Housing Mutual Equity Shares (HOMES):
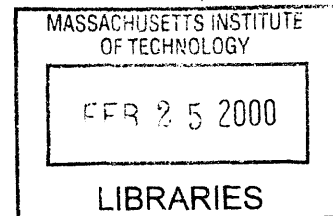## A Residential Appreciation Investment Vehicle

By

Jason Blank

B.A. Legal Studies/Politics

University of California at Santa Cruz, 1993

SUBMITTED TO THE DEPARTMENT OF URBAN STUDIES AND PLANNING IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
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Housing Mutual Equity Shares (HOMES): A Residential Appreciation Investment Vehicle

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ABSTRACT

This thesis attempts to answer, "how can investment in the equity appreciation of owner-occupied real estate occur on a market-wide basis?" Using financial engineering, the author introduces a new security design to overcome the hurdles and restrictions that prevent widespread capital market investment in owner-occupied residences. Named Housing Mutual Equity Shares (HOMES), this new investment vehicle resolves housing affordability issues for potential homeowners and provides attractive risk-adjusted rates of return for investors.

The reader is first given an in-depth analysis of the demand for housing space and residential finance. Second the HOMES vehicle is introduced, hypothetical returns for 1975 through 1995 are calculated, and then analyzed and adjusted for risk. Third, the author explores the economic value of the HOMES vehicle, addressing concerns of homeowners, investors, lenders, and agents. Fourth, a comparative case study juxtaposes HOMES and a similar, but failed, product from the late seventies, Shared Appreciation Mortgages (SAMs). Finally, the author identifies a few questions for further research.

Thesis Supervisor: W. Tod McGrath

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Acknowledgements

Table of Contents

Chapter One: Introduction

Following in the footsteps of Miller, Sklarz, Stedman, Case, Shiller, Weiss, Chinloy, Cho, Snavely, and Geltner, this study proposes a unique vehicle for opening an investment conduit between the capital markets and the equity in owner-occupied homes.[1]

On the national level, unleveraged housing equity has consistently returned between 5% and 6% and is negatively correlated with stocks and bonds.[2] The equity component of the national housing market was valued at $4.5 trillion in 1993.[3] An opportunity to invest in a product with low risk, steady returns, and extremely deep supply should attract institutional investors.

I propose the creation of Housing Mutual Equity Shares (HOMES) as a vehicle to resolve the numerous issues relating to executing this investment opportunity and realizing the superior risk-adjusted returns offered by owner-occupied housing. HOMES are a cross between a mezzanine debt claim and private mortgage insurance, invested in owner-occupied homes across the country. HOMES are attractive as an investment vehicle, because they use the homeowner's own debt capacity, in the form of the homeowner's mortgage, to leverage returns.

This paper is organized into six chapters. The second chapter profiles the demand side of the American residential housing market, paying particular attention to the capital structure of housing transactions. I look at relevant aspects of homeowners' demand for housing and how they finance their needs.

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[1] Miller, Sklarz, Stedman. It's Time for Some Options in Real Estate. "Real Estate Securities Journal", 9, 1 (1988), Page 42. Case, Shiller, Weiss. Index-Based Futures and Options Markets in Real Estate: A Big Future for Real Estate in Institutional Portfolios. "Journal of Portfolio Management, Winter 1993, Page 83. Chinloy, Cho. Unlocking Housing Equity. "Real Estate Finance". Winter 1998, Page 79. Geltner, Miller, Snavely. We Need a Fourth Asset Class: HEITs. "Real Estate Finance Journal", Volume 12 (2), Pages 71-81.

[2] Geltner, Miller, Snavely. We Need a Fourth Asset Class: HEITs. "Real Estate Finance Journal", Volume 12 (2), Pages 71-81.

[3] National Home Equity   = Median Home Equity * Number of Households
    $4,502,065,092,000   = $46,669 * 96,468,000
Eller and Fraser. Asset Ownership of Households: 1993. "U.S. Department of Commerce and Bureau of the Census". P70-47, 9/1995.

In the third chapter, I introduce the HOMES Investment Vehicle. The first section discusses the basic security design. The second section quantifies and evaluates the expected investment returns. The third section examines the role of HOMES in the secondary market for claims on residential housing.

The fourth chapter explores the economic value of HOMES by adopting, in turn, the perspective of borrowers, investors, lenders, and agents. I point out the strengths, which are many, and weaknesses, which are few, of the HOMES investment vehicle.

In the fifth chapter, I undertake a detailed comparative analysis of HOMES and a distant cousin which was introduced in the late 1970s, Shared Appreciation Mortgages (SAMs). I suggest why SAMs failed and why HOMES will succeed as an alternative. In the sixth and final chapter, I outline issues appropriate for future research and provide some concluding remarks.

Throughout this analysis, the use of the term home or house is interchangeable with a single-family dwelling, a co-op, a condominium, a townhouse, a rowhouse, an attached dwelling, a detached dwelling, or any other structure where an owner-occupant might live and a lender might make a loan secured by a mortgage.

In 1997, the Joint Center for Housing Studies of Harvard University estimated the 1995 owner-occupied, residential housing value to be $7.2T, with $2.6T in mortgage obligations and $4.6T in housing equity. The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1997.

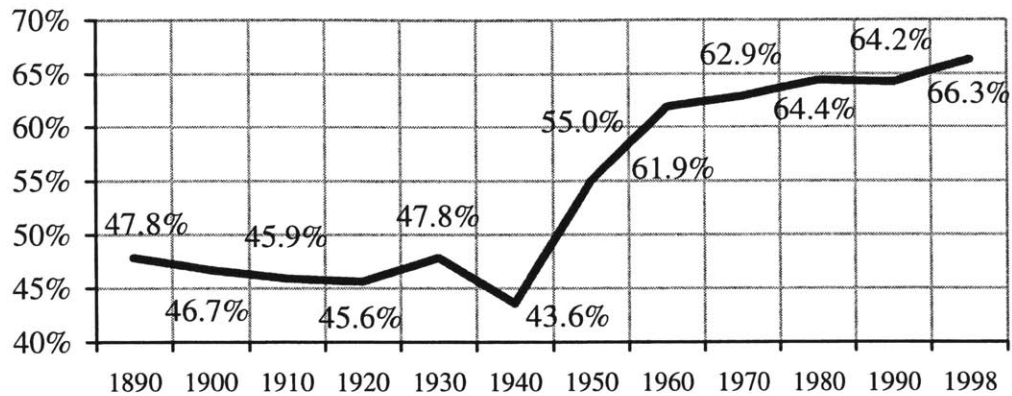**Chapter Two**: Housing Demand and Residential Financing

In this chapter I present an overview of the national housing market. Using a combination of statistical and descriptive methods, I paint a picture of the nation's housing market. My goal is to provide the reader with an understanding of the demand side of the housing market. I examine who is buying homes. When they are buying, "how much are they paying and how are they financing the purchase?" I especially look closely at current high LTV financing techniques. For those who are renters, "why are they not buying and what are the restrictions to ownership?" During the ownership period I ask, "are homeowners making improvements, and if so, how valuable are they?" "How often and why do homeowners refinance their primary mortgage?" Now that they own their home, "how many years until they sell it?" I discuss how often homeowners default on their mortgage obligations and how much is usually recovered through foreclosure in such situations. Finally, I illustrate potential indicators of default through statistical analysis of purchase financing ratios. With the information in this chapter, the reader will be prepared to assess the market impact of my HOMES Investment Vehicle, when I introduce it in the next chapter.

Section I: Homeowners

The purpose of this section is to provide the reader with an understanding of the characteristics that define American homeowners. I approach this task from both financial and demographic perspectives. Using a dynamic series of statistics, I express the change in homeowner characteristics over a range of stratification values.

The majority of Americans own their own home. In 1995, 63,544,000 households were owner-occupied, for an effective homeownership rate of 65.4%. In 1998 we reached an ownership rate of 66.3%, which is the highest rate in U.S. history. (See Exhibit 2.1)

Homeownership Rate

Homeownership Rate

Year	Rate
1890	47.8%
1900	46.7%
1910	45.9%
1920	45.6%
1930	47.8%
1940	43.6%
1950	55.0%
1960	61.9%
1970	62.9%
1980	64.4%
1990	64.2%
1998	66.3%

Source: Bureau of the Census   **Exhibit 2.1**

The following chart compares the percentage of households that own the home they occupy to the percentage of the population that rents the home in which they live. (See Exhibit 2.2) Among other things, this shows that the number of persons per household is approximately equal, whether the household is a renter or an owner. It also shows that there are approximately 106M households.

Owners vs. Renters
Population Size and Number of Households

	households	population
owner	64M (65%)	173M (66%)
renter	34M (35%)	91M (34%)
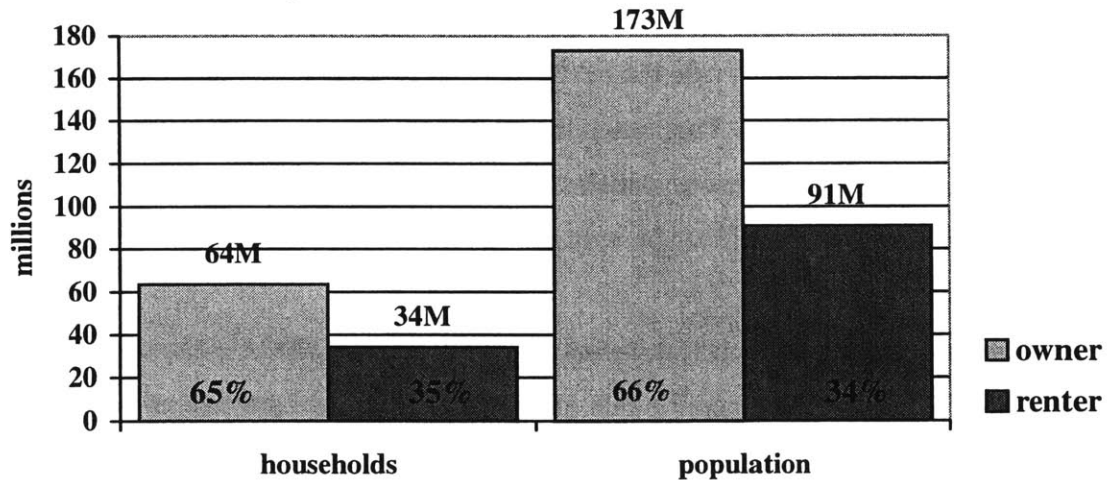
Source: 1995 American Housing Survey and 1995 Bureau of the Census

Exhibit 2.2

Stratifying owner-occupied homes by annual household income shows that ownership is concentrated around the national median income.[4] (See Exhibit 2.3) There is a tail into the higher income brackets.

Owner-Occupied Household Income Distribution

Exhibit 2.3

Owners vs. Renters

Median Net Worth per Household

	Owner	Renter
Home Equity	$46,669	
Other Assets	$32,741	$1,899

☐ **Other Assets** ■ **Home Equity**

Exhibit 2.4

Homeowners have significantly more wealth than renters. (See Exhibit 2.4) Not only do homeowners have the equity in their homes, but they also to have other substantial assets, such as stocks, bonds, and liquid savings.[5]

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[4] The median household income in 1995 was $35,887. U.S. Census Bureau.

Distribution of Median Household Net Worth

Non-Real Estate Assets
44%

Other Real Estate Assets
11%

Primary Home
45%
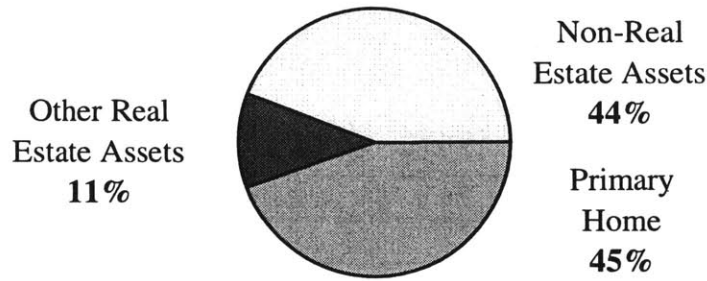
Exhibit 2.5[6]

However, homeowners arguably have too much of their net worth in real estate. In 1993, the median homeowner had 56% of his/her net worth invested in real estate. (See Exhibit 2.5) Median home equity was $46,669.[7] There is a direct relationship between net worth and the rate of homeownership. (See Exhibit 2.6) When homeowners are stratified by net worth, we see that their wealth distribution is much higher than that of the median household. (See Exhibit 2.7)

Net Worth and Homeownership Stratified by Monthly Household Income

Homeownership Percentage (right scale)

Household Net Worth (Owners and Renters) (left scale)

| $1,071 | $1,963 | $2,995 | $4,635 | $4,635+ |

Household Income
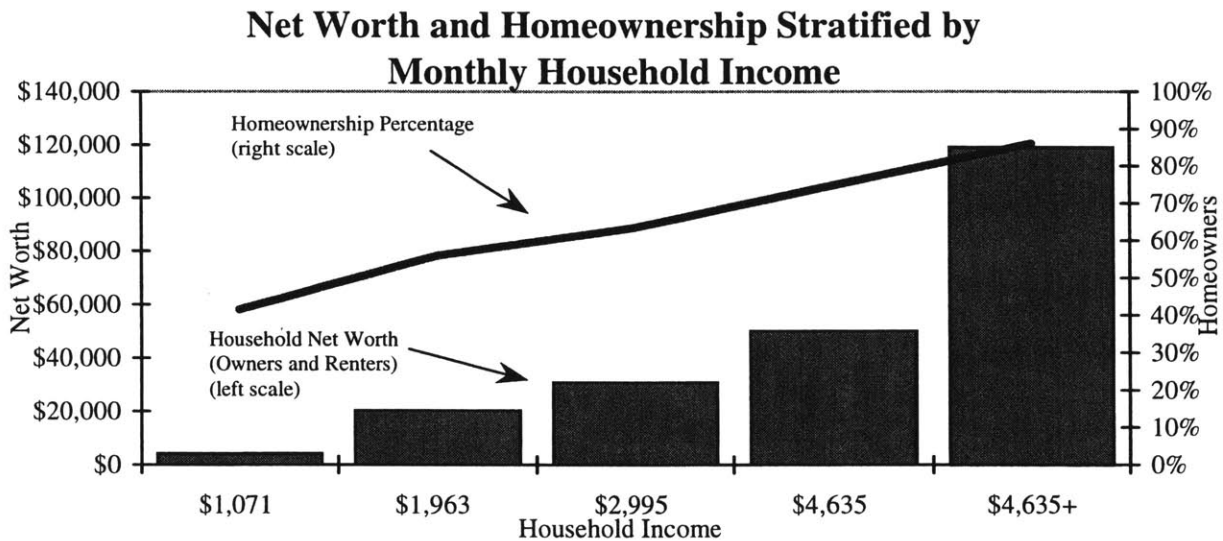
Exhibit 2.6

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[5] Eller and Fraser. Asset Ownership of Households: 1993. "Census Bureau" P70-47. 9/1995.

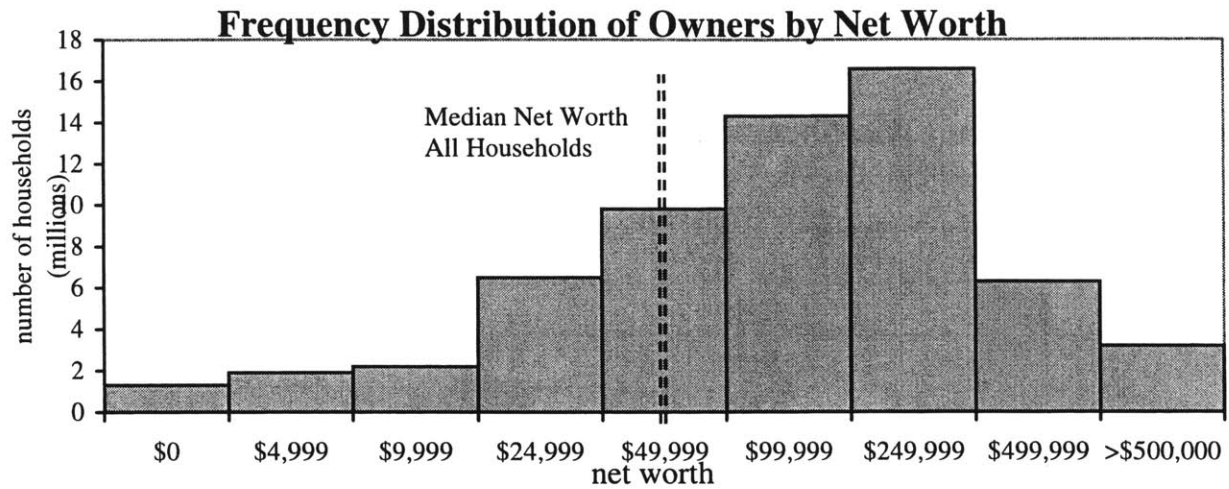[6] This calculation includes owners and renters.

[7] Ibid. 44% was invested in the homeowner's primary residence and 11% is invested in other real estate.

Frequency Distribution of Owners by Net Worth

Median Net Worth
All Households

number of households (millions)

net worth

$0 $4,999 $9,999 $24,999 $49,999 $99,999 $249,999 $499,999   >$500,000

Source: Bureau of the Census 1993

Exhibit 2.7

Homeownership also increases with age. (See Exhibit 2.8) Households headed by persons aged 44 years old and below are less likely to be homeowners than the national average. This is likely a confluence of lower income, lower savings, and a propensity to move more frequently.[8]

Homeownership Frequency Distribution by Age

Renters

Owners

<35   35-44   45-54   55-64   >64
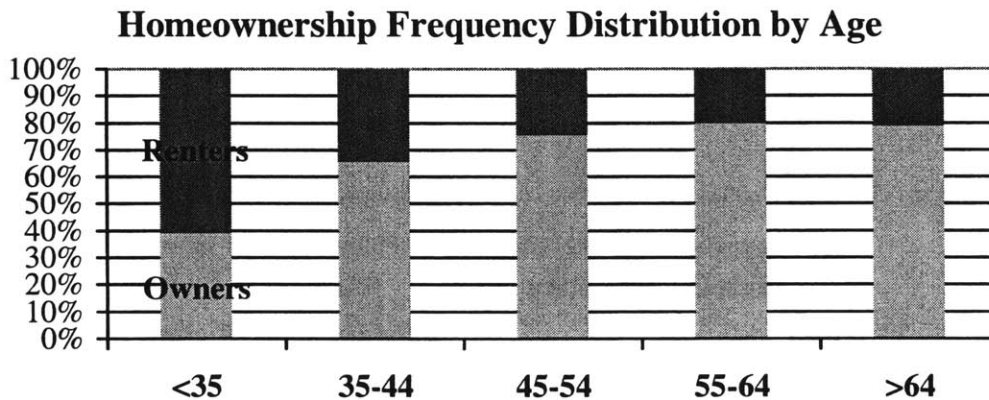
Source: Bureau of the Census 1996

Exhibit 2.8

From a demographic perspective, whites are over-represented, as owners and blacks and Hispanics are under-represented as owners. (See Exhibits 2.9 and 2.10) 50% more blacks and

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[8] Statistical Abstract of the United States. "Census Bureau" 1996. Between 1992 and 1993, 17.5% of persons aged 30 to 44 moved, 30.9% of persons aged 25 to 29, and 35.8% of persons aged 20 to 24. Only 6.6% of persons older than 44 moved during that same time period. Population Profile of the United States 1995. "Census Bureau" 7/1995.

60% more Hispanics need to become homeowners to bring homeownership statistics in proportion with population representation.

Frequency Distribution of Population and Tenure by Race
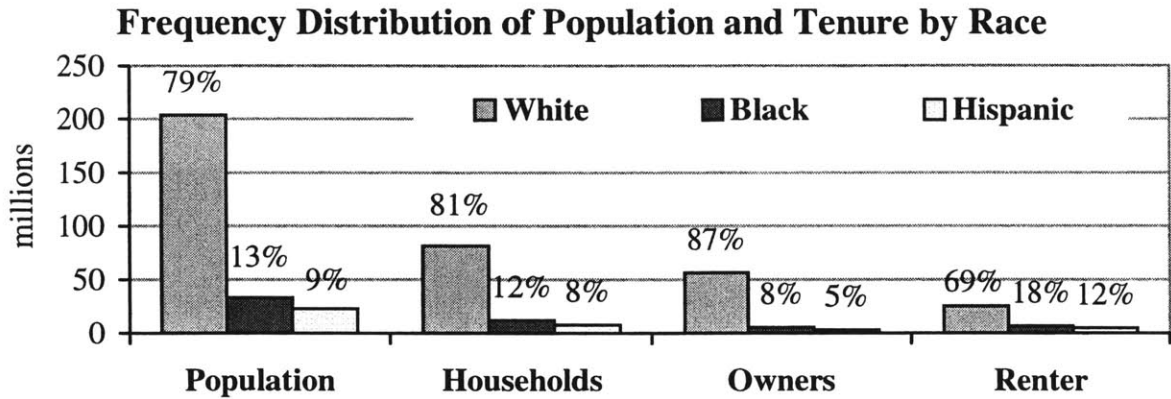
Source: 1995 American Housing Survey and Bureau of the Census (1995 & 1997)

Exhibit 2.9

Homeownership by Race and Income

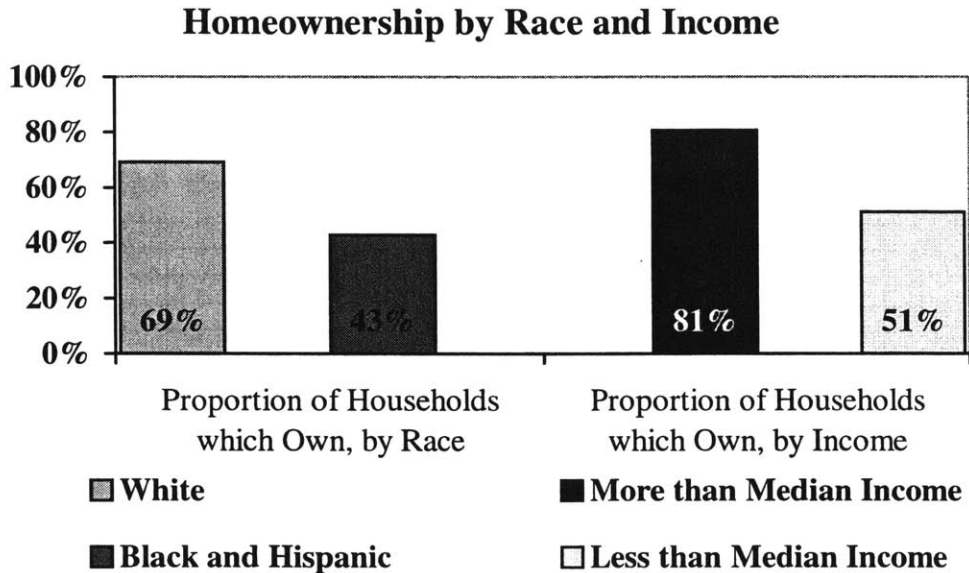Source: Bureau of the Census (1995 & 1997) and MGIC (1999)

Exhibit 2.10

In summary, homeowners have higher income and wealth, are older, and are whiter than the general population. When considering residential finance, perhaps the most significant characteristic of homeowners is the concentration of wealth in their homes. With the homeowners' median equity value in their primary residence exceeding 44% and their combined real estate assets exceeding 56%, homeowners arguably have too much wealth concentrated in

one asset type. However, appreciation in real estate is probably a significant source of that equity, and the difficulty in liquefying a portion of that equity may explain why it remains in real estate assets.

Section II: Current and Historical Home Values

This section addresses the value of property homeowners possess. I profile the current distribution of home values, median home values, and the growth in home prices. I discuss the factors that contribute to changes in home prices over time. And I also highlight the difference between home values in dense metropolitan areas and sparse rural areas.

Home Value Frequency Distribution
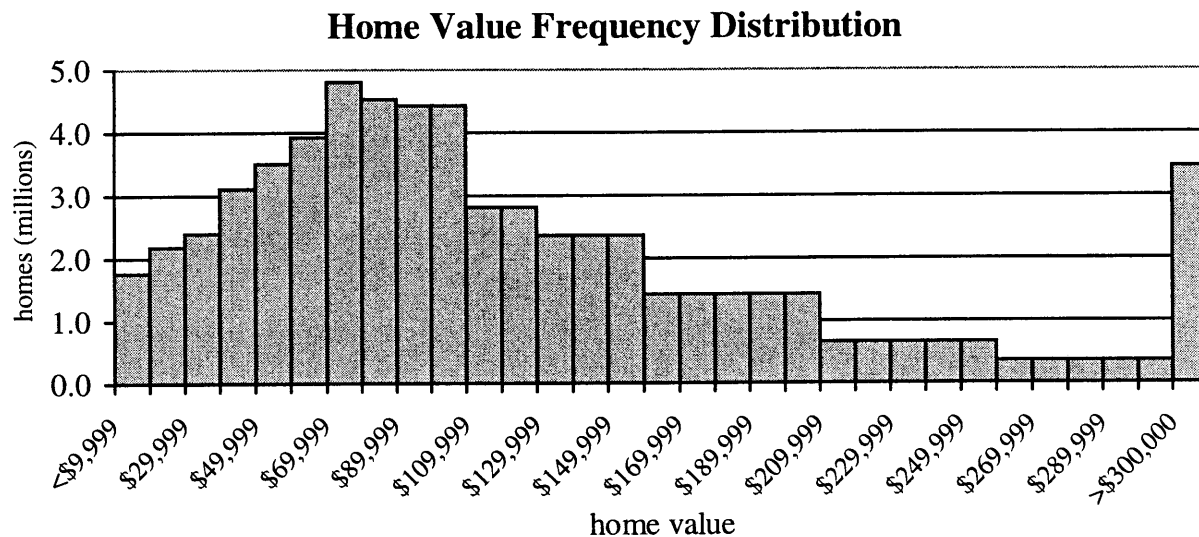
Exhibit 2.11

The distribution of home values looks similar to the distribution of annual income seen in the prior section. (See Exhibits 2.3 and 2.11) This substantiates the idea that that most homeowners buy the most expensive home they can afford based on the debt service their monthly income can support. If this were not true, the distribution of home values might be random, irregular, or flat, but not as strikingly similar to the distribution of household incomes.

Home prices are a function of supply and demand. The supply of housing is in the hands of builders. The primary factors that dictate housing demand are population, household formation,

inflation, commuting costs and distance, and land value. In the aggregate, housing demand has been strong for the last one hundred years.[9]

For the past twenty-four years, home values have increased an average of 5.71% per year. (See Exhibit 2.12) This appreciation rate means that a home purchased at the end of 1974, for $100,000 would have been worth $374,442 at the end of 1998. (See Exhibit 2.13)

Unleveraged Home Value Appreciation
1975 - 1998

Source: Conventional Repeat Homes Sales Index

Exhibit 2.12

Increase in Value of $100,000 Home
1974 - 1998
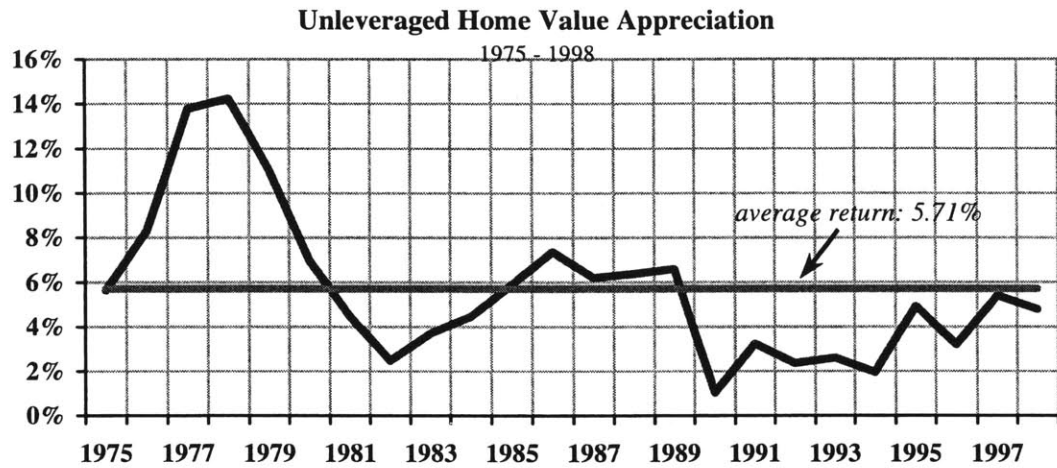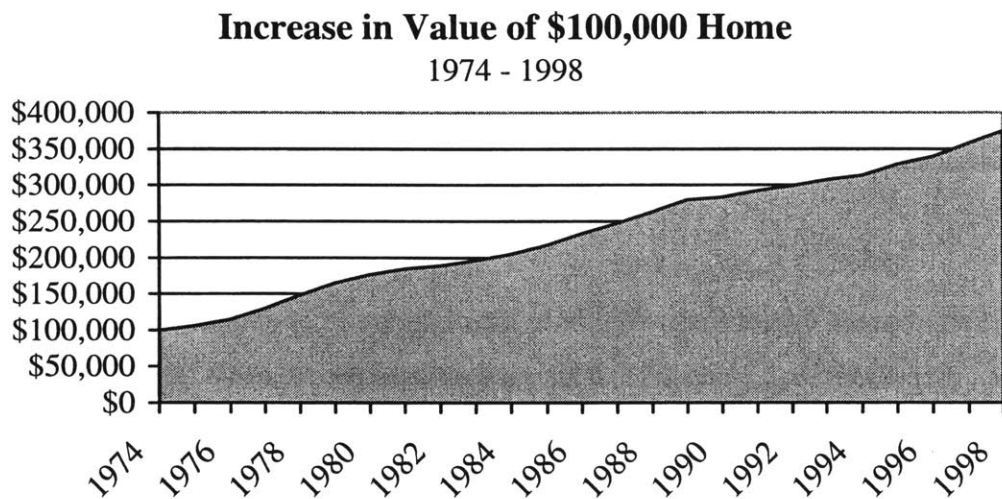
Exhibit 2.13

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[9] Values have increased in 101 of the last 103 years. Oppenheimer & Co. study, 1980. (Source: Dept of Commerce) I added 1980 through 1998 from Convention Mortgage Repeat Home Sales Index.

The nominal, median home price has not changed significantly over the past ten years. (See Exhibit 2.14) In 1998, median values of both new and used homes are within 10% of 1989 median home values.[10]

Median Home Sale Prices

Source: Joint Center for Housing Studies of Harvard University

Exhibit 2.14[11]

Home prices are higher in metropolitan and suburb markets than in rural areas. These higher-density areas are where most young professionals locate. The barriers to homeownership are higher in these areas than the national average. But, regardless of age and/or locat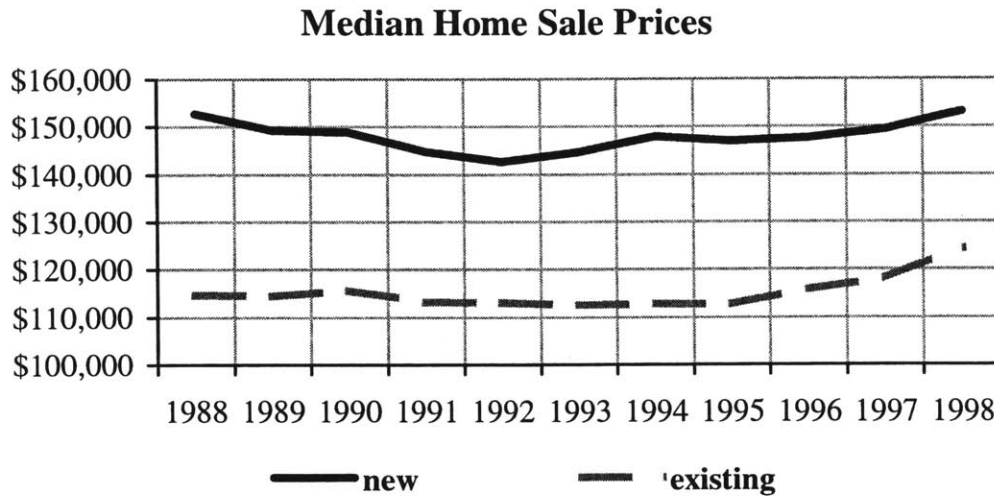ion, the median home price of constant quality, existing residences have been appreciating faster than inflation for almost one hundred years.

	Urban	Suburbs	Rural	Suburban vs. Rural Density Premium
Median Owner-Occupied Home Value[12]	$98,503	$112,836	$80,318	40.5%

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[10] These statistics do not contradict the returns calculated from the Conventional Mortgage Repeat Sales Index. Rather, median home value indices are not controlled for changes in the size and quality of homes, while repeat home sales indices are. Therefore, it is likely that the median new home is smaller in size and has fewer amenities than it did in 1988.

[11] All residences, in nominal dollars. The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1997

[12] Owner-occupied residences only. 1995 American Housing Survey

Section III: Residential Financing

The purchase of a home usually represents the largest amount of debt and the highest ratio of leverage a homeowner ever assumes. In this section, I explore the inputs and constraints of residential purchase financing. I focus on the homeowner's equity contribution, the lender's mortgage, and the relationship between them. I investigate aggressive alternatives to traditional mortgage underwriting standards, such as high-LTV mortgages, government mortgage guarantees and innovative private mortgage insurance (PMI) programs. This section provides a comprehensive survey of current home purchase financing alternatives.

Sources of Down Payment
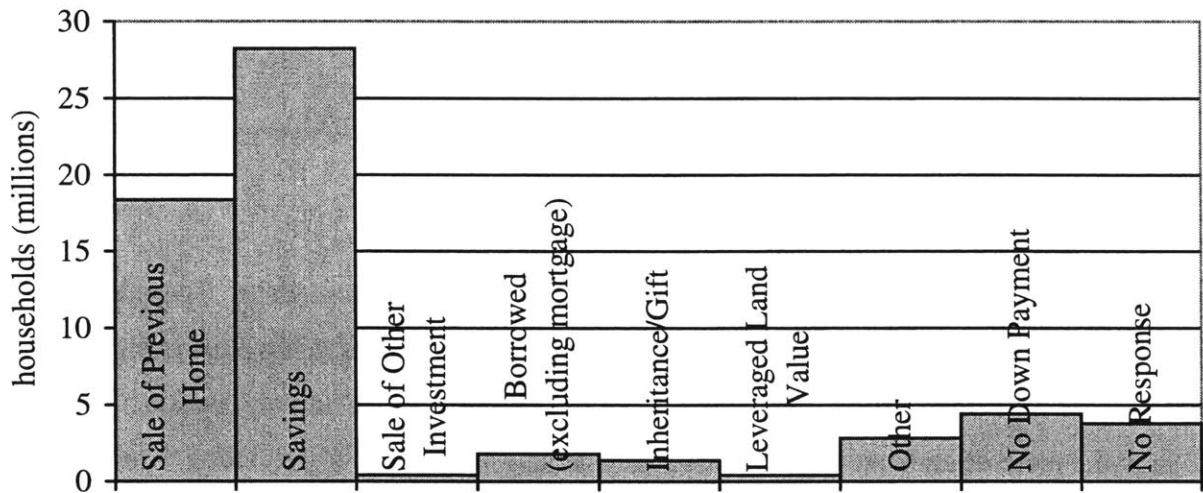
Source: 1995 American Housing Survey

Exhibit 2.15

A significant number of people who buy homes are able to do so because they were previous homeowners or because they had equity available for the downpayment. (See Exhibit 2.15) Persons who wish to purchase a home who are not already homeowners with unrealized home equity or who have not saved enough capital are not likely to succeed. The greatest perceived obstacle to homeownership is not having enough money for a downpayment. In 1998, 29% of all renters believed that this was their major obstacle to homeownership.[13]

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[13] National Housing Survey. "Fannie Mae" 1998.

They are probably correct. In 1996 the average homeowner purchasing a new home with a conventional mortgage made a 21.9% equity downpayment. (See table below.) In 1996, the median price of a new home was $150,094.[14] Therefore, the weighted average equity downpayment was $32,870, which is 87% of the 1993 median household net worth.[15] Therefore, typical downpayments require the majority of all household assets.

Weighted Average Down Payment for Conventional Mortgages Originated

for Home Purchases

	1990	1992	1993	1994	1995	1996
New Home[16]	25.1%	23.4%	22.0%	21.3%	21.4%	21.9%
Previously Occupied[17]	25.1%	23.5%	22.9%	19.9%	19.9%	20.9%

When purchasing a home, once the potential homeowner has enough capital for a downpayment, they almost always turn to a lender for a mortgage. The annual volume of new mortgages is significant. (See Table) Most mortgages are conventional mortgages. (See Exhibit 2.16)

Annual Mortgage Originations[18] (billions)

1990	1991	1992	1993	1994	1995	1996	1998
$710	$793	$1,124	$1,242	$1,019	$930	$809	$1,500

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[14] The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1998.

