# Household Mobility over the Great Recession: Evidence from the U.S. 2007-09 Survey of Consumer Finances Panel

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**Abstract**

This paper uses data from the 2007–09 Survey of Consumer Finances panel to examine U.S. households' decisions to move and the role of negative home equity and economic shocks, such as job loss, in these decisions. Even over this period of steep house price declines and sharp recession, we find that most moves were prompted by standard reasons. The recession's effects are nonetheless apparent in the notable fraction of homeowners who moved involuntarily due to, for example, foreclosure. Many involuntary moves appear to stem a combination of negative home equity and adverse economic shocks rather than negative equity alone. Homeowners with both negative equity and economic shocks were substantially more likely to have moved between 2007 and 2009 and to have moved involuntarily. The findings suggest that, analogous to the double-trigger theory of default, the relationship between negative equity and household mobility varies with households' exposure to adverse shocks.

## I.    Introduction

More than one in ten U.S. households moves in any given year, and about one-third of households have moved in the past five years.[1]  The ability to move allows households to pursue better job opportunities or to obtain housing that is better suited to their needs, so constraints on mobility can reduce the well-being of families that wish to move but cannot.  In addition, to the extent moves are tied to job changes, impediments to household mobility may contribute to frictional unemployment.

The extraordinary house price decreases during the 2006–12 period and the ensuing large number of homeowners who owe more on their mortgages than their houses are worth have likely complicated households' ability to move.  The effect of negative equity on a household's decision to move is ambiguous.  On the one hand, households with negative equity or who have experienced nominal losses on their homes may be less willing or able to move.  On the other, households who have suffered economic shocks may default on their mortgages and consequently move as result of foreclosure.  The empirical literature has not reached a consensus as to which of these effects dominates.

This paper draws on the rich information in the 2007–09 Survey of Consumer Finances panel (SCF) to examine households' decisions to move and, in particular, the importance of negative equity and economic shocks in these decisions.  We begin by considering households' reported reasons for moving and find that, even during this historically unusual period, households moved for a variety reasons that are commonly cited for moving in other time periods as well, such as job changes, high housing costs, or a desire for a better location or space.

The effects of the recent recession are nevertheless apparent in the considerable fraction—nearly 20 percent—of homeowners' moves that were due to foreclosure.  In this light, we examine more closely the role of negative equity and other economic factors on homeowners' mobility.  We find that families with negative home equity were more likely to have moved over this period than families with positive home equity.  Further, we find that underwater homeowners' greater mobility is largely driven by the positive correlation between negative equity and adverse economic shocks over this period.  Homeowners who experienced both negative home equity and an economic shock

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[1] Estimates from the U.S. Current Population Survey indicate that between 11 and 13 percent of householders moved in each year between 2004 and 2012 and that 35 percent of families moved between 2005 and 2010.  Data from the 2004, 2007 and 2010 Surveys of Consumer Finances—the primary data source used in this paper—yield slightly greater estimates of one- and five-year mobility rates (15–16 percent and 41 percent, respectively).

such as job loss were especially likely to move and to move for involuntary reasons such as foreclosure. In contrast, families with negative equity but that do not meet our criteria of economic insecurity were about as likely to move as other families. These empirical patterns suggest that, akin to the double-trigger view of mortgage default, many homeowners moved between 2007 and 2009 due to coincident economic shocks and negative equity.

## II.  Data and measures

*2007−09 Panel Survey of Consumer Finances*

Our primary data are from the 2007–09 SCF panel. The SCF surveys have typically been conducted as cross-sections every three years and provide the most comprehensive and highest quality microdata available on U.S. household wealth.[2] The SCF combines a geographically stratified random sample and a list sample that oversamples households that are likely to be relatively wealthy. Our analysis uses nonresponse-adjusted survey weights, which account for this sample design, so that the estimates are representative of U.S. households.[3]

The 2007 component of the 2007–09 SCF panel was conducted as part of the sequence of triennial cross-sectional SCF surveys. After the 2007 SCF was largely completed, the Federal Reserve Board designed and implemented the 2009 follow-up survey to provide a fuller picture of the effects of the intervening recession on households' finances than was available from aggregate data. The 2009 survey's structure largely mirrored that of the 2007 survey so that it is possible to construct parallel estimates of wealth and its components for each household in both years.

The 2009 survey additionally collected a variety of data on changes in households' situations between 2007 and 2009, including whether the household had moved. For households that owned a home in 2007and had moved by 2009, this information includes whether the household retained ownership of their 2007 residence and, if so, whether the property was still the household's primary residence. Based on these questions, we classify families that owned their home in 2007 as having moved if, in 2009, the family either no longer owned the 2007 home or if they still owned the 2007 home but were living in a new residence (either owned or rented). Classifying renters' mobility is relatively straightforward: families that rented in 2007 but did not rent the same property in 2009 are defined as having moved.

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[2] See Bricker, Kennickell, Moore and Sabelhaus (2012) for results from the most recent triennial SCF.
[3] Our subsequent regression results are not qualitatively different if we do not use weights.

The information on households' moves in the 2007–09 SCF panel includes data on aspects of mobility that are often not available in other data sources.  First, the SCF data indicate the reason for the move, so we can distinguish involuntary moves due to eviction or foreclosure from moves for other reasons such as a desire to be closer to relatives.  Second, the data distinguish moves, loosely speaking, within a local labor market from moves to a new labor market; specifically, the survey asked whether the family moved to a different metropolitan area (if the family resided in an MSA in 2007) or county than the one where the family lived in 2007.[4]  As Molloy, et al. (2011) note, MSAs are typically constructed to correspond to local labor markets, so MSA-based measures of mobility likely more accurately capture moves across labor markets than cross-county or cross-state measures used in some studies of mobility (*e.g.*, Coulson and Grieco, 2013; Donovan and Schnure, 2011).

The choice to collect panel data came after the 2007 survey had largely concluded, so the survey did not take other steps to facilitate re-contacting respondents as a part of the 2007 interview. Given this, one potential concern is that results from the 2007–09 SCF panel may be biased if families that moved between 2007 and 2009 were more difficult to locate.  However, fewer than three percent of 2007 SCF participants could not be located (Kennickell, 2010).

A second, similar concern is that the results may be biased if households which moved were less likely to be re-interviewed after being located.  For example, settling in after a move may impose additional demands on a family's time and, consequently, a household that moved recently may be less likely to participate in the 2009 survey.  Indeed, although almost 90 percent of the eligible 2007 SCF households were re-interviewed, Kennickell (2010) finds that geographic mobility was one of the few statistically significant correlates of non-response: families that moved between 2007 and 2009 were less likely to complete the 2009 follow-up survey (conditional on having been located).[5] Any resulting bias to the estimates due to either of these concerns may be mitigated by our use of the nonresponse-adjusted weights, which incorporate the extensive information available on all households that participated in the 2007 SCF.

