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Does High Home-Ownership Impair the Labor Market?

David G. Blanchflower and Andrew J. Oswald

Abstract

We explore the hypothesis that high home-ownership damages the labor market. Our results are relevant to, and may be worrying for, a range of policymakers and researchers. We find that rises in the home-ownership rate in a US state are a precursor to eventual sharp rises in unemployment in that state. The elasticity exceeds unity: A doubling of the rate of home-ownership in a US state is followed in the long-run by more than a doubling of the later unemployment rate. What mechanism might explain this? We show that rises in home-ownership lead to three problems: (i) lower levels of labor mobility, (ii) greater commuting times, and (iii) fewer new businesses. Our argument is not that owners themselves are disproportionately unemployed. The evidence suggests, instead, that the housing market can produce negative 'externalities' upon the labor market. The time lags are long. That gradualness may explain why these important patterns are so little-known.

JEL codes: I1, I3.

Keywords: Natural rate of unemployment; labor market; housing market; structural; business cycles; mobility.

David G. Blanchflower is the Bruce V. Rauner '78 Professor of Economics at Dartmouth College, a part-time professor at the University of Stirling; a Research Associate at the NBER and a Nonresident Senior Fellow at the Peterson Institute. He was a member of the Monetary Policy Committee at the Bank of England from 2006–09. **Andrew J. Oswald** is a professor of Economics at the University of Warwick in England and a Research Associate at the ESRC Centre for Competitive Advantage in the Global Economy (CAGE). He has been a visiting professor at Cornell, Dartmouth, Harvard, and Princeton.

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Peterson Institute for International Economics

1750 Massachusetts Avenue, NW Washington, DC 20036-1903
Tel: (202) 328-9000 Fax: (202) 659-3225 www.piie.com

INTRODUCTION

Unemployment is a major source of unhappiness, mental ill-health, and lost income.[1] Yet after a century of economic research on the topic, the determinants of the equilibrium or 'natural' rate of unemployment are still imperfectly understood, and unemployment levels in the industrialized nations are today 10 percent, with some nations over 20 percent.[2] The historical focus of the research literature has been on which labor-market characteristics—trade unionism, unemployment benefits, job protection, etc.—are particularly influential.

We propose a different approach to the problem. Our study provides evidence consistent with the view that the housing market plays a fundamental role as a determinant of the rate of unemployment. We study modern and historic data from the United States. We construct state panels, and then estimate unemployment equations.[3] Using data on two million randomly sampled Americans, we also estimate equations for the number of weeks worked, the extent of labor mobility, the length of commuting times, and the number of businesses. Our results seem relevant to, and should perhaps be seen as worrying for, a wide range of policy-makers and researchers. There are four main conclusions. First, we document a strong statistical link between high levels of home-ownership in a geographical area and later high levels of joblessness in that area. We show that this result is robust across sub-periods going back to the 1980s. The lags from ownership levels to unemployment levels are long. They can take up to five years to be evident. This suggests that high home-ownership may gradually interfere with the efficient functioning of a labor market. Second, we show that, both within states and across states, high home-ownership areas have lower labor mobility. Importantly, this is not due merely to the personal characteristics of owners and renters. We are unable, in this paper, to say exactly why, or to give a complete explanation for the patterns that are found, but our study's results are consistent with the unusual idea that the housing market can create dampening externalities upon the labor market and the economy. Third, we show that states with higher rates of home-ownership have longer commute times. This phenomenon is likely to be a reflection of the greater transport congestion that goes with a less mobile workforce and it will act to raise costs for employers and employees. Fourth, we demonstrate that states with higher rates of home-ownership have

1. Linn, Sandifer, and Stein (1985), DiTella, MacCulloch, and Oswald (2003), Murphy and Athanasou (1999), Paul and Moser (2009), and Powdthavee (2010), for example.

2. The euro area unemployment rate for December 2012 was 11.7 percent, ranging from a low of 4.3 percent in Austria, 5.3 percent in Germany, and 5.8 percent in the Netherlands, up to a high of 26.8 percent in Greece and 26.1 percent in Spain, both of which had youth unemployment rates of greater than 50 percent. France had a rate of 10.6 percent and Italy 10.9 percent, while the United Kingdom and the United States both had unemployment rates of 7.8 percent. See http://epp.eurostat.ec.europa.eu/cache/ITY_PUBLIC/3-01022013-BP/EN/3-01022013-BP-EN.PDF.

3. Our work builds upon a tradition of labor-market research with state panels from the 1990s in sources such as Blanchard and Katz (1992) and Blanchflower and Oswald (1994).

lower rates of business formation. This might be the result of zoning restrictions and NIMBY effects of a kind that, as Fischel (2004) discusses, are rational for homeowners. But currently that channel can be only a conjecture.

The data used in this paper are almost wholly from the United States. However, our conclusions may have wider implications. Taken in conjunction with new work by Laamanen (2013), which was done independently of our own,[4] and reaches similar conclusions for the country of Finland, the findings may go some way to explain why nations like Spain (80 percent owners, 20+ percent unemployment) and Switzerland (30 percent owners, 3 percent unemployment) can have such different mixtures of home-ownership and joblessness. Figure 1 shows that there is a strong positive correlation across the wealthy countries between their home-ownership rates and the latest unemployment rates. Such a figure is open to the sensible criticism that the scatter might be an illusion caused by country fixed-effects. However, that objection cannot be raised about figure 2, which is for the United States. It plots very long changes (approximately half-century changes) in home-ownership rates and unemployment rates across the US states—minus Alaska and Hawaii—and generates a similar result. It plots the 50-year change in home-ownership rates (1950–2000) against a 60-year change in unemployment rates (1950–2010).[5]

The later analysis does not depend on data from the special period of the 2007 US house-price crash;[6] nor does it rely on the idea that homeowners are themselves disproportionately unemployed (there is a considerable literature that suggests such a claim is false, or, at best, weak); nor does it imply that spatial compensating differentials theory is incorrect; nor is it Keynesian in spirit;[7] nor does it rest upon the idea of house-lock in a housing downturn (for example, Ferreira, Gyourko, and Tracy 2010, Valletta 2012). Our paper makes a simple statistical contribution and discusses possible mechanisms. The detailed nature of any housing-labor externality remains poorly understood.

BACKGROUND

In his 1968 address to the American Economic Association, Milton Friedman famously argued that the natural rate of unemployment can be expected to depend upon the degree of labor mobility in the economy. The functioning of the labor market will thus be shaped not just by long-studied factors such

4. In April 2013, Laanamen and Blanchflower and Oswald discovered they had equivalent empirical findings, though done in different ways, for Finland and the United States respectively.

5. Source for the 1950 state unemployment rates is http://www.census.gov/prod/www/abs/decennial/1950cenpopv2.html

6. Repercussions from the worldwide house-price bubble are discussed in sources such as Bell and Blanchflower (2010) and Dickens and Triest (2012).

7. We would like to acknowledge valuable discussions with Ian McDonald on this issue. One reason why our effect does not appear to be consistent with a Keynesian argument is that we find the lags from home-ownership are long, and that is inconsistent with the idea that our estimated unemployment effect in time t is the result of aggregate demand in time t.

as the generosity of unemployment benefits and the strength of trade unions,[8] but also by the nature, and inherent flexibility and dynamism of, the housing market. However, on that topic there has been relatively little empirical research.

One important early line of work stemmed from scholars such as McCormick (1983) and Hughes and McCormick (1981). This found evidence that in certain types of public-sector housing the degree of labor mobility was low and the associated joblessness was high.[9] That research tradition still continues—as in Dujardin and Goffette-Nagot (2009). A broader literature at the border between labor and urban economics has considered whether there might be fundamental differences in the labor-market impact of renting rather than owning. Some of this work was triggered by the suggestion in a public lecture by Oswald (1996, 1997) that, especially in Europe, at the aggregate level a higher proportion of home-ownership (or 'owner-occupation') seems to be associated empirically with a larger amount of unemployment. Oswald's data were mainly for the western nations and for the US states. He presented no formal regression equations. Green and Hendershott (2001) subsequently reported US econometric results that were somewhat, though not entirely, supportive.

One theoretical interpretation of these early patterns was that home-ownership might raise unemployment by slowing the ability of jobless owners to move to new opportunities. In response to this idea, a number of researchers later examined micro data. The ensuing literature concluded that the bulk of the evidence is against the idea that home-owning individuals are unemployed more than renters. Hence—though the empirical debate continues—a number of authors concluded that Oswald's general idea must be incorrect and the cross-country pattern must be illusory. A modern literature includes Battu, Ma, and Phimister (2008), Coulson and Fisher (2002, 2009), Dohmen (2005), Head and Lloyd-Ellis (2012), Van Leuvensteijn and Koning (2004), Munch, Rosholm, and Svarer (2006), Rouwendal and Nijkamp (2010), Smith and Zenou (2003), and Zabel (2012).

An alternative possibility—one that has not, to our knowledge, been fully explored empirically—is the hypothesis that the housing market might create externalities. There are a number of ways in which such spillovers might operate. For example, Serafinelli (2012) shows in the US labor market that there appear to be beneficial informational externalities upon workers' productivity from a high degree of labor mobility. Although the author does not pursue the implication, this raises the possibility that any housing market structure that led to immobility could, therefore, produce negative externalities on workers and firms. Oswald (1999) suggests a different possible channel. Homeowners might act to hold back development in their area (through zoning restrictions) in a way that could be detrimental to

8. For example, OECD (1994) and Layard, Nickell, and Jackman (1991).

9. McCormick (1983) makes the interesting point that economists should not work on the assumption that low mobility is always undesirable. If home-ownership facilitates the accumulation of wealth, and wealth has a negative effect on migration rates, then a migration cost arises which will and should influence migration and hence unemployment rates, without necessarily doing "bad things."

new jobs and entrepreneurial ventures. This would be NIMBY pressures in action. A third possibility is that regions with high home-ownership might be difficult ones in which to attract migrant workers (who may require the flexibility of rental accommodation). As a fourth possibility, a formal model in the literature by Dohmen (2005) predicts that high ownership can be associated with high unemployment. The reason, within Dohmen's framework, is not one linked to an externality but instead to the fact that the composition of the unemployed pool is endogenous to the structure of the housing market (in other words, the kind of person who is unemployed alters when the home-ownership rate goes up). None of these mechanisms requires the homeowners themselves to be disproportionately unemployed (as in the critique of Munch, Rosholm, and Svarer 2006).

Most unemployment researchers begin from the tradition of neoclassical economics and with the idea that there is some underlying equation, defined over tastes and technology, that explains the structural or long-run rates of unemployment and employment. Whether from the modern matching tradition due especially to researchers such as Mortensen and Pissarides (1994), the 1990s macro-labor literature due especially to researchers such as Layard, Nickell and Jackman (1991), or the classical literature that goes back at least to Pigou (1914), a huge body of empirical work in economics has searched for labor market characteristics—such as the degree of trade unionism—that might enter that natural-rate equation.

