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How Housing Busts End: House Prices, User Cost and Rigidities During Down Cycles

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December 15, 2008

This paper could not have been written without the help of Rachel Hamilton, Milena Mereva, and Ratha Ly.

I. Introduction

Property markets have always been cyclical, and many economists have explored the causes and consequences of cyclicality in housing and commercial real estate. Indeed, re than a half century after the great depression, the National Bureau of Economic Research (NBER) regularly explored linkages among real estate investment, mortgage credit, and aggregate business cycles. (See, for example, NBER volumes by Wickens and Foster, 1937; Blank, 1954; Abramovitz, 1964; and Zarnowitz, 1992.) The regular boom and bust cycles in real property were important in their own right, but also as key components of the aggregate business cycle.

In previous work, we have analyzed the way housing booms at the top of the business cycle tend to unwind, relying upon the experience of the U.S. over the past 35 years (Case and Quigley, 2008). In that analysis, we sought to emphasize the unique aspects of housing markets that contributed to the end of the boom in the U.S. economy in the 21st century.

But by 2008, however, the decline in the U.S. housing and mortgage markets had moved far beyond the unwinding of a traditional and well understood housing boom. We are in the midst of an unprecedented decline. Housing starts and existing sales are at record low levels, and the huge U.S. mortgage market has collapsed in a sea of defaults and foreclosures, sending shock waves through the world financial system. Trillions of dollars in what were thought to be "safe" fixed-income investments have been wiped out in a short period of time.

Now the questions are: When and how will the current severe decline be arrested? When will the market return to some sense of normalcy? How far will prices decline?

How large will financial losses be? Who will ultimately bear those losses? What can we do to avoid a disaster like this in the future?

This paper does not pretend to answer all of those questions, but instead to provide some insight about the economic factors that will ultimately determine those answers.

Our focus will be on the housing market and home prices. Section II presents a quantitative history of the movement of house prices in the United States between 1975 and 2008 including the impact of the boom and bust cycle of 2000-2008 on the national balance sheet and the historical relationship between housing prices and household income over the cycle.

Section III describes the traditional process of disequilibrium adjustment which is unique to the housing market, and which has played it self out during every previous recovery period. This housing bust of 2005-2008, however, is different in a variety of ways making the task of predicting the timing and the character of the ultimate bottom difficult.

Section VI presents a perspective that helps integrate the effects of the important, but seemingly disparate, aspects of the current housing crisis in the U. S. These aspects include house price changes, expectations about price changes, the demand for housing, and the imperative for relaxed mortgage underwriting standards in the U.S. during the period leading up to the crash in the housing market. This perspective is the annual user-cost of housing capital -- which drives the demand for housing and homeownership, the demand for housing finance, and the demand for liquidity in the housing market. This perspective also reconciles the demand for relaxed standards of mortgage finance and the profitability of those alternative mortgages to financial institutions.

Section V is a brief conclusion.

II. House Prices and Land Values in the U.S.

A. A Brief History of Housing Cycles in the U.S. Since 1975

There are several regularities in the course of house prices in the U.S. during the past 30 years. First, in nominal terms national house prices simply never declined until 2006. Second, in real terms national housing prices have been mildly cyclical with long periods of ups and downs. Third, regional cycles and local housing prices have followed a number of quite different courses depending on variations in the elasticity of housing supply and in regional economic performance. And since 2006, prices have been falling very sharply across the country.

The OFHEO national quarterly repeat sales index, reported in Figure 1, rose nearly six fold in nominal terms between the beginning of 1975 and the end of 2007. Figure 2 plots of the S&P Case-Shiller (CS) national index, arguably a more precise measure of price movement, but one that is available only after 1987. The CS index declined in only two quarters in 20 years: one quarter in 1990 and in another quarter in 1994. In both cases the decline was less than half of one percent. Nominal prices rose at an annual rate of six percent overall, but the data also reveal a rapid acceleration around the year 2000. Between Quarter 1, 2000 and Quarter 1, 2006, the CS national index rose by 90 percent.

Table 1 compares the increases in home prices with income growth and inflation. For the same period, 1975 through 2007, the Consumer Price Index rose four fold, implying an annual rate of increase of about 4.5 percent. Per capita personal income grew at the same rate as house prices while median household income did not keep pace.

Figure 3 shows the OFHEO national index in real terms. The data indicate four time periods when real prices declined. Until 2006, the largest decline was recorded in the late 1970s and early 1980s.

In a number of regions boom and bust cycles led to more substantial periods of decline. Table 2 presents a rough chronology of the ups and downs of home prices in the U.S. based on CS metro area indexes repeat sales indexes produced by Fiserv CSW. Between 1975 and the late 1990s, major price booms occurred in California (twice) and the Northeast. Major busts occurred in Texas, the Northeast and California.

In 1975, the economy was in recession. During the subsequent period of recovery, California experienced a substantial housing price boom, with nominal home prices rising 139 percent. During the same period, house prices in the rest of the country only rose about half as much, by 64 percent. That boom ended with the deep "double dip" recession of 1980 through 1983. At the time, the 30 year, fixed rate mortgage carried an interest rate as high as 18 percent, and the overnight Fed Funds rate was above 20 percent. Demand dropped sharply and many expected to see a sharp drop in home prices. However, nominal prices in California never fell. Instead, prices stood essentially unchanged from 1981 to late 1984 when the next boom began. In the nation as a whole, real home prices peaked in 1980 and did not return to this level until a decade later.

Between 1980 and 1985, the recession ended, inflation subsided, interest rates fell, and by the end of the period nominal house prices had increased by 25 percent. But they were still substantially below their 1980 peak, at least in real terms.

From 1985 to 1990, regional variations in housing market conditions were substantial. First, the "oil patch" states, which had never experienced much of a housing

price boom, experienced sharp declines. The "oil rich" states, including Texas, felt the economic effects of ten-dollar-a-barrel oil, declining employment, and aggressive bank examiners. Texas and the West South Central region as a whole saw prices fall 14 percent in nominal terms and reached a trough after 10 quarters. But steeper declines were felt in states like Oklahoma where nominal prices fell 24 percent, and the bottom was not reached for two full years. The impact of the economic reversal on mortgage defaults in these markets was enormous.

But precisely as Texas and the oil rich states were in decline, the Northeast and California housing markets were booming. House prices more than doubled in the Northeast in a period of four years, beginning at the end of 1984 reaching a peak at the end of 1988. The second California boom, which nearly doubled prices throughout the far west, was in full swing as the bubble in the Northeast burst in 1989.

Both the Northeast boom and the second California boom were followed by downturns of significant magnitude. Prices fell 13 percent the Northeast where a bottom was reached in 14 quarters. In California nominal prices fell by 14 percent, and the trough was not reached for 20 quarters. As in the Southwest a decade earlier, there was considerable variation within the region. In San Diego prices declined by 17 percent, and did not hit bottom for six years. The timing of the "rolling recession" and the overlapping housing market cycles kept national home price indexes rising steadily, with only modest cyclicality overall. There were no expansions or contractions in the housing market at a national level until 2000.

But beginning rather suddenly in 2000, regional housing markets in the U.S. began to move together. Over the next six years, very rapid acceleration occurred at the same

time in many regions, states and metropolitan areas. At the national level, prices increased nearly 90 percent from 2000 to the peak in 2006. The CS composite indexes rose by more than 100 percent.

The last part of Table 2 shows just how strong the 21st century boom was. The largest house price increases were in Miami, where prices increased 181 percent between 2000 and 2006. Los Angeles was just behind at 173 percent, with both Washington D.C. and San Diego recording price increases of over 150 percent. Note also that the largest increases were in the lowest tiers of the house price distribution. In Miami and Los Angeles, the average property in the lower tier more than tripled in price. Just behind them were San Diego, Washington and Las Vegas.

House prices in some cities and regions were less volatile. Cleveland, Dallas, Atlanta, Denver, Detroit and Charlotte had steady house-price growth of 23 percent (Atlanta) to 40 percent (Denver) – but with no real boom in their local economies. However, prices in these cities declined later, at the same time that prices declined in those cities that had experienced the more dramatic run ups in economic activity and in local house prices.

Table 3 reports data that were released in November 2008, indicating the extent of house price declines since the peaks of the local markets (which occurred at different times in different cities). The current decline began in September, 2005, in Boston. Since that time, prices have declined by over 11 percent in Boston. Overall prices in Boston have declined in a pattern that seems to be similar to the bust that occurred in 1988-1992. The pattern in New York is similar.

The most severe declines have been in Las Vegas, Miami and Phoenix where prices have declined just under one third from their peaks in late 2006 and May 2008. Next comes California with prices in San Diego, Los Angeles and San Francisco all down 25 to 30 percent from their peaks. House prices are also down by more than 20 percent in Tampa, Detroit and Washington D.C. Holding their own, but still in decline, year over year, are Charlotte, Dallas, Portland, Seattle, Denver and Atlanta have experienced price declines of 10 percent or less.

For the first time in many decades, U.S. housing prices are declining virtually everywhere – the S&P CS national index is down 18.8 percent from the peak through the 1st quarter of 2008.

B. Housing on the National Balance Sheet

Another way to view housing prices and asset values is through the lens of the national balance sheet. Case (2006) has recently provided a rough estimate of the value of land and residential structures in the United States over time. The methodology employed estimates the total value of the residential stock from Census and OFHEO data on the total number of housing units and prices at the state level. Asset data reported independently in the Flow of Funds (FOF) are generally consistent. In 2000, total housing assets were about $14.8 trillion.

To distinguish between capital and land, the replacement cost of housing capital is estimated each year from construction cost data assembled by the Residential Construction Branch of the Census Bureau. The difference between replacement cost and market value is the value of land.

Table 4 reports the course of asset values in housing since 2000 in the U.S. since 2000 using the FOF methodology. Between 2000 and 2004 a total of $10 trillion was added to residential assets -- the result of a substantial and sustained building boom. This new construction added over 9 million units. In addition, there was substantial spending on home improvements as well as large increases in land values. The division between new capital and new land was about $5 trillion each.

