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The Effects of the Housing Crisis on
Labor Mobility and Unemployment

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Abstract

The recent housing crisis has had drastic effects on the labor market. Falling home values have forced some homeowners to remain in their homes for financial reasons even when a move is desired because they are locked-in. When labor cannot move freely from place to place, employment is affected. The greater the lock-in effect, the more negative the labor market externalities. In this paper, the relationship among homeownership, labor mobility, and unemployment is examined. The lock-in effect, nominal loss aversion, and Oswald's hypothesis will all be applied to the recent housing crisis in an effort to show the drastic economic effects the crisis will continue to have into the future. The results of this research predict that the economic recovery will continue to be slow and that the labor market may not fully recover for a very long time. More research will certainly need to be done to confirm these findings and the correlation among homeownership, labor mobility, and unemployment.

The Effects of the Housing Crisis on Labor Mobility and Unemployment

Introduction

Owning a home is the epitome of success. It is a symbol of status, it brings a sense of stability and security to its inhabitants, and it has historically been the best way to accumulate and store wealth. In addition to these feel-good benefits, homeownership carries with it untold positive externalities. Household wealth increases each time home values appreciate, and, until recently, home values had always sustained an upward trend. Thus, citizens who own homes traditionally become wealthier as time goes on simply by continuing to make mortgage payments. Increases in home equity then allow homeowners to take out additional loans and increase consumption beyond their current income constraint. Therefore, homeownership can grow GDP by encouraging household consumption beyond what renters alone would be able to sustain.

The positive externalities of homeownership extend beyond the obvious financial benefits. Owners tend to make necessary repairs and enhance features of their homes in order to further appreciate the home's value (and improve the aesthetics of the neighborhood). Community involvement and voting in school elections, too, is valuable to homeowners: because home prices are determined by what a buyer is willing to pay, homes become more valuable as the community environment and the local school system become more attractive to potential buyers. Homeownership—and especially appreciating home values—is important to financing local and state government expenditures and therefore the provision of public goods. Finally, the stability created by homeownership improves aggregate utility by allowing owners the pleasure of building local friendships and the freedom to personalize their living accommodations. It is

because of these many benefits that owning a home is such a prominent piece of the American dream.

Despite all these desirable effects of homeownership, it has recently been accused of being a detriment to economic growth and prosperity. As the housing crisis and the resulting recession continue to depress home values, the advantages of homeownership are being reexamined. Are the aforementioned benefits significant enough to support the United States' high rate of homeownership in light of the growth restrictions it may cause? This paper seeks to answer this provocative question and, specifically, to examine how the negative externalities associated with homeownership may combine with the bursting of the housing bubble to stagnate economic growth in the immediate future.

The Lock-In Effect

One of the greatest arguments against homeownership is that it can create a lock-in effect by which homeowners are restricted from moving in response to job-market stimuli. This effect can therefore lead to higher frictional unemployment: unemployed homeowners become restricted to looking for jobs that lie within their immediate geographic location and thus are more likely to experience a relatively lengthy duration of unemployment. Certainly, the job search horizon for unemployed homeowners is likely to be considerably smaller than that of a comparable renter. Perhaps of even greater concern is that homeowners who already have jobs are less likely to accept a better position elsewhere unless it too lies within a reasonable distance of their current location. This would not be such a bad thing if it did not result in a misallocation and underutilization of skilled labor resources. Instead, a homeowner's aversion to accepting a new job in a different geographic location negatively impacts GDP growth and places upward pressure on the natural rate of unemployment.

The aversion to geographic job mobility certainly seems to be an unintended consequence of homeownership; no rational worker chooses to remain at a low-paying job when a new, higher-paying job opening arises elsewhere, *ceteris paribus*. If this is the case, then why does the lock-in effect exist? In theory, homeowners are willing and able to change their consumption of housing (in other words, move) whenever their desires change. If a family desires a larger house and is able to afford a larger house, the family ought to be entirely free to move. Likewise, if a homeowner is offered a better job in a different city and would have to relocate in order to accept it, the homeowner should be able to do so. Unfortunately these scenarios are not resolved so simply. Rather, there are significant closing and moving costs associated with moving into a new home. Venti and Wise in 1984 wrote that the average family would forego \$60 per month in income to avoid moving. Though this foregone income reflects both monetary and nonmonetary costs, it illustrates that there are significant transaction costs associated with any move. Homeowners must therefore have enough liquid assets to cover the cost of moving, and consequently, such transaction costs may prevent homeowners from relocating even if the new home is no more expensive than the old.

Take for example a man with a \$60,000 salary. Suppose he purchased a \$240,000 home in June, 2006 (the monthly median values of a new home sold in the US in the months of May through August of 2006 were \$238,200; \$243,200; \$238,100; and \$243,900, respectively, according to the US Census Bureau). Now suppose he is offered a new job paying \$72,000 a year (a twenty percent raise) where his skills would be better utilized, but he must move to a neighboring state to accept it. Suppose too that he finds a \$240,000 home for sale in the area to which he needs to move and that the closing and moving costs associated with this relocation total \$25,000. As long as the man in our scenario possesses \$25,000 in liquid assets, he is almost

certain to make the move. If, however, he only has \$10,000 in liquid assets, it will be significantly more difficult for him to move and be able to accept the new job offer, despite the promise of twenty percent higher pay.

The costs of moving certainly are not limited to the financial burdens of realtor's closing costs and moving truck rentals. They also include the social and familial costs associated with moving such as making new friends, finding ways to get involved in the new community, and getting the kids accustomed to the new school district. These social costs alone may be enough to persuade potential movers to stay put. When combined with the financial costs of moving, it is easy to see why homeownership may create a considerable lock-in effect that adversely affects labor market mobility.

The lock-in effect becomes evident in a second way as well. We know from our above discussion that homeowners may be reluctant or unable to move because of the associated transaction costs, whether financial or otherwise. It has also been found that homeowners may become locked-in when housing prices fall. This predicament occurs because homeowners often do not have sufficient liquid assets to be able to afford a new down payment without first selling their existing home. As a result, homeowners are dependent upon the sale of their existing home in order to have the financial capacity to move into a new home. It is obvious, then, that a widespread fall in housing prices can have catastrophic effects on labor mobility.

To illustrate this, let us reconsider the man in our earlier example. Recall that he owns a \$240,000 home and has an annual income of \$60,000. This is in agreement with the average historical ratio of median home prices to median income in the United States of 4.1, meaning that, on average, the value of a homeowner's home is 4.1 times his annual income (Ritholz, 2010). Assume that he is a conservative borrower and bought his \$240,000 home in 2006 with a

\$60,000 (twenty-five percent) down payment. Also assume that his new job offer (which includes a twenty percent salary increase but requires an interstate move) occurs in May, 2010 after a steep decline in nationwide home values. Suppose that the value of his home has fallen thirty percent to \$168,000 (the Case-Shiller US Housing Index fell 27.4 percent from 189.59 in the second quarter of 2006 to 137.66 in the second quarter of 2010, while the Composite-10 and Composite-20 indexes fell even more dramatically; see Figure 1). We will use a thirty year mortgage rate of 6.65 percent (the average thirty year rate for the months of May, 2006 through August, 2006 calculated from data obtained from Freddie Mac) and a property tax rate of 1.38 percent (the average nationwide property tax rate published by the New York Times in April, 2007).

