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Housing Market Liquidity and the Effect on Unemployment in the United States: An Application to the U.S. Housing Market, Isolating Regional Housing Market Liquidity and the Associated Effect on Unemployment

Lindsey M. Piegza
The Graduate Center, City University of New York

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by

LINDSEY M. PIEGZA

A dissertation submitted to the Graduate Faculty in Economics in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York

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_____	_____
Date	Merih Uctum
	Chair of Examining Committee
_____	_____
Date	Wim Vijverberg
	Executive Officer

Supervisory Committee:

Merih Uctum

Wim Vijverberg

Yochanan Shachmurove

THE CITY UNIVERSITY OF NEW YORK

ABSTRACT

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Advisor: Merih Uctum

This study proposes a measure of price spread between the bid (or the offer price from the buyer) and the ask (or the list price of the seller) in order to isolate the effect of housing market liquidity on unemployment. Housing market liquidity is defined as its impact on labor market equilibrium and unemployment at the state and regional levels. This proxy for housing market liquidity offers a more thorough measure of housing liquidity or market clearing ability compared with the current literature, which has relied on price or price changes alone as the primary measure of activity in the housing market. Price alone does not account for liquidity. Rather, the ratio between what a seller is asking and a buyer is willing to pay more clearly captures liquidity. The larger the price spread, the more illiquid the asset. This study provides facts consistent with the hypothesis that the housing market plays an essential role as a determinant of regional unemployment.

Table of Contents

Lists of tables

I. Introduction

Unemployment is a primary source of lost income in labor markets. Yet, after a century of economic research, the determinants of the 'natural' rate or equilibrium level of unemployment are not fully understood. According to World Bank data, the U.S. has an unemployment rate of less than 6 percent, while Spain has nearly 20 percent. In Africa, unemployment rates extensively vary across countries from 3 to above 90 percent. The focus of research is to identify labor-market uniqueness such as the percentage of the labor force participating in a trade union, the amount and type of job protection offered, or the type and extent of unemployment benefits.

There is an interest, however, in understanding the relationship between unemployment and the local housing market. As with unemployment, homeownership rates greatly vary across the world with near-80 percent homeownership in Spain and 30 percent homeownership in Switzerland. The levels of unemployment and homeownership on a national level vary across the globe, as well as on a state and local level in the U.S. This paper is motivated by the latter, a micro view of the state and regional housing market, as well as the impact on unemployment in the United States.

One of the important interactions is between housing and labor markets. The usual assumption is that there exists a positive relationship between unemployment and homeownership. This has become known as the theory or hypothesis of Oswald (Oswald, 1996, 1997, 1999). Oswald argues that high unemployment, as well as rigid unemployment differentials among regional labor markets, is positively correlated with homeownership. Oswald claims that a higher homeownership rate results in increased levels of immobile homeowners across regions because the associated costs of buying and selling homes prevent them from relocating. In other words, homeowners are limited to make a job-related relocation from a region with a relatively low

demand for labor to an alternative, more prosperous region with a higher demand. As a result, higher levels of homeownership are presumed to limit interregional relocation and restrict regional labor markets. Restricted labor markets are less able to return to equilibrium following localized labor demand shocks. The theory of a positive relationship between unemployment and homeownership is the basis for a plethora of other areas of study including the notions of spatial mismatch unemployment presented by Layard et al. (1991), Holzer (1991), and others.

In the U.S., both Democratic and Republican government officials encourage increasing homeownership rates. Both political parties highlight the recent rise in homeownership as a national achievement. Since the Great Depression, the American government has made great efforts to simplify the path to homeownership for all citizens. According to the 2008 White House CRS Report to Congress, through the use of government sponsored entities (GSEs) such as Freddie Mac, Fannie Mae and the Federal Home Loan Banks, the U.S. government guarantees $6.5 trillion in assets with the purpose of promoting homeownership. Homeownership is further promoted by tax policy which allows homeowners to deduct mortgage interest payments for a primary residence or a second home. However, the Federal government has done little to educate the American populace on the use and access of credit markets or mortgage instruments in the pursuit of homeownership. Politicians believe that homeownership creates a tie and commitment to the community, and is thus, a net positive for the local economy and the nation as a whole. As President Obama said in a speech given to Desert Vista High School on August 6, 2013, "So that's one of the things about housing. It is not just important for the person who owns the house; our economy is so impacted by everything that happens in housing." Homeownership helps to "build the middle class" and our sense of "community."

Homeownership and unemployment rates are important macro and microeconomic indicators often used, individually or together, to gauge the health of the economy in a particular region or of the national economy. The housing market is of a particular interest following the Great Recession. The Great Recession was a severe economic downturn caused by a plethora of market events including a credit crunch in 2007 after a prolonged housing market boom. According to Bureau of Labor Statistics (BLS) records, the Great Recession resulted in the highest unemployment levels seen in more than a generation in the developed world.

This research studies the possible effects of the housing market on unemployment rates in the United States through an alternative measurement of liquidity rather than homeownership or nominal movements. Housing is an important component of the economy affecting regional and national unemployment through labor mobility, potentially limiting employment opportunities and income growth. There is not, however, an appropriate and efficient variable to measure the relationship between housing markets and unemployment. Most research looks at housing as a restriction, creating a 'lock-in' effect whereby homeowners are unable to move to areas that offer increased job opportunities due to an illiquid asset holding. In this case, housing restricts the homeowner to the job opportunities within a certain radius around the home. If unable to sell the home, the owner can't move to an alternative location. The very nature of the lock-in effect, however, suggests that ownership itself is not enough to create immobility. The lock-in effect is created due to a lack of liquidity that allows housing assets to be bought and sold quickly and easily.

This study proposes a measure of price spread between the bid (or the offer price from the buyer) and the ask (or the list price of the seller) in order to isolate the effect of housing market liquidity on unemployment. Housing market liquidity is defined as its impact on labor market

equilibrium and unemployment at the state and regional levels. In other words, bid-ask price spread accounts for the liquidity or the ability of the housing market to clear. This proxy for housing market liquidity offers a more thorough measure of housing liquidity or market clearing ability compared with the current literature, which has relied on price or price changes alone as the primary measure of activity in the housing market such as Chan (2001), and Gupta and Miller (2009). Price alone does not account for liquidity. Rather, the ratio between what a seller is asking and a buyer is willing to pay more clearly captures liquidity. The larger the price spread, the more illiquid the asset. This study provides facts consistent with the hypothesis that the housing market plays an essential role as a determinant of regional unemployment.

This study uses data from the Bureau of Labor Statistics (BLS) to construct state panels in order to estimate unemployment equations. The BLS provides unemployment data from an eligible sample of 60,000 Americans selected randomly. In addition, Zillow.com, a leading on-line source for home sales, provides detailed listing and sales data. The housing market spread variable is constructed from the database on Zillow.com.

This paper explores the effect of regional housing market price spread on unemployment. Chapter II reviews the literature focusing on i) housing liquidity or market clearing ability and ii) housing models that include unemployment. Housing liquidity is isolated to explain movements in unemployment rates across regions of the United States. Chapter III presents the housing market and unemployment data, as well as the LSDV model to estimate the effect of regional housing market liquidity on unemployment. The model of housing market price spreads justifies the use of this unique measure as an appropriate indicator of housing market liquidity. The proxy of housing market liquidity or market clearing ability and the effect on unemployment are estimated

through LSDV regression on the state and regional level. Chapter V reviews the results and concludes the paper.

II. Literature Review

Interest in the relationship between unemployment and housing or more specifically homeownership is triggered by extensive research. Andrew Oswald is among many exploring the relationship between homeownership and unemployment rates before the most recent housing market crisis of the early 2000s. Oswald studies the relationship between homeownership and unemployment across states and regions in the U.S. as well as across European countries, generally concluding a positive relationship. In other words, Oswald concludes that rising homeownership leads to a rise in the rate of unemployment. Homeownership acts to slow the ability of jobless homeowners to relocate to new areas that offer more employment opportunities.

Drawing a direct parallel between homeownership and employment seems unrealistic given the other relevant variables. After all, homeownership in and of itself is not necessarily mobility-restrictive if there is adequate liquidity in the marketplace to absorb changes in housing demand and supply. Thus, a measure of housing market liquidity or the clearing ability of the market is better suited to measure the fluidity of state and regional housing markets. The most appropriate measure of liquidity remains the price spread between the buyer and seller of an asset or the bid-ask spread. The larger the spread, the less liquid the asset.

Additionally, a measure of housing liquidity is a potentially better proxy for the lock-in affect housing has on labor. Similarly, the health of the housing market, and a gauge of the ability of the local market to support additional housing activity via offers and purchases, is a better indication of mobility opportunities than stagnant, slow-adjusting homeownership rates indicate.

II.1. Historical Relationship between Housing and Unemployment

Policy makers often assume that unemployment and housing prices have a negative correlation: when unemployment is down, home prices are up. However, there are few relationships in economics that are rigidly fixed. H9ousing prices and unemployment are vital measures of the U.S. economy and of particular concern to policy makers, but limited studies have clearly defined the relationship between these two variables. While the unemployment rate is often included in housing market literature, the unemployment rate itself is most often not the main focus of study. Rather, the unemployment rate is used as an explanatory variable.

Nearly all Western countries throughout history have experienced a time of joblessness. According to a 2008 Eurostat Euro-Indicators Data Report, most European countries experience periods of high unemployment. According to Oswald (1996,1999), these periods of high unemployment correlate with policies aimed to increase homeownership. In Greece, for example, where homeownership exceeds 80 percent, the unemployment rate is over 20 percent. Since the 1950s, homeownership is on the rise in Europe as a result of policies, such as reduced taxes designed to encourage homeownership. In Spain, according to Eurostat data, homeownership is near 80 percent compared to less than 40 percent following the Second World War. Even in the aftermath of the Great Recession, European governments continue to offer financial support to encourage homeownership. Most of Western Europe offers access to credit to supplement the shift from rental housing to homeownership. These practices, however, are at odds with the hypothesis that economies require flexibility. In an ever-changing world, regional economies benefit from mobile labor enabling the shift to new locations in order to find jobs. Private rental housing assists in the need for flexibility. Renters, as opposed to homeowners, are more mobile. A flexible rental market allows a laborer from Zurich, for example, to fill an employment opening in Geneva.