The bottom row of Table 4 shows what has happened to the value of the residential stock as of the first quarter of 2008. The combination of new residential investment and the revaluation of capital value (due to increases in replacement costs) implies that the aggregate value of residential structures increased by $1.96 trillion since 2005. At the same time, land value has declined by $1.68 trillion. If we confine the analysis to *owner occupied* homes held by households, the aggregate value was $19.82 trillion at the end of 2005. Despite the fact that homebuilding and renovation were extensive in 2006 and 2007, the aggregate value of the owner occupied stock declined by almost $100 billion to $19.72 trillion. The home mortgage liabilities of the household sector increased from $8.61 trillion to $10.60 trillion during the same period. Over two trillion in additional debt was added to the household balance sheet -- with no corresponding increase in collateral.

C. Income and House Prices

One of the key determinants of effective final demand in the housing market is, of course, income. In this section, we describe the movement of home prices and local

income over the cycle. One view is that prices will stop falling when house price to income ratios return to "normal levels."

First of all, in many states, these ratios were quite stable over time. Case and Shiller (2003) explored the relationship between changes in home prices and one measure of income using state data. From 1985 though 2002, they found a relatively stable relationship between per capita personal income and housing prices in 43 states. In the remaining 8 states, the relationship was quite cyclical and very volatile.

Volatility seems to have increased. In 2008, metropolitan area housing markets seemed to fall into one of three regimes: the flat markets, the single peak markets and the markets exhibiting regular economic cycles. In most of the country, markets are flat. Figures 4 and 5 show this pattern for five metropolitan markets: Chicago, Charlotte, Dallas, Memphis, and Pittsburgh. In these cities, house prices have not increased markedly relative to income. On the contrary, prices have fallen relative to income in most time periods. The ratio is relatively constant, except in Chicago.

The single peak states are Miami, Phoenix and Las Vegas. Figures 6 and 7 indicate a remarkably similar pattern for Phoenix and Miami. Phoenix is perfectly stable with a ratio of housing prices to income of 5 from 1989 through 2000. The ratio then rose slowly to a value of six in 2004 before jumping up to 9 in 2006 and falling immediately back to 6 in 2008. Miami was stable at a ratio of 6 until 2000, after which it rose slowly to a value of 7 in 2004 before jumping to a high value of 12 in 2006 and falling back to 8 by 2008. This same pattern is present in Las Vegas.

In the Northeast and in California (Figures 8 and 9) the boom-bust cycle has been virtually continuous. The ratio of home price to per capita income in Boston rose from 7

to 11 during the boom which ended in 1988. This was followed by a decline back to a value of just above 7 by the mid 1990s. Beginning in 1999, the ratio again rose sharply -- peaking at the end of 2005 at a value of 12. By the end of the first quarter 2008, it was back down to a level of 10. A similar pattern can be found in data for New York and for the New England region.

In Los Angeles, the pattern is the same but the ratios are higher. For California, the ratio of house prices to income started at about 7 in the mid-1980s, then rose to just under 11 by 1990 before beginning a 7 year decline back to 6 by 1997. From 1997 to 2001, it rose slowly and then accelerated to 16 by the peak in 2006. Finally the California ratio fell back to 11 by mid-2008.

Certainly, the very high ratios in California and the Northeast suggest that increases in the price of housing preceded the course of income growth. Since the peak, prices have fallen quite significantly, however, and they are likely to continue falling into the future.

III. The Market Clearing Processes in the Housing Market

In August, 2008, housing markets were plagued by an excess supply of property for sale. Demand is down in some regions because of an ailing economy. Turmoil in credit markets led to a credit crunch and higher long term interest rates. In many cities there was a glut of speculative vacant units; in others, the market was flooded with foreclosed property as the result of mortgage defaults or tax arrears. Pessimism about the course of house prices was discouraging demanders.

Regardless of the cause, two kinds of market clearing processes were at work as the markets searched for a bottom: the *price clearing* auction process and the *quantity clearing search process.*

Certainly, in any market there exists a schedule of prices that will clear the market. If all the houses currently for sale were auctioned each day and sold to the highest bidder, the market would clear every day. Price would simply fall until every property found a satisfied bidder. In the Fall of 2008, a lot of auctions were taking place. In fact in early 2008, about 20 percent of all existing homes that sold were sold out of foreclosures, most of those at auction.

In a quantity clearing process, the market again starts with a high inventory of unsold homes sharply. Prices are sticky as buyers bid low and sellers hold out. Housing production falls. Since homes "do not sell," the inventory of unsold property remains high. Household formation continues and new households and in migrants absorb the inventory at softer prices; production eventually rises with only small declines in recorded transfer prices.

Combined with the well-documented fact that the housing market is likely to generate bubbles (see for example Case [1986, 2000], Case and Shiller [1988, 1989, 1990, 2003] , the quantity clearing process generates a cycle which has played itself a number of times.

With price inertia, house prices increase and over shoot, demand slows, presaging the next cycle. The process is self reinforcing because housing production is a large component of aggregate demand. When production falls, it slows the economy which

slows demand growth. Case and Quigley (2008) report quite large income effects from the contractions in housing production that the U.S. has experienced over the years.

An essential component of the quantity clearing process in the housing market has been sticky prices. Strong evidence of this stickiness can be found simply in the inventory of unsold homes which rises dramatically at the beginning of every downturn. Many properties remain available on the market for months and sometimes years. Direct evidence can also be found in the responses of housing market participants to survey questions. Buyers who sold properties prior to buying in four metropolitan areas (Orange County California, San Francisco, Boston and Milwaukee) were asked, "If you had been unable to sell your home for the price that you received, what would you have done?" In the first survey in 1988, of the total of 254 respondents, 37 percent said that they would have "left the price the same and waited for a buyer, knowing full well that it might take a long time." Another 28 percent answered that they would have taken the house off the market or rented it. In addition, 30 percent answered that they would have "lowered the price step by step hoping to find a buyer." Only 5 percent (12 respondents out of 254) answered that they would have "lowered the price until a buyer was found."

The same survey was conducted two decades later in the same metropolitan areas. In the spring of 2008, the survey showed that individual sellers had become much more likely to reduce price when demand declined, but a surprising number were still prepared to hold out. While 5 percent said they "would have lowered the price until they found a buyer" in 1988, more than 20 percent would have adopted this strategy in 2008.

Downward stickiness has been most evident when declines in demand are triggered by mortgage rate increases, and when most potential sellers have non assumable

fixed-rate mortgages. A clear illustration could be observed at the end of the California boom which lasted to the 3rd quarter of 1980. During the boom, house prices in the state rose dramatically, increasing 170 percent. But in 1980, interest rates increased sharply. The double dip recession had dampened housing demand in the state, but the combination of high interest rates and the recession caused the housing market to contract sharply. But prices in California never fell in nominal terms in the ensuing period. One reason was that, with non assumable mortgages, house sellers would have lost the economic value of low fixed-rate mortgages. It is interesting to note that Vancouver experienced similar price increases at roughly the same time. But long-term fixed-rate mortgages do not exist in Canada. As a result, the increased interest rates led quickly to higher required house payments. Demand declined quickly, and nominal prices declined by about 60 percent in a very short period of time.

It is important to note that when demand shifts and prices stick, some agreements are nevertheless reached and some properties do sell. The buyers are those whose income or wealth allow them to participate in the market and whose preferences for specific units are strong. The market is thin, but the sales prices recorded are genuine.

Figure 10 and Table 5 illustrate the quantity clearing process at the macro level and show just how regular the cycle has been. Since the early seventies, we have witnessed four major housing cycles. Housing starts peaked in 1973, 1978, 1986, and 2006. In the first three cycles starts then fell by over 60 percent to less than a million. Historically, the trough is reached at about one million housing starts. In the most recent cycle, starts hit exactly a million in December, 2007 and then declined to about 791,000 one year later.

Table 5 indicates the regularity of past housing cycles. Historically, real gross residential investment is about 5.6 percent of real GDP at the top of the cycle.. At the bottom of the last three cycles, the same ratio dropped to about 3.5 percent of real GDP. More recently (October 2008) real gross residential investment declined to 3.0 percent of GDP, and it shows no sign of rising soon.

The homebuilding sector is the only major industry that in a normal contraction loses over 60 percent of its business. In 2007, the average cost of a new home was roughly $300,000. After subtracting land and imports, roughly $240,000 in new residential construction is added to GDP for each housing start. With housing starts down to 791,000, a total of 1.47 million housing starts were foregone. That is a demand shock of just $350 billion. It also confirms the magnitude of the reported decline in gross private residential investment from a peak at $808 billion to $479 billion (nominal). With a multiplier of 1.4, this yields a decline in aggregate demand and a loss in GDP of 3.2 percent.

If the current decline were like past declines, the bottom would be in sight. It is not. The reason is that a large current inventory of delinquent mortgages threatens to flood the market with additional units to be auctioned out of foreclosure.

D. What is different about this Cycle?

The events that unfolded in the U.S. financial markets beginning in 2000 were unprecedented. Figure 11 chronicles the period. It relies heavily on the work of Greenspan and Kennedy (2005, 2007). The national housing boom between 2000 and 2007 described earlier has roots in the prior turmoil in financial markets. The rapid

decline of high tech industries, the stock market collapse in 2000 and 2001, and the slow level of technology investment led to a relaxed monetary policy in an attempt to stimulate the economy. In January 2001 the Federal Reserve cut the target Fed Funds Rate by 50 basis points from 6.5 percent to 6 percent. By the end of the year, the target Fed Funds rate had been cut 11 times to 1.75 percent.

At the time the easing of credit began, the 30 year fixed conventional mortgage rate was 7.17 percent, down slightly from the 8.3 percent that it had averaged for the first 9 months of 2000. By the time the Fed Funds rate hit 1.75 percent in the fourth quarter, the conventional fixed rate mortgage was down to 6.39 percent. The Fed Funds rate continued on its downward trend until it hit 1 percent in June of 2003 where it stayed for over a year. By that time, the conventional 30 year fixed-rate mortgage carried an interest rate of 4.6 percent. This easing was accomplished with a massive injection of liquidity which clearly put pressure on yields and margins everywhere.

In terms of affordability, a $300,000 conventional 30 year fixed rate mortgage with 20 percent down at 8.3 percent requires the monthly payment of $ 1,811 before tax benefits. With the mortgage rate at 6.39 percent, the monthly payment is $1,500. With a 4.6 percent interest rate, the monthly payment is only $1,230. Thus, the expansionary policy pursued during this short period reduced the monthly cost of buying a home by almost a third.