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[4] The SCF question asked if the family had moved "to a different city" but the interviewer was instructed to record "no" for moves to a city in the same metropolitan area.  For households that did not reside in a metropolitan area, the interviewer was instructed to record "no" for moves within the same county.

[5] If the 2007 respondent was alive and living in the U.S., the target household in 2009 was the one that contained that person.  Otherwise, if the 2007 respondent had a spouse or partner who was a part of the primary economic unit as defined in the 2007 survey and who lived permanently in the U.S., the target household in 2009 was the one that contained the 2007 spouse or partner of the 2007 respondent.  If neither of these criteria were met, the case was considered out of scope.

*Measuring home equity and economic shocks*

In examining the role of negative equity on mobility, we consider two measures of homeowners' equity position. The first uses the self-reported data in the SCF on the home's current value and on the balance of all outstanding home-secured debt in 2007.[6] This measure of home equity may be more accurate than an estimate based on aggregate data or price indexes to the extent it incorporates property- and borrower-specific information. In addition, a family's decision to move or default depends on its perception of its house value and equity position.[7]

Nonetheless, one might be concerned that self-reported house values and mortgage balances contain greater measurement error than other estimates of these amounts. For example, homeowners that do not foresee moving may not closely monitor house price movements. Further, the share of a borrower's payments that go to interest declines over time, so borrowers who do not understand this fact and are unaware of the current mortgage balances may have difficulty accurately estimating this amount. However, Bucks and Pence (2006, 2008) conclude that, on the whole, homeowners' assessment of their home values and mortgage balances in the SCF align reasonably well with external estimates. Moreover, we find that self-reported data and house price indexes provide similar estimates of the shares of homeowners that are underwater.[8]

A second potential drawback of this measure is that it gauges homeowners' equity position in 2007. Few homeowners reported having negative equity in 2007, and consequently the estimated relationship between negative equity and mobility may be imprecisely estimated. In addition, some families may have chosen to move between 2007 and 2009 due to events that occurred after the 2007 interview, such as a sharp decline in housing equity or another negative event. In such a case, the self-reported 2007 equity value would not provide an accurate basis for assessing the correlation between mobility and negative equity.

In light of these potential concerns, we focus on a second measure of negative equity, namely predicted negative equity as of September 2008 (approximately the midpoint of the two interviews).

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[6] Home-secured debt in the SCF includes first- and junior lien mortgages, home-equity loans, and home-equity lines of credit.

[7] This may be particular true for families in the initially considering a move or default. A family that pursues one of these options may revise their estimate of their home value if the process provides information about the market price of the home.

[8] Homeowners' beliefs about the amount of equity they hold in their home could affect mobility, even if these beliefs diverge from external estimates. Further, the value that the family places on their home may differ from the "market" value to the extent that the price of the home (as for many types of assets) may not be unique. For example, the assessed value of a home can differ from the appraised value, and the homeowner may be willing to sell the home at a price that differs from both of these. In addition, as noted by Schulhofer-Wohl (2011), even in the presence of these errors in measurement, the sign of our subsequent coefficient estimates will be correct.

We predict home equity for families that owned their home in 2007 and did not move by 2009 based on LoanPerformance (LP) house price indexes and the self-reported value of the home in 2007 and 2009, if the family did not move. The estimate of home equity in 2008 further assumes that households made the scheduled payments on these loans.[9]

We take advantage of the comprehensive data available on household finances in the SCF to construct four criteria for defining a family as potentially economically insecure. Three measures capture measures of a families' financial position in 2007, specifically, whether the family: i) had a payment-to-income ratio greater than 40 percent; ii) was late on debt payments by two months or more in the prior year, or; iii) had been turned down for credit in the preceding five years.[10] The fourth measure reflects a family's *ex post* employment security, which we measure based on whether the family head or spouse reported having lost a job in the 12 months prior to the 2009 interview.[11]

We combine the first three criteria and, for brevity, subsequently refer to a family that meets any one of these as "financially insecure." We refer to families that meet any of the four criteria as "economically insecure." Each of the four measures of economic insecurity can lead to the types of liquidity, income, or credit constraints that may contribute to default under the double-trigger hypothesis. That said, the measures potentially capture different aspects of economic insecurity: for

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[9] We predict home equity by adjusting the value of the home based on a combination of survey responses and external home price indices. For families that owned a home in 2007 and retained that home (even if they moved) we find the fraction of the self-reported home value change that occurred by September 2008. That is, we find the percent decline in the self-reported value of the house ($\text{SCFValue}^{09}/\text{SCFValue}^{07}$) and scale it by the fraction of the change in the home price index that occurred by September 2008 ($(\text{HPI}^{08} - \text{HPI}^{07})/(\text{HPI}^{09} - \text{HPI}^{07})$). For families that sold their 2007 home we use the reported sales price.

Our home price index is the Loan Performance (LP) Core Based Statistical Area (CBSA)-level house price index. For the five percent of SCF homes that are not in an LP CBSA we use the state-level LP home price index. CBSAs comprise Metropolitan Statistical Areas (MSAs) and micropolitan areas.

An alternative predicted equity measure only adjusts the 2007 self-reported value of the home by the house price change implied by LP as of September 2008. These results are qualitatively similar.

The subsequent results are also qualitatively similar if house price changes are estimated based on the Federal Housing Finance Agency (FHFA) house price indexes. The FHFA house price indexes are based on repeat-sales of single-family homes, including refinancing appraisals as an observed "repeat sale," for properties with conforming, conventional mortgages purchased or securitized by Fannie Mae or Freddie Mac. In contrast, the Tier 11 LP HPI used in this analysis includes mortgages of all types, and the LP repeat-transactions include only sales transactions.

[10] Included among families denied credit are those who responded that they did not apply for credit because they believed they would be turned down. Earlier studies, including Jappelli (1990) and Duca and Rosenthal (2006), have found the SCF questions about credit applications and outcomes provide a useful indicator of households that are more likely to be credit constrained.

[11] In the primary analysis, we identify families in which the respondent or spouse/partner (if applicable) reportedly was unemployed and looking for work at any time during the past 12 months prior to the 2009 interview. This measure would not reflect unemployment spells that started and ended between the 2007 interview and early 2008. To account for such spells, we additionally treated households as having experienced a negative employment shock not only if their income in 2008 was reportedly low due to low labor market earnings. This broader definition of employment shocks yields qualitatively similar conclusions.

example, a family may have difficulty borrowing but not face high unemployment risks. In addition, the financial vulnerability measures are forward-looking and identify families that are in a position in which the effect of a shock could be devastating. In contrast, the unemployment spell measure is backward-looking and identifies families that had experienced a negative employment shock.