In our scenario, the homeowner would have made 48 monthly payments of \$1431.54 (including \$276 monthly to cover property taxes) by May, 2010 and have a remaining loan balance of \$171,336.91 (see Table 1). In this relatively extreme—but entirely plausible—situation, the homeowner owes more on his mortgage than his home is actually worth on the market, even though he is a conservative borrower and makes his monthly payments religiously. As a result of the steep decline in home values, our hypothetical homeowner is now locked-in to his existing home. He is unable to make the interstate move necessary to accept his new and better job offer unless he has enough liquid capital to cover the difference between his home value (\$168,000) and his loan balance (\$171,336.91) as well as make a down payment on his new home.

Now let us imagine that the area in which our homeowner lives in fact was not so hard-hit by the housing crisis. Instead, suppose that the value of his home falls only ten percent to \$216,000 in the four years from June, 2006 to May, 2010. In this case, our homeowner has

\$45,000 in equity (\$216,000 less the roughly \$171,000 loan balance) with which to make a new down payment after he sells his house. If the bank requires a twenty percent down payment, however, he can only afford a new home worth \$225,000 unless he has additional liquid assets. It is true that the falling home prices may in fact enable him to buy a larger house with more amenities than his current \$240,000 home for the depressed price of \$225,000. Nonetheless, he cannot afford the down payment on a \$240,000 home, a price that would be consistent with the average house price-to-income ratio of 4.1 times his annual \$60,000 income. Our homeowner may therefore be less willing to move because his current home was once worth more than the price of any new home he could purchase. This tendency to remain in a home in which the price has depreciated even when better housing options are available for a better price is called loss aversion.

Indeed, nominal loss aversion significantly affects household mobility (Engelhardt, 2003). As home prices decline, households not only become financially constrained, but they also become less likely to want to move. Homeowners tend to avoid realizing nominal house price losses and treat losses differently from gains. Scholars have shown that loss aversion has an effect in everything from condominium selling prices in Boston to financial investments and risk-taking (Genesove & Mayer, 2001; Thaler, Tversky, Kahneman & Schwartz, 1997). In an empirical study, Engelhardt (2003) concludes that nominal house price losses are indeed quite powerful. In fact, a nominal loss of five percent decreases the likelihood of a move by 44 percent, holding everything else equal (Engelhardt, 2003). Ferreira, Gyourko, and Tracy (2010) confirm the effects of nominal losses in their research. They find that every \$10,000 in recent nominal losses decreases mobility by 1 percentage point (Ferreira, et al, 2010). Therefore, in an

environment in which home values are falling, it is not only the financial constraint but also the principle of nominal loss aversion that creates a significant lock-in effect.

While the transaction costs associated with moving and declines in home prices can create a lock-in effect for homeowners, Quigley in 1987 suggested yet another way in which homeowners can become locked-in: rising interest rates. Homeowners with long-term fixed rate mortgages may become unable to move simply because of increases in the market interest rate. If market interest rates increase over time such that homeowners have mortgages with lower interest rates than that available on the open market, homeowners will be much less willing to move. Figure 2, taken from Quigley's 1987 article, shows that homeowners experience a significant lock-in effect when interest rates rise to 12, 14, and 16 percent given an original 30-year, 10 percent fixed-rate mortgage. Thus, Quigley concludes that favorable mortgage terms create a lock-in effect for homeowners similar to that of falling home values and transaction costs (1987).

To illustrate, let us return again to our homeowner. Assume that our homeowner is actually able to purchase his desired \$240,000 home and accept his new job. To buy the home, he signs a thirty-year mortgage at a fixed rate of 4.64 percent (the average rate for the months of May to August, 2010, according to monthly data from Freddie Mac) in June, 2010. Now suppose that five years later, in June 2015, he is offered yet another new job with another salary increase (say, from \$72,000 to \$80,000) but it too requires an interstate move. Also suppose that the mortgage rate in 2015 is 6.11 percent (the average for the ten years leading up to October, 2010, according to data from Freddie Mac). Even if we disregard the moving costs and any change in home values over this time, our homeowner will have to settle for a much lower-priced home unless he is able and willing to make either a larger down payment or a higher monthly

payment. For instance, his same \$240,000 home with a \$60,000 down payment would cost \$1367.95 per month at a 6.11 percent rate as opposed to \$1203.07 per month (both numbers include \$276 per month for property taxes) at the 4.64 percent rate of 2010, a 13.7 percent higher monthly payment (see Tables 2 and 3). It is clear to see that rising interest rates can indeed constrain the mobility of homeowners.

The lock-in effect creates several externalities in addition to decreasing homeowner mobility. First, locked-in homeowners are more likely to commute greater distances to find work, thus congesting roadways and emitting greenhouse gasses (Oswald, 1999). A second, related effect is that homeowners are more vulnerable to regional economic downturns because they are unable to relocate to areas with a better job market (Oswald, 1999). Third, public goods resources may be misallocated because a municipality's population may be artificially inflated by locked-in homeowners who would otherwise have moved away from the area (Chan, 2001). Fourth, aggregate utility can be lowered as a result of the lock-in effect because homeowners become unable to adjust housing consumption according to changes in their desires (Ferreira, et al, 2009). The fifth and most concerning of these externalities is an increase in unemployment. As homeowners become locked-in, they are more susceptible to economic downturns and less able to adjust to changing labor market conditions. The correlation between homeownership and unemployment is most famously discussed in a 1997 paper by Andrew Oswald, and it is sometimes referred to as the Oswald Hypothesis.

Oswald's Hypothesis

The basis for Oswald's Hypothesis is that unemployment increases as homeownership increases. The biggest reason for this positive correlation is the decrease in labor mobility that results from homeownership, known as the lock-in effect, as discussed above. Why, though,

does the lock-in effect cause higher unemployment? Oswald proposes that employment is affected by homeownership because homeowners are less willing and able to respond to local demand shocks than comparable renters.

The starting point for Oswald's hypothesis is that a person can choose either to rent or buy a home. Those who rent are choosing to be more easily mobile than those who own, and thus are better prepared for changes in the local labor market. In contrast, those who choose to own incur the cost of being more vulnerable to local demand shocks. In equilibrium, renting and home-owning necessarily provide the same expected utility and therefore the cost of immobility incurred by homeowners must be offset by some amount of satisfaction gained from the freedom to personalize their living accommodations. In addition, although renters are freer to move if necessary, homeowners can also respond to labor market changes in the form of commuting or, in the extreme, moving. Homeowners will, however, incur significantly higher moving costs than renters because of the lock-in effect.