We wish to remain open-minded about the true model of the labor market. For a region's unemployment rate, we will think about this generically as an autoregressive relationship that has a steady state solution, U*, which we will think of as the natural rate of unemployment. In estimation, we can view the relevant equation as:

Unemployment rate in a region U(t) = f(U(t-1), labor market characteristics, housing market characteristics, people's demographic and educational characteristics, region characteristics, year dummies)

We will add the rate of home-ownership in an area to the usual list of variables. For some nations, it would be ideal to allow for a division of the housing market into three broad segments—owners, private renters, and public-sector renters. In our empirical work, however, we use data from the United States, where public renting is sufficiently rare that it can be largely neglected.

EMPIRICS

Tables 1 and 2 document the raw data. As implied by the earlier figure 2, home-ownership in the United States has grown strongly since 1900. It changed from a mean of approximately 46 percent in that year to approximately 65 percent by the year 2010. Table 2 shows that the US rate peaked in the year 2004, at 69 percent. This was a few years before the start of the infamous modern housing crash. In 2010, the US states with the highest levels of home-ownership were states such as Minnesota, Michigan, Delaware,

and Iowa. The ownership levels were lowest in states such as California and New York (and in DC if viewed as a state).[10]

In tables 3 and 4, we estimate unemployment equations. The estimation here is on an annual panel of US states and uses as its dependent variable the natural logarithm of the state unemployment rate. Our data cover a quarter of a century of consecutive years and are drawn from the Merged Outgoing Rotation Groups of the Current Population Survey. The exact period is 1985 to 2011, which gives us an effective sample size of 1377 area-time observations (that is, of states by years). The different columns of tables 3 and 4 lay out a range of specifications, including autoregressive specifications with a lagged dependent variable. Table 3 is presented for intellectual completeness rather than because we believe it to be an adequate specification (a lagged dependent variable enters strongly significantly, as would be expected, so table 3 should not be used to draw reliable inferences).

What emerges most clearly from tables 3 and 4 is a correlation between unemployment in a state in time t and the rate of home-ownership in that state in year t-3 and earlier. Summarizing, we find that unemployment:

- Is higher in states that had high home-ownership rates in the past. The long-run elasticity varies from 0.8 to 1.5. Given the context, these are large numbers.
- Is autoregressive, with a coefficient on the lagged dependent variable U_{t-1} of approximately 0.8. Hence long-run effects are greatly magnified compared to the short-run or 'impact' effect of the independent variable.
- Is uncorrelated with union density in the state. The appendix shows that that is also true of unemployment insurance (UI) generosity.
- Is correlated, as would be expected, with the personal characteristics of workers in the state (the detailed results are not reported but follow the usual pattern of joblessness being greater among those with fewer qualifications).
- Is not significantly correlated with current home-ownership (the detailed results not reported), which is why tables 3 and 4 begin, in their respective column 1s, with an ownership variable in time period t-1.

10. The most recent quarterly data on home-ownership rates suggest that the decline may have slowed (percent).

	Q1	Q2	Q3	Q4		Q1	Q2	Q3	Q4
2012	65.4	65.5	65.5	65.4	2008	67.8	68.1	67.9	67.5
2011	66.4	65.9	66.3	66.0	2007	68.4	68.2	68.2	67.8
2010	67.1	66.9	66.9	66.5	2006	68.5	68.7	69.0	68.9
2009	67.3	67.4	67.6	67.2	2005	69.1	68.6	68.8	69.0

Available at http://www.census.gov/housing/hvs/files/qtr412/q412press.pdf.

These judgments are from pooled cross-sections, so they describe associations in the data. We should be cautious before imputing meaning into such patterns. Nevertheless, the fact that the key correlation exists with a housing market variable so heavily lagged (back to t-5), and that the regression equations control for state and year effects, suggests that the pattern is of interest and deserves to be taken seriously. Figure 3 plots the impulse-response function for one algebraic example.

Table 3 contains the simplest results. In column 1, the home-ownership variable enters negatively with a coefficient of -0.3282 and a t-statistic larger than two. If the underlying economic prosperity in a state is captured in that year by data on either its current (high) home-ownership rate, or by data on its (low) unemployment rate, a negative correlation here is not surprising. Columns 2 and 3 of table 3 then examine longer lags, and the ownership variable becomes insignificantly different from zero.

Columns 4, 5, and 6 of table 3 contain results that are more remarkable. We see here that the lagged home-ownership rate in the state becomes a powerful positive predictor of later unemployment in that state. This finding is consistent with—though it does not prove—the claim that, after some years have passed, a high degree of owner-occupation in an area can have a deleterious structural effect on the labor market in that area. Table 3 reveals that the coefficient on home-ownership in an unemployment equation becomes larger as the time lag becomes longer. In column 5 of table 3, the long-run home-ownership elasticity of unemployment is 0.8. These equations control for a number of independent influences on the rate of joblessness. Importantly, both state and year dummies are included in the estimation.

Table 3 is useful for illustrative purposes but is not a natural or believable specification. It is known that, presumably because unemployment is a stock variable and not a flow variable, unemployment equations empirically are typically highly auto-regressive and thus (because stocks are best characterized by differential equations) need to include a lagged dependent variable. We now turn to that kind of specification.

Table 4 contains the paper's most important results. In the first column of table 4, for the entire period up to 2011, a lagged dependent variable has a coefficient of 0.8482 (with a t-statistic of approximately 50). Column 1 of table 4 includes a set of year dummies; a set of state dummies; 18 dummy variables for different levels, in the underlying micro data, of people's education; and controls for personal characteristics such as the average age of people in the state. The unemployment rate in this form of panel is a slow-adjusting variable, and that holds true despite the inclusion of state fixed effects. In this first column of table 4 the coefficient on lagged home-ownership is 0.2488. Here the lag is only a single year. The t-statistic on this coefficient is 2.73, so the null hypothesis of a zero coefficient can be rejected at conventional levels of confidence. The coefficient on union density has the wrong sign to be a signal of any deleterious effect on joblessness; it is negative, with a t-statistic of only 0.71.[11] These estimates allow for adjustment for clustered standard errors.

11. In the appendix we also examine the impact of state unemployment benefits but can find no effect.

Because this regression equation in column 1 of table 4 is effectively a first-order difference equation, the long-run home-ownership elasticity of unemployment is larger than the impact effect of approximately 0.25. The long-run effect is, more precisely, 0.2488 divided by (1.0000 – 0.8482). Hence the long run, or steady state, elasticity is estimated here at 1.7. In this context, that is a surprisingly large number, and suggests the possibility that there are profound connections between the workings of the US housing market and its labor market.

Interestingly, the size of the coefficient strengthens as we go further back. Column 2 of table 4 introduces a further lag on the home-ownership rate variable, namely, for ownership in year t-2. It enters with a coefficient of 0.3359. The null hypothesis of zero can again be rejected; the t-statistic is 3.69.

In columns 3, 4, and 5, respectively, further and further lags on home-ownership are included. In the fifth column of table 4, for example, the lagged dependent variable has a coefficient of 0.7840 and a coefficient on home-ownership in t-5 of 0.4302. The implied long run elasticity is approximately 2.

The final column of table 4 gives the fullest kind of specification where all home-ownership rates are included from t-1 to t-5. The sum of these coefficients is approximately 0.49. The long run relationship thus continues to be a large one—in this case with a steady state elasticity of 2.2.

Is the pattern robust? Our experiments suggest that it is. First, it is conceivable that unemployment and home-ownership simply both follow a state-level business cycle but with different lagged timing. One way to probe for this is to replace the state and year dummies with state time trends; it turns out that the results are then essentially unchanged (results available on request).[12] Splitting the data into two sub-periods, as in table 5, provides another illustration. It reveals the apparently reliability of the correlation between the log of unemployment in period t and the log of home-ownership in a much earlier year. In each of the two sub-periods in table 5, lagged home-ownership enters significantly. For the period 1989–2001, the first segment of table 5 estimates the coefficient on home-ownership in t-5 at 0.3566. The coefficient on the lagged dependent variable in this estimated equation is 0.7169. Therefore the long-run home-ownership elasticity of unemployment is 1.3. In the later period, the coefficient on ownership in t-5 is 0.6246, and the lagged dependent variable's coefficient is 0.6844. Then the long-run elasticity is 2.0.

Some economists may prefer to focus on the level of employment as a key variable rather than on the rate of joblessness itself. For that reason, table 6 replicates the same general finding using

12. Another possibility, suggested to us by Barry McCormick, is that both unemployment and home-ownership are driven by a common state level business cycle with different lag structures. Our correlation might then be illusory. We tested for this by estimating a series of state level home-ownership equations, which included long lags on both the log of the home-ownership rate (5 lags) and the log of the unemployment rate (7 lags). There was no evidence of any effect from long lagged unemployment rates, which suggests that home-ownership here is not driven by local business cycles.

employment-rate, rather than unemployment-rate, data. Lagged home-ownership rates enter strongly negatively in this state panel equation.

Table 7 tries a different check and turns to micro data on individual workers. It estimates a weeks-worked equation using data from the March Current Population Surveys between 1992 and 2011. The sample size is approximately 2 million individuals. The dependent variable in table 7 is the number of weeks an individual worked during the previous year, rather than the more usual 'point of time' measure of whether an individual was unemployed on the day they were surveyed. Their answers are reported in 8 size bands in the data set; we allocated mid-points. Non-workers were allocated zero weeks worked. In table 7 we include controls for year and state, as well as personal controls for race, gender, and education, along with whether the individual was a mover—defined as whether they changed their place of residence over the year as well as if they primarily worked full-time and/or were a union member. In addition, we include controls for whether the individual was a homeowner or a renter (with the excluded category being renters who received the accommodation for no charge). We also include the log of the state*year home-ownership rate, defined at the household level, lagged four years in columns 1 and 3 and five years in columns 2 and 4. Separate results are presented for the full sample as well as for the (vast) majority who were non-movers. Consistent with earlier results, lagged home-ownership enters negatively with a large coefficient in table 7 (though it hovers close to the 95 percent cut-off level of confidence). It is thus associated with fewer weeks worked. This is equivalent to our earlier finding: It seems to imply that the 'natural rate of employment' is reduced by high ownership of homes. What is notable about table 7 is that we are apparently picking up deleterious effects on the labor market after controlling for the individual worker's *own housing status* (that is, whether he or she is an owner).

INTERPRETING THE PATTERNS

Many labor economists who look at these equations will wonder about a possible role for, and any consequences of the housing market's structure upon, the degree of labor mobility in the United States. We turn, therefore, to tables 8 to 11.

Using US Census data, table 8 reports for a long run of years—with some gaps because of missing data—the mean values for a variety of different measures of mobility. Five columns are given. The data in the first column are on the total proportion of citizens moving their place of residence during the year. In 2010–11, for example, 11.6 percent of Americans moved home. In 1947–48, the figure was 20.2 percent. This much larger number was not because of the closeness of 1947 to the end of the Second World War: Until the end of the 1960s the proportion of movers continued to be approximately 20 percent. As column 1 of table 8 shows, from the 1970s to the 2000s there is evidence of a secular downtrend in the percent movers category. Even before the housing crash of 2008–09, the percentage of Americans moving residence had fallen to approximately 14 percent per annum.