## III. How many households moved and why?

About 22 percent of households moved between the 2007 and 2009 interviews, and roughly half of moves over this period were local (Table 1). Nearly half of renters moved between 2007 and 2009, a rate roughly five times that for homeowners. Renters' greater mobility aligns with expectations and with prior studies (*e.g.*, Coulson and Grieco, 2013). One reason renters may be more mobile is differences in transaction costs, which are generally thought to be higher for homeowners, including the costs of selling the prior residence and of financing a new home. Further, homeowners and renters are typically at different points in the life cycle; families that own their home, for example, typically have older heads, tend to have greater wealth and income, and are more likely to be couples with children present in the home (Appendix Table 1). Accounting for such observable differences between renters and owners narrows the estimated gap in mobility rates by about half to roughly 20 percentage points.

The overall estimated 2007–09 mobility rate is 2.3 percentage points lower if one considers only moves in which the household did not retain ownership of the 2007 residence. Roughly one-third of 2007 homeowners that moved between 2007 and 2009 did not sell the 2007 home. This narrower definition of household moves has the advantage of being substantially comparable to mobility rates that can be constructed for the SCF cross-sections. The fraction of families that moved between SCF interviews was 8 percentage points lower than the fraction of families that reported in 2007 that they had purchased or moved into the home in the prior 26 months, the median number of months between the 2007 and 2009 SCF panel interviews (table 1, memo).[12]

The Current Population Survey (CPS) and other data sources indicate that mobility rates in the U.S. have trended down since the 1980s (Molloy *et al.,* 2011). This longer-term trend is also apparent in the cross-sectional SCF surveys conducted since 1989, but it does not appear to explain the relatively steep drop in mobility over the 2007–09 period. More specifically, to gauge whether

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[12] These measures of two-year mobility rates may not be strictly comparable because the underlying questions differ. Nevertheless we believe that the differences in the questions likely accounts for little of the difference in the 2007 and 2009 estimates.

the decline in mobility observed in the SCF panel simply reflects this longer-term trend, we estimate a linear trend in mobility rates based on the seven SCF surveys between 1989 and 2007 and predict the mobility rate in 2009 if this trend had continued. The actual mobility rates, as captured in the 2007–09 SCF panel, are significantly lower than the predicted rates, a finding that suggests that the recent recession measurably reduced homeowner mobility. For example, if the estimated historical trend based on the 1989–2007 SCFs had continued through 2009, the 26-month mobility rate would have been seven percentage points greater than the observed rate of 19.9 percent.[13] The difference between the 26-month mobility rate in 2007 and the share of families that moved during the SCF panel period is greater for homeowners than for renters in both absolute and, particularly, proportional terms.

Families that moved between 2007 and 2009 reported a variety reasons for moving that include both voluntary and involuntary considerations (Table 2). About 30 percent of moves were prompted, at least in part, by wanting to live either in a different location or in a new or different space—reasons that would appear to be largely voluntary.[14] A slightly lower fraction of moves were due to principally involuntary reasons such as foreclosure, eviction, or short sale or, similarly, to high housing costs. Thirteen percent of movers cited job changes, a reason that likely comprises both involuntary and voluntary changes in employment.

To provide context for these reasons, we compare them to the reasons cited by household heads in the Current Population Survey (CPS) that moved between 2007 and 2009. The relative frequencies of several of the reasons for moving are often similar to those in the SCF. For example, movers in both the CPS and SCF commonly pointed to a desire for a new or better housing, less-expensive housing, and job changes (Appendix Table 3).

The two data sources diverge on some dimensions, however. Some of the discrepancies may be due to differences in classifications of reasons and differences in response options that were available to respondents. Most notably for the purposes of this paper, the reported shares of households that moved because of foreclosure or eviction differ starkly between the two data sets. The CPS did not directly identify moves due to foreclosure and eviction in the 2007, 2008, or 2009, but only if nearly all moves due to an "other housing reason" or "other reasons" were due to

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[13] This difference is significant at a [one percent] level. The estimates of the change in one- and three-year mobility rates are significant at [one- and five-percent] levels, respectively. Inference is based on standard errors that account of imputation uncertainty, sample design, and the correlation between estimates for households in the 2007–09 SCF panel.
[14] Families that moved could report more than one reason, but most gave only one. Accordingly, column totals in table 2 may be greater than 100 percent.

involuntary reasons would the share be comparable to that in the SCF. The lack of an explicit "foreclosure/eviction" response option in the 2007–2009 surveys likely lowered the prevalence of this response in the CPS. Consistent with this conjecture, the share of families that reported having moved due to "foreclosure/eviction" increased from 0.9 percent in 2011, when this reason was coded from write-in responses, to 1.7 percent in 2012, while the share citing "other housing reasons" increased between 2011 and 2012.

Comparing the reasons for moves reported in the 2012 CPS (when foreclosure/eviction was provided as an explicit response) to the reasons in the SCF, at least three considerations may contribute to the sizable, 8.5 percentage point difference between the two surveys (10.2 percent in the SCF panel compared with 1.7 in the 2012 CPS). First, foreclosure rates fell between 2009 and 2011.[15] Second, the mobility reasons code frame in the CPS is limited relative to the SCF; the CPS frame includes only "foreclosure/eviction" but the SCF allows us to include several other reasons for forced moves.[16] Third, SCF respondents could report several reasons for moving, whereas the CPS data record only the primary reason. When we restrict our definition to include only "foreclosure" or "eviction" and include only the first reason for moving, the difference falls to 3.7 percentage points.

The factors that precipitate moves differ by the distance of the move in ways that generally accord with expectations.[17] For example, the roughly 40 percent of movers that moved long distance cited job changes or a wanting to live nearer to family as reasons for moving, whereas families that moved locally rarely cited these reasons. Local movers more commonly reported wanting to become homeowners or a desire for a different space. Surprisingly, however, long-distance movers were relatively more likely to have moved to have a shorter commute. Families that moved due to foreclosure, eviction, or similar reasons were more likely to move locally and remain in the same local labor market area rather than to move outside the 2007 MSA or county.

Several of the most common factors that precipitated moves were similar for both homeowners and renters including moving due to a job change, a desire to be nearer to relatives, or wanting a

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[15] Data from RealtyTrac indicate that foreclosure filings peaked in the second half of 2009 and remained elevated before they fell in the fourth quarter of 2010. The Federal Reserve Board's analysis of Mortgage Bankers Association data shows the stock of foreclosed properties peaked in 2009 and roughly held steady through early 2012 (Board of Governors of the Federal Reserve System, 2013, Figure 21).

[16] The comparable CPS question (NXTRES) is "what was [your] main reasons for moving?" The data frame for the question is found in the Current Population Survey 2012 Annual Social and Economic (ASEC) Technical Documentation Supplement (http://www.census.gov/prod/techdoc/cps/cpsmar12.pdf).