To borrow the example Oswald develops in his 1997 paper, "Theory of Homes and Jobs," consider two cities connected by a single road. People can choose to live in either city but not anywhere in between. They may rent or own and we assume that renters can move between the two cities without incurring any costs while homeowners must incur either a commuting cost or a moving cost in order to work in the other city. Assume that both cities start with equal labor market conditions and renters and homeowners are spread equally, such that half of all homeowners and half of all renters live in each city.

Suppose now that one city experiences an economic boom. As the economy expands, nominal prices increase and employers demand more workers and thus are willing to pay higher wages. Renters in the other city are lured to the booming city by the higher wages and, because

they incur no moving costs, will relocate as soon as wages in the booming city rise above those in their current city. Homeowners in the less-fortunate city cannot take such quick advantage of the rising wages in the neighboring city. Though homeowners have the option to commute to the booming city, they will not do so until wages rise above the cost of commuting. Further, because there is limited capacity on the road between the two cities, congestion results as more and more homeowners become commuters. This effectively raises the cost of commuting and discourages additional homeowners from taking advantage of the rising wages in the booming city.

Homeowners may also choose to move from the less-fortunate to the prosperous city, but they must incur a moving cost to do so. Consequently, owners will not choose to move unless wages continue to rise such that the cost of commuting exceeds the cost of moving.

Clearly owners are worse-off than renters in the event of a local demand shock, but how does this relate to unemployment? As the state of the booming city becomes better, the less-fortunate city falls into a recession relative to the other. It becomes relatively more difficult to find a job in the depressed city and thus relative unemployment rises. Further, homeowners who may be unemployed in the depressed city will not get a job in the booming city unless they are sufficiently compensated for the commuting cost they incur. In this way, commuting (and the resulting externality, congestion) acts as an unemployment benefit (Oswald, 1997). That is to say that congestion on the commute to work is, in effect, a disincentive to employment. This, in combination with the cost of moving, creates relatively high unemployment among homeowners in the depressed city. Homeowners, because of their lower propensity to move, are willing to wait out a stretch of unemployment to avoid moving or commuting costs. Were every resident a renter, however, this increase in unemployment would be nonexistent as the workforce would adjust freely to the change in labor demand.

Yet Oswald's hypothesis may not be as straightforward as it seems. In fact, it has been met with significant opposition from scholars. Van Leuvensteijn and Koning (2003) argue that the unemployment due to homeownership as described in Oswald's hypothesis does not take into account individual behavior. In contradiction to Oswald's hypothesis, they argue that the lower job mobility found in homeowners is due to higher job commitment which therefore reduces the risk of unemployment. They also find that homeownership has no impact on the rate of transition to a new job. Coulson and Fisher (2002) argue that homeowners have a lower probability of unemployment and incur shorter spells of unemployment. On the other hand, Munch et al. (2008) discovers that, while homeowners indeed experience shorter durations of unemployment, they are also less likely to leave unemployment for a job outside the local labor market, a result that is consistent with Oswald's findings.

Macroeconomic data also tends to support Oswald's hypothesis. In a study examining the twenty Organization for Economic Cooperation and Development (OECD) nations, Nickell and Layard (1999) calculate that a ten percent change in the share of homeowners is coupled with a 1 to 1.5 percentage-point change in unemployment. In his own research, Oswald plots unemployment against homeownership and finds a strong upward correlation (a 2 percentage-point change in unemployment for every ten percent change in rate of homeownership) both among the countries of Europe and North America and among the states of the USA (Oswald, 1999). As can be seen from Figures 3 and 4, as homeownership rates increase over time, unemployment rates increase correspondingly; the nations and states with higher rates of homeownership tend to have higher unemployment. Green and Hendershott (2001b) also confirm Oswald's hypothesis with data from the United States. They find that in the middle-age class (35 to 64 years of age) homeownership does indeed seem to constrain labor mobility and

cause higher unemployment. In a second study, they control for selectivity bias and come to the same conclusion—unemployed individuals in owning households find jobs less rapidly than those in renting households—but only to one eighth of the magnitude Oswald suggests (Green and Hendershott, 2001a).

There certainly needs to be more research done on this subject to determine whether the Oswald hypothesis holds. For the sake of this paper, however, we will assume that it is indeed an accurate assumption regarding the relationship between labor mobility and unemployment. It is important to note also that unfavorable labor market outcomes may be related to homeownership even if it is true that owners find employment relatively more quickly than renters. In this case, labor resources become misallocated. Because owners are less likely to look outside their local area for new employment, they are more likely to accept a local job for which they are ill-suited. This labor market inefficiency raises costs of production and lowers real wages. Prices rise as a result and real incomes fall because homeowners are limited to jobs within the local labor market and thus do not search for a job which will best utilize their skills (Oswald, 1999). In this way, an immobile labor force is detrimental to the economy regardless of any correlation between homeownership and unemployment.

The Housing Crisis and Labor Mobility

If we apply the logic of the lock-in effect and Oswald's hypothesis to the housing crisis that began in 2006, we paint a bleak picture for the next several years. We begin by discussing some of the economic conditions surrounding the housing crisis.

The easy money policy of the mid-2000s helped build a highly prosperous economy. It also allowed almost anyone and everyone who wanted to buy or refinance a home to get virtually any size loan at a favorable rate. Consequently, housing values skyrocketed to all-time highs:

from the first quarter of 2000 to the second quarter of 2006, the Case-Shiller Composite-20 index more than doubled (see Figure 1). Unfortunately, home values were propped up by millions of loans to less-credit-worthy homeowners due to the widespread relaxation of residential mortgage underwriting standards (Dudley, 2010). When it became evident that some—in fact, abnormally many—homeowners could not repay their mortgages, housing values plummeted and the financial crisis ensued. In the three years following its peak in the first quarter of 2006, the Composite-20 index fell 30 percent (Figure 1). The rapid depreciation in home prices resulted in the near-collapse of the American financial system, an enormous cutback in consumer spending (Figure 5), a steady climb in unemployment (Figure 6), and ultimately the worst recession in depth and length since the Great Depression (Figures 7 and 8). Another, and perhaps overlooked, consequence of the housing crisis is the impact it may have on labor mobility, one which will last well beyond the recovering economy.

There are several reasons labor mobility is and will continue to be significantly affected by the housing crisis. First and foremost is the abnormally high number of homeowners who have underwater mortgages; that is, a situation in which they owe more on their house than it is presently worth. According to an August 26, 2010 report from First American CoreLogic, at the end of the second quarter of 2010, 11 million homes—23 percent of all mortgaged properties—were worth less than the debt owed on them (CoreLogic, 2010). Though these numbers are down from 11.2 million and 24 percent at the end of the first quarter, they are still near the historical highs reached in the last quarter of 2009.