[15] Median net worth in 1993 was $37,587. Savage. Who Can Afford to Buy a House in 1993? "US Census Bureau". H121/97-1. 7/1997.

[16] These are for conventional mortgages only. Rates & Terms on Conventional Home Mortgages, Annual Summary. "US Federal Housing Finance Board" 1990 – 1996.

[17] Ibid

[18] Statistical Abstract of the United States. Bureau of the Census. 1996. Lereah. Housing Finance: A Long-Term Perspective. "Business Economics" 32(3): 21-26. 7/1997. Colton, Hamecs. The Transformation of the U.S. Housing Finance System. "Housing Finance" 47(1): 7-10. 1/1999.

Type of Primary Mortgage
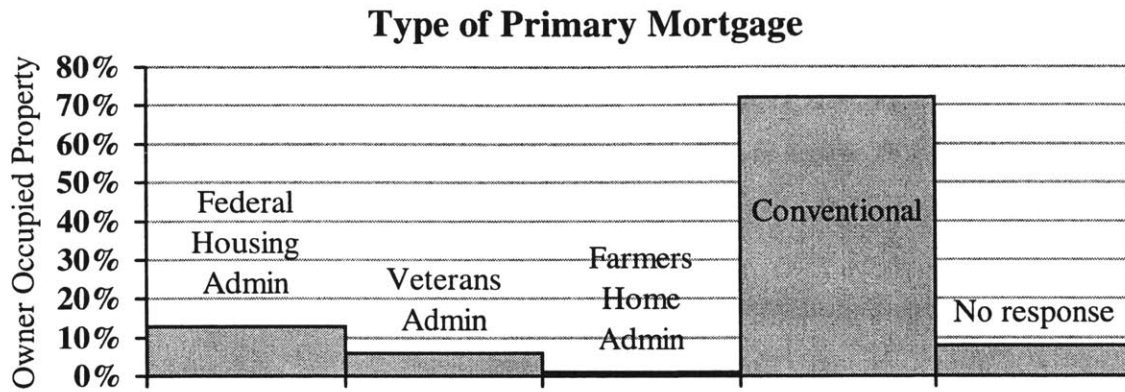
Source: 1995 American Housing Survey

Exhibit 2.16

Weighted Average LTV Ratio for Conventional Mortgages Originated for Home Purchases

	1990	1992	1993	1994	1995	1996
New Home[19]	74.9%	76.6%	78.0%	78.7%	78.6%	78.1%
Previously Occupied[20]	74.9%	76.5%	77.1%	80.1%	80.1%	79.1%

On a weighted average basis, in the 1990s, LTVs of 80% have been used in home purchases. However, high-LTV, conventional mortgages (above 90%) have increasingly been used to purchase homes. (See Exhibit 2.17) In 1989, high-LTV mortgages only represented 7% of new conventional mortgages; by 1996 they had increased to represent 25% of all new conventional mortgages.[21] (See Exhibit 2.18) "Excluding government insured loans, most mortgages which have LTVs of 95% or greater increased from 1% in 1985, to 3% in 1990, and 7% in 1998."[22]

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[19] These are for conventional mortgages only. Rates & Terms on Conventional Home Mortgages, Annual Summary. "US Federal Housing Finance Board" 1990 – 1996.

[20] Ibid

[21] Ibid

[22] The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1999.

Frequency Distribution of LTVs of New Conventional Mortgages

>90%

80% - 90%

70% - 80%

<70%

Exhibit 2.17

Change in Originations of Conventional Mortgages with LTVs >90% and <70%

1998 Index Value =100

>90%

<70%

1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998
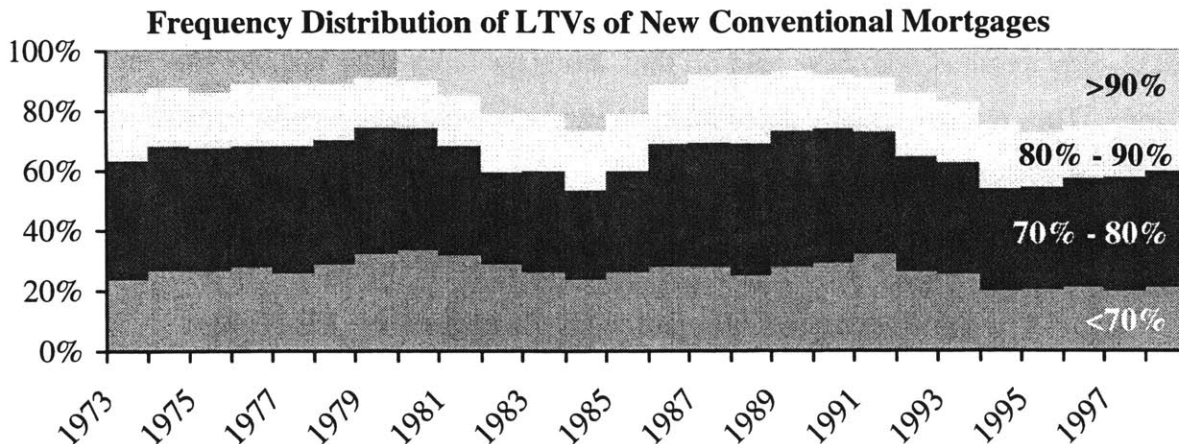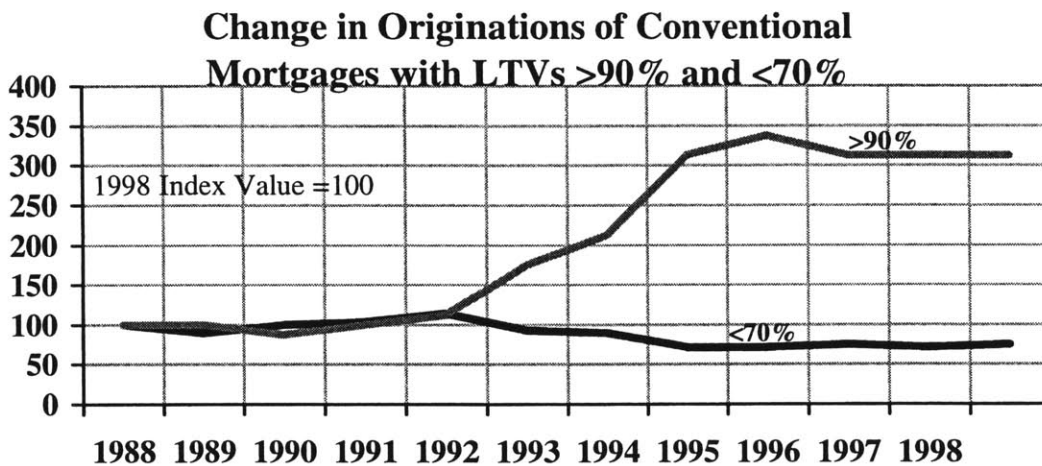
Exhibit 2.18

On the other hand, 32% of homeowners claim to have no mortgage debt on their home.[23] Contrary to basic logic, these mortgage free homeowners are not necessarily wealthier than the typical homeowner. In fact, wealthier homeowners (measured by annual income) take advantage of the tax shield from mortgage interest payments and have the highest percentage of mortgage

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[23] National Housing Survey. "Fannie Mae" 1998.

debt capitalization. (See Exhibit 2.19) Rather, households without mortgage debt tend to be headed by older persons, who have paid off their mortgage obligations and have not moved from their home. They also are usually depression era survivors who have a philosophical opposition to any kind of personal debt.

Owner-Occupied Homes with Outstanding Mortgage
Stratified by Income
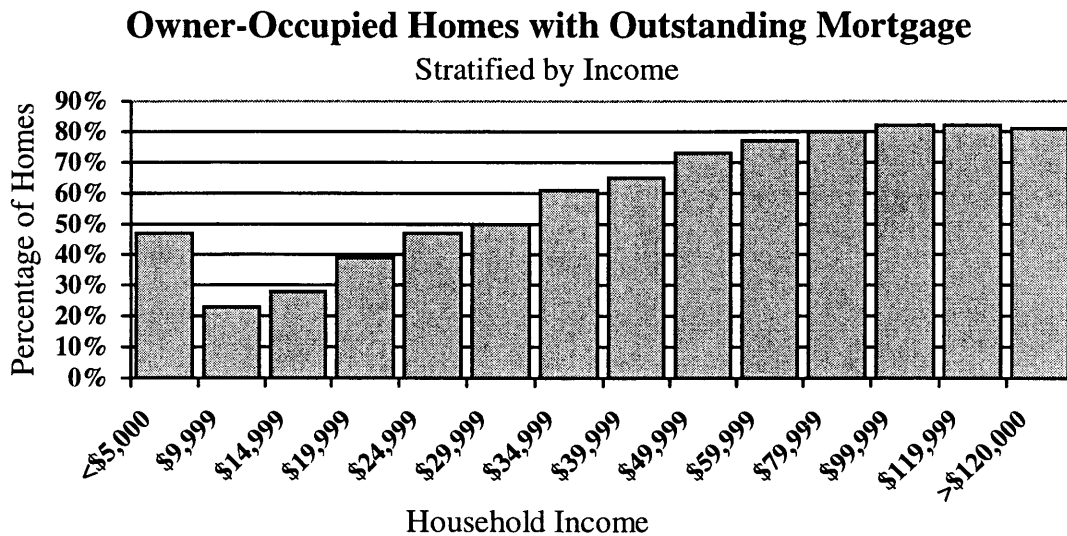
Source: 1995 American Housing Survey

Exhibit 2.19

There are basically two types of mortgages, conventional and the rest. Conventional mortgages accounted for 72% of all mortgages in place as of 1995.[24] In the next section, I review conventional mortgages and a few of the more popular mortgage alternatives below.

As part of the New Deal legislation, the Federal Housing Administration (FHA) was started in 1934 as the Mutual Mortgage Insurance Fund (MMIF). Not only did it insure mortgages, but it also protected banks and savings and loans from further Depression related mortgage losses. In its current state, the FHA provides federal mortgage guarantees on loans to qualified borrowers. These borrowers tend to be lower-income and/or first time buyers. Unfortunately, for the homeowner, FHA insurance can never be cancelled as long as the mortgage is outstanding.

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[24] 1995 American Housing Survey.

Beginning after WWII, the Veteran's Administration started insuring the mortgages of returning veterans and their immediate families. Veteran's Administration loans have below market rates and are typically 100% LTVs.[25] Mortgages from the Veteran's Administration and the FHA are purchased by the Government National Mortgage Administration (GNMA or Ginnie Mae), and then pooled and sold. Ginnie Mae mortgage pools are the only secondary mortgage pools that carry an explicit guarantee from the federal government.

Conventional mortgages are classified as conforming or non-conforming. Conforming loans are loans that comply with the Government Sponsored Enterprises (GSEs) secondary market purchase requirements. The requirements are involved, but their goal is to increase home ownership and promote the secondary market involvement in mortgages. Therefore, the GSEs' conforming mortgage rules are designed to reduce the highest risk from the mortgages they purchase.

Generally, conventional mortgages are self-amortizing and provide the right to prepay at the homeowner's discretion with no prepayment penalty. Mortgages that are non-conforming include Jumbos (see discussion below) and otherwise conforming loans, but that violate a GSE rule. For example mortgages against properties with more than 10% commercial space in the same building are non-conforming. Conforming conventional mortgages must have a LTV of 80%, or the inclusion of PMI for loans with LTVs above that threshold.[26] In 1998, the maximum conforming loan amount was $227,150.[27]

Jumbos are mortgages that are otherwise conforming, but have an outstanding loan balance above the threshold of the conforming loan limit that defines a conventional mortgage. (See Exhibit 2.20) This maximum limit is set each January as the year-over-year (October)

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[25] Mortgage Guaranty Insurance Corporation Press Release. Where There is a Will, There's Mortgage Insurance. 4/6/1999. Mortgage Guaranty Insurance Corporation Press Release. Why the New Cancellation Law Will Benefit Everybody. 7/24/1998.

[26] Hamecs, Renner. Low Money Down. "Housing Economics", 47(3): 10-13. March 1999.

[27] Freddie Mac Press Release. Freddie Mac Announces New Mortgage to Expand Homeownership. 5/6/1998.

percentage increase in the average single-family home price as measured by the Federal Housing Finance Board's Monthly Survey of Rates and Terms.

Jumbo Mortgages

Market Share of All Conventional Originations
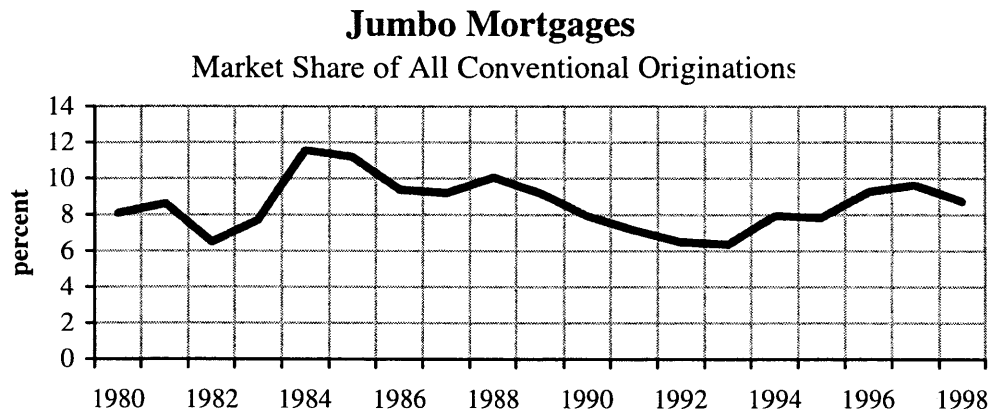
Exhibit 2.20

Despite the additional default risk of mortgages with little homeowner equity invested in the home, the number of new high LTV mortgages has been increasing. Especially as the median price of a home rises, more potential homeowners must turn to high LTV finance programs to purchase their first home. Traditional definitions of high LTV loans are loans with debt ratios equal or greater than 90%. In this section, I relax the definition to include all loans with LTVs of 80% or greater since that is the threshold where PMI is required by lenders. (See Exhibit 2.21)

New Conventional Mortgages Which Require PMI
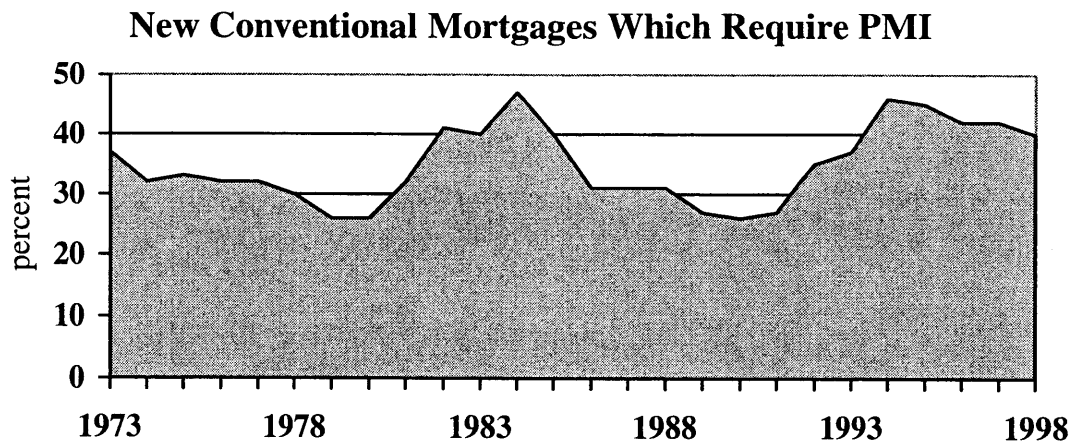
Exhibit 2.21

In 1957, a Milwaukee real estate attorney named Max Karl, created private mortgage insurance (PMI) as an alternative to the FHA and VA programs.[28] Today, twenty to thirty percent of all new loans carry FHA, VA, or PMI policies.[29] For the last eight years, PMI has underwritten the largest component of this business.[30] Because of PMI, homeowners can make purchases with downpayments ranging from twenty percent to as little as one percent. In 1998, fifty percent of all new policies written by the Mortgage Guaranty Insurance Corporation (MGIC) were for 95% LTV loans.[31] Between 1957 and 1998, private mortgage insurers wrote 19 million policies, for an average of 463,414 policies per year. The underwriting rate is increasing; in 1998, 2 million policies were written.[32]

Robust econometric credit scoring of prospective borrowers affords lenders protection from the idiosyncratic risks of individual homeowner default. However, credit scoring does not protect lenders from the systemic risk of default due to dramatic down swings in the real estate market cycle. This systemic risk is called collateral risk, and is defined as the risk of falling property values.[33] In fact, homes purchased with 80% or higher LTV loans are foreclosed upon three times as often as those purchased with 50% LTV loans.[34] PMI policies cover the systemic risk for the lenders.[35]

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[28] Mortgage Guaranty Insurance Corporation Press Release. Where There is a Will, There's Mortgage Insurance. 4/6/1999.

[29] Ibid

[30] Ibid. PMI companies underwrite more policies than FHA and VA combined. (Mortgage Guaranty Insurance Corporation Press Release. Private Mortgage Insurance: Part of the Homeownership Affordability Solution. 5/6/1999.)

[31] Ibid. 5/6/1999. In 1991, 95% LTV loan policies were only 20% of MGIC's new business. 97% LTV loan policies represented 5% of new MGIC business in 1998, and are continuing to increase.

[32] Ibid.

[33] Ibid.

[34] Mortgage Guaranty Insurance Corporation Press Release. Private Mortgage Insurance: Your Partner in Housing. 3/13/1998. Further evidence of this is the GSEs policy requiring mortgage insurance on loans with a LTV higher than 80%. (Hamecs, Renner. Housing Economics, 47(3): 10-13. March 1999.)

[35] As mentioned earlier, new mortgages have increasingly higher LTVs. Because lenders require the purchase of PMI policies to protect their claims, the homeowners have no choice but pay the premiums. Therefore, PMI has increased market share will the increase in the average LTV of new mortgages issued.

The cost of PMI ranges between 30 and 100 basis points annually, and currently PMI premiums are quoted at about 78 basis points of the original loan balance.[36,37,38] Traditional PMI premiums are not tax deductible. Usually some of the PMI premium is paid at the closing and the rest is paid on a monthly basis, although private mortgage insurers have introduced a wide variety of PMI programs in the last few years. All of the new alternatives are designed to get around the need for the borrower to pay monthly private mortgage insurance premiums; some of the new PMI programs are discussed below.

PMI has a bad reputation with borrowers for psychological and economic reasons. Psychologically, borrowers dislike PMI because the monthly payments do not go toward paying down the balance of their loan and traditionally borrowers had difficulty canceling the PMI policy.[39] From a financial perspective, the monthly payments for traditional PMI are not tax deductible and in a down real estate market the 20% equity threshold can be hard to attain, so the PMI premiums can go on for years.[40]

Innovative uses of PMI are the leading edge in low downpayment, high LTV loans. High LTV mortgages are the fastest growing component of the home purchase finance industry. This is not

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[36] Hamecs, Renner. Low Money Down. "Housing Economics", 47(3): 10-13. March 1999.

[37] http://www.pmigroup.com/mortgage_bankers/calc_MI_prem.html
In addition, phone interview with Countrywide Mortgage (800-435-6276) on 6/30/99. Quoted monthly PMI premiums of $108 on a $166,250 mortgage, which equates to a cost of 0.78% annually.

[38] Chapter four has an extensive discussion on the effective cost of PMI. Thinking about the cost of PMI as approximately only 78 basis points annually for the entire mortgage is misleading. The homeowner actually only needs enough capital to reach 80% LTV. Since the homeowner is only borrowing that capital difference, they are really purchasing an option. (One can analyze the transaction as two options, one is a call on the value of the home and the other is a put on the balance of the mortgage.) Therefore the cost of effective cost of PMI becomes a very expensive option premium. The complete analysis is found in chapter four.

[39] Historically, PMI policies were hard to cancel, because the PMI companies were difficult to deal with, the lenders were not inclined to have their mortgage insurance removed, removal required an appraisal, which is expensive, and homeowners found the number of actions, documents, and letters required onerous. A new federal law simplifies the process and makes cancellation mandatory after certain benchmarks. Anonymous. Congress Approves PMI Cancellation Measure. "ABA Bank Compliance". 19(8 Regulatory & Legislative Advisory)):7. 8/1998. And Mortgage Guaranty Insurance Corporation Press Release. Why the New Cancellation Law Will Benefit Everybody. 7/24/1998.

[40] When PMI companies compare the cost of PMI to alternative high LTV programs they usually assume that the home value increases and the requirement to pay PMI is gone in five to seven years. When home values drop or remain relatively stable, PMI premiums can last for at least ten years or more.

surprising, considering that 67% of renters have not bought a home because they can't afford one.[41]

Despite the public's inclination against PMI, 13.5% of the existing $4 trillion in mortgage debt, $540 billion, is covered by PMI.[42] In 1998, 40% of all new conventional mortgages had LTVs above 80%, and should have been required to purchase a PMI policy.[43] For a variety of reasons, PMI firms have begun to offer alternatives to the monthly PMI premium model.

Freddie Mac and Fannie Mae have been leading a push toward expanded mortgage origination, by lowering the cost of capital required to purchase a home. Recently, they have focused on the cost of PMI. In the fall of 1998, Freddie Mac convinced Congress to pass a law that allowed these GSEs to pursue alternatives to PMI, when hedging against default risk in high LTV loans.[44] In the last twelve months, Freddie Mac and Fannie Mae have instituted new loan programs that reduce the homeowner's monthly obligation by reducing the monthly PMI premium. This is accomplished by reducing the required amount of coverage from a PMI policy for loans that qualify as conventional mortgages and by the GSEs collecting a 150 basis point fee, up front, on each new loan, which is invested in default insurance pools managed by the respective GSEs.[45]

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[41] The reasons for lack of affordability include insufficient down payment and insufficient monthly debt capacity, based on outstanding debt and monthly income. National Housing Survey. "Fannie Mae" 1998.

[42] Mortgage Guaranty Insurance Corporation Press Release. Private Mortgage Insurance: Your Partner in Housing. 3/13/1998.

[43] Rates and Terms on Conventional Home Mortgages. "US Federal Housing Finance Board" 1998.

[44] Hamecs, Renner. Low Money Down. "Housing Economics", 47(3): 10-13. March 1999.
The law was quickly repealed. A serious battle is brewing to keep Freddie Mac and Fannie Mae from moving into new lines of business within the residential mortgage industry. Eight industry trade groups have come together to form FM Watch. The group's goal is to restrain Freddie Mac and Fannie Mae within their current product lines and lobby and influence Congress to keep them there. Schroeder. The Wall Street Journal, 6/17/1999, A28. Nonetheless the Chairmen of Freddie Mac and Fannie Mae have said publicly that they remain committed to "considering a wider variety of choices to offset mortgage default risk." Hamecs, Renner. Low Money Down. "Housing Economics", 47(3): 10-13. March 1999.

[45] Hamecs, Renner. Low Money Down. "Housing Economics", 47(3): 10-13. March 1999.

In a reaction to these initiatives by the GSEs and the introduction of Piggyback Mortgages (see discussion below), most PMI companies have introduced a lump-sum premium PMI product.[46] This "financed single premium," mortgage insurance policy is paid for at the time of the loan closing. The homeowner compensates the lender, who buys the policy, by either increasing their loan balance, or by accepting a higher coupon rate loan. The primary financial benefit to the homeowner is that under this program the entire monthly obligation is tax deductible, but the interest component of the payments has increased. The primary psychological benefit for the private mortgage insurers is that the homeowner is no longer constantly reminded that they are servicing their lenders insurance policy. Mortgage insurance companies also list the single lien on the home as an ancillary benefit to the homeowner, in case they want to place a second lien on their home and access some of their equity.[47]

The Piggyback Mortgage, or 80-10-10, is a newer type of mortgage program. It is comprised of a conventional first mortgage with a LTV of 80%, a second mortgage with a LTV of 10%, and a 10% downpayment made by the borrower. The second mortgage is usually a fifteen-year term and carries an interest rate 200 basis points greater than the first mortgage. The lender usually sells the first mortgage into the secondary market, but keeps the second mortgage.[48] The originator probably keeps the second mortgage because the adverse selection and moral hazard risks result in the secondary markets discounting the value below the originators' cost of origination.

The Piggyback Mortgage is popular for three reasons. First, because borrowers' generally dislike PMI, the Piggyback Mortgage is attractive as an alternative to PMI.[49] Second, borrowers are able to deduct more of their monthly housing obligations from their taxes than they would

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[46] Mortgage Guaranty Insurance Corporation Press Release. Does Financing Private Mortgage Insurance Premiums Make Sense for Your Borrowers? 4/16/1998.

[47] Ibid. Hamecs, Renner. Low Money Down. "Housing Economics", 47(3): 10-13. March 1999.

[48] Hamecs, Renner. Low Money Down. "Housing Economics", 47(3): 10-13. March 1999.

[49] Piggyback Mortgages go by the nicknames of "PMI Busters" and "No PMI" loans. Mortgage Guaranty Insurance Corporation Press Release. Does Financing Private Mortgage Insurance Premiums Make Sense for Your Borrowers? 4/16/1998.

have been able to with traditional PMI. Third, it allows lenders to break up what could have otherwise been a jumbo loan, into a conventional loan, which can easily be sold into the secondary markets, and a smaller second mortgage.

There are four disadvantages to the Piggyback Mortgage. First, the downpayment must be at least ten percent of the home value. Therefore, Piggyback Mortgages are not attractive to borrowers who are significantly equity constrained. Second, because the adverse selection and moral hazard risks result in excessive secondary market discounting, the lender most often retains the highest risk component of the transaction. Third, recently passed bank and thrift regulations require that lenders who hold both the first and second mortgages on a home, where the combined LTV exceeds 90%, must set aside a higher ratio of assets, because of the increased risk of default.[50] Fourth, the existence of two liens on the homeowner's property may make a lender less likely to place a third lien on the home in exchange for a home equity loan.[51]

Housing finance is a complex industry. Successful innovation is rewarded with business from current homeowners who are buying new homes, and the vast unmet needs of the renter market. With approximately 35M households living in rented homes, the potential for a housing finance market expansion is enormous.

Section IV: Housing Affordability

In this section, I profile those households that do not own their own home. I look at the demographic and financial composition of renters. I explore why they are not homeowners by examining the relative cost of housing. Because the moving parts of housing finance are complex, there are several reasons why renters cannot afford a home; and these reasons vary in common causality. Because familiarity with the issues preventing housing affordability is

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[50] Hamecs, Renner. Low Money Down. "Housing Economics", 47(3): 10-13. March 1999. This rule does not apply to lenders who sell the first, but retain the second.

[51] But, if the homeowner is willing to use some of the proceeds of the home equity loan to payoff the existing second mortgage component of the Piggyback Mortgage, then lenders will probably have fewer reservations, since they will become the second lien.

essential to understanding the demand-side of the housing market, I look closely at the complexities.

26% of all renters say that finding a home they like which they can afford is a major obstacle to home ownership.[52] The number one reason for the selection of one home over another is financial. (See Exhibit 2.22) By financial, we can assume that the homeowner had financial restrictions such that the selected home was chosen for its compliance with these financial restrictions.

Reasons for New Home Selection

Homeowners Who Moved Within Past 12 Months
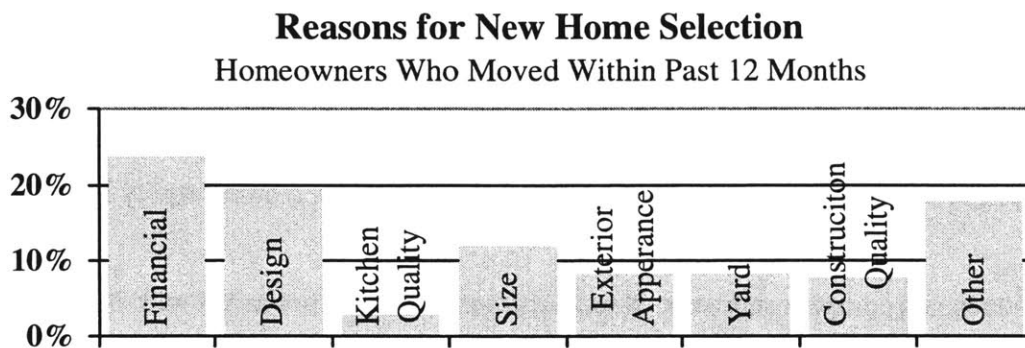
Source: American Housing Survey 1995

Exhibit 2.22

Year	Median New Home Price	Median Family Income (annual)	Ratio
1900	$4,881	$490	9.9x
1910	$5,377	$630	8.5x
1920	$6,296	$1,489	4.2x
1930	$7,146	$1,360	5.2x
1940	$6,558	$1,300	5.0x
1950	$9,446	$3,319	2.8x
1960	$16,662	$5,620	2.9x
1970	$23,400	$9,867	2.3x
1980	$64,600	$34,538	1.9x
1990	$122,900	$36,770	3.3x
1998	$152,200	$37,690	4.0x

Source: Bureau of the Census and Oppenheimer (Census and National Assoc. of Home Builders)

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[52] National Housing Survey. "Fannie Mae" 1998.

As we can see from the table above and the chart below, in the first half of this century, the median cost of a new home fell in comparison to the median, annual household income. However, around 1980, the trend reversed itself and the relative cost of housing is dramatically on the rise.

Housing Affordability
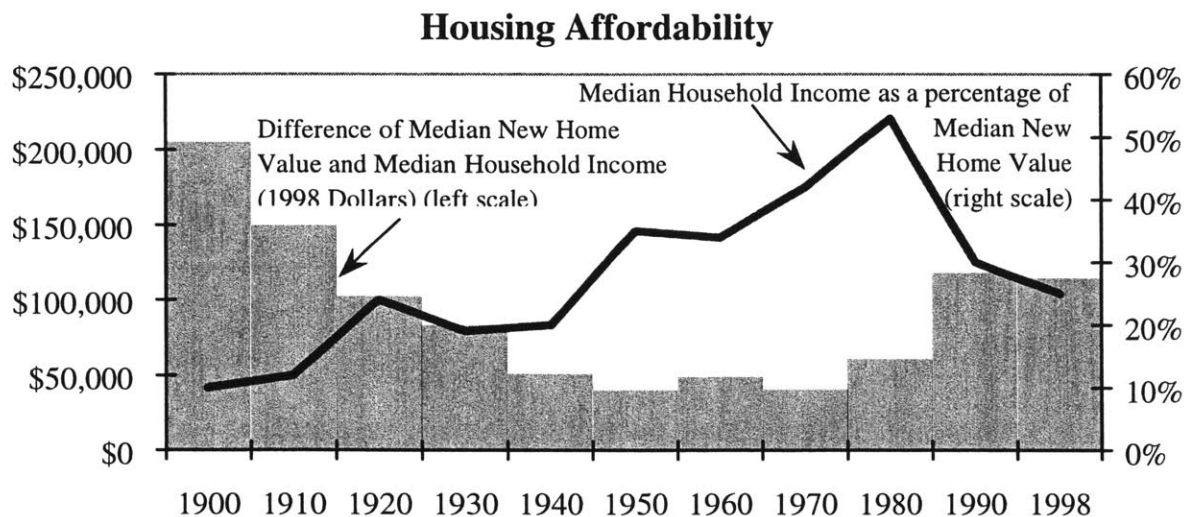
Source: Bureau of the Census and Oppenheimer (Census and National Assoc. of Home Builders)

Exhibit 2.23

The left scale on the chart above shows that in the last thirty years, the difference between the cost of a new home and the income the median household earns has increased dramatically. (See Exhibit 2.23) This measure of housing affordability shows that though household incomes are increasing, the price of housing is increasing at a much more rapid pace. The rate at which home value appreciation is outpacing median income is evidence by the 53% decrease in income as a percentage of home value over the last thirty years.

"Affordability is by far the most pressing problem for the 8.6M renter and 5.6M owner households with extremely low incomes."[53] For the analyst, the difficulty lies in how one defines affordability. Is a household to be evaluated on its income or its wealth, or both? The following data explore both net worth and income to put the issues in perspective.

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[53] The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1998.

Frequency Distribution by Net Worth: Owners Vs. Renters
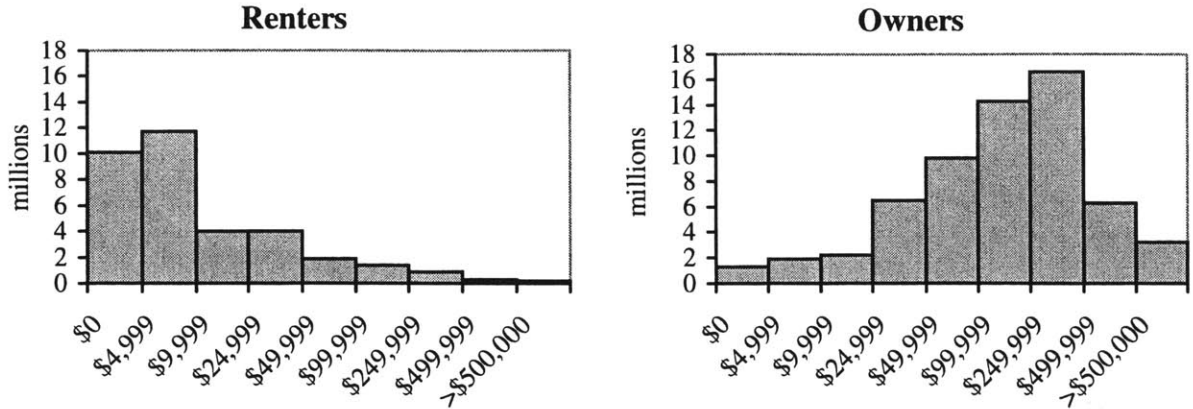
Renters

Owners

Source: 1993 Bureau of the Census

Exhibit 2.24

Ignoring the fact that there are overall, more owners than renters, the distribution of homeowners' net worth is significantly higher than that of renters. (See Exhibit 2.24) The majority of the net worth of owners (in the right frame) is around $100,000, while that of renters (left frame) is around $5,000.

Owners vs. Renters
Net Worth per Household
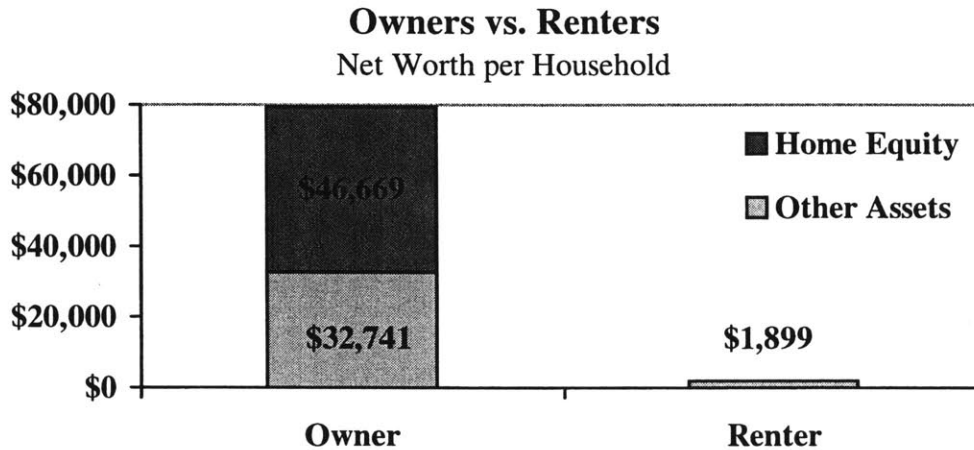
Source: 1993 Bureau of the Census

Exhibit 2.25

The aggregate wealth of homeowners is significantly higher than that of renters.[54] (See Exhibit 2.25) Equity capital is necessary to make a downpayment on the home purchase. As outlined previously, the average homeowner makes a 20% equity downpayment. If net worth is a surrogate for available equity capital, the typical renter does not have enough to make a downpayment. "The greatest single barrier to homeownership for most potential home buyers is the lack of a sizable downpayment."[55]

Median Net Worth as a Function of Age
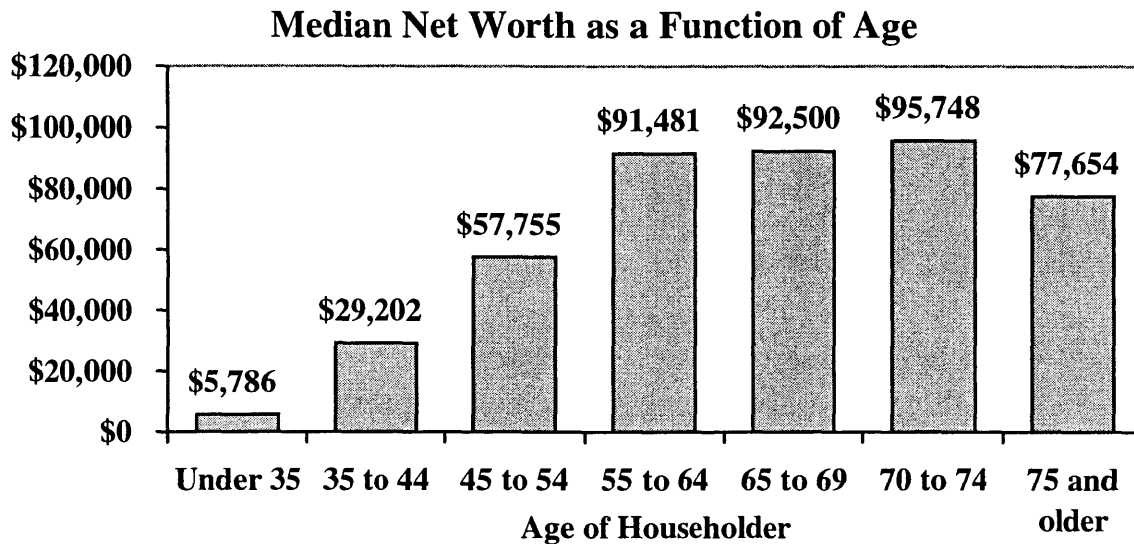
Source: US Dept. of Commerce and Bureau of the Census

Exhibit 2.26

Delving deeper into the issue of renter wealth, it is illuminating to explore wealth and household tenure by age and race. As would be expected, there is a direct relationship between the age of the household and the net worth of the household. (See Exhibit 2.26) Younger households have less wealth than older ones. This restricts younger households from enter the ranks of homeownership. "Nearly half of today's 25 to 34 year olds have only a high-school education, seriously limiting their earning power in the new global economy. These workers in particular

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[54] The interesting question is, "which came first, the chicken or the egg?" Was the net worth of households already high when they purchased their first home? Or do most homeowners start out with a lower net worth and it is the act of homeownership that makes them richer? Alternatively, when did the $32,741 of other assets become a component of the net worth of the median homeowner?