In columns 2 to 5 of table 8, the figure for total percentage movers is disaggregated. For 2010–11, for example, the total figure of 11.6 percent was made up of:

11.6 percent total movers = 7.7 percent movers within the county + 2.0 percent movers within the state + 1.6 percent movers out of state to another state + 0.4 percent movers out of the United States itself

This breakdown gives an arithmetical sense of the huge degree of geographical flows that go on within a 12-month period. As the identity equation in italics makes clear, there are different ways to measure 'mobility' in the United States. We start analytically with the left-hand side variable, namely, percent total movers.

To get a sense of the relationship between the rate of geographical movement and the home-ownership rate, table 9 provides a set of micro-econometric equations. In this case the dependent variable is a zero-one variable for whether the survey respondent moved home in the preceding 12 months. In the first column of table 9, state and year dummies are included, but the only other independent variables are the state unemployment rate and the home-ownership rate in the state. As might be expected from standard economic theory, people are more likely to have moved if there is a high degree of joblessness in their state (the coefficient is 0.0127 with a t-statistic of 3.44). Moreover, areas with a high level of home-ownership have lower mobility, ceteris paribus. The coefficient in the first column of table 9 is –0.1766 with a large t-statistic. This implies that the rate of movement in a state is nearly 18 percentage points lower in a place with double the home-ownership rate of another area.

The coefficients in column 1 of table 9 are only marginally influenced by the addition to the regression equation of a set of personal controls (such as the individual's age and level of education). Columns 2 and 3 demonstrate the apparent robustness. The coefficient on the logarithm of state home-ownership falls in size only slightly to –0.1542. However, as more variables, and in particular ones for whether the individual is a renter or owner, are added to the columns of table 9, the log of the home-ownership rate in the state drops. If standard errors are clustered at the state level alone, then the variable loses statistical significance. As might be expected, the variables for the literal housing status of the person are strong. Being a renter is associated with a much greater chance of being a mover. In the final column of table 9, that coefficient is 0.2134. In this equation, the coefficient on the log of home-ownership is –0.0633 with a t-statistic of 1.62.

Because mobility can be conceived of more broadly, table 10 estimates equations instead for both within-state and out-of-state mobility combined. In this case there is evidence of a robust negative effect of state home-ownership upon the rate of mobility. The first column of table 10 estimates the state-panel equation:

Log Mover Rate in t = f(Log Mover Rate in t-1, Log Unem Rate in t-1, Log Union Density Rate in t-1, Log Home-ownership Rate in t-1, state dummies, year dummies, personal controls).

There is a smallish but statistically significant degree of auto-regression in the mover equations of table 10. The coefficient on the lagged dependent variable enters with a coefficient of 0.1336. More interestingly, the degree of home-ownership in the state has a substantial effect. Its coefficient is –0.8125 with a t-statistic greater than 5. As we add longer and longer lags of home-ownership, going from column 1 to column 6 in table 10, the coefficient drops in size (to a still-substantial –0.3445) but retains its negative sign and its statistical significance at conventional cut-off levels.

A classic issue in the economics of migration is to what extent workers move long distances. It is possible to study this within the continental United States by using data on state-to-state moves. Table 11 presents regression results. It takes as its dependent variable the proportion of out-of-state movers, which is a subset of the movers examined in table 9. Some of the underlying changes in residence may be of a comparatively short distance—if for example a New Hampshire worker chooses to relocate just over the state border in Vermont—but on average they will be larger moves than for the within-state data of table 10.

In table 11 our concern is again with whether there is evidence that having a high home-ownership rate in the state is inimical to mobility. Column 1 of table 11 estimates a mover-rate equation in which there is a lagged dependent variable, a state unemployment variable, a state union density variable, the home-ownership variable, a set of year and state dummies, and variables for the degree of education and personal characteristics of citizens in the state. In this and later columns, the lagged dependent variable enters with a well-determined coefficient of approximately 0.2. The coefficients on the unemployment and union variables are not statistically different from zero. Home-ownership, however, enters in a statistically significant way in column 1 of table 11. At more than unity, its elasticity is large. That number implies that a doubling of the home-ownership rate would be associated with a halving of the mobility rate. Column 2 examines the same regression equation but with a one-year lag on the home-ownership variable. The result is the same and the elasticity now larger. Going to longer lags, however, pushes down both the coefficient and the degree of statistical significance.

It is possible that the links between high home-ownership and later high unemployment are nothing to do with the degree of labor mobility. If so, what other processes might be at work? To try to probe possible mechanisms, table 12 examines whether there is a connection between home-ownership levels in an area and the ease with which individuals can get to their workplace. Any model with a neoclassical flavor would suggest that the cost of travelling to work should act as an impediment to the rate of employment (because it raises the opportunity cost of a job). Table 12 shows that high home-ownership

is associated with longer commuting times, which is consistent with the idea that moving for an owner-occupier is expensive, and that in consequence the places with high home-ownership will see more workers staying put physically but working further from their family home. Because roads, in particular, are semi-public goods in which individuals can create congestion problems for others, this pattern in the data is consistent with the existence of un-priced externalities. The elasticity in the final column of table 12 is approximately 0.12.

Table 13 and table 14 turn to the possible concern that—for zoning or NIMBY or other reasons—a high degree of home-ownership in an area might be associated with a lower degree of tolerance for new businesses. Table 13 estimates regressions equations in which the dependent variable is the number of registered firms in the state. State home-ownership enters negatively in these equations with a coefficient of approximately –0.03 and a t-statistic greater than 2. The right-hand segment of table 13 reports the same equations for small firms. Once again, the size of these estimated effects in the regression equations seem to be economically and not just statistically significant. The implied long-run elasticities from home-ownership on to business formation are large.

Similar patterns emerge using data on US establishments rather than on firms. The results are given in the state-panel equations of table 14, where the lagged dependent variable has a large coefficient, and the logarithm of the home-ownership rate in the state enters with a coefficient of approximately –0.03. Although more research will be required on this topic, and the detailed mechanisms are currently unknown, these findings are consistent with the view that high home-ownership levels may be inimical to business formation rates.

CONCLUSIONS

The results in this paper are consistent with the view that high home-ownership impairs the vitality of the labor market and slowly grinds out greater rates of joblessness. Given the emphasis that most western governments put on the promotion of home-ownership (one exception is Switzerland, which taxes homeowners' imputed rents), it is important that other researchers check and probe these results. Taken at face value, our findings should be worrying for policy-makers. A possible reason why these patterns have attracted so little notice from both researchers and the public is that the time lags are long. High levels of home-ownership do not destroy jobs this year; they tend to do so, on our estimates, the year after next. Unless these long linkages are studied, the consequences of high levels of home-ownership are not easy to see.

What mechanism lies behind the findings? It is not possible to be certain. Our main contribution should be seen as a statistical one—as documenting patterns of potential interest to economists and social scientists, and perhaps especially to labor economists, macroeconomists, economic geographers,

and urban economists. Nevertheless, we have made an attempt to look below the reduced-form link between current home-ownership and later joblessness. In doing so, we have found evidence that high home-ownership in a US state is associated with

- lower labor mobility,
- longer commutes, and
- fewer new firms and establishments.

It should be emphasized that this is after we have controlled for state fixed-effects and a range of possible confounding variables. Our results are consistent with the recent conclusions of a European study done independently by Laamanen (2013). His study has a number of stronger methodological features than were available to us.

We have estimated equations using micro data from the United States from the 1980s to the present day. There are four main conclusions. First, rises in a US state's home-ownership rate are associated with later rises in joblessness in that state. The long-run elasticity is estimated to lie between 1 and 2. This is strikingly large. It suggests that a doubling of home-ownership in a state would be associated in the steady state with more than a doubling of the unemployment rate. Second, after controlling for state fixed-effects, we show that areas with higher ownership have lower mobility. The long-run elasticity is approximately –0.3. Third, high home-ownership areas have longer commute-to-work times, which can be expected in those areas to raise costs for employers and employees. The long-run elasticity is approximately –0.1. Fourth, high home-ownership areas have lower rates of business formation. It is conceivable–we are not able to offer proof—that this may be due to zoning or NIMBY effects. That conjecture deserves scrutiny in future research.

It is important to emphasize that our study does not claim that homeowners are unemployed more than renters (very probably they are not). Nor is it an attempt to build on the idea that homeowners are less mobile than renters (though they probably are). Instead, because the estimates in tables 7 and 9 of the paper control for whether individuals are themselves renters or owners, the patterns documented in the paper are consistent with the possibility that the housing market can generate important negative externalities upon the labor market.

Our analysis has a number of important weaknesses. Unlike Laamanen (2013), we are unable to assess the effect of exogenous changes in the structure of the housing market. We have had to rely, instead, upon an examination of the lagged pattern of unemployment observed a number of years after a movement in a state's rate of home-ownership. Thus our study adopts the so-called 'prospective study' format that is common in medical science and epidemiology. This is potentially a weakness and means that some underlying omitted variable, or causal force, might be responsible for the link between H_t and U_{t+n}. That

would not make the patterns in this paper uninteresting ones, but it would mean that a key variable is missing from the analysis. Another lacuna in our study is a detailed account of the processes by which the housing market affects the equilibrium rates of unemployment and employment. It may be that the effect of high home-ownership comes partly from some engendered reduction in the rate of labor mobility within a geographical area. However, we are doubtful that this works in a classical way through a lower amount of state-to-state migration.[13] Finally, unlike McCormick (1983), we have been unable to distinguish between those owners who are currently paying a mortgage and those who own their home outright.

Economists currently lack a full understanding of the interplay between the housing and labor markets. We believe these issues demand the profession's attention.

REFERENCES

Battu, H., Ma, A., and Phimister, E. 2008. Housing tenure, job mobility and unemployment in the UK. *Economic Journal* 118: 311–328.

Bell, D., and Blanchflower, D.G. 2010. UK unemployment in the great recession. *National Institute Economic Review* October. London.

Blanchard, O., and Katz, L.F. 1992. Regional evolutions. *Brookings Papers on Economic Activity* 1: 1–77.

Blanchflower, D.G., and Oswald, A.J. 1994. *The wage curve*. Cambridge, MA: MIT Press.

Coulson, N.E., and Fisher, L.M. 2002. Tenure choice and labor market outcomes. *Housing Studies* 17: 35–49.

Coulson, N.E., and Fisher, L.M. 2009. Housing tenure and labor market impacts: The search goes on. *Journal of Urban Economics* 65: 252–264.

Dickens, W.T., and Triest, R.K. 2012. Potential effects of the Great Recession on the US labor market. *BE Journal of Macroeconomics* 12: article number 8.

DiTella, R., MacCulloch, R.J., and Oswald, A.J. 2003. The macroeconomics of happiness. *Review of Economics and Statistics* 85: 809–827.

Dohmen, T.J. 2005. Housing, mobility and unemployment. *Regional Science and Urban Economics* 35: 305–325.

Dujardin, C., and Goffette-Nagot, F. 2009. Does public housing occupancy increase unemployment? *Journal of Economic Geography* 9: 823–851.

Ferreira, F., Gyourko, J., and Tracy J. 2010. Housing busts and household mobility. *Journal of Urban Economics* 68: 34–45.

Fischel, W.A. 2004. An economic history of zoning and a cure for its exclusionary effects. *Urban Studies* 41: 317–340.