[17] The differences shown in Table 2 in the reasons for local moves relative to long-distance moves are largely unchanged if one additionally controls for tenure (Appendix Table 2).

different space or location. This similarity might be surprising given the differences noted above in the characteristics of homeowners and renters and the presumably higher transaction costs in moving faced by homeowners. Since renters tend to be younger and hence less likely to be settled in a career, for example, one might expect that renters would be more likely to cite job changes as a reason for moving. Higher transaction costs might be expected to lead not only to greater mobility for renters but also to a greater share of moves for largely voluntary reasons for renters compared with homeowners.

Other reasons for moving diverge for homeowners and renters. Homeowners that moved were also about twice as likely as renters that moved to cite changes in marital or partnership status as the reason for moving over the period. Not surprisingly, a far greater fraction of renters than homeowners pointed to the desire to own a home. Arguably, the most notable difference by tenure, however, is in the share of moves due to foreclosure, short sale, or eviction. Nearly 20 percent of homeowners that moved cited one of these involuntary, housing-related reasons, compared with about six percent of renters that moved. In fact, these reasons were the most common ones cited by homeowners that moved and remained in the same MSA or county (Appendix Table 2).

**IV.    The interplay of economic insecurity, negative equity, and homeowner mobility**

The analysis of the reasons that households moved between 2007 and 2009 highlights the importance of involuntary moves and, in turn, the potential effects of negative equity on homeowners' mobility over this period. The following sections examine more closely the empirical relationship between negative equity and mobility.

The direction of the correlation between negative equity and household mobility is theoretically ambiguous. On the one hand, sharp house price declines may lead homeowners to default and, consequently, to move from the home, especially if the likelihood of recovery in house prices appears slim. A homeowner may also decide to move and retain ownership of the house for use as a rental property. Further, if adverse shocks such as loss of a job are positively correlated with house price declines, these may also lead to a positive correlation between negative equity and mobility. For instance, a homeowner that is laid off might extract home equity, or the loss of income may lead to mortgage default. Foote, *et al.* (2008), Bhutta, *et al.* (2010), Elul *et al.* (2010), and Herkenhoff (2012) each find evidence in support of this double-trigger view of mortgage default: foreclosure is often the consequence of not only negative home equity but also a contemporaneous adverse shock that makes it difficult to meet mortgage payments.

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On the other hand, homeowners who can service their loan payments but have limited available assets may be "locked-in" to their home. Housing often accounts for a sizable share of families' assets and homes are typically highly leveraged. As with any leveraged asset, small percentage declines in house prices can translate into large equity losses. Thus, underwater families may be less likely to move if they lack the funds to remedy the deficiency, pay for closing costs, and put down a downpayment on a new home (Chan, 2001). The downpayment requirement may have been particularly binding in recent years because of tight credit conditions.

Even households that are not liquidity constrained may be less likely to move in the wake of house price declines if homeowners are reluctant to sell at a nominal loss, as suggested by the findings of Engelhardt (2003), Genesove and Mayer (2001), and Foote, *et al.* (2008).[18] Further, as noted by Molloy *et al.* (2011), house price declines may reduce expectations of future house values and, in turn, reduce the incentives for current homeowners and renters alike to invest in a new home.

Empirical assessments of the relationship between negative equity and mobility have not resolved this theoretical ambiguity. Ferreira, *et al.* (2010, 2011), for instance, conclude based on the American Housing Survey (AHS) that households with negative home equity are less likely to move than other households. In contrast, Schulhofer-Wohl's (2011) analysis of AHS data indicates that negative equity is associated with a greater probability of moving.[19] Coulson and Grieco (2013) examine household mobility between 1999 and 2009 in the Panel Study of Income Dynamics (PSID). In line with the findings of Schulhofer-Wohl (2011), they conclude that homeowners with negative equity are relatively more mobile, and they find homeowners that are severely underwater are especially likely to move out of state.[20]

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[18] Apparent loss aversion may result from the value that the homeowner places on non-capitalized attributes of the home. For example, a home provides a community of neighbors and established social networks, and moving can entail non-financial costs such as disruption of children's education. In addition, idiosyncratic components of the home may be highly valued by the homeowners but less valued by a potential buyer of the home.

[19] Schulhofer-Wohl (2011) and Ferreira *et al.* (2010, 2011) differ in their treatment of cases in which a homeowner moves but retains ownership of a previous home; Schulhofer-Wohl (2011) considers such housing transitions as moves, whereas Ferreira et al. (2010, 2011) do not. As noted above, the estimated mobility rate is greater if one treats moves in which the homeowner retains ownership as moves, but our subsequent results are qualitatively unchanged whether we include all movers (Schulhofer-Wohl, 2011) or drop the 2007 homeowners that retained ownership of their previous home from the sample (Ferreira et al., 2010, 2011).

[20] The differing conclusions regarding the sign of the correlation between negative equity and mobility is not unique to Schulhofer-Wohl (2011) and Ferreira et al. (2010, 2011). Several other studies that examine correlations at an aggregate level, such as county-level mobility and house price declines, have similarly reached divergent conclusions (see., e.g., Aaronson and Davis, 2011; Donovan and Schnure, 2011; Modestino and Dennett, 2011, and; Molloy et al., 2011).

This paper builds on these prior studies of the relationship between negative equity and mobility in its focus on the potential role for interaction between negative equity and adverse economic shocks in determining relationship. As noted above, several studies provide evidence that negative equity and adverse shocks jointly underlie at least some mortgage defaults, so it is perhaps natural to consider the extent to which such double triggers affect, in turn, household mobility. Even if such double triggers play an important role in a household's decision to default, however, it does not necessarily follow that double triggers are important determinants of household mobility. A homeowner may default without subsequently moving and, as highlighted in Section III, many families may move for a variety of reasons other than default.

## V.    Analysis of the role of negative equity and adverse shocks in mobility

In the 2007 interview, 1.3 percent of SCF homeowners reported that their primary home was worth less than the total amount of their outstanding home-secured debt (Table 3).[21] Because house prices continued to decline after the 2007 SCF was completed, we use CBSA- and state-specific house price indexes (as detailed above) to estimate whether homeowners had negative home equity in September 2008.[22] We estimate that six percent of 2007–09 panel SCF homeowners were underwater in September of 2008.[23] About one in five homeowner families that were underwater by either measure moved over the two-year period or more than twice the 9.7 percent rate for homeowners overall.

Financial insecurities entering the recession and employment shocks between 2008 and 2009 were common among homeowners, and homeowners that met these criteria were more likely than other families to have moved. Nearly one-quarter of homeowners met at least one of the financial-insecurity criteria, and for 16 percent of families that owned their home, the head of family or spouse had an unemployment spell between surveys. More than one-third of homeowner families were classified as economically insecure on one or both dimensions. Mobility rates were four to six

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[21] This fraction rises to 1.9 percent if families that reported mortgage debt equal to the value of the home are included.