[55] Longhofer. PMI Reform: Good Intentions Gone Awry. "Economic Commentary (Federal Reserve Bank of Cleveland)" 1-4. 3/15/1997.

are finding it more and more difficult to save enough for a downpayment on a home and to earn enough to cover the monthly costs of ownership."[56]

Median Net Worth Per Household

	Nationwide	White	Black	Hispanic
	$37,587	$45,740	$4,418	$4,656
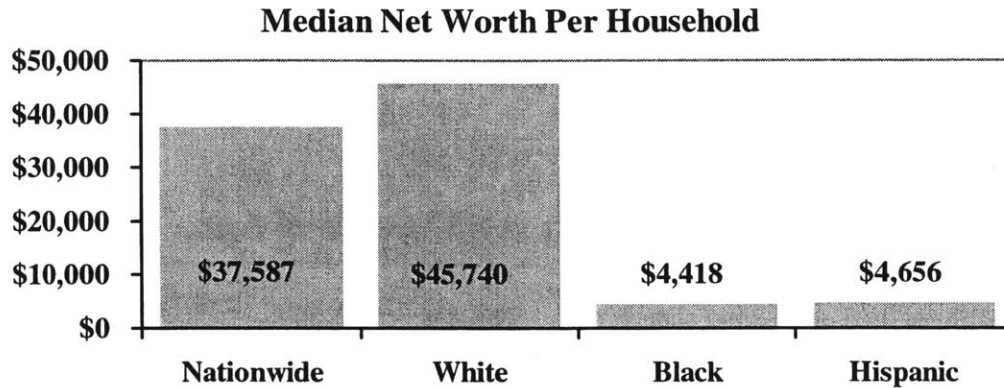
Source: US Dept. of Commerce and Bureau of the Census

Exhibit 2.27

When stratified by race, it is clear that wealth of minorities is significantly less than that of whites. (See Exhibit 2.27) One would therefore conclude that minorities are less able to make the necessary downpayment to purchase a home.

Monthly Household Income as a Function of Race

☐ White   ■ Black   ☐ Hispanic

households (millions)

| monthly household income | $1,071 | $1,963 | $2,995 | $4,635 | $4,635+ |
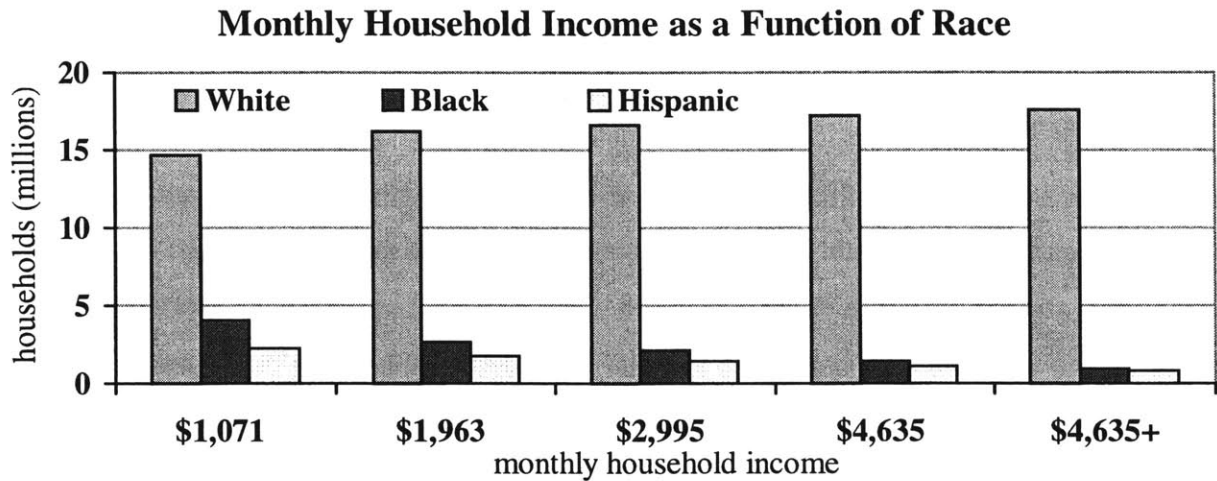
Source: Bureau of the Census 1993

Exhibit 2.28

Regardless of the ability to make a downpayment, homeowners also must service the monthly debt obligation. In the same way that minorities have less wealth, they also make less income.

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[56] The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1998.

(See Exhibit 2.28) It is relevant to note that at higher monthly income levels, the number of white people increases and the number of minorities decreases. (See Exhibit 2.29) Though minorities represent less of the population, they are also under-represented at higher income distributions.

Median Net Worth as a Function of Race
Stratified by Income

Bar chart. Y-axis: "median net worth of households" ranging from $0 to $140,000. X-axis: "monthly household income" with categories $1,071, $1,963, $2,995, $4,635, $4,635+. Legend: White, Black, Hispanic.
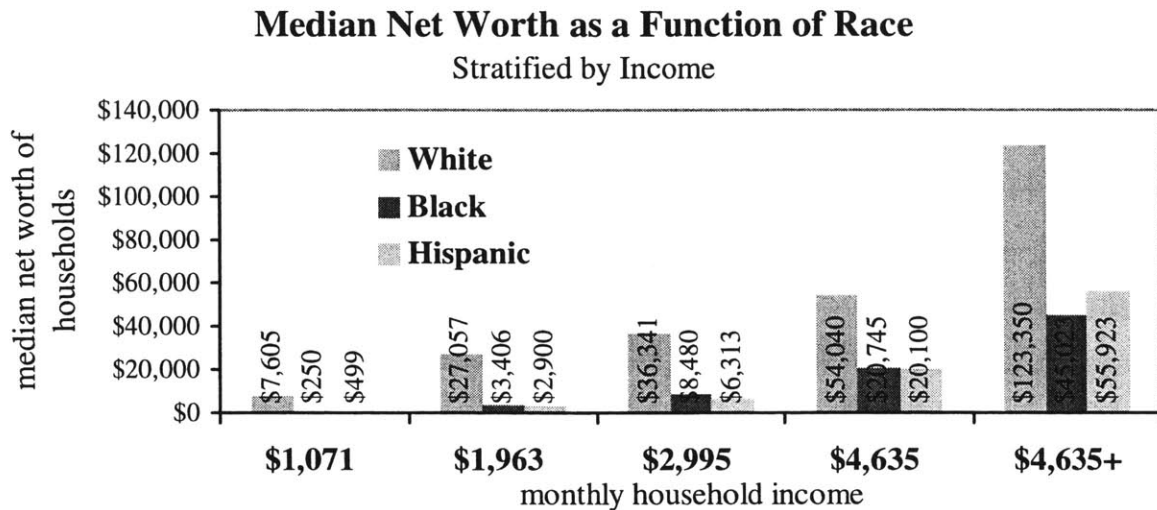
At $1,071: $7,605, $250, $499
At $1,963: $27,057, $3,406, $2,900
At $2,995: $36,341, $8,480, $6,313
At $4,635: $54,040, $20,745, $20,100
At $4,635+: $123,350, $45,102, $55,923

Exhibit 2.29

Combining income and net worth, we discover a surprising result. For the same monthly incomes, whites have been able to accumulate more wealth than minorities. Since homeownership accounts for 44% of the median net worth of a household, the largest share, it is safe to assume that these minorities, even at higher income levels, do not own as much real estate as white households. This conclusion is substantiated by exhibits 2.9 and 2.10 that show that minorities own less real estate than their proportional share of the population.

The relevant exercise is to combine the wealth and income of renters to determine how (un)likely they are to purchase a home. When looking at a renter's entire financial picture, we can appropriately understand the probability of homeownership relative to current homeowners. The following home purchase affordability comes from the Census Bureau report, *Who Can Afford to Buy a House in 1993?*[57] There is a significant difference in percentage of homeowners who can

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[57] Savage. Who Can Afford to Buy a House in 1993? "US Census Bureau". H121/97-1. 7/1997.

afford to purchase a home (by selling theirs) versus percentage of renters who can afford to purchase a home. In 1993, 73% of current owners could afford to sell their home and purchase a modestly priced home in the area. On the contrary, only 11% of renters could afford to do so. (See Exhibit 2.30 and 2.31)

Owners vs. Renters

Percentage Which Can Afford to Purchase Residence in 1993
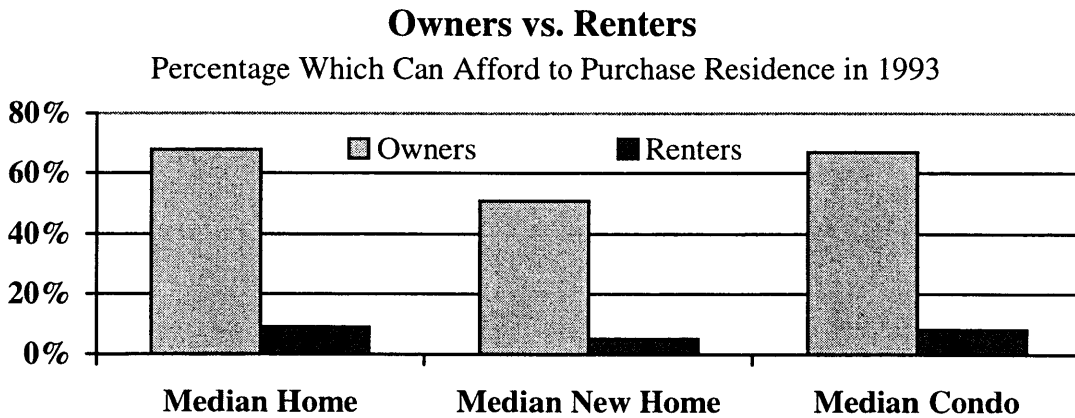
Source: 1993 Bureau of the Census

Exhibit 2.30[58]

Even though the owners are in a better position, not all of the owners enjoy the same financial strength. Of the owners, 83% of white owners could afford to relocate to a modestly priced home in the area, while only 70% of black owners and 63% of Hispanic owners could afford to do so.

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[58] Ibid. The calculations were performed on an area-by-area basis and then aggregated. Areas were defined as in or out of a metropolitan area, and if within a metropolitan area, whether in or out of the central city. This provided apples-to-apples comparisons of families, their wealth, their income, and the home prices in the same families' area. The median home value is the value of the home with 50% of the other home values in the area above and 50% below. A modestly priced home had 25% below and 75% above. Affordability certainly varied with home price, which varied with region. These are national aggregates. The concept of affordability in the above chart is defined as follows. The homeowner is considered to be able to afford the home if they can either buy the home for cash, or finance the purchase with a 30-year conventional mortgage with 5% down and the prevailing market interest rate.

Owners vs. Renters
Percentage of Race Which Can Afford to Buy a Modestly Priced Home
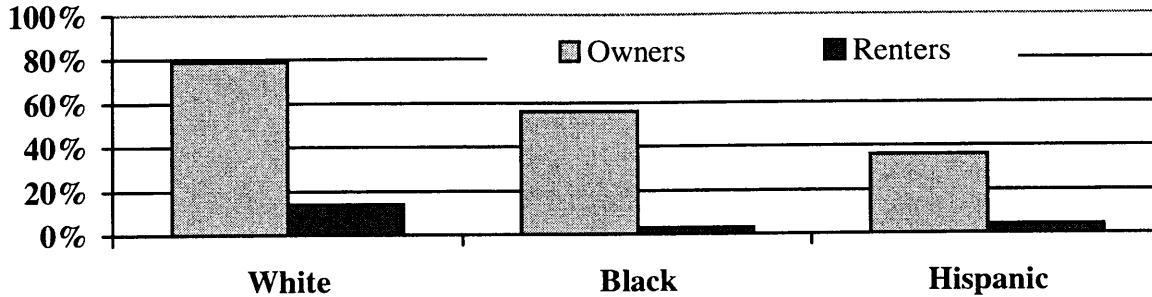
Source: 1993 Bureau of the Census   **Exhibit 2.31**

For renters, a low income is one constraint to home affordability, but not the primary one. This is evidenced in that while 2% of renters who made less than renter median income could afford a modestly priced home, 11% of renters who made more than renter median income could afford the same home. Though 5.5 times more renter households with higher income could afford to purchase a home, fully 39% of renters who made more than the renter median income still could not afford to purchase a home.

Beyond lower income, there are two other reasons why households cannot afford to purchase a home. The first is a lack of capital for the downpayment. The second is a reduction in monthly, mortgage debt service capacity due to other monthly debt obligations. 35% of renter households could not qualify to purchase a home for one of these reasons, while the other 65% of renter households could not qualify to purchase a home for more than one of these reasons. 19% both lacked a downpayment and could not afford the debt service on a mortgage.

As I have shown, significant percentage of minority races, lower incomes, and younger ages underrepresented among homeownership.[59] Because 60% of all renters say that buying a home is either very important or their number one priority, resolving the hurdles to homeownership would create significant market reaction.[60] Though the number of first time homebuyers is

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[59] This is also substantiated in: Mortgage Guaranty Insurance Corporation Press Release. Private Mortgage Insurance: Part of the Homeownership Affordability Solution. 5/6/1999.

[60] National Housing Survey. "Fannie Mae" 1998.

increasing, 65% of all renters say they rent, because of circumstances that prevent them from owning a home.[61] These circumstances are generally defined as one of the following three items: they can't afford to buy a home; they have bad credit; or they can't find a home, which they like, and that they can afford.[62]

Most households who were renters could not afford to buy a home. This can largely be attributed to the 46% of renters that had excessive debt and insufficient income.[63] The Census study determined that providing a downpayment subsidy would improve affordability more than a lower downpayment or a decline in interest rates. I explore this conclusion in detail in later chapters.

The reader may point to the statistics on lower income and lower net worth renter households as the futility in their pursuit of homeownership. However, the ranks of renters with low income and low net worth include many future high-income earners and wealthy individuals. Young professionals and recent graduate school students tend to locate in higher-density areas. As was shown earlier, home prices are higher in metropolitan and suburb markets than in rural areas. The barriers to homeownership are higher in these metro areas than the national average. As a result these young professionals are renters with little to no net worth. At best, they can afford higher debt service, but cannot afford to make a significant downpayment. I expect that hey would readily accept a viable solution to their homeownership constraint.

Section V: Home Improvements

Once a homeowner purchases their home, their housing expenditures, above and beyond debt service and taxes, do not cease. To many observers, it appears that often, homeowners perform a great deal of maintenance and improvement projects. In fact, the 1998 Harvard University Joint Center for Housing Studies, State of the Nation's Housing Report says that whether the home

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[61] Ibid

[62] Ibid

[63] Savage. Who Can Afford to Buy a House in 1993? "US Census Bureau". H121/97-1. 7/1997.

was built pre-1940, 1940-1959, 1960-1979, or 1980-1995, on average about 50% of homeowners make home improvements and repairs.[64] However, the value of those expenditures is quite small, relative to the overall value of the properties.

Owner-Occupied Expenditures
Improvements and Repairs
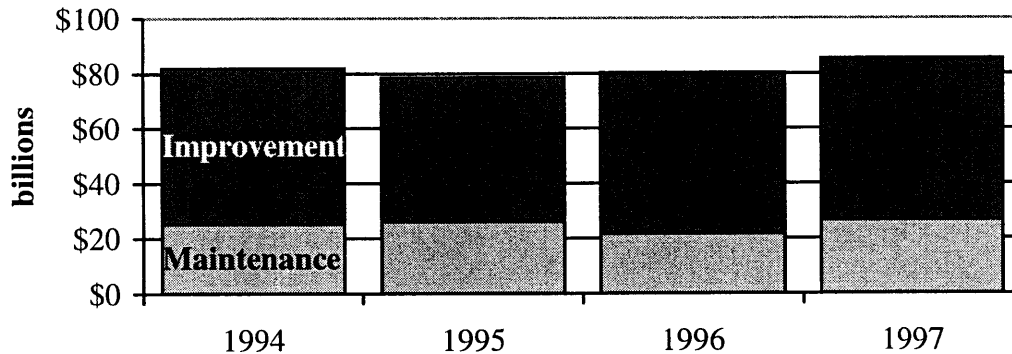
Source: 1997 Bureau of the Census

Exhibit 2.32

In the middle of this decade, maintenance and improvement expenditures by homeowners were about $80B annually. (See Exhibit 2.32) While this is a large nominal amount, in 1995 it was only 0.95% of the overall value of the properties.[65] Two years later, the Harvard University Joint Center for Housing Studies', 1997 State of the Nation's Housing Report estimated that home improvements were 0.8% of total owner-occupied housing value in 1996.[66]

It is important to note the distinction between maintenance and improvements. The Bureau of the Census tracks housing expenditures and they include "relatively expensive [maintenance]

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[64] The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1998.

[65] Census Bureau and American Housing Survey 1995:

$$\text{Percent of Overall Value} = \frac{\text{Expenditures}}{\text{Median home value} * \text{Number of Owner-Occupied Homes}}$$

$$0.95\% = \frac{\$78.583,000}{\$129,811 * 63,544,000}$$

[66] $62.8B of home improvements and 1995 owner-occupied, residential housing value was $7.2T. This excludes the value of the homeowners' time. The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1997.

items" in the improvements category.[67] Therefore, all remaining maintenance category expenditures are offsetting normal depreciation and scrappage. The rest are improvement expenditures, which are essentially investment and wealth creation. In 1995, improvement expenditures represented 0.63% of the overall property values unto which they were performed.

Owner-Occupied Improvements and Repairs
Stratified by Income
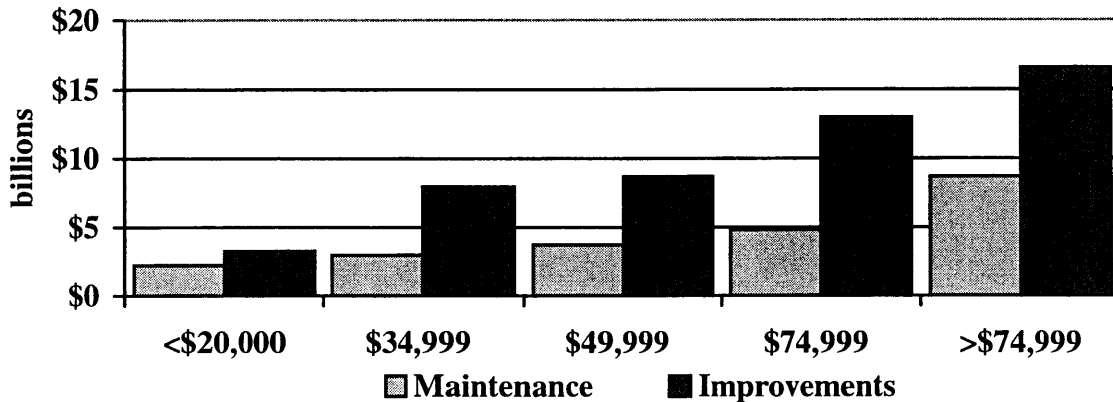
Source: 1997 Bureau of the Census

Exhibit 2.33

Expenditures are not uniform across all types of owners. Middle-aged owners make more expenditures than younger and older owners, while wealthier owners spend more than lower earners. (See Exhibits 2.33 and 2.34) Because of the baby boomer generation, one would expect to see higher expenditures from middle-aged owners. But, only 15% of baby boomers say they will remodel or make improvements to their existing home after their kids move out.[68] Therefore, those who are currently spending the most on home improvements do not plan to continue to do so when they become "empty nesters".

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[67] These include: complete furnace or boiler, entire roof, central air-conditioner, all siding, water heater, entire electrical wiring, doors, plumbing fixtures, all water pipes, windows, septic tank or cesspool, sink or laundry tub, complete walks or driveway, and garbage disposal unit. Expenditures for Residential Improvements and Repairs. "Census Bureau" C50/97-Q4. 7/1998.

[68] National Housing Survey. "Fannie Mae" 1998.

Owner-Occupied Improvements and Repairs
Stratified by Age
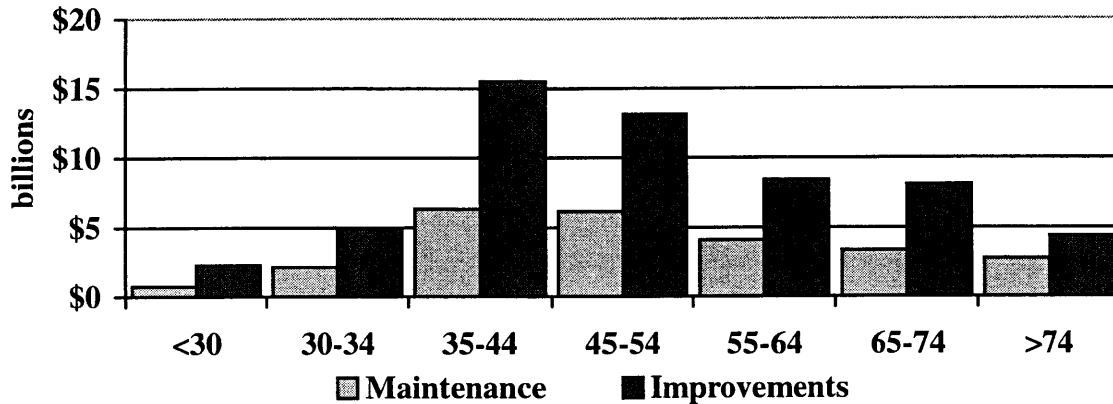
Maintenance ▢   Improvements ■

Exhibit 2.34

Section VI: Primary Mortgage Refinancing

One of the central characteristics of modern residential mortgages is the ability to prepay or refinance the outstanding loan balance. Most homeowners know that they have the freedom to refinance their mortgage at their discretion. In 1998, approximately 6M homeowners refinanced their primary mortgage.[69] In 1995, it was estimated that 39M housing units were mortgaged.[70] Therefore, about 15% of outstanding mortgages were refinanced in 1998. This volume is high above the norm; 1998 set a record for the highest number of refinancings ever. The significant drop in interest rates combined with considerable unrealized appreciation in the underlying property inspired this unprecedented refinancing surge.

Of the refinancings in 1998, 51% were "cash-out" closings.[71] This means that after signing the new mortgage obligation and paying off the original mortgage, the homeowner also received a check for the difference. This was accomplished by increasing the nominal size of the new

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[69] Follain, Lekkas, Lehman. Refinancers Crave Cash on Top of Lower Monthly Payments. "Secondary Mortgage Markets" Spring 1999. The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1999. 1995 American Housing Survey.

[70] 39,026,000 units. Statistical Abstract of the United States. "Census Bureau" 1996.

[71] Follain, Lekkas, Lehman. Refinancers Crave Cash on Top of Lower Monthly Payments. "Secondary Mortgage Markets" Spring 1999.

obligation by at least 5% over the outstanding loan balance on original mortgage, at the time of refinancing.[72]

While the homeowners increased their leverage, relative to when they purchased the home, it was still lower. The new LTVs were lower than the previous mortgages, at origination. The median increase in was approximately 11% of the value of the home.[73] Because the loan size only grew by 5%, unrealized appreciation in the value of the home was the source of the proceeds for the owner.[74] In fact, for every 10% increase in the value of the home, refinancing homeowners only took out a 7% larger replacement loan.

It seems that lower interest rates are enough impetus to cause some homeowners to refinance, but it requires lower interest rates and significant home value appreciation to inspire refinancing accompanied by cashing-out. However, even when using cash-out refinancing, homeowners are still using less leverage than when they first purchase their home. The median outstanding mortgage was 61% LTV and was replaced by a new mortgage with a 72% LTV.[75] Federal Housing Finance Board data has show that the average mortgage LTV at origination is approximately 80%.[76]

Homeowners make no secret of their inclination to free illiquid appreciation trapped in their home. Only 8% of Baby Boomers and 6% of Generation Xers expect that the equity in their home will be a major part of their retirement finances.[77] 61% of Baby Boomers and 57% of Gen

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[72] Ibid.

[73] Ibid.

[74] "The Federal Reserve estimates that since 1995, home sales have yielded an average of about $35,000 in capital gains." Mabry. This Boom, Some Say, Is on the House. "Wall Street Journal" 7/6/99.

[75] Ibid.

[76] See the *Residential Financing* section of this chapter. Rates & Terms on Conventional Home Mortgages, Annual Summary. "US Federal Housing Finance Board" 1990 – 1996.

[77] National Housing Survey. "Fannie Mae" 1998.

Xers project that the equity in their homes will not have any part in their retirement finances.[78]
Therefore, homeowners do not see home equity as a significant source of their long-term wealth
creation, so they take it out when it accumulates.[79]

The best predictors of mortgage refinancing are models which not only account for reduction in
interest rates and increases in home value appreciation, but also the change in income of the
homeowner. The best explanatory model of mortgage termination uses these three factors as
primary conditions and is able to predict refinancing with 71.1% accuracy.[80] Because this model
has superior explanatory power, we know that the combination of reduced interest rates, home
value appreciation, and stable or increased household income is required to understand and
predict a homeowner's refinancing decision.

Section VII: Ownership Duration

An essential component to understanding the demand-side of the housing market is the length of
ownership of a purchased property. Once a homeowner has purchased a home, "how long until
they sell the home and purchase another?" The housing market is dynamic, with a high degree
of mobility. On the whole, homeowners move quite frequently; more than the casual observer
realizes. (See Exhibit 2.35) According to American Housing Survey data, 10 years after
purchasing a home 63.3% of the households have moved and 85.1% have moved after twenty
years.

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[78] Ibid.

[79] Of course it is a significant source of their "original" wealth generation. But once they liquefy the capital from
the home value, it seems that they may be putting it into the stock market. Follain, Lekkas, Lehman. Refinancers
Crave Cash on Top of Lower Monthly Payments. "Secondary Mortgage Markets" Spring 1999. If the capital
markets continue to return over 10% annually, while the after-tax cost of home financing is approximately 5.5%, the
homeowners are acting rationally.

Though rational, homeowners do contradict themselves. From the Federal Housing Finance Board data, we see that
homeowners make a median downpayment of approximately 20%. This is not an insignificant amount of capital.
Especially when the cost of equity financing is usually higher than the cost of debt financing. A detailed discussion
on why homeowners might do this follows in the fourth chapter.

[80] Archer, Ling, McGill. The Effect of Income and Collateral Constraints on Residential Mortgage Terminations.
"Regional Science and Urban Economics" 26 (1996) 235-261.

Ownership Duration Frequency Distribution
1975 and 1995 Average
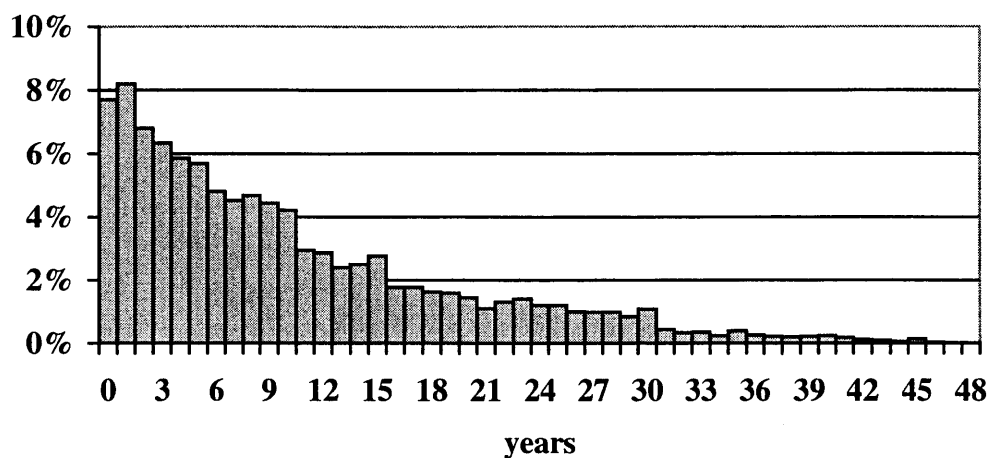
Exhibit 2.35

The above exhibit examines the duration of ownership for the same purchasing cohort.[81] If one hundred households bought a home at the beginning of a year, families would begin selling those homes and moving according to the distribution presented above. I have averaged the 1975 AHS data and the 1995 AHS data to account for any shifts in ownership duration over those twenty years.[82]

Though the overall population of homeowners is highly mobile, certain subsets are more mobile than others. When considering the category of homeowners by age, we see that younger owners are an especially mobile group. (See Exhibit 2.36) On average, 43.3% of those 34 years old or less have moved in the past twelve months.

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[81] American Housing Survey 1975, Part A (H-150-75A), Table A-2, Page 10. American Housing Survey 1975, Part C (H-150-75C), Table A-2, Page 26.; http://www.census.gov/des.

[82] The average differential between same classes from the 1975 AHS data and the 1995 AHS data was only 0.104% and the standard deviation was only 1.07%. Ownership duration patterns did not change much in the twenty years between surveys.

Age Distribution of Owners
Moved in Past 12 Months
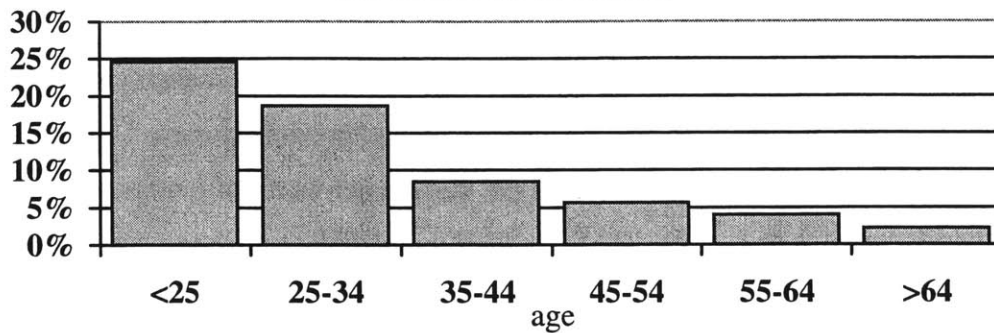
Source: American Housing Survey 1989   **Exhibit 2.36**

So the question is, "why is everyone moving so often?" There are a variety of answers. (See Exhibit 2.37) The number one is reason is for a renter to become a homeowner. In 1995 23% of home purchases were made to first time homeowners, or previous homeowners who had been renting for a period.

Reasons for Moving
Homeowners Who Moved Within Past 12 Months
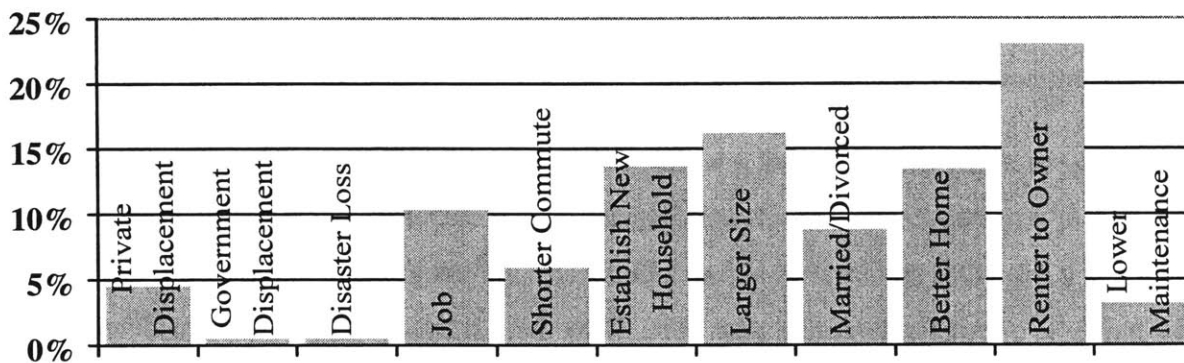
Source: American Housing Survey 1995   **Exhibit 2.37**

We know that the act of becoming a homeowner is the primary reason that homeowners had moved in the prior twelve months. And we know that young homeowners are three times as likely to move than the rest of the homeowner population. Therefore, we can conclude that majority of recent renter-to-owner movers are young. Since, the median net worth of households

under 35 years old is ten times less than households aged 45 to 54. The majority of first time homeowners do not have significant financial resources.

It is likely that the rest of the renter-to-owner movers also have limited financial resources. They are either older first time homebuyers or households who had previously owned a home, became renters and were becoming owners again. Since the median net worth of renters was only $1,899 in 1993, it is safe to assume that on the whole, both of these recent renter-to-owner home purchasers also do not have a great deal of wealth. When combining these two observations, we can conclude that the largest cohort of homebuyers is struggling financially to make their home purchase.

Section VIII: Default

Mortgage obligation default is an important risk to understand in residential financing. The reality of owner-occupied mortgage default is lower than commonly perceived. This is attributed to the fact that when a homeowner files for bankruptcy they are allowed to keep their home, but the lender's lien against the home is also retained.[83] Thus, homeowners are deterred from defaulting. Therefore, though personal bankruptcy is on the rise, default on owner-occupied mortgage debt remains an unattractive option for homeowners.

It is important to understand just how low the risk of mortgage default is. The Mortgage Bankers Association of America compiles and publishes the National Delinquency Survey each quarter. (See Exhibit 2.38) This survey shows that default rates are not a significant portion of the overall universe of outstanding mortgage debt. Why then, is mortgage default considered such a significant risk?

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[83] Calomiris. High Loan-to-Value Mortgages: Problem or Cure? "Journal of Lending & Credit Risk Management" 81(1): 39-43. 9/1998.

National Delinquency Survey
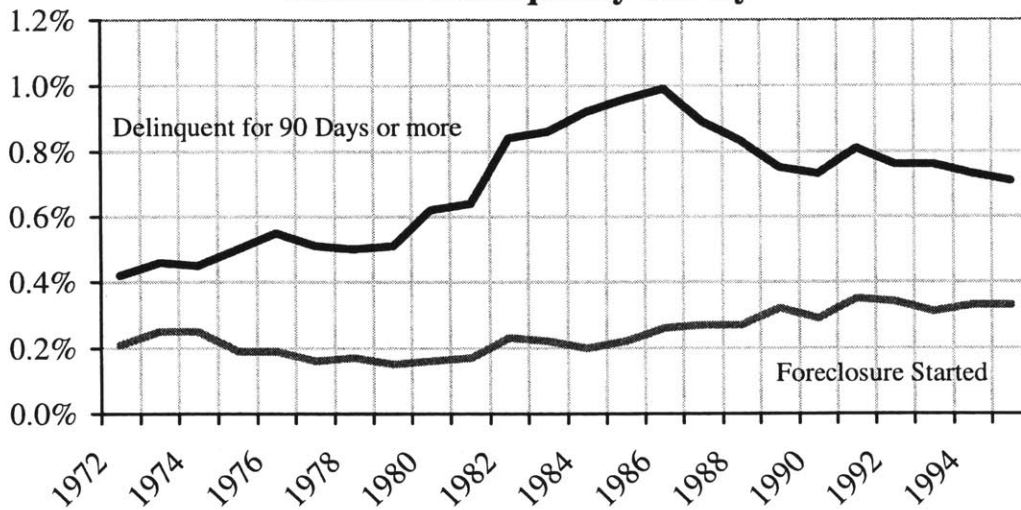
Source: National Delinquency Survey

Exhibit 2.38

"Mortgage lending involves a variety of risks. At its core, however, are two fundamental questions: How likely is the applicant to default on his or her loan, and how large will the lender's loss be in the event of default? It is well understood that a borrower's loan-to-value (LTV) ratio is intimately related to both of these risks."[84] Understanding that one of the keys to predicting mortgage default is the LTV, "what is an acceptable LTV?" "Research shows that borrowers making less than 20% downpayments lose their homes through foreclosure more than three times more often than borrowers who buy homes with 50% downpayments."[85]

But loans with 80%, or greater, LTVs cannot be as risky as the above statements would make them seem, otherwise lenders would not originate so many. Recall that the median LTV for much of the last decade has been near 80%, with an additional 40% of all new mortgages above the 80% LTV threshold. In fact these higher LTV loans are not necessarily riskier than the lower LTV loans, provided the proper precautions are taken. When lending to homeowners with "prime" Fair Isaac Co. (FICO) credit scores, defaults are significantly lower than general default

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[84] Longhofer. PMI Reform: Good Intentions Gone Awry. "Economic Commentary (Federal Reserve Bank of Cleveland)" 1-4. 3/15/1997.