13. There is evidence—using a variety of statistical methods—that Adam Smith's compensating differentials theory of equal utility across geographical space successfully fits the data for the US states (see Roback 1982, for example; or recently Herz and Van Rens 2012, on the inability of mismatch to explain recent US experience; or in a different way the work of Oswald and Wu 2010). Consistent with this, new work by Modestino and Dennett (2013) finds little evidence that house-lock contributes to the pattern of US unemployment.

Green, R.K., and Hendershott, P.H. 2001. Home-ownership and unemployment in the US. *Urban Studies* 38: 1509–1520.

Head, A., and Lloyd-Ellis, H. 2012. Housing liquidity, mobility, and the labor market. *Review of Economic Studies* 79: 1559–1589.

Herz, B., and Van Rens, T. 2012. Accounting for mismatch unemployment. Working paper, University of Warwick. Coventry, England.

Hughes, G., and McCormick, B. 1981. Do council housing policies reduce migration between regions? *Economic Journal* 91: 919–937.

Laamanen, J-P. 2013. Home-ownership and the labour market: Evidence from rental housing market deregulation. Tampere Economic Working Paper, No. 89, University of Tampere, Finland. Available at http://tampub.uta.fi/handle/10024/68116.

Layard, R., Nickell, S.J., and Jackman, R. 1991. Unemployment: Macroeconomic performance and the labor market. Oxford University Press: Oxford.

Linn, M.W., Sandifer, R., and Stein, S. 1985. Effects of unemployment on mental and physical health. *American Journal of Public Health* 75: 502–506.

McCormick, B. 1983. Housing and unemployment in Great Britain. *Oxford Economic Papers* 35(S): 283–305.

Modestino, A.S., and Dennett, J. 2013. Are American homeowners locked into their houses? The impact of housing conditions on state-to-state migration. *Regional Science and Urban Economics* 43: 322–337.

Mortensen, D.T., and Pissarides, C.A. 1994. Job creation and job destruction in the theory of unemployment. *Review of Economic Studies* 61: 397–415.

Munch, J.R., Rosholm, M., and Svarer, M. 2006. Are home owners really more unemployed? *Economic Journal* 116: 991–1013.

Murphy, G.C., and Athanasou, J.A. 1999. The effect of unemployment on mental health. *Journal of Occupational and Organizational Psychology* 72: 83–99.

OECD (Organization for Economic Cooperation and Development). 1994. The Jobs Study. Paris.

Oswald, A.J. 1996. *A conjecture on the explanation for high unemployment in the industrialized nations: Part 1*. University of Warwick Economic Research Paper 475.

Oswald, A.J. 1997. Thoughts on NAIRU. *Journal of Economic Perspectives* 11: 227–228.

Oswald, A.J. 1999. The housing market and Europe's unemployment: A non-technical paper. Unpublished. University of Warwick. Coventry, England.

Oswald, A.J., and Wu, S. 2010. Objective confirmation of subjective measures of human well-being: Evidence from the USA. *Science* 327: 576–579.

Paul, K.I., and Moser, K. 2009. Unemployment impairs mental health: Meta-analyses. *Journal of Vocational Behavior* 74: 264–282.

Petrongolo, B., and Pissarides, C.A. 2001. Looking into the black box: A survey of the matching function. *Journal of Economic Literature* 39: 390–431.

Pigou, A. 1914. Unemployment. Holt: New York.

Powdthavee, N. 2010. *The happiness equation*. Icon Books: Duxford.

Roback, J. 1982. Wages, rents, and the quality of life. *Journal of Political Economy* 90: 1257–1278.

Rouwendal, J., and Nijkamp, P. 2010. Home-ownership and labor market behaviour: Interpreting the evidence, *Environment and Planning A*. 42: 419–433.

Serafinelli, M. 2012. *Good firms, worker flows, and productivity*. Working paper, UC Berkeley.

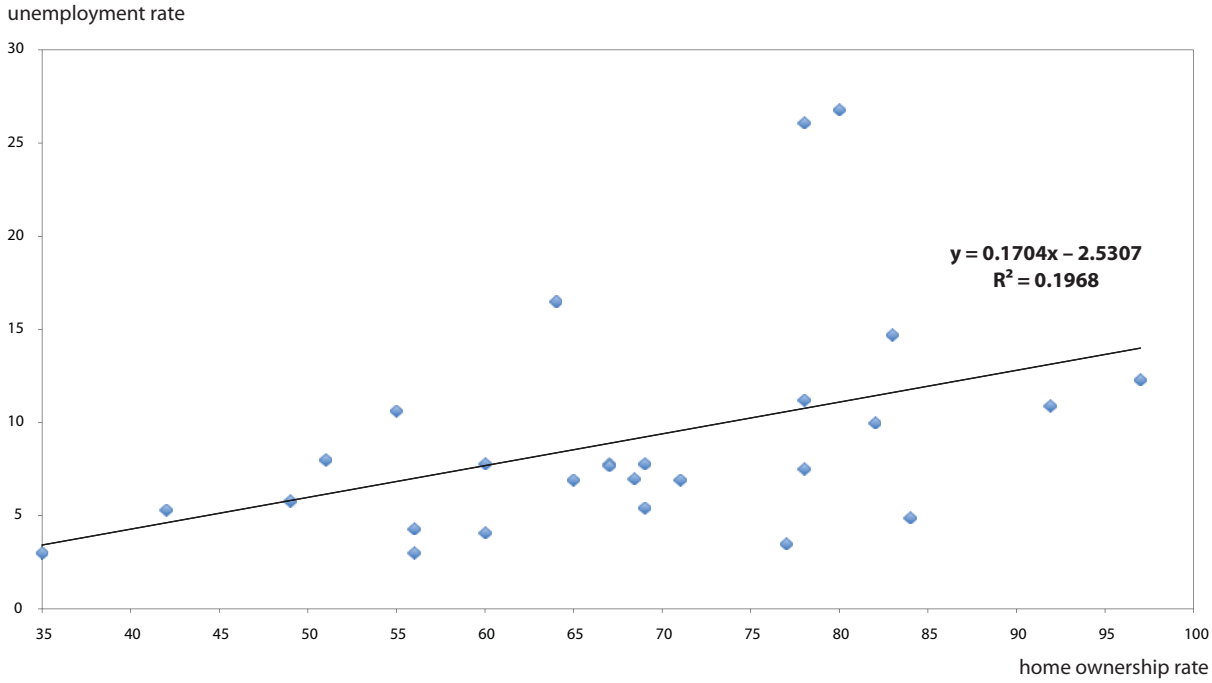
Smith, T.E., and Zenou, Y. 2003. Spatial mismatch, search effort, and urban spatial structure, *Journal of Urban Economics* 54: 129–156.

Valletta, R. 2012. House-lock and structural unemployment. Working paper 2012-25, Federal Reserve Bank of San Francisco.

Van Leuvensteijn, M., and Koning, P. 2004. The effect of home-ownership on labor mobility in the Netherlands. *Journal of Urban Economics* 55: 580–596.

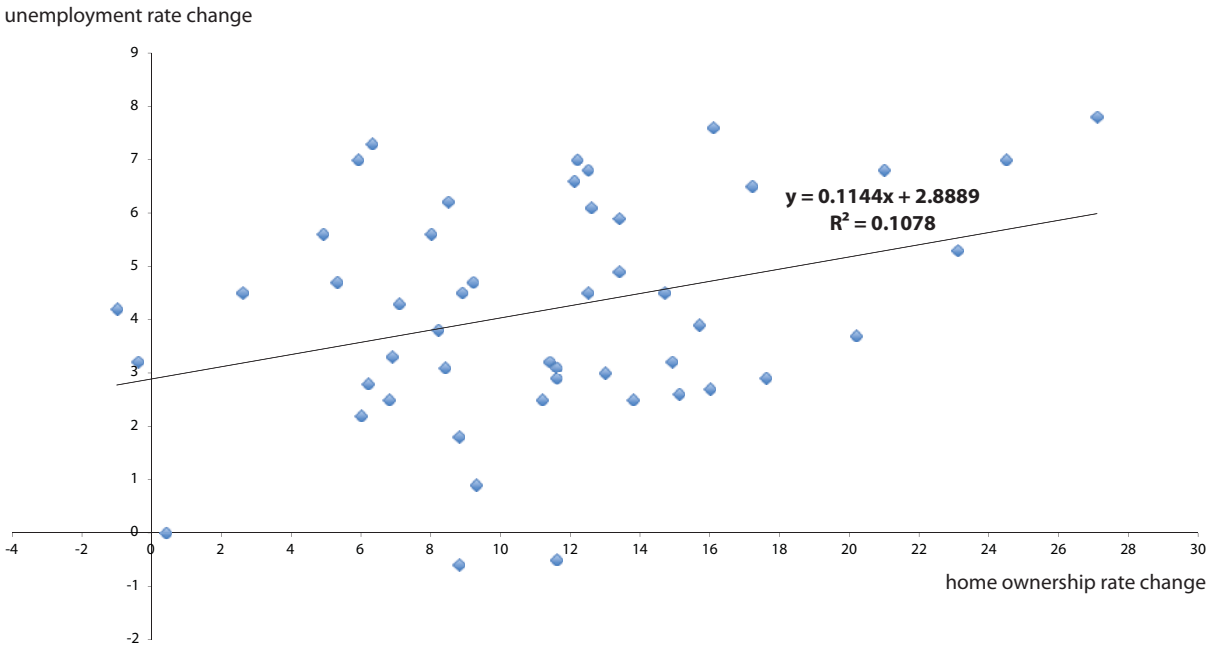
Zabel, J.E. 2012. Migration, housing market, and labor market responses to employment shocks. *Journal of Urban Economics* 72: 267–284.

Figure 1 Unemployment rates and home ownership across 28 EU and OECD countries and Switzerland



Source: Organization for Economic Cooperation and Development (OECD).

Figure 2 The states of the USA: Changes over half a century 50-year home ownership rate change 1950–2000 versus 60-year unemployment rate change 1950–2010



Source: Census Bureau.