Related to the high rate of negative-equity homeowners is the dramatic decline in equity as a percentage of home value. Figure 9 depicts this trend throughout the housing crisis. Owners' equity dropped to a trough of about 35 percent of home value, 30 percentage points

below the historical average of 65.2 percent. The historically low rates of owners' equity created by the recent house price declines can severely constrain mobility. As loan-to-value (LTV) ratios—the remaining mortgage balance as a percentage of the associated home value—increase and house prices decrease, labor mobility falls. In 1989 in California, for example, the average LTV ratio was 67 percent and the 2-year mobility rate was just over 15 percent. In 1997, the average LTV ratio had risen to 78 percent and the average house price had fallen about 20 percent. In that span, the 2-year mobility rate fell to just 11.7 percent. Other markets that experienced sharp house price declines saw similar drops in mobility (Ferreira, et al, 2010).

Present day, the high loan-to-value (LTV) ratios that resulted from the “easy-money” policies in the early- to mid-2000s are putting downward pressure on the mobility rate. National LTV ratios rose as loan underwriting standards were relaxed, and down payments fell to the 5 to 10 percent range. As housing prices fall, the amount of owner's equity fall, and LTV ratios consequently rise. Once a homeowner's LTV ratio exceeds 90 percent, meaning the mortgage amount is more than 90 percent of the home value, the homeowner becomes spatially locked (Chan, 2001). Because the transaction costs associated with moving often exceed 5 percent of the home value and banks are generally unwilling to accept less than 5 percent down, a 90 percent LTV ratio means a homeowner is financially constrained from moving unless the owner has other liquid assets to cover the difference. Empirically, Chan found that households with loan-to-value ratios greater than 80 percent are 50 percent less likely to have moved after 4 years given declining house prices compared to a scenario in which house prices do not decline (2001). The combination of high LTV ratios prior to the housing bust and the declining home values throughout 2007-2009 certainly are affecting labor mobility. This effect is exacerbated for homeowners in negative equity situations (LTV ratios greater than 100 percent). Negative-

equity homeowners are not able to retire their mortgage even after selling their house, nor can they afford to take on a second mortgage in most cases. Therefore, owners cannot move in response to labor market (or other) stimuli unless they choose to default.

Additionally, negative equity affects more than just the homeowners who are actually underwater in their mortgages. Non-distressed home sales have fallen substantially as well, particularly in areas with high levels of negative equity (CoreLogic, 2010). Figure 10 shows how non-distressed home sales vary with low and high levels of negative equity. Clearly, negative equity limits the mobility of local financially-unconstrained owners as well as those who are actually financially-constrained. The effect of low negative equity is drastic and the effect of high negative equity is even more severe. In fact, by July 2009, non-distressed homeowner mobility was just one-fifth of what it had been in July 2006 in zip codes with greater than 50 percent negative equity.

The discussion above leads us to the second reason labor mobility will continue to be affected by the housing crisis: the nominal loss aversion principle. Those who live in or near areas in which negative equity exists are less likely to move because the selling value of their own home has similarly decreased. As discussed above, people tend to avoid selling assets at a nominal loss even when it is seemingly irrational to not sell. Therefore, the presence of negative equity homes in a given neighborhood, zip code, or state reduces the propensity of unconstrained homeowners to move due to the downward pressure it has on surrounding homes' values. This effect will continue to haunt homeowners even as the economy continues to recover: even unconstrained owners will continue to be reluctant to move until their home value has appreciated back to the original purchase price.

The third reason the housing crisis is likely to have a large negative impact on future labor mobility is that interest rates are almost certainly going to go up from where they are currently. As of November 11, the interest rate for 30-year, fixed-rate mortgages dropped to 4.17 percent, the lowest it has been since Freddie Mac began keeping records in 1971 (Kucera and Gopal, 2010). According to data from the Freddie Mac website, the average 30-year rate in the ten years prior was 6.11 percent. By nature of averages, after a severe upswing or downswing, rates tend to approach and then swing well past the mean in order to balance back out. Hence, interest rates are slated to rise in the near future—not just until they match the 10-year average, but likely significantly higher.

As interest rates rise in the future, homeowners who buy while rates are still low are likely to become locked into their homes in the future. Again, this can have drastic effects on labor mobility. As *The Atlantic* author Daniel Indiviglio puts it, “...if you have a new job opportunity in another city, then you’ll be less likely to take it. Your ultra-low mortgage interest rate will keep you glued to your home” (2010). The greater the differential between the interest rate at the time of purchase and the rate when the opportunity to move arises, the less likely an owner is to move. Thus, when new and better job opportunities arise several years from now for homeowners who are buying at the present interest rates, they may not be able to accept the job as freely as is economically desirable. The historically low mortgage rates also allow less-financially-secure borrowers to buy a home. These are precisely the people for whom labor mobility matters most to obtain jobs—and those who are most affected by interest rate and home value fluctuations (Indiviglio, 2010).

It is especially important for these marginal homebuyers to have the flexibility to move when labor market changes dictate a move, but it is also necessary that the labor force in general

be mobile. Indeed, labor mobility seems to be an essential factor in the ability of the American economy to recover from recessions. Moody's Economy.com chief economist Mark Zandi states that it was "the ability and willingness of workers to relocate [that] contributed to labor-market recoveries following recessions that ended in March, 1975 and November, 1982" (Matthews, Dorning & Taub, 2010). Without such labor mobility, there is no telling how long it would have taken for the labor market to recover from these recessions.

The importance of mobility in the recovery from these and other recessions makes the current situation particularly disconcerting. Because the housing crisis has left so many people locked into their homes, it is likely to take much longer for the labor market to recover than following previous recessions. It is even being suggested that the labor market may never fully recover. Economist Michael Feroli from JP Morgan Chase & Co. estimates, "The stagnant workforce may raise the long-term trend rate for unemployment by 1 percentage point and lower economic growth 0.3 percent a year through 2012" (Matthews, et al, 2010).

The lack of mobility is already affecting not only unemployment but also labor market efficiency. Without a mobile labor force, workers will not be able to match up with ideal jobs. Wharton professor Fernando Ferreira describes this problem: "There are not a lot of opportunities to move. That is a huge factor in terms of less mobility. And the lack of mobility definitely hurts the efficiency of the labor market" (Fletcher, 2010). This labor market inefficiency is keeping the economy from recovering as quickly as it ought. The national unemployment rate persists around 10 percent and the duration of unemployment is longer than it has been since the Great Depression (see Figure 6). Federal Reserve Bank of Minneapolis president Narayana Kocherlakota observes, "Firms have jobs, but can't find appropriate workers. The workers want to work, but can't find appropriate jobs" (Hilsenrath, 2010). Until workers are

once again able to move freely in response to labor market stimuli, workers and jobs will not be able to match up efficiently. Yet, the housing crisis may not allow mobility to return to the levels needed for such labor market efficiency.

