and Wise (2000) found that the Life Cycle Hypothesis was not supported in practice, as elderly people were not found to downsize their housing equity, but rather remain in the same house throughout their old age.

Skinner's empirical tests using aggregate national data showed a marginal propensity to consume out of unexpected increases in housing wealth of .03. However, his tests utilizing micro data from the Panel Survey of Income Dynamics (PSID), which analyzes individual perceptions of housing worth and spending over a span of several years, show mixed results. House value is significantly related to consumption in household level power data with a marginal propensity to consume of six cents per dollar

of house price increase, however the significance wanes when the model controls for household fixed effects.

Studies have also been conducted on the saving pattern behaviors of individuals in response to house price changes, again resulting in contradictory or inconclusive results. Gary Engelhardt's (1995) work shows an increase (decrease) in savings resultant on real capital housing losses (gains). However, the results were asymmetrical in that all of the savings offset stemmed from those households experiencing housing capital losses. Additionally, his work demonstrates that the measure of saving has a large influence on results. Using active savings (the difference between disposable income and consumption) as a dependant variable, Engelhardt shows a marginal propensity to consume out of housing wealth of .14. However, when a second measure of saving is used – the change in real wealth including passive gains such as capital gains and inheritances – the results suggest an *increase* in non-housing wealth (savings) of 1 cent for every dollar rise in real housing, which is not significantly different from zero. Moreover, when the bottom and top 2.5 percent of outliers are removed, the MPC in the initial test reduces to .03. Also, as in Skinner's work, house price data was obtained from the PSID, which bases price movements solely on homeowners' perceptions of housing value, which may or may not be the actual amount obtained in the market.

Finally, Case, Quigley and Shiller (2001) make the case that housing wealth changes are actually more effective in predicting consumption than movements in financial wealth. Using both international data from 14 countries as well as US state data, they find housing wealth elasticities of .11 to .17 and .05 to .09, respectively. Variations in consumption propensities stem from the inequality between national data sets,

inconsistencies between consumption and house price measurements across nations, and inherent institutional differences among nations (such as different taxation policies on capital gains), all of which might effect consumption measurements and consumer behavior across nations.

Several other works have been published in this arena of house price effects[2], however consistently with differing results. A common issue has been the difficulty in accurately measuring consumption, savings and house price data and running tests in such a way as to evaluate consumption sensitivity and demonstrate a powerful relation between the two. Analyses involving some measurement of consumption regressed on a house price indicator, such as the studies described above, merely demonstrate a correlation between the two variables. For example, a positive relation between house prices and consumption could indicate that the polled population simultaneously increased expenditures on both housing and consumption due to an increase in overall propensity to spend or that population increased, causing consumption and housing spending to increase. The more difficult task involves extinguishing possible reasons such as those for the relationship between the two variables in order to get a better idea of the effect of house price changes on consumption.

III. Data

The two sets of data required for my analysis were a house price indicator and a measurement of retail sales across the U.S. at periodic intervals. Since I was looking for the change in house prices and the change in retail consumption across a period a price

[2] Hoynes and McFadden (1994), Elliot (1980).

index would be sufficient. The most important criteria in choosing my data was that it were objective and consistent across data points.

To conduct my analysis, I chose to use house price indexes from Freddie Mac's Conventional Mortgage Home Price Index (CMHPI) at the Metropolitan Statistical Area (MSA) level to measure house price changes across geographic locations. Unlike other home price indexes based on mean or median values of homes sold during a given period, the Conventional Mortgage Home Price Index is constructed, using regression techniques, from observations of actual sales prices or appraised values of the same homes over time. Thus, compared to the PSID, which is the primary data set used in housing wealth studies, the CMHPI provides an objective measurement of house price appreciation in a given area. Moreover, the data allows for a more macro economical approach by looking at the effect of house price appreciation on an entire city area rather than on individual households. Though Freddie Mac releases this index quarterly, with 1980 serving as the base year, I looked at the change in housing values across two time periods, 1987 to 1992 and 1992 to 1997. The basic characteristics of housing growth during these two periods are provided in Table 1 below. As can be seen, house price growth has slowed down from the first period to the next from an average of 28% to 24%.