[85] Mortgage Guaranty Insurance Corporation Press Release. Private Mortgage Insurance: Your Partner in Housing. 3/13/1998.

rates.[86] Only 0.6% of High Loan-to-Value (HLTV) mortgages with prime FICO scores experience severe delinquency, where payments fall 90 days past due.[87] While the general universe of Low-Loan-to-Value home equity loans, which include sub-prime debtors, averages 3.0% severe delinquency.[88]

Therefore, while overall the risk of mortgage default is minimal, the key to understanding the risk of mortgage default is credit scoring. The LTV of the mortgage only becomes an issue, when comparing equalized credit scores.

Chapter Summary

This chapter provided an overview of the owner-occupied housing market. Now we understand who homeowners are, how they come to purchase their homes, to what extent they reinvest in their homes, and when and why they sell their homes. We also have insight into who renters are and what their restrictions are to becoming homeowners.

Equipped with knowledge, the reader is prepared to evaluate the Housing Mutual Equity Shares (HOMES) investment vehicle in home equity. HOMES is designed to respond to many of the needs of existing homeowners and potential homeowners, while capturing an opportunity to participate financially in the potential appreciation of the properties.

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[86] Calomiris. High Loan-to-Value Mortgages: Problem or Cure? "Journal of Lending & Credit Risk Management" 81(1): 39-43. 9/1998.

[87] Ibid.

[88] Ibid.

Chapter Three: The HOMES Investment Vehicle

In this chapter I explore the structure and return profile of the HOMES Investment Vehicle. In the first section, I define the concept of HOMES and its place in residential finance. In the second section I look closely at the risk and return characteristics of the HOMES vehicle. The third section is devoted to the implications of pooling HOMES and trading them in the secondary capital markets.

Section I: Introduction of Security Structure

In this section, I carefully explain the design of the HOMES Investment Vehicle. I present a general overview of HOMES. Then I delve into important financial detail regarding the mechanics of HOMES. Last I answer some immediate questions regarding the vehicle and its relationship to other components of traditional housing finance.

Concept and Basic Security Design

The HOMES Investment Vehicle generates investment exposure to the equity appreciation in owner-occupied housing and makes it available to investors in the capital markets. HOMES are a hybrid of private mortgage insurance and a mezzanine debt position, invested in owner-occupied homes across the country. By investing capital along side homeowners in exchange for a financial claim on such owner-occupied residences, HOMES provide investment exposure to the appreciation in the value of those residences.

The key to understanding HOMES begins with my proposal to modify the capital structure used for a home purchase. In the HOMES model, a prospective homeowner purchases their new home using their own equity capital, a mortgage from a traditional lender, and a second mortgage provided by the HOMES vehicle. (See Exhibit 3.1) This second mortgage will be a zero coupon, participating note. The mortgage note issued by the HOMES investment vehicle will require no payments from the homeowner during ownership of the home. Instead, in consideration of the additional downpayment capital received at the purchase, the homeowner

will repay the original HOMES loan amount and a percentage of the appreciation in the value of the home, when the property is sold. (This feature is discussed in detail, below.)

The HOMES mortgage note has no repayment term. The obligation will be repaid whenever the homeowner sells the home. Though, the homeowner will guaranty repayment of the principal, the homeowner will not be required to guaranty that the value of the home increases. The rate of appreciation of the home's value—and, therefore the rate of return on the HOMES investment— will be left to market forces. The only investment return promises the homeowner makes to HOMES investors is that nominal rate of return on the HOMES mortgage note (including transaction costs) will be no less than zero.

Capital Structure Using HOMES
(at purchase)

☐ Lender	First Mortgage
☐ HOMES	Participating Second Mortgage
☐ Homeowner	Equity
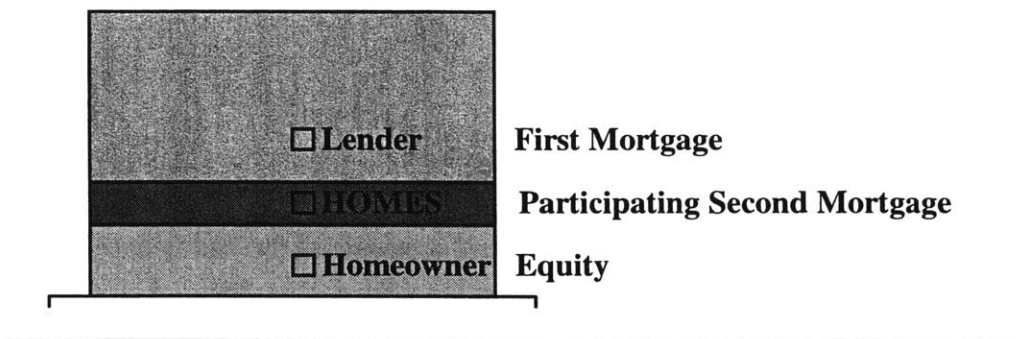
Exhibit 3.1

Once originated, pools of a few thousand HOMES second mortgages will be sold to the capital markets. Borrowing from the success of the primary mortgage/secondary market model, each pool must be comprised of diverse claims. Thus, the heterogeneity of each pool will be defined through the geographic location and nominal value of the primary mortgage. Investors prefer that the LTVs of the primary mortgages in the pools be homogenous. In addition, the ratio of the homeowner's equity to the HOMES capital will be homogenous in each pool. A further discussion of the capital market component of HOMES occurs in the second part of this chapter.

There are many important components to the operation and success of the HOMES second mortgage and the subsequent secondary market for investors. I explore these throughout the rest of this chapter and the next. Now I focus on three aspects of the HOMES second mortgage, which are central to its viability at the property level. These include the homeowner-to-HOMES capital ratio, the allocation of the home value appreciation at disposition, and the legal position of the HOMES claim.

The ratio of homeowner equity to HOMES capital is very important. On one hand, a homeowner to HOMES equity ratio greater than 1:1 ensures that the homeowner has a substantial investment in their home, and that they will always have more equity at risk in their home than do the HOMES investors. On the other hand, a homeowner to HOMES equity ratio less than 1:1 makes the financing transaction more attractive to capital constrained borrowers on the front end.[89] It is important to remember that the only downside protection for HOMES investors is the promissory note to repay the HOMES principal. Nonetheless, because the homeowner will have equity at risk and because the investment is also their primary residence, I believe that this capital structure aligns the interests of the homeowner with that of the HOMES vehicle, while allowing the HOMES investor to have a stake in an individual home.

Adopting lessons from the traditional mortgage lending business, the better the credit score and the higher the debt capacity of the borrower, the lower the minimum homeowner to HOMES capital ratio can be. In application, the ratio will vary on a sliding scale, similar to the way in which interest rates and maximum LTVs on newly originated mortgages are dependant on the borrower's financial picture.[90] In Chapter 4, I explore the moral hazard and adverse selection risks, which are the drivers of the sensitivity of the homeowner to HOMES equity ratio.

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[89] Of course, on the back end, the homeowner has a corresponding lower claim on the appreciation in the property.

[90] For simplicity, I maintain a homeowner to HOMES equity ratio of 1.5:1 throughout the return analysis HOMES in this study.

The amount of the primary mortgage will be no greater than the homeowner can qualify for based on his/her own debt capacity.[91,92] The homeowner is responsible to make the mortgage payments on the first mortgage. The lender will have no recourse back to HOMES for delinquent mortgage payments in the same way that a first lien has no recourse to a traditional second lien.[93]

The HOMES participating second mortgage is secured with a second priority lien on the asset, junior to the first mortgage lender's lien. The second priority lien protects the return due to the HOMES investors. On the upside the lien is a percentage claim on the appreciation in the value of the home above the purchase price, and on the downside it is the nominal value of the capital contributed by HOMES at the purchase. The definition of the percentage HOMES claim is the amount of capital contributed by HOMES in proportion to all of the equity invested in the home at the time of purchase.[94] The claim is calculated according to the following formula:

$$\text{HOMES}_{\%Claim} = \frac{\text{HOMES}_{\$Capital}}{\text{HOMES}_{\$Capital} + \text{Homeowner}_{\$Equity}}$$

Where Equity is the downpayment paid at acquisition by the homeowner, Capital is the HOMES mortgage contribution and Claim is the proportion of the appreciated value due to HOMES. Likewise, the homeowner's claim is calculated according to the following formula:

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[91] Because the homeowner will not be required to make any payments to the HOMES vehicle until the home is sold, lenders should not change their underwriting standards because of the HOMES equity investment.

[92] To a large extent, the capital structure should be dependent on the homeowner's selection of the debt level. As with a traditional residential capital structure, the homeowner should have the right to specify the loan-to-value ratio of the mortgage. Ultimately, the maximum LTV on the primary mortgage is constrained by the borrowers' financial strength and a maximum level set by the HOMES underwriting standards. HOMES may impose a limit on the LTV of the primary mortgage, because when the primary mortgage LTV gets too high the nominal amount of capital contributed by the HOMES vehicle becomes too small to justify the fixed costs of underwriting and servicing the investment.

[93] If the homeowner defaults on the first mortgage and the lender forecloses, the HOMES vehicle will only recover funds if the lender can liquidate the home and generate more than the balance due on their mortgage. More on the legal position of HOMES below.

[94] Closing costs are not part of the homeowner's equity contribution. Closing costs are not traditionally paid by mortgage lenders, they are not a component of the acquisition price, they will not be a component of the sale price, and the homeowner would have had to pay them regardless of whether they used the HOMES capital, or not.

$$\text{Homeowner}_{\%Claim} = \frac{\text{Homeowner}_{\$Equity}}{\text{HOMES}_{\$Capital} + \text{Homeowner}_{\$Equity}}$$

The following formula expresses the payoff to HOMES:

If HomeSalePrice > HomePurchasePrice, then:

$$\text{HOMES}_{\$Claim} = \text{HOMES}_{\$Capital} + ((\text{HomeSalePrice} - \text{HomePurchasePrice}) * \text{HOMES}_{\%Claim})$$

If HomeSalePrice ≤ HomePurchasePrice, then:

$$\text{HOMES}_{\$Claim} = \text{HOMES}_{\$Capital}$$

As a result the payoff to the HOMES vehicle is similar to debt with a call option. Where, the downside payoff is equal to the original capital contributed by HOMES and the upside payoff is a percentage of the sale proceeds from the home less the original purchase price.[95] The payoff to HOMES is independent of how much principal the homeowner has paid down on the primary mortgage.[96] Therefore, as far as the homeowner is concerned, the return to HOMES is a static percentage allocation.

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[95] The true downside is the risk of default on the primary mortgage and foreclosure on the home. An assessment of this risk is fully addressed, using option pricing theory, below.

[96] This feature leaves the homeowner free to refinance the primary mortgage up to a maximum no greater than the original LTV, or the difference of the sum of the HOMES claim and the homeowner's original equity contribution. This ensures that the homeowner continues to enjoy the same minimum capital ratio that existed at purchase, while leaving the homeowner the flexibility to access some of their net worth in the home. See the discussion below for more detail on refinancing.

Allocation of Property Value

Legend:
- Homeowner Down Payment
- HOMES
- Homeowner Principal Paid Down
- Primary Mortgage Original Loan Balance
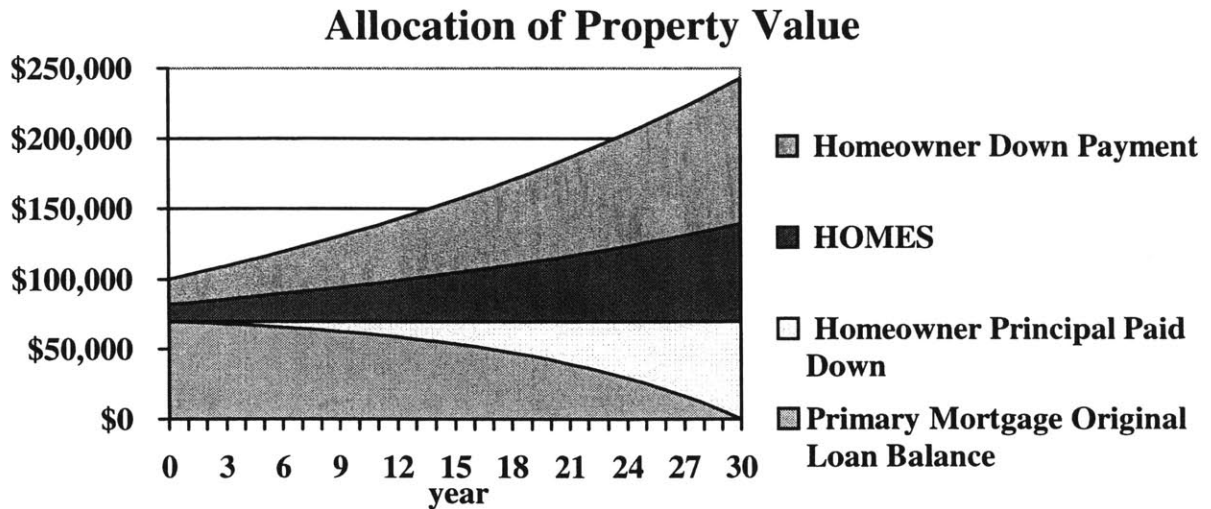
Exhibit 3.2

Exhibit 3.2 displays the claim allocation on a $100,000 home purchased with a 70% LTV primary mortgage ($70,000), 12% equity from HOMES ($12,000), and 18% equity from the homeowner ($18,000). This scenario is also displayed numerically in the table below. This projection assumes a 30-year amortization schedule, an interest rate of 8% on the primary mortgage, no principal prepayment by the homeowner, and 3% annual appreciation in the value of the home. At the end of thirty years, the balance on the primary mortgage is $0. In addition to the return of their principal, HOMES and the homeowner receive their appreciation claims. The HOMES appreciation claim is worth $57,090, and the homeowner's appreciation claim is worth $85,636. Because of the return of principal, if the property were sold, the homeowner would receive $173,636 and the HOMES investors would receive $69,090. The homeowner would be responsible for all closing costs.

Return Calculation Table

		Year 0	Year 30
Home Value		$100,000	$242,726
Home Appreciation		$0	$142,726
Primary Mortgage		$70,000	$0
HOMES Principal		$12,000	$12,000
HOMES Appreciation Claim %	40%		
HOMES Appreciation Claim $		$0	$57,090
HOMES Return		$12,000	$69,090
Homeowner Principal		$18,000	$88,000
Homeowner Appreciation Claim %	60%		
Homeowner Appreciation Claim $		$0	$85,636
Homeowner Return		$18,000	$173,636

Appreciation Allocation
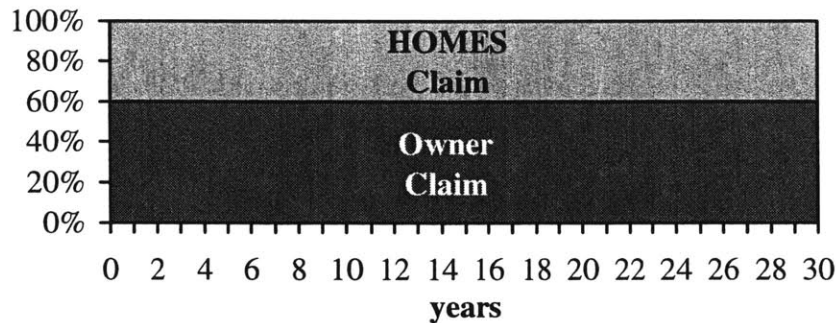
Exhibit 3.3

More generally, the value of this home, in excess of the original, purchase price, is allocated 40% to HOMES and 60% to the homeowner.[97] (See Exhibit 3.3) This 60:40 split is a function of the

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[97] The total proceeds to the homeowner, from the sale of the home, are not necessarily proportional to the amount of capital contributed by the homeowner. As a percentage of the sale proceeds, the homeowners' return ranges from as high as equal to the percentage of total equity the homeowner contributed, to as little as equal to the appreciation split (60/40) between the homeowner and HOMES. In this example, the range of returns to the homeowner, as a percentage of the total value of the home, can be as high as 88% and as low as 60%.

The actual proceeds received at the time of sale are a function of three things. First, the ratio of homeowner to HOMES capital contributions at the time of purchase. In this example, I have used 60:40. This relationship, when combined with the primary mortgage LTV, defines the upper and lower limits of percentage of total value due to the homeowner. Second, the amount of principal the homeowner has paid down on the primary mortgage, at the time of sale. And third, the rate of appreciation in the value of the home.

homeowner to HOMES capital ratio of 18:12.[98] The following reflects the calculation of the HOMES $_{\%Claim}$.

$$HOMES_{\%Claim} = \frac{HOMES_{\$Capital}}{HOMES_{\$Capital} + Homeowner_{\$Equity}}$$

$$40\% = \frac{\$12,000}{\$12,000 + \$18,000}$$

Likewise, the homeowner maintains a 60% claim on the appreciation value of the home. (See Exhibit 3.4) The value of the home grew from $100,000 to $242,726, at the end of thirty years. Of this, the HOMES total claim is worth $69,090 and the homeowner's total claim is valued at $173,636.
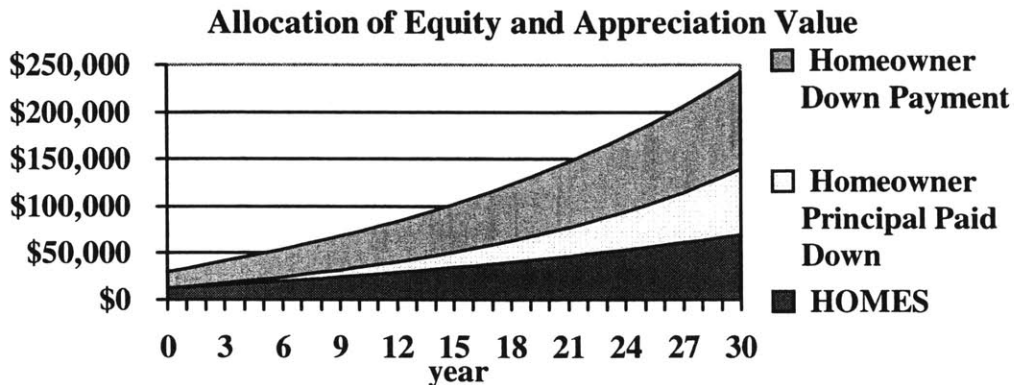
Exhibit 3.4

For the HOMES vehicle, the proportional return is the reverse of the homeowners'. The more the sale proceeds are a function of the appreciation in the home value, the higher the HOMES return, relative to the capital contributed by HOMES. In this example the HOMES claim can range from as little as 12% to as much as 40%. The reason there is a difference between the percentage equity contributed by the two parties and the percentage claim on the home total value stems from the fact that the homeowners' principal pay down contributions are not leveraged in the appreciation calculation. These dollars are returned to the homeowner on a 1:1 ratio.

[98] As described above, and further examined below, this ratio is flexible and is dependent on the financial strength of the borrower.

The homeowner has an additional claim on the home value; as he/she repays the principal on the mortgage, a second claim is accrued. (See Exhibit 3.5) This exhibit graphically displays the homeowner's entire share of the home value. It is the combination of both the claim resulting from the equity contributed at purchase and the principal paid on the primary mortgage. At the time of purchase, the homeowner's equity claim is $18,000 and he/she has not paid any principal toward the primary mortgage. At the end of thirty years, the homeowner has made an $18,000 downpayment and paid $70,000 in principal on the mortgage. The claim on the home appreciation has grown to $85,636, for the homeowner's total claim of $173,636.

Homeowner Equity and Mortgage Principal Paid
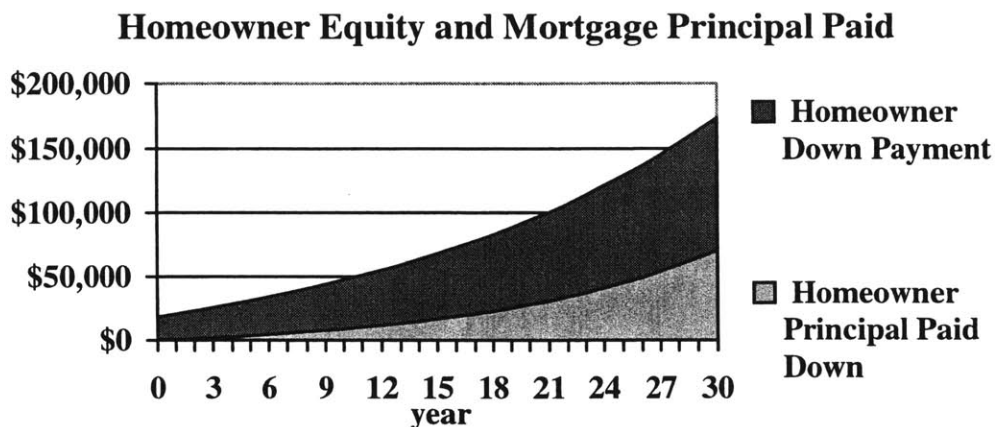
Exhibit 3.5

HOMES' exact legal position is uncertain, because the concept is entirely theoretical. However, the second mortgage position claim is widely used and readily enforced. And the HOMES product is identical to some commercial property, participating second mortgages. Therefore, based on precedent, it is likely that the HOMES vehicle will have no problem operating and defending its legal claims.

Effect of the Use of the HOMES Vehicle on Traditional Residential Financing Activities

The most frequent financing events made by homeowners include mortgage payment, mortgage prepayment, mortgage refinancing, the addition of another mortgage or an equity line of credit,

and additional investment in the property through improvement or renovation. This section examines each activity and explores the effect that the HOMES second mortgage would have on them.

The introduction of the HOMES vehicle into the residential ownership capital structure has no effect on the most common homeowner activity, primary mortgage repayment. As the homeowner fulfills his/her monthly debt service the existence of the HOMES claim is inconsequential. Even if the homeowner wants to prepay all or part of the primary mortgage, the arraignment with the HOMES vehicle has no effect on the homeowner or on the primary mortgage lender. Likewise, homeowner payment and prepayment activity on the first mortgage does not affect the relationship between the homeowner and the HOMES vehicle.

The homeowner's ability to refinance their primary mortgage will be slightly restricted when they have used the HOMES second mortgage to purchase their home. The traditional capital structure affords the homeowner the right to refinance their primary mortgage and either increase or decrease the LTV, and/or increase or decrease the outstanding loan balance, and/or increase or decrease their monthly payment, and/or increase or decrease the remaining term on the primary mortgage, and/or increase or decrease the interest rate of the primary mortgage. When a homeowner has used the HOMES vehicle financing they continue to have the freedom to make all of those same choices, expect for the following. They cannot increase the LTV above what it was when the HOMES capital was contributed and they cannot borrow against any of the current value of the HOMES claim.[99] This ensures that the homeowner can liquefy their entire share of the appreciation in the home, without changing the original capital balance of the relationship between the homeowner and HOMES.[100]

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[99] Because of the HOMES second priority lien, the new lender should ensure that the homeowner does not borrow any of the HOMES return due to HOMES, when refinancing.

[100] Borrowing their share of the unrealized appreciation in the home will reduce the ratio of the unrealized claims on appreciation in the value of the home between the homeowner and HOMES, but will not reduce the ratio of the originally contributed capital in the home. Though the homeowner-to-HOMES relationship risks moral hazard, this refinancing policy gives the homeowner the freedom they need to utilize their share of the appreciation in the home while minimizing the HOMES exposure to moral hazard.

In addition to these two restrictions, the following conditions must be met for the homeowner to refinance their primary mortgage without violating the HOMES lending agreement and the HOMES lien. The homeowner must be current on the primary mortgage payments. The homeowner must have the additional debt capacity to maintain the debt service on the new second loan.[101] The home must be recently appraised. If all of these conditions are met, the homeowner can refinance their primary mortgage.

With this set of refinancing rules, the question of appraisal error surfaces.[102] Because the homeowner can borrow up to the same LTV that was employed at the purchase of the property, limited by the value of the HOMES claim, a home that is refinanced on an over-appraised value runs the risk of the reducing the ratio of original purchase capital that remains invested in the property. In the case of a declining property value and an over-appraisal, the homeowner could end up borrowing a portion of their capital used to purchase the home, and lower the homeowner to HOMES capital ratio.

Homeowners need to access the appreciation in their homes. It is probably the number one method of household wealth building. Economists and the 1999 State of the Nation's Housing report, published by the Joint Center for Housing Studies of Harvard University, attribute the majority of the current economic expansion, "wealth effect" spending on unrealized home appreciation and "cash out" refinancing and second mortgages. Previously, most pundits credited the source of the current "wealth effect" spending with the significant increase in the value of the capital markets. However, as pointed out in a Wall Street Journal article on the topic, probably only the top 3% of the nations households are effected by the capital markets "wealth effect", as only the top 10% of the nation's wealthiest households own 88% of the domestic mutual funds and stocks. The rest of the significant increase in national spending seems to be coming from increases in home values.

But home appreciation, "wealth effect" spending is not necessarily desirable. The Federal Reserve reported that by the end of 1998 the national savings rate was −0.4%, meaning households annually spend more than they make. By the second quarter of 1999, the national household savings rate had dropped further to −1.2%. While a government can survive for years with a significant cash flow deficit, individuals cannot. Too much credit will ignite inflation and bring any viable economic expansion to its knees. If the 1999 State of the Nation's Housing report, published by the Joint Center for Housing Studies of Harvard University, and the Wall Street Journal article--and the economists quoted within it--are to be believed, a major source of this additional credit comes from lines of credit and second mortgages.

Mabry. This Boom, Some Say, Is On The House. "The Wall Street Journal". Page A2, 7/6/1999.
The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1999.
Kellner. Hey, Big Spender! "cbs.marketwatch.com". 6/29/1999.

[101] These two will probably be the requirements of the new lender, as well.

[102] I doubt that residential appraisals tend to over-value properties. I expect that the opposite is true. Appraisals are done for the benefit of lenders; therefore a tendency to understate home values would be rewarded.

But this risk is almost inconsequential for three reasons. First, even for a significant drop in value and a considerable over-appraisal the actual change in the capital ratio is very small.[103] Second, if the ratio were reduced, it would only be a temporary change. The final allocation of capital is based on percentages of the sale price and the original loan balance on the original primary mortgage. Any capital ratio reduction, which might have occurred during a refinancing, would be eliminated at the time of the subsequent sale. And finally, the concept of the HOMES investment vehicle is based on the regular appreciation in the aggregate value of residences. Slight decreases in value are not expected to last long or affect much of the value of the housing stock.

Traditionally, if a homeowner wants to tap the equity in their home without refinancing their primary mortgage, they borrow through a second mortgage or a home equity line of credit. Both of these usually assume the second lien position on the home. Within the HOMES capital structure, the second lien position is taken by the HOMES second mortgage. Under the HOMES model, homeowners will be free to access their share of the appreciation in the home, utilizing a second mortgage or a home equity line of credit, under the following conditions. Some of these conditions are the same as those that govern refinancing.

The homeowner must be current on the primary mortgage payments. The homeowner must have the additional debt capacity to maintain the debt service on the new second loan. The home must be recently appraised.[104] As defined by the appraised value, the sum of the current outstanding loan balance on the primary mortgage and the loan balance on the new second mortgage loan cannot exceed the LTV on the original mortgage. The remaining equity in the home must be

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[103] For a home worth $100,000 at purchase, which drops 10% in value and is over-appraised by 5%, the capital ratio drops from 1.5 to 1.34 (approximately 10%). The shift in the capital ratio is no worse than the loss in value of the home.

[104] The new lender will probably require current payments and additional debt capacity, as well. However, an important distinction is that because second lenders are usually aggressive, HOMES will re-underwrite the property, using a new appraisal and the homeowner's current financial statements. Using more conservative debt capacity standards, HOMES will make a determination of the maximum additional monthly debt service the homeowner can assume, if any at all. If the homeowner fails the HOMES test for a second loan, the homeowner always has the option of refinancing the first mortgage. This is especially viable if interest rates have dropped.

equal to or greater than the sum of nominal value of the HOMES claim and the homeowner's downpayment equity. If all of these conditions are met, the HOMES vehicle will concede its second position to another lender, and assume the third lien position.

As stated in the previous chapter, home improvement expenditures (new investment and wealth creation) averaged 0.63% in 1995. Under the current proposal, the HOMES vehicle stands to unfairly gain from a homeowner's infusion of capital and labor if a major improvement project is undertaken. A significant improvement by the homeowner represents an increase to the paid-in-equity by the homeowner. The difficulty in trying to adjust the paid-in-equity arises when trying to measure the value of the additional contribution. The opportunity for moral hazard and deceptive contractor/homeowner transactions make valuing an improvement difficult. There is no good solution to the potential risks, and HOMES will operate under the policy of no change in cost basis. This restriction is likely to tailor the market for potential HOMES users to those not likely to undergo major projects. This includes purchasers of new housing stock/new construction home purchases, apartment/condo purchases, homeowners likely to move in a shorter period of time[105], young homeowners, and lower income homeowners.

Section II: Return Analysis

Now that I have outlined the operation of the HOMES investment vehicle, I need to explore its return potential. This next section answers the question, "Why should capital market investors be interested in investing in HOMES?" The answer is that investors should place capital in investments with superior risk-adjusted returns. I will demonstrate that HOMES offers such returns. The following flowchart provides an overview of the methodology followed in this section. (See Exhibit 3.6)

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[105] The faster a homeowner moves, the quicker capital is returned to HOMES. A short tenured homeowner is desirable. Coincidentally, these include, among others, younger homeowners. Since younger homeowners usually do not make major home improvement expenditures and since they move relatively often, they fit an excellent profile as a potential user of the HOMES capital.

Analytic Process Flowchart

Data

Home Value Frequency Distribution 1975 AHS	Ownership Duration Frequency Distribution 1975 & 1995 AHS

Beginning of Term Values

Home Values Random Order Generation 30,000	Ownership Period Random Order Generation 30,000

FNMA Return Index

End of Term Values

Invested Capital

Underwriting
Servicing
Default Allowance

Return on Investment
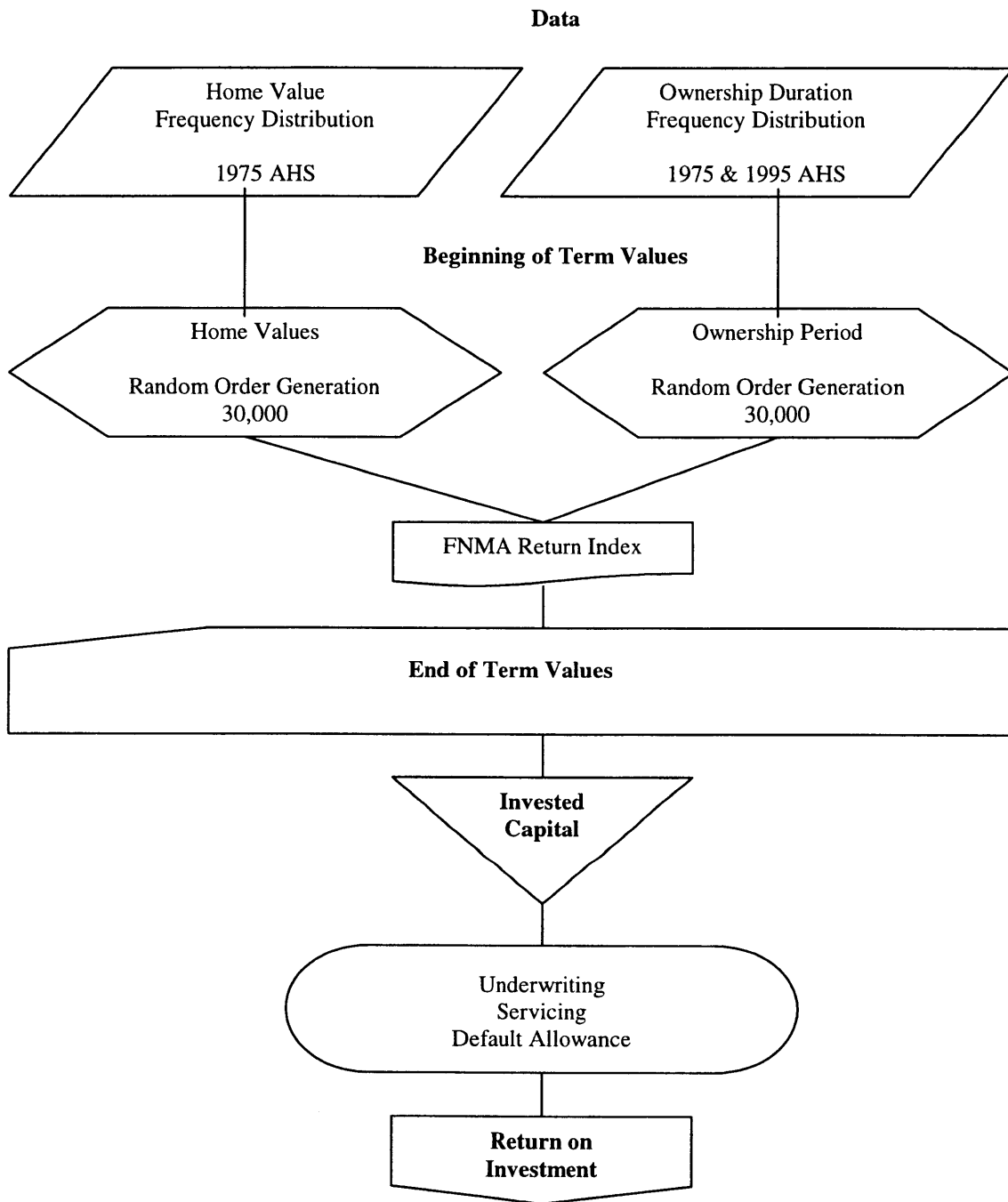
Exhibit 3.6

Statistical Methodology

To estimate the investment return from HOMES, I created a data set of 30,000 hypothetical housing transactions. Each transaction record included the purchase price of a home in 1975, the number of years from 1975 until the home was sold, and the price of the home when it was sold.[106] The hypothetical transaction data set was carefully and realistically constructed using the following methods.

The first step involved gathering data from the 1975 and 1995 American Housing Survey (AHS).[107] The AHS is a frequent survey conducted by the U.S. Census Department. Every two years, the U.S. Census Department queries households around the nation and every year they examine twelve metropolitan regions, rotating through the 46 metropolitan regions of the Census every four years. In total, the survey is compiled by asking a sample set of questions to 55,000 households. The survey is conducted with the same 55,000 housing units each time.[108] Pollakowski considers the AHS the most uniform and complete housing survey in the country.[109] For my purposes this is important because the AHS includes homes of all values and transaction status. Repeat home sales indices only include homes that have been sold more than once during the index period. Use of a repeat home sales index exclusively would exclude valuable and realistic housing data.

From the 1975 AHS data, I extracted the national frequency distribution of owner-occupied homes with values above $25,000. $25,000 was chosen as the minimum home value for two reasons. First, in 1995 dollars, $25,000 is approximately equivalent to $78,750.[110] On average,

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[106] 1975 was chosen because that is the beginning of the FNMA/FHLMC Repeat Home Sales Index. As I discuss later, I used the FNMA/FHLMC Repeat Home Sales Index to calculate the sale value of the homes.

[107] American Housing Survey 1975, Part A (H-150-75A), Table A-2, Page 10. American Housing Survey 1975, Part C (H-150-75C), Table A-2, Page 26.; http://www.census.gov/des.

[108] http://www.census.gov/hhes/www/housing/ahs/ahsdescr.html

[109] Pollakowski. Data Sources for Measuring House Price Changes. "Journal of Housing Research", Vol. 6, Issue 3, 1995, Page 377.