[22] The SCF panel data allow us to compare self-reported house price declines to the values predicted by LP (Appendix Table 4). SCF homeowners from 2007 who moved and sold their house between surveys were asked for the sales price. Based on this sales price and a deflated 2007 mortgage balance, about 16 percent of SCF homeowners who moved and sold in between surveys were expected to be underwater, nearly the same as the 16.5 percent underwater rate predicted for movers by LP. Further, the SCF and LP house price changes appear to agree among these groups. Among movers in the SCF the median (mean) LP house price change as of September 2008 is a 10 percent (12 percent) decline. Among the SCF moved who sold their house, the median (mean) house price change is an 8 percent (9 percent) decline.

[23] Under this approach, the estimated share of homeowners that were underwater was five percent in June 2008 and ten percent in June 2009. The subsequent results are qualitatively similar whether we choose September 2008, June 2008, or June 2009 as the reference point for estimated negative equity.

percentage points greater than average for homeowners that were either financially insecure at the start of the recession or that experienced an unemployment spell in 2008 or 2009.

A disproportionate share of underwater homeowners entered the recession with financial insecurities or to confront unemployment spells during the recession. More than half of the homeowners with predicted negative equity met at least one of the financial-insecurity criteria, nearly one-quarter experienced an unemployment spell between surveys, and nearly two-thirds were economically insecure on either dimension (table 3, memo). These homeowners that both faced economic insecurity and estimated negative equity were particularly likely to have moved. Most notably, greater than half of homeowners that experienced unemployment and that had negative equity moved between 2007 and 2009.

To distill the differences in mobility more directly, we construct three mutually exclusive groups: i) families that have non-negative equity but were economically insecure (either through an unemployment shock or through financial insecurity); ii) families with negative equity but that were not economically insecure; iii) and families that were both economically insecure and had negative equity. Families with positive home equity that were not insecure are the omitted group. We control for differences in demographic and other characteristics in estimating differences in mobility across the four groups, as shown in equation (1):

$$\text{moved}_i = \alpha + \beta_1 \text{Insecurity alone}_i + \beta_2 \text{Predicted negative equity alone}_i$$
$$+ \beta_3 \text{Both insecurity and negative equity} + \gamma X_i + \varepsilon_i$$

Note that each of the $\beta$ coefficients is directly interpretable as the difference in mobility relative to non-vulnerable homeowners that were not underwater.[24] The vector $X$ captures differences in the characteristics of homeowners including: family income from all sources in 2006; net worth; 2007 house value; marital status; the presence of children in the household; age of the household head; race/ethnicity of the 2007 SCF respondent; number of years in the home; whether the home is within an MSA; whether the home is in a recourse state.[25]

In addition, we control for the county level unemployment rate and the subjective probability, reported in the 2007 survey, of moving within the next two years. We control for the county level

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[24] Put differently, it is not necessary to sum the coefficients to estimate the difference in mobility for families that both have negative home equity and are financially-vulnerable families, as would be the case for "conventional" dummies and interaction terms. On the other hand, one cannot immediately determine the statistical significance of the interaction term, *i.e.,* the additional the effect of both having predicted negative equity and being economically insecure over and above either of the criteria alone.

[25] We transform net worth by *sign*(net worth)*$ln$(*abs*(net worth /1000)+1).

unemployment rate since some families may have moved in anticipation of a potential layoff, which our measure based on realized unemployment spells may not capture. The subjective likelihood of staying in the same home accounts for the fact that some moves may have been anticipated rather than the result of adverse economic shocks or declines in home equity.

After controlling for economic security and for observable differences across households in this way, homeowners that experienced a combination of negative equity and economic insecurity—unemployment, financial insecurity, or either of these—were significantly more likely to move than families that experience neither negative equity nor economic insecurity (Table 4, column 1).[26] For example, the probability of having moved for a family that was underwater and that met either of the economic-insecurity criteria was roughly 22 percentage points greater than the rate for families that did not have negative equity and that was not classified as economically insecure.

By comparison, economically insecure families that had zero or positive home equity were about two percentage points more likely to move. Homeowners with negative equity that were not economically insecure were also about two percentage points more likely to move (neither difference is statistically significant).[27] However, when considering unemployment and financial insecurity separately, homeowners with negative equity that were not insecure were about nine percentage points more likely to move relative to families that did not have negative equity and that were not classified as economically insecure.

The greater mobility of homeowners that faced both negative equity and economic insecurity is wholly attributable to differences in the likelihood of involuntary moves, as shown in the second and third columns. Depending on the measure of economic insecurity, the probabilities of moving due to foreclosure, short sale or a similar reason were between 17 and 36 percentage points greater for economically insecure homeowners with negative equity, a difference that is remarkable given that only 1.9 percent of homeowners moved for involuntary reasons. In contrast, neither unemployment nor any measure of economic insecurity was predictive of moves for other, voluntary reasons.

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[26] In Table 4, negative equity is defined based on predicted negative equity in 2008. Appendix Table 6 presents estimates based on negative equity in 2007 (a definition that captures a smaller set of families).

[27] The linear probability model (LPM) is generally easier to explain but yields inefficient parameter estimates and, potentially, predicted values that are outside of the [0,100] range. Appendix Table 5 shows results for logistic regression of equation (1), which are quite similar to those in Table 4 in economic and statistical significance. The results suggest that the odds of moving, for example, were about 62 percent greater when a family had only an unemployment spell than when the family had neither an unemployment spell nor negative equity. In line with results of Table 3, the odds of moving are close to five times greater when the family has both unemployment spell and negative equity than when the family had neither. The results are likewise similar if the data are trimmed to exclude observations whose predicted value are not in [0,100] in the LPM estimation in Table 4 (as suggested in Horrace and Oaxaca, 2005).

Columns (4) and (5) distinguish between local and long-distance moves and suggest that economic shocks tend to increase the probability of local moves, particularly for homeowners that were estimated to be underwater. The probability of moving within the same MSA or county between 2007 and 2009 was more than three percentage points greater for families that experienced an unemployment spell but had positive home equity, for example, and it was 27 percentage points greater for families with both an unemployment spell and negative equity. In isolation, negative equity, financial insecurity, and unemployment did not significantly affect the likelihood of a long-distance move. Homeowners that experienced unemployment or economic insecurity along with negative equity were more likely to have moved outside of the MSAs or counties where they lived in 2007, though the magnitude of these differences is smaller than for local moves and the statistical significance is weaker. One reason that homeowners might be more likely to move locally is liquidity constraints. Indeed, our measures of financial insecurity are intended to identify families that were liquidity constrained in 2007, and particularly families that meet one of the economic vulnerability criteria and had negative equity may have greater difficulty affording the transaction costs of a longer-distance move.[28]

Much of the recent interest in the relationship between negative equity and mobility has stemmed from a desire to understand the implications of the extraordinary share of homeowners with negative equity for the labor market. An unemployed worker that moves within a metropolitan area is likely to face similar labor market conditions in the new location, whereas a worker that moves to a new metro area is likely to face different labor market conditions. One might conjecture that the unemployment rate has remained relatively high in the wake of the recent recession, in part, because unemployed workers that own a home, in particular, have been constrained in their ability to move to take a new job.