Table 1 Historical home-ownership rates in the United States: By decade from 2010–1900 (percent)

	2010	2000	1990	1980	1970	1960	1950	1940	1930	1920	1910	1900
United States	65.1	66.2	64.2	64.4	62.9	61.9	55.0	43.6	47.8	45.6	45.9	46.5
Alabama	69.7	72.5	70.5	70.1	66.7	59.7	49.4	33.6	34.2	35.0	35.1	34.4
Alaska	63.1	62.5	56.1	58.3	50.3	48.3	54.5	n.a.	n.a.	n.a.	n.a.	n.a.
Arizona	66.0	68.0	64.2	68.3	65.3	63.9	56.4	47.9	44.8	42.8	49.2	57.5
Arkansas	67.0	69.4	69.6	70.5	66.7	61.4	54.5	39.7	40.1	45.1	46.6	47.7
California	55.9	56.9	55.6	55.9	54.9	58.4	54.3	43.4	46.1	43.7	49.5	46.3
Colorado	65.5	67.3	62.2	64.5	63.4	63.8	58.1	46.3	50.7	51.6	51.5	46.6
Connecticut	67.5	66.8	65.6	63.9	62.5	61.9	51.1	40.5	44.5	37.6	37.3	39.0
Delaware	72.1	72.3	70.2	69.1	68.0	66.9	58.9	47.1	52.1	44.7	40.7	36.3
DC	42.0	40.8	38.9	35.5	28.2	30.0	32.3	29.9	38.6	30.3	25.2	24.0
Florida	67.4	70.1	67.2	68.3	68.6	67.5	57.6	43.6	42.0	42.5	44.2	46.8
Georgia	65.7	67.5	64.9	65.0	61.1	56.2	46.5	30.8	30.6	30.9	30.5	30.6
Hawaii	57.7	56.5	53.9	51.7	46.9	41.1	33.0	n.a.	n.a.	n.a.	n.a.	n.a.
Idaho	69.9	72.4	70.1	72.0	70.1	70.5	65.5	57.9	57.0	60.9	68.1	71.6
Illinois	67.5	67.3	64.2	62.6	59.4	57.8	50.1	40.3	46.5	43.8	44.1	45.0
Indiana	69.9	71.4	70.2	71.7	71.7	71.1	65.5	53.1	57.3	54.8	54.8	56.1
Iowa	72.1	72.3	70.0	71.8	71.7	69.1	63.4	51.5	54.7	58.1	58.4	60.5
Kansas	67.8	69.2	67.9	70.2	69.1	68.9	63.9	51.0	56.0	56.9	59.1	59.1
Kentucky	68.7	70.8	69.6	70.0	66.9	64.3	58.7	48.0	51.3	51.6	51.6	51.5
Louisiana	67.2	67.9	65.9	65.5	63.1	59.0	50.3	36.9	35.0	33.7	32.2	31.4
Maine	71.3	71.6	70.5	70.9	70.1	66.5	62.8	57.3	61.7	59.6	62.5	64.8
Maryland	67.5	67.7	65.0	62.0	58.8	64.5	56.3	47.4	55.2	49.9	44.0	40.0
Massachusetts	62.3	61.7	59.3	57.5	57.5	55.9	47.9	38.1	43.5	34.8	33.1	35.0
Michigan	72.1	73.8	71.0	72.7	74.4	74.4	67.5	55.4	59.0	58.9	61.7	62.3
Minnesota	73.0	74.6	71.8	71.7	71.5	72.1	66.4	55.2	58.9	60.7	61.9	63.5
Mississippi	69.6	72.3	71.5	71.0	66.3	57.7	47.8	33.3	32.5	34.0	34.0	34.5
Missouri	68.8	70.3	68.8	69.6	67.2	64.3	57.7	44.3	49.9	49.5	51.1	50.9
Montana	68.0	69.1	67.3	68.6	65.7	64.0	60.3	52.0	54.5	60.5	60.0	56.6
Nebraska	67.2	67.4	66.5	68.4	66.4	64.8	60.6	47.1	54.3	57.4	59.1	56.8

(continues)

Table 1 Historical home-ownership rates in the United States: By decade from 2010–1900 (percent) *(continued)*

	2010	2000	1990	1980	1970	1960	1950	1940	1930	1920	1910	1900
Nevada	58.8	60.9	54.8	59.6	58.5	56.3	48.7	46.1	47.1	47.6	53.4	66.2
New Hampshire	71.0	69.7	68.2	67.6	68.2	65.1	58.1	51.7	55.0	49.8	51.2	53.9
New Jersey	65.4	65.6	64.9	62.0	60.9	61.3	53.1	39.4	48.4	38.3	35.0	34.3
New Mexico	68.5	70.0	67.4	68.1	66.4	65.3	58.8	57.3	57.4	59.4	70.6	68.5
New York	53.3	53.0	52.2	48.6	47.3	44.8	37.9	30.3	37.1	30.7	31.0	33.2
North Carolina	66.7	69.4	68.0	68.4	65.4	60.1	53.3	42.4	44.5	47.4	47.3	46.6
North Dakota	65.4	66.6	65.6	68.7	68.4	68.4	66.2	49.8	58.6	65.3	75.7	80.0
Ohio	67.6	69.1	67.5	68.4	67.7	67.4	61.1	50.0	54.4	51.6	51.3	52.5
Oklahoma	67.2	68.4	68.1	70.7	69.2	67.0	60.0	42.8	41.3	45.5	45.4	54.2
Oregon	62.2	64.3	63.1	65.1	66.1	69.3	65.3	55.4	59.1	54.8	60.1	58.7
Pennsylvania	69.6	71.3	70.6	69.9	68.8	68.3	59.7	45.9	54.4	45.2	41.6	41.2
Rhode Island	60.7	60.0	59.5	58.8	57.9	54.5	45.3	37.4	41.2	31.1	28.3	28.6
South Carolina	69.3	72.2	69.8	70.2	66.1	57.3	45.1	30.6	30.9	32.2	30.8	30.6
South Dakota	68.1	68.2	66.1	69.3	69.6	67.2	62.2	45.0	53.1	61.5	68.2	71.2
Tennessee	68.2	69.9	68.0	68.6	66.7	63.7	56.5	44.1	46.2	47.7	47.0	46.3
Texas	63.7	63.8	60.9	64.3	64.7	64.8	56.7	42.8	41.7	42.8	45.1	46.5
Utah	70.4	71.5	68.1	70.7	69.3	71.7	65.3	61.1	60.9	60.0	64.8	67.8
Vermont	70.7	70.6	69.0	68.7	69.1	66.0	61.3	55.9	59.8	57.5	58.5	60.4
Virginia	67.2	68.1	66.3	65.6	62.0	61.3	55.1	48.9	52.4	51.1	51.5	48.8
Washington	63.9	64.6	62.6	65.6	66.8	68.5	65.0	57.0	59.4	54.7	57.3	54.5
West Virginia	73.4	75.2	74.1	73.6	68.9	64.3	55.0	43.7	45.9	46.8	49.5	54.6
Wisconsin	68.1	68.4	66.7	68.2	69.1	68.6	63.5	54.4	63.2	63.6	64.6	66.4
Wyoming	69.2	70.0	67.8	69.2	66.4	62.2	54.0	48.6	48.3	51.9	54.5	55.2

n.a. = not available

Source: US Census Bureau.

Table 2a Recent annual home-ownership rates in the United States, 2000–10 (percent)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
United States	67.4	67.8	67.9	68.3	69.0	68.9	68.8	68.1	67.8	67.4	66.9
Alabama	73.2	73.2	73.7	76.2	78.0	76.6	74.2	73.3	73.0	74.1	73.2
Alaska	66.4	65.3	67.1	70.0	67.2	66.0	67.2	66.6	66.4	66.8	65.7
Arizona	68.0	68.1	65.6	67.0	68.7	71.1	71.6	70.4	69.1	68.9	66.6
Arkansas	68.9	71.2	70.3	69.6	69.1	69.2	70.8	69.5	68.9	68.5	67.9
California	57.1	58.2	57.7	58.9	59.7	59.7	60.2	58.3	57.5	57.0	56.1
Colorado	68.3	68.5	68.9	71.3	71.1	71.0	70.1	70.2	69.0	68.4	68.5
Connecticut	70.0	71.8	71.5	73.0	71.7	70.5	71.1	70.3	70.7	70.5	70.8
Delaware	72.0	75.4	75.6	77.2	77.3	75.8	76.8	76.8	76.2	76.5	74.7
DC	41.9	42.7	44.1	43.0	45.6	45.8	45.9	47.2	44.1	44.9	45.6
Florida	68.4	69.2	68.7	69.5	72.2	72.4	72.4	71.8	71.1	70.9	69.3
Georgia	69.8	70.1	71.8	71.4	70.9	67.9	68.5	67.6	68.2	67.4	67.1
Hawaii	55.2	55.5	57.9	58.3	60.6	59.8	59.9	60.1	59.1	59.5	56.1
Idaho	70.5	71.7	73.0	74.4	73.7	74.2	75.1	74.5	75.0	75.5	72.4
Illinois	67.9	69.4	70.1	70.7	72.7	70.9	70.4	69.4	68.9	69.1	68.8
Indiana	74.9	75.3	75.1	74.4	75.8	75.0	74.2	73.8	74.4	72.0	71.2
Iowa	75.2	76.6	73.9	73.4	73.2	73.9	74.0	73.7	74.0	72.4	71.1
Kansas	69.3	70.4	70.3	70.3	69.9	69.5	70.0	69.4	68.8	67.4	67.4
Kentucky	73.4	73.9	73.7	74.4	73.3	71.6	71.7	72.9	72.8	71.2	70.3
Louisiana	68.1	67.1	67.4	67.5	70.6	72.5	71.3	71.5	73.5	71.9	70.4
Maine	76.5	75.5	74.0	73.7	74.7	73.9	75.3	74.3	73.9	74.0	73.8
Maryland	69.9	70.7	72.0	71.6	72.1	71.2	72.6	71.7	70.6	69.6	68.9
Massachusetts	59.9	60.6	62.6	64.3	63.8	63.4	65.2	64.3	65.7	65.1	65.3
Michigan	77.2	77.1	76.0	75.6	77.1	76.4	77.4	76.4	75.9	74.5	74.5
Minnesota	76.1	76.1	77.3	77.2	76.4	76.5	75.6	73.5	73.1	72.9	72.6
Mississippi	75.2	74.5	74.9	73.4	74.0	78.8	76.2	74.0	75.4	75.5	74.8
Missouri	74.2	74.0	74.8	74.0	72.4	72.3	71.9	70.4	71.4	72.0	71.2
Montana	70.2	68.3	69.4	71.5	72.4	70.4	69.5	67.3	70.3	70.7	68.1
Nebraska	70.2	70.1	68.5	69.5	71.2	70.2	67.6	68.2	69.6	70.2	70.4

(continues)

Table 2a Recent annual home-ownership rates in the United States, 2000–10 (percent) *(continued)*

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Nevada	64.0	64.6	65.3	64.8	65.7	63.4	65.7	63.3	63.6	62.4	59.7
New Hampshire	69.2	68.4	69.5	74.4	73.3	74.0	74.2	73.8	75.0	76.0	74.9
New Jersey	66.2	66.5	66.9	66.9	68.8	70.1	69.0	68.3	67.3	65.9	66.5
New Mexico	73.7	70.8	70.0	70.3	71.5	71.4	72.0	71.5	70.4	69.1	68.6
New York	53.4	53.9	54.8	54.3	54.8	55.9	55.7	55.9	55.0	54.4	54.5
North Carolina	71.1	71.3	70.0	70.0	69.8	70.9	70.2	70.3	69.4	70.1	69.5
North Dakota	70.7	71.0	69.4	68.7	70.0	68.5	68.3	66.0	66.6	65.7	67.1
Ohio	71.3	71.2	72.1	72.8	73.1	73.3	72.1	71.4	70.8	69.7	69.7
Oklahoma	72.7	71.5	69.6	69.1	71.1	72.9	71.6	70.3	70.4	69.6	69.2
Oregon	65.3	65.8	66.2	68.0	69.0	68.2	68.1	65.7	66.2	68.2	66.3
Pennsylvania	74.7	74.3	74.0	73.7	74.9	73.3	73.2	72.9	72.6	72.2	72.2
Rhode Island	61.5	60.1	59.4	59.9	61.5	63.1	64.6	64.9	64.5	62.9	62.8
South Carolina	76.5	76.1	77.5	75.0	76.2	73.9	74.2	74.1	73.9	74.4	74.8
South Dakota	71.2	71.5	71.5	70.9	68.5	68.4	70.6	70.4	70.4	69.6	70.6
Tennessee	70.9	69.7	70.3	70.8	71.6	72.4	71.3	70.2	71.7	71.1	71.0
Texas	63.8	63.9	63.4	64.5	65.5	65.9	66.0	66.0	65.5	65.4	65.3
Utah	72.7	72.4	72.8	73.4	74.9	73.9	73.5	74.9	76.2	74.1	72.5
Vermont	68.7	69.8	70.3	71.4	72.0	74.2	74.0	73.7	72.8	74.3	73.6
Virginia	73.9	75.1	74.4	75.0	73.4	71.2	71.1	71.5	70.6	69.7	68.7
Washington	63.6	66.4	66.9	65.9	66.0	67.6	66.7	66.8	66.2	65.5	64.4
West Virginia	75.9	76.4	77.2	78.1	80.3	81.3	78.4	77.6	77.8	78.7	79.0
Wisconsin	71.8	72.3	72.2	72.8	73.3	71.1	70.2	70.5	70.4	70.4	71.0
Wyoming	71.0	73.5	73.0	72.9	72.8	72.8	73.7	73.2	73.3	73.8	73.4

Source: Current Population Survey.