We may therefore see a significant shift away from the labor market conditions we have seen historically. As Nobel Laureate Joseph Stiglitz remarked in January, “One of the hallmarks of America’s labor market is a high level of mobility. We are about to lose that” (Matthews, et al, 2010). The new mindset of the labor force is such that, even when homeowners are no longer financially constrained from moving, workers will be slow to move to accept new job opportunities. According to a Towers Watson study, a “secure and stable position” appeared on 86 percent of respondents’ surveys as one of the most important factors in a preferred work situation compared to “substantially higher levels of compensation” which appeared on 74 percent of surveys (2010). Clearly, workers are not as easily persuaded to move now as in the past, even when better job opportunities are available. Adjustments to the way workers seek employment and employers seek labor may therefore be necessary. Assistant Treasury Secretary Alan B. Krueger explains, “In the past, people tended to move to where the jobs are. Now it is necessary to have more of a strategy to move the jobs—and create new jobs—in areas where the people are” (Fletcher, 2010). Without a new strategy of this sort, the lack of workforce mobility will continue to dampen the economic recovery.

Labor mobility has indeed slowed considerably during the recession. Only 1.6 percent of Americans moved between states in the year ended March, 2009. The number of renters who moved out of state decreased 13.6 percent from 2006 to 2009, and homeowners moved even less. In the same span, 25.5 percent fewer homeowners moved between states (Fletcher, 2010). Consequently, people have been either unable or unwilling to move even if the labor market

would warrant a move. Because of the interstate inflexibility of the labor market, large disparities among state unemployment rates have developed. In Nevada, the unemployment rate in September was a nationwide-high 14.4 percent, while the unemployment rate in North Dakota was only 3.7 percent (Table 4). Before the recession, the difference between the highest and lowest state unemployment rate was just 4.4 percentage points; in September, it was 10.7 points (Hilsenrath, 2010). Further, it is not just cross-state moves that have stagnated. In the year ended March, 2009, only 12.5 percent of Americans moved following a record low of 11.9 percent the year prior (Matthews, et al, 2010). It is clear to see that, in light of the housing bust, homeowners are unable or simply unwilling to accept a job outside their local labor market unless they can do so without moving.

Conclusion

The hypotheses and data put forth in this paper show that there is a definite relationship among home prices, labor mobility, and unemployment. As a result of the recent housing crisis, it appears that labor mobility will continue to be constrained well into the future; there is no indication that home values will appreciate back to their pre-crisis levels anytime soon. Therefore, homeowners may be locked into their homes for an extended period of time and employment will suffer. The stagnant workforce is likely to increase the natural rate of unemployment as workers cannot match up with appropriate jobs efficiently. The duration of unemployment may remain high because homeowners are still unable or unwilling to move out of their depreciated homes and thus are stuck in unemployment until a local employment opportunity arises. Rising interest rates will prolong the mobility problem because owners will not choose to give up a low-interest mortgage to move into a new home with a higher mortgage rate. In short, the housing crisis has had, and will continue to have, a significant effect on

unemployment. Furthermore, because of the unfavorable equity positions in which many homeowners now find themselves, the recovery from the most recent recession may be much longer than originally anticipated.

More research certainly needs to be done to confirm the much-contested Oswald hypothesis and to examine the relationship among homeownership, labor mobility, and unemployment. It will be interesting to see how the labor market reacts as home values and GDP recover and whether homeowners will be willing and able to move in response to job opportunities. We can only hope that the housing crisis will not have an effect as deep and long-lasting as this research suggests.

Table 1: Amortization Schedule 1—For Home Bought at 2006 Interest Rates						
Home Value	240,000					
Mortgage Value	180,000					
Mortgage Term	30 years	360				
Interest Rate	6.65%	0.55%				
Monthly Payment	1,155.54					
Property tax Rate	1.38%					
Property Taxes Payable	3,312.00	276.00				
Month	Payment	Interest	Principle	Balance	Monthly Property Tax	Total Monthly Payment
Jun-06	1,155.54	997.50	158.04	179,841.96	276.00	1,431.54
Jul-06	1,155.54	996.62	158.91	179,683.05	276.00	1,431.54
Aug-06	1,155.54	995.74	159.79	179,523.26	276.00	1,431.54
⋮	⋮	⋮	⋮	⋮	⋮	⋮
May-10	1,155.54	950.63	204.91	171,336.91	276.00	1,431.54

Table 1 shows our homeowner's mortgage payments for his \$240,000 home purchased in 2006 assuming a 6.65 percent 30-year mortgage rate up until May, 2010 when he receives his new job offer. The \$240,000 home value is obtained from average new home sale price data from the US Census Bureau and the mortgage rate is from data obtained from Freddie Mac. The property tax rate for this and the next two tables is from the New York Times and the extra column for "mortgage term," "interest rate," and "property taxes payable" shows monthly payment data.

Table 2: Amortization Schedule 2—For Home Bought at 2010 Interest Rates						
Home Value	240,000					
Mortgage Value	180,000					
Mortgage Term	30 years	360				
Interest Rate	4.64%	0.39%				
Monthly Payment	927.07					
Property tax Rate	1.38%					
Property Taxes Payable	3,312.00	276.00				
Month	Payment	Interest	Principle	Balance	Monthly Property Tax	Total Monthly Payment
Jun-10	927.07	696.00	231.07	179,768.93	276.00	1,203.07
Jul-10	927.07	695.11	231.96	179,536.97	276.00	1,203.07
Aug-10	927.07	694.21	232.86	179,304.11	276.00	1,203.07
⋮	⋮	⋮	⋮	⋮	⋮	⋮
Jun-15	927.07	635.79	291.28	164,138.05	276.00	1,203.07

Table 2 shows the same homeowner's mortgage payments assuming instead that he bought at the 4.64 percent mortgage rate available in 2010; data from Freddie Mac.

Table 3: Amortization Schedule 3—For Home Bought at 2015 (projected) Interest Rates						
Home Value	240,000					
Mortgage Value	180,000					
Mortgage Term	30 years	360				
Interest Rate	6.11%	0.51%				
Monthly Payment	1,091.95					
Property tax Rate	1.38%					
Property Taxes Payable	3,312.00	276.00				
Month	Payment	Interest	Principle	Balance	Monthly Property Tax	Total Monthly Payment
Jun-15	1,091.95	916.50	175.45	179,824.55	276.00	1,367.95
Jul-15	1,091.95	915.61	176.34	179,648.21	276.00	1,367.95
Aug-15	1,091.95	914.71	177.24	179,470.97	276.00	1,367.95
⋮	⋮	⋮	⋮	⋮	⋮	⋮

Table 3 shows the homeowner’s monthly mortgage payments for a house bought at the 10-year average 30-year mortgage rate of 6.11 percent, according to data from Freddie Mac.