At first glance, the SCF data might be seen as consistent with the hypothesis that a portion of the elevated unemployment rate in recent years could be attributed to reduced mobility of underwater homeowners. In particular, families that owned a home in 2007 and moved locally were more than twice as likely to have a head or spouse/partner that was unemployed in 2009 than those

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[28] For example, the median 2007 liquid assets for homeowners in the SCF panel that moved locally was about $2,800 while median liquid assets for homeowners that moved out of the area was about $8,750. Greenstone (1997, page 666) notes that distance of move serves as a proxy for out-of-pocket costs as well as psychic costs and information costs.

that moved long distance (4.6 percent compared with 9.6 percent), whereas the unemployment rates for these groups were nearly identical in 2007 (1.6 percent compared with 1.8 percent).[29]

However, a simple calculation suggests that this difference in unemployment rates by the distance of move likely explains little of the increase in unemployment between 2007 and 2009 because this difference in unemployment rates is relevant for only a small minority of families. Less than seven percent of all families were 2007 homeowners that moved and only half of these, or about 3.4 percent of all families moved locally.

Considering all families in the SCF panel, 4.3 percent of households had a head or spouse/partner that was unemployed in 2007, and in 2009 this fraction was 7.7 percent. If homeowners that moved locally had the same unemployment rate in 2009 as homeowners that moved long-distance, the fraction of all households with a head or spouse/partner that was unemployed would have been only 0.1 percentage points lower, 7.6 percent. This back-of-the envelope calculation suggests that the sluggish recovery of employment after the recent recession is largely due to factors other than constrained homeowner mobility, a conclusion which generally echoes the findings of several recent studies of the labor market consequences of house price declines and negative equity (Coulson and Grieco, 2013; Valletta, 2012; Modestino and Dennett, 2011; Molloy, *et al.*, 2011; and Donovan and Schnure, 2011).

## VI.    Conclusions

Data from the 2007–09 SCF panel indicate that, on the whole, household mobility fell at the onset of the recent recession. Families that moved did so for a variety of reasons, and most moves were attributable to considerations, such as desire for a better location or space, that were commonly cited by families that moved during other time periods. At the same time, a sizable fraction of moves—about 10 percent of moves by all families and nearly 20 percent of moves by homeowners—that stemmed from foreclosure, eviction, or similar involuntary reasons.

This paper takes advantage of the SCF panel's extensive information on households' balance sheets and employment experiences to examine in depth the role of adverse economic shocks and negative home equity in households' mobility decisions. These data indicate that the unconditional mobility rates of families with negative equity were higher than those of homeowners with positive

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[29] These percentages are the share of homeowner families in which the household head or spouse/partner (if applicable) was unemployed at the time of the interview. In contrast, the unemployment spell variables considered elsewhere capture households in which the head or spouse/partner (if applicable) had been unemployed at any time in the year prior to the 2009 interview.

equity. However, this result appears to be driven largely by the fact that underwater homeowners were more likely to confront negative economic shocks. Underwater homeowners who neither entered the recession in a financially insecure position nor experienced an unemployment spell over the 2007–09 period were no more likely to move than homeowners that were otherwise similar but who had positive home equity. In contrast, families that were estimated to be underwater in 2008 and who met one of our economic-insecurity criteria were substantially more likely to move than other families and to move, in particular, due to foreclosure or similar involuntary reasons.

This finding yields new perspective on the relationship between negative equity and homeowner mobility. In particular, it appears that studies of this relationship would do well to measure and account for adverse shocks. Adverse economic shocks, most notably unemployment, and negative equity were, of course, relatively common during the time period covered by the SCF panel. Other data sources spanning other time periods would allow a fuller understanding of the role of adverse economic shocks for households' decisions to move.

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**Table 1. Share of households that moved by distance of move: All families and by housing tenure**

Percent

|  | All families | Homeowners | Renters |
|---|---|---|---|
| Moved, 2007–09 | 22.2 | 9.7 | 50.2 |
|   Local | 11.2 | 4.8 | 25.7 |
|   Long distance | 11.0 | 4.9 | 24.5 |
| Moved and left prior residence, 2007–09 | 19.9 | 6.3 | 50.2 |
|  |  |  |  |
| MEMO |  |  |  |
|   Lived in 2007 residence ≤ 26 mos. | 27.9 | 15.0 | 56.8 |

Source: 2007–09 panel SCF.
Local moves refer to moves within the same MSA (if applicable) or county; long-distance moves are those in which the family moved to a new MSA (if applicable) or county.


**Table 2. Reasons for moving reported by families that moved: All families that moved, by tenure, and by distance**

Percent

|  |  | Distance of move | | 2007 Tenure | |
|---|---|---|---|---|---|
| Reason | Families that moved | Local | Long-distance | Renter | Home-owner |
| Wanted new/different space | 20.1 | 27.6 | 12.4 | 20.9 | 18.2 |
| Costs/rent too high | 18.4 | 18.2 | 18.5 | 20.3 | 13.7 |
| Changed jobs | 12.7 | 2.5 | 23.2 | 12.5 | 13.2 |
| Wanted better/different location | 11.1 | 11.8 | 10.3 | 11.4 | 10.2 |
| Foreclosed/evicted/other involuntary | 10.2 | 13.5 | 6.7 | 6.2 | 19.4 |
| To be near relatives | 9.8 | 3.7 | 16.0 | 10.4 | 8.3 |
| Want to own home | 9.7 | 14.0 | 5.3 | 12.9 | 2.3 |
| Health | 5.9 | 6.0 | 5.8 | 5.2 | 7.8 |
| Divorce/separation | 5.7 | 5.5 | 5.8 | 2.6 | 12.9 |
| Moved in with new spouse/partner | 4.5 | 3.8 | 5.2 | 4.8 | 3.6 |
| Shorter commute | 4.4 | 2.5 | 6.5 | 5.2 | 2.7 |
| Retired | 1.2 | 0.9 | 1.5 | 0.5 | 2.8 |
| Other housing reasons | 0.8 | 1.0 | 0.6 | 0.9 | 0.6 |
| Rented in 07, now own same home | 0.4 | 0.8 | <0.1 | 0.6 | <0.1 |

Source: 2007–09 panel SCF.
Local moves refer to moves within the same MSA (if applicable) or county; long-distance moves are those in which the family moved to a new MSA (if applicable) or county.
Up to nine reasons for moving are used in this calculation, so totals may sum to more than 100 percent.