From 1950 to 1960, Europe had a low unemployment rate and, while on the rise, a relatively low homeownership rate. Meanwhile, at the same time, the United States had a comparatively high homeownership rate of 60 percent and one of the highest unemployment rates in the industrialized world. Nevertheless, reflecting a rise in unionization rather than homeownership trends, American policy makers adjusted to a more European model of employment policies with a more generous government safety net. Part of the difference between the U.S. and Europe is the high firing costs and more generous unemployment compensation offered in Europe. Since 1960s, homeownership rates in the U.S. are on the rise along with the annual average rate of national unemployment.

By the 1990s, the U.S. homeownership rate was over 64 percent and the unemployment rate was 6.1 percent. By 2004, the U.S. homeownership rate was nearly 69 percent and the unemployment rate was 5.0 percent. All other developed countries, with the exception of Japan and Switzerland, observed a rise in unemployment over this period. Countries with relatively higher unemployment rates had relatively faster growth in homeownership. In other words, countries with a substantial portion of citizens renting had a lower unemployment rate than countries with a majority of people in owner-occupied housing.

Rapidly increasing homeownership rates and rising home prices reflect easing liquidity standards in the postwar era. In anticipation of robust growth forthcoming in the 1980s, the derivative mortgage market expanded beyond initial development. The derivatives market encourages lending via risk pooling for individual financial institutions and widens credit opportunities beyond underwriting principles governed by the credit score of the borrower or property values.

The link between housing and unemployment holds within a nation as it does across diverse countries. The correlation between homeownership and unemployment, while evident in countries and regional economies, however, is not entirely understood.

II.2. An introduction to Oswald: The Labor Market in Housing Market Models

Oswald (1997) claims that the relationship between housing and unemployment is based on the perceived notion that housing consumption limits employment opportunities through reduced mobility. In other words, homeownership reduces labor flexibility because of delays and difficulties regarding selling a home and limiting employment opportunities. Oswald (1997) finds that homeownership ties or 'tethers' individuals to a particular location, making them less willing and able to move to areas with more employment opportunities. Specifically, Oswald concludes that generally a 10 percent rise in the rate of homeownership is associated with a 2 percentage point increase in unemployment.

Oswald (1997) concludes that there is a positive relationship between levels of homeownership and joblessness across regions. Furthermore, he finds that there are significant lags in the effect. The impact of higher homeownership rates driving up the rate of unemployment lags by five years. The conclusion that high homeownership gradually undermines the labor market is of great concern, motivating further study.

Moreover, Oswald (1997) shows that the relationship between homeownership and unemployment holds across large and small areas. He finds that both within and across states, areas of elevated homeownership are plagued by low labor mobility. Interestingly, this is not accounted for by personal variables or characteristics of renters versus owners. However, the study

fails to conclude why there is such an unwavering relationship, although, intuitively, the outcomes are sensible. It is reasonable that increased participation in homeownership creates negative externalities in local labor markets. Furthermore, Oswald concludes that elevated homeownership rates can cause additional phenomena such as larger congestion periods on roads and bridges, increasing travel and commuting costs for employees. Also, Oswald finds that states with high homeownership rates can have regions with relatively low unemployment. Real estate markets are extremely localized and often vary within a state. This holds true for a state with a high average homeownership rate.

Building from Blanchard and Katz (1992), Oswald (1997, 1999) models five mechanisms to explain the positive relationship between unemployment and homeownership all of which lead to a lack of mobility and a lock-in effect. All of the mechanisms appear to be at least in part linked to the extrapolated relationship between decreased labor mobility, homeownership and an ineffective labor market clearing mechanism.

II.2.A. High Moving and Social Costs

The primary mechanism involves the direct influence of high costs of moving associated with homeownership. This includes not just the costs of physically moving personal items to a new location but the financial costs associated with selling and acquiring a new home. Given different levels of tax regulations, the cost of financing including acquiring a home equity loan and solicitor fees, results in a high level of expense. Certainly, the associated costs of moving are larger – and in many cases significantly larger – for homeowners than renters. This suggests that homeowners may be unwilling to relocate even if labor market openings in an alternative location are more appealing – either in nature of the position or in terms of monetary compensation. Thus,

the unwillingness to relocate can hinder new entrants from entering – or leaving – an existing market.

The expenses of relocating include the fee of the realtor, closing costs and the overhead of renting a moving truck. They also include the social and household expenses linked with relocating. These can include everything from creating a new social circle of friends, becoming involved in a new community, and introducing children into a new school system. These social expenses are real costs and can influence homeowners to remain in their current residence. When coupled with the quantitative monetary expense of relocating, it is understandable that homeownership can create a substantial lock-in effect retarding mobility in the labor market and restricting homeowners to their current place of residence.

II.2.B. Falling Home Values

A marked decline in home values has a negative impact on mobility and impedes the flexibility of the labor market. From the aforementioned argument regarding both the qualitative and quantitative costs of moving, it is apparent that property owners are reluctant to move due to the related transaction expenses which can include a potential realized loss when selling a home for a reduced price. It is shown that homeowners experience lock-in as housing values drop. Aside from a loss of price appreciation, this dilemma is also rooted in the fact that homeowners typically do not have adequate liquid assets to afford a first payment or down payment on an alternative residence without first selling their current home. In other words, many homeowners are reliant on the sale of their present home in order to have the financial resources to relocate into a new home.

II.2.C. Reduced Capital Investment

Prolonged inefficiencies in labor markets as a result of immobility produce high costs and reduced production. In the long-run, high costs squeeze businesses from the marketplace lending to further jobs losses.

An immobile labor market disrupts an efficient assignment of resources and leads to a certain type of spatial mismatch by which housing market frictions can cause less appropriate and inefficient employment matching. In other words, high levels of immobility cause the economy to be less efficient. A misallocation of resources has a detrimental impact on local labor markets by raising the cost of production as a result of lower labor productivity. Higher production costs lead to higher market prices and thus, lower real wages and reduced employment opportunities relative to a more flexible labor market.

Of course, in actuality, homeowners themselves are more likely to limit mobility or inhibit commercial growth in or near residential areas. In a 1999 paper, Oswald proposes that homeowners seek to maintain the status-quo, the current composition of persons, as well as the balance and location of housing units; homeowners seek to create more stable living environments. Homeowners prefer to maintain the tranquility of their neighborhoods and seek to reduce development and commercial building, depress business start-ups, and hold back entrepreneurial ventures and subsequent job creation. Areas with high homeownership often deter entrepreneurs from investing in operations which leads to reduced levels of capital investment because strict and onerous developmental laws or limitations on land and commercial development. Thus, businesses themselves are hesitant to open a new factory, or office space, in areas with high homeownership resulting in reduced employment opportunities.

II.2.D. Commuting Costs

Homeowners are willing – or resigned - to commute. The construct of many U.S. cities is based on a city center comprised of commercial and residential rental buildings. Single-family homes are most densely populated in the secondary and tertiary layers surrounding urban centers. As a result of the proximity to the city center, homeowners travel often and for long periods of time. Longer travel times create congestion and traffic increasing the cost of commuting. High travel costs reduce the incentive to work by reducing take-home pay net of commuting costs. These costs include gasoline, tolls, vehicle registration, and parking fees, as well as amortization of the car, repair and financing costs. High work-related costs including travel reduce the appeal of employment. Similarly, high work-related costs increase the appeal of unemployment.

Oswald (1999) remarks that homeowners have a tendency to travel longer distances between a residence and location of employment in comparison to renters. However, an increased willingness to travel can result in more dense populations in the surrounding, lower cost areas. This phenomenon may have a negative impact on economic growth by hindering occupational matching. This hypothesis dovetails the initial hypothesis that homeowners are less mobile and hence, forced to increase their employment search zone – while keeping that zone reasonably tethered to their place of residence.

II.2.E. Limited Relocation Options

An unemployed homeowner faces two challenges, the loss of a job and the inability to relocate into an area with more hiring opportunities. High levels of homeownership limit opportunities particularly for younger workers by restricting mobility into new areas offering employment opportunities; younger men and women find it particularly difficult to relocate if there

are few low-cost rental options. Without rental options, those without capital resources to purchase a home are at a severe disadvantage in an environment where ownership is the leading form of housing.

Oswald (1997) focuses on the relationship between unemployment and owner-occupied housing in a financial system with heterogeneous locations such as cities with similar characteristics for both local housing and labor markets. Within similar locales, residents face similar decisions on whether to purchase or rent a home. From that point, differences in productivity and underlying economic conditions determine different unemployment levels across cities, as well as the differing prices of houses and rentals. The relative cost of renting, the underlying property value and the activity level or market liquidity determines housing price premiums taking into account the underlying differences in locations. Liquidity itself, however, depends on the health of the labor market and the relative strength of the labor market compared with nearby or comparable cities.

II.3. Regional and Local Data Choices

According to the American Bankers Association (ABA), homeownership rates are on the rise, up nearly 40 percent over the past millennium and rising to 65 percent in 2010. The media and policy debates highlight the concern surrounding homeownership and the inconclusive relationship with the labor market. There is concern that homeownership causes friction in the labor market. Modern theory looks into the relationship between homeownership and labor market mobility against the backdrop of restrictive homeownership. The hypothesis is that high homeownership rates cause labor immobility in labor markets with high unemployment.

The literature explores the relationship between homeownership and unemployment. In several publications, Oswald (1996, 1997, and 1999) dissects the hypothesis that homeownership is positively related to labor immobility and unemployment. This leads to both lower levels of income and reduced levels of growth. Oswald presumes a positive correlation between homeownership rates and the level of unemployment across OECD countries. However, following Shelton (1968), later works employ time-series data for the U.S. and render a similar positive relationship between homeownership and unemployment.

According to Oswald (1997), unemployment increases most noticeably in counties with the fastest development in homeownership. This relationship holds even on the city level. According to a U.S. Department of Housing and Urban Development (HUD) report on the housing market in Detroit-Warren-Livonia, Michigan, the Detroit MSA market is a recent example of this relationship. Following the Great Recession in the United States, employees in Michigan, once General Motors workers, find themselves in the midst of a deteriorating local labor market. Unemployed workers who own their home cannot find a buyer and therefore cannot relocate to other areas of the state or country that have more favorable employment opportunities. This is an unending downward spiral with no simple solution.