If the point had been to stimulate the mortgage and housing markets, it certainly worked. Housing production and sale of existing homes boomed. In October of 2001 there were about 1.52 million housing starts annually. By the end of 2003 housing starts had increased by a third, to well over 2 million. Existing home sales were 5.2 million

annually at the beginning of 2001 and were 6.5 million by the third quarter of 2003. There is little doubt that the housing market kept the economy out of recession through the turbulent times of the early and mid 2000s.

As shown in Figure 11, at the end of 2002, home sales and mortgage volumes exploded. First, low interest rates stimulated demand for refinance. Between the 4th quarter of 2002 and the 4th quarter of 2003, $5.5 trillion in mortgages were originated, and $3.7 trillion were paid off. In five quarters, the total of new mortgage originations was about the same as the entire stock of mortgage debt outstanding in 2001. Seventy five percent of the originations were for the refinance of existing homes.

In June of 2003, mortgage rates began to rise, moving from 4.60 percent to 5.97 percent by August. The third quarter of 2003 saw the highest volume of refinances, with originations of *$942 billion in a single quarter*. Then the refi boom was over. In the fourth quarter, refinances fell by 56 percent.

During the expansion of credit up to the end of 2003, the industry grew and became highly competitive. The sector generated fee income of about 2.5 percent of the $4 trillion in total originations in 2003 -- over $100 billion.

With low default and foreclosure rates and high housing prices, lenders competed vigorously for the business of home buyers. Purchase originations doubled from $239 billion in 2004 to $478 billion in 2005. Much of this business was directed at low income neighborhoods and sub-prime borrowers. Between 2002 and 2006, the market originated $14.4 trillion in mortgages, retired $10.3 trillion in debt, and increased the stock of outstanding mortgage debt to $10.3 trillion from $6.2 trillion. Appendix Table 1 uses

HMDA data to show how lending shifted into low and moderate income tracts in virtually every metro area.

Needless to say, a credit expansion of this magnitude had a major impact on the housing market. First of all, prices rose. As the data in Table 2 revealed, between 2000 and 2006 prices in the bottom tier increased the most -- in Miami by 241 percent, in Los Angeles by 249 percent, and by 200 percent in Washington, D.C., Las Vegas, and San Diego. The CS composite indexes more than doubled, and the national index increased by nearly 90 percent.

At the end of 2005 and finally into 2006, the housing market began to soften. Interest rates rose, and the 30 year mortgage interest rate was back to 6.6 percent by the last half of 2006. Gluts of speculative building occurred in Florida, Arizona and Nevada. Home prices in California and in the Northeast had become very high to relative to incomes. The manufacturing base of the Midwest fell into recession. As expectations turned gloomy in 2006, sixteen of the CS metropolitan areas had price declines in 2005 or 2006. By 2007 all were declining. This had never been reported before.

Inventories rose. In the past, when markets overshot the mark, prices were sticky and adjustment was orderly. With house prices falling nationally, and with the bulk of the newly-written mortgage debt in high loan-to-value loans, mortgage defaults rate rose sharply.

What about underwriting? Over the past 30 years, statistical models of default and foreclosure were developed which seemed to "explain" differential default and foreclosure incidence as a function of borrower and loan characteristics. These models were used by all market participants, sometimes without even knowing it. The most

widely known underwriting tools were “Loan Prospector” and “Desktop Underwriter,” developed by Fannie Mae and Freddie Mac respectively. Their low cost and ease of operation made them the industry standard, and as these models diffused in the market, originators and mortgage insurance companies that did not accept their decisions got little new business.

Their stated goal was to transform the current patchwork risk-allocation process into a more efficient and accurate risk based pricing system. But it was hard, and ultimately impossible, to use information from a thirty-year period of rising house prices in the environment which had changed so rapidly.

Between 2000 and 2005 there was a boom of historical proportions, and it has been described in some detail above. That boom had a credit market underpinning unlike any other in history. Indeed the period 2000-2008 has been one of the truly important economic episodes of the last century. The result was a flood of bad mortgages with millions headed for foreclosure.

By August of 2008, roughly 20 percent of all existing home sales were sold in foreclosure procedures. The result was a large increase in the number of properties thrown into the price clearing auction market, but 80 percent of properties were still trading in the traditional sticky price quantity clearing market process. The extent of housing price decline as the U.S. approaches a bottom depends on the mix of properties actually hitting the market place.

IV. User Costs, Price Expectations and Demand, and Mortgage Finance

The linkage between housing prices, housing and the demand for mortgage credit is more complicated than for many goods because housing represents an investment good as well as a consumption good. The annual flow of services (R, the "user cost") to a homeowner from an infinitely-lived housing asset, V is a simple function of the interest rate i, R=iV. Recognition of depreciation at an annual rate d and residential property taxes at rate t yields the rent relationship

(1) $R1 = (i + t + d) V.$

But property taxes and mortgage interest payments are deductable at rate T from household income for federal tax purposes, at least in the U.S. The interest rate can also be expressed as the real rate j plus the rate of inflation k. Thus,

(2) $R2 = [(j + k + t) (1 – T) + d] V.$

How do changes in the prices of housing affect the annual cost of housing services? By owning the dwelling for a year, the consumer receives the capital gain or loss at the real rate of g. A gain, i. e., an increase in housing prices, reduces the user cost by $(g + k) V$. Moreover, the capital gain is essentially untaxed at realization. This implies that the net user cost to the homeowner in any year is

(3) $R3 = [(j + k + t) (1 – T) + d – (g + k)] V.$

Equation (3) represents the after-tax user cost of owner-occupied housing. (See Quigley, [1998], for an extensive discussion.) Note that at higher real interest rates, the annual cost is higher, but at higher levels of inflation, the user cost is lower. Higher property tax rates increase the user cost, but higher marginal tax rates on income reduce

the user cost. Importantly, increases in the price of housing during any year reduce the average cost of homeownership by the extent of the capital gain.

Changes in these parameters can have large effects upon the annual cost of owner-occupied housing For example, at plausible values of the variables in Equation (3) – say, j = g = 3 percent, t = d = 2 percent, T = 30 percent -- a decrease in the inflation rate from five percent to one percent doubles the after-tax user cost of housing. At k = 3 percent, an increase of real housing prices from two percent to four percent reduces the after-tax housing cost by three quarters.

During periods of high inflation (when nominal interest rates and nominal house price increases are high), there is great concern about the "affordability" of homeownership. As Equation (3) demonstrates, these concerns are not about the cost of housing services at all; rather they reflect apprehension about the inability of potential homeowners to qualify for home finance using conventional underwriting standards. An increase in the interest rate implies a more-than-proportionate increase in monthly payments on a level-payment, fixed-term, self-amortizing mortgage contract. Under conventional underwriting criteria, the income required to qualify for a mortgage increases linearly with the required monthly payment.

It is clear that increases in housing prices make existing homeowners better off. These increases in housing prices also reduce the user cost of housing to potential homeowners, increasing their demand for owner-occupied housing. This increased demand typically cannot not be realized, however, as a result of the constraints imposed by conventional mortgage underwriting standards.

This perspective indicates how the newly synchronized national boom in housing prices in 2000-2005 affected expectations about future price changes. With regular national increases in housing prices recorded, market participants expected price increases in the future. This reduced the user cost of housing for existing homeowners, increasing their demand for housing. It also increased the demand for homeownership among renters, and it reduced their user costs if they could qualify for mortgage finance. Expected price increases in housing also reduced the risks to lenders of relaxing their historical underwriting standards. With expected home price increases, renter who were offered riskier loans to purchase housing were nevertheless good risks for mortgage originators and underwriters. A riskier mortgage loan under conventional underwriting standards (as measured by the income of the borrower or the loan-to-value ratio of the contract) could be more than offset by a rapid increase in asset values and collateral. Loans with low initial interest rates and reset provisions could be attractive to borrowers and lenders, because expected increases in house values could allow the borrower to refinance the loan in a short period at better terms. The same principle made it appear less risky to offer cash-out refinances to owners of existing properties.

The user-cost perspective also suggests why the system came screeching halt in a short period of time. Note, from Equation (3), that the user cost varies directly with the increase in the price of housing. If housing prices increase less rapidly this month than last month, this is an increase in the user cost. This depresses demand and reduces the demand for homeownership. Thus, the dynamic implications of the price boom of the 2000-2005 were inherently unstable. Anything – any exogenous circumstance – that

caused house prices to increase less rapidly could cause prices to decline in the future. The bubble in the housing market was poised to burst.

V. Conclusion

What can we conclude about the when and how the housing market is likely to return to some semblance of normality?

First, two market clearing processes are in full swing. Sales of existing home rose in July 2008, to an annual rate of 5 million. Auction sales currently account for about 20 percent of transactions through the fall of July 2008. The August release of Case Shiller Indexes through June show that, in 9 of the 20 cities covered, prices rose -- some (Boston) for three consecutive months. On the other hand, in the glut cities of Miami, Phoenix and Las Vegas, prices were still falling in June. It is clear that the market is working. The excess supply which had built up over the decade is beginning to work through the system. Next we should expect to see housing starts begin to turn upwards.

How long will it take? All eyes are on California. Representing about 25 percent of the housing value in the country, the national figures will be determined by events in that single state. While prices are still in decline through June, the rate of decline has slowed markedly. Existing home sales in California were up substantially, to an annual rate of nearly half a million. As we have seen, the California economy has witnessed declines before, and it has always managed to come roaring back. It was almost exactly 20 years ago, in June, 1988, when the *Wall Street Journal* carried a headline on the front page about the "frenzy" throughout California home markets.

The extent of the losses is yet to be determined. This will depend on the speed of the legal process, and the rate at which traditional buyers and sellers adjust their bids and asking prices closer together to produce agreements. The two kinds of market clearing processes are both working and average home prices remain in the middle.