**Table 3. Characteristics of homeowners, by 2007–2009 mobility**

Percent unless otherwise noted

| Characteristic | Percent of homeowners | Pr(moved \| characteristic) |
|---|---|---|
| *Home equity* | | |
| Negative equity (2007) | 1.3 | 21.4* |
| Pred. negative equity (2008) | 6.4 | 24.4** |
| *Financial insecurities and employment shocks* | | |
| Financial insecurities in 2007 | 23.6 | 14.2** |
| Unemployment spell in 2008 or 2009 | 16.2 | 15.9** |
| Economic insecurity (either fin'l or unemp.) | 34.2 | 13.7** |
| *Financial insecurities and shocks and estimated negative equity* | | |
| Estimated negative equity and fin'l insecurities in 2007 | 3.5 | 35.3** |
| Estimated negative equity and unemp. spell in 2008 or 2009 | 1.5 | 50.1** |
| Estimated negative equity and economic insecurity | 4.1 | 36.6** |
| | | |
| MEMO | | |
| Percent of predicted negative equity homeowners with… | Percent | |
| Financial insecurities in 2007 | 54.7 | |
| Unemployment spell in 2008 or 2009 | 23.3 | |
| Economic insecurity (either fin'l or unemp.) | 65.2 | |

Source: 2007–09 panel SCF.
Estimates are weighted with non-response adjusted sampling weights. **significant at 5%, * significant at 10%.
Significance levels are for differences in mobility rates for homeowners with and without the characteristic and
are based on 999 bootstrap replicate samples and incorporate both sampling and imputation uncertainty.

**Table 4.** Estimates of negative equity and economic insecurity on the probability of moving, relative to positive home equity and no other shock.

| | Type of move | | | | |
| | | Reason | | Distance | |
| | Any | Involuntary | Voluntary | Local | Long-distance |
| | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Financial insecurity or unemployment spell | 1.73 | 0.91* | 0.82 | 1.84** | -0.11 |
| | (1.16) | (0.48) | (0.99) | (0.79) | (0.80) |
| Negative equity | 2.03 | 0.83 | 1.21 | 1.05 | 0.98 |
| | (4.87) | (1.86) | (4.88) | (3.28) | (4.57) |
| Both | 21.83** | 19.89** | 1.94 | 17.59** | 4.24 |
| | (4.23) | (3.17) | (3.79) | (3.66) | (3.16) |
| | | | | | |
| Unemployment spell | 3.15** | 2.04** | 1.12 | 2.97** | 0.19 |
| | (1.47) | (0.79) | (1.21) | (1.26) | (1.04) |
| Negative equity | 8.56** | 6.69** | 1.86 | 7.06** | 1.50 |
| | (3.42) | (1.79) | (3.03) | (2.87) | (2.58) |
| Both | 36.03** | 35.73** | 0.29 | 26.98** | 9.05 |
| | (8.66) | (7.21) | (5.70) | (7.68) | (6.75) |
| | | | | | |
| Financial insecurity | 1.39 | 0.55 | 0.85 | 1.13 | 0.26 |
| | (1.43) | (0.64) | (1.22) | (1.08) | (0.99) |
| Negative equity | 9.19** | 7.75** | 1.43 | 3.68 | 5.51 |
| | (4.62) | (2.96) | (4.37) | (3.36) | (4.74) |
| Both | 18.82** | 17.14** | 1.68 | 17.54** | 1.28 |
| | (4.33) | (3.42) | (3.90) | (3.46) | (3.38) |
| | | | | | |
| Other regressors included | Yes | Yes | Yes | Yes | Yes |
| MEMO | | | | | |
| Mean of dep. variable | 9.7 | 1.9 | 7.8 | 4.8 | 4.9 |

Note: The dependent variable *move* is equal to 100 if the family moved and 0 otherwise.
The estimation sample includes SCF homeowners other than mobile-home owners and homeowners that operate a farm or ranch business on the property.
Negative equity is estimated based on percent of 2007-2009 home value change that occurred as of September 2008 in LoanPerformance home price index (described in text).
Standard errors, in parentheses, are based on 999 bootstrap replicate samples and incorporate both sampling and imputation uncertainty.
Regressions include controls for income and income squared; net worth (transformed as sign(net worth)* ln(abs(net worth/1000)+1))); children present; age of head and age squared; years in home; subjective probability of moving in 2007 interview; value of home in 2007; level and change in county unemployment rate; and MSA status. Estimates are weighted with non-response adjusted sampling weights. **significant at 5%, * significant at 10%.

**Appendix Table 1. Characteristics of all families and of movers by tenure**

| Characteristic | All Families | | | Families that moved | | |
| --- | --- | --- | --- | --- | --- | --- |
| | All Families | Renters | Home-owners | All Families | Renters | Home-owners |
| Married | 60.0 | 40.9 | 68.5 | 52.3 | 45.2 | 68.9 |
| White, non-Hispanic | 70.0 | 53.7 | 77.3 | 60.6 | 55.4 | 72.8 |
| Northeast | 19.1 | 20.9 | 18.3 | 11.4 | 12.7 | 8.5 |
| North Central | 23.3 | 20.9 | 24.4 | 24.5 | 24.6 | 24.4 |
| South | 36.0 | 33.0 | 37.3 | 37.8 | 36.4 | 41.2 |
| West | 21.6 | 25.2 | 20.0 | 26.2 | 26.3 | 25.9 |
| Age of head (2007) | 49.3 | 40.8 | 53.1 | 39.4 | 36.2 | 46.9 |
| College degree (2007 head) | 37.7 | 25.8 | 43.1 | 33.3 | 25.2 | 52.0 |
| Children in household (2007) | 45.7 | 46.8 | 45.2 | 49.9 | 48.2 | 53.9 |
| 2007 Pr(move in next 2 years) | 23.3 | 46.1 | 13.1 | 52.1 | 58.0 | 38.4 |
| Urban area (2007) | 84.5 | 84.8 | 84.4 | 85.1 | 84.4 | 86.8 |
| Recourse state (2007) | 65.0 | 63.6 | 65.6 | 61.7 | 61.7 | 61.7 |
| Median income (thous. 2009 $) | 51.2 | 31.0 | 68.2 | 36.9 | 31.9 | 74.5 |
| Median net worth (thous. 2009 $) | 140.4 | 5.4 | 262.8 | 13.7 | 5.4 | 204.6 |