Amid a massive array of study and lingering theoretical uncertainty, the correlation between homeownership and labor mobility, as well as unemployment, is an empirical matter. On a macroeconomic level, a number of studies including Barcelo (2006) demonstrate that elevated homeownership levels escalate unemployment. However, the relationship between homeownership and unemployment remains inconclusive. Furthermore, it varies across data subsectors; macro state and country level data and micro city and metropolitan statistical area level (MSA).

II.3.A. Country level data

Oswald (1996, 1997, 1999) concludes that, particularly for Europe, high levels of homeownership are associated with higher rates of unemployment. In a study of 19 OECD countries from 1960 until 1990, using fixed and random effects models, Oswald (1997) concludes that homeownership and unemployment have a positive relationship at the national level with an elasticity of 0.17. Oswald claims that his findings explain the differential between Spain and Switzerland. Spain has the highest unemployment and homeownership rates in Europe, while Switzerland has the lowest unemployment and homeownership rates.

Using similar data from OECD countries, Nickell (1998) supports the conclusions found in Oswald (1996, 1997, 1999). He studies the correlation between homeownership and unemployment using data from for 20 countries belonging to the Organization for Economic Cooperation and Development (OECD) over a five-year period between 1989 and 1994. Nickell demonstrates that unemployment is positively correlated with homeownership with an elasticity of 0.13.

Using a search model for unemployed workers for 20 OECD countries, Munch et al. (2006) conclude that homeownership creates restrictions to labor mobility leading to higher reservation wages and increased joblessness. Using the same identification strategy of Munch et al. (2006), Rouwendal and Nijkamp (2010) use national Danish data collected from government statistics over eight years from 1993 until 2001 and find a positive relationship between homeownership and unemployment supporting the theory of Oswald (1996).

Using an empirical model accounting for wages and job duration, Rouwendal and Nijkamp (2010) conclude that homeownership heightens labor immobility - in labor markets with high unemployment - causing increased unemployment. While Rouwendal and Nijkamp find that

homeowners are 29 percent less likely to leave their current place of employment relative to renters in the first place, homeowners are also 14 percent more likely to be unemployed as a result of immobility.

Prior to Oswald (1996), Murphy and Sullivan (1985) find a positive relationship between high levels of homeownership and unemployment. Using survey data from Germany and the Netherlands in the 1980s and early 1990s, Murphy and Sullivan (1985) demonstrate that "healthy housing markets" with high levels of homeownership inhibit labor mobility due to heightened costs associated with housing. Focusing more specifically on the impact on immigration, Murphy and Sullivan (1985) find heightened costs of homeownership are a particularly large deterrent to relatively poorer immigrants. Immigrants and immigrant families are more likely to choose an alternative location or opt to commute from a further distance into a more costly area for employment rather than residence purposes.

Using country level data from the UK during the late 1970s and early 1980s, Hughes and McCormick (1987) study the effect of homeownership on unemployment and find a positive correlation. Hughes and McCormick conclude that British policy encouraging homeownership has led to an unintended "inflexibility" in the UK labor market. Motivated by the recent rise in unemployment throughout Europe, Hughes and McCormick find that government policies aimed at increasing homeownership in the UK led to market inefficiencies and a rise in joblessness. Prior to Oswald (1996), Hughes and McCormick (1987) also find a "lock-in" effect as a result of heighten homeownership in the UK.

II.3.B. State and Regional Level Data

Oswald (1996) studies the correlation between homeownership and unemployment for 19 countries belonging to the Organization for Economic Cooperation and Development (OECD) over a thirty-year period from 1960-1990. Finding a positive correlation, Oswald concludes, "We can put Europe back to work…by reducing homeownership." The positive correlation Oswald reports, however, is not just among countries but also on state levels within Italy, France, Switzerland, Sweden, and the United Kingdom. Furthermore, while early analysis targets the European labor markets, Oswald (1999) includes the western states of the U.S. He finds a similarly positive relationship i.e. high homeownership and unemployment rates.

Using U.S. state level data over a twenty-year period from 1970 to 1990, Green and Hendershott (2001b) find, like Oswald, a positive relationship between unemployment and homeownership. Similar to the 0.13 elasticity result in Nickell (1998), Green and Hendershott demonstrates that unemployment is positively correlated with homeownership with an elasticity of 0.18. These two replications, Nickell (1998), and Green and Hendershott (2001b), reinforce the conclusions by Oswald (1999). Green and Hendershott (2001b), however, find some inconsistencies across U.S. states. In particular, they find that in some cases high homeownership rates do not always correlate with high unemployment. While noting some inconsistencies or outlier states, Green and Hendershott (2001b) broadly support the results presented in Oswald (1996, 1997,1999).

The findings of Green and Hendershott (2001b) are similar to recent work by Laamanen (2013) who explores the varying mixtures of homeownership and unemployment rates at the state level across Europe and the U.S. Using annual data from a panel of U.S. states, Laamanen finds a positive relationship between homeownership and unemployment. After one year, Laamanen

finds an increase in home ownership has a small, but immediate effect on unemployment. Using a thirty-year lag, Laamanen concludes that the effect of a one percentage point increase in homeownership is estimated at a 1.7 to 2.2 percentage point increase in unemployment. Anderson and Burgess (2000) also analyses data using state-level data for the United States. While not specifically citing homeownership, Anderson and Burgess conclude that the natural rate of unemployment in a particular state is directly correlated to the flexibility of the local labor market or the ease with which people can relocate from state to state to search for employment. The higher the inflexibility of the labor market, the higher the natural rate of unemployment.

Based on a regional search model, Coulson and Fisher (2009) show a positive relationship between homeownership and unemployment. Studying U.S. state and metropolitan areas using data from the U.S. Current Population Survey and Panel Study of Income Dynamics (PSID), Coulson and Fisher find that an elevated degree of homeownership is correlated with "enhanced labor market effects" including both employment volume and wages. Coulson and Fisher demonstrate that unemployed homeowners are less willing to relocate to other areas offering either lower housing costs or rental prices, or more employment opportunities, since during such times homeowners can only acquire a relatively lower value for their current dwelling. This decision not to relocate limits the job opportunities for homeowners and may perpetuate unemployment. Thus, Coulson and Fisher (2009) find housing has a sizable effect on earnings as homeowners often settle for lower earnings relative to renters due to their immobility. However, high-wage markets are themselves often synonymous with areas of high homeownership. As a result, all else equal, homeowners on average have higher earnings than renters and are less likely to be unemployed. However, higher regional homeownership rates are correlated with a greater probability of individual worker unemployment.

DiPasquale and Glaeser (1999) find labor immobility is a result of homeownership. Using the U.S. General Social Survey, they document that homeowners have lower mobility rates across states. While DiPasquale and Glaeser find that homeownership encourages investment in local amenities and social capital because of immobility, barriers to mobility also lead to increased unemployment. Homeownership, therefore, reduces mobility and has a negative effect on labor market activity. DiPasquale and Glaeser conclude that there are two contrasting effects of homeownership: a high reservation wage requirement and an increase in labor force dropouts. There are higher costs associated with homeownership than renting. There are also high costs associated with relocating residences which leads to a relatively higher reservation wage requirement.

In a theoretical review of state level homeownership in the U.S., Dietz and Haurin (2003) find that immobility as a result of homeownership leads to higher unemployment. Echoing the notion of DiPasquale and Glaeser (1999) that homeownership has a positive influence on local neighborhoods including constancy and the accretion of social capital, Dietz and Haurin ultimately agree with the conclusion presented in Oswald (1996) that homeownership and unemployment have a positive relationship. Dietz and Haurin conclude that one of the consequences of homeownership is immobility and negative labor market friction or unemployment but argue further research is needed.

Following Hughes and McCormick (1987) earlier work, Cameron and Muellbauer (1998) look at the UK on a smaller, regional level. Using regional data for the UK from the 1980s, they find that homeowners either by force or by choice shift residences less frequently than renters leading to increased restrictions on labor and higher unemployment. Cameron and Muellbauer agree with Oswald (1996,1997) that high levels of homeownership are correlated with high levels

of unemployment causing homeownership lock-in. An increase in unemployment leads to a loss of output and a higher vulnerability to inflationary pressures.

Using regional panel data with fixed effects model, Dohmen (2005) shows that high homeownership levels are positively correlated with unemployment in the UK. However, like Coulson and Fisher (2009), Dohmen finds that individual homeowners are more likely to be employed relative to renters. Dohmen assumes that owner and rental housing units are perfect substitutes. This assumption is at odds with most conventional models of homeownership which fails to reflect the relative premium of homeownership relative to renting. Furthermore, Dohmen notes that the type of jobs lost vary as a result of a rise in homeownership. Dohmen assumes that higher wealth individuals more likely own their home and work in white collar jobs as opposed to renters who tend to work in blue collar positions. Nevertheless, Dohmen concludes that homeownership constrains career prospects by reducing labor mobility resulting in relatively higher rates of unemployment.

Using German regional data, Johnes and Hyclak (1994) support the hypothesis that high levels of homeownership are positively correlated with unemployment or "inferior outcomes in the labor market." Using both cross-sectional and pooled data models, Johnes and Hyclak find homeowners are less likely to shift locations than renters because homes cannot be overturned or sold without incurring search and transaction expenses. Given this financial burden, households are location-bound. Furthermore, given the presumed commitment, households refrain from buying a home unless there is an implicit intention to settle down or a definitive commitment to a region for an extended duration of time. Johnes and Hyclak support the conclusion in Oswald (1996,1997) that there is a positive relationship between homeownership and unemployment.

Johnes and Hyclak additionally conclude, however, that the significance of the relationship is "marginal" at best.

Johnes and Hyclak assume workers accept a favorable job offer. Portions of homeowners, however, turn down a favorable opportunity due to selling costs. High selling costs relative to the benefits of moving may cause workers to turn down favorable employment opportunities. Clearly, the liquidity of the housing market influences employment and unemployment within a local community and in the aggregate by deterring homeowners from potentially accepting a favorable job. At the individual level, as well as the regional and national levels, there is a positive relationship between homeownership and unemployment.