It remains to be determined who will bear the costs and who will reap benefits. Clearly those who made their living in the home building sector and in the mortgage markets were hurt severely. Shareholders in Fannie and Freddie, real estate and mortgage brokers, and countless others were hit hard. Home owners have lost trillions in equity. For some, who bought at the peak, it was their life savings or worse. Many turned to bankruptcy; for others who bought years ago in boom cities, it was simply an asset ride. But on the other side, millions of renters – many who have been struggling with no prospect of buying a house -- can now see homeownership at more affordable prices.

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Figure 1
Nominal House Prices (OFHEO National Index)

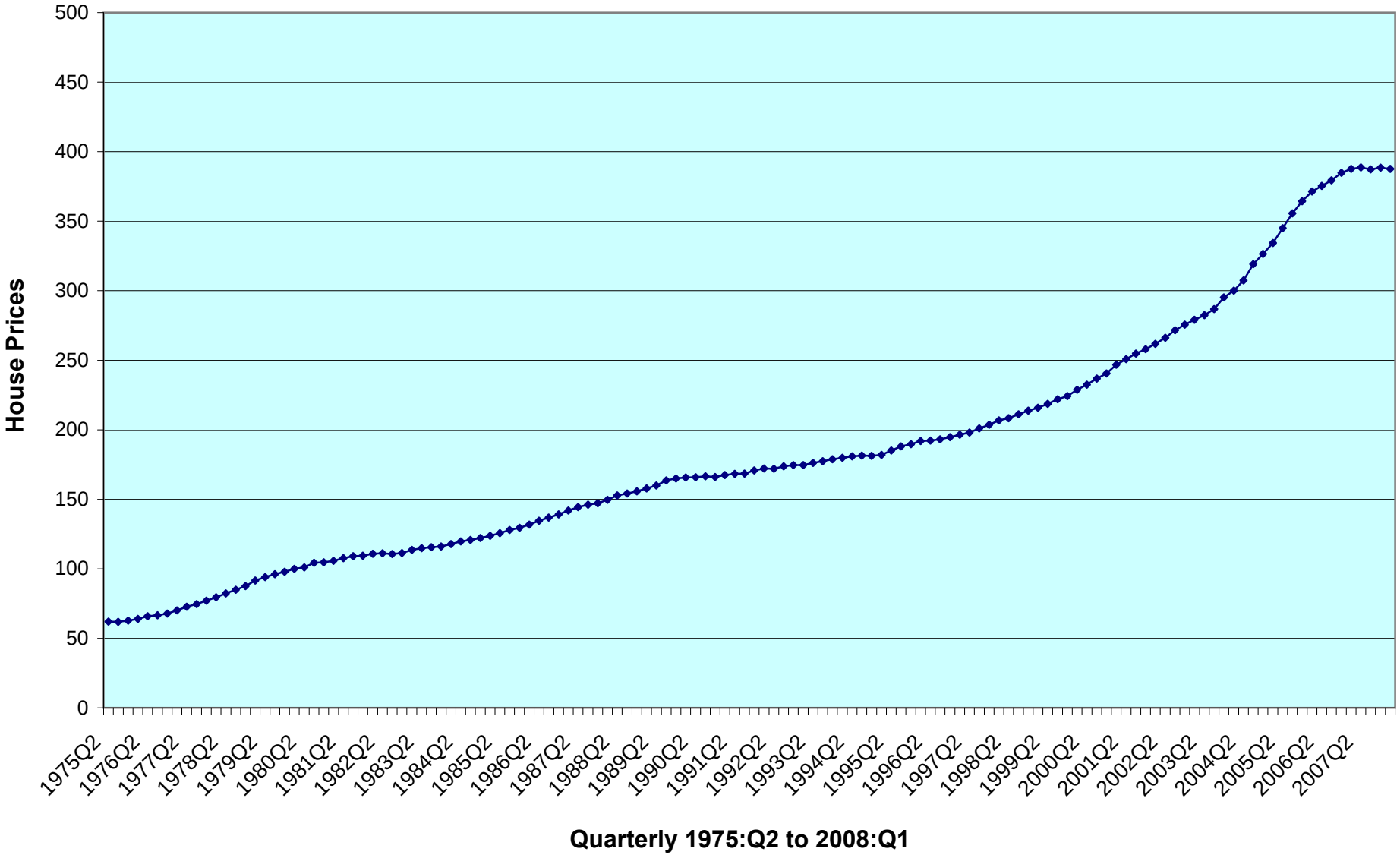
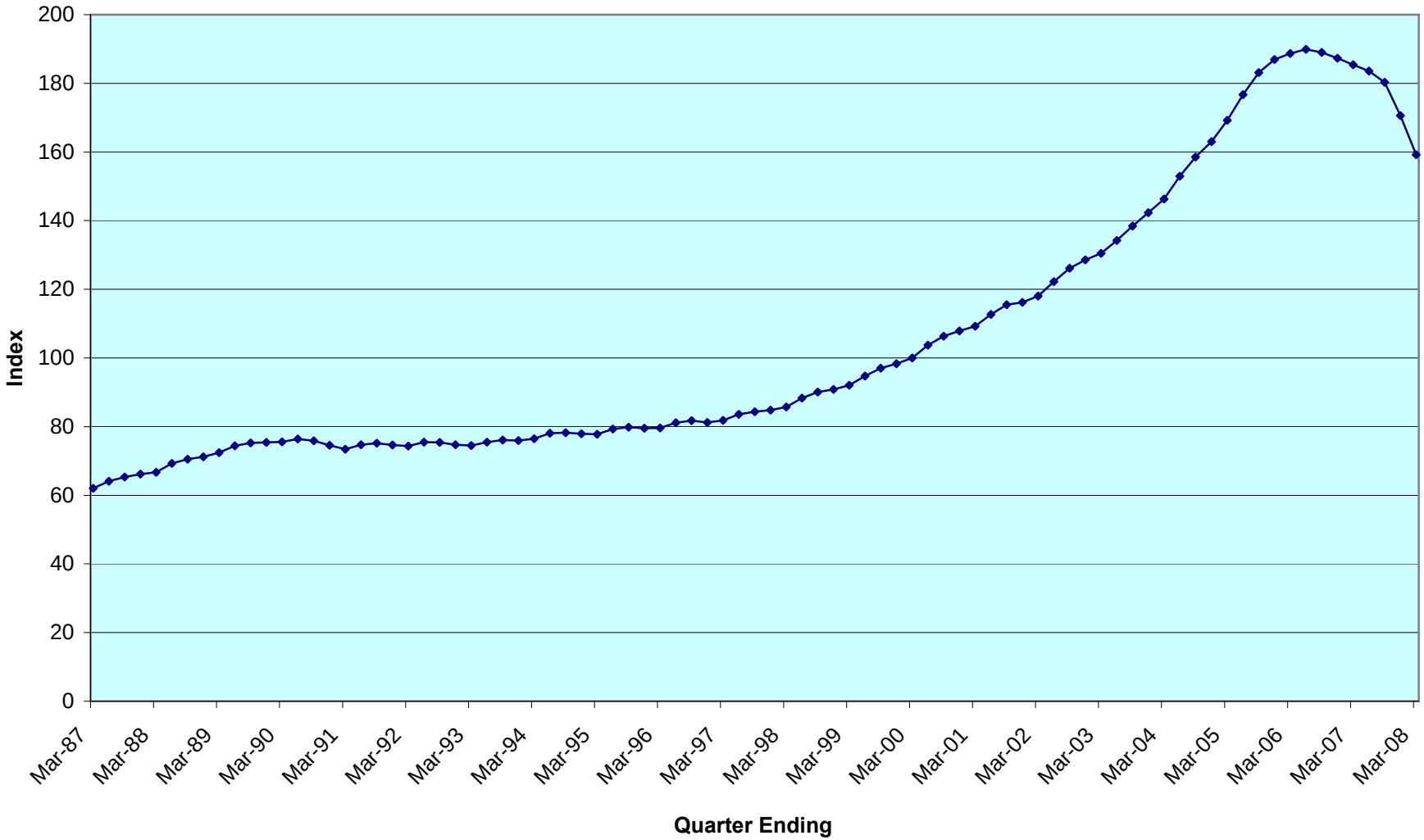


Figure 2
National Case-Shiller Home Price Index, March 1987 - March 2008



Source: S&P Case-Shiller Index

Figure 3
Real House Prices (OFHEO National Index)
House Value Equals $100,000 House in the Year 2000