[110] Calculated using inflation estimates in the Seasonally Adjusted Consumer Price Index. Downloaded from the Federal Reserve Bank of St. Louis at http://www.stls.frb.org/fred/index.html.

in 1995, most dwellings worth more than $78,750 were likely to be of sufficient condition to appreciate in value. Second, based on anecdotal evidence, a home or apartment worth $25,000 or more in 1975 was of similar condition to these same standards. The future value of anything worth less might be questionable.

From this 1975 AHS data, I calculated the percentage distribution of national home values. (See Exhibit 3.7) This data set was 22,987,000 homes. Unfortunately, the survey did not group homes into classes with uniform intervals. Rather the home valuation ranges of each frequency class varied between $5,000 and $15,000. I wanted to create a hypothetical transaction data set of uniform home value increments. So I divided the AHS frequency classes into even class intervals with $1,000 increments by distributing each class across its bin.[111]
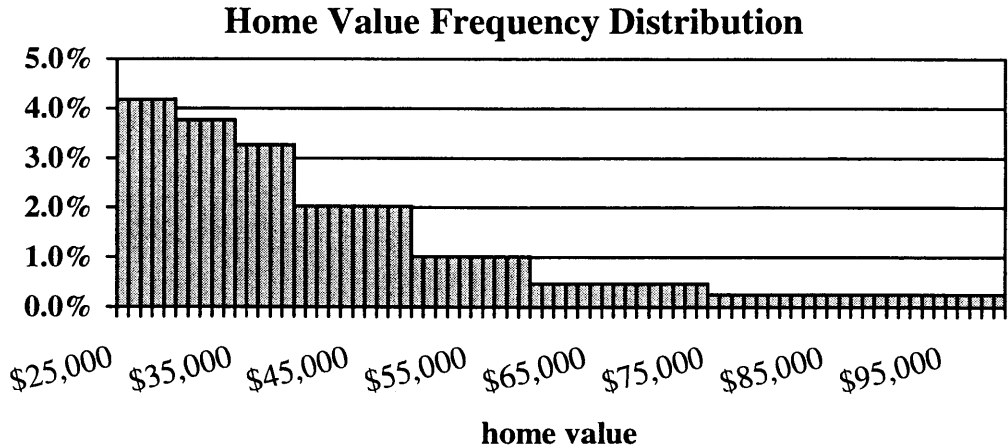
Home Value Frequency Distribution

home value

Exhibit 3.7

Once I had normalized the home value intervals I had a useable frequency distribution set. I then applied the Microsoft Excel Random Number Generation Function to create 30,000 individual home values. The Random Number Generation Function created home values in random order, which, in aggregate, had the same frequency distribution as the 1975 AHS data.

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[111] For example, the $25,000 to $29,999 class contained 4,804,000 homes. I redistributed this so that there were 960,800 homes valued at $25,000, 960,800 homes valued at $26,000, 960,800 homes valued at $27,000, 960,800 homes valued at $28,000, and 960,800 homes valued at $29,000.

Now that I created starting home prices, I needed to know how many years, after purchase, until the homes would be sold. To determine this, I needed to know the holding term frequency distribution, so I again turned to the AHS. This time I used both the 1975 and the 1995 survey data. From the 1975 AHS data, I extracted the frequency distribution of the number of years the owner of an owner-occupied home, worth more than $25,000, lived in that home.

From the 1995 data, I extracted the same information, how long an owner had lived in their home. The 1995 data was available in actual survey sample sets, as opposed to the nationally extrapolated results from the 1975 AHS. I set the minimum value requirement at $78,750 in 1995 dollars, which is approximately equivalent to $25,000 in 1975 dollars. This resulted in 13,410 homes that I distributed into annual frequency intervals.

Because duration of homeownership might change over time, I averaged the number of owners at each frequency interval from the 1975 AHS data and the 1995 AHS data. This will compensate for changes in homeownership duration during my analysis period.[112],[113] (See Exhibit 3.8) I then used the Microsoft Excel Random Number Generation Function to create 30,000 hypothetical duration periods. The frequency distribution of the random order data set was identical to that of the frequency distributions of the 1975 AHS and the 1995 AHS ownership duration terms.

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[112] The average differential between same classes from the 1975 AHS data and the 1995 AHS data was only 0.104% and the standard deviation was only 1.07%. Ownership duration patterns did not change much in the twenty years between surveys.

[113] It is important to note that the very nature of the HOMES claim may influence home sales patterns. Upon sale, the homeowner is required to give up some of the "wealth" they have enjoyed the benefit of, without really possessing. Meaning, they have been living in a larger, nicer, or otherwise more expensive home than their personal financial position would have afforded them alone. Because of this, home ownership durations may extend.

Ownership Duration Frequency Distribution
1975 and 1995 Average
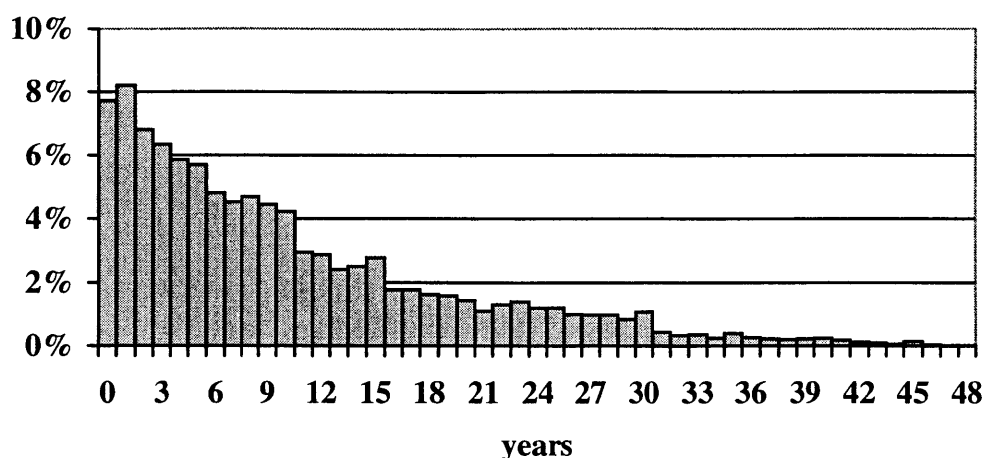
Source: American Housing Survey

Exhibit 3.8

Now I had a data set of 30,000 random order home values and ownership durations in equal frequency distribution to actual AHS data.[114] This data set represented the home ownership transaction opportunities available in 1975. The final step was the calculation of the home value in the year of sale.

For this I used the Conventional Repeat Home Sales Index (FNMA Index). The FNMA Index is the most complete and accurate repeat homes sales index in the country.[115] It was begun in 1992 with the combination of the FNMA and FHLMC home loan transaction databases. It began with over 1.57M transaction pairs at matched addresses and has grown to over 5M transactions. The index starts in 1975 and statistically aggregates quarterly home prices in metropolitan statistical areas, states, census regions, and at the national level.[116],[117]

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[114] I simply combined the two random order data sets because there is no evidence that home value has any influence on ownership duration. I arrived at this conclusion after I linearly regressed 14,675 data pairs from the 1995 AHS (I included all home values). The effect of home value on ownership duration resulted in a R^2 of 4.60%, an adjusted R^2 of 4.59% with a T-Statistic of −26.6.

[115] Pollakowski. Data Sources for Measuring House Price Changes. "Journal of Housing Research", Vol. 6, Issue 3, 1995. Case and Szymanski. Journal of Housing Research, Vol. 6, Issue 3, 1995.

[116] Stephens, Li, et al. Conventional Mortgage Home Price Index. "Journal of Housing Research", Vol. 6, Issue 3, 1995.

From the FNMA Index, I extracted the annual returns at the national level for 1975 through 1995. (See Exhibit 3.9)

Unleveraged Home Value Appreciation
1975 - 1998
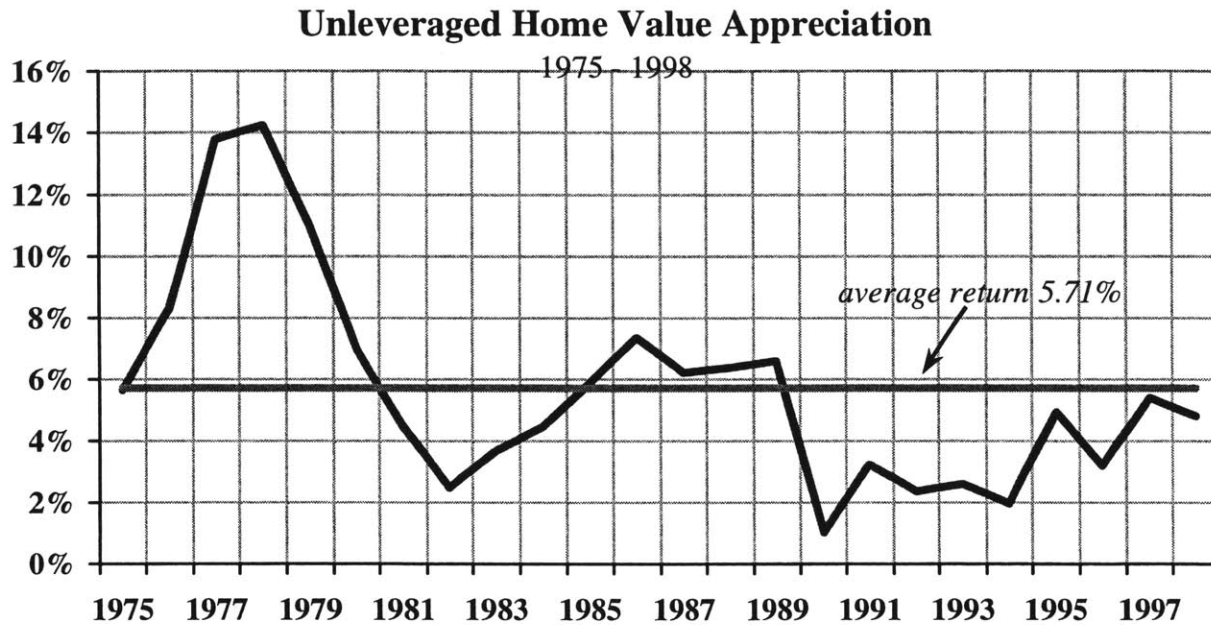
Source: Conventional Repeat Homes Sales Index

Exhibit 3.9

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[117] The three drawbacks of the FNMA Index are that it only contains conventional loans, it does not control for the effects of major capital improvements to a home, and it includes mortgage refinancing on a home as a transaction. An index with conventional loans only excludes loans guaranteed by government agencies, such as VA or FHA, and jumbo loans; both types of loans do not meet the conventional loan underwriting criteria. Therefore low value homes and high value homes are truncated from the index. The lack of control for major capital improvements is a perplexing problem, which I address elsewhere in this study. However, the U.S. Census estimates home renovations (C-50 expenditures) at 0.5% annually. (Stephens, Li, et al. Conventional Mortgage Home Price Index. "Journal of Housing Research", Vol. 6, Issue 3, 1995.) At that rate, the net effect on the HOMES investment is not significant.

The value of a home in the FNMA Index that was a refinancing transaction comes from the lender's appraisal. Stephens, Li, et al believe that there is an upward bias in these appraisals. In an attempt to control for appraisal bias, they removed all refinancing transactions from the database. The appreciation rate for the period 1Q85 – 4Q90 dropped 0.58% annually. This is not a dramatic decrease. In defense of refinanced home transactions, it should be noted that a homeowner is much more likely to refinance a home that has appreciated in value than one whose value has remained flat or declined. I do not think that there need be an upward bias in home value appraisals.

Year	1975	1976	1977	1978	1979	1980	1981	1982
Return	5.7%	8.3%	13.8%	14.2%	11.0%	7.0%	4.5%	2.5%

Year	1983	1984	1985	1986	1987	1988	1989	1990
Return	3.7%	4.4%	5.9%	7.4%	6.2%	6.4%	6.6%	1.0%

Year	1991	1992	1993	1994	1995	1996	1997	1998
Return	3.2%	2.4%	2.6%	2.0%	4.9%	3.2%	5.4%	4.8%

Term	1975 – 1995	1975 - 1998
Average Return[118]	5.88%	5.71%

I then applied these returns to my created data set of home transactions. If a home was sold in or before 1995, the sale price was calculated according to the following formula:

$$\text{Sale Price}_N = \text{Purchase Price}_O * \text{Duration Appreciation}_N$$

Where: $\text{Duration Appreciation}_N = \text{FNMA Index Value}_N / \text{FNMA Index Value}_O$

Where: N = sale year, O = start year (1975)[119]

If a home sale was predicted to be later than 1995, I captured that home value as of 1995.[120]

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[118] I have included the returns through 1998 in this chart and the table, though I only used returns through 1995 in my analysis. This is an arithmetic average. Compounded, geometric averages are 1975 – 1995: 4.88% and 1975 – 1998: 4.71%.

[119] Example:

Home Purchase Price (1975):	$100,000
Ownership Duration (years):	10
FNMA Index Value (1975):	100
FNMA Index Value (1985):	216.8

$\text{Duration Appreciation}_N$ = FNMA Index Value $_N$ / FNMA Index Value $_O$
2.168 = 216.8 / 100

Sale Price_N = Purchase Price $_O$ * Duration Appreciation $_N$
$216,800 = $100,000 * 2.168

With that the hypothetical transaction data set was now complete. I created a data set of 30,000 hypothetical housing transactions. Each transaction record included the purchase price of a home in 1975, the number of years from 1975 until the home was sold, and the price of the home when it was sold. The hypothetical transaction data set was carefully and realistically constructed using the most complete survey data.

Cash Flow

The hypothetical transaction data set served as my basis for predicting the expected cash flows from investing in individual homes. I assumed that the HOMES vehicle had $10M to invest in 1975. I modeled the cash flows as the return on investments from three leverage ratio scenarios: 70% LTV, 80% LTV, and 90% LTV. In each of the scenarios, I maintained the same homeowner to HOMES equity ratio of 1.5:1.

Capital Contributions

LTV	Homeowner	HOMES
70%	18%	12%
80%	12%	8%
90%	6%	4%

In the first step, I calculated the nominal amount of debt, the nominal amount of the HOMES capital contribution, and the nominal amount of homeowner equity for each home based on the purchase price in 1975. In order to accurately calculate the HOMES investment cost basis, for each hypothetical HOMES mortgage written, I added $300 as an underwriting expense. This underwriting expense was deducted from the available capital in the HOMES investment pool, but did not reduce the required capital contribution to purchase individual homes. The calculations were completed using the following formulae.

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[120] Alternatively, for homes sold after the twentieth year, I could have calculated an average appreciation rate and applied it to project the home values at sale. However, rather than make unfounded estimates, I based my return calculations on actual FNMA Index return values.

$$\text{MortgageBalance}_{\$} = \text{PurchasePrice} * \text{LTV}_{\%}$$

$$\text{HOMES}_{\$\text{Capital}}{}^{[121]} = [(\text{PurchasePrice} - \text{MortgageBalance}_{\$}) * \text{HOMES}_{\%\,\text{Claim}}]$$
$$+ \text{UnderwritingExpense}^{[122]}$$

$$\text{Homeowner}_{\$\text{Equity}} = (\text{PurchasePrice} - \text{MortgageBalance}_{\$}) * \text{Homeowner}_{\%\,\text{Claim}}$$

Alternatively, the homeowner contribution and HOMES contribution plus underwriting costs could have been calculated using the following method. Either approach yields the same result.

---

[121] For example:

$$\text{HOMES}_{\$\text{Capital}} = [(\text{PurchasePrice} - \text{MortgageBalance}_{\$}) * \text{HOMES}_{\%\,\text{Claim}}] + \text{UnderwritingExpense}$$

$$\$8,300 = [(\$100,000 - \$80,000) * 40\%] + \$300$$

Likewise:

$$\text{Homeowner}_{\$\text{Equity}} = (\text{PurchasePrice} - \text{MortgageBalance}_{\$}) * \text{Homeowner}_{\%\,\text{Claim}}$$

$$\$12,000 = (\$100,000 - \$80,000) * 60\%$$

Of this $8,300 deducted from the available capital of the HOMES vehicle, $8,000 was contributed to the purchase of the home and $300 was an underwriting expense. Homeowner transaction costs are ignored, because the homeowner would pay the same amount or more of closing costs and points if he/she had decided not to use the HOMES capital.

[122] The HOMES UnderwritingExpense is not used in the calculation of the HOMES $_{\%\,\text{Claim}}$, only as an internal expense to the HOMES underwriters.

$$\text{HOMES}_{\text{\$Capital}}{}^{[123]} = (\text{PurchasePrice} * \text{HOMES}_{\text{\%Contribution}}) + \text{UnderwritingExpense}$$

$$\text{Homeowner}_{\text{\$Equity}} = \text{PurchasePrice} * \text{Homeowner}_{\text{\%Contribution}}$$

Using this method, I hypothetically invested $10M in each of the three scenarios. Because the individual HOMES nominal capital requirements changed with each LTV level, the scenarios resulted in different transaction totals.

LTV	Actual Capital	Number of Homes
70%	$9,998,580	1,851
80%	$9,996,060	2,701
90%	$9,998,480	4,998

To calculate the proceeds and distribution from the sale of the home I needed to determine the amount of principal paid on the mortgage by the homeowner and the outstanding balance of the mortgage at the sale. I assumed a mortgage rate of 9.05% and a 30-year amortization term.[124] I assumed that the homeowner made monthly mortgage payments, repaid principal as defined by the amortization schedule, and sold the home on the last day of the sale year. I assumed that during the ownership period the homeowner made no major capital improvements and did not refinance the home.

---

[123] For example:

$$\text{HOMES}_{\text{\$Capital}} = (\text{PurchasePrice} * \text{HOMES}_{\text{\%Contribution}}) + \text{UnderwritingExpense}$$

$$\$8,300 = (\$100,000 * 8\%) + \$300$$

Likewise:

$$\text{Homeowner}_{\text{\$Equity}} = \text{PurchasePrice} * \text{Homeowner}_{\text{\%Contribution}}$$

$$\$12,000 = (\$100,000 * 12\%)$$

Homeowner transaction costs are ignored, because the homeowner would pay the same amount or more of closing costs and points if he/she had decided not to use the HOMES capital.

[124] 9.05% was the average interest rate on a 30 year fixed rate mortgage in 1975, according to the FreddieMac Primary Mortgage Market Survey (PMMS). http://www.freddiemac.com/pmms/pmms30.htm. In addition, this rate required the borrower pay 1.1 points at the closing. I assume that the homeowner will continue to pay these points under the HOMES structure, because the loan amount is not increasing and the homeowner would have paid the same nominal amount whether they used HOMES equity or not.

Using the homeowner's and HOMES' claim on the value of the home above the original loan balance of 60% and 40% respectively, the value of their claims were calculated as follows:

$$HOMES_{\$Claim} = HOMES_{\$Capital} + ((HomeSalePrice - HomePurchasePrice) * HOMES_{\%Claim})$$

$$Homeowner_{\$Claim}{}^{125} = HomeSalePrice - OutstandingMortgageBalance - HOMES_{\$Claim}$$

Besides the homes that were sold, I also needed to account for the homes in the transaction data set that did not sell until after the 20-year period. Using the current asset value of the unsold home in 1995 and the outstanding mortgage balance at the end of 1995, I used the method outlined above and calculated the value of the HOMES claim on the remaining houses in the HOMES portfolio at the end of 1995.

I then aggregated the expected cash flows from each year of the investment. According to the ownership duration data outlined above, approximately eight percent of the homes would be sold prior to the end of the first year.[126] I assumed that these homes did not appreciate in that short period of time and that these return cash flows were equal to the equity invested. I also assumed that the entire $10M could not be invested immediately, it would likely take a year to enter into all of these transactions. Therefore, I included the equity returned in the first year with the total capital invested.

I then applied a default and foreclosure rate to expected cash flows. In estimating realistic defaults, I used the Mortgage Bankers Association of America's National Delinquency Survey.

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[125] Because a brokerage commission from the sale of the home would reduce the amount of the homeowner's capital return, but would not reduce the return to HOMES, the homeowner's complete proceeds are calculated as follows:

$$Homeowner_{\$Proceeds} = HomeSalePrice - OutstandingMortgageBalance - HOMES_{\$Claim}$$
$$- (BrokerageCommission * HomeSalePrice)$$

[126] Ownership duration is independent of whether the buyer is a first time homeowner. The 1995 AHS data identifies which homes first time buyers owned. The ownership duration of homes that were owned by first time buyers was evenly distributed across holding periods.

Using the conventional loan data in the survey, I calculated the average annual percentage of mortgages that were ninety days past due and mortgages for which foreclosure proceeds had begun.[127] (See Exhibit 3.10) For 1975 through 1995 I reduced my cash flows by the actual default rate. In order to remain as conservative as possible, in both instances I assumed 100% loss with no recovery. For the HOMES' claims that remained unsold in 1995, I applied the average default rate for 1991 through 1995.

Historical Default and Foreclosure

year	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
default	1.67%	1.71%	1.55%	1.35%	1.23%	1.50%	1.78%	2.47%	2.93%	2.96%	3.10%

year	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	5yr Avg.
default	3.41%	3.13%	2.83%	2.73%	2.38%	2.92%	2.92%	2.73%	2.70%	2.61%	2.78%

Default and Foreclosure Rates
90 Days Past Due and Foreclosed
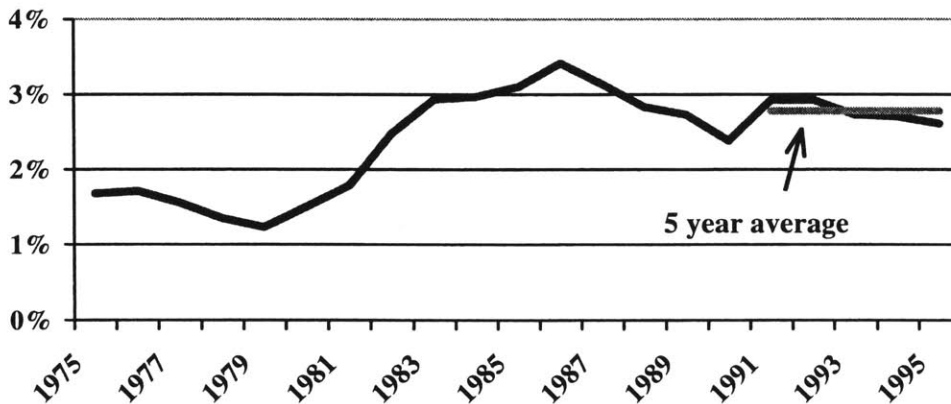
Source: National Delinquency Survey from Mortgage Bankers Association of America

Exhibit 3.10

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[127] The weighted average default rate I applied was 2.56%. The American Banker's Association reports that home equity loans (which are very similar in claim to HOMES) typically have a delinquency status of 1%. Therefore, my return estimates are overly conservative.

I then deducted estimated annual servicing expenses of $5 per outstanding HOMES transaction. These costs represent the overhead required to monitor and service the outstanding HOMES liens. These servicing costs should be less than the traditional 50bp servicing charge for primary mortgage servicing, because HOMES have significantly less servicing requirements. Unlike traditional mortgages, there is not a regular monthly payment process. The only burden is ownership monitoring and sale transaction processing.[128]

I now had expected cash flows for my three scenarios. (See Exhibits 3.11-3.13)

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[128] For each of the properties unsold in year 20, I calculated the expected future servicing expenses, and then discounted them to a year 20 present value at a rate of 8%.

Exhibit 3.11

70% LTV

Year	Investment	Residuals	Servicing	Defaults[129]	Cash Flow
0	$ (9,998,580)	$ 769,200	$ (9,255)	$ (12,846)	$ (9,251,481)
1		$ 950,265	$ (8,460)	$ (16,250)	$ 925,556
2		$ 1,170,595	$ (7,695)	$ (18,144)	$ 1,144,756
3		$ 1,131,742	$ (6,950)	$ (15,279)	$ 1,109,514
4		$ 1,324,765	$ (6,380)	$ (16,295)	$ 1,302,091
5		$ 1,846,434	$ (5,900)	$ (27,697)	$ 1,812,838
6		$ 1,603,588	$ (5,365)	$ (28,544)	$ 1,569,679
7		$ 1,481,751	$ (4,935)	$ (36,599)	$ 1,440,217
8		$ 1,656,993	$ (4,535)	$ (48,550)	$ 1,603,908
9		$ 1,527,800	$ (4,110)	$ (45,223)	$ 1,478,467
10		$ 1,696,015	$ (3,755)	$ (52,576)	$ 1,639,683
11		$ 989,734	$ (3,380)	$ (33,750)	$ 952,604
12		$ 1,289,272	$ (3,165)	$ (40,354)	$ 1,245,753
13		$ 1,612,812	$ (2,940)	$ (45,643)	$ 1,564,230
14		$ 1,695,944	$ (2,680)	$ (46,299)	$ 1,646,965
15		$ 1,718,799	$ (2,435)	$ (40,907)	$ 1,675,457
16		$ 978,174	$ (2,185)	$ (28,563)	$ 947,426
17		$ 1,231,817	$ (2,060)	$ (35,969)	$ 1,193,788
18		$ 1,968,711	$ (1,905)	$ (53,746)	$ 1,913,060
19		$ 1,009,759	$ (1,675)	$ (27,263)	$ 980,820
20		$ 1,307,574	$ (1,540)	$ (34,128)	$ 11,992,692 [130]

	Portfolio	PV Servicing	Defaults	
>20	$ 11,034,174	$ (7,080)	$ (306,309)	

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[129] I assumed 100% loss severity to ensure maximum conservatism.

[130] The Year 20 Cash Flow includes the sum of the homes sold that year and the value of the unsold homes at the end of that year, which are labeled as Year >20.

Exhibit 3.12

80% LTV

Year	Investment	Residuals	Servicing	Defaults[131]	Cash Flow
0	$ (9,996,060)	$ 758,480	$ (13,505)	$ (12,667)	$ (9,263,752)
1		$ 919,356	$ (12,345)	$ (15,721)	$ 891,290
2		$ 1,214,665	$ (11,305)	$ (18,827)	$ 1,184,533
3		$ 1,352,274	$ (10,295)	$ (18,256)	$ 1,323,724
4		$ 1,789,357	$ (9,490)	$ (22,009)	$ 1,757,858
5		$ 2,327,617	$ (8,715)	$ (34,914)	$ 2,283,988
6		$ 2,057,266	$ (7,950)	$ (36,619)	$ 2,012,696
7		$ 2,111,508	$ (7,335)	$ (52,154)	$ 2,052,018
8		$ 2,309,252	$ (6,720)	$ (67,661)	$ 2,234,871
9		$ 2,368,008	$ (6,070)	$ (70,093)	$ 2,291,845
10		$ 2,142,145	$ (5,490)	$ (66,407)	$ 2,070,249
11		$ 1,612,032	$ (4,965)	$ (54,970)	$ 1,552,097
12		$ 1,986,230	$ (4,610)	$ (62,169)	$ 1,919,451
13		$ 2,203,450	$ (4,235)	$ (62,358)	$ 2,136,858
14		$ 2,318,042	$ (3,870)	$ (63,283)	$ 2,250,890
15		$ 2,611,474	$ (3,510)	$ (62,153)	$ 2,545,811
16		$ 1,459,808	$ (3,125)	$ (42,626)	$ 1,414,057
17		$ 1,651,231	$ (2,920)	$ (48,216)	$ 1,600,096
18		$ 2,559,843	$ (2,690)	$ (69,884)	$ 2,487,269
19		$ 1,402,153	$ (2,390)	$ (37,858)	$ 1,361,905
20		$ 1,898,838	$ (2,210)	$ (49,560)	$ 16,571,560 [132]
		Portfolio	**PV Servicing**	**Defaults**	
>20		$ 15,155,283	$ (10,081)	$ (420,711)	

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[131] I assumed 100% loss severity to ensure maximum conservatism.

[132] The Year 20 Cash Flow includes the sum of the homes sold that year and the value of the unsold homes at the end of that year, which are labeled as Year >20.

Exhibit 3.13

90% LTV

Year	Investment	Residuals	Servicing	Defaults[133]	Cash Flow
0	$ (9,998,480)	$ 681,680	$ (24,990)	$ (11,384)	$ (9,353,174)
1		$ 1,053,363	$ (22,915)	$ (18,013)	$ 1,012,436
2		$ 1,435,201	$ (20,960)	$ (22,246)	$ 1,391,996
3		$ 2,078,413	$ (19,285)	$ (28,059)	$ 2,031,069
4		$ 2,811,507	$ (17,765)	$ (34,582)	$ 2,759,161
5		$ 4,012,668	$ (16,355)	$ (60,190)	$ 3,936,123
6		$ 3,835,948	$ (14,840)	$ (68,280)	$ 3,752,828
7		$ 3,470,763	$ (13,575)	$ (85,728)	$ 3,371,460
8		$ 3,783,325	$ (12,500)	$ (110,851)	$ 3,659,973
9		$ 3,712,811	$ (11,355)	$ (109,899)	$ 3,591,557
10		$ 4,155,332	$ (10,325)	$ (128,815)	$ 4,016,191
11		$ 3,134,590	$ (9,235)	$ (106,890)	$ 3,018,466
12		$ 3,497,136	$ (8,490)	$ (109,460)	$ 3,379,186
13		$ 3,554,704	$ (7,795)	$ (100,598)	$ 3,446,311
14		$ 4,008,387	$ (7,160)	$ (109,429)	$ 3,891,798
15		$ 4,910,459	$ (6,495)	$ (116,869)	$ 4,787,095
16		$ 2,777,481	$ (5,700)	$ (81,102)	$ 2,690,679
17		$ 2,869,319	$ (5,260)	$ (83,784)	$ 2,780,275
18		$ 4,321,219	$ (4,845)	$ (117,969)	$ 4,198,405
19		$ 2,889,137	$ (4,270)	$ (78,007)	$ 2,806,861
20		$ 3,069,078	$ (3,885)	$ (80,103)	$ 27,937,739 [134]
		Portfolio	**PV Servicing**	**Defaults**	
>20		$ 25,683,903	$ (18,269)	$ (712,985)	

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[133] I assumed 100% loss severity to ensure maximum conservatism.

[134] The Year 20 Cash Flow includes the sum of the homes sold that year and the value of the unsold homes at the end of that year, which are labeled as Year >20.

Investment Performance

	FNMA Index	HOMES			S&P 500
Leverage	n/a	70%	80%	90%	n/a
Required Return[1,6,8,11]	9.88%	8.64%	11.69%	20.85%	15.90%
IRR/Total Return[2,6,10]	4.88%	14.46%	18.23%	26.26%	15.90%
Capital Invested	n/a	$9.998M	$9.996M	$9.998M	n/a
NPV[7]	n/a	$5.410M	$5.560M	$3.240M	n/a
Standard Deviation[3]	3.60%	3.29%	4.96%	9.89%	13.30%
Sharpe Ratio[4]	(0.311)	2.568	2.466	2.048	0.744
M^2 (Excess Return)	-14.04%	24.25%	22.89%	17.34%	0.00%
Correlation[5]	(0.049)	0.086	0.084	0.072	1.000
Beta[9]	(0.013)	(0.423)	(0.735)	(1.670)	1.000

[1]Average Risk Premium of Housing over CPI ('75-'95, 5 year moving average) = 7.73%. See discussion below.

[2]Return of FNMA Index and HOMES exclude 7% non-cash yield for use of home by occupant. See discussion below.

[3]Yield used for Standard Deviation of HOMES

[4]Assumed Riskfree 6%

[5]FNMA Index Total Return vs. S&P 500 Total Return and Yield of HOMES vs. S&P 500 Total Return

[6]For period 1975 -1995. Average S&P 500 Return is 15.90%

[7]Based on investment of approximately $100M

[8]Leveraged HOMES required return calculated using modified WACC. See discussion below.

[9]Assumed debt beta 0.2

[10]Total Returns calculated as geometric average. Arithmetic average for FNMA Index is 5.88%.

[11]5 year moving average of CPI (1994-1998) = 2.15%

I analyzed the cash flows from the three leverage scenarios to calculate the investment performance of HOMES. The application of traditional financial measurements allows us to determine the relative attractiveness of HOMES. My results indicate that an investment in

HOMES is an attractive opportunity and represents a significant positive net present value. My results are summarized in the above table and discussed in detail below.

The first step of interpreting the cash flows requires that I make an assumption. Because I did not project the value in the year of sale for homes to be sold after 1995, I assumed that the remaining portfolio of housing equity claims in the HOMES vehicle could be liquidated at the end of 1995 for its then present value. In reality, the cash flows would continue for over twenty more years.[135] The Internal Rate of Return (IRR) calculations resulted in attractive returns for the 70%, 80%, and 90% LTV scenarios of 14.46%, 18.23%, and 26.26% respectively. These equity-like returns seem appropriate for my leveraged equity investment.

Next, I wanted to calculate the Net Present Value (NPV) of the approximately $10M HOMES investment. To do so, I needed to develop a required rate of return appropriate for the risk of the HOMES cash flows. I approached this task from two directions. I used the Miller and Modigliani theorem (MM) and the related weighted average cost of capital formula (WACC) and the Capital Asset Pricing Model (CAPM). These resulted in widely differing assessments of the risk in the HOMES cash flows.

The CAPM theorem produced very low discount rates and the most aggressive net present value. I began by calculating the beta of the annual, unleveraged FNMA Index returns relative to that of the annual S&P 500 returns for the 1975 to 1995 period. The correlation of the FNMA Index was only –0.049.[136] The beta of the unleveraged FNMA Index was –0.013.[137] Leveraging the

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[135] Playing devil's advocate, I removed the remaining portfolio value in 1995 from the IRR calculation to determine the magnitude of the effect of including the present value of those cash flows. The change to the IRR was significant, but not devastating. Nonetheless, I believe that the value should remain in the calculation, since the value is real, even if I am assuming away liquidity friction.

LTV	IRR with Residuals	IRR without Residuals
70%	14.46%	13.14%
80%	18.23%	17.22%
90%	26.26%	25.73%

[136] I used the Microsoft Excel Correlation Function where the formula is:

$$\text{Correlation}_{FNMA, S\&P500} = \frac{\text{Covariance}_{FNMA, S\&P500}}{\text{Standard Deviation}_{FNMA} * \text{Standard Deviation}_{S\&P500}}$$

FNMA Index beta at the 70%, 80%, and 90% LTVs exposed the error of using the CAPM method with a negative beta.

LTV	Beta	Required Return
0%	(0.013)	5.87%
70%	(0.423)	1.81%
80%	(0.735)	-1.28%
90%	(1.670)	-10.53%

In the above table I show that the CAPM predicts that the use of leverage reduces the risk of HOMES, since the unleveraged beta is negative to begin with.[138] Because risk must increase with the use of leverage, I concluded that the CAPM was not an appropriate method to calculate the required return of HOMES.

As an alternative, I applied MM and the WACC to the search for an appropriate discount rate. To begin, I needed to determine the unlevered return on the asset. Financial theory assumes that this return is the sum of a risk-free return and a risk premium adjustment. Therefore, I needed to find the average risk premium demanded by housing investors. I did this by calculating the average spread of the five year moving average of the FNMA Index plus a 7% non-cash yield

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Geltner calculated the correlation with the S&P 500 to be –0.0799 for the 1976 to 1993 period. Geltner, Miller, Snavely. We Need a Fourth Asset Class: HEITs. "Real Estate Finance Journal", Volume 12 (2), Pages 71-81.

[137] Where:
Covariance $_{FNMA, S\&P500}$ = Correlation $_{FNMA, S\&P500}$ * Standard Deviation $_{FNMA}$ * Standard Deviation $_{S\&P500}$
        -0.0002377   = -0.049 * 0.036 * 0.133

Beta = $\dfrac{\text{Covariance }_{FNMA, S\&P500}}{\text{Variance }_{S\&P500}}$

-0.013 = $\dfrac{-0.0002377}{0.01771}$

[138] Beta $_{Equity}$ = Beta $_{Asset}$ + D/E * (Beta $_{Asset}$ – Beta $_{Debt}$)
            Where, assumed Beta $_{Debt}$ = 0.2, Beta $_{Asset}$ = -0.013

Return $_{Equity}$ = Return $_{Riskfree}$ + Beta $_{Equity}$ * (Return $_{S\&P500}$ - Return $_{Riskfree}$)
            Where: Return $_{S\&P500}$ = 15.9%, Return $_{Riskfree}$ = 6%

over the five year moving average of the Consumer Price Index.[139,140] The average risk premium from 1975 through 1995 was 7.73%.[141] Using the current 5-year moving average from the CPI, from 1994 through 1998, of 2.15%, I concluded that the current unleveraged required return on housing is 9.88%.[142]

I could now parse the required return of the HOMES claim from the overall asset. Because of the complex capital structure of HOMES, I modified the WACC equation. This is the standard WACC equation:

$$Return_{Asset} = (Return_{Debt} * Weight_{Debt}) + (Return_{Equity} * Weight_{Equity})$$

I modified the WACC equation to the following:

$$R_{Asset} = (W_{Debt\ Lender} * R_{Debt\ Lender}) + (W_{Debt\ HOMES} * (W_{Claim\ HOMES} * R_{Equity})) +$$
$$(W_{Equity\ Homeowner} * (Y_{Homeowner} + (W_{Claim\ Homeowner} * R_{Equity})))$$

Where: $R_{Asset} = 9.88\%$ $W_{Debt\ Lender} = LTV$

$R_{Debt\ Lender} = 7.50\%$ $W_{Claim\ HOMES} = 40\%$ $W_{Debt\ HOMES} = (1-LTV) * W_{Claim\ HOMES}$

$Y_{Homeowner} = 7.00\%$ $W_{Claim\ Homeowner} = 60\%$ $W_{Equity\ Homeowner} = (1-LTV) * W_{Claim\ Homeowner}$

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[139] The 7%, non-cash yield is the benefit of housing and shelter enjoyed by the homeowner. David Geltner and Timothy Riddiough concur that this has historically been between 6% and 7%. It is usually equated with the income yield earned by rental housing investors and paid by tenants who live in a rented dwelling.