II.4. Housing Market Models: A Discussion of Reservation Price, List Price, Sale Price, and Days on Market (DOM)

As the housing market in the U.S. continues to recover in the aftermath of the Great Recession, equity constraints and distaste for loss are factors that impact current housing demand. Housing equity is tangible and easily measured. Other factors such as costs and qualitative variables are included in the decision of the buyer. Accounting for additional sunk costs, as well as the perceived value of the home by the seller, the ask price (or the list price of the seller) often surpasses the reservation price of the seller or the lowest offer the seller is willing to accept. In the chapters to follow, the factors that affect list price and price reduction are reviewed, and the impact of both on the number of days a property is listed on the market (DOM) before it is sold.

II.4.A. Reservation Price

The perception of the minimum value of the property along with opportunity cost helps the seller to set the reservation price. On the one hand, an alternative to selling is renting. The reservation price is affected by the current rental prices. Relatively high rents drive the perceived opportunity cost higher, as well as the reservation price of the seller. On the other hand, if the homeowner receives a job opportunity in another part of the country, or the homeowners' insurance policy runs out when the property is vacant for a while, the reservation price of the seller declines.

Furthermore, the reservation price reveals information to the buyer regarding the flexibility of the seller and willingness to negotiate or reduce the price. Sellers with a lower reservation price often self-identify with a lower ask price while sellers less likely to negotiate self-classify with a relatively higher ask price. Albrecht, Gautier, and Vroman (2010) suggest a seller with a relatively lower reservation price is motivated by external factors such as a need to acquire a sales contract on the current property in order to bid on a different property.

II.4.B. Setting the List Price

Lazear (1986) suggests that the largest challenge for a seller in the U.S. housing market is choosing an appropriate list price given all available information. Lazear analyzes pricing with this challenge and presents a two-period model with the list price of the seller the primary determinant of how quickly a home is sold. In the first period, a seller is unaware of market valuations and arbitrarily choses a list price based on perceived value of the home. In the second period, the seller acquires information on relative pricing within the market and adjusts the list to accurately reflect prices in the existing market. In thin or slow markets, a smaller number of buyers

in the first period offer the seller limited data regarding market conditions and values. Therefore, in slow markets, a seller chooses a list price and is often willing to cut the list price quickly if incoming data suggests a need to do so.

Yavas and Yang (1995) study the optimal asking, or list price for a property. Contrary to Lazear (1986), they conclude that sellers do not arbitrarily set their list price. Even in the initial period, Yavas and Yang find that sellers base their list price on several factors including expected bargaining power, the realtor fee, search costs, the perceived value of the home and a professional valuation of the home. Since the rate of commission is typically fixed and most home searches are conducted with minimal cost, these two variables have a negligible effect on the list price decision of the seller.[1]

II.4.C. List Price and Days on Market (DOM)

A measure of days on market (DOM) is commonly used in housing market models to capture market activity levels. Following their theoretical search model on optimal list price, Yavas and Yang (1995) look at the relationship between DOM and list price. Splitting their data into price quartiles, Yavas and Yang conclude that the list price sends a signal indicating the reservation price of the seller to potential buyers and impacts the "search intensity level" of the realtor. Overvaluing a home with a relatively higher list price, increases DOM for median priced homes but does not impact the time on market for relatively cheap or expensive homes. This suggests that the housing market for median priced homes is extremely competitive relative to the high and low ends of the market. In competitive housing markets, sellers are compelled to

[1] Most home searching is conducted via the internet with zero to minimal cost.

appropriately price their home relative to other homes for sales within the same sector of the market.

Similar to Yavas and Yang (1995), Anglin, Rutherford and Springer (2003) find that a rise in the list price impacts DOM disproportionately more in markets with little price variability. Furthermore, they suggest that DOM is more reflective than home prices of cyclical and brokerage-related variables such as aggregate economic growth and mortgage financing availability, although not significant in list price choice. However, location and physical characteristics of the individual home are critical to DOM and have a substantial impact on the final sale price. Consequently, sellers carefully consider these aspects when determining a self-assessed value of their home and choosing a list price, contrary to Lazear (1986) who suggests at least in the first period, that the seller arbitrarily chooses a list price.

Glower, Haurin and Hendershott (1998), and Horowitz (1992) study price reductions and suggest previous price reductions for a home lowers the initial offer of a buyer. Horowitz (1992) uses a framework of 10 variables consisting of price measures and property characteristics such as the number of bathrooms and bedrooms, square footage, the type of property and lot size. Glower, Haurin and Hendershott (1998) conclude that sale prices are closely linked to both the approximated property value and the overvaluation by the seller, which acts as a signal to the buyer in regards to the degree of motivation of the seller. A seller who is motivated to sell quickly or who has a predetermined sell-by date tends to overvalues less and chooses a relatively lower list price compared to other similarly valued homes on the market. By choosing a lower list price, a seller can expedite a sale and lower DOM.

Inflexibility in list price often stems from inadequate information available to the seller on the current conditions of the housing market. With full information, expectations of the seller are based on both previous pricing data from sales in the area and information about current conditions. Overtime, both buyers and sellers have access to more data regarding individual valuations. Active listings information, as well as pricing information is publicly released and regularly updated. With just a key stroke, sellers can look for the asking price of all homes for sale in a particular area and more accurately set a list price reflecting market conditions. This, in turn, causes the seller to limit DOM.

Miller and Sklarz (1986) suggest that there are two options for a home seller that can affect DOM. The first option is to offer the home at a relatively high list price, attempting to obtain the highest probable bid, possibly above the market value of the property. The second option is to list the property in line with the expected sales price to expedite the transaction and limit associated sale costs. The first approach prolongs the time the house is on market because an elevated list price reduces the pool of potential buyers, i.e. a relatively high list price compared to the assessed value of the home discourages potential buyers and potentially extends DOM. The second approach, causes a faster exchange since a relatively low price makes the property attractive to prospective buyers. Days on market are rarely zero. Housing units are heterogeneous, so buyers need to learn relative market value. "Assessed market value" is uncertain.

Arnold (1999) confirms the conclusion of Miller and Sklarz (1986) that the first list price directly influences the rate at which buyers show interest in the property for sale. Arnold suggests that the seller is not always aware of the assessed property value or that an initial asking price above the assessed value discourages potential buyers. However, Arnold concedes that some sellers are aware and intentionally choose a list price to prolong DOM and increase the probability of obtaining

a higher bid from a narrower group of potential buyers. The latter scenario suggests that the seller is confident about the uniqueness of the property. However, if comparable attributes are offered at a lower price, the seller is unlikely to find a buyer.

Building on the thesis of Arnold (1999), Johnson, Benefield and Wiley (2007) show that varying DOM is not the result of overpricing. They find that overpricing represents distinguishable and unique features of the individual property, as well as differences in preferences on part of both the seller and the buyer. Similarly, Haurin (1988) suggests that DOM is positively associated with the uniqueness of a particular house. Homes with unique characteristics are often more expensive with a higher sale price due to the limited supply. They are often more illiquid due to both a higher price point and a limited pool of buyers, thus, extending DOM.

Belkin, Hempel, and McLeavey (1976) conclude that while overvaluing a home with a relatively high list price occurs at the individual level, it does not occur indefinitely. Consistent overvaluing and inflexible reservation prices limit sales activity. In the case of overvaluing, selling prices are expectantly above purchase prices. Conversely, elevated list prices beyond willing purchase prices lead to sizable price reductions if the seller is eager to sell. Therefore, while DOM may be extended on an individual level as a result of overvaluing, Belkin, Hempel, and McLeavey (1976) show that widespread overvaluing cannot be sustained.

While it may ultimately slow the sale process, Benitez-Silva, Eren, Heiland and Jimenez-Martin (2010) conclude that sellers normally over-price their home by an average 5 to 10 percent to compensate for assumed bargaining. This further explains the disparity between list and transaction prices. Furthermore, Merlo and Ortalo-Magne (2004) conclude that both the seller and the buyer perceive an average 8 percent threshold for negotiation around the initial list price. The list price

allows buyers and sellers to compare prices of similar properties on the market in order to establish an appropriate relative value. Finding comparable properties allows both parties to make assumptions regarding a likely transaction price. Sellers, however, tactfully increase the list price to take into account potential bargaining by the buyer.

Furthermore, much of the variance in DOM can be explained by the existing pool of buyers or lack thereof, depending on seasonal factors. Genesove and Mayer (2001) suggest market seasonality directly influences housing market activity. During the fall and winter there are relatively fewer potential buyers in the market. Therefore, homes for sale during the fall and winter often experience longer DOM, reflecting the low levels of market activity. Genesove and Mayer (2001) show that sellers anticipate seasonal downturns in the housing market, as well as longer DOM during these periods, and consequently choose moderately high reservation prices during these periods of slow activity. During market troughs, or periods of declining prices, it is risky for sellers to have an inflexible reservation price given the limited number of buyers. When making an offer, however, a buyer considers other attributes in addition to DOM. To properly gauge an appropriate offer, buyers look at DOM and prior price reductions.

The link between days on market and selling price is a subject of great discussion and continues to be a focus in the housing market research community. While many sellers choose a list price based on current market factors, others are swayed by a presumed uniqueness of their property or arbitrarily choose a relatively high list price despite ample market data available to sellers. An elevated list price limits interest from potential buyers and extends DOM.

II.5. Conclusion

Economists often observe the labor and housing markets to measure the health of a particular region or country. Key indicators of economic activity are homeownership and unemployment rates. Thus, they are often at the center both of economic research and policy makers. In the aftermath of the housing market crash, home prices and homeownership rates are of particular interest. Some suggest that increased homeownership is positively correlated with employment. Others suggest a rise in homeownership leads to restrictions on labor mobility, locking-in workers and reducing employment. While research has been conducted on both housing and labor markets separately, the relationship between homeownership and employment is not fully understood.