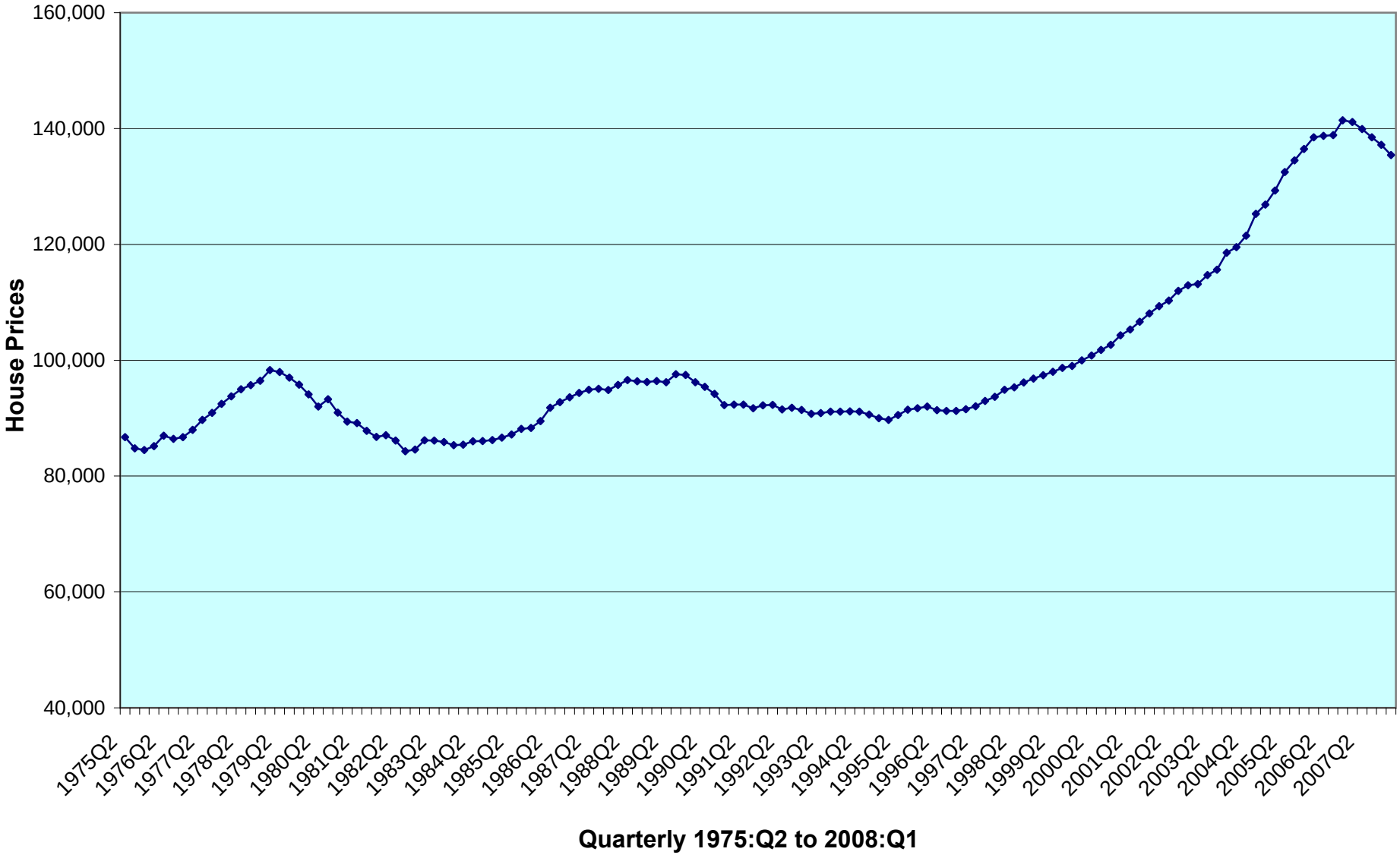
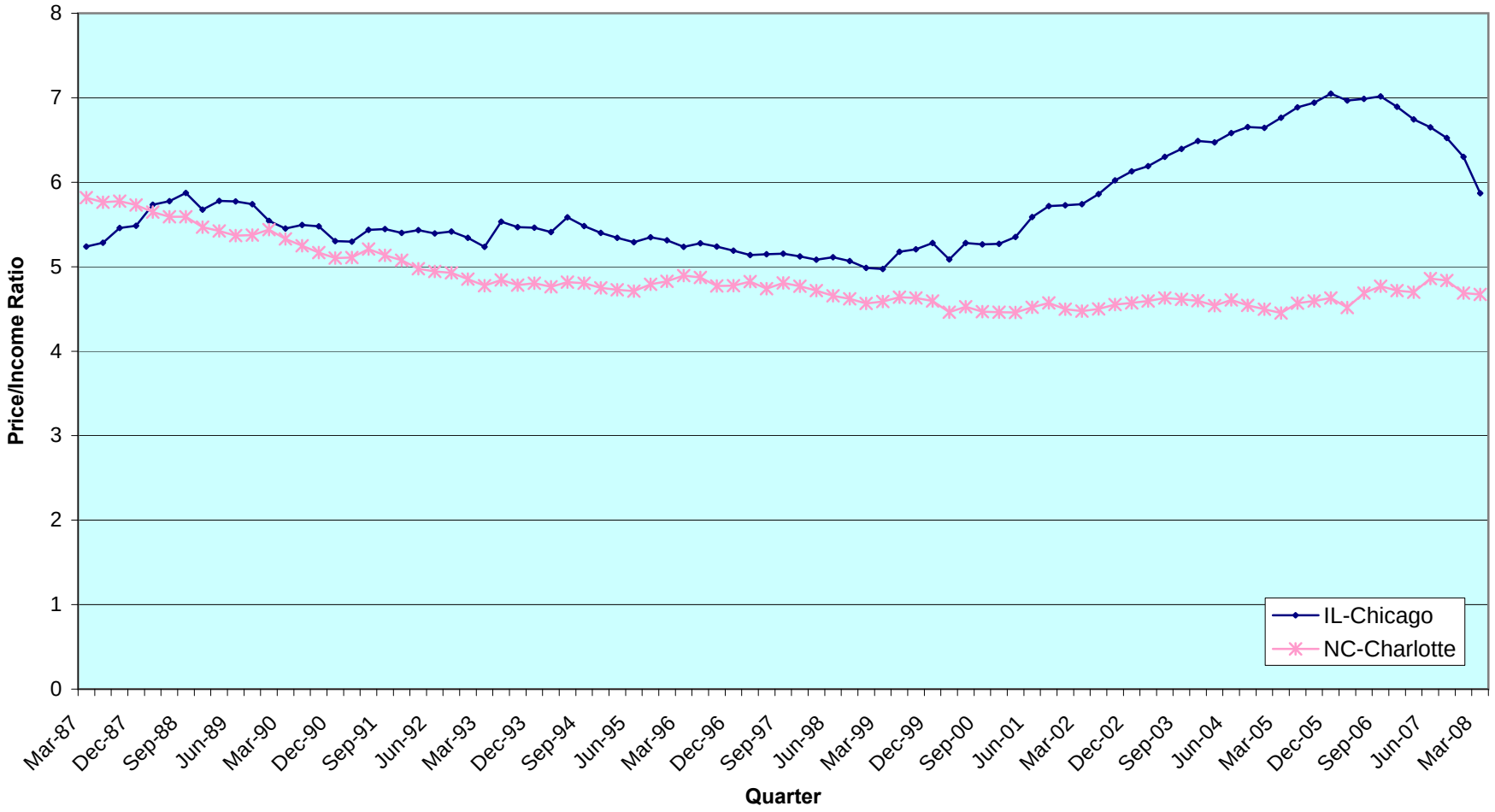
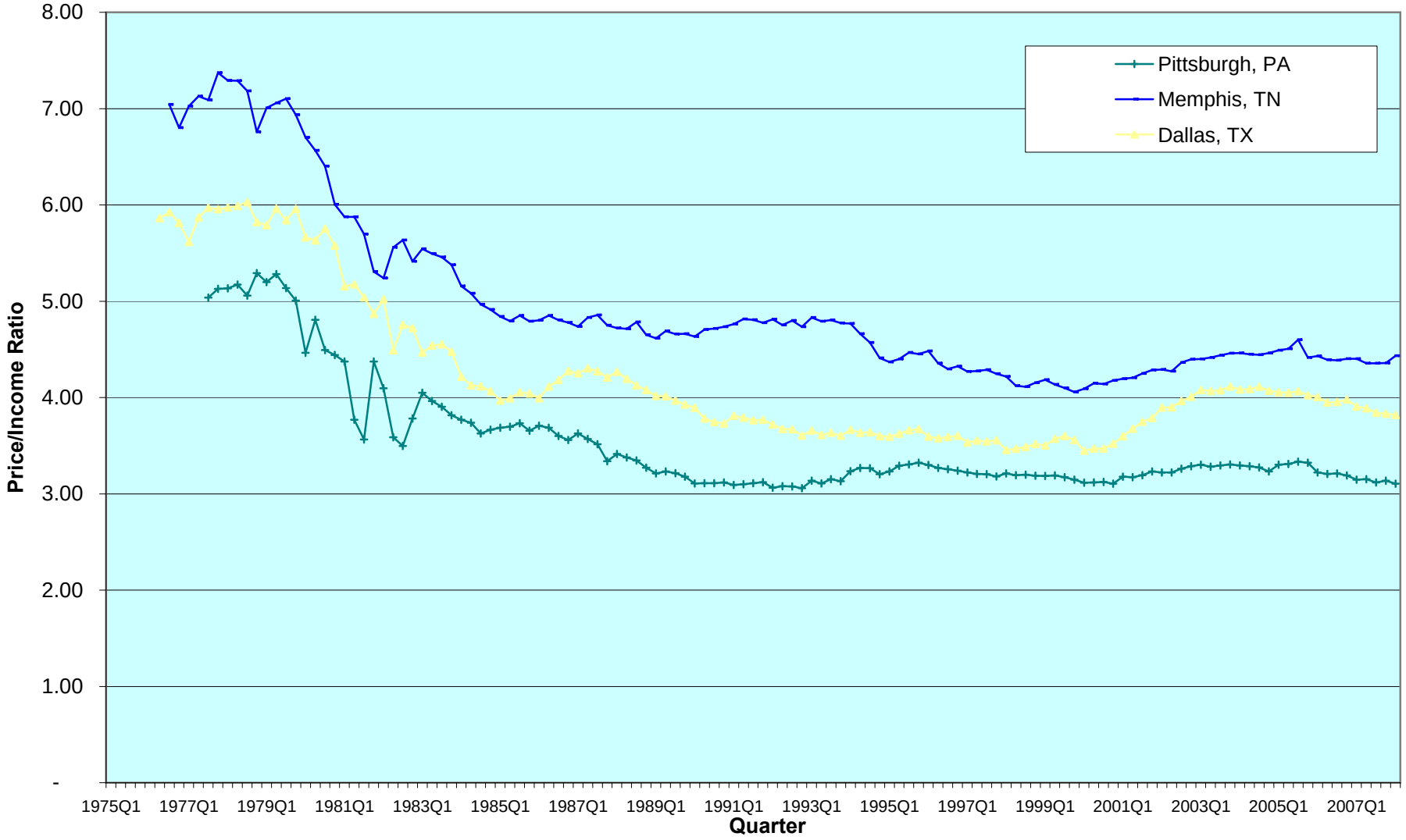


Figure 4
Home Sales Price/Per-capita Income Ratios for Chicago and Charlotte Metro Areas
Q1 1987-Q1 2008