[140] Calculated using inflation estimates in the Seasonally Adjusted Consumer Price Index. Downloaded from the Federal Reserve Bank of St. Louis at http://www.stls.frb.org/fred/index.html.

[141] I consider this measure of the risk premium to be pretty reliable. The standard deviation was only 1.60% and a regression of the influence of the 5 year moving average of the CPI on the 5 year moving average of the total return to housing resulted in a R^2 of 58.9%.

[142] $Return_{Asset} = RiskPremium + CPI$

   $9.88\% = 7.73\% + 2.15\%$

For example, using a 70% LTV with a 60:40 homeowner:HOMES ratio (18%:12%):

$$9.88\% = (70\% * 7.50\%) + (12\% * (40\% * Re)) + (18\% * (7\% + (60\% * Re)))$$

$$9.88\% = 5.25\% + 4.8\%Re + 1.26\% + 10.8Re$$

$$3.37\% = 15.6\%Re$$

$$21.6\% = Re$$

The total, required equity return, at 70% LTV, on the home is 21.6%. This must be split between the homeowner's claim and the HOMES claim. Therefore:

$$RequiredReturn_{HOMES} = HOMES_{Claim} * Return_{Equity}$$
$$8.64\% = 40\% * 21.6\%$$

$$RequiredReturn_{Homeowner} = Homeowner_{Claim} * Return_{Equity}$$
$$12.96\% = 60\% * 21.6\%$$

The required returns, which result from the above-modified WACC, are found in the table below.

LTV	Discount Rate	NPV
70%	8.64%	$5.41M
80%	11.69%	$5.56M
90%	20.85%	$3.24M

Using these discount rates on the projected cash flows, I arrived at the NPVs found in the table above. Since each scenario assumed that approximately $10M of capital was invested, HOMES present an opportunity to create excess, risk-adjusted wealth of between 32% and 55% more than the invested capital.

To put the risk adjusted returns of HOMES in perspective I utilized two techniques of modern portfolio management that compare the relative performance of an investment, by adjusting the

returns for risk. First, I calculated the Sharpe Ratio of each of the leverage scenarios and compared them to the Sharpe Ratio of the S&P 500. The Sharpe Ratio is the ratio of return divided by standard deviation, as a measure of risk. This allows different portfolio to be compared on a return and risk basis. Because I cannot measure the secondary market volatility of HOMES, I used the standard deviation of the current yield of the HOMES for the 1975 – 1995 period.[143] For the total return of the HOMES, I used the IRR of the HOMES for the 1975 – 1995 period. Assuming a riskfree rate of 6%, the HOMES Sharpe Ratios dominate that of the S&P 500.

LTV	70%	80%	90%	S&P 500
Sharpe Ratio	2.568	2.466	2.048	0.744
M^2 (Excess Return)	24.25%	22.89%	17.34%	0.00%

Franco Modigliani and his granddaughter Leah Modigliani developed the M^2 method of risk adjusted, return analysis. The M^2 is a very simple technique that calculates an absolute measure of excess return by equalizing the risk of separate portfolios.[144] The risk is equalized by calculating the fraction that equates the risk—standard deviation—of the two portfolios, then multiplying the returns by that fraction. By this measure, the HOMES vehicle offers far superior return for risk equal to the overall stock market.

Section III: HOMES in the Secondary Market

Once a HOMES second participating mortgage has been originated, the lender can retain the claim in its portfolio, or sell it. I think HOMES pools will make an excellent investment product

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[143] The secondary market price of HOMES will be a function of the current yield returned to investors. The current yield will be a product of ownership duration and home value appreciation. Other important exogenous influences on the secondary market price will be the inflation rate, economic growth, and unexpected changes in ownership duration.

[144] Calculate the ratio required to make the standard deviation of the subject portfolio, in this instance the HOMES portfolio, equal to the standard deviation of the market portfolio. Then multiply the return of the subject portfolio by that factor. This is the risk-adjusted return. Then subtract the market return from the risk-adjusted return. This is the absolute, excess return by which the portfolio dominates the market portfolio.

and suggest that a vibrant secondary market is likely develop for HOMES pools. In this section I briefly explain the characteristics a HOMES secondary market is likely to have.

The format of the HOMES secondary market is likely to closely follow that of the secondary market for traditional mortgages. These mortgage-backed securities (MBS) have a long and colorful history, going back at least thirty years, to the days of Lewie Ranieri at Salomon Brothers.[145] The market for traditional MBS, at $1.5T in 1993, is massive.[146] The demand for alternative housing finance claims should quickly flow from this established market.

One of the primary attributes of the traditional MBS secondary market is the composition of the pools. Their structure affords investors reasonable predictability. The traditional MBS pool is decidedly heterogeneous. The heterogeneity of each pool is defined through the geographic location and nominal value of the primary mortgage. This distribution creates risk reduction through diversification. Interestingly, however, investors prefer that the LTVs of the primary mortgages in the pools be homogenous.

HOMES pools should borrow this model to attract secondary market investor interest. Each pool should contain mortgages of heterogeneous geographic location and initial nominal value and homogenous percentage appreciation claims. The market heterogeneity and percentage claim homogeneity of the HOMES pooled product will create the same type of predictability that MBS investors demand. In that spirit, in addition to the LTVs being homogenous, the ratio of the homeowner's equity to the HOMES capital should also be homogenous in each pool.

The potential investor universe for HOMES pools should resemble that of MBS pools. In addition, it should claim membership of housing finance market participants who want to hedge their portfolio risk and cannot do so with traditional MBS products. These include traditional mortgage lenders, MBS investors, PMI underwriters, and homeowners who cannot effectively hedge their housing market exposure with traditional MBS products.

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[145] Lewis. Liar's Poker. Penguin Books. 1990.

[146] Timothy Riddiough Lecture Notes. MIT Center for Real Estate. Spring 1999.

An interesting component of investors' reactions to a HOMES secondary market will derive from the HOMES pool valuation. HOMES pools probably have a better risk return profile than a traditional MBS pool. Refer to the extensive section on investors' reception to HOMES, in Chapter Four, where a discussion of the effect of interest rates on the value of a HOMES claim and a HOMES pool is explored in detail.

The support and involvement of the GSEs would significantly enhance the chances for a successful launch of a HOMES pool secondary market. The participation of GSEs, with their multi-billion dollar capital resources, buying, pooling, and maintaining a secondary market in HOMES pools would certainly help to establish deep market for HOMES pools. Such a deep market ensures investors that they are creating a position in a potentially attractive investment alternative to MBS. The question is, why would the GSEs want to get involved?"

Involvement in a HOMES pool secondary market would provide several benefits to the GSEs. Because Fannie Mae and Freddie Mac are publicly traded companies, they are trying to grow their business size every quarter. HOMES pools represent a new product line with significant market growth potential. (In the next chapter I take several perspectives on the potential size of the HOMES market.) In fact, "it has also been reported that Fannie Mae may be considering adding a home equity line of credit (HELOCs) product to its offerings."[147] This type of new product support at the GSEs is excellent for HOMES. And as far as the GSEs should be concerned, HOMES look very similar to HELOCs.

GSEs are also likely to support the launch of a HOMES secondary market, because they say that one of their missions is to increase homeownership. HOMES should significantly increase the homeownership rate, because it is one of the most effective ways to increase home affordability. (See the next chapter for extensive discussion on housing affordability.) So from a public relations perspective, the GSEs would be remiss in not promoting HOMES.

Mortgage originators and Wall Street financial product engineers should both be involved in the creation of a HOMES secondary market. This is because they are both motivated by the same

thing, deal flow. These two types make money off the spread on new origination when it is sold to the investors in the capital markets. Both mortgage originators and Wall Street bankers are likely to support the creation a HOMES secondary market, if such a market promised to provide a new source of revenue growth, via deal volume.

HOMES pools would be serviced in the same way that traditional MBS and derivative MBS products are serviced. In fact, the same servicers could probably add HOMES to their servicing operation with very little additional cost. I suggest that each pool come with a provision that the issuer retains a 10% tailpiece. The issuer can subordinate this piece, so that the HOMES investors are not stuck waiting for fifty years for appreciation payments, when the last of the homeowners decides to sell. Instead, the issuer can close the pool, by retaining the residual cash flows from the holdout, non-movers.

It is apparent that there are many good reasons for a secondary market in the HOMES second participating mortgage to develop. But at this stage, I refuse to coin the moniker HOMES backed securities (HBS), since HOMES were invented at MIT. Sounds like a problem for further research. In the next chapter, I delve deeply into the profile of potential HOMES mortgage originators, consumers, and investors.

Chapter Summary

In this chapter I explored the structure and return profile of the HOMES Investment Vehicle. After defining the HOMES concept and its role in residential finance, I profiled the risk and return characteristics of the HOMES vehicle. The last section explored the implications of pooling HOMES and the reason why trading them in the secondary capital markets is a likely event. In summary, HOMES offer a unique and rewarding residential finance alternative.

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[147] Lereah. <u>Housing Finance: A Long-Term Perspective</u>. "Business Economics". 32(3): 21-26. 7/1997.

Chapter Four: Economic Value of HOMES

Economic value is the key to successful financial innovation. HOMES will be widely accepted and utilized if it is financially advantageous for housing market participants to do so. Answering the question, "why will HOMES be utilized," I review the sources of economic value in the HOMES vehicle by synthesizing the information presented in the previous two chapters. Across five sections, I analyze the HOMES proposal from the perspective of government officials and GSEs, capital market investors, lenders, agents, and homeowners. For all housing finance participants, HOMES introduces significant benefits that provide real value to the user. Economic value is the primary requirement for the wide acceptance of HOMES.

Section I: Government and GSEs Reception

Public officials will appreciate HOMES because it helps achieve two important public goods. Use of the HOMES participating second mortgage should both increase the national rate of homeownership and liquefy some of the enormous value in home equity that is currently illiquid. An increase in homeownership as a public good is self-explanatory. The desirability of liquefying some of the housing equity requires some explaining.

In 1995, the approximate value of illiquid housing equity was $4.5T.[148] That makes home equity one of the largest sources of national wealth; it is certainly the largest source of illiquid wealth. There is too much wealth trapped in home equity. While having wealth is beneficial, not being able to access that wealth is not. The multiplier effect of liquidity in the monetary system is so important that monetary policy is second only to interest rate policy as a Federal Reserve economic governing tool. The HOMES vehicle is designed to securitize a portion of home equity. Once securitized and traded in the capital markets, it becomes part of the flow of funds

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[148] National Home Equity = Median Home Equity * Number of Households
    $4,502,065,092,000 = $46,669 * 96,468,000

Eller and Fraser. Asset Ownership of Households: 1993. "U.S. Department of Commerce and Bureau of the Census". P70-47, 9/1995.

that helps to grow the economy. Government officials should be attracted to the multiplier effect generated by the liquid capital that HOMES would create.

Home equity loans are the only existing product that could accomplish similar goals. However it is valid to argue that home equity loans are fundamentally different than the zero coupon structure of HOMES and do not liquefy home equity in the same way that HOMES promises to do. Regardless, home equity loans have a big hurdle to significantly tap into the $4.5T pool of home equity. In 1997, there existed only $420B in home equity loans.[149] Therefore only 9.3% of the total home equity market has been partially liquefied for the economy. Of that $420B, only approximately $49B has been securitized into the capital markets.[150] This only represents 1.1% of all home equity.[151] Government officials arguably would be happy to see more of this activity.

As quasi-government agencies, GSEs would also appreciate the prevalent use of HOMES. The two largest GSEs, Fannie Mae and Freddie Mac, hold increased homeownership as one of their central tenets. In addition, their business models prevent them from expanding beyond housing finance.[152] Since they are both public companies, an additional product line will help them to continue to grow and please their shareholders. "It has also been reported that Fannie Mae may be considering adding a home equity line of credit (HELOCs) product to its offerings."[153] This is excellent for HOMES, because as far as the GSEs are concerned, in some ways HOMES look very similar to HELOCs and the GSEs may partake in supporting the creation of a HOMES secondary market.

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[149] Canner, Durkin, Luckett. Recent Developments in Home Equity Lending. "Federal Reserve Bulletin" 4/1998.

[150] Lereah. Housing Finance: A Long-Term Perspective. "Business Economics" 32(3): 21-26. 7/1997.

[151] For comparison, in 1998, the capital markets purchased securitized home mortgage loans that were equivalent to 58% of the entire mortgage note production volume that year. Ibid.

[152] And industry competitors are making every effort to prevent them from expanding within their current industry offerings. Refer to the FM Watch lobbyist group mentioned in second chapter.

[153] Ibid.

Section II: Capital Markets Reception

There are many reasons why capital markets investors will be interested in investing in HOMES pools. In general, HOMES should look familiar to them because HOMES represent an investment product similar to the mortgage-backed securities (MBS) available in the enormous secondary mortgage market. But HOMES are distinct and an investment in HOMES pools has many unique attributes that should be attractive to investors. In this section I explain how HOMES offer long term exposure to residential real estate, interest rate protection, a unique hedging opportunity, long term, positive return history, future demographic synergies, unparalleled risk/return profile and unique portfolio risk reduction should all appeal to investors in ways that other investments cannot.

The secondary mortgage market is worth several trillion dollars. The pool of investors who capitalize that market is large and investors' appetites remains strong. In 1998, new MBS origination was $835B, which meant that 58% of all new mortgages in 1998 were funded by the capital markets investors, through the secondary mortgage markets.[154]

Economic Value to Investors

Successful financial engineering and innovation requires that a new financial product offer economic value to the investor. HOMES pools offer three sources of economic value. The opportunity to make an investment in a security which is based on a unique underlying market, the creation of a centralized marketplace for a traded good, and the reduction of transaction costs are all proven characteristics of successful financial engineering.

As I mentioned above, HOMES will securitize some of the $4.5T of currently illiquid housing equity. While securitized home equity loans are the closest existing product for investors, they only represent 1.1% of the potential market of housing equity. This means that HOMES is a unique opportunity for investors to capitalize on the rise in home prices from a combination of factors unavailable to them in other investment products. Demographic trends and physical

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[154] Colton, Hamecs. The Transformation of the U.S. Housing Finance System. "Housing Economics" 47(1): 7-10. 1/1999.

attributes, uniquely combined in real estate, make an opportunity to invest in HOMES a one-of-a-kind for capital markets investors. Factors such as population growth, inevitable inflation, the irreplaceably of good locations with short employment commutes, and the general appreciation in land values (which they are not making anymore of) are all present in a HOMES pool. (See the detailed discussion of population growth trends below.)

The creation of a HOMES pool secondary market represents a centralized market place to trade housing equity. Housing is geographically disparate, and it is well documented that the real estate markets are less efficient than the capital markets. HOMES pools utilize the individual homeowners to overcome the geographic dispersion and search cost inefficiencies that HOMES investors would otherwise face. The structure of HOMES places the homeowner in the role of the local operating partner, helping HOMES investors to place their money in carefully selected residential real estate. Ultimately a HOMES pool secondary market would be the creation of a centralized market for housing equity, which would reduce investment transaction costs for investors.

HOMES reduces transaction costs in more ways than one. Assuming that an investor could individually make a pool of investments similar to those that HOMES proposes making; the individual servicing of the liens would be too cumbersome and expensive to make the venture worthwhile. HOMES pools reduce servicing costs and are very efficient by leveraging off of the existing mortgage servicing industry. Therefore, HOMES offer three sources of economic value to investors.

Past Returns and Portfolio Effects

The return on residential housing has been excellent on both a nominal basis and a risk-adjusted basis for over one hundred years. Nationally aggregated, homes values have increased in 101 out of the last 103 years.[155] No investment opportunity has that consistent of a positive return record. The creation of HOMES and the subsequent securitization of the appreciation claims

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[155] Based on an Oppenheimer study (with data from the Department of Commerce), which said that through 1980, 83 out of 85 years were net increases in home prices. I added returns from 1981 through 1998, with data from the Conventional Repeat Sales Index. Shared Appreciation Mortgage. "Oppenheimer Asset Advisors" 3/1981. Freddie Mac and Fannie Mae Conventional Repeat Sales Index.

promises to be the only efficient way for investors to gain exposure to such attractive housing returns.

Chapter three showed that the HOMES product would have generated significant positive NPV returns on a historical basis. While returns of 14% to 26% are enough to attract the attention of most investors, when adjusted for risk (using the modified WACC equation) the HOMES returns really became outstanding. Not only would have investing in HOMES been a positive NPV transaction, but the wealth creation would have been a significant excess of 32% to 55% over the invested capital.

When judging the HOMES vehicle returns with the Sharpe ratio as a yardstick, HOMES stood out with ratios of 2.0 to 2.5, while the S&P 500 only had a Sharp ratio of 0.7. In addition, the M^2 excess return calculation was astounding. The risk adjusted, returns—equalized to the risk of the S&P 500 returns—were nominally 32% to 39%, or 17% to 24% above the market.

While the excellent nominal, cumulative, inflation-adjusted, and risk-adjusted returns of HOMES should be enough to attract investors, there is a final historical return characteristic which promises to truly set HOMES apart in the universe of securities products. Residential real estate has a very low—to negative—correlation to the returns of the stock and bond markets. (See Table) When combined in a portfolio with stocks, bonds, and commercial real estate, residential real estate helps create an efficient (minimum-variance) portfolio with a return of 10% and very low risk of only 4.28%.[156] This type of non-correlated investment opportunity should attract institutional investors in droves.

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[156] Geltner, Miller, Snavely. We Need a Fourth Asset Class: HEITs. "Real Estate Finance Journal", Volume 12 (2), Pages 71-81.

Owner-Occupied Housing Return Correlation with Other Investments[157]

S&P 500	-0.0799
T-Bills	-0.1147
Long-Term US Treasury Bonds	-0.3332

Future Returns and Demographic Trends

While past returns have been especially rewarding, future returns from home ownership should remain attractive. HOMES offer long-term exposure to residential real estate, interest rate protection, and demographic synergies into the future in ways that other investments cannot. HOMES is an opportunity for investors to capitalize on the rise in home prices from a combination of these factors. This should make HOMES appeal to investors long into the future.

Some investors, typically fixed income investors, want to see a constant stream of cash returning to them. With HOMES, investors should enjoy that return pattern for two reasons. Based on the historical back testing in Chapter Three, the cash flow returns from HOMES were immediate and constant. Looking forward, this should remain so because of the profile of the homeowners who have the greatest likelihood of using HOMES. One of the most likely HOMES users is a young, first-time homebuyer. As was explored in the housing mobility, ownership duration, and housing affordability sections in Chapter Two, younger people—who need additional capital to purchase a home, because they have much less money than older households—also move much more frequently than older households. Therefore, younger households can use HOMES to break into homeownership. And on average, 43.3% of 34 year-old and younger headed households, who own their own home, will move in a year or two.[158] There is a detailed discussion of HOMES-user, homeowner profiles later in this chapter.

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[157] Ibid. Based on annual returns, 1976 – 1993.

[158] American Housing Survey 1995.

Overall, demographic trends and population growth are strongest reasons investors should be attracted to HOMES. "Growth in the number of households is the single largest source of residential construction demand, accounting for over 70 percent of home building activity during the 1990s."[159] Over the past decade, new households have formed at the rate of 1.1M – 1.2M per year.[160] Likewise, there have been approximately 16M new housing starts, averaging about 1.6M per year.[161] The 1998 State of the Nation's Housing Report by the Joint Center for Housing Studies of Harvard University projects homeownership rates to continue the upward trend started in 1982 and climb from the 1997 rate of 67.0% to 69.2% in 2010. That is an increase of 16,917,000 new homeowners in 15 years.[162] If this occurs, a scrappage rate any higher than 0.4% per year (based on 106.4M housing units in 1995 AHS) will result in less new supply than new demand and continued home value inflation.[163] The long-term housing scrappage rate has been about 0.5% annually.[164] So unless the residential construction industry operates at maximum capacity for the next fifteen years, the demand for new housing should remain strong relative to the new supply available.

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[159] The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1999.

[160] Ibid.

[161] Ibid.

[162] This is a total increase in households of 6,887,000 from the 1995 AHS to the Harvard projections for 2010. Of homeowners, the increase is from 63,544,000 owners in 1995 (AHS) to 80,461,000 owners in 2010.

[163] Equilibrium is defined as:

NewHousingStarts – NewHouseholds = TotalHousingUnits * Scrappage Rate
1.6M – 1.15M = 106.4M * Scrappage Rate
0.4% = Scrappage Rate

[164] DiPasquale, Wheaton. Urban Economics and Real Estate Markets. 1996. Page 238.

Long-Term Household Formation and Housing Unit Demand

	1995	2050	
Population[165]	263.9M	392.0M	(projected)
Persons/Household	2.7	2.7	(assume constant[166])
Number of Households[167]	97.7M	145.2M	
Household Growth Rate	1.5%	0.7%	
Equilibrium Annual Net Housing Stock Increase[168]	1.6% - 0.5% =1.1%	$n - 0.5\% = 0.7\%$ $n \approx 1.2\%$	(new construction less scrappage)

For very long-term housing supply to outpace demand, new housing starts would need to maintain their current record pace for the next fifty years. (See Table.) Based on current population projections, the residential building industry would have to maintain starts equaling over 1.2% of all existing housing, to overshoot demand. The current record setting pace is 1.6%, which is at an all time high for the number of new housing units.

Many pundits claim that the death of the baby boomer generation will greatly reduce demand for housing. This is not true. The baby boomer generation's role as the population driver of housing demand will be replaced by effects coming from new population growth. As long as there is

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[165] Census Bureau

[166] It is overly conservative to assume that the number of persons per household will remain constant. Since 1890, each ten-year period has witnessed an average of 22% growth in the number of households. During these same ten-year periods each one percent increase in population has been met with a 1.6% increase in the number of occupied housing units. Though the likelihood of persons per household to drop significantly below two is low, if it did drop to 2.0 persons per household in 2050, the annual growth rate in number of households would almost double from 0.7% to 1.3%. This means that the construction industry would have to launch new housing starts at the rate of 1.8% annually for the next fifty years. That is 12.5% higher than the current record expansion, and ten times longer in duration.

10 years ending	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
Growth in Population	21%	21%	15%	16%	7%	15%	19%	13%	11%	10%
Growth in Num. Households	26%	27%	20%	23%	17%	23%	23%	20%	27%	14%
Persons Per Household	4.3	4.1	3.9	3.7	3.4	3.2	3.1	2.9	2.6	2.4

[167] American Housing Survey 1995

[168] New housing starts in 1995 were 1.665M and the number of housing units was 106.4M, for a projected gross increase in housing of 1.6%. The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1999. Bill Wheaton estimates residential housing scrappage at 0.5% annually. Therefore, if housing starts exceed 1.2% for the next fifty years, there will be too much supply.

immigration the overall population size will increase. Only the lowest population projections show a decrease in population when the baby boomers die. The median population projections—which show net population growth—estimate that by 2029, baby boomers will only be 16% of the overall population.

One-third of the current growth in population is caused by net immigration. By 2050, 86% of the population growth will be caused by post-1992 net immigration and their offspring.[169] One should not underestimate the achievements in homeownership of immigrants. "The view of a housing crisis in the making because of the larger baby-boom generation being replaced by a smaller baby-bust generation must be reassessed in light of such trends [immigration]."[170] In 1996, homeownership rates for foreign-born citizens were 66.9% while that of native-born citizens was only 0.5% higher at 67.4%.[171] Immigrants will find a financial way to fill the homes the baby boomers will vacate. As evidence of this, "demographic influences alone explain over 80 percent of the increase in Hispanic homeownership between 1995 and 1997."[172]

"Immigrants also make up a sizable portion of the population from which new first-time buyers are likely to be drawn—younger renter households." They make up 12% of the 25-44 year-old age group. "Fannie Mae, as part of its Showing America a New Way Home initiative, has placed particular emphasis on helping immigrants achieve homeownership." [173] The HOMES vehicle would be uniquely positioned to also help them achieve their goal of homeownership.

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[169] Population Profile of the United States. "Bureau of the Census" P23-189. 7/1995.

[170] McArdle, Masnick. The Changing Face if America's Homebuyers. "Mortgage Banking" 56(3): 58-65. 12/1995.

[171] Callis. Moving to America—Moving to Homeownership. "Bureau of the Census". H121/97-2. 9/1997.

[172] Ibid.

[173] McArdle, Masnick. The Changing Face if America's Homebuyers. "Mortgage Banking" 56(3): 58-65. 12/1995.

Type of Household[174]	Baby Boomers	Echo Boomers
Single-Person (Total)	13.7%	23.1%
Single Person Owner	8.5%	11.4%

Immigrants are not the only young population likely to become influential homeowners. Echo Boomers, the children of the baby boomers (people aged 18-22 in the 1998 Current Population Survey), are living alone in greater numbers than any previous generation. (See Table.) This dramatic increase in the number of single-person households will continue the century long trend to drive the average persons per household lower. This will, in turn, increase the demand for housing units.[175]

But twenty-somethings are not the only generation contributing to the increase in single-person households. In 1980, only 66% of households in the 25-44 year-old cohort were married, if the trend continues, by 2010 less than half of this age group will live in married households.[176] Less married people means less persons per household. "The number of people living alone will also be in the rise. The average age at first marriage continues to drift upward, and the share of single-person households among all cohorts born after 1940 is climbing. The number of single-person households age 65 and over will grow by 1.7M [in the next decade]."[177]

Meanwhile, the Baby-Bust generation (born 1965 – 1977) is, "on a higher homeownership trajectory than past generations."[178] In addition, the parents of Baby Boomers are not leaving their homes. "Of those households with members aged 70 and over living outside institutions, only 3 percent reside in assisted or congregate facilities that provide health, domestic, or

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[174] The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1999.

[175] Ibid.

[176] The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1994.

[177] The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1998.

[178] Ibid.

personal-care services."[179] This means less vacant housing for new households, thus housing demand should remain strong into the next two decades.

Relative to Other Investment Opportunities

The relationship of securitized mortgage products with interest rate changes is complex. I review this dynamic and that of a securitized HOMES pool below. Then I explain why HOMES is superior and why HOMES should be very attractive relative to other fixed income products.

The return on fixed income products is primarily governed by market interest rates. The best method of understanding this inverse relationship comes from the traditional price-to-yield function of bonds. As interest rates rise, plain-vanilla bond prices fall and bonds with call options (such as traditional MBS) also fall. On the other hand, as interest rates fall, plain-vanilla bond prices rise and bonds with call options begin to rise, but then their price appreciation becomes restricted and levels off at a maximum price ceiling.

This is because the issuer of a callable bond can exercise their option and call the bond back from the investor. So as interest rates fall, the value of the bond only increases a limited amount. When the prepayment option on the primary mortgage is in the money, the homeowner is most likely to return the mortgage principal to the MBS investor. (This happens when the homeowner terminates the primary mortgage by buying a new home or refinancing the primary mortgage on the existing home.) This is usually at the worst time for the MBS investor to have their money returned to them, because market interest rates are lower.

However, the price of a HOMES pool should only not level off like a traditional MBS, it should actually rise higher and faster than the price of even a traditional bond. This is because there is an unrealized appreciation payment accruing within the home's value, and therefore within the value of the HOMES pool.[180] For a HOMES investor, a drop in interest rates presents an

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[179] The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1999.

[180] What is the value of this appreciation, how is it measured, and what effect does it have on the value of the HOMES claim? Is the rise and fall of home prices positively correlated or inversely correlated with the change in

opportunity to receive the appreciation payment from the home sale sooner than if interest rates had not dropped.[181] Therefore HOMES pools have built-in call protection, which should be very popular with secondary market investors.

As a Unique Hedge Product

Currently, there are neither perfect hedges nor efficient and effective synthetic hedges for many participants in the real estate lending and insuring business.[182] Shiller has been suggesting a

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interest rates? The answer is not clear. This is primarily because of the competing and opposite effects caused by the same economic market factors. When interest rates rise, to the extent that rise is attributable to inflation, one would expect home values to rise as well. Thus the value of HOMES should rise as well. However, as interest rates rise, so do discount rates, so the future value of the cash flows from the HOMES pool is worth less in present value.

On the other hand, as interest rates fall, to the extent that it is attributable to inflation falling, one would expect home prices to fall. However, as interest rates fall, the capitalization of the home value should increase. In addition, as interest rates fall, there may be supply constraints that restrict building. Demand will inflate the value of existing housing stock. Lower interest rates should make the present value of the HOMES pool cash flows worth more.

These competing forces pose an interesting problem, but do not answer, "how interest rates will ultimately affect the value of the HOMES claim."

According to Bill Wheaton, while home prices are a function of many things, interest rates are very significant. Interest rates are used to capitalize the economic rent into the value of the home. In understanding the effect of the change in interest rates on home prices, the essential question is, "what is the coefficient on the interest rate factor in a regression of home value predictors?" Meaning, is the effect of a higher (lower) interest rate on the price of a home greater than the change in the present value from the differential in compounded discounting?

The answer is that the coefficient is a function of the input supplies and barriers to entry to building housing in a particular market. The steeper the supply curve in a market, the lesser the interest rate affects the price of the home in that market. In that case, other factors take on a more important role. The flatter the supply curve, the greater the interest rate effect. (Home values in Atlanta, with low barriers to entry, are determined more by interest rates than are home prices in Boston, with high barriers to new residential construction.)

Ultimately, this question is a matter for further research. DiPasquale, Wheaton. Urban Economics and Real Estate Markets. 1996.

[181] It is important to note that the HOMES pool investor would only receive the appreciation payment if the homeowner took the opportunity of lower interest rates to not only payoff their existing mortgage, but sell their existing home and go out and buy a new home. There is evidence that this is often the case. The Harvard University Joint Center for Housing Studies attributes the low cost of homeownership (which is a function of interest rates) with the record amount of homeownership. The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1999.

[182] The most widely used method is hedging with U.S. Treasury bonds futures. While financial real estate products have some correlation to U.S. Treasury rates, they are not highly correlated and therefore are not the best hedge.

traded futures housing contract for many years.[183] The field of potential investors in an effective real estate finance hedge is large, especially on the short side.

Traditional mortgage lenders, MBS investors, PMI underwriters, and homeowners (in their role as investors) could short secondary market traded HOMES pools to hedge against losses from defaults on first mortgages, PMI insurance policies, home equity loans, and Second mortgages (from piggyback mortgages and otherwise), and/or general home value which accompany economic downturns. This is an excellent hedge, because the HOMES position will lose value prior to a traditional first position. It is the type of "pure play" hedging opportunity not currently available to these participants in the housing finance industry.

The list of reasons to invest in traded HOMES pools is long. Long term exposure to residential real estate, interest rate protection, a unique hedging opportunity, long term, positive return history, future demographic synergies, unparalleled risk/return profile and unique portfolio risk reduction should all appeal to investors in ways that other investments cannot. While homeowners, lenders, government officials and real estate market participants should be attracted to HOMES, I have shown that investors should be especially cheerful of the opportunity to invest in HOMES.

Section III: Lenders Reception

The use of HOMES in residential finance should be a boon to primary mortgage lenders. In this section, I show how HOMES promises to reduce default risk, increase originations, and offer a hedge to the risk embedded in lenders' mortgage portfolios. The introduction of any of these three characteristics would help improve the profitability of a lending operation, so a product, which combines all of these advantages, should be embraced.

Given that lenders have long positions and are substantially worried about mortgage default, HOMES helps reduce mortgage default and thus is uniquely advantageous to lenders.

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[183] Case, Shiller, Weiss. Index-Based Futures and Options Markets in Real Estate: A Big Future for Real Estate in Institutional Portfolios. "Journal of Portfolio Management, Winter 1993, Page 83.

Inherently, HOMES provides one default protection, which is better than any normal mortgage financing, regardless of LTV, and HOMES has an additional three types of default protection for lenders on high LTV transactions.

"Mortgage lending involves a variety of risks. At its core, however, are two fundamental questions: How likely is the applicant to default on his or her loan, and how large will the lender's loss be in the event of default? It is well understood that a borrower's loan-to-value (LTV) ratio is intimately related to both of these risks."[184] The use of HOMES can reduce the primary mortgage LTV.

Some homeowners who use HOMES capital will do so to lower the LTV on their primary mortgage. HOMES is especially attractive to homeowners who want to avoid paying PMI by lowering the LTV on their primary mortgage below 80%. Homeowners who use HOMES to lower their LTV will be less likely to default than if they had alternatively financed their home purchase with PMI, or if they had neither used HOMES nor PMI. This is because the homeowners who use HOMES can more readily afford their total monthly debt service payments, which are lower than the monthly debt service obligations of PMI users' and homeowners with no credit enhancement. So the homeowners who use HOMES capital have a lower default risk profile for the lenders who originate their primary mortgage, regardless of their primary mortgage LTV.

While accomplishing a goal similar to PMI, HOMES offers three additional advantages to lenders. As we have seen, mortgages originated with high LTVs are much more likely to experience default than those that were originated at lower LTV ratios. All mortgages that require PMI are high LTV mortgages. The new congressional, auto-cancellation rule for PMI, requires that the policy is canceled when the paid in equity reaches 22%. When this occurs, lenders immediately lose their default protection. But the risk to the lender is not gone. In comparison the HOMES position remains as long as the homeowner owns the property. Therefore, a HOMES mortgage—which was originated at the same time as a high-LTV, PMI

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[184] Longhofer. PMI Reform: Good Intentions Gone Awry. "Economic Commentary (Federal Reserve Bank of Cleveland)" 1-4. 3/15/1997.

protected mortgage—will have a lower LTV than the high-LTV loan, thus greater default protection than the mortgage which just had its PMI protection removed.[185]

In some cases, the new congressional, auto-cancellation rule protects homeowners to the detriment of lenders. Under the new rule, provided the LTV is less than or equal to 78%, even if the borrower had previously been in default, as soon as they make their payments current, the PMI policy must be cancelled.[186] Also, cancellation at 78% LTV occurs according to the original amortization table of the mortgage.[187] Therefore, the lender loses control of such important externalities as market risk. A serious drop in property values would leave the lender exposed to increased chance of default. Under the HOMES model in the case of loss, the primary mortgagor always enjoys the additional protection of the HOMES investor losing first.

For these three reasons, a homeowner who purchased their home using a primary mortgage and a HOMES participating second mortgage may represent less risk to the primary lender, than a homeowner who used a high LTV primary mortgage and PMI. From the lenders point of view, HOMES is attractive default protection.

As was discussed in Chapter Two, lenders have already introduced an alternative to PMI-enhanced, high LTV primary mortgages. Piggyback mortgages are designed to make high LTV financing affordable, without requiring that the homeowner pay PMI. As far as the lender is concerned, a primary mortgage with a HOMES participating second should be a preferable lending product to piggyback mortgages for three reasons.

HOMES will allow the first mortgage lender to underwrite only the credit risk—or idiosyncratic risk—of the homeowner and layoff all of the collateral risk—or systemic risk, or catastrophic risk on the HOMES vehicle. The later risk is typically market related and is concentrated in the

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[185] This assumes the mortgages were for the same value, issued on the same date, and experienced principal similar paydowns.

[186] Anonymous. Congress Approves PMI Cancellation Measure. "ABA Bank Compliance". 19(8 Regulatory & Legislative Advisory)):7. 8/1998. Longhofer. PMI Reform: Good Intentions Gone Awry. "Economic Commentary (Federal Reserve Bank of Cleveland)" 1-4. 3/15/1997.

[187] Anonymous. Congress Approves PMI Cancellation Measure. "ABA Bank Compliance". 19 (8 Regulatory & Legislative Advisory):7. 8/1998.

highest levels of the homeowner's mortgage leverage. With piggyback mortgages—or 80-10-10s—this concentrated systemic risk is in the 10% second mortgage, which the primary lender also issues. The use of HOMES extricates the lender from the need to underwrite the systemic risk.