To measure retail sales and its components I use US Census data from the Economic Census taken every five years, which measures establishment data by NAICS at the MSA level. An establishment refers to a location of trade, such a single store, in which the dollar amount of sales arising from that location is recorded and then aggregated for each MSA. Retail establishments are those that are primarily involved in

the sale of retail merchandise without additional transformation, or render services necessary to the sale of merchandise. NAICS refers to the North American Industry Classification System, a system of industry classification similar to SIC codes used to categorize the various retail establishments. Additionally, I measure the change in sales within nine categories of spending (various NAICS categories) to determine which area is most highly correlated with house price movements. The basic characteristics of sales growth are provided in Table 1 below. Like house price growth, sales growth has slowed on average from 34% in the previous period to 31%.

Since housing values have changed dissimilarly across geographic areas, figures from the 163 MSAs and PMSAs reported in the CMHPI will form the basis of my data set. House price growth and the change in retail sales are measured across each region over two five year periods, 1987-1992 and 1992-1997.

Table 1
Summary Characteristics

House Price Growth	1987-1992	1992-1997	**Retail Sales Growth**	1987-1992	1992-1997
Mean	0.28	0.24	Mean	0.34	0.31
Standard Deviation	0.22	0.14	Standard Deviation	0.21	0.15
Max	1.10	0.71	Max	1.44	1.46
Min	-0.13	-0.13	Min	-0.08	-0.01
Median	0.25	0.24	Median	0.32	0.28

Though both sets of data provide accurate and clear measurements, a few drawbacks exist. Primarily, the CMHPI covers only 163 out of the over 300 available MSAs and PMSAs and thus only those areas could be used for the sample set. Secondly,

the Economic Census switched from using SIC codes to using NAICS codes to classify various categories of establishments in 1997. Thus, several categories that might have made for interesting analysis in the second part of my study such as apparel or grocery spending are not comparable from 1992 to 1997. However, the Census provides a bridge between SIC codes and NAICS codes, which is helpful in identifying categories that remain constant over the two classification systems. Thirdly, using MSA data lends itself to measuring consumption only in the local area; increases in spending at distant locations arising from a housing wealth increase will not be included. Fourthly, income and population growth data that I use as controls in my regression measure the change in each MSA from 1990 to 2000 as they are derived from the Decennial Census. However, this should be an adequate proxy for income and population growth in a given area during the time periods of analysis. Finally, information was not available for all 163 MSAs across every variable and time period as MSAs evolve over time and thus, not every point was used in each regression.

IV. Basic Regression

The basic statistical approach to determine the relation between house price growth and retail sales growth is an ordinary least squares regression analysis using the data described above. Retail sales growth is regressed on several independent variables including house price growth across MSAs and PMSAs. Potential problems in determining the relation between the two factors include omitted variable biases, timing issues, pre-existing trends in the economy and other potential reasons for observing a positive relation between the two. The following analysis will help to explain how each

problem was dealt with through the introduction of covariates such as controls, lagged variables and other measures used to map the significance of the housing effect. Additionally, as my data is taken over two five year periods, the regressions control for fixed effects between time periods by including a dummy variable for each period when needed.

The basic model used for the OLS estimates is:

$$\Delta Y_i = \alpha + \beta \Delta H_i + \gamma \Delta I_i + \delta \Delta P_i + \varepsilon_i$$

Where:

ΔY_i = % Change in retail sales over five years in MSA *i*
ΔH_i = % Change in house prices over five years in MSA *i*
ΔI_i = % Change in income from 1990 to 2000 in MSA *i*
ΔP_i = % Change in population from 1990 to 2000 in MSA *i*

Table 2 provides basic statistical relationships between house price movements and changes in retail sales across two time periods, 1987-1992 and 1992-1997. Figures 1 and 2 provide scatter plots of these relationships, respectively.