Table 2b Annual homeownership rates in the 1980s and 1990s in the United States, 1984–99 (percent)

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
United States	64.5	63.9	63.8	64.0	63.8	63.9	63.9	64.1	64.1	64.0	64.0	64.7	65.4	65.7	66.3	66.8
Alabama	73.7	70.4	70.3	67.9	66.5	67.6	68.4	69.9	70.3	70.2	68.5	70.1	71.0	71.3	72.9	74.8
Alaska	57.6	61.2	61.5	59.7	57.0	58.7	58.4	57.1	55.5	55.4	58.8	60.9	62.9	67.2	66.3	66.4
Arizona	65.2	64.7	62.5	63.3	66.1	63.9	64.5	66.3	69.3	69.1	67.7	62.9	62.0	63.0	64.3	66.3
Arkansas	65.9	66.6	67.5	68.1	67.0	66.3	67.8	68.6	70.3	70.5	68.1	67.2	66.6	66.7	66.7	65.6
California	53.7	54.2	53.8	54.3	54.4	53.6	53.8	54.5	55.3	56.0	55.5	55.4	55.0	55.7	56.0	55.7
Colorado	64.7	63.6	63.7	61.8	60.1	58.6	59.0	59.8	60.9	61.8	62.9	64.6	64.5	64.1	65.2	68.1
Connecticut	67.8	69.0	68.1	67.0	66.5	66.4	67.9	65.5	66.1	64.5	63.8	68.2	69.0	68.1	69.3	69.1
Delaware	70.4	70.3	71.0	71.1	70.1	68.7	67.7	70.2	73.8	74.1	70.5	71.7	71.5	69.2	71.0	71.6
DC	37.3	37.4	34.6	35.8	37.5	38.7	36.4	35.1	35.0	35.7	37.8	39.2	40.4	42.5	40.3	40.0
Florida	66.5	67.2	66.5	66.3	64.9	64.4	65.1	66.1	66.0	65.5	65.7	66.6	67.1	66.9	66.9	67.6
Georgia	63.6	62.7	62.4	63.9	64.8	64.7	64.3	65.7	66.9	66.5	63.4	66.6	69.3	70.9	71.2	71.3
Hawaii	50.7	51.0	50.9	50.7	53.2	54.7	55.5	55.2	53.8	52.8	52.3	50.2	50.6	50.2	52.8	56.6
Idaho	69.7	71.0	69.8	71.6	71.5	70.2	69.4	68.4	70.3	72.1	70.7	72.0	71.4	72.3	72.6	70.3
Illinois	62.4	60.6	60.9	61.0	61.4	61.9	63.0	63.0	62.4	61.8	64.2	66.4	68.2	68.1	68.0	67.1
Indiana	69.9	67.6	67.6	69.1	68.3	68.2	67.0	66.1	67.6	68.7	68.4	71.0	74.2	74.1	72.6	72.9
Iowa	71.3	69.9	69.2	67.7	68.3	69.6	70.7	68.4	66.3	68.2	70.1	71.4	72.8	72.7	72.1	73.9
Kansas	72.7	68.3	66.4	67.9	68.6	68.1	69.0	69.7	69.8	68.9	69.0	67.5	67.5	66.5	66.7	67.5
Kentucky	70.2	68.5	68.1	67.6	65.4	64.9	65.8	67.2	69.0	68.8	70.6	71.2	73.2	75.0	75.1	73.9
Louisiana	70.1	70.2	70.4	71.0	68.5	66.3	67.8	68.9	66.7	65.4	65.8	65.3	64.9	66.4	66.6	66.8
Maine	74.1	73.7	74.0	73.2	72.2	73.6	74.2	72.0	72.0	71.9	72.6	76.7	76.5	74.9	74.6	77.4
Maryland	67.8	65.6	62.8	62.7	63.5	65.5	64.9	63.8	64.8	65.5	64.1	65.8	66.9	70.5	68.7	69.6
Massachusetts	61.7	60.5	60.3	60.6	60.0	58.9	58.6	60.2	61.8	60.7	60.6	60.2	61.7	62.3	61.3	60.3
Michigan	72.7	70.7	70.9	71.7	72.5	73.2	72.3	70.6	70.6	72.3	72.0	72.2	73.3	73.3	74.4	76.5
Minnesota	72.6	70.0	68.0	68.9	69.1	68.3	68.0	68.9	66.7	65.8	68.9	73.3	75.4	75.4	75.4	76.1
Mississippi	72.3	69.6	70.4	72.5	73.7	72.2	69.4	71.8	70.4	69.7	69.2	71.1	73.0	73.7	75.1	74.9
Missouri	69.5	69.2	67.8	66.1	64.8	63.7	64.0	64.2	65.2	66.4	68.4	69.4	70.2	70.5	70.7	72.9
Montana	66.4	66.5	64.4	65.0	65.4	67.9	69.1	69.6	69.9	69.7	68.8	68.7	68.6	67.5	68.6	70.6
Nebraska	69.3	68.5	68.3	66.8	66.6	67.2	67.3	67.5	68.4	67.7	68.0	67.1	66.8	66.7	69.9	70.9

(continues)

Table 2b Annual homeownership rates in the 1980s and 1990s in the United States, 1984–99 (percent) *(continued)*

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Nevada	58.9	57.0	54.5	54.1	54.3	54.3	55.8	55.8	55.1	55.8	55.8	58.6	61.1	61.2	61.4	63.7
New Hampshire	67.1	65.5	64.8	66.4	67.9	67.0	65.0	66.8	66.6	65.4	65.1	66.0	65.0	66.8	69.6	70.2
New Jersey	63.4	62.3	63.3	64.0	64.8	65.7	65.0	64.8	64.6	64.5	64.1	64.9	64.6	63.1	63.1	64.5
New Mexico	68.0	68.2	67.8	67.2	65.4	65.5	68.6	69.5	70.5	69.1	66.8	67.0	67.1	69.6	71.3	72.6
New York	51.1	50.3	51.3	52.0	50.7	52.3	53.3	52.6	53.3	52.8	52.5	52.7	52.7	52.6	52.8	52.8
North Carolina	68.8	68.0	68.2	68.4	68.3	69.4	69.0	69.3	68.6	68.8	68.7	70.1	70.4	70.2	71.3	71.7
North Dakota	70.1	69.9	69.2	68.9	67.7	67.1	67.2	65.4	63.7	62.7	63.3	67.3	68.2	68.1	68.0	70.1
Ohio	67.7	67.9	68.2	68.6	69.6	69.6	68.7	68.7	69.1	68.5	67.4	67.9	69.2	69.0	70.7	70.7
Oklahoma	71.0	70.5	69.7	70.9	72.1	71.4	70.3	69.2	68.9	70.3	68.5	69.8	68.4	68.5	69.7	71.5
Oregon	61.9	61.5	63.9	64.6	64.0	63.4	64.4	65.2	64.3	63.8	63.9	63.2	63.1	61.0	63.4	64.3
Pennsylvania	71.1	71.6	72.3	71.8	72.1	72.8	73.8	74.0	73.1	72.0	71.8	71.5	71.7	73.3	73.9	75.2
Rhode Island	60.9	61.4	62.2	60.4	62.0	61.2	58.5	58.2	56.8	57.6	56.5	57.9	56.6	58.7	59.8	60.6
South Carolina	69.1	72.0	70.3	72.8	73.8	71.0	71.4	73.1	71.0	71.1	72.0	71.3	72.9	74.1	76.6	77.1
South Dakota	69.6	67.6	65.9	66.8	66.4	65.8	66.2	66.1	66.5	65.6	66.4	67.5	67.8	67.6	67.3	70.7
Tennessee	67.6	67.6	67.4	67.2	66.9	67.3	68.3	68.0	67.4	64.1	65.2	67.0	68.8	70.2	71.3	71.9
Texas	62.5	60.5	61.0	61.1	59.9	61.0	59.7	59.0	58.3	58.7	59.7	61.4	61.8	61.5	62.5	62.9
Utah	69.9	71.5	68.0	69.0	70.2	70.4	70.1	70.7	70.0	68.9	69.3	71.5	72.7	72.5	73.7	74.7
Vermont	66.9	69.5	69.8	70.5	68.7	69.7	72.6	70.8	70.8	68.5	69.4	70.4	70.3	69.1	69.1	69.1
Virginia	68.3	68.5	68.2	69.0	69.8	70.2	69.8	68.9	67.8	68.5	69.3	68.1	68.5	68.4	69.4	71.2
Washington	65.7	66.8	65.1	64.4	64.2	64.2	61.8	61.8	62.5	63.1	62.4	61.6	63.1	62.9	64.9	64.8
West Virginia	72.0	75.9	76.4	72.5	73.2	74.8	72.0	72.4	73.3	73.3	73.7	73.1	74.3	74.6	74.8	74.8
Wisconsin	65.2	63.8	66.5	68.2	68.0	69.3	68.3	68.9	69.4	65.7	64.2	67.5	68.2	68.3	70.1	70.9
Wyoming	68.8	73.2	72.0	68.9	67.8	69.6	68.9	68.7	67.9	67.1	65.8	69.0	68.0	67.6	70.0	69.8

Source: Current Population Survey.

Table 3 Unemployment equations without a lagged dependent variable—estimated using state-year cell means

	1985–2011	1986–2011	1987–2011	1988–2011	1989–2011	1989–2011
Log home-ownership rate$_{t-1}$	–.3282 (2.09)					–.8309 (3.39)
Log home-ownership rate$_{t-2}$		.0031 (0.02)				.2540 (0.78)
Log home-ownership rate$_{t-3}$			.2083 (1.29)			.0012 (0.00)
Log home-ownership rate$_{t-4}$				.4588 (2.87)		–.1520 (0.48)
Log home-ownership rate$_{t-5}$					.8060 (5.18)	1.0216 (4.40)
Union density	–.4232 (1.08)	–.5939 (1.47)	–.7233 (0.47)	–.8038 (1.99)	–.1693 (0.70)	–.6592 (1.66)
Year dummies	25	24	23	22	21	21
State dummies	50	50	50	50	50	50
Education dummies	18	18	18	18	18	18
Personal controls	4	4	4	4	4	4
N	1377	1326	1275	1224	1173	1173
Adjusted R^2	.7831	.7792	0.7822	.7958	.8151	.8175

Notes: The dependent variable in this table is the log of the state unemployment rate in year t. The personal controls here are age, gender, 15 level-of-education variables, and two race dummies. t-statistics are in parentheses.