With piggyback mortgages, even after issuance, lenders tend not to sell the second loan of the traditional piggyback mortgages, while they most often sell the primary mortgage component. This is probably because the market places too high a discount rate on the adverse selection risk. Thus lenders are often stuck with the riskiest piece of the piggyback loan. And bank regulators require that banks must retain higher asset coverage for those riskier second mortgages than is required for primary mortgages or other leveraged assets. HOMES allows lenders to free up cash by eliminating the need to retain a risky second mortgage with higher asset coverage ratio requirements.

In total lenders should find HOMES very appealing. In addition to providing better default protection than normal mortgages, PMI mortgages, and piggyback mortgages, HOMES also is an operational and financial improvement over piggyback mortgages. Furthermore, as was mentioned in the previous section, as capital market participants, lenders can use HOMES to hedge against real estate market devaluation and potential default in their own mortgage portfolios. And finally, HOMES represents an alternative to PMI, which homeowners tacitly avoid (see discussion below). Because of this, lenders' use of HOMES, in conjunction with traditional primary mortgages could increase their overall origination.

Section IV: Agents Reception

Historically there have been two types of participants in the housing industry who have been integral information providers: real estate brokers and mortgage brokers. Practitioners of both of these roles make themselves valuable by ensuring that they are a source of information needed

by homeowners.[188] "How does HOMES fit with their role and does its use advance or retard their goals?"

Most often a real estate broker is employed by the owner of a property to help dispose of it. These brokers are often compensated with a commission, calculated as a percentage of the sale price of the home. The higher the sale price, the larger the commission earned by the broker. If HOMES is widely accepted, it promises to generally inflate home prices, by making housing more affordable; in the same way that the rise of the secondary mortgage market made housing more affordable and helped inflate home prices.[189] Therefore, it is likely that real estate brokers would promote HOMES to potential buyers, in the hopes that the ultimate sale price of the home will be higher.

Mortgage brokers' are charged with finding sources of money for potential homeowners to use in the purchase of a property. In exchange for facilitating the lending transaction between the borrower and the lender, the mortgage broker usually receives a commission from the lender. Mortgage brokers will view HOMES as capital that can be offered as another funding source for their client, the borrower. The use of HOMES will make it easier for the primary mortgage to be approved and will ultimately enable the buyer to purchase the property. Any additional resources available to mortgage brokers will probably be readily accepted. Therefore, mortgage brokers should promote HOMES to borrowers.

HOMES would primarily access potential homeowners through mortgage brokers and residential brokers. Both types of professionals are likely to promote this capital source because it allows a homeowner to more readily purchase a home and increases the likelihood that the homeowner will buy a home with a higher nominal price. To ensure the ready support of these agents for homeowners' use of HOMES capital, it is probable that HOMES would have to offer a commission at each loan closing. But such a commission would be worthwhile. In 1997,

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[188] It is interesting to note that proponents of the Internet claim that technology promises to replace both types of brokers as a more efficient method of gathering, processing, and distributing information.

[189] See generally regarding housing affordability and home price appreciation: The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1999.

mortgage brokers accounted for 57% of all new mortgage originations.[190] Such a large, central source of residential financing demand must be co-opted for HOMES to succeed.

Section V: Homeowners Reception

Homeowner acceptance is a primary ingredient to the success of the HOMES investment vehicle. In this section, I closely explore the reasons why homeowners should consider HOMES an attractive financing alternative. Synthesizing information presented in the previous two chapters, I review the high cost of housing and the resulting lack of homeownership affordability, homeowners' conflicting desires for less mortgage debt and less home equity, how homeowners' dislike of PMI dictates their financing activities, and homeowner home improvement activity.

Throughout, I suggest ways in which the use of HOMES can resolve homeowner residential finance restrictions, including HOMES derived housing affordability solutions, HOMES as a low cost alternative to PMI, tax consequences from HOMES use, and other HOMES advantages. I especially focus on resolving most of the housing finance issues raised in Chapter Two, including the dramatic gap between households who can afford to buy a home and households who cannot, by showing how HOMES is the lowest cost and most effective housing affordability solution. And because HOMES is not just a tool for low-income households, I also show that there are after-tax advantages from HOMES use for households that possess more significant financial resources.

Cost of Housing

In the last decade, home values have risen while the cost of monthly housing debt service has fallen. (See Exhibit 4.1) While existing homeowners have benefited, households that do not yet own a home are actually disadvantaged. "House price inflation has already made it more difficult for marginal borrowers in some areas to save enough to buy a home."[191]

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[190] Colton, Hamecs. The Transformation of the U.S. Housing Finance System. "Housing Economics" 47(1): 7-10. 1/1999.

[191] The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1999.

Mortgage Payments vs. Home Prices
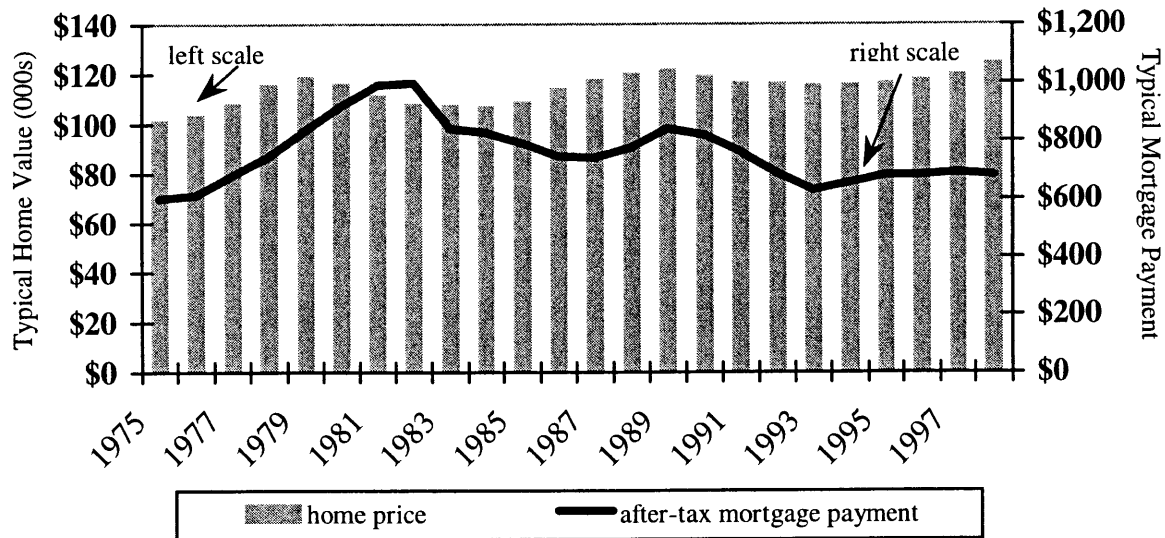
Source: Joint Center for Housing Studies of Harvard University 1999

Exhibit 4.1[192]

Most homeowners who purchased their home a few years ago have enjoyed appreciation in the value of their home. As was shown in Chapter Two, these homeowners have a tendency to reinvest some of this money into their next residence. The more they net on the sale of their current home, the more they can pay for their new home—on a leveraged basis. Therefore, the recent spate of housing appreciation is increasingly disadvantageous for current renters who cannot break into the owner-occupied housing market.

As I explained earlier in this chapter, the long-term projection for housing demand remains strong through 2050. As home prices continue to rise, potential homeowners can turn to HOMES to overcome their restrictions from buying a home. We are currently in a "virtuous circle" of housing appreciation. When home values climb, the net worth of current homeowners

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[192] Ibid. The monthly debt service payments are calculated with mortgage rates from the Federal Housing Finance Board Monthly Interest Rate Survey, assuming 90% LTV and a 30 term. All values are expressed in 1998 current dollars. The tax shield is a percentage above the standard deduction, which is 5% through 1986, 4.25% in 1987 and 3.5% from 1988 forward.

will increase accordingly.[193] These homeowners will use their increased net worth to further the increase in home values.[194] Under-representation of certain age and race populations, among the ranks of homeowners, and the over-representation of certain age and race populations, among the ranks of renters, promises to increase as the self-reinforcing attributes of the virtuous circle perpetuate themselves. Potential homeowners can use HOMES capital to achieve homeownership and participate in this cycle.

Housing Affordability

Homeowners' acceptance of HOMES will be determined by potential homeowners' willingness to exchange a claim on their homes' appreciation for additional purchase capital. I think millions of households will be willing to do so. This is because, I believe that most homeowners purchase the most expensive home they can afford under the monthly debt service required by their mortgage.[195] Since many potential homeowners have very limited financial resources, they will likely use HOMES to buy any home at all. For those homeowners who can already afford basic shelter, this vehicle will enable homeowners to realize the benefits of a larger and/or nicer

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[193] Consider that on average 44.4% of the net worth of households comes from the equity in their home. Eller and Fraser. Asset Ownership of Households: 1993. "U.S. Department of Commerce and Bureau of the Census". P70-47, 9/1995.

[194] The second most common source of downpayment capital is the equity from the owner's previous home. The more a homeowner's current home has appreciated, the more they can afford to pay for their next home. (1995 American Housing Survey.) In addition, this experience is taken to the extreme in the case of primary downpayment sources, personal net worth (not in housing). In 1998 and 1999 in Silicon Valley, home sales and home prices have reached frenzied levels. Never before have such high per square foot and aggressive seller's terms been suburban market standards. (Twelve hundred square foot homes often trade at $400,000.) Sale prices are always a significant premium over asking price and homeowners typically extract several months of rent free occupancy, after the closing, from the new owners. The drivers of this market frenzy are net worth gains in public, high technology companies. (Fortune Magazine. 5/1999.)

[195] According to William Wheaton (MIT Center for Real Estate lecture April 27, 1999), individual housing expenditures do not increase on an income-adjusted basis because of exogenous stimuli, such as children. Housing expenditures are almost entirely a function of household income. But the demand for increased housing exists beyond the limitations of household income. Homeowners should view HOMES capital as an additional equity-like resource toward their housing use demand.

Also, I pointed out, in chapter two, that the distribution of home values looks very similar to the distribution of annual income. This substantiates the idea that that most homeowners buy the most expensive home they can afford, from a debt service perspective. If this were not true, the distribution of home values would be irregular, or flat, but not so similar to the distribution of household incomes.

home for their family and maintain their debt service payments at the appropriate level for their income.

A lack of financial resources is the single greatest restriction to renters' successful conversion to homeownership.[196] As the price of housing rises, the hurdles preventing renters from becoming homeowners also rise. The introduction of HOMES is a potential boon to renters, because it offers them an additional, housing finance capital source when they need it most.[197] In this section, I explore many of the financial restrictions to housing affordability and describe ways in which HOMES resolves these restrictions.

The housing affordability section in Chapter Two looked closely at the difference in financial resources between owners and renters. It painted a clear picture that renters have significantly less wealth and income than owners. It further showed that among homeowners, minorities and young persons are underrepresented, when compared to their proportion of the overall population. HOMES is a valuable tool that these groups can use to achieve their goal of homeownership.

In Chapter Two we learned that the act of becoming a homeowner was the primary reason that homeowners had moved in the prior twelve months. And we learned that young homeowners are three times as likely to move than the rest of the homeowner population. Therefore, we can conclude that majority of recent renter-to-owner movers are young. As we also saw in Chapter Two, the median net worth of households under 35 years old is ten times less than households aged 45 to 54. Therefore, the majority of first time homeowners do not have significant financial resources.

It is likely that the rest of the renter-to-owner movers also have limited financial resources. They are either older first time homebuyers or households who had previously owned a home, became renters and were becoming owners again. Since the median net worth of renters was only $1,899

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[196] Savage. Who Can Afford to Buy a House in 1993? "US Census Bureau". H121/97-1. 7/1997.

[197] Once renters become homeowners, they are able to build wealth more easily.

in 1993, it is safe to assume that, on the whole, both of these recent renter-to-owner home purchasers also do not have a great deal of wealth. (See Exhibit 4.2)

Owners vs. Renters
Net Worth per Household

	Owner	Renter
$80,000		
$70,000		
$60,000		
$50,000		
$40,000		
$30,000		
$20,000		
$10,000	$79,410	$1,899
$0		
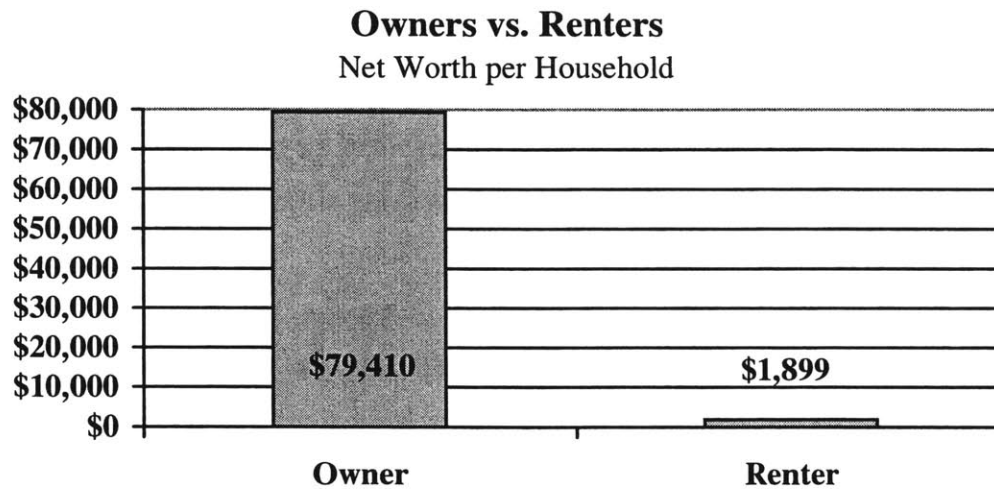
Source: 1993 Bureau of the Census   **Exhibit 4.2**

When combining these two observations, we can conclude that the largest cohort of homebuyers is struggling financially to make their home purchase. Because of this, these households should entertain using the capital from the HOMES vehicle to help them more easily buy a home.

Low income, lack of downpayment capital, and reduced monthly, mortgage debt service capacity due to other monthly debt obligations are the three constraints to renter-to-owner home purchase affordability.[198] 35% of renter households could not qualify to purchase a home for one of these three reasons, while the other 65% of renter households could not qualify to purchase a home for more than one of these reasons. Of this latter group, 19% lacked both a downpayment and could not afford the debt service on a mortgage.

HOMES can singularly help low-income households, families who are capital constrained, and households with otherwise outstanding debt service obligations, which in turn restrict their mortgage debt service capacity. The capital from the HOMES participating second mortgage

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[198] Savage. Who Can Afford to Buy a House in 1993? "US Census Bureau". H121/97-1. 7/1997.

reduces the nominal size of the primary mortgage, which effectively reduces the monthly debt service. Alternatively, HOMES can reduce the capital required for a downpayment. Used in conjunction, HOMES can lower the monthly mortgage payment obligation and the size of the homeowner's downpayment.

If renters are not prepared to use HOMES today, they may in the future, because potential owners are likely to continue to struggle when trying to buy a home. All demographic trends point to higher housing demand. Echo Boomers, the children of the baby boomers (people aged 18-22 in the 1998 Current Population Survey), are living alone in greater numbers than any previous generation.[199] It is expected that the number of Echo Boomers doing so will continue to increase. This increase in the number of households will increase housing demand, which will push home prices higher.

Year	White	Black	Hispanic	Other
1990	75.7%	12.3%	9.0%	3.8%
2050	52.5%	15.7%	22.5%	11.4%

Another hurdle to equal ownership representation comes from the population growth projections discussed earlier in this chapter. Referencing the table above, one can see that minorities are projected to represent a larger proportion of the population. Unfortunately, homeownership is an access game. Those who own first will see their home value and net worth rise in front of those trying to purchase a home. As housing supply struggles to keep up with housing demand— which is being driven by population/immigration growth—home values, and the barriers to entry of non-owners, promise to rise.[200] It is likely that natural features of population growth and traditional housing finance will exacerbate the under-representation of renters, who are predominately minorities, within the ranks of homeowners.

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[199] The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1999.

[200] I say that housing supply is likely to struggle to keep up with housing demand, because at projected demand rates, housing supply (as defined by new housing starts) would have to sustain record levels (measured both in percentage and absolute terms) for the next fifty years. Since the Federal Reserve uses new housing starts as one of its key indicators of general inflation, one can easily envision a seesaw, wherein the Fed raises interest rates, just as the building industry begins to bring sufficient new supply on-line.

"But for blacks and whites, the strong economy and recent efforts to reach low-income and minority borrowers explain more of the gains in homeownership than demographic factors such as household growth. With the wider availability of more flexible loans and reduced costs of obtaining a mortgage, more cash-strapped and income-constrained borrowers have been able to qualify for mortgages than in the past. Between 1993 and 1996, lending to low- and moderate-income homebuyers rose by 30.2 percent while lending to upper-income buyers rose by 20 percent. Meanwhile, lending over this period was up 45 percent to minority buyers compared with only 14 percent to white buyers."[201]

This argues in favor of the utilization of HOMES capital, as an additional financing source, by showing that when alternative financing solutions are offered to groups under-represented as homeowners, they accept these alternatives. The question is, "how viable is HOMES as a housing affordability solution?"

HOMES is the most viable solution available. The Savage Study at the Bureau of the Census addressed the question of improving home affordability.[202] (See Table) Reducing interest rates by 300 basis points would improve the affordability of a modestly priced home by 1%. Eliminating the downpayment requirement increases the affordability of a modestly priced home by 3%.[203] Neither of these scenarios would result in a significant increase in housing

[201] The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1998.

[202] Savage. Who Can Afford to Buy a House in 1993? "US Census Bureau". H121/97-1. 7/1997. The calculations were performed on an area-by-area basis and then aggregated. Areas were defined as in or out of a metropolitan area, and if within a metropolitan area, whether in or out of the central city. This provided apples-to-apples comparisons of families, their wealth, their income, and the home prices in the same families' area. The median home value is the value of the home with 50% of the other home values in the area above and 50% below. A modestly priced had 25% below and 75% above.

The concept of affordability is defined as follows. The homeowner is considered able to afford a home if they can either buy the home for cash, or finance the purchase with a 30yr conventional mortgage with 5% down and at the prevailing market interest rate. Affordability certainly varied with home price, which varied with region. These are national aggregates.

[203] Dropping conventional mortgage interest rates 300 basis points would only increase affordability of a modestly priced home by 1%. Alternatively, if downpayment requirements were reduced to 0%, home affordability of a modestly priced home would only increase by 3%. Neither action increases home affordability as significantly as additional downpayment capital.

affordability. Instead, Savage found that a downpayment subsidy increases home affordability significantly. The following table expresses the dramatic increase.

Down Payment Subsidy	Increase in Home Affordability		
	Total	Black	Hispanic
$1,000	1%	N/A	N/A
$2,500	3%	2%	2%
$5,000	14%	15%	10%
$7,500	21%	21%	16%
$10,000	25%	24%	19%

These significant home affordability increases confirm the theoretical validity and efficacy of the HOMES proposal. On the front-end of the purchase transaction, HOMES capital is analogous to a downpayment subsidy. Therefore, HOMES is an excellent way to serve the unmet demand for homeownership and increase the homeownership rate.

"Low downpayment loans are also no panacea for affordability. While easing wealth constraints, low-downpayment loans actually worsen income constraints by adding to the size of loans. In addition, they require payment of mortgage insurance, which adds half of a percentage point or more to interest rates."[204] HOMES aids home affordability without further burdening the borrower with debt service payments. Therefore, the use of HOMES by financially limited renters should be significant.

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[204] The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1999.

Reduced Equity

While HOMES capital is the equivalent of a downpayment subsidy when the home is purchased, it is dissimilar during ownership and at the sale of the home. A stereotypical subsidy does not require repayment plus appreciation upon sale. Therefore, while HOMES enables many to purchase a home, "will homeowners accept the HOMES investment in exchange for a reduced equity stake in their own home?"

In this section I try to answer this question by exploring homeowners' statements and actions regarding their home financing. Homeowners make claims that they want less debt outstanding on their home, yet they do not consider the potential buildup of equity in their homes to be a major resource for long term financial planning, such as retirement savings. Through survey responses and financing activity, I examine what homeowners' mean when they make these seemingly contradictory statements about their property finances and their investment planning. And I suggest how to interpret these statements in light of the HOMES vehicle proposal.

52% of Americans want to pay off their mortgage as quickly as possible.[205] But only 8% of Baby Boomers and 6% of Generation Xers expect that the equity in their home will be a major part of their retirement finances.[206] How can half of the homeowners in America want to reduce their mortgage debt, and correspondingly increase the size of the equity in their home, while more than ninety percent of American homeowners expect that the equity in their home will not be a major long term financial resource?

This contradiction is especially confusing given that the majority of American homeowners are not wealthy enough to remain solvent without accessing the capital in their homes. Between 44% and 59% of the median homeowner's net worth is the equity in their home.[207] Therefore,

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[205] National Housing Survey. "Fannie Mae" 1998.

[206] Ibid.

[207] Both statistics are from the Bureau of the Census, in 1993. The difference shows how difficult it is to measure median net worth, and source of assets. The median homeowner net worth is estimated to be $79,410. Eller and Fraser. Asset Ownership of households: 1993. "Census Bureau" P70-47. 9/1995. Savage. Who Can Afford to Buy a House in 1993? "US Census Bureau". H121/97-1. 7/1997

only between $32,500 and $44,000 of the median homeowner's wealth is other liquid assets. This is not enough liquid wealth to sustain a long retirement, or much of anything for a long period of time. Again, "how can this apparent contradiction between low mortgage debt and low home equity be understood?"

Approaching the conundrum from the debt perspective, I assume that the homeowners' primary goal is to reduce their debt. I do not think they are making these contradictory statements while thinking about the equity aspect. Especially since 61% of Baby Boomers and 57% of Generation Xers project that the equity in their homes will not have *any* part in their retirement finances.[208] I suspect that homeowners are emphasizing lowering their debt, and the increased equity, which comes with lower mortgage debt, is an unwanted side effect.

In light of this, the lower nominal primary mortgage, which accompanies the HOMES capital structure, should be attractive to typical homeowners. A homeowner who uses a HOMES participating second mortgage will reduce their outstanding primary mortgage debt, and at the same time, will reduce what they consider to be an unnecessary buildup of equity value in their home.

Homeowners also tell a similar story about their attitude toward their home equity through their mortgage refinancing activity. Freddie Mac conducted a study of the conventional mortgages purchased by Fannie Mae and themselves during 1998. Of the refinancings, 51% were cash-out closings, where the new mortgage was at least 5% higher than the retired note.[209] But on average, the LTVs of the new mortgages were 11% higher, for an average new LTV of 72%. This clearly represents the homeowners' reduction of the equity built-up in their property values. Because homeowners keep their home equity levels low, I do not think that the reduced home equity claim, which accompanies the use of the HOMES second mortgage, will be problematic.

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[208] National Housing Survey. "Fannie Mae" 1998.

[209] A cash-out refinancing means the homeowner replaces the original mortgage with a new one and receives a check for some amount of additional debt on the new mortgage, above the nominal balance of the retired mortgage. Follain, Lekkas, and Lehman. Refinancers Crave Cash on Top of Lower Monthly Payments. "Secondary Mortgage Markets" Spring 1999.

It is hard to say what is happening to the capital from the cash-out refinancings. Does it represent a portfolio rebalancing, is it used for everyday consumption, or is it somehow reinvested back into the home? Often, it is used to pay off existing home equity loans.[210] But these home equity loans themselves were taken out in an effort by the homeowner to get at the equity they had trapped in their home. In this case, the equity position in the home was already reduced. Other times, once homeowners liquefy the capital from the home value, it seems that they may be putting it into the stock market.[211] Either way, the use of the proceeds of the cash-out refinancing activity is a continuation of homeowner efforts to reduce their home equity. Again, homeowners are not likely to resist the reduced home equity claim, which accompanies a HOMES second mortgage.

In fact, homeowners have been increasing their use of home equity loans for the last five years.[212] (See Table) This is another representation of the general reduction in the amount of equity homeowner's have in their homes. Homeowners are using home equity loans because they are one of the few viable methods of liquefying the equity homeowners' have trapped in their homes.

	1993	1994	1995	1996	1997
Value of Home Equity Loans[213] (billions)	$261	$274	$299	$347	$420

Whether acting through mortgage refinancing and/or home equity loans, or responding to a survey, homeowners make it clear that they do not emphasize a build up of equity within their

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[210] Canner, Durkin, Luckett. Mortgage Refinancing. "Federal Reserve Bulletin" 8/1990.

[211] Follain, Lekkas, Lehman. Refinancers Crave Cash on Top of Lower Monthly Payments. "Secondary Mortgage Markets" Spring 1999.

[212] Ibid.

[213] Ibid.

home. Therefore, homeowners should not be opposed to the reduction in home equity that results from the use of HOMES capital.

In fact, homeowners should applaud the trend toward less home equity. Judged by modern portfolio theory, homeowners have considerably too much of their net worth in real estate. 44% of the median homeowner's net worth comes from the equity in their home.[214] Combined with an additional 11% in other real estate assets, fully 56% of the median homeowner's wealth is concentrated in an illiquid investment or two. The diversification benefits of less concentrated wealth, not only in real estate but within one property, are substantial.[215] The benefits go a long way toward confirming the statement mentioned above, that the over 90% of homeowners do not believe that their home equity will play a major role in their retirement resources. Homeowners need to diversify their portfolio and HOMES is a great way to help them do so.

Alternative to PMI

Up until now, the use of PMI has been the primary method for homeowners to purchase a home with less than a 20% downpayment. The lender requires that the homeowner purchase the lender an insurance policy, which pays the lender the value of the mortgage balance, if the homeowner defaults. There is a great deal of anecdotal evidence that homeowners dislike PMI and paying PMI premiums. In this section, I look closely at the size of the PMI market and the real cost of PMI to the homeowner. I prove that homeowners' dislike of PMI controls their housing finance activity. And I explore the potential market size of homeowners who could use HOMES to avoid paying PMI.

The market size of homeowners who need to utilize PMI is significant. Despite the public's disinclination toward PMI, $540 billion, or 13.5% of the existing $4 trillion in mortgage debt, is

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[214] Eller and Fraser. Asset Ownership of households: 1993. "Census Bureau" P70-47. 9/1995.

[215] Geltner, Miller, Snavely. We Need a Fourth Asset Class: HEITs. "Real Estate Finance Journal", Volume 12 (2), Pages 71-81.

covered by PMI.[216] And that percentage is rising. Since 1990, the weighted average LTV of new conventional mortgages has been bumping up against, and sometimes going higher than, 80%. (See Exhibit 4.3 and Table) In 1998, 40% of all new conventional mortgages had LTVs above 80%, and by definition should have required the purchase of a PMI policy.[217]

Weighted Average LTV for Conventional Mortgages Originated
for Home Purchases

	1990	1992	1993	1994	1995	1996
New Home[218]	74.9%	76.6%	78.0%	78.7%	78.6%	78.1%
Previously Occupied[219]	74.9%	76.5%	77.1%	80.1%	80.1%	79.1%

New Conventional Mortgages Which Require PMI
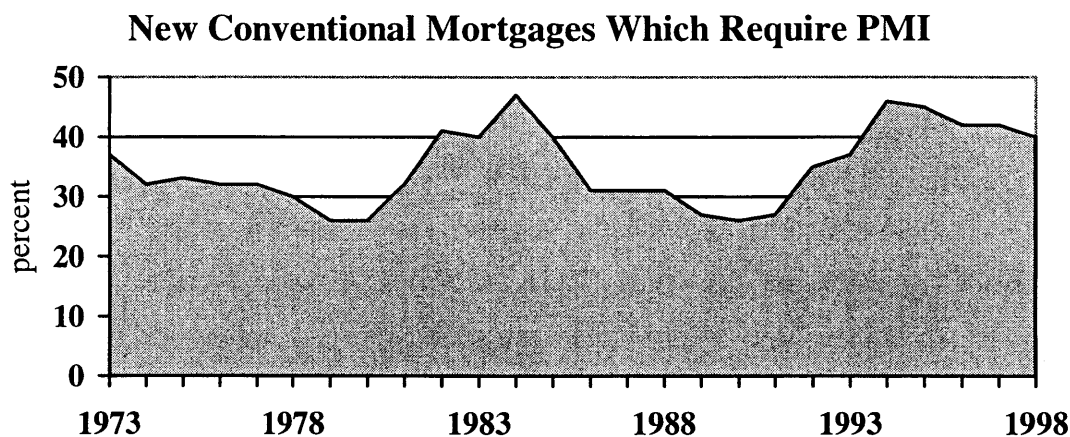
Source: 1998 Federal Housing Finance Board

Exhibit 4.3

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[216] Mortgage Guaranty Insurance Corporation Press Release. Private Mortgage Insurance: Your Partner in Housing. 3/13/1998.

[217] Rates and Terms on Conventional Home Mortgages. "US Federal Housing Finance Board" 1998.

However, the PMI industry estimates that only 20% to 30% of all new mortgages carry some sort of mortgage insurance, including VA and FHA. Therefore, some of the mortgages with LTVs above 80% are obviously not being required to pay PMI. For this section, I use the technical definition of mortgages with LTVs of 80% or more. Mortgage Guaranty Insurance Corporation Press Release. Where There is a Will, There's Mortgage Insurance. 4/6/1999.

[218] These are for conventional mortgages only. Rates & Terms on Conventional Home Mortgages, Annual Summary. "US Federal Housing Finance Board" 1990 – 1996.

[219] Ibid

Looking more closely at those mortgages that required PMI, 25% of the new mortgages in 1998 had LTVs from 80% to 90%. This means they were relatively close to not needing PMI. Of the remaining mortgages with LTVs over 80%, as many as 50% may have been originated with 95% LTVs.[220] In other words, as many as 20% of all new conventional mortgages in 1998 had 95% LTVs.

For the last several years, 60% of all homeowners have been making a downpayment of at least 20%, and homeowners have kept the weighted average LTV at almost exactly 80%. It is not a coincidence that the weighted average LTV has hovered just below the requirement for PMI coverage. Though the PMI market is significant, homeowners dislike PMI and as a group are reticent to increase the size of PMI market. This dislike of PMI goes so far as to have an effect on their residential financing decisions.

Remembering that homeowners do not want to have a significant amount of equity in their homes, I ask, "why is the weighted average downpayment approximately 20%, when this is such a significant amount of capital?" Especially when the costs of equity financing are less than the cost of debt financing. "Bruecker (1994) and Jones (1993) develop theoretical models of the demand for mortgage debt by households. If the cost of equity financing—or the return required on the equity component—is greater than the cost of mortgage debt—or the return required by lenders—and both costs are known with certainty, both analyses predict that households will move to a corner solution, i.e. they attempt to minimize the use of equity financing. However, the build-up of housing equity is a principal method of savings, and homebuyers frequently make

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[220] 1998, 50% of MGIC's business was 95% LTV loans. They write PMI policies for most types of mortgages with LTVs over 80%. Therefore, taking their experience as representative of the PMI market, 50% of all PMI policies on 40% of all new conventional mortgages requiring PMI is 20% of all new conventional mortgages requiring PMI with LTVs of 95%. Mortgage Guaranty Insurance Corporation Press Release. Private Mortgage Insurance: Part of the Homeownership Affordability Solution. 5/6/1999.

large downpayments. These observed interior solutions contradict the predictions of the certainty models."[221]

If homeowners do not want to keep their wealth trapped in their homes, why are they making such large equity downpayments and contradicting themselves? I believe it is because they do not want to make PMI payments. The conflict, as defined by the average home equity share, or conversely the average LTV of conventional mortgage originations, is centered at approximately an 80% LTV. Coincidentally, that is the exact point where homeowners are required to begin paying PMI premiums. It seems that the median homeowner makes as little an equity downpayment as possible to avoid paying PMI. Then he begins a process of refinancing and cashing-out the unrealized appreciation in the home, whenever the value becomes significant enough to do so. But when the homeowner refinances, the homeowner usually keeps the new LTV low enough to avoid the need to make PMI premium payments on the new mortgage.

Therefore, I infer from the above research by Bruecker, Jones, Archer, Ling, and McGill, that homeowners dislike making PMI premium payments so much that they suspend rational behavior to avoid making them. Why would they do so? By looking at the problem from another angle, is it possible that homeowners are acting rationally? Perhaps the cost of PMI is higher than commonly perceived.

To evaluate the effective cost of PMI, we need to put PMI in economic perspective. As far as the homeowner is concerned, PMI is not an insurance policy to protect against the chance that they might default; rather, to the homeowner PMI represents the equivalent of a special debt package. The homeowner perceives that this package is comprised of a mezzanine second mortgage and the PMI policy. Since the homeowner does not have 20% equity to use as a downpayment, they are required to take this package of the additional debt they need, above 80% LTV, and the PMI policy, which covers their entire mortgage. But in the eyes of the homeowner, since the PMI would not have been necessary if the LTV was 80% or less, the PMI

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[221] The references to "corner" and "interior" solutions are components of Game Theory. Corner solutions are optimal while interior solutions are less than optimal. Archer, Ling, McGill. The Effect of Income and Collateral Constraints on Residential Mortgage Terminations. "Regional Science and Urban Economics" 26 (1996) 235-261. Brueckner. The Demand for Mortgage Debt: Some Basic Results. (working paper) University of Illinois. 1994. Jones. The Demand for Home Mortgage Debt. "Journal of Urban Economics" 33, 10-28. 1993.

is effectively a cost related only to this special debt package. The homeowner does not see the purpose of PMI for the entire mortgage, only the portion above 80%.

With this understanding of the effective value of PMI to a homeowner, I calculated the effective cost of PMI. (See Table) I compared the effective cost of PMI to that of traditional mortgage debt, the required return on equity, and the effective cost of HOMES. I calculated the cost of PMI as the IRR of three types of cash flows. In the first period, the homeowner receives the initial capital, above 80% LTV, to purchase the home. Then the homeowner services the monthly debt on the "mezzanine mortgage" balance above 80% LTV and pays the PMI premium payments. When the mortgage terminates there are no additional cash flows. It is important to note that I only included the additional cost of the PMI premiums until the outstanding loan balance had been reduced to 78%. I did this, because under the new congressional PMI law, 78% LTV is the automatic termination level for PMI policies. The LTV of the PMI financed home was 88% and the annual cost of PMI was 78 basis points.

Effective Cost of Financing Sources

Home Appreciation Rate	-3%	0%	3%
PMI Term (years)[222]	27	10	4
PMI	16.89%	14.91%	11.21%
PMI Return on Equity[223]	12.00%	12.00%	12.00%
HOMES	0.00%	0.00%	7.24%
HOMES Return on Equity[224]	11.69%	11.69%	11.69%
Debt	7.75%	7.75%	7.75%

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[222] The term of the PMI policy is the length of time, in years, until the homeowner has contributed enough additional principal and the home has appreciated in value enough to reach an outstanding LTV of 78% on the primary mortgage.

[223] The PMI required return on equity is calculated as:

$$R_{Asset} = R_{PMI} + (W_{Debt} * R_{Debt}) + (W_{Equity} * (Y_{Homeowner} + R_{Equity}))$$

Where: $R_{Asset} = 9.88\%$ $W_{Debt} = 88\%$ $R_{PMI} = 0.78\%$

$R_{Debt} = 7.75\%$ $Y_{Homeowner} = 7.00\%$ $W_{Equity} = 12\%$

[224] The HOMES required return on equity is a complex modified WACC introduced in Chapter Three.

The effective cost of HOMES is the IRR of two cash flows. The homeowner first receives the HOMES capital, above 80% LTV, to purchase the home. Then, when the home is sold, the homeowner returns the initial capital plus the HOMES share of the appreciation in the property value. In the HOMES financing, I assumed that the homeowner invested 12%, HOMES contributed 8%, and the LTV of the primary mortgage was 80%. All scenarios assume the home is held for 30 years.

It is hard to compare the effective cost of PMI to the cost of equity, because the cost of PMI depends on the realized appreciation. However, we can see that the cost of PMI is much closer to the cost of equity than the cost of debt. This explains why homeowners seem to be acting irrationally and choosing equity financing instead of debt financing when the LTV nears 80%. To homeowners, PMI seems to cost just as much as equity.

On the other hand, when using HOMES the effective cost is much cheaper for the homeowner than the equity alternative. In fact, HOMES competes with the cost of traditional debt for the lowest cost source funds for the homeowner.

One of the striking observations is that the effective cost of PMI (including the "mezzanine" debt service) is considerably higher than the quoted rate of approximately 78 basis points. Regardless of its cost relative to other financing sources, when the cost of PMI is considered as a package, with the high LTV debt that always accompanies it, PMI is much more expensive than is made clear to homeowners.

The above data shows that HOMES is especially rewarding for homeowners in a flat to down housing market. When home prices remain the same or drop, HOMES is the cheapest form of financing a homeowner can access. This makes HOMES a unique residential financing alternative for homeowners who are purchasing a home, but believe that the housing market in that region is near the top of an appreciation cycle. No other form of financing even comes close.