Table 2
Retail Sales Growth vs. House Price Growth

Dependent Variable: Aggregate Retail Sales Growth		
	1987-1992	1992-1997
House Price Growth	**0.29**	**0.52**
t-statistic	*3.85*	*6.78*
R^2	0.09	0.22

Figure 1

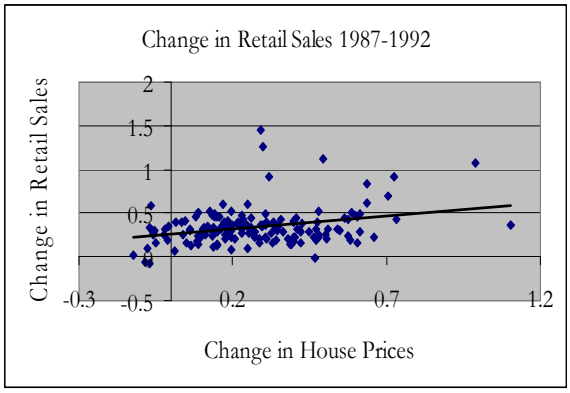
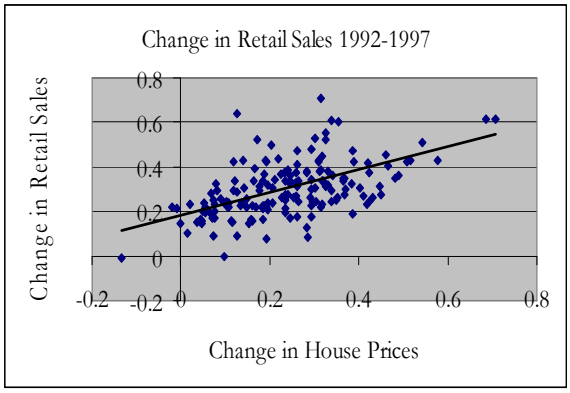


Figure 2



The increase in the house price coefficient over the two periods indicates that the relationship between the two variables has strengthened in more recent times, though there has been a significant correlation in the past as well. The one factor regression shows a large and significant housing elasticity of .52 in column two of Table 2, implying that changes in housing equity have a large influence on consumption in the surrounding area.

One possible explanation for the strong positive relationship between house price changes and retail sales growth within an area is that as area residents prosper, they spend more on both retail consumption and housing, thereby driving up both factors. To control for this occurrence, I added aggregate income to the right hand side of the regression. Similarly, population is added as a control variable, as an increase in area residents would cause spending on both retail and housing consumption in the area to increase. However, the extent of these variables' effect on house price growth is dependent on the space constraints within the metropolitan area. For example, in areas such as New York or San Francisco, one might conclude that an increase in population or income that boosts housing demand would cause a rise in house prices due to the supply and space

constraints in these cities. However, in less populated or space restricted areas such as cities in the Midwest, an increase in population or disposable income, though heightening demand, might not create a similar appreciation in house prices due to the elastic supply curve. Because of this ambiguous relationship, population and income were added as control variables. Table 3 shows the results of these basic controlled regressions, using data from just 1992-1997 and then using data from both time periods and controlling for fixed effects for each period.

Table 3
Basic Regression

Dependent Variable: Aggregate Retail Sales Growth

	1992-1997		All data points	
House Price Growth	**0.30**	**0.32**	**0.34**	**0.35**
t-statistic	*4.25*	*4.08*	*7.44*	*7.65*
Income Growth	**0.32**	**0.28**	**0.39**	**0.29**
t-statistic	*8.08*	*3.39*	*11.55*	*4.31*
Population Growth		0.09		0.21
t-statistic		*0.63*		*1.72*
Intercept	-0.01	0.01	**-0.07**	-0.03
t-statistic	*-0.19*	*0.20*	*-2.23*	*-0.87*
F statistic	*64.81*	*43.18*	*67.09*	*51.36*
Observations	163.00	163.00	318.00	318.00
R^2	0.45	0.45	0.39	0.40

As shown above, the house price coefficient remains stable and significant through the addition of income and population controls. Using all data points, there seems to be a marginal propensity to consume out of housing wealth of .35 after the addition of both controls as seen in the last column of Table 3. Using all data points, both

income and house prices are significant at the 1% level and population shows up at the 10% significance level.

However, the model's robustness is tested in the following section, which describes additional tests used to measure the relation between house prices and consumption.