Table 4: Seasonally Adjusted Unemployment Rates by State, September, 2010					
Rank	State	Rate	Rank	State	Rate
1	NORTH DAKOTA	3.7	27	ALABAMA	8.9
2	SOUTH DAKOTA	4.4	28	IDAHO	9.0
3	NEBRASKA	4.6	28	PENNSYLVANIA	9.0
4	NEW HAMPSHIRE	5.5	28	WASHINGTON	9.0
5	VERMONT	5.8	31	CONNECTICUT	9.1
6	HAWAII	6.3	32	WEST VIRGINIA	9.2
7	KANSAS	6.6	33	MISSOURI	9.3
8	IOWA	6.8	34	NEW JERSEY	9.4
8	VIRGINIA	6.8	34	TENNESSEE	9.4
8	WYOMING	6.8	36	NORTH CAROLINA	9.6
11	OKLAHOMA	6.9	37	ARIZONA	9.7
12	MINNESOTA	7.0	38	DISTRICT OF COLUMBIA	9.8
13	MONTANA	7.4	38	MISSISSIPPI	9.8
14	MARYLAND	7.5	40	ILLINOIS	9.9
14	UTAH	7.5	41	GEORGIA	10.0
16	ARKANSAS	7.7	41	OHIO	10.0
16	MAINE	7.7	43	INDIANA	10.1
18	ALASKA	7.8	43	KENTUCKY	10.1
18	LOUISIANA	7.8	45	OREGON	10.6
18	WISCONSIN	7.8	46	SOUTH CAROLINA	11.0
21	TEXAS	8.1	47	RHODE ISLAND	11.5
22	COLORADO	8.2	48	FLORIDA	11.9
22	NEW MEXICO	8.2	49	CALIFORNIA	12.4
24	NEW YORK	8.3	50	MICHIGAN	13.0
25	DELAWARE	8.4	51	NEVADA	14.4
25	MASSACHUSETTS	8.4			

Table 4 shows the difference among state unemployment rates as of September, 2010. The data was obtained from the United States Bureau of Labor Statistics.

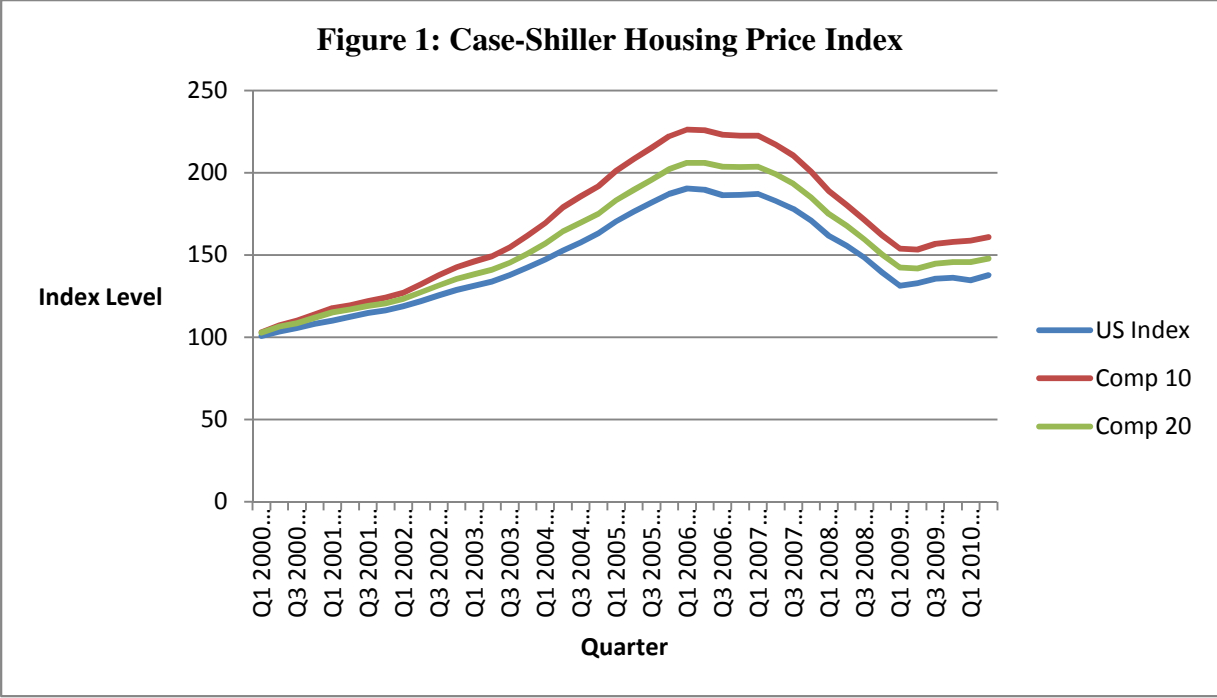


Figure 1 shows the dramatic rise and fall of US housing prices. This graph was created using is seasonally-adjusted quarterly data from www.standardandpoors.com.

Figure 2: Cumulative Probability of Moving

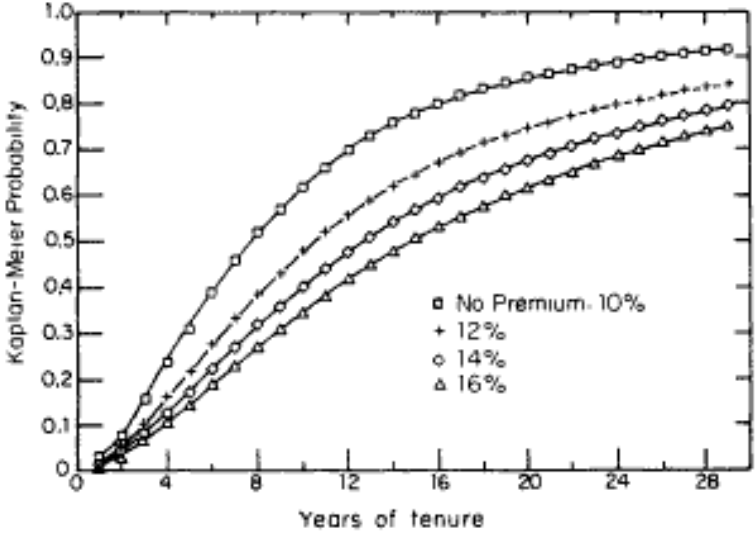


Figure 2 is taken from J. M. Quigley’s 1987 paper, “Interest Rate Variations, Mortgage Prepayments and Household Mobility.” The chart shows that when interest rates rise from the initial 10 percent 30-year mortgage rate to 12, 14, and 16 percent, respectively, the probability of moving for every length of tenure falls.

Figure 3: Homeownership and Unemployment rates in the Countries of North America and Europe

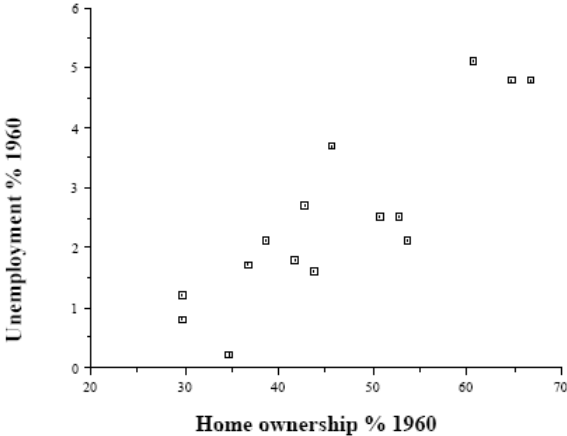
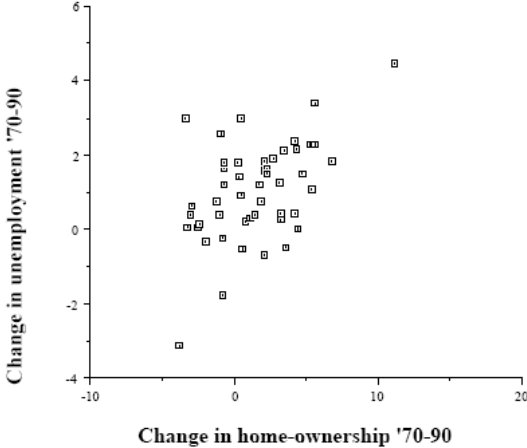


Figure 3 shows the positive correlation between the unemployment rates and the homeownership rates in North American and European countries in the year 1960. The chart was taken from A. Oswald’s 1999 paper.