**Appendix Table 2.   Reasons for moving reported by families that moved by tenure and distance**

Percent

| Reason | Homeowners | | Renters | |
|---|---|---|---|---|
| | Local | Long-distance | Local | Long-distance |
| Wanted new/different space | 23.3 | 13.2 | 29.3 | 12.0 |
| Costs/rent too high | 16.6 | 10.9 | 18.8 | 21.9 |
| Changed jobs | 4.1 | 22.0 | 1.8 | 23.7 |
| Wanted better/different location | 11.6 | 8.5 | 11.7 | 11.1 |
| Foreclosed/evicted/other involuntary | 25.8 | 13.2 | 8.4 | 3.9 |
| To be near relatives | 4.0 | 12.5 | 3.6 | 17.6 |
| Want to own home | 3.7 | 2.4 | 18.5 | 6.9 |
| Health | 6.8 | 8.7 | 5.7 | 4.6 |
| Divorce/separation | 13.0 | 12.8 | 2.5 | 2.7 |
| Moved in with new spouse/partner | 2.2 | 5.0 | 4.4 | 5.3 |
| Shorter commute | 0.2 | 5.1 | 3.4 | 7.1 |
| Retired | 1.2 | 4.1 | 0.8 | 0.1 |
| Other housing reasons | 0.6 | 0.6 | 1.1 | 0.6 |
| Rented in 07, now own same home | <0.1 | <0.1 | 1.1 | <0.1 |

Source: 2007–09 panel SCF.

Notes: Local moves refer to moves within the same MSA (if applicable) or county; long-distance moves are those in which the family moved to a new MSA (if applicable) or county.

Up to nine reasons for moving are used in this calculation, so totals may sum to more than 100 percent.

**Appendix Table 3. Reasons for moving, CPS Householders, 2007–09**

| Reason | Percent |
|---|---|
| Wanted new or better home/apartment | 13.6 |
| To establish own household | 12.3 |
| Other family reason | 10.6 |
| Wanted cheaper housing | 9.5 |
| New job or job transfer | 9.4 |
| Other housing reason | 8.2 |
| To be closer to work/easier commute | 6.8 |
| Wanted own home, not rent | 5.9 |
| Change in marital status | 5.6 |
| Wanted better neighborhood/less crime | 5.0 |
| To attend or leave college | 3.0 |
| Other job related reason | 2.9 |
| Other reasons | 2.3 |
| To look for work or lost job | 1.8 |
| Health reasons | 1.6 |
| Retired | 0.6 |
| Change of climate | 0.6 |
| Natural disaster | 0.3 |

**Appendix Table 4.** Comparison of SCF self-reported house values to values predicted by LoanPerformance.

Percent unless otherwise noted

| | SCF homeowner movers | |
|---|---|---|
| | Values based on reported sales price^ | Values predicted by LoanPerformance# |
| Percent underwater | 16 | 16 |
| Mean house price change | 8 | 10 |
| Median house price change | 9 | 12 |

^ Based on self-reported sales price of SCF homeowners that moved and sold their house in between survey dates. Percent underwater is further based on 2007 self-reported mortgage balance, deflated by expected mortgage balance paid by September 2008.
# Based on 2007 self-reported house price of SCF homeowner movers. House price is modified by the CBSA-level LoanPerformance house price index (for those in a CBSA) or state-level LoanPerformance house price index (for those not in a CBSA). Percent underwater is further based on 2007 self-reported mortgage balance, deflated by expected mortgage balance paid by September 2008.

**Appendix Table 4.** Logistic estimates of negative equity and economic shocks on the probability of moving, relative to positive home equity and no other shock.

| | Dependent variable: moved between 2007 and 2009 | | |
| --- | --- | --- | --- |
| | (1) | (2) | (3) |
| Unemployment spell | 1.62** | … | … |
| | (0.38) | … | … |
| | [2.09] | | |
| Financial insecurity | … | 1.26 | … |
| | … | (0.29) | … |
| | | [1.00] | |
| Economic insecurity (fin'l insecurity or unemp.) | … | … | 1.37 |
| | … | … | (0.28) |
| | | | [1.52] |
| Negative equity alone | 1.24 | 1.27 | 0.64 |
| | (0.50) | (0.78) | (0.47) |
| | [0.60] | [0.39] | [-0.61] |
| Both negative equity and economic insecurity | 6.12** | 2.54** | 3.32** |
| | (4.98) | (1.08) | (1.52) |
| | [2.22] | [2.19] | [2.61] |
| Other regressors included | Yes | Yes | Yes |

Note: odds ratios are presented along with standard error of the odds ratio in () and t-statistic in brackets. The appropriate t-statistic is the ratio of the estimated logit coefficient to the standard error of that estimate and is not the ratio of the odds ratio to the standard error of the odds ratio. Standard errors, in parentheses, are based on Stata.MIcode.do from the 2007 SCF Codebook (http://www.federalreserve.gov/econresdata/scf/files/codebk2007.txt). The dependent variable *move* is defined as 0 if no move and 100 for a move. SCF homeowners only, excluding mobile-home owners and homeowners that operate a farm or ranch business on the property. Prediction uses LoanPerformance home price index as of September 2008. Regressions include controls for natural log of income; net worth (transformed as sign(net worth)* ln(abs(net worth/1000)+1))); children present; age of head and age squared; years in home; subjective probability of moving in 2007 interview; natural log of value of home in 2007; level and change in county unemployment rate; and MSA status. Estimates are weighted with non-response adjusted sampling weights.

**Appendix Table 5.** Estimates of actual negative equity in 2007 and unemployment shocks on the probability of moving, relative to positive home equity and no other shock.

| | Type of move | | | | |
| | | Reason | | Distance | |
| | Any | Involuntary | Voluntary | Local | Long-distance |
| | (1) | (2) | (3) | (4) | (5) |
| Unemployment spell | 4.01 | 2.67 | 1.35 | 3.96 | 0.94 |
| | (1.71) | (0.78) | (1.65) | (1.20) | (1.10) |
| Negative equity | -3.07 | 3.98 | -7.05 | 3.19 | -2.71 |
| | (5.70) | (2.42) | (5.32) | (3.78) | (3.37) |
| Both | 23.64 | 16.66 | 6.97 | 37.94 | -16.68 |
| | (15.71) | (6.95) | (14.10) | (22.52) | (5.55) |
| Other regressors included | Yes | Yes | Yes | Yes | Yes |

Note: Negative equity is defined as of 2007 interview. The dependent variable *move* is defined as 0 if no move and 100 for a move. A similar classification is used for each subset of moves; for example an involuntary move is defined as 100 if the respondent was forced to move and defined as 0 if the respondent was not forced to move (including if the respondent chose to move). SCF homeowners only, excluding mobile-home owners and homeowners that operate a farm or ranch business on the property. Standard errors, in parentheses, are based on 999 bootstrap replicate samples and incorporate both sampling and imputation uncertainty. Regressions include controls for income and income squared; net worth (transformed as sign(net worth)* ln(abs(net worth/1000)+1))); children present; age of head and age squared; years in home; subjective probability of moving in 2007 interview; value of home in 2007; level and change in county unemployment rate; and MSA status. Estimates are weighted with non-response adjusted sampling weights.