V. Robustness of Model

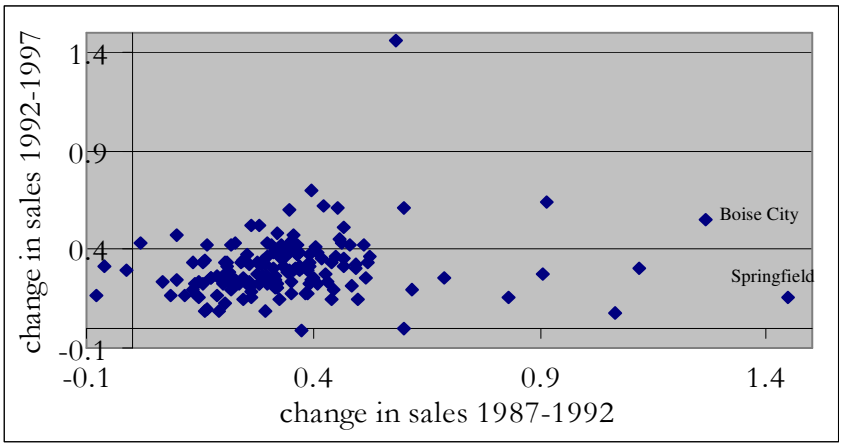
In this section I describe other possible explanations for the correlation between house prices and retail consumption and test each assumption individually to distinguish the relation between the two factors.

A. Pre-existing Trends

It could be the case that retail sales follow past trends and areas that have been growing in the past continue to grow into the future. Thus, I control for trends in the economy by adding lagged retail sales growth (from 1987 to 1992) as an independent variable. The results in Table 4 imply that current sales trends do not depend on past sales trends. A negative and statistically significant coefficient of -.13 on lagged sales growth indicates that high past retail sales growth is actually indicative of slower growth in the next period. A scatter plot of past sales growth on present sales growth helps to visualize this conclusion. Even in high growth areas in the past such as Springfield, MA and Boise City, ID, growth in the subsequent five-year period has slowed to rates comparable with other MSAs.

Table 4	
Dependent Variable: Aggregate Retail Sales Growth	
	1992-1997
House Price Growth	**0.23**
t-statistic	*2.92*
Income Growth	**0.53**
t-statistic	*5.09*
Population Growth	-0.19
t-statistic	*-1.14*
Lagged Sales Growth	**-0.13**
t-statistic	*-2.67*
Intercept	**-0.07**
t-statistic	*-1.66*
F statistic	*40.56*
Observations	156.00
R^2	0.52

Figure 3



B. Reverse Causality

After demonstrating the lack of economic trends, I discuss the idea of reverse causality. Instead of house price movements creating shifts in retail sales, it might be the case that people tend to move to places where the numbers of stores are growing. Thus, in areas that have high sales growth one might also see house prices appreciating. To test the validity of this theory, I regress the change in house prices (1992 to 1997) as the dependant variable on past sales growth (1987-1992). This demonstrates how much of

present house price growth can be explained by retail sales growth in the previous period, or if a relation between these two factors exists at all. As an additional test of timing, I regress sales growth on lagged house price growth to measure the influence of previous house price appreciation in an area on retail sales growth in the ensuing period. Table 5 shows the results of these tests, the first set of columns has house prices on the left hand side and the second retail sales.