Figure 4: The Correlation Between the Growth of Homeownership and Unemployment Across the States of the USA from 1970 to 1990



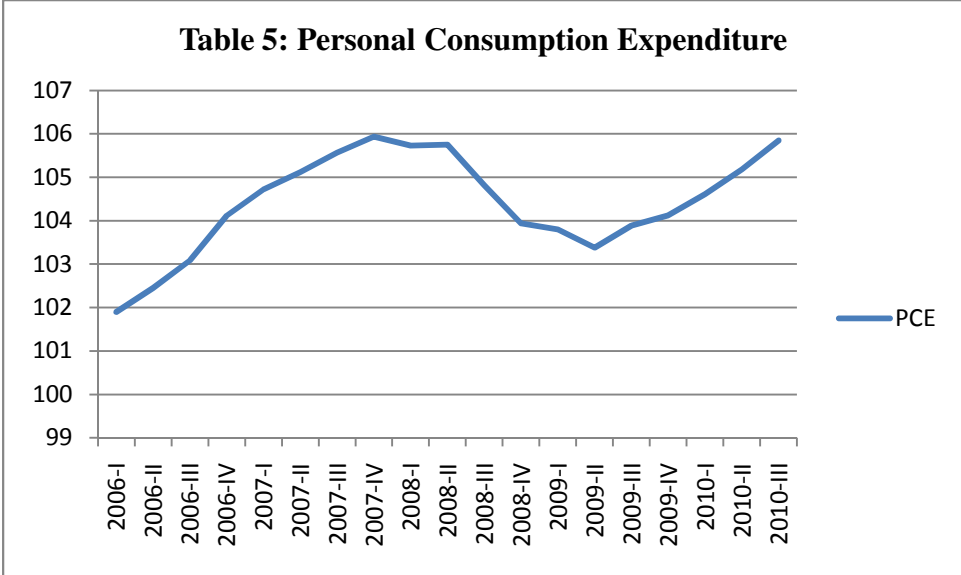
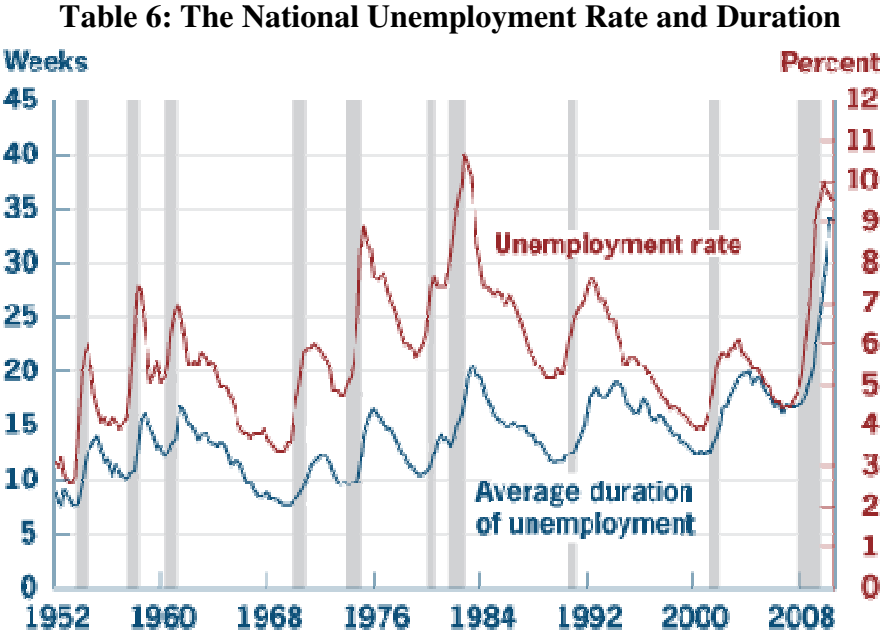


Figure 5 shows the drastic fall in seasonally-adjusted personal consumption throughout the recession. The graph shows quantity-indexed data for each quarter from 2006 through the third quarter of 2010. The recession lasted from December, 2007 through June, 2009 according to the National Bureau of Economic Research. The data for this graph was obtained from the US Bureau of Economic Analysis Table 2.3.3.



Note: Shaded bars indicate recessions.
 Source: Bureau of Labor Statistics; authors' calculations.

Table 6 shows the unemployment rate (top line, right axis) and the duration of unemployment (bottom line, left axis). Both the unemployment rate and the duration of unemployment in the most recent recession spiked to levels as high or higher than at any other time since the Great Depression. The chart was obtained from the Federal Reserve Bank of Cleveland.

Figure 7: Employment Changes During Postwar Recessions

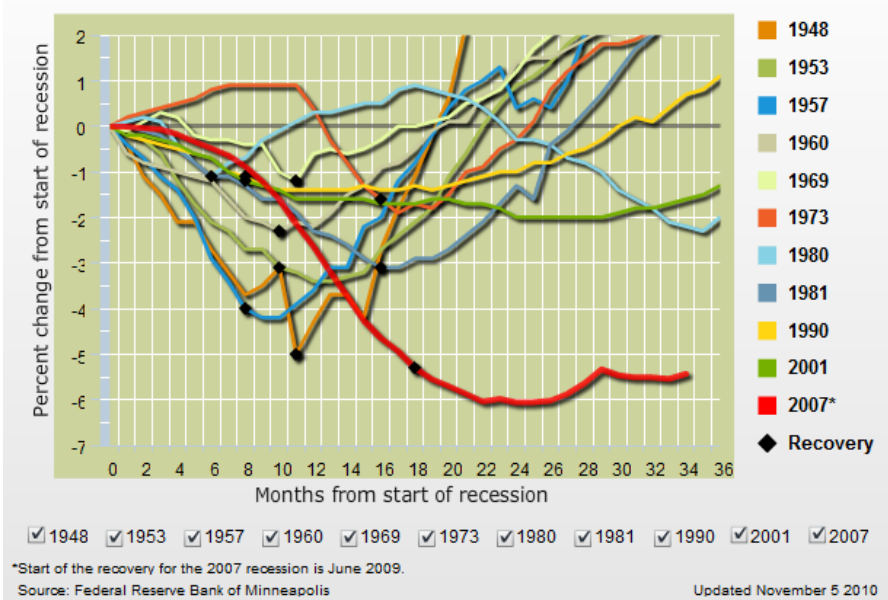


Figure 7 shows how employment fell during each post-World War II recession. The recession that began in 2007 is clearly the deepest and longest in terms of decreases in employment. The chart comes from the Federal Reserve Bank of Minneapolis.