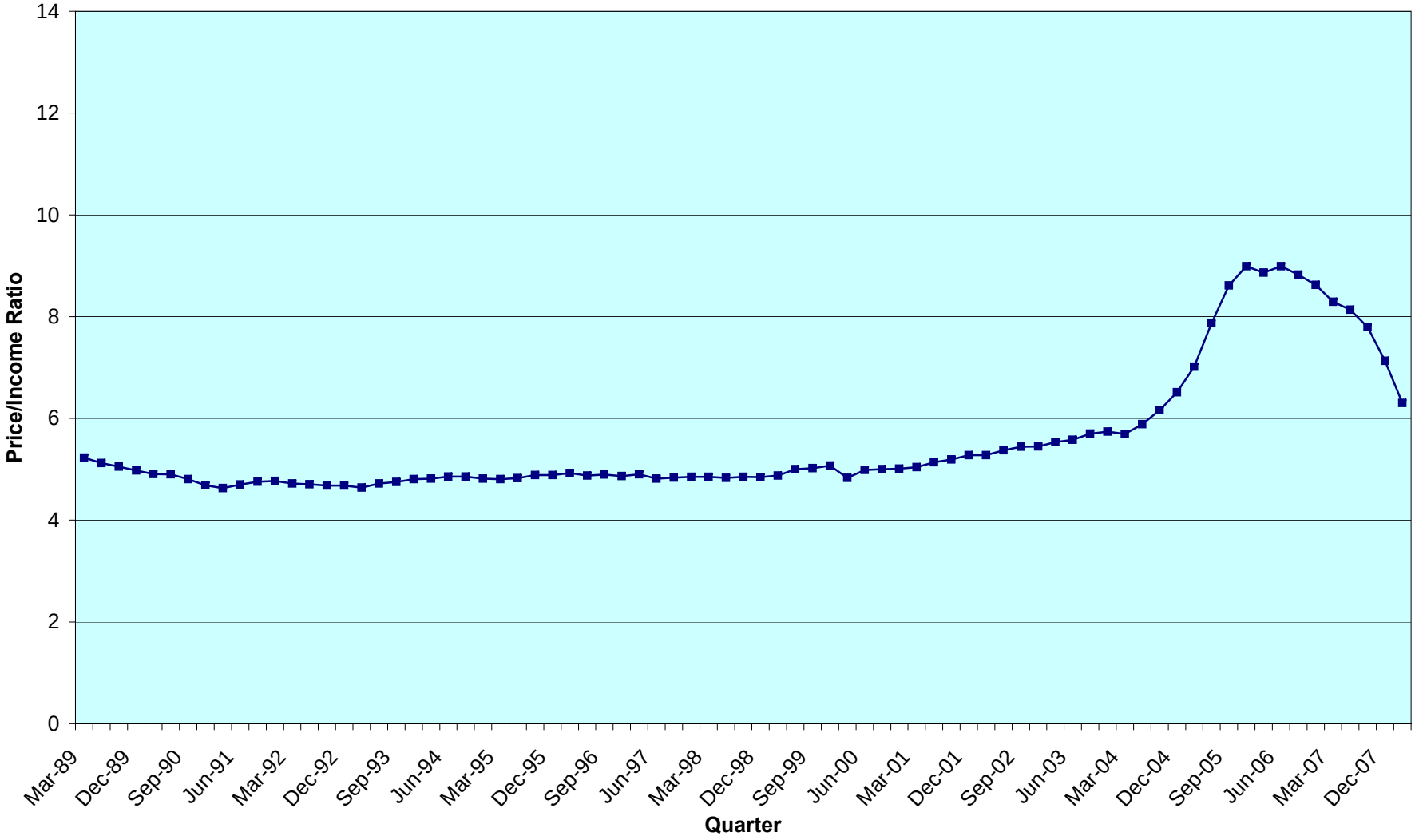
Sources:
S&P Case-Shiller Index; Census Bureau; BEA; Moody's Economy.com.

Figure 5
House Price/Per-capita Income Ratios for Memphis, Dallas, and Pittsburgh Metro Areas



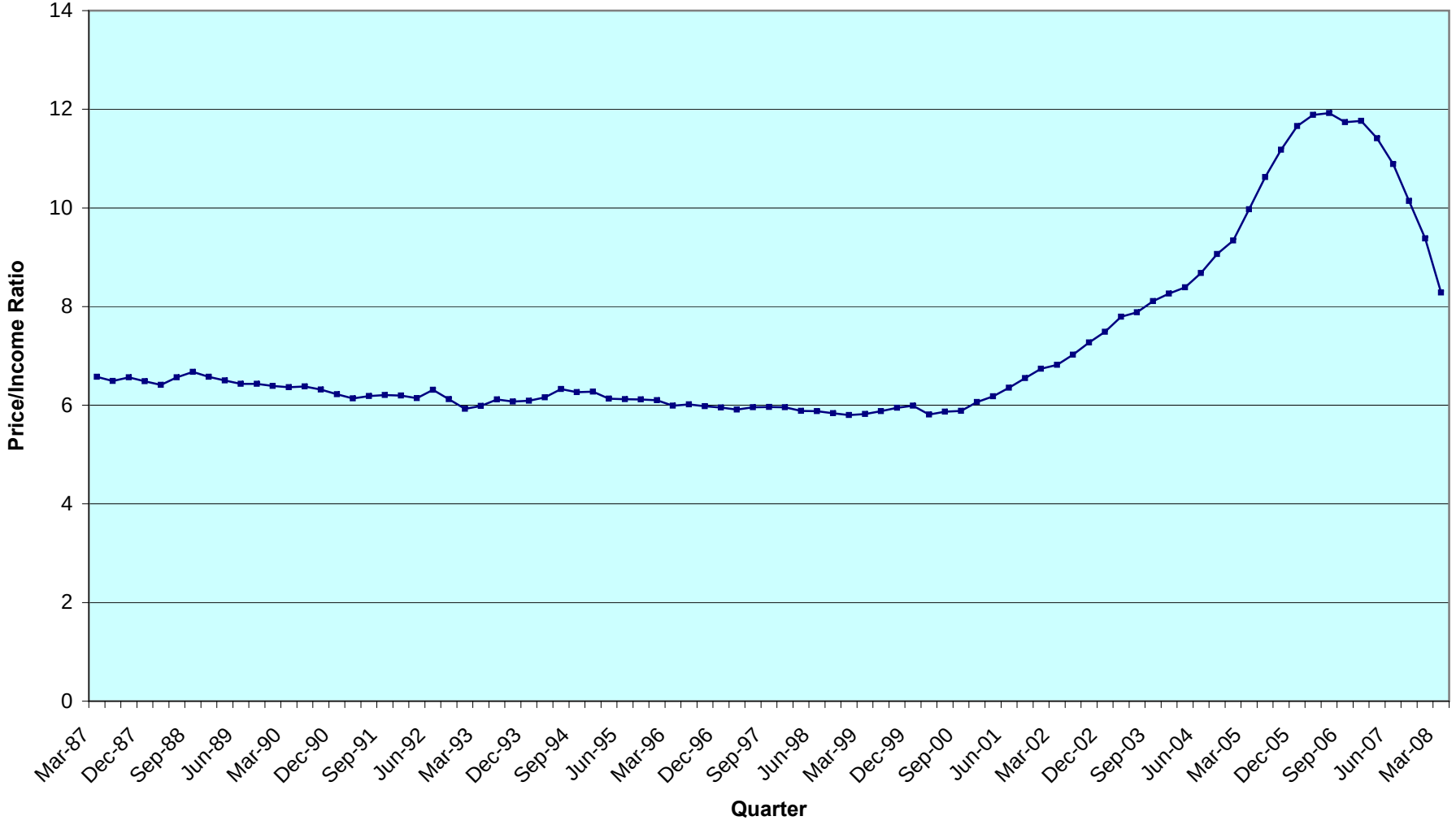
Note: Median sales price of existing single-family houses in 2000 deflated with the OFHEO purchase-only price index for the metropolitan area.

Figure 6
Home Sales Price/Per-capita Income Ratios for Phoenix Metro Area, Q1 1987-Q1 2008



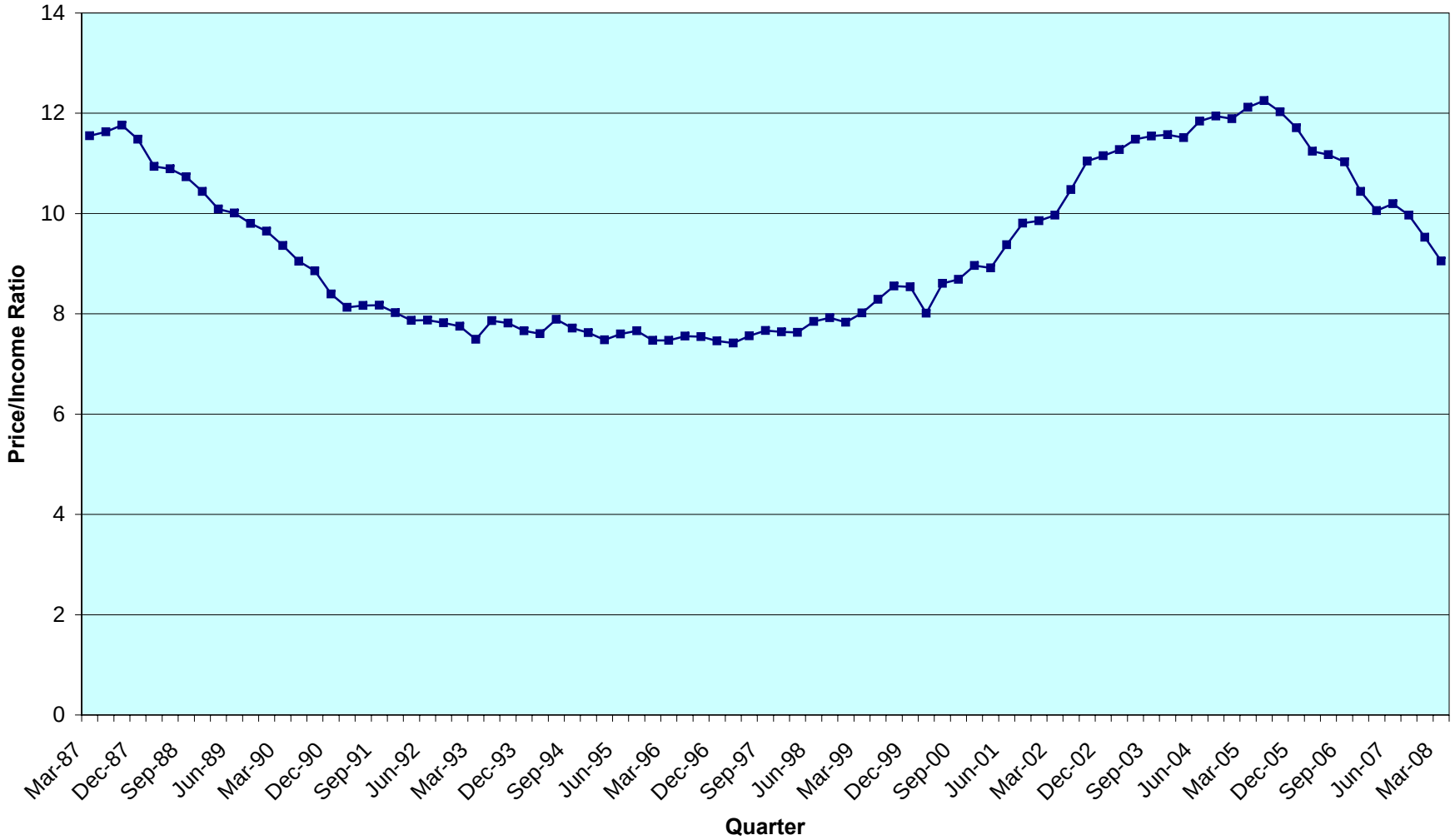
Sources:
S&P Case-Shiller Index; Census Bureau; BEA; Moody's Economy.com.