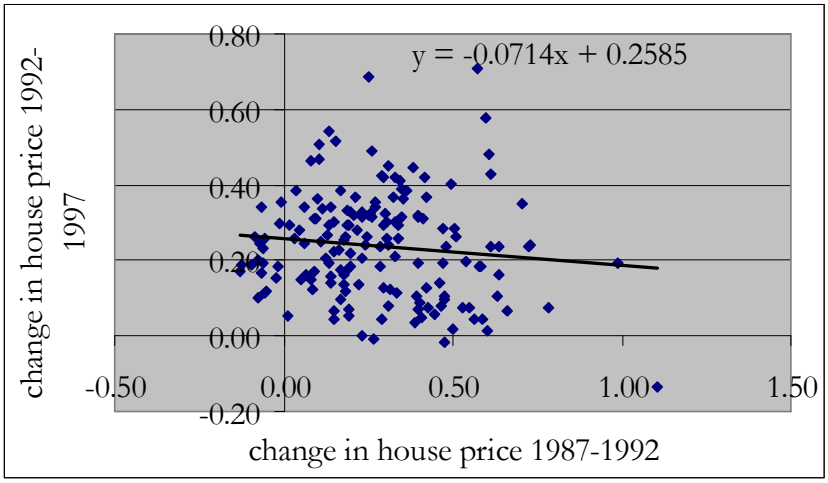
Table 5
Test of Timing

Dependent Variable: Change in House Prices		Dependent Variable: Change in Retail Sales			
Lagged Retail Sales Growth	0.02	Lagged House Price Growth	**-0.13**	**-0.09**	**-0.09**
t-statistic	*0.32*	*t-statistic*	*-2.97*	*-1.96*	*-1.98*
Income Growth	**0.80**	Income Growth	**0.42**	**0.68**	**0.49**
t-statistic	*9.74*	*t-statistic*	*5.96*	*8.03*	*4.74*
Population Growth	**-1.16**	Population Growth	-0.14	**-0.47**	-0.20
t-statistic	*-7.99*	*t-statistic*	*-1.05*	*-3.20*	*-1.16*
		Lagged Retail Sales Growth		-0.08	-0.08
		t-statistic		*-1.41*	*-1.52*
		House Price Growth			**0.23**
		t-statistic			*2.93*
Intercept	**-0.17**	Intercept	0.05	-0.08	-0.04
t-statistic	*-3.98*	*t-statistic*	*1.20*	*-1.62*	*-0.78*
F statistic	*33.55*	*F statistic*	*38.88*	*38.26*	*33.86*
Observations	156.00	Observations	163.00	156.00	156.00
R^2	0.40	R^2	0.42	0.50	0.53

The coefficient of .02 on lagged retail sales growth that is not significantly different from zero in the first regression indicates that past sales growth in an area is not correlated with current house price growth. The theory that people move to places experiencing sales expansions is not supported. However, lagged house price growth seems to have an opposite effect on retail sales growth in an area. The coefficient of -.09 in column three of the second regression shows that areas that have had slower house

price growth in the past have greater sales growth in the current period and vice versa. However, with a coefficient of .23 in the third column of the second regression, concurrent house price growth still maintains a strong positive correlation to current sales growth. This conclusion is further backed by the fact that current house price growth has a slightly negative relation with past house price growth as seen in Figure 4. If sales growth is therefore related to concurrent house price growth, it should be negatively related to lagged house price growth.

Figure 4



C. Further Evidence

To strengthen the relation between retail sales growth in an area and house price growth, the relationship between the acceleration of each variable was analyzed. The change in retail sales growths from 1987-1992 to 1992-1997 was regressed on the change in house price growths between these respective periods. The coefficient of .44 on change in house price growth shown in Table 6 indicates that there is a strong relation between the changes in the growth rates of these two factors, after controlling for income and

population. In other words, as house price growth slows in an area, so does retail sale growth, and as house price growth picks up, we would expect to see retail sales growth also increasing.

Table 6 **Changes in Growth Rates**	
Dependent Variable: Δ Aggregate Retail Sales Growth	
(1987-1992) to (1992-1997)	
Δ House Price Growth	**0.44**
t-statistic	*6.13*
Income Growth	-0.03
t-statistic	*-0.19*
Population Growth	-0.26
t-statistic	*-0.89*
Intercept	0.05
t-statistic	*0.52*
F statistic	*15.66*
Observations	155.00
R^2	0.24

These results add a second dimension to the relation between house prices and retail sales as not only are their growths related but so are the rates of change of their growths. This provides a stronger argument that one factor actually influences the other and helps to eliminate other unobservable factors which might influence both housing and retail sales. For example, an omitted right hand side variable that helped explain the positive relation between house prices and retail sales would now have to change growth rates in the same direction to continue to explain the relation between house prices and retail sales that we see from the results above; the likelihood of this is less viable.

Finally, in support of wealth effect and life cycle theories, I perform several tests that cut along various dimensions of house price dynamics to help demonstrate the relation between house prices and retail sales. I first add homeownership*house price growth as an interaction variable to distinguish between house price elasticities in areas with high homeownership rates versus areas of low homeownership. If wealth effect theories were true, we should expect to see areas with greater homeownership having greater housing elasticities since house price appreciation only affects the wealth portfolio of homeowners. To perform this analysis, I divided my entire sample of MSAs into two groups based on their homeownership rates, one group with rates above the median rate of 63% and one below. I then added another indicator variable to my basic regression for areas with high homeownership, as well as an interaction variable (homeownership rate*house price growth) for those respective regions. I then performed a similar analysis with just the bottom and top homeownership quartiles to further distinguish the separation caused by differing homeownership rates. Table 7 below reports the results.