III. The Model and Data

III.1. Model Motivation and Variable Choice

Modeling the relationship between homeownership and unemployment rates at the regional level requires a consideration of a multitude of extraneous potential determinants. There are a few empirical studies that focus on estimating and identifying transaction-based liquidity aspects of house prices, a literature gap which reflects the complexity of the subject (Pehkonen, 1999). This issue, however, is not impossible all together; following Wilhelmsson (2002), an individual factor model and "straightforward" justification is used for variable choice.

Regional housing markets offer different attributes such as structure type, location, and neighborhood quality. These local differences justify price differences across housing markets and influence the clearing ability of the market. Metro level data controls for location variances. Labor market characteristics are assumed to be relatively similar on the regional level including industry, relative wealth, locational characteristics, and income, but no assumption is made regarding the ability of any homeowner to withstand a price decline in value.

The analysis focuses on five liquidity factors which include days on market (DOM), list price, sale price, unemployment and housing market price spread. This model assumes that the regional unemployment rate has a steady state solution which is U^*. Furthermore, the model assumes the steady state unemployment rate accurately reflects the current market clearing ability of the underlying regional labor markets within state bounds as the Layard et al. (1991) model implies.

The difference between the sale and list prices is a function of the time the property is listed but unsold calculated in days. In an aggressive search environment, sellers post various list prices for their home. However, once a buyer meets the asking price, negotiations presumably cease. An

active housing market results in an increased number of bids whereas a slower market has fewer bids. For this reason, while the time it takes to sell a property can often capture the inflexibility of buyers and sellers, it does not adequately capture market liquidity. Thus, market liquidity or market clearing ability is modeled as the ratio between sale and list prices.

The selling price reflects the accepted bid level and the list price reflects the offer the seller is willing to accept from the buyer. A lack of liquidity leads to a divergence between the transaction and list prices based on a preliminarily perceived value by the seller.[2] In this case, bid-ask "spread" is calculated as the ratio between the offer of the buyer (the sale price) and the ask price of the seller (the list price) and represents the cost of immediate execution. The bid-ask spread ratio is thus, a measure of the ease of sales transactions or market clearing ability. [3]

Following Diaz and Jerez (2013), the housing market price spread model includes the bid-ask price spread ratio of the property. A smaller list-sale price ratio, larger nominal price spread, indicates a higher level of illiquidity. Conversely, a larger price ratio, smaller nominal price spread, suggests a higher level of liquidity. An increasingly liquid housing market or larger price ratio, i.e. lower nominal spread, facilitates labor mobility and reduces the lock-in effect of homeownership.[4] Thus, housing price spread ratio is expected to have a negative relationship to unemployment.

[2] The analysis is interested in an appropriate proxy by which to measure liquidity rather than the specific determinants of liquidity in real estate.

[3] The analysis makes no assumption regarding the nominal price level of the buyer or the seller relative to the underlying value of the property. The paper focuses exclusively on the disparity between the bid price of the buyer and the ask price of seller, which represents the bid-ask spread and reflects the costs of the transaction.

[4] As the bid-ask spread increases or the price ratio decreases, labor mobility decreases and unemployment rises. The more illiquid the housing market, the more labor is immobile, increasing unemployment.

The bid price includes an implicit premium for the buyer and a discount for the seller for an instant purchase and consequently, it reflects the required concession the seller has to make for an instantaneous sale. Therefore, the spread between the bid and ask prices is a natural measure of liquidity.

III.2. The Model

This paper follows the efficiency wage theory developed by Shapiro and Stiglitz (1984) to explain involuntary unemployment. Accordingly, near full-employment, it is easier to find jobs for the unemployed, making the cost of being fired relatively low, and therefore shirking if working conditions are not optimal. In order to prevent shirking, employers have an incentive to pay their workers above-market wages.

Following Oswald (1996), the efficiency-wage model is:

(1) $$lnw = lnb + g(\phi U)$$

(2) $$\mu = c(w, r, p^0)$$

(3) $$b = b(\mu)$$

All variables are in real terms. The variables are defined as follows: *w* is the wage rate, *b(.)* is the government unemployment benefits rules, *g(.)* is the structure of the no shirking condition, ϕ is the search effectiveness parameter and also represents an inverse wage pressure, and *U* is the unemployment rate. The variable μ is the technology parameter, *c(.)* is the unit cost function, *r* is the rental rate on capital, and p^0 is the intermediate input cost.

Equation 1 is the no-shirking condition. It shows that at equilibrium, the efficiency wage increases in benefits from the government and search effectiveness, and decreases in the

unemployment rate. Equation 2 is the zero-profit condition, which assumes constant inputs. Equation 3 is the government benefits rule.

After substituting equation 2 and equation 3 into equation 1, the equilibrium unemployment rate is:

(4) $$U^* = U^*(\phi, r, p^0, b(\mu))$$

At equilibrium, unemployment decreases with an increase in ϕ, and increases in r, p^0, b. The response to r and p^0 comes from the zero-profit condition i.e., a rise in cost of production leads to a reduction in wages in order to restore zero profits, which leads to higher unemployment as wages are bid down. The response to ϕ is due to the no-shirking condition which is essentially an inverse wage pressure variable i.e., as the cost of job search is reduced, potential employees are more easily matched with employers, leading to lower unemployment. The response to b is due to government benefit rules and follows Carruth et al (1996): a rise in real unemployment benefits reduces the cost of joblessness, causing higher unemployment.

This paper assumes zero government benefits and price shocks. Thus, as Reid (1972) and Blau (1990) argue, the effectiveness of job-finding methods is the primary determinant of joblessness. This paper assumes that in the long-run U only responds to search effectiveness. This model also incorporates hysteresis following a widely-adopted approach included in Barro and Gordon (1981), Abraham and Katz (1984), and Staiger et al. (1997).

The model of equilibrium unemployment is:

(5) $$U_t^* = U^*(U_{t-1}, \phi)$$

Equation 5 implies that unemployment is positively affected by hysteresis ($U_u^* > 0$) and negatively impacted by search effectiveness ($U_\phi^* < 0$).

This paper proxies search effectiveness as the average days on markets for homes and the average spread price ratio between sale and list prices. Therefore, the empirical version of the model is written as:

$$U_{k,t} = \beta_0 + \beta_1 U_{k,t-1} + \beta_2 DOM_{k,t} + \beta_3 S_{k,t} + \sum_{i=1}^{4} \alpha_i T_{i,t} + \epsilon_{(k,t)} \quad (6)$$

where $U_{k,t}$ is state unemployment rate at time t in state k. $U_{k,t-1}$ is a lagged unemployment in state k. $DOM_{k,t}$ is the average days on market for homes in state k at time t. $P_{l,k,t}$ is the state list price and $P_{s,k,t}$ is the state sale price averaged across state k.[5] $S_{k,t}$ is the average price spread ratio between sale and list prices at time t in state k defined as $(P_{s,k,t}/P_{l,k,t})$. The estimation method is least-squares dummy variables (LSDV) with time dummies T.

The hypothesis advanced by the theoretical model is that β_3 is negative: a lower bid-ask price ratio (or larger nominal price spread indicating a more illiquid housing market) increases unemployment.

III.3. The Data

The data include DOM, list price, sale price and unemployment, as well as the generated housing price spread variable at the state level on an annual basis. Some transformation of the data is required.

[5] The proportional bid-ask spread for the market is created from the data on individual home sales compiled into annual averages.

III. 3. A. List and Sale Prices

Sale price reflects the accepted bid and the list price reflects the offer the seller is willing to accept from the buyer. The list and sale prices are compiled from Zillow Real Estate Market Reports gathered from Zillow.com for the period 2008-2012.[6] Data are provided at the metro level on a monthly basis. The analysis uses more than 5,000 metro level transaction data to construct state level averages for each year in the U.S. for 449 metropolitan areas and 38 states. Transaction data are compiled from individual asset level data matched to represent an average housing market unit sale,[7] using metro and state codes to designate the location of an individual house and where the transaction occurs, resulting in 190 annual transaction observations.[8] The list and sale prices are used to create the bid-ask spread ratio.

III.3.B. Price Spread

The price spread represents the cost of immediate execution and thus, measures the ease of sales transactions or market clearing ability. Price spread is calculated as the ratio between the offer price of the buyer (the sale price) and the ask price of the seller (the list price) rather than the simple difference between the nominal values. Price spread is comprised of list and sale prices across the U.S. reported at the metro level on a monthly basis from Zillow.com converted into annual averages.

[6] According to Zillow.com, Zillow accounts for 10-30% of market transactions in the U.S.

[7] For some countries, it is necessary to include a dissection of the housing market into three extensive segments including private renters, owners, and public-sector renters. However, this analysis focuses on homeowners so the rental market – both private and public - is purposefully excluded.

[8] The transaction data is reported on the metro level as opposed to the Metropolitan Statistical Area level (MSA).

1. After removing incomplete or missing data items from the available five-year time frame, yearly averages are constructed for both sales and list price data on the metro level from the reported monthly data. The annual metro averages are constructed from the monthly metro level data. Equal weights are given to each housing unit in a given metro area.

2. Using annual metro level data from 2008 until 2012, the sales and list data are matched to construct an annual ratio between the sale and list price. The ratio is computed as the ratio of the annual average sale price over the annual average list price.[9] The data is matched on the metro basis for each of the five years from 2008 until 2012.[10] For example, Aberdeen, Washington 2008 average sales price / Aberdeen, Washington 2008 average list price = Aberdeen, Washington average 2008 ratio between the sale and list price.

3. Once creating metro level spread data, state averages are constructed. The metro data are arranged by state; each state is represented by a series of metro level ratio data. The metro level data are aggregated into a state-level average series, where each metro is given equal weight in calculating the state average. While population is known, and might be used as a weight in a calculation of a weighted average, a preferred weight is the number of

[9] To better account for the expected diversity of housing and labor markets across the U.S., the ratio of the averages is used, as opposed to the average of the ratios. Liquidity observations diverging from the mean have much less of an impact in the latter calculation, potentially undermining the importance of the relationship being studied. The ratio of the averages better captures the impact of housing market liquidity rather than the average of the ratios which better articulates the average liquidity level in housing markets across the US.