Figure 7
Home Sales Price/Per-capita Income Ratios for Miami Metro Area, Q1 1987-Q1 2008



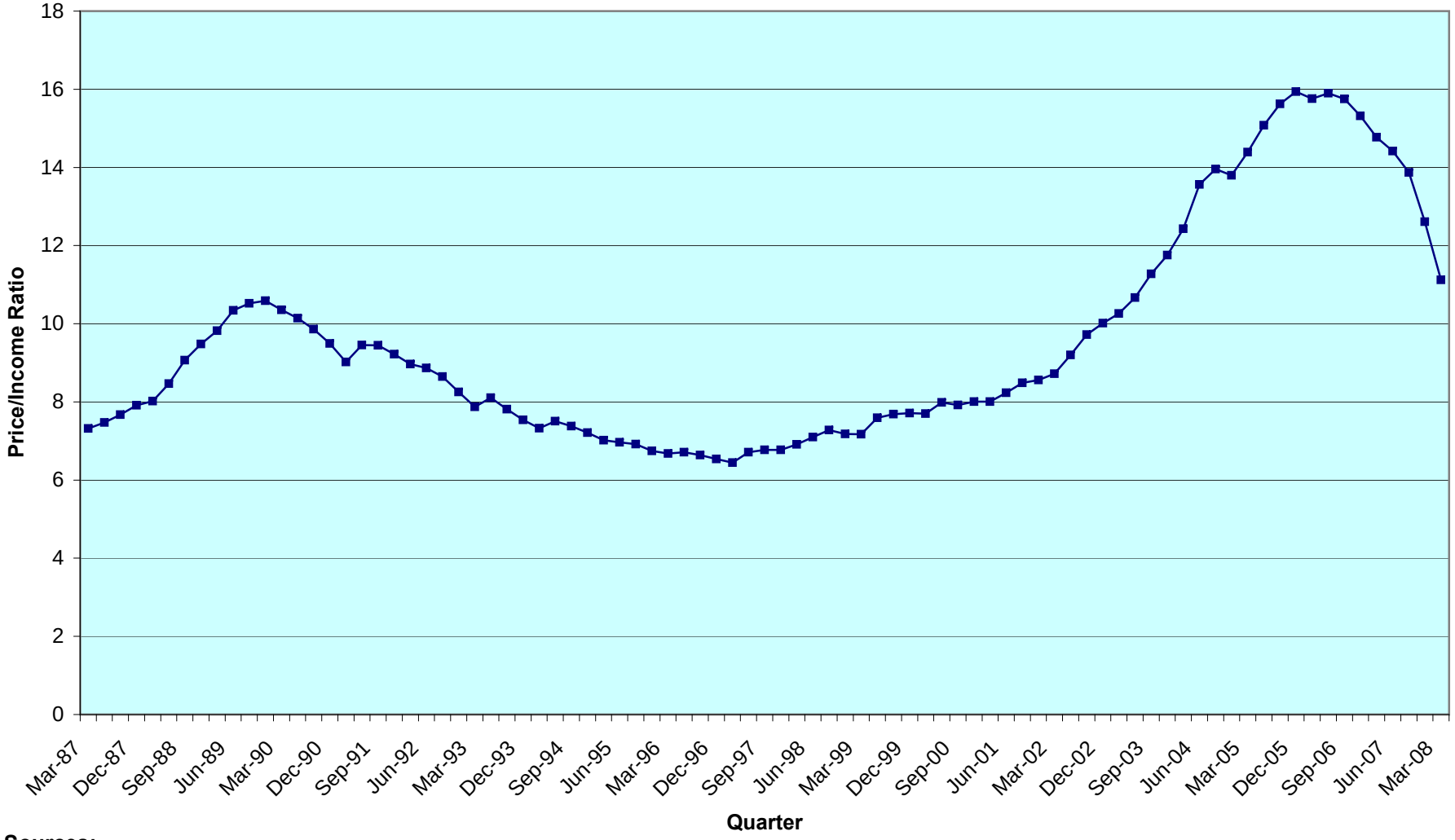
Sources:
S&P Case-Shiller Index; Census Bureau; BEA; Moody's Economy.com.

Figure 8
Home Sales Price/Per-capita Income Ratios for Boston Metro Area, Q1 1987-Q1 2008



Sources:
S&P Case-Shiller Index; Census Bureau; BEA; Moody's Economy.com.

Figure 9
Home Sales Price/Per-capita Income Ratios for Los Angeles Metro Area, Q1 1987-Q1 2008



Sources:
S&P Case-Shiller Index; Census Bureau; BEA; Moody's Economy.com.