Table 7 Effect of Homeownership		
	Includes all MSA's	Only top and bottom quartiles
House Price Growth	**0.35**	**0.32**
t-statistic	*6.25*	*4.28*
Income Growth	**0.36**	**0.51**
t-statistic	*4.62*	*4.85*
Population Growth	0.10	0.07
t-statistic	0.73	*0.39*
House Price Growth*Homeownership	0.01	0.03
t-statistic	0.06	*0.23*
High Ownership Indicator	0.00	0.01
t-statistic	-0.05	*0.28*
Intercept	-0.07	***-0.17***
t-statistic	-1.55	*-2.98*
F statistic	*34.61*	*24.24*
Observations	313.00	155.00
R^2	0.40	0.50

The results in Table 7 indicate that, though the interaction variable has a positive coefficient of .01, which strengthens to .03 when quartiles are used, supporting wealth effect theories, the relation is not statistically significant from zero. One explanation might be that the small deviance between median homeownership rates of 70% to 57% even among top and bottom quartiles makes the effects of homeownership hard to distinguish. However, concurrent house price growth remains significantly correlated with sales with a coefficient of .35 to .32, as in all models tested thus far.

A second test of the effects of house price movements involves breaking down retail sales into several specific categories. As mentioned in Section 3, the switch from the SIC classification system into the NAICS system in 1997 limits the comparable categories which can be analyzed. However, some useful spending categories such as furniture store sales, drug store merchandise, eating and drinking places, bowling centers,

hardware stores, liquor stores, and automobile purchases remain comparable. The growth in sales of each of these categories was separately regressed on house price growth and income and population growth controls to discover which categories of spending had the highest correlation with house prices. The house price coefficient associated with each category (with and without income and population growth controls) is shown in Table 8.

Though several categories become insignificant after adding controls, eating and drinking place sales and automobile sales remain significantly correlated with house price growth. It is noted that both these categories include superfluous goods. The results tend to show that consumption on more essential goods such as clothing, furniture, drug store merchandise and hardware sales are smoothed, whereas purchases of cars or dining out more frequently results from the wealth effect as expected.

Table 8
Categories of Spending

Sales Category	House Price	House Price	Income	Population
Women's Clothing	0.19	0.26	(0.36)	1.08
t-statistic	*0.65*	*0.73*	*(0.84)*	*1.52*
Furniture	**0.67**	0.48	0.28	(0.02)
t-statistic	*2.54*	*1.51*	*0.84*	*(0.04)*
Drug Store Merchandise	0.46	0.40	0.19	(1.25)
t-statistic	*0.64*	*0.48*	*0.22*	*(0.88)*
Eating and Drinking places	**1.14**	**1.33**	(0.33)	0.24
t-statistic	*2.37*	*2.13*	*(0.42)*	*0.19*
Bowling Centers	**0.35**	0.02	**0.71**	**(1.10)**
t-statistic	*1.87*	*0.09*	*2.58*	*(2.37)*
Hardware Stores	(0.34)	(0.26)	(0.17)	0.43
t-statistic	*(1.14)*	*(0.73)*	*(0.50)*	*0.69*
Liquor Stores	**0.33**	0.07	0.41	(0.38)
t-statistic	*1.72*	*0.28*	*1.60*	*(0.91)*
Automobiles	**0.52**	**0.36**	0.25	0.04
t-statistic	*4.00*	*2.23*	*1.25*	*0.12*

VI. Implications and Conclusion

I have examined the housing wealth effect and life cycle hypothesis by regressing retail sales growth on house price changes across metropolitan areas. Using retail sales as a proxy for consumption eliminates the inconsistencies associated with measuring consumption figures. Moreover, my study takes a more macro economical stance over previous studies in looking at the effects of house price changes within metropolitan regions, and not individual or household effects. The results of my study demonstrate a strong and significant correlation between house price growth and sales growth that remains robust through various model specifications. Marginal propensities to consume out of housing wealth of around .3 to .35 were most prevalent, indicating a 1% change in retail sales for every 3% increase in house prices.