[10] In some instances, list and sale prices may not be recorded in the same year. If this is the case, the transaction is recorded in the year of the sale. For example, if a house is listed in September 2009 but sold in April 2010, the transaction is booked as a 2010 transaction.

transactions and the number of transactions is unknown. It would be incorrect to assume a higher population predisposes a higher number of transactions. Thus, no assumption is made on the relative importance of metro areas within a state. For example, for Washington, the annual ratio data is averaged across Aberdeen, Bellingham, Bremerton, Centralia, Ellensburg, Kennewick, Longview, Moses Lake, Mount Vernon, Oak Harbor, Olympia, Portland, Seattle, Shelton, Spokane, Walla Walla, Wenatchee, and Yakima metro areas for each year over the five-year period from 2008 until 2012.

4. The data collected from Zillow neither represent all transactions in a given housing market, nor are transactions recorded by Zillow perfectly similar across all markets. In some cases, Zillow data may capture more high-end sales in one market and more low-end sales in another, or perhaps a larger share of sales in one metro area verses a smaller share in another. Thus, the data have clear imperfections; data sources for housing market transactions for the metro level are extremely limited.

III.3.C. Days on Market (DOM)

DOM is a function of the time a property is unsold measured in days. DOM data are reported by Zillow Real Estate Market Reports from 2008 until 2012. DOM data are reported at the state level on a monthly basis. They are used to construct annual averages.[11] Once the annual state DOM averages are constructed, the states are matched to the annual average state ratios between the list and sale price data.

[11] The time measurement is for each day of the month as opposed to business days of the month as housing market transactions are often conducted outside of normal business hours.

III.3.D. Unemployment Rate

The unemployment rate reflects the current market clearing ability for the regional labor markets within state boundaries. Unemployment data are readily available from the Bureau of Labor Statistics (BLS) which provides state level unemployment rates on an annual basis. The unemployment rate data are obtained over a longer period from 2007 until 2012 given the inclusion of lagged unemployment (see appendix). No transformation is required for the unemployment data.

Using Real Estate Market Reports from 2008 until 2012, state level transaction data are constructed across 38 states.[12] The remaining 12 states and the District of Columbia are omitted from the analysis due to lack of data.[13]

For the regional analysis, data are separated into four regions according to the designation of the Census Bureau for the West, South, Northeast and Midwest as shown in Table 9, Appendix A. Additionally, state data are ranked by the most and least populous states according to 2014 Census Bureau data, also shown in Table 9.

[12] Alabama, Arkansas, Arizona, California, Colorado, Connecticut, Delaware, Florida, Georgia, Hawaii, Iowa, Illinois, Indiana, Kentucky, Louisiana, Massachusetts, Maryland, Michigan, Minnesota, Missouri, North Carolina, Nebraska, New Hampshire, New Jersey, Nevada, New York, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Virginia, Washington, Wisconsin, West Virginia

[13] Zillow does not operate in all 50 states.

IV. Results

IV.1. State Results

The sample space consists of 38 state averages across five years for a total of 190 observations. Table 1, Appendix A, presents the sample statistics. State unemployment varies from 3.8 percent to 13.9 percent over the period 2008 until 2012. Days on market (DOM) vary by state from a low of 68 to 183 days with an average duration of 125 days. Housing price spread ratio averages 0.947 suggesting the sale price is often discounted by 5 percent relative to the list price. In particular circumstances, however, such as a bidding war or foreclosure sale, the final sale price exceeds the list price resulting in a price spread ratio above 1.0. The highest in Table 1 is 1.7 suggesting a home, for example, listed at $30,000 sells for $51,000. Table 2, Appendix A, depicts the sample statistics for the trimmed data set with observations with a price spread ratio greater than 1.2 removed. Table 3, Appendix A, presents the sample statistics using the alternative dependent variable DU calculated as the change in unemployment i.e., unemployment minus unemployment lagged.

Table 5, Appendix A, depicts the empirical results of the least-squares dummy variables (LSDV) regression of unemployment on housing price spread at the state level. This regression shows the impact of housing liquidity on unemployment.[14] Later, this chapter uses this liquidity measure and offers empirical results of the least-squares dummy variables (LSDV) regression at the regional level. The best determinant of the effect of regional housing markets on unemployment requires an appropriate proxy for liquidity. The paper uses the bid-ask spread ratio as a proxy for housing market liquidity.

[14] A direct Granger test answers the question, does housing price spread Granger-cause unemployment? An F-statistic of 3.241 means that the null hypothesis of no Granger-causality is rejected.

Intuitively, higher priced homes tend to be more illiquid, facing a smaller pool of potential buyers. Also, higher priced homes are associated with larger transaction costs and in general a longer period of time on the market. However, the stickiness of the market is an inability to connect buyers with sellers. Thus, independent of nominal price levels or buyer pools, the transaction ratio between list and sale price presents a true measure of market liquidity or market clearing ability.

A large change from the list price to sale price creates a negative market spread. This negative relationship suggests that as market prices adjust, sellers are slow to adapt to changing market conditions. Sellers may also be unwilling to adjust their list price but it is assumed that sellers are motivated to sell. However, the list price suggests the general flexibility of the seller and perception of market conditions. Sellers are generally more inflexible than buyers. Sellers are more willing to extend the transaction period and wait for an alternative, higher bid. This inability to adapt to the market equilibrium rate creates illiquidity in the market resulting in a wider nominal bid-ask price spread or smaller bid-ask ratio. This bid-ask spread ratio represents the level of market efficiency and general market liquidity or market clearing ability.

As expected, the inclusion of a lagged value of unemployment, the dependent variable (DV), suggests a substantial amount of serial correlation in unemployment. Unemployment at time t-1 enters into the equation with a coefficient of 0.9601.[15] Given the large value of the estimated coefficient on the lagged dependent variable, an alternative measure of unemployment, DU, defined as change in unemployment, is used to affirm the impact of housing price spread ratio on employment; see Table 6, Appendix A. The alternative dependent variable does not

[15] The results of the Skewness-Kurtosis (Jarque-Bera) Test found the prob>chi2 is 0.2316. Because the result is not small, not under 0.05, the null hypothesis of normality cannot be rejected and thus, conclude the residuals are normally distributed.

significantly affect the coefficient of either the housing price spread ratio or DOM. The alternative DV confirms the initial results reported in Table 5. As shown in Table 5, DOM enters the equation with a coefficient of 0.0065 and in Table 6, using the alternative DV, DOM enters the equation with a coefficient of 0.0062. Similarly, price spread ratio, as shown in Table 5, enters the equation with a coefficient of 0.4744. In Table 6, using the alternative DU dependent variable, price spread ratio enters the equation with a coefficient of 0.4191. In both instances the positive and relatively similar sized coefficients of DOM and housing price spread ratio suggests the use of unemployment as the DV, or the alternative DV calculated as the change in unemployment, does not materially impact the results of the analysis.

Furthermore, some states have relatively higher unemployment rates. Those states that start with a higher unemployment rate have potential for a larger nominal drop in unemployment. The equation assumes, however, that post-recession all states follow the same downward trend. The model uses fixed effects to confirm a universal trend across years.

Seemingly not robust, the housing price spread ratio is estimated with an unexpected positive sign, significant at the ten percent level. The price spread ratio of housing is 0.4744 suggesting that a lower market liquidity represented by a lower price ratio (or a higher nominal price spread) is not necessarily associated with higher unemployment. This result, however, does not hold for all regions of the country. In Chapter 2, the results determine that increased levels of market inefficiency or lower market liquidity have a negative impact on employment in particular regions. Intuitively, larger nominal price spreads suggest a less liquid housing market and a more stagnant labor turnover. Limited labor mobility reduces effective job search and raises unemployment.

In some cases, the price spread ratio value is noticeably large. A value of 1 suggests that the sale price matches the list price. A coefficient above 1 suggests that the sale price is above the listing price. While not uncommon for the sale price to exceed the asking price, according to the National Association of Realtors (NAR), a sale more than 20 percent above the original listing price is historically rare. The most common causes of a sale price far exceeding a list price is a bidding war for a property or foreclosure sale. In these instances, the list price is often intentionally set low with the expectation of multiple offers bidding up the sale price. While relatively well above the initial list price, in these instances, the accepted nominal sale price is often well below market value. In the aftermath of the Great Recession, foreclosure sales were not uncommon occurrences resulting in price ratios well above 1.2.

In accordance with National Association of Realtors (NAR) historical data, a price spread ratio above 1.2 is considered an outlier. Testing the legitimacy of the results, Table 7, Appendix A, presents the regression eliminating all values above 1.2. Rather than construct state averages with varying sets of metro areas in different years, which would create a heterogeneous comparison, transactions with price spreads above 1.2 are discarded within each metro area. The number of metro areas and thus, the number of state level observations remains unchanged at 190. Again, the reason for an above average price spread ratio is likely to be valid – reflecting a bidding war or a low list price relative to market activity – rather than the result of misreporting. However, an above trend ratio still may reflect underlying region specific variances that could skew the results.

Table 7 confirms that the results are little impacted by the inclusion or exclusion of outlying price ratio data. Unemployment lagged, DOM and price spread ratio enter the reduced data set equation with coefficients of 0.9628, 0.0065, and 0.4575, respectively. These results are

similar to the coefficients presented in Table 5. Lagged unemployment, DOM and price spread ratio enter the equation amid the unaltered full data set, with coefficients of 0.9601, 0.0065, and 0.4744, respectively.

DOM is significant and increases unemployment. Price spread also increases unemployment but is not significant on the national level. Intuitively, DOM is a time sensitive measure of the liquidity in the market. The longer a home is listed for sale without an accepted offer, the less liquid the market. DOM, however, is not necessarily a reflection of housing market liquidity. DOM, or the duration of a sales transaction, can be impacted by financing restrictions, closing procedural issues, realtor inspections or other reasons, independent of market clearing ability.[16] Furthermore, the insignificance of price spread is not the result of multicollinearity with a relatively low variance inflation factor.[17] Additionally, other factors in the economy represented by time dummies had an offsetting effect on the impact of housing on unemployment. This suggests that local market factors can offset the impact of an illiquid housing market on unemployment. In other words, the time dummies reflect the general decline in the unemployment rate due to the economic recovery.