Source: Calculated from the Merged Outgoing Rotation Group (MORG) files of the US Current Population Survey, 1985–2011.

Table 4 Unemployment equations with a lagged dependent variable—estimated using state-year cell means

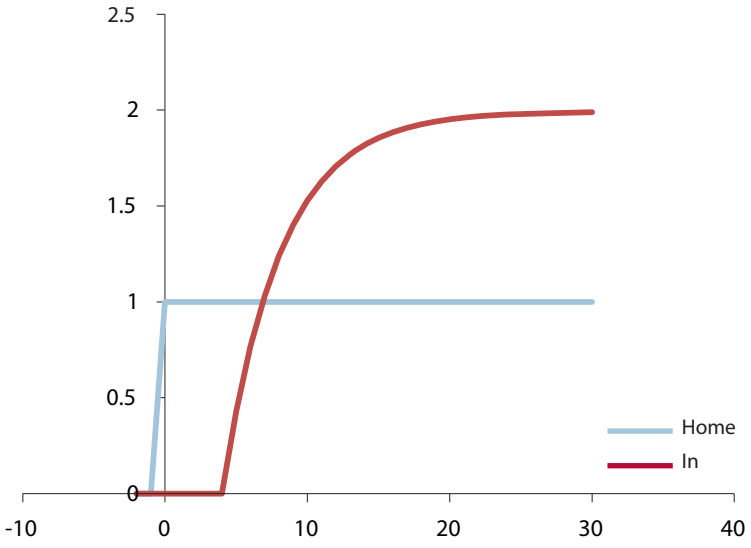
	1985–2011	1986–2011	1987–2011	1988–2011	1989–2011	1989–2011
Log unemployment rate$_{t-1}$	.8482 (50.67)	.8536 (50.86)	.8442 (51.37)	.8173 (49.08)	.7840 (45.77)	.7860 (45.24)
Log home-ownership rate$_{t-1}$	.2488 (2.73)					–.1460 (1.01)
Log home-ownership rate$_{t-2}$		.3359 (3.69)				.3303 (1.73)
Log home-ownership rate$_{t-3}$			.2927 (3.26)			–.0837 (0.44)
Log home-ownership rate$_{t-4}$				.3429 (3.79)		–.0171 (0.09)
Log home-ownership rate$_{t-5}$				.4302 (4.47)	.4081 (2.97)	
Union density	–.1619 (0.71)	–.1041 (0.61)	–.1066 (0.47)	–.1109 (0.48)	–.1693 (0.70)	–.1402 (0.60)
Year dummies	25	24	23	22	21	21
State dummies	50	50	50	50	50	50
Education dummies	18	18	18	18	18	18
Personal controls	4	4	4	4	4	4
N	1377	1326	1275	1224	1173	1173
Adjusted R^2	.9283	.9292	.9330	.9349	.9323	.9371

Notes: The dependent variable in this table is the log of the state unemployment rate in year t. The personal controls here are age, gender, 15 level-of-education variables, and two race dummies. t-statistics are in parentheses. If the equation of column 1 is re-estimated with contemporaneous home-ownership then home-ownership has a t-statistic less than 2; the exact result for the right hand side of that equation is as follows (with t-statistics in parentheses):

0.8447 (50.52) Logunt-1 + 0.1154 (1.26) log home – 0.1407 (0.64) union density.

Source: Calculated from the Merged Outgoing Rotation Group (MORG) files of the US Current Population Survey, 1985–2011.

Figure 3 The impulse response function in log unemployment after a one unit rise in homeownership



Note: This uses the representative equation: lnun(t) = .784*lnun(t–1) + .4302 home(t–5)

Table 5 Evidence of robustness across two sub-periods: Unemployment equations with a lagged dependent variable

	1989–2001		2002–2011		
Log unemployment rate$_{t-1}$	.7214 (28.18)	.7169 (28.23)	.6839 (18.31)	.6939 (19.05)	.6884 (18.87)
Log home-ownership rate$_{t-1}$	–.0814 (0.44)		–.2113 (0.81)		
Log home-ownership rate$_{t-2}$	.3862 (1.59)		.0344 (0.11)		
Log home-ownership rate$_{t-3}$	.1081 (0.44)		–.1486 (0.50)		
Log home-ownership rate$_{t-4}$	–.3381 (1.45)		.6098 (2.07)	.6867 (3.64)	
Log home-ownership rate$_{t-5}$	.5162 (2.81)	.3566 (2.66)	.3042 (1.24)		.6246 (3.26)
Union density	–.5202 (1.48)	–.4778 (1.37)	.3853 (1.24)	.3343 (0.75)	.3236 (0.72)
Year dummies	12	12	9	9	9
State dummies	50	50	50	50	50
Education dummies	18	18	15	15	15
Personal controls	4	4	4	4	4
N	663	663	510	510	510
Adjusted R^2	0.9307	.9296	.9439	.9440	.9391

Note: The dependent variable is the log of the state unemployment rate in year t. t-statistics are in parentheses.

Source: MORG files of the CPS.

Table 6 Employment equations with a lagged dependent variable—estimated using state-year cell means

	1985–2011	1986–2011	1987–2011	1988–2011	1989–2011	1989–2011
Log employment rate$_{t-1}$	.8846 (64.67)	.8837 (62.66)	.8897 (62.44)	.8771 (60.01)	.8581 (56.29)	.8576 (56.10)
Log home-ownership rate$_{t-1}$	–.0164 (1.72)					.0259 (1.66)
Log home-ownership rate$_{t-2}$		–.0317 (3.30)				–.0330 (1.59)
Log home-ownership rate$_{t-3}$			–.0298 (3.10)			–.0013 (0.07)
Log home-ownership rate$_{t-4}$				–.0313 (3.21)		.0107 (0.54)
Log home-ownership rate$_{t-5}$				–.0431 (4.32)	–.0457 (3.07)	
Union density	.0337 (1.42)	.0468 (1.94)	.0414 (1.72)		.0414 (1.65)	.0414 (1.63)
Year dummies	25	24	23	22	21	21
State dummies	50	50	50	50	50	50
Education dummies	18	18	18	18	18	18
Personal controls	4	4	4	4	4	4
N	1377	1326	1275	1224	1173	1173
Adjusted R^2	.9832	.9831	.9838	.9841	.9842	.9842

Notes: The dependent variable in this table is the log of the state employment rate, in year t. t-statistics are in parentheses. The personal controls here are age, gender, 15 education variables, and two race dummies.

Source: MORG files of the US Current Population Survey, 1985–2011.

Table 7 Weeks-worked equations 1992–2011—estimated using micro data

	All		Non-movers	
Log home-ownership rate$_{t-4}$	–.7679 (2.14)		–.7123 (1.95)	
Log home-ownership rate$_{t-5}$		–.6960 (1.94)		–.6740 (1.81)
Home owner	.7529 (10.77)	.7527 (10.76)	.6190 (8.75)	.6192 (8.75)
Renter	.3734 (5.26)	.3731 (5.26)	.2569 (3.50)	.2573 (3.50)
Non-mover	.6593 (24.44)	.6592 (24.44)	n.a.	n.a.
Union density	1.8295 (2.08)	1.7019 (1.94)	1.2324 (1.40)	1.1125 (1.27)
Constant	3.7152	3.4327	4.2496	4.1088
Year dummies	25	24	23	22
State dummies	50	50	50	50
Education dummies	15	15	15	15
Personal controls	7	7	7	7
N	2,268,197	2,268,197	1,981,950	1,981,950
R^2	.8075	.8075	.8216	.8216

n.a. = not available

Note: The dependent variable here is the number of weeks that that individual worked in the previous year. Personal controls include gender, race and a full-time variable. Excluded category: rent in lieu of cash. Standard errors clustered at the state/year cell. t-statistics are in parentheses.

Source: March CPS.

Table 8 US data on the annual rate of mobility (defined as moving residence) and the home-ownership rate

	Percent movers	Same county	Same state	Different state	Abroad	Home-ownership rate
2011						66.2
2010–11	11.6	7.7	2.0	1.6	0.4	66.9
2009–10	12.5	8.7	2.1	1.4	0.3	67.4
2008–09	12.5	8.4	2.1	1.6	0.4	67.8
2007–08	11.9	7.8	2.1	1.6	0.4	68.2
2006–07	13.2	8.6	2.5	1.7	0.4	68.8
2005–06	13.7	8.6	2.8	2.0	0.4	68.9
2004–05	13.9	7.9	2.7	2.6	0.6	69.0
2003–04	13.7	7.9	2.8	2.6	0.4	68.3
2002–03	14.2	8.3	2.7	2.7	0.4	67.9
2001–02	14.8	8.5	2.9	2.8	0.6	67.8
2000–01	14.2	8.0	2.7	2.8	0.6	67.4
1999–2000	16.1	9.0	3.3	3.1	0.6	66.8
1998–99	15.9	9.4	3.1	2.8	0.5	66.3
1997–98	16.0	10.2	3.0	2.4	0.5	65.7
1996–97	16.5	10.5	3.0	2.4	0.5	65.4
1995–96	16.3	10.3	3.1	2.5	0.5	64.8
1994–95	16.4	10.8	3.1	2.2	0.3	64.0
1993–94	16.7	10.4	3.2	2.6	0.5	64.0
1992–93	17.0	10.7	3.1	2.7	0.6	64.2
1991–92	17.3	10.7	3.2	2.9	0.5	64.1
1990–91	17.0	10.3	3.2	2.9	0.6	64.0
1989–90	17.9	10.6	3.3	3.3	0.6	63.9
1988–89	17.8	10.9	3.3	3.0	0.6	63.8
1987–88	17.8	11.0	3.3	3.0	0.5	64.0
1986–87	18.6	11.6	3.7	2.8	0.5	63.8
1985–86	18.6	11.3	3.7	3.0	0.5	63.9
1984–85	20.2	13.1	3.5	3.0	0.6	64.5
1983–84	17.3	10.4	3.6	2.8	0.5	64.7
1982–83	16.6	10.1	3.3	2.7	0.4	64.8
1981–82	17.0	10.3	3.3	3.0	0.5	65.4
1980–81	17.2	10.4	3.4	2.8	0.6	65.6
1977–79						64.9
1975–76	17.7	10.8	3.4	3.0	0.6	64.7
1972–75						64.5
1970–71	18.7	11.4	3.1	3.4	0.8	64.2
1969–70	19.1	11.7	3.1	3.6	0.8	64.3
1968–69	19	11.7	3.2	3.4	0.7	63.9

(continues)

Table 8 US data on the annual rate of mobility (defined as moving residence) and the home-ownership rate *(continued)*

	Percent movers	Same county	Same state	Different state	Abroad	Home-ownership rate
1967–68	19.5	11.8	3.4	3.6	0.7	63.6
1966–67	19.0	11.6	3.3	3.4	0.7	63.5
1965–66	19.8	12.7	3.3	3.3	0.5	63.0
1964–65	20.7	13.4	3.5	3.3	0.5	
1963–64	20.1	13.0	3.3	3.3	0.5	
1962–63	20.0	12.6	3.1	3.6	0.6	
1961–62	19.6	13.0	3.0	3.1	0.5	
1960–61	20.6	13.7	3.1	3.2	0.6	
1959–60	19.9	12.9	3.3	3.2	0.5	
1958–59	19.7	13.1	3.2	3.0	0.5	
1957–58	20.3	13.1	3.4	3.3	0.5	
1956–57	19.9	13.1	3.2	3.1	0.5	
1955–56	21.1	13.7	3.6	3.1	0.6	
1954–55	20.4	13.3	3.5	3.1	0.6	
1953–54	19.3	12.2	3.2	3.2	0.6	
1952–53	20.6	13.5	3.0	3.6	0.5	
1951–52	20.3	13.2	3.2	3.4	0.4	
1950–51	21.2	13.9	3.6	3.5	0.2	
1949–50	19.1	13.1	3.0	2.6	0.3	
1948–49	19.2	13.0	2.8	3.0	0.3	
1947–48	20.2	13.6	3.3	3.1	0.3	

Notes: For four different definitions of mobility—within the county, within the state, across states, and overseas

Source: Census Bureau (available at http://www.census.gov/hhes/migration/data/cps/cps2011.html).