These results are inline with Engelhardt's findings of a marginal propensity to consume out of housing wealth of .3, but are much greater than Skinner's results in the range of .03 to .06. One possible explanation might be the timing of the studies, as Skinner conducted his analysis using data from 1976 to 1981 compared with the more recent measurements in my study. Propensity to consume out of housing wealth might have increased in more recent times. Additionally, my data measured the behavior in metropolitan areas, which may differ from the behavior in more rural areas where individuals do not move as often and the housing wealth portfolio is not as large. Similarly, my results are larger than that of Case, Quigley and Shiller who found marginal propensities to consume out of housing wealth in the range of .11 to 17 using international data. Again, I believe a similar rational could serve as the reasoning for this discrepancy, as residents in other countries do not relocate with as much frequency as in

the U.S. and therefore, do not realize the change in their housing equity. However, these explanations should be subject to more empirical research to determine their validity.

Through the study, I have demonstrated that retail sales in an area are expected to climb as house prices within the area also rise. Moreover, certain areas of spending are more correlated to house price changes such as automobile sales or dining out over other more staple goods. Though my results have eliminated possible explanations for the correlation between housing wealth and retail sales, paving the way for a stronger relationship, significant conclusions to that extent cannot be drawn without additional tests.

Possible studies in the future could measure the effect of demographics on house price elasticities. By dividing MSAs into income brackets, one could find out if wealthy or poorer areas react differently to house price movements. For example, a consumer's income bracket could influence the degree to which wealth increases affected consumption. One might hypothesis that families within low-income brackets might not have enough liquidity to enable them to spend their wealth increase presently. On the other hand, families within high-income brackets might already have enough saved up for retirement that an increase in housing wealth would not change their savings/consumption patterns.

In the same manner, a person's age could influence the degree to which housing price increases affect consumption patterns. Following the traditional life cycle hypothesis, individuals at a young age borrow in order to finance the purchase of a new house, and an increase in housing prices could negatively affect current consumption, as these individuals are forced to save more to complete their first purchase. Younger

individuals are also more apt to spend most of their disposable income and save little for the future, as retirement is still a far distance ahead. Thus, an increase in housing wealth might not significantly affect their spending patterns as it might for older households who are actively saving for the future. Differences in reactions to housing price movements could affect the degree to which a particular geographic area is “hit” by house price changes. Tests relating demographic characteristics with consumption patterns could be key in determining a more specific amount by which local area consumption will be affected by house price movements once the demographics of the area are also taken into account. Moreover, demographic patterns such as the ones described above would lend more credence to the classic life cycle hypothesis.

References

Case, Karl, John Quigley, and Robert Shiller. 2001. "Comparing wealth effects: The stock market versus the housing market." Working paper.

Elliot, J. Walter, "Wealth and Wealth Proxies in a Permanent Income Model," *Quarterly Journal of Economics*, 95, 1980: 509-535.

Engelhardt, Gary. "Consumption, Down Payments, and Liquidity Constraints." Journal of Money, Credit, and Banking, vol. 28, no. 2, May 1996.

Engelhardt, Gary. "House Prices and Home Owner Saving Behavior." NBER Working Paper #5183, July 1995.

"Home is Where the Money Is," CBSNews.com, July 29, 2003, Available <http://www.cbsnews.com/stories/2003/07/29/eveningnews/ends/main565686.shtml>

Hoynes, Hilary and Daniel McFadden, "The Impact of Demographics on Housing and Non Housing Wealth in the United States," NBER Working Papers # 4666, March 1994.

Poterba, James and Andrew Samwick. "Household Portfolio Allocation over the Life Cycle." NBER Working Paper #6185, September 1997.

Skinner, Jonathan. "Housing and Saving in the United States," in Noguchi and Poterba, eds, Housing Markets in the United States and Japan, NBER, University of Chicago Press, 1994: 191-213.

Skinner, Jonathan. "Is Housing Wealth a Sideshow?" in David Wise, ed, Advances in the Economics of Aging, NBER, University of Chicago Press, 1996: 241-268.

Skinner, Jonathan. "Housing Wealth and Aggregate Saving," Regional Science and Urban Economics, Vol. 19 (2), May 1989: 305-24.

Thaler, Richard H., "Anomalities: Savings, Fungibility, and Mental Accounts," *Journal of Economic Perspectives* 4, 1990: 193-206.

US Census Bureau, *2000 US Census Brief*.

Venti and Wise. "Aging and Housing Equity." NBER Working Paper #7882, September 2000.