The housing market recovery continues in the aftermath of the Great Recession across many of the metropolitan areas in the country. A large supply of new listings continues to fuel the housing recovery while a smaller supply of distressed properties lessens the downward pressure on prices. Often homes sell more quickly in rising price environments, and subsequently sell slower as home prices fall. The list price depends on market trends. Furthermore, the list price

[16] Industry standard accepts the use of a time measurement of sales activity along with a price measurement of transactions or, in this case, price spread ratio.

[17] The results of the variance inflation factor (VIF) test in Stata find the mean of VIF is 1.46. VIF values greater than 10 may warrant further examination. In this study, none of the VIFs appear problematic.

also reflects the assessed value of the property by the seller, the commission of the real-estate agent, the perceived bargaining power of the seller and the associated costs with selling and holding the housing asset.

IV.2. Regional Results

The data are across 449 metropolitan areas in the United States from 2008 until 2012. After dropping several observations for incomplete data there are 5,157 observations. The estimation method is a least square regression at the state level including dummy variables for years. The dependent variable is unemployment, and unemployment at time t-1 is included as a lagged independent variable.[18] The primary independent variable of focus is housing price spread ratio. Housing price spread is derived from the ratio between sale and list prices. Housing price spread ratio is a proxy for liquidity in each region at t. Tables 10 to 17, Appendix A, show the sample statistics and the estimation results for separate regions.

As anticipated, the inclusion of a lagged value of unemployment, the dependent variable (DV), captures a high degree of serial correlation in unemployment in the regional level as on the national level. Unemployment at time t-1 has a coefficient about 0.9 for all regional areas.

DOM is significant and increases unemployment. Price spread ratio also increases unemployment but is not significant on the national level which suggests that some regional labor markets are less sensitive to an illiquid housing market. DOM has an expected positive sign throughout the different regions. Intuitively, DOM is a time sensitive measure of liquidity in the market. DOM is the reciprocally liquidity measure. The longer a home is listed for sale without

[18] Building on the classic bid-ask price model from Oswald (1996), this analysis uses unemployment and lagged unemployment rather than the first difference of unemployment.

an accepted offer, the less liquid the market. Of the four regions, the DOM variable has the largest coefficient of 0.02 for the Midwestern region (see Table 17).

Consistent with the results on the national level, housing price spread ratio is not robust but estimated with different signs across regions suggesting that different regional labor markets react differently to local housing market conditions. In theory, the effect may differ across regions for a number of reasons. For example, in some states and regions of the country workers are accustomed to longer commutes (Oswald, 1999) and (Westerlund et al., 2003). An increased willingness to travel for employment reduces the impact of an illiquid local housing market on unemployment. Furthermore, some states have more diversified industry. Diverse employment opportunities may help to alleviate unemployment independent of housing market constraints.

A negative sign on price spread ratio indicates that lower market liquidity represented by a lower price ratio (or a higher nominal price spread) is associated with higher levels of unemployment. Intuitively, a lower price spread ratio points to a less liquid housing market and a more stagnant labor turnover. Limited labor mobility reduces effective job search and raises regional unemployment. In the South (Tables 12 and 13), a lack of liquidity in the housing market increases unemployment.[19]

In the West region (Tables 10 and 11), price spread ratio and unemployment move in the same direction.[20] The estimated coefficient for price spread is significant and equals to 4.58, indicating that a less liquid housing market is not associated with higher levels of unemployment. Although, in this case, despite the fact that the housing market does not clear, nearby labor markets

[19] The South is comprised of Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, North and South Carolina, Tennessee, Texas, Virginia, and West Virginia.

[20] The West is comprised of Arizona, California, Colorado, Hawaii, Nevada, Oklahoma, Oregon, and Washington.

in numerous large metropolitan cities or areas offer enough opportunity to limit the negative effect of a less liquid local housing market on regional unemployment. The Western region of the U.S. has also experienced an improvement in employment since the Great Recession due to general trends of the economy.

Nevertheless, there is no intuitive relationship for the Northeast and Midwest.[21] In the Northeast, the price spread ratio has a positive coefficient of 0.2713 (Table 15) and a coefficient of 0.025 in the Midwest (Table 17). In the Northeast and Midwest, a higher level of housing market illiquidity (smaller price spread ratio) is not associated with a higher level of unemployment.

Regional employment markets are quite diverse. Therefore, the effect of a less liquid housing market impacts regional labor markets differently. The differences arise from diversity in housing opportunities, job diversity, and geography. In particular, large populated states or regions with numerous large metropolitans are weakly impacted by a less liquid housing market. The West, for example, is dominated by large metropolitan areas across Arizona and California with several of the largest cities in the country within each state. By comparison, in the South, this is not the case. Rather, Southern states generally have one major city per state or in states such as Texas with multiple large cities the distance between each is high. This may explain the lack of significance of the DOM and price estimates in the South (Tables 12 and 13). The results for the Northeast and the Midwest regions are similar to the full sample results (Tables 14 to 17). An increase in DOM raises unemployment, though substantially more in the Midwest. Furthermore, the price spread ratio is insignificant although positive, for the Northeast and Midwest.

[21] The Northeast is comprised of Connecticut, Maine, New Hampshire, New Jersey, New York, Pennsylvania and Rhode Island. The Midwest is comprised of Iowa, Illinois, Indiana, Michigan, Minnesota, Missouri, Nebraska, Ohio and Wisconsin.

One concludes that different regions in the U.S., particularly those with access to a variety of metropolitan labor markets, are unevenly impacted by a less liquid housing market. The estimate of price spread ratio in the West suggests that differences in regional labor markets lead to different effects. The other three regional estimates for price spread are not significantly different from zero. Thus, while regional variances are expected, the differences motivate further research in this area. Housing market liquidity or market clearing ability unequally impacts labor markets across different regions in the United States.

Tables 18 and 19, Appendix A, show the unemployment equation across the top 10 most populous states.[22] As expected, given numerous large metropolitan labor markets, housing market liquidity does not have an effect on unemployment. Housing price spread ratio has a statically insignificant coefficient of 0.2828.

Tables 20 and 21, Appendix A, show the unemployment equation across the 10 least populous states.[23] As expected, regions that are less populated or have a lower number of highly populated metropolitan areas are more strongly impacted by a less liquid housing market. The housing price ratio has a statistically significant coefficient of -0.2621, suggesting that a smaller price ratio (larger nominal price spread) is associated with higher unemployment.

Previous literature such as Nickell (1998) and Barcelo (2006) conclude homeownership and unemployment have a positive relationship with an elasticity of 0.13 and 0.17, respectively. Oswald (1996) finds that a 10-percentage point rise in homeownership is associated with an increase of approximately 1.4 percentage points in joblessness. While the results of this analysis

[22] The most populous states include California, Florida, Georgia, Illinois, Michigan, North Carolina, New York, Ohio, Pennsylvania, and Texas.

[23] The least populous states include Arkansas, Delaware, Hawaii, Iowa, Nebraska, New Hampshire, Nevada, Oklahoma, Rhode Island, and West Virginia.

are less robust at the aggregate, they conceal important differences at the regional level: using transaction level data as a proxy for housing market liquidity, this analysis finds that illiquid housing markets restrict mobility and lead to higher unemployment in the South. In this sense, this approach complements the approach of the existing literature examining homeownership and unemployment.

V. Conclusion

Housing research often focuses on home prices as it relates to housing and labor markets. Following the bid-ask price model of Shapiro and Stiglitz (1984), this paper demonstrates that the spread between list and sale home prices reflects housing market liquidity. Empirical estimates indicate that housing market spreads are positively related to sales prices and transaction costs are negatively related to housing price momentum and activity levels. Housing market liquidity is a function of supply, demand and an operation that connects the two. With low housing market liquidity, sellers cannot sell and buyers cannot find a home. Essentially, housing liquidity represents the ability for buyers and sellers to trade in the market. The spread between the bid and ask prices for a housing market transaction is an alternative and well-defined proxy of housing market liquidity or market clearing ability, and general market liquidity.

The general hypothesis is that there exists a negative relationship between homeownership and unemployment. Homeownership acts as a restraint on the mobility of workers and thus, a catalyst for higher unemployment. Homeownership, however, does not properly measure the impediment since it is not the ownership of the asset itself, but the inability to sell the asset in an illiquid market. In other words, the liquidity of the asset relative to market conditions

affects labor mobility. The motivation is to present an alternative proxy for the effect of housing market liquidity on unemployment.

The appropriate instrument to measure housing market liquidity or market clearing ability is not well defined. This dissertation presents an alternative measure for housing market liquidity in order to analyze the effect of homeownership on unemployment across the United States. This paper proposes a housing market price spread variable as an appropriate measure of housing market liquidity. With a proper measure of housing market liquidity, this paper assesses the effects of local housing markets on unemployment. The statistical insignificance of most of the estimates for the price spread variable indicates that this measure is still not the best possible measure for housing market efficiency.

The results provide weak support for the expected directional relationship i.e., a more illiquid housing market reduces market liquidity or market clearing ability and raises unemployment. A homeowner unable to complete a sale faces higher hurdles for finding better employment opportunities. However, the estimated effect is statistically insignificant in most of the specifications examined, often with the wrong signs. One interesting exception is for small housing markets, where illiquidity does lead to higher unemployment.

The results are consistent with the view that an illiquid housing market impairs labor market activity and lead to higher unemployment. Given the prominence and importance that developed societies place on homeownership, it is vital to further investigate this area. A lack of liquidity restricts the housing activity and causes a negative impact on labor markets. This dissertation sparks the need for further investigation into the relationship between labor market liquidity and unemployment, perhaps through the use of an alternative data source including micro level household data.

Appendix A: Results Tables

Table 1: Base Sample Statistics

Sample Statistics						
Variable		Obs	Mean	Std.Dev	Min	Max
Unemployment		190	8.169	1.945	3.800	13.900
Unemployment Lagged		190	7.611	2.367	3.000	13.900
DOM		190	124.873	20.703	67.673	183.000
PriceSpread		190	0.947	0.098	0.764	1.697

Table 2 below displays the total number of observations, mean, standard deviation, minimum and maximum for each of the included variables: unemployment, DOM, and housing market price spread.