Figure 8: Output Changes During Postwar Recessions

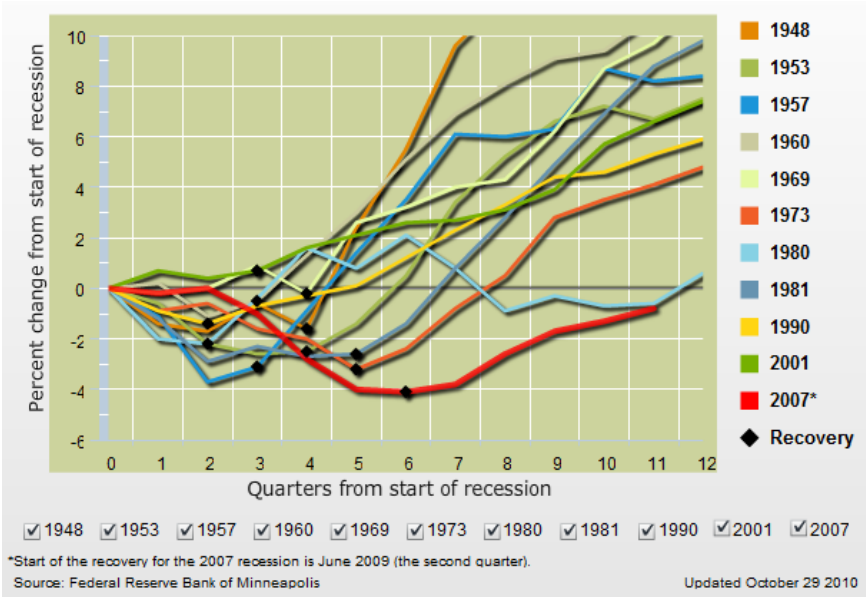


Figure 8 shows how aggregate output was affected during each postwar recession. Again, the recession that began in 2007 is the deepest and longest. The chart was obtained from the Federal Reserve Bank of Minneapolis.

Figure 9: Owner’s Equity as a Percentage of Home Values and the House Price Index

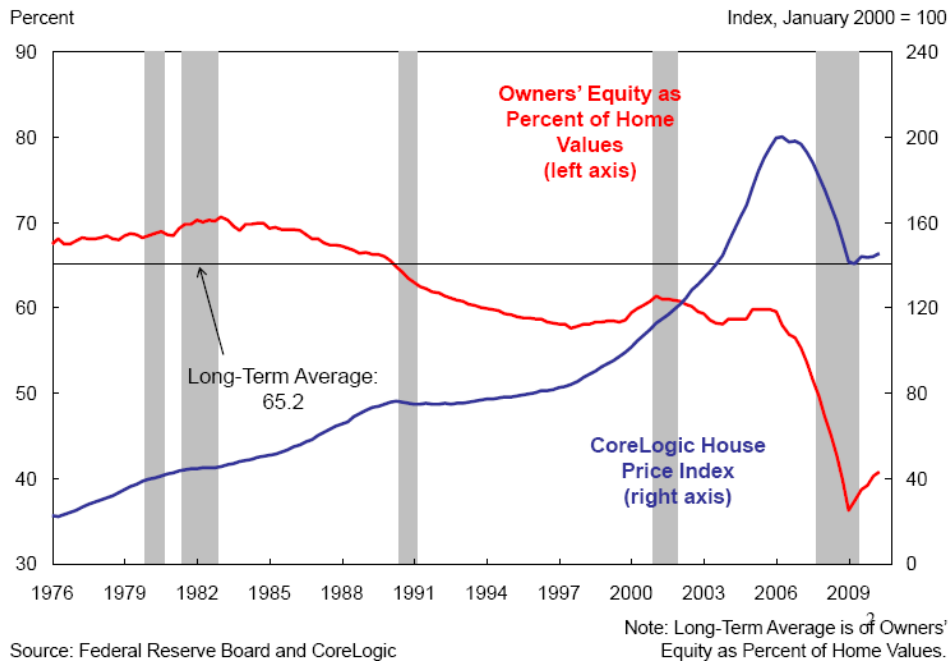


Figure 9 shows how owner’s equity has fallen sharply throughout the recession and how home prices rose. Owner’s equity as a percentage of home values fell to an all-time low of around 35 percent in 2009. The grey bars indicate recessions. The chart was obtained from the Federal Reserve Bank of New York.

Figure 10: Negative Equity and Homeowner Mobility

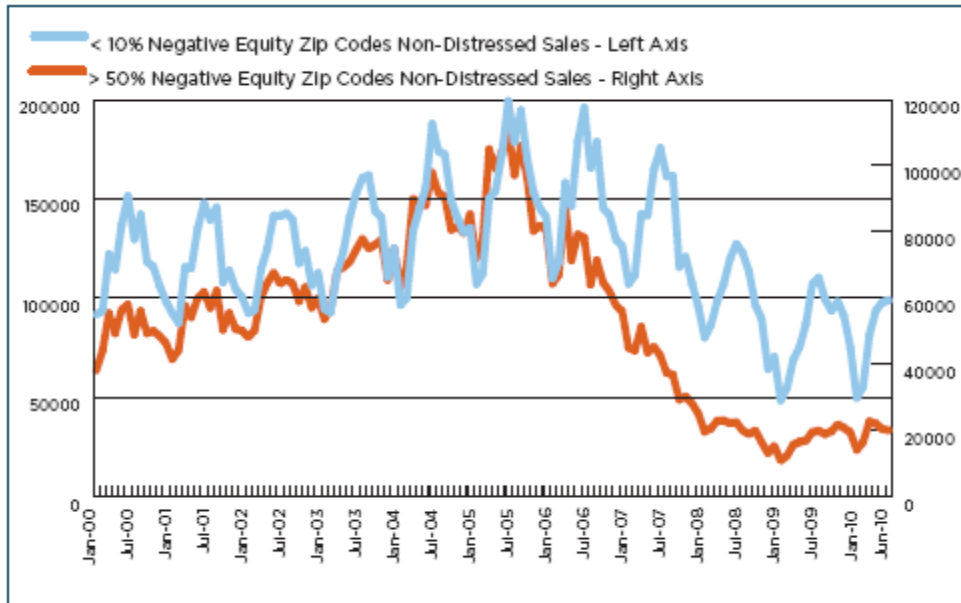


Figure 10 illustrates the decrease in non-distressed home sales both in zip codes that have low negative equity and zip codes with high negative equity. Low negative equity is the more volatile line on the left axis, and high negative equity is on the right. The graph was obtained from CoreLogic.

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