Table 9 Mover equations where the dependent variable is whether the individual moved residence, 1989–2010

Log unemployment rate	.0127 (3.44)	.0116 (3.33)	.0116 (2.57)	.0079 (2.54)	.0079 (1.78)
Log home-ownership rate	–.1766 (9.20)	–.1542 (8.44)	–.1542 (4.09)	–.0633 (3.85)	–.0633 (1.62)
Renter				.2134 (73.45)	.2134 (18.19)
Renter (in lieu of cash)				.1144 (38.52)	.1144 (27.18)
Year dummies	22	19	19	19	19
State dummies	50	50	50	50	50
Personal controls	0	21	21	21	21
Clustered standard errors	State & year	State & year	State	State & year	State
N	2,941,082	2,941,082	2,941,082	2,941,082	2,941,082
R^2	.0109	0.491	.0491	.1208	.1208

Source: March CPS. The mover variable relates to a question asked in March of that year asking whether the respondent had moved over the preceding year. So the home-ownership and unemployment variables relate to the previous year, 2010. The personal home-ownership variables and other personal controls relate to the date of interview i.e., March 2011. Personal controls here are age, gender, four race dummies, and 15 level-of-education dummies. t-statistics are in parentheses.

Table 10 Moving rate equations—estimated using state-year cell means

Log mover rate$_{t-1}$	.1336 (4.06)	.1506 (4.63)	.1639 (5.03)	.1724 (5.32)	.1742 (5.39)	.1700 (5.12)
Log unemployment rate$_{t-1}$	.0419 (1.64)	.0468 (1.83)	.0557 (2.17)	.0605 (2.36)	.0629 (2.45)	.0451 (1.67)
Log union density rate$_{t-1}$	–.0494 (1.29)	–.0460 (1.19)	–.0564 (1.45)	–.0628 (1.62)	–.0662 (1.71)	–.0667 (1.67)
Log home-ownership rate$_{t}$	–.8125 (5.45)					
Log home-ownership rate$_{t-1}$		–.6950 (4.70)				
Log home-ownership rate$_{t-2}$			–.4446 (3.00)			
Log home-ownership rate$_{t-3}$				–.3242 (2.23)		
Log home-ownership rate$_{t-4}$					–.3085 (2.15)	
Log home-ownership rate$_{t-5}$					–.3445 (2.36)	
Year dummies	20	20	20	20	20	19
Education dummies	15	15	15	15	15	15
State dummies	50	50	50	50	50	50
Personal control variables	5	5	5	5	5	5
N	1071	1071	1071	1071	1071	1020
R^2	.8424	.8424	.8403	.8397	.8396	.8396

Note: Here the dependent variable is the log of the proportion of movers per annum within the state. As before, the data are answers given to whether the respondent had moved over the preceding year. So the home-ownership and unemployment variables relate to the previous year, 2010. The personal home-ownership variables and other personal controls relate to the date of interview i.e., March 2011. Personal controls are age, gender, four race dummies, and 15 education dummies. t-statistics are in parentheses.

Source: March CPS.

Table 11 Moving rate equations for out-of-state movers—estimated using state-year cell means

Log mover rate$_{t-1}$	.2155 (6.84)	.2155 (6.87)	.2187 (6.91)	.2206 (7.02)	.2212 (7.03)	.2117(6.48)
Log unemployment rate$_{t-1}$	–.0317 (0.45)	–.0339 (0.48)	–.0125 (0.18)	–.0047 (0.07)	.0016 (0.02)	–.0051 (0.07)
Log union density rate$_{t-1}$	.0352 (1.29)	.0559 (0.52)	.0276 (0.33)	.0251 (0.24)	.0103 (0.12)	.0184 (0.17)
Log home-ownership rate$_{t}$	–1.0396 (2.57)					
Log home-ownership rate$_{t-1}$		-1.3104 (3.25)				
Log home-ownership rate$_{t-2}$			–.7302 (1.80)			
Log home-ownership rate$_{t-3}$				–.7977 (2.00)		
Log home-ownership rate$_{t-4}$					–.6513 (1.65)	
Log home-ownership rate$_{t-5}$						–.5736 (1.43)
Year dummies	20	20	20	20	20	19
Education dummies	15	15	15	15	15	15
State dummies	50	50	50	50	50	50
Personal control variables	5	5	5	5	5	5
N	1071	1071	1071	1071	1071	1020
R^2	.7276	.7277	.7267	.7269	.7265	.7258

Note: Here the dependent variable is the log of the proportion of movers per annum who left the state. The personal controls relate to the date of interview i.e., March 2011. Personal controls are age, gender, four race dummies and 15 education dummies. Here the mover variable is as before but is now defined as the proportion that moved out of state in the state-year cell. t-statistics are in parentheses.

Source: March CPS.

Table 12 Log commuting-time equations, 2005–10 (in minutes)—estimated using state-year cell means

Log home-ownership rate$_{t}$	–.6208	–.6294	–.3533	.1145	.1196
	(14.60)	(14.30)	(5.47)	(2.35)	(2.42)
Year dummies	—	5	—	5	5
State dummies	—	—	50	50	50
Education dummies	—	—	—	—	15
Personal controls	—	—	—	—	10
N					
Adjusted R^2	.0040	.0042	.0208	.0209	.0415
N	7,509,307	7,509,307	7,509,307	7,509,307	7,509,307

Note: Here the dependent variable is the log of the average commuting time per annum in the state. Personal controls are age and its square, male, and seven race dummies. Standard errors are clustered by state and year. t-statistics are in parentheses. The mean of commuting time is 25.2 minutes (one way); it has a standard deviation of 22.2 minutes.

Source: American Community Surveys Micro Data files.

Table 13 Log number-of-firms equations, 1988–2010—estimated using state-year cell means

	Log number of $firms_t$			Log number of small $firms_t$		
Log number of $firms_{t-1}$	.9417	.9416	.9416			
	(112.57)	(113.87)	(106.55)			
Log number of small $firms_{t-1}$				.9497	.9504	.9504
				(115.56)	(119.12)	(118.65)
Log home-ownership $rate_{t-4}$	–.0297			–.0278		
	(2.78)			(2.14)		
Log home-ownership $rate_{t-5}$		–.0334	–.0333		–.0408	–.0408
		(3.01)	(2.21)		(2.68)	(1.95)
Year dummies	23	22	22	23	22	22
State dummies	51	51	51	51	51	51
Education dummies	15	15	15	15	15	15
Personal controls	10	10	10	10	10	10
Standard errors clustered by	State & year	State & year	State	State & year	State & year	State
N	1122	1122	1122	1122	1122	1122
R^2	.9999	.9999	.9999	.9999	.9999	.9999
N						

Note: Here the dependent variable is the log of the number of firms per annum in the state. Personal controls are age and its square, male and seven race dummies. t-statistics are in parentheses.

Source: Calculated from the Business Dynamics files. See http://www.census.gov//econ/susb/data/susb2010.html and http://www.sba.gov/advocacy/849/12162#susb.

Table 14 Number-of-establishments equations, 1988–2010—estimated using state-year cell means

	Log number of establishments$_t$		
Log number of establishments$_{t-1}$	.9414	.9411	.9411
	(113.60)	(115.14)	(109.07)
Log home-ownership rate$_{t-4}$	–.0300		
	(2.96)		
Log home-ownership rate$_{t-5}$		–.0317	–.0317
		(3.16)	(2.36)
Year dummies	23	22	22
State dummies	51	51	51
Education dummies	15	15	15
Personal controls	10	10	10
Standard errors clustered by:	State & year	State & year	State
N	1122	1122	
R^2	.9999	.9999	.9999

Notes: Here the dependent variable is the log of the number of establishments per annum in the state. Personal controls are age and its square, male and seven race dummies. Standard errors are clustered by state and year. t-statistics are in parentheses.

Source: Calculated from the Business Dynamics files. See http://www.census.gov//econ/susb/data/susb2010.html and http://www.sba.gov/advocacy/849/12162#susb.

Appendix Table A1 Checking for an effect from unemployment benefits (the replacement rate): Log unemployment rate equations estimated using state year cells using the Merged Outgoing Rotation Group (MORG) files of the Current Population Survey, 1989–2011

					1989–2000	2001–2011
Log unemployment rate$_{t-1}$	.7855 (45.70)	.7871 (45.88)	.7843 (45.76)	.7877 (45.81)	.7370 (28.07)	.6664 (21.67)
Log home-ownership rate$_{t-5}$	.4315 (4.73)	.4241 (4.65)	.4291 (4.70)	.4252 (4.66)	.3279 (2.29)	.5953 (3.33)
Union density	–.1120 (0.48)	–.1112 (0.48)	–.1165 (0.50)	–.1088 (0.47)	–.4438 (1.24)	.2237 (0.54)
U.I. replacement rate$_{t}$	–.0006 (1.04)			–.0004 (0.60)		
U.I. replacement rate$_{t-1}$		–.0347 (2.22)		–.0327 (2.05)	–.0274 (1.41)	–.0444 (1.71)
U.I. replacement rate$_{t-2}$			–.0110 (0.69)			
Year dummies	21	21	21	21	11	10
State dummies	50	50	50	50	50	50
Education dummies	18	18	18	18	18	15
Personal controls	4	4	4	4	4	4
N	1173	1173	1275	1224	612	561
Adjusted R^2	.9371	.9373	.9330	.9349	.9375	.9371

Notes: The personal controls are age, gender, and two race dummies. Here the replacement rate is defined as average weekly benefit amount defined below divided by average weekly earnings from the MORGs. t-statistics are in parentheses.

Source: Of UI data—see http://workforcesecurity.doleta.gov/unemploy/hb394.asp from US Dept of Labor Employment and Training Administration ET Financial Data HANDBOOK 394 Report FEDERAL-STATE EXTENDED BENEFITS REPORT FOR 1983 THROUGH 2012 UNDER PUBLIC LAW 91-373.