Figure 10
Housing Starts, 1972-June 2008

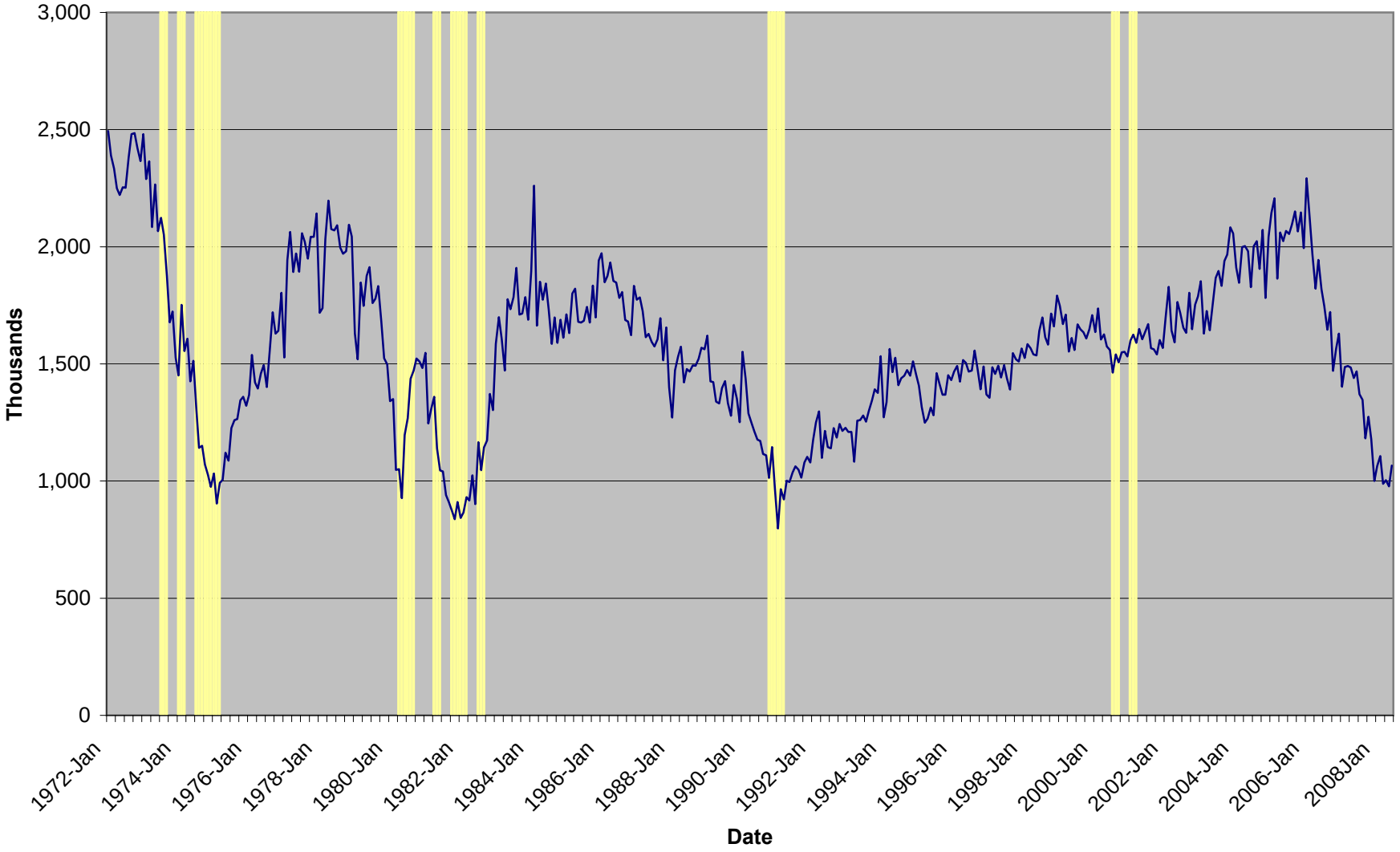


Fig 11: US total quarterly originations 2000-2008

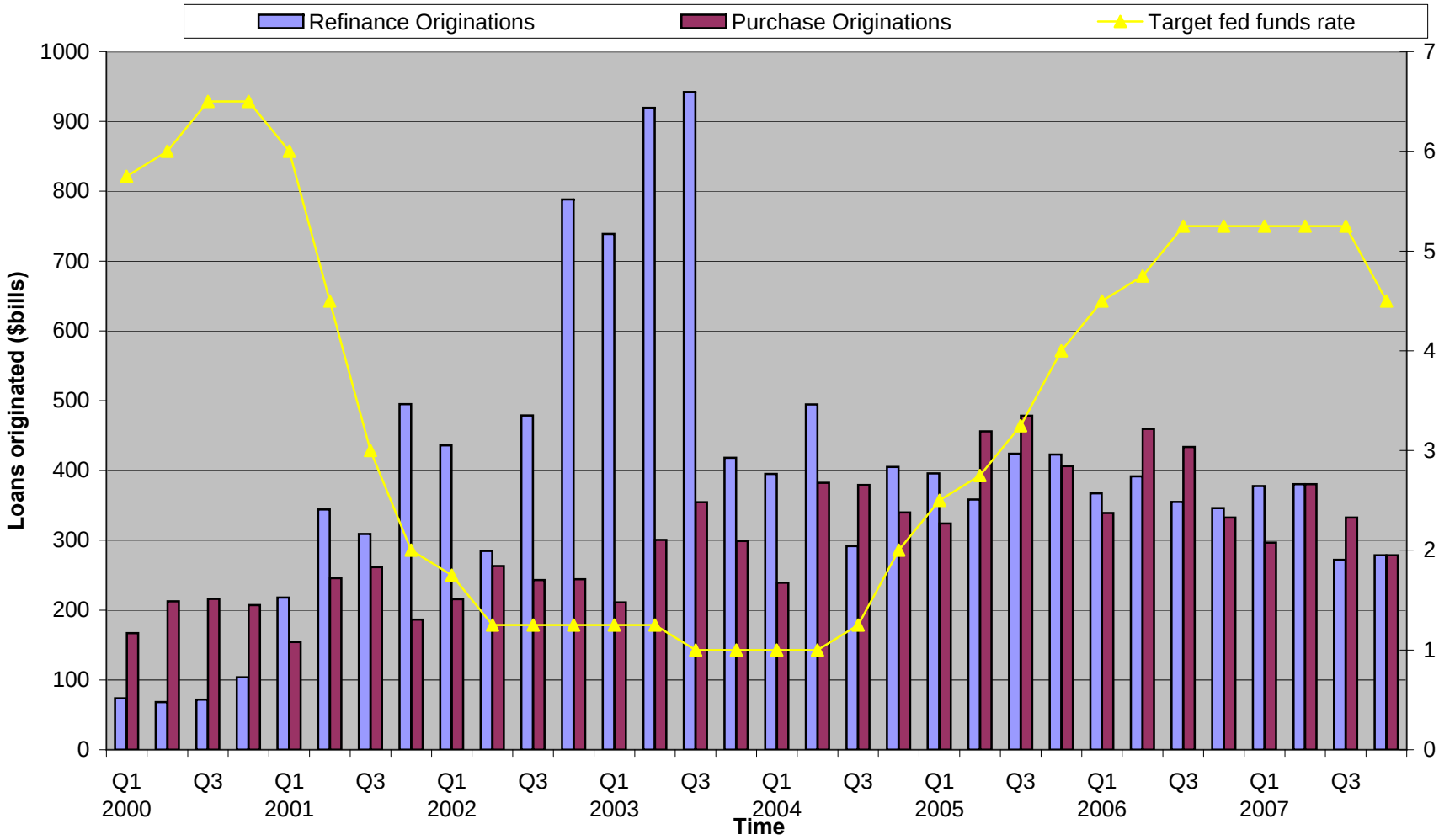


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Table 1
House Prices, Income, and Consumer Prices
1975 - 2006

	Total Changes	Annualized
OFHEO Basic Index of House Prices	536%	6.0%
Median Household Income	294%	4.6%
Per Capita Personal Income	546%	6.0%
Average Hourly Earnings	277%	4.4%
Consumer Prices CPI-U	289%	4.5%

Sources: OFHEO, Bureau of Economic Analysis, Bureau of Labor Statistics, Economy.com

Table 2
Booms and Busts since 1975

1975-80	California boom I ending in recession	+139%
	US National Index	+64%
1980-85	Nominal prices in California hold	
	Deep recession/recovery	
	US National Index	+25%
1985-90	US National Index	+27%
	Texas bust (no real boom) 86-88 Bottom: 10 quarters	-14%
	Oklahoma 83-88 Bottom: 24 quarters	-24%
	New England/NY boom 84-88	+114%
	New England/NY bust 88-92 Bottom: 14 quarters	-13%
	California II boom 84-90	+91%
1990-95	Only National decline 92:2 and 91:1	+4%
	California II bust 90-95 Bottom: 20 quarters	-14%
	San Diego Bottom: 24 quarters	-17%
	US National Index	+25%
1995-2000	Housing prices all moving up	
	US National Index	+29%
2000-2006	US National	+89%
	Composite 10	+128%
	Composite 20	+107%
	Miami	+181%
	Bottom tier	+241%
	Los Angeles	+173%
	Bottom tier	+239%
	Washington DC	+151%
	Bottom tier	+197%
	San Diego	+150%
	Bottom tier	+196%
	Las Vegas	+134%
	Bottom tier	+193%
	Phoenix	+127%

Table 3

S & P Case-Shiller Index -- Through September 2008

Released November 25, 2008

Metro Area	Peak	% Δ Since Peak	% Δ Last Year	% Δ from August to Septem	% Δ from July to August	% Δ 2000 to September 200
Phoenix	Jun 2006	**-38.5%**	-31.9%	-3.5%	-2.9%	+39.79
Las Vegas	Aug 2006	**-37.6%**	-31.3%	-2.6%	-2.4%	+46.58
Miami	Dec 2006	**-36.4%**	-28.4%	-2.6%	-1.8%	+78.72
San Diego	Nov 2005	**-34.4%**	-26.3%	-2.4%	-2.3%	+64.12
Los Angeles	Sep 2006	**-32.6%**	-27.6%	-2.5%	-1.8%	+84.54
Detroit	Dec 2005	**-29.0%**	-18.6%	-2.5%	-0.8%	-9.83
San Francisco	May 2006	**-33.4%**	-29.5%	-3.9%	-3.5%	+45.53
Tampa	Jul 2006	**-28.1%**	-18.5%	-1.8%	-0.4%	+71.24
Washington D.C.	May 2006	**-24.4%**	-17.2%	-2.2%	-0.7%	+89.90
Minneapolis	Sep 2006	**-17.9%**	-14.4%	-1.0%	-1.0%	+40.51
Cleveland	Aug 2006	**-11.0%**	-6.4%	-0.6%	1.1%	+9.87
Boston	Sep 2005	**-11.8%**	-5.7%	-1.1%	0.1%	+60.98
Chicago	Sept. 2006	**-12.3%**	-10.1%	-1.1%	-0.1%	+47.84
New York	Jun 2006	**-11.4%**	-7.3%	-1.0%	-0.2%	+91.32
Atlanta	Aug. 2006	**-10.1%**	-9.5%	-1.3%	-0.3%	+22.72
Seattle	Jul 2007	**-10.1%**	-9.8%	-1.4%	-0.7%	+72.84
Denver	Sep 2006	**-6.6%**	-5.4%	-1.3%	0.0%	+30.96
Portland	Jul 2007	**-9.0%**	-8.6%	-1.3%	-1.3%	+69.67
Dallas	Jun 2007	**-3.6%**	-2.7%	-0.8%	-0.2%	+21.96
Charlotte	Aug. 2007	**-4.0%**	-3.5%	-1.3%	-0.8%	+30.40
Composite 10	Jun 2006	**-23.4%**	-18.6%	-1.9%	-1.1%	+73.25
Composite 20	Jul 2006	**-21.8%**	-17.4%	-1.8%	-1.0%	+61.56

Table 4
Changes in the Value the U.S. Housing Stock, 2000-2008
(Billions of Current Dollars)

	Total Value	Structures	Land	Land as % of Total
Stock 2000, Q4	14,772.3	10,436.5	4,335.8	29.4%
Change 2000-2005	10,075.0	4,949.9	5,125.2	
	68%	47%	118%	
Stock 2005, Q4	24,847.3	15,386.4	9,461.0	38.1%
Change 2005-2008	279.9	1,957.7	(1,677.8)	
	1%	13%	-18%	
Stock 2008, Q1	25,127.2	17,344.0	7,783.2	31.0%

Sources: U.S. Flow of Funds Accounts, Board of Governors, Federal Reserve System, tables B100, B102, and B103, for 4th quarter 2000, 4th quarter 2005, and 1st quarter 2008.

Footnotes: * Gross private residential investment for 2006, 2007 and 1st quarter 2008 totaled 1,538 billion.

Table 5
Gross Residential Investment and Housing Starts in Down Cycles
1973-2008

Cycle I*	Peak 1973:1	Trough 1975:1	Percent Change
Gross Residential Investment (billions of $ 2000)	$310.60	$189.20	-39%
Percent of GDP	5.7%	3.6%	
Housing Starts (millions of units)	2.481	0.904	-63%

Cycle II*	Peak 1978:3	Trough 1982:3	Percent Change
Gross Residential Investment (billions of $ 2000)	$356.60	$182.90	-49%
Percent of GDP	5.5%	3.5%	
Housing Starts (millions of units)	2.141	0.927	-61%

Cycle III*	Peak 1986:4	Trough 1991:1	Percent Change
Gross Residential Investment (billions of $ 2000)	$355.90	$250.00	-30%
Percent of GDP	5.6%	3.5%	
Housing Starts (millions of units)	2.26	0.798	-65%

Cycle IV*	Peak 2006:1	2008:3	Percent Change
Gross Residential Investment (billions of $ 2000)	$607.20	$350.50	-42%
Percent of GDP	5.5%	3.0%	
Housing Starts (millions of units)	2.265	0.791	-65%

*Peak and trough dates are for gross residential investment. For housing starts, peak and trough dates are:
Cycle I: January 1973 - February 1975
Cycle II: December 1977 - August 1981
Cycle III: February 1984 - January 1991
Cycle IV: January 2006 - October 2008
Source: US Bureau of the Census Construction Reports, November 19, 2008; Board of Governors of the Federal Reserve System, Flow of Funds Data, Table F10, Line 19; Bureau of Economic Analysis, GDP release October 20, 2008, Table 1.1.6