Regardless of the rate of appreciation, the effective cost of HOMES is far less than that of using PMI. While these costs should begin to equalize the faster a home appreciates, because the effective life of the PMI policy is reduced, PMI does not offer the same downside cost of financing protection that HOMES does.

Because the economic cost of PMI is too high and since most homeowners let their opposition to PMI control their residential housing finance activity, homeowners who would otherwise be required to pay PMI should be especially attracted to utilizing capital from the HOMES second participating mortgage. By doing so, these homeowners can continue to make the same equity downpayment as before, but will not longer have to make monthly PMI payments. By determining how many homeowners this might include, we can understand how large just one of the potential HOMES markets is.

As noted above, 25% of mortgages originated in 1998 had LTVs between 80% and 90%. Using the median suburban home price of $112,836, these homeowners made downpayments between $11,283 and $22,567.[225] Using the 60:40 homeowner downpayment to HOMES capital assumption, any household which made a 12.01% or greater downpayment would no longer need PMI, because the addition of the HOMES 8% capital makes the LTV of the primary mortgage lower than the 80% LTV threshold.

Assuming even distribution of the number of mortgages with LTVs between 80% and 90%, 20% of all conventional mortgages originated in 1998 could have used HOMES to avoid paying PMI.[226] Since there was $1.436T in origination in 1998, $287B in new mortgage debt could have been free of the PMI requirement, if the homeowners had used HOMES capital to help

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[225] 1995 American Housing Survey

[226] Mortgages with LTVs between 80% and 88% could have avoided PMI, with the use of HOMES. This means 80% of the mortgages between 80% and 90% LTV, assuming even distribution. 25% of all new conventional mortgages were between 80% and 90% LTV. 80% of those were 20% of all new conventional mortgages. Therefore, 20% of all new conventional mortgages in 1998 could have used HOMES to avoid paying PMI. Assuming the 60/40 equity to capital ratio.

them purchase their home.[227] This means that over 3M households could have used HOMES to avoid paying PMI, assuming the median suburban home price of $112,836.[228]

As we have seen in this section, most homeowners do what they can to avoid paying PMI. The average conventional mortgage LTV has hovered at or below 80% for the last decade. When refinancing, homeowners often cash-out, but do not increase their LTV over 80%. Even when debt capital is less expensive than equity capital, homeowners continue to use excessive equity capital. With this much indication that homeowners who can afford to avoid paying PMI do so, I believe that the 3M additional homeowners who could avoid paying PMI, by using HOMES, would consider doing so.

Tax Implications for Homeowner

Real estate is taxed by rules that differ from those that govern other investments; therefore no financial analysis of real estate is complete without evaluating the effect of taxes. I suspect that the IRS will rule that the final shared appreciation payment to the HOMES investors is an interest payment. Therefore, like payments toward the primary mortgage, the homeowner's obligation to HOMES will be a tax shield, reducing the homeowner's after tax cost and increasing the after tax return. (See the detailed return calculations in the next section.)

When comparing HOMES to PMI, on a monthly affordability basis, the after-tax cost of HOMES is lower than traditional PMI. This is because traditional PMI premium payments are not tax deductible. Because all of the interest paid toward the primary mortgage is deductible, when using HOMES, HOMES is less expensive, on an after-tax basis, than a PMI alternative.

In fact, when most homeowners use HOMES, there should be a significant double tax shield benefiting the homeowner. The first occurs when they sell the home and get a capital gains tax shield of up to $500K. At the same time, the homeowner must pay some percentage of the appreciation to HOMES. I suspect that this payment will be tax deductible as mortgage interest.

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[227] Though, the amount of the mortgage debt would have been lower if HOMES were used, because the use of HOMES lowers the nominal mortgage balance.

[228] As a disclaimer, in this section I used the technical definition of the PMI requirement--a mortgage with a LTV over 80%.

Therefore, the after-tax gains, to the homeowner, form the sale of the property should be very attractive compared to those of a traditional financing route.

But the highest tax advantage to using HOMES is available to those with the most income. Top income tax bracket households, who have little downpayment capital, are constrained by their lack of capital, not their debt capacity. As a result, they cannot afford to purchase an expensive enough home—meaning a home with a high enough nominal mortgage amount—which most effectively shelters their income. This is because the higher the monthly interest payments, the more the homeowner's taxes are reduced. The use of the additional HOMES capital allows the homeowner to purchase a more expensive home. Thus they can fully utilize their monthly debt capacity and shield as much income as possible. When combined with the other tax advantages listed above, this makes HOMES look very attractive to high-income households, who are restricted by low downpayment capital.

In summary, from a tax perspective, HOMES is at least as attractive as other residential financing scenarios, and sometimes more attractive.

Return to Homeowner

In order to properly evaluate the HOMES alternative, a prospective homeowner must understand the before- and after-tax return implications from using HOMES. In this section, I undertake a comparative analysis of the return to the homeowner from a HOMES assisted purchase, as opposed to the returns earned from a traditional primary mortgage with traditional PMI, a traditional mortgage with lender pre-paid PMI, and a Piggyback mortgage. I have chosen these alternatives, because they are currently the most prevalent residential financing solutions, for a household that has limited financial resources.

I approach the homeownership goal from the three most likely homeowner perspectives. In three separate scenarios, I calculate the returns from purchasing a home with a predetermined home value, a predetermined monthly debt service budget, and a predetermined downpayment maximum. In all three, I calculate the economic return, which includes the opportunity cost of

capital at an assumed 10% rate and the non-cash, housing benefit yield at an assumed 7% rate. I assumed that closing costs are $3,000 and the HOMES appreciation split was 60% homeowner and 40% HOMES. I included a 6% reduction in sale proceeds from brokerage commission and the after-tax monthly debt service payment is calculated using an assumed 30% tax rate and the cumulative interest in the first year of payments.

Constant Home Price

	Mortgage plus PMI		PMI in Mortgage		Piggyback		HOMES	
Year 0								
Home Price	**$100,000**		**$100,000**		**$100,000**		**$100,000**	
Homeowner Equity	12%		12%		10%		12%	
Downpayment & Closing Costs	**$15,000**		**$15,000**		**$13,000**		**$15,000**	
Additional Capital	$0		$0		$0		$8,000	
Mortgage	1st	2nd	1st	2nd	1st	2nd	1st	2nd
LTV	88%	0%	88%	0%	80%	10%	80%	0%
Term (yrs)	30	0	30	0	30	15	30	0
Mortgage Rate	7.785%	0%	8.625%	0%	7.785%	9.785%	7.785%	0%
PMI Rate	0.88%		0%		0%		0%	
Total Monthly Payment (P&I & PMI)	**$697**		**$684**		**$681**		**$575**	
After-Tax Payment (30% tax assumed)	**$527**		**$495**		**$502**		**$420**	
Year 10								
Appreciation Rate	3%		3%		3%		3%	
Appreciation Split	100/0		100/0		100/0		60/40	
Total Homeowner Proceeds*	$49,477		$54,558		$61,876		$64,529	
Homeowner IRR	-8.34%		-6.45%		-4.11%		-3.35%	
Adj. Homeowner IRR**	**-1.34%**		**0.55%**		**2.89%**		**3.65%**	

*This includes the economic return, from the opportunity cost of capital. Therefore, downpayment and monthly debt service capital, not paid in, are assumed invested at 10%.

**The homeowner return is adjusted to include the non-cash housing benefit, which is estimated to yield the homeowner 7% annually.

In the first return scenario, I assumed that the potential homeowner is neither debt service constrained nor equity capital constrained, but is looking for the method of financing a specific home purchase, which will generate the most economic benefit. The return from the use of HOMES is superior to that from any of the other three methods.[229] While the price of the home

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[229] It should not be surprising that the returns are negative. The IRR calculation is comparing the initial investment, at closing, plus the high debt service costs to the final appreciation value. The additional debt service payments have a significant influence on the resulting IRR.

is the same, the monthly, out of pocket expense is the lowest and the sale proceed returns in year 10 are the highest.

In the next scenario (below), I assumed that the potential homeowner is debt service constrained, and will utilize their maximum debt service capacity, when purchasing their home. While the monetary economic return to the homeowner is not the highest in this scenario, the value of the home purchased using HOMES is far superior, allowing the homeowner an opportunity to purchase a home that is worth 18% more than the next most valuable home. For the appropriate homeowner, this benefit is worth more than the 3% annual economic return differential.

Debt Service Capacity Constrained

	Mortgage plus PMI		PMI in Mortgage		Piggyback		HOMES	
Year 0								
Home Price	$71,725		$73,051		$73,398		$86,947	
Homeowner Equity	12%		12%		10%		12%	
Downpayment & Closing Costs	$11,607		$11,766		$10,340		$13,434	
Additional Capital	$0		$0		$0		$8,000	
Mortgage	1st	2nd	1st	2nd	1st	2nd	1st	2nd
LTV	88%	0%	88%	0%	80%	10%	80%	0%
Term (yrs)	30	0	30	0	30	15	30	0
Mortgage Rate	7.785%	0%	8.625%	0%	7.785%	9.785%	7.785%	0%
PMI Rate	0.88%		0%		0%		0%	
Total Monthly Payment (P&I & PMI)	$500		$500		$500		$500	
After-Tax Payment (30% tax assumed)	$378		$362		$368		$365	
Year 10								
Appreciation Rate	3%		3%		3%		3%	
Appreciation Split	100/0		100/0		100/0		60/40	
Total Homeowner Proceeds*	$40,432		$42,939		$48,012		$39,689	
Homeowner IRR	-6.48%		-5.38%		-3.40%		-6.82%	
Adj. Homeowner IRR**	**0.52%**		**1.62%**		**3.60%**		**0.18%**	

*This includes the economic return, from the opportunity cost of capital. Therefore, downpayment and monthly debt service capital, not paid in, are assumed invested at 10%.

**The homeowner return is adjusted to include the non-cash housing benefit, which is estimated to yield the homeowner 7% annually.

In the final scenario, I assume that the homeowner is capital constrained. This is an especially meaningful scenario, because HOMES capital also has something to offer homeowners who can already afford a home and are not required to pay PMI, particularly if they have additional debt capacity. This is most appropriate for households with high monthly income, but little equity capital. As mentioned in Chapter Two, the median suburban home price is 40% higher than the median rural home price. Because such a low capital, high-income household is likely to live in the suburbs, the far superior return should be attractive.

Downpayment Capital Constrained

	Mortgage plus PMI		PMI in Mortgage		Piggyback		HOMES	
Year 0								
Home Price[230]	$83,333		$83,333		$100,000		$83,333	
Homeowner Equity	12%		12%		10%		12%	
Downpayment & Closing Costs	$13,000		$13,000		$13,000		$13,000	
Additional Capital	$0		$0		$0		$6,667	
Mortgage	1st	2nd	1st	2nd	1st	2nd	1st	2nd
LTV	88%	0%	88%	0%	80%	10%	80%	0%
Term (yrs)	30	0	30	0	30	15	30	0
Mortgage Rate	7.785%	0%	8.625%	0%	7.785%	9.785%	7.785%	0%
PMI Rate	0.88%		0%		0%		0%	
Total Monthly Payment (P&I & PMI)	$581		$570		$681		$479	
After-Tax Payment (assume 30% tax)	$439		$413		$502		$350	
Year 10								
Appreciation Rate	3%		3%		3%		3%	
Appreciation Split	100/0		100/0		100/0		100/0	
Total Homeowner Proceeds*	$54,186		$58,421		$51,442		$66,730	
Homeowner IRR	-5.40%		-4.00%		-6.39%		-1.16%	
Adj. Homeowner IRR**	**1.60%**		**3.00%**		**0.61%**		**5.39%**	

*This includes the economic return, from the opportunity cost of capital. Therefore, downpayment and monthly debt service capital, not paid in, are assumed invested at 10%.

**The homeowner return is adjusted to include the non-cash housing benefit, which is estimated to yield the homeowner 7% annually.

For the highest return from any of these models, a homeowner in the capital constrained scenario who has excess debt service capacity could use HOMES and increase the home price and the

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[230] The home price is the calculated as the homeowner's equity divided by the stated homeowner equity percentage.

primary mortgage LTV to maximize their monthly payments. In additional to earning a superior economic return, the home value, as we saw in the second scenario, would be much higher than any other financing method.

In summary, when a homeowner analyzes the use of HOMES from a financial return perspective, they should be attracted to the superior results—results that are superior regardless of their financial limitations.

Home Improvements

The HOMES capital investment looks attractive from many homeowner financial perspectives. However, its desirability is limited for those homeowners who are interested undertaking significant capital improvement projects. Under the current proposal, the HOMES vehicle stands to gain from a homeowner's infusion of capital and labor if a major improvement project is undertaken. A significant improvement by the homeowner represents an increase to the paid-in-equity by the homeowner.

However, it is risky to adjust the paid-in-equity, because it is difficult to measure the value of the additional contribution from an improvement. The opportunity for moral hazard and deceptive contractor/homeowner transactions make accurately valuing an improvement challenging. If the homeowner enjoyed a shift in the homeowner:HOMES equity ratio from an improvement, the homeowner benefits from overpaying for a contractor's services. Since the additional cost will return to the homeowner the homeowner is almost encouraged to have the cost of the improvement inflated.

There is no good solution to the potential risks associated with adjusting the homeowner: HOMES equity ratio, and HOMES will operate under the policy of no change in cost basis. This restriction will tailor the market for potential HOMES users to those not likely to undergo major projects. This includes purchasers of new housing stock/new construction home purchases,

apartment/condo purchases, homeowners likely to move in a shorter period of time[231], young homeowners, and lower income homeowners. Will this restriction hurt HOMES viability?

In the middle of this decade, maintenance and improvement expenditures by homeowners were about $80B annually. While this is a large nominal amount, in 1995 it was only 0.95% of the overall value of the properties.[232] Two years later, the Harvard University Joint Center for Housing Studies', 1997 State of the Nation's Housing Report estimated that home improvements were 0.8% of total owner-occupied housing value in 1996.[233]

It is important to note the distinction between maintenance and improvements. The Bureau of the Census tracks housing expenditures and they include "relatively expensive [maintenance] items" in the improvements category.[234] Therefore, all remaining maintenance category expenditures are offsetting normal depreciation and scrappage. The rest are improvement expenditures, which are essentially investment and wealth creation. In 1995, improvement expenditures represented 0.63% of the overall property values unto which they were performed. Therefore, when put in perspective, the annual value of housing improvements should be less than one percent of the total value of the investments made with HOMES.

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[231] The faster a homeowner moves, the quicker the capital is returned to HOMES. A short tenured homeowner is desirable. Coincidentally, these include, among others, younger homeowners. Since younger homeowners usually do not make major home improvement expenditures and since they move relatively often, they fit an excellent profile as a potential user of the HOMES capital.

[232] Census Bureau and American Housing Survey 1995:

$$\frac{Expenditures}{Median\ home\ value\ *\ Number\ of\ Owner\text{-}Occupied\ Homes}$$

$$\frac{\$78.583,000}{\$129,811\ *\ 63,544,000}$$

[233] $62.8B of home improvements and 1995 owner-occupied, residential housing value was $7.2T. This excludes the value of the homeowners' time. The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1997.

[234] These include: complete furnace or boiler, entire roof, central air-conditioner, all siding, water heater, entire electrical wiring, doors, plumbing fixtures, all water pipes, windows, septic tank or cesspool, sink or laundry tub, complete walks or driveway, and garbage disposal unit. Expenditures for Residential Improvements and Repairs. "Census Bureau" C50/97-Q4. 7/1998.

Toward the issue of fairness between the homeowner and the HOMES vehicle, it is implied that the homeowner should make regular maintenance efforts and expenditures while occupying the home. It is reasonable to assume that the home should be in similar condition upon sale as it was upon purchase. Therefore, only improvement expenditures should be considered when evaluating the limitations of the HOMES structure on homeowners' reception of it. Thus, the relevant expenditures only represent 0.63% annually of the value of the potential housing stock that HOMES is suggesting it will co-invest in with homeowners.

The Harvard University Joint Center for Housing Studies 1998 report states that whether the home was built pre-1940, 1940-1959, 1960-1979, or 1980-1995; on average about 50% of homeowners make home improvements and repairs.[235] This means that on average, the other 50% of homeowners would be inclined to use HOMES capital without any potential conflict.

Harvard Joint Center for Housing Studies, 1997 State of the Nation's Housing Report states that, "spending on housing improvements is highest among 35 to 44 year-olds and remains strong up to retirement." Therefore, HOMES should be very attractive to younger potential homeowners, because they do much less home improvement work anyway. Combine this with under-representation of younger potential homeowners in the ranks of homeownership statistics and the potential market with younger homeowners is large.

"Changes in incomes and family size are important determinants of more discretionary types of projects, such as adding rooms and updating kitchens."[236] Since the majority of the HOMES potential market is likely to be younger and/or have less income, as a group, they are less likely to undertake significant home improvement projects. Therefore, they are less likely to perceive a conflict with the HOMES position.

Middle-aged owners make more expenditures than younger and older owners, while wealthier owners spend more than lower earners. Because of the Baby Boomer generation, one would

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[235] The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1998.

[236] Ibid.

expect to see higher expenditures from middle-aged owners. But, only 15% of Baby Boomers say they will remodel or make improvements to their existing home after their kids move out.[237] Therefore, those who are currently spending the most on home improvements do not plan to continue to do so when they become "empty nesters". This is a low figure, which bodes well for HOMES to avoid a major conflict with a large potential market.

Using another approach, I am able to analyze some homeowner improvement activity by examining home equity lines of credit. 17% of all homeowners have a home equity line of credit. 40% of all homeowners with a home equity line of credit say that they use it for home improvements. Therefore, only 6.8% of all homeowners use a home equity line of credit for home improvements.[238] Alternatively, the Federal Reserve says that only 13% of all homeowners have an equity line of credit.[239] If this is true, then only 5.2% homeowners use a home equity line of credit for home improvements. Either way, the use of home equity lines of credit for home improvements is very low, which should be good news for the HOMES proposal.

Overall, homeowner improvement expenditures are not significant. When improvement expenditures are stratified by income and age and combined with the most likely users of HOMES, it becomes clear that the lack of adjustment for additional paid-in-capital will not seriously limit the potential users of HOMES.

Additional Advantages

Homeowners should also be attracted to HOMES in their roles as investors. The presence of HOMES allows them to short HOMES in the secondary market to raise cash and diversify personal portfolios. As was shown above, homeowners' wealth is currently too heavily concentrated in their personal residences. Homeowners can use HOMES to help them diversify

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[237] National Housing Survey. "Fannie Mae" 1998.

[238] Ibid.

[239] Canner, Durkin, Luckett. Recent Developments in Home Equity Lending. "Federal Reserve Bulletin" 4/1998.

their portfolios with low transaction costs. Homeowners in New England would have significantly benefited from such activity during the late 1980s and early 1990s.

In addition, the HOMES vehicle has a simple structure, which is easy for homeowners to understand. In exchange for capital used to purchase their home, some percentage of the sale price will be paid to the HOMES vehicle.

Chapter Summary

In this chapter, I showed that HOMES should be accepted because the proposal has significant economic value and it will be financially advantageous for users to do so. Across five sections, I analyzed the HOMES proposal from the perspective of government officials and GSEs, capital market investors, lenders, agents, and homeowners. I described how the HOMES vehicle introduces significant benefits that provide value which is superior to that currently available as a residential financing alternative. Because of this, I suggest that participants in the housing finance industry embrace HOMES as a solution to many of their existing obstacles.

Chapter Five: Product Case Study

In the previous four chapters, I analyzed the demand side of the owner-occupied housing market, proposed my financing vehicle which is designed to appeal to the supply and demand for residential capital, and evaluated how HOMES best fulfills many of the unmet needs of housing finance participants. In this chapter, I undertake a comparative analysis. As a litmus test for the viability of HOMES, I look closely at why a somewhat similar product, Shared Appreciation Mortgages (SAMs), failed in the early 1980s.

At the end of the 1970's and the beginning of 1980's, Oppenheimer Capital proposed the creation of a mortgage product that was designed to resolve homeowner housing affordability constraints and capital market investor demand.[240] The purpose of SAMs was so similar to that of HOMES, I feel that careful analysis of SAMs is worthwhile in judging the potential viability of HOMES. Such analysis is especially rewarding because SAMs failed to generate any market share, and at a rudimentary level, the design of SAMs could be mistaken for that of HOMES.

Section I: Security Design

In the proposed capital structure the homeowner makes a typical equity downpayment and assumes a first mortgage against the home. The first mortgage, a SAM, was issued at below market interest rates and participated in any appreciation in the value of the home. The proposed split was not standardized, but was suggested to be 33/67 or 50/50. The interest rate reduction suggested was 300 basis points, which would have reduced market rates from 14% to 11%, at that time. As usual, the homeowner makes fixed, monthly principal and interest payments. In addition, at the termination of the mortgage, the homeowner makes an appreciation payment, according to the predetermined split.

SAMs were designed to capitalize on the rampant inflation and high interest rates of that period. The goal was to convince investors of the merits of home appreciation as a hedge against inflation, while returning principal and interest income in the interim. SAMs capital market

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[240] All of the research on SAMs came from the following two documents. Salomon Brothers did valuation analysis on SAMs, but did not issue any of their own. Shared Appreciation Mortgage. "Oppenheimer Asset Advisors" 3/1981. Baum. Investment Characteristics of Shared Appreciation Mortgages. "Salomon Brothers" 3/1981.

appeal was based the assumption that home prices went up with inflation. Homeowners were supposed to determine that the present value of the 3% rate reduction was equal to the premium of the call option on the upside potential in the value of their home.

Put simplistically, SAMs are a combination of a standard primary mortgage and my HOMES proposal. While the design is innovative, it is more problematic than revolutionary. In the next two sections, I explain the many detractors preventing the success of SAMs, and the few attributes that had economic value.

Section II: SAMs Pros

The number of sources of economic value is limited to three. The primary advantage is that a home equity appreciation product is a great hedge against inflation for SAMs investors. Therefore, true to their stated goal, SAMs are designed well if inflation is aggressive.

SAMs should appeal to homeowners, because when using a SAM, the homeowner is able to purchase their home with a mortgage at below market interest rates. This is beneficial to homeowners with limited debt capacity, because it lowers the effective cost of homeownership.

SAMs other significant value to investors is that a SAMs pool has a better price/yield relationship than traditional MBS. In secondary market trading, pooled SAMs have some built-in call protection. In the case of an interest rate drop, the likelihood of homeowner refinancing increases. With homeowner refinancing comes the return of the appreciation payment to the SAMs investors. Therefore, when the homeowner wants to return the mortgage principal— which is usually at the worst time for the investor, because market interest rates are lower—the SAMs investor gets a big appreciation payment.

But the call protection of a SAMs pool is not as good as that of a HOMES pool. In the case of HOMES, the homeowner must actually move for the claim to be retired, not just refinance. Thus the price/yield relationship of SAMs is not as attractive on the downside as the HOMES curve.

All of this is ignoring the argument that a SAM or HOMES appreciation obligation might change homeowners' refinancing or home sale characteristics.

Section III: SAMs Cons

Though the positive aspects of the SAMs security design seem encouraging, there are six significant characteristics of the SAMs design that probably contributed to its failure. While the overall proposal is a step in the right direction, the following items make the product a non-starter.

In the SAM capital structure, the SAM lender is the only lender. This removes a layer of traditional oversight, which is currently the primary lenders' role. Because of the unique moral hazard issues present in enforcing the shared appreciation component of the agreement at a sale transaction, it is desirable to have the primary lender position remain. Such an additional party can judge arms length transactions, provide objective appraisal analysis and property lien oversight. The SAM structure makes moral hazard, such as selling the home for too little money, more likely, while the HOMES design retains the primary lender for additional oversight.

Because the SAM combines a traditional, first mortgage and an equity appreciation payment into one vehicle, the structure builds a conflict of interest into the security design. Primarily, the homeowner's best interests and the SAM investor's best interests are not necessarily aligned regarding the amount and timing of the appreciation payment, which is required at mortgage termination.

Very few people, if any, move when their mortgage is scheduled to terminate. For those who sell and move before the scheduled termination, there is probably no problem. However, for those who remain past the mortgage amortization period (which every homeowner wants the freedom to do), "where are they going to come up with the money to pay the appreciation payment that is due?" It is highly unlikely that a homeowner will have that much liquid capital, without selling their home. Therefore the HOMES capital structure is preferable to the SAM,

because the homeowner does not enter into a financing agreement with a built in conflict of interest that among other things restricts their housing options.

The SAM mortgage effectively blocks the homeowners' ability to refinance for many years, because the homeowner must retire the SAM obligation, including the appreciation component, upon refinancing. The option to refinance is blocked, because it is unlikely that the homeowner can afford to make the appreciation payment upon refinancing. Assume that the homeowner is debt capacity constrained, which is very likely if they took a below market interest rate product, and has no additional capital with which to pay the appreciation obligation upon refinancing. If this is the case, the earliest a homeowner can afford to refinance is 12 years after the origination of the SAM obligation. (See Table)

Homeowner Net Position Upon Refinancing

Appreciation Rate

Year	0%	3%	5%	8%	10%
0	$ (17,633)	$ (17,633)	$ (17,633)	$ (17,633)	$ (17,633)
1	$ (16,651)	$ (17,687)	$ (18,378)	$ (19,415)	$ (20,106)
2	$ (15,608)	$ (17,552)	$ (18,887)	$ (20,947)	$ (22,360)
3	$ (14,500)	$ (17,223)	$ (19,154)	$ (22,230)	$ (24,403)
4	$ (13,325)	$ (16,692)	$ (19,170)	$ (23,253)	$ (26,232)
5	$ (12,076)	$ (15,953)	$ (18,921)	$ (23,999)	$ (27,832)
6	$ (10,751)	$ (14,994)	$ (18,391)	$ (24,438)	$ (29,169)
7	$ (9,344)	$ (13,806)	$ (17,557)	$ (24,531)	$ (30,194)
8	$ (7,851)	$ (12,374)	$ (16,394)	$ (24,223)	$ (30,835)
9	$ (6,265)	$ (10,683)	$ (14,868)	$ (23,444)	$ (30,989)
10	$ (4,582)	$ (8,716)	$ (12,941)	$ (22,101)	$ (30,521)
11	$ (2,794)	$ (6,453)	$ (10,566)	$ (20,079)	$ (29,246)
12	$ (896)	$ (3,872)	$ (7,689)	$ (17,231)	$ (26,924)
13	$ 1,118	$ (948)	$ (4,244)	$ (13,372)	$ (23,237)
14	$ 3,257	$ 2,347	$ (157)	$ (8,270)	$ (17,770)
15	$ 5,528	$ 6,046	$ 4,664	$ (1,634)	$ (9,978)
16	$ 7,938	$ 10,181	$ 10,322	$ 6,899	$ 850

assuming: home value $100,000
beginning LTV 80%
SAM appreciation claim is 40%
SAM interest rate is 6%
no principal prepayment during the SAM term
home value and homeowner debt service capacity grow at the same rate
refinance transaction costs are $3,000
new mortgage interest rate is 8%
homeowner has no additional capital available at time of refinance
new mortgage maximizes homeowner debt capacity
new mortgage balance equals retired SAM outstanding loan balance

The actual breakeven point depends on the appreciation rate of the home, the homeowner's debt capacity, additional capital available to the homeowner, the transaction costs to refinance, the new mortgage rate, and the percentage share of the appreciation payment. Since one of the primary factors is the size of the appreciation payment, the faster the home loses value, the faster

the homeowner can afford to refinance. This type of misaligned incentives is a major flaw in the SAM design.

When a "non-sale" event, such as a refinancing or the termination of the SAM, triggers the appreciation payment, the home is valued using appraisal techniques. If the appraisal is miscalculated one of the parties is harmed and the other is benefited. If the appraisal is too low the investor is damaged and if the appraisal is too high the homeowner is harmed. Since appraisers are likely to err on the side of conservatism it is likely the investor will not get their complete claim in the case of a non-sale event.

Oppenheimer suggested that the SAMs product be accompanied by a mortgage insurance requirement of 20% coverage for mortgages with LTVs above 80%. Because the SAM has an equity claim, it seems that the PMI requirement should disappear. As a result SAMs are only making housing slightly more affordable for the homeowner, by lowering the interest rate a few hundred basis points, but they are requiring a significant share of the homeowner's appreciation.

Also, like HOMES, SAMs have a valuation conflict when the homeowner undertakes a major improvement to the property.

While the number of SAMs characteristics that restrict its economic value are long, the number of sources of economic value are limited to three. The primary advantage is that a home equity appreciation product is a great hedge against inflation for SAMs investors. Therefore, true to their stated goal, SAMs are designed well if inflation is aggressive.

SAMs should appeal to homeowners, because when using a SAM, the homeowner is able to purchase their home with a mortgage at below market interest rates. This is beneficial to homeowners with limited debt capacity, because it lowers the effective cost of homeownership.

SAMs other significant value to investors is that a SAMs pool has a better price/yield relationship than traditional MBS. In secondary market trading, pooled SAMs have some built-in call protection. In the case of an interest rate drop, the likelihood of homeowner refinancing increases. With homeowner refinancing comes the return of the appreciation payment to the SAMs investors. Therefore, when the homeowner wants to return the mortgage principal—

which is usually at the worst time for the investor, because market interest rates are lower—the SAMs investor gets a big appreciation payment.

But the call protection of a SAMs pool is not as good as that of a HOMES pool. In the case of HOMES, the homeowner must actually move for the claim to be retired, not just refinance. Thus the price/yield relationship of SAMs is not as attractive on the downside as the HOMES curve. All of this is ignoring the argument that a SAM or HOMES appreciation obligation might change homeowners' refinancing or home sale characteristics.

Chapter Summary

Oppenheimer was on the right track with the SAMs proposal; the three sources of economic value are appealing, at first. The primary advantage is that a home equity appreciation product is a great hedge against inflation for SAMs investors, therefore, true to their stated goal, SAMs are designed well if inflation is aggressive. However, the number of SAMs characteristics that restrict its economic value are great. The combined primary mortgage and appreciation payment design resulted in too many significant reductions in economic value. It is no wonder that SAMs never become much more than a proposal. In comparison, HOMES have a great deal of economic value.

Chapter Six: Conclusion and Further Research

Section I: Conclusion

In this thesis, I proposed Housing Mutual Equity Shares (HOMES) as a vehicle to resolve the numerous issues relating to executing an investment in owner-occupied housing and realizing the superior risk-adjusted returns available therein. HOMES are a mezzanine debt claim, invested in owner-occupied homes across the country. In some capacities, HOMES acts as a replacement for PMI.

In the previous five chapters, I outlined the demand side of the residential space and finance market, I described the HOMES vehicle, calculated the potential investment returns and analyzed them, I explored the economic value of HOMES from the perspective of borrowers, investors, lenders, and agents and I compared HOMES to a similar, though failed product.

I showed that on the national level, unleveraged housing equity has consistently returned between 5% and 6% and is negatively correlated with stocks and bonds.[241] While this rate of return is seemingly unimpressive, when considered in conjunction with the negative risk correlation and leveraged with a primary mortgage, residential housing begins to look very attractive as an investment alternative.

Based on this, I have introduced a security that is designed to make an investment in owner-occupied housing a reality for the broad capital markets. Both debt and equity investors should be attracted to an opportunity to invest in a security that can realistically return between 10% and 25% (depending on the leveraged employed) and have the depth of a $4.5 trillion supply.[242] An

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[241] Geltner, Miller, Snavely. We Need a Fourth Asset Class: HEITs. "Real Estate Finance Journal", Volume 12 (2), Pages 71-81.

[242] National Home Equity = Median Home Equity * Number of Households
    $4,502,065,092,000 = $46,669 * 96,468,000
Eller and Fraser. Asset Ownership of Households: 1993. "U.S. Department of Commerce and Bureau of the Census". P70-47, 9/1995.

opportunity to invest in a product with low risk, steady returns, and extremely deep supply should attract institutional investors.

I have also gone to great lengths to explain why homeowners might want to use HOMES. In detail, I explored the financial positions and residential financing needs of homeowners. I showed multiple scenarios where a potential homeowner might consider using HOMES in the purchase of their home. Because the attributes and economic value of HOMES is wide ranging, many homeowners can find a reason to employ the capital available from a HOMES participating, second mortgage.

Therefore, I suggest that HOMES ought to be a successful new security. Investors, lenders, and homeowners should find components of HOMES similar to PMI, commercial mortgages, mezzanine debt, mezzanine equity, and mortgage-backed securities. This familiarity should make market participants comfortable with the introduction and initial use of HOMES. I predict that if a residential financial services firm with a strong reputation were to offer HOMES, there would be demand from both homeowners and investors.

Section II: Further Research

Though HOMES have been well thought out and offer significant economic value to all housing finance participants, there are some questions left unanswered. In this section, I outline the topics which merit further research.

Potential conflicts with the first position mortgage holder need to be further addressed. Though, for the extensive reasons I mentioned in Chapter Four, I believe that the presence of the HOMES claim benefits the first mortgage lender more than potential conflicts of interest might harm the lender, the issue should be more thoroughly researched.

In 1997, the Joint Center for Housing Studies of Harvard University estimated the 1995 owner-occupied, residential housing value to be $7.2T, with $2.6T in mortgage obligations and $4.6T in housing equity. The State of the Nation's Housing. "Joint Center for Housing Studies of Harvard University". 1997.

HOMES' exact legal position is uncertain, because the concept is entirely theoretical. However, the second mortgage position claim is widely used and readily enforced. And the HOMES product is identical to some commercial property, second participating mortgages. Therefore, based on precedence, it is likely that the HOMES vehicle will have no problem operating and defending its claims in the legal environment. It will be meaningful to confirm that a percentage appreciation lien is legally permissible in most states and that this type of product is legal for use in residential finance.

I have shown that at least 50% of homeowners do not undergo any major improvement projects. This half of homeowners, which does not make major additional capital investments after the purchase date, should have no opposition to HOMES' inability to revalue paid-in-capital. However, it is worth developing a method to value home improvements, so that the half of homeowners who do make improvements and renovations can consider using HOMES capital, conflict free.

I believe that the modified WACC equation I introduced in Chapter Three produces a reasonable measure of the required return from the HOMES investment. Nonetheless, it would be an interesting exercise to use an option-pricing model to measure the risk of the HOMES capital investment and derive an alternative risk adjusted return. While a sophisticated analysis would use a multi-period approach, a simplistic method could use a trinomial, decision tree, option payoff valuation, where the down leg is foreclosure and recovery, the middle leg is capital return with no appreciation, and the up leg is a percentage payoff.

In Chapter Four I highlighted the price/yield relationship of a HOMES pool. While it seems likely that a HOMES pool should have call protection when interest rates drop, the magnitude of the call premium is difficult to predict. This is because the probability and amount of the appreciation payments from the HOMES mortgages are linked to the change in interest rates. I am sure a great deal of research has been done on the effect of the change in interest rates to the value of homes. A very complex and interesting analysis would further that research and try to measure the effect and the value of interest rate movements on pooled HOMES claims.

One of the primary risks of the HOMES proposal is the increased chance for moral hazard that the reduced homeowner equity claim will induce. It will be important to study the human propensity towards moral hazard and the nature of that risk in light of changing ownership conditions. The findings can be applied to further examine the dynamic of the homeowner equity to HOMES equity ratio.

The potential homeowners attracted to HOMES capital will possess various capital resources, income levels, and credit histories. Using robust econometric credit scoring, extensive default experience, and the moral hazard conclusions from the above research, one can develop parameters for the relationship between the homeowner:HOMES capital ratio and the required appreciation claim. A sliding scale needs to be developed which takes all of these factors into account.[243]

While the IRRs of HOMES are within the norms of equity returns, the risk-adjusted returns prove HOMES to be an unprecedented investment opportunity. It is important to note that some of the transaction costs I estimated may be higher (e.g.: closing costs, servicing fees), which would reduce the returns of the HOMES, but not significantly.

Further understanding of PMI will not necessarily directly improve the success of HOMES, but it may promote a better comprehension of the alternatives homeowners will compare HOMES to. It would be interesting to determine the cost of PMI using option-pricing theory, as a continuation of the calculation of the "effective cost" of PMI, which I began in Chapter Four. If the option pricing model predicts a lower cost of PMI than is effectively being charged, then this would be another economic method of proving why homeowners dislike PMI and avoid paying it.

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[243] Generally, a homeowner with high debt capacity & low equity resources will require a low homeowner:HOMES capital ratio. A homeowner with limited debt capacity & some capital will develop a higher homeowner:HOMES capital ratio.

In review, while I believe that the statistical, financial, and analytical methodologies I used in this study were sound, there are serious questions that are raised by my research. The potential benefits from the successful creation of a HOMES vehicle motivate my quest to answer them. These questions will form the basis of my future work.

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