Table 2: Trimmed Sample Statistics[24]

Sample Statistics						
Variable		Obs	Mean	Std.Dev	Min	Max
Unemployment		190	8.169	1.945	3.800	13.900
Unemployment Lagged		190	7.611	2.367	3.000	13.900
DOM		190	124.873	20.703	67.673	183.000
PriceSpread		190	0.870	0.056	0.710	1.012

[24] At the metro level, prior to aggregation to state level, the data set is reduced to exclude outlier data defined as price spread ratio greater than 1.2.

Table 3: Sample Statistics Using the Change in Unemployment (DU)

Sample Statistics					
Variable	Obs	Mean	Std.Dev	Min	Max
Unemployment -Unemployment Lagged (DU)	190	0.559	1.663	-2.600	4.100
DOM	190	124.873	20.703	67.673	183.000
PriceSpread	190	0.947	0.098	0.764	1.697

Table 4 below displays the total number of observations, mean, standard deviation, minimum and maximum for each of the included variables: unemployment-unemployment lagged (DU), DOM and housing market price spread.

Table 4: Trimmed Sample Statistics Using the Change in Unemployment (DU)[25]

Sample Statistics					
Variable	Obs	Mean	Std.Dev	Min	Max
Unemployment -Unemployment Lagged (DU)	190	0.559	1.663	-2.600	4.100
DOM	190	124.873	20.703	67.673	183.000
PriceSpread	190	0.870	0.056	0.710	1.012

[25] At the metro level, prior to aggregation to state level, the data set is reduced to exclude outlier data defined as price spread ratio greater than 1.2.

Table 5: Least-Squares Dummy Variables (LSDV) Regression Results

Dependent variable: Unemployment in the United States

Regression Results						
Variable	Coef.	Std.Err	t	p>|t|	[95% Conf.	Interval]
Unemployment Lagged	0.9601	0.0298	32.1800	0.0000	0.9013	1.0190
DOM	0.0065	0.0025	2.5300	0.0120	0.0014	0.0115
PriceSpread	0.4744	0.5043	0.9400	0.3480	-0.5206	1.4694
Year2	0.0205	0.1713	0.1200	0.9050	-0.3175	0.3586
Year3	-2.8298	0.2108	-13.4200	0.0000	-3.2457	-2.4138
Year4	-3.1009	0.2009	-15.4400	0.0000	-3.4973	-2.7045
Year5	-2.7990	0.1932	-14.4900	0.0000	-3.1801	-2.4179
Constant	1.3485	0.6162	2.1900	0.0300	0.1326	2.5643
No.Obs.	190					
Adj. R-Squared	0.8808					

Table 6: Least-Squares Dummy Variables (LSDV) Regression Results Using DU

Dependent variable: The change in unemployment in the United States (DU)

Regression Results						
Variable	Coef.	Std.Err	t	p>|t|	[95% Conf.	Interval]
DOM	0.0062	0.0025	2.4300	0.0160	0.0012	0.0112
PriceSpread	0.4191	0.5037	0.8300	0.4060	-0.5746	1.4129
Year2	-0.0783	0.1549	-0.5100	0.6140	-0.3839	0.2273
Year3	-3.0220	0.1545	-19.5700	0.0000	-3.3268	-2.7173
Year4	-3.2723	0.1550	-21.1100	0.0000	-3.5781	-2.9664
Year5	-2.9405	0.1619	-18.1600	0.0000	-3.2600	-2.6211
Constant	1.2537	0.6135	2.0400	0.0420	0.0433	2.4641
No.Obs.	190					
Adj. R-Squared	0.8361					

Table 7: Least-Squares Dummy Variables (LSDV) Regression Results Using Trimmed Data Set (Price Ratio Data< 1.2)

Dependent variable: Unemployment in the United States

Regression Results						
Variable	Coef.	Std.Err	t	p>|t|	[95% Conf.	Interval]
Unemployment Lagged	0.9628	0.0298	32.3100	0.0000	0.9040	1.0216
DOM	0.0065	0.0026	2.5100	0.0130	0.0014	0.0117
PriceSpread	0.4575	0.9147	0.5000	0.6180	-1.3474	2.2624
Year2	0.0146	0.1720	0.0800	0.9330	-0.3248	0.3539
Year3	-2.8421	0.2109	-13.4700	0.0000	-3.2583	-2.4260
Year4	-3.1141	0.2008	-15.5100	0.0000	-3.5103	-2.7179
Year5	-2.8148	0.1928	-14.6000	0.0000	-3.1953	-2.4344
Constant	1.3794	0.9471	1.4600	0.1470	-0.4894	3.2482
No.Obs.	190					
Adj. R-Squared	0.8803					

Table 8: Trimmed Least-Squares Dummy Variables (LSDV) Regression Results Using DU

Dependent variable: The change in unemployment in the United States (DU) aggregated from state level data.[26]

Regression Results						
Variable	Coef.	Std.Err	t	p>|t|	[95% Conf.	Interval]
DOM	0.0063	0.0026	2.4200	0.0160	0.0012	0.0114
PriceSpread	0.4881	0.9158	0.5300	0.5950	-1.3188	2.2950
Year2	-0.0756	0.1563	-0.4800	0.6290	-0.3840	0.2328
Year3	-3.0215	0.1546	-19.5400	0.0000	-3.3265	-2.7164
Year4	-3.2735	0.1552	-21.0900	0.0000	-3.5797	-2.9673
Year5	-2.9459	0.1619	-18.1900	0.0000	-3.2654	-2.6264
Constant	1.2101	0.9388	1.2900	0.1990	-0.6421	3.0624
No.Obs.	190					
Adj. R-Squared	0.8357					

[26] At the metro level, prior to aggregation to state level, the price ratio data are restricted to values below 1.2.

Table 9: Regional Classification

West	South	Northeast	Midwest	Most Populous	Least Populous
Arizona	Alabama	Connecticut	Iowa	California	Arkansas
California	Arkansas	Maine	Illinois	Florida	Delaware
Colorado	Delaware	New Hampshire	Indiana	Georgia	Hawaii
Hawaii	Florida	New Jersey	Michigan	Illinois	Iowa
Nevada	Georgia	New York	Minnesota	Michigan	Nebraska
Oklahoma	Kentucky	Pennsylvania	Missouri	North Carolina	New Hampshire
Oregon	Louisiana	Rhode Island	Nebraska	New York	Nevada
Washington	Maryland		Ohio	Ohio	Oklahoma
	North Carolina		Wisconsin	Pennsylvania	Rhode Island
	South Carolina			Texas	West Virginia
	Tennessee				
	Texas				
	Virginia				
	West Virginia				

Table 10: West Region Sample Statistics

Sample Statistics					
Variable	Obs	Mean	Std.Dev	Min	Max
Unemployment	45	8.556	2.206	4.800	13.800
Unemployment Lagged	45	7.942	2.703	3.000	13.800
DOM	45	109.517	21.901	67.673	172.719
PriceSpread	45	0.942	0.085	0.822	1.267

Table 11: West Region Least-Squares Dummy Variables (LSDV) Regression Results

Dependent variable: Unemployment in the West Region[27]

Regression Results							
Variable	Coef.	Std.Err	t	p>|t|	[95% Conf. Interval]	
Unemployment Lagged	0.9052	0.0599	15.1000	0.0000	0.7837	1.0266
DOM	0.0045	0.0078	0.5800	0.5640	-0.0112	0.0203
PriceSpread	4.5826	1.4107	3.2500	0.0020	1.7241	7.4410
Year2	0.3811	0.3859	0.9900	0.3300	-0.4008	1.1629
Year3	-2.2279	0.4899	-4.5500	0.0000	-3.2205	-1.2354
Year4	-2.9089	0.4905	-5.9300	0.0000	-3.9028	-1.9150
Year5	-2.9975	0.5409	-5.5400	0.0000	-4.0936	-1.9015
Constant	-1.8924	1.8944	-1.0000	0.3240	-5.7308	1.9461
No.Obs.	45					
Adj. R-Squared	0.9152					

[27] The West is comprised of Arizona, California, Colorado, Hawaii, Nevada, Oklahoma, Oregon, and Washington.

Table 12: South Region Sample Statistics

Sample Statistics					
Variable	Obs	Mean	Std.Dev	Min	Max
Unemployment	65	8.249	1.617	5.300	11.900
Unemployment Lagged	65	7.652	2.218	3.300	11.900
DOM	65	128.791	15.337	89.923	161.708
PriceSpread	65	0.934	0.091	0.764	1.235

Table 13: South Region Least-Squares Dummy Variables (LSDV) Regression Results

Dependent variable: Unemployment in the South Region[28]

Regression Results							
Variable	Coef.	Std.Err	t	p>|t|	[95% Conf. Interval]	
Unemployment Lagged	0.9230	0.0631	14.6300	0.0000	0.7967	1.0493
DOM	-0.0005	0.0059	-0.0800	0.9370	-0.0123	0.0113
PriceSpread	-0.1948	0.9120	-0.2100	0.8320	-2.0211	1.6315
Year2	-0.1468	0.2917	-0.5000	0.6170	-0.7309	0.4374
Year3	-2.7716	0.4054	-6.8400	0.0000	-3.5834	-1.9598
Year4	-3.2537	0.3818	-8.5200	0.0000	-4.0182	-2.4892
Year5	-3.0297	0.3608	-8.4000	0.0000	-3.7522	-2.3072
Constant	3.2685	1.2384	2.6400	0.0110	0.7886	5.7483
No.Obs.	65					
Adj. R-Squared	0.8543					

[28] The South is comprised of Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, North and South Carolina, Tennessee, Texas, Virginia, and West Virginia.

Table 14: Northeast Region Sample Statistics

Sample Statistics					
Variable	Obs	Mean	Std.Dev	Min	Max
Unemployment	35	8.143	1.673	4.800	11.800
Unemployment Lagged	35	7.460	2.122	3.400	11.800
DOM	35	136.228	21.116	99.596	183.000
PriceSpread	35	0.903	0.030	0.829	0.965

Table 15: Northeast Region Least-Squares Dummy Variables (LSDV) Regression Results

Dependent variable: Unemployment in the Northeast Region[29]

Regression Results							
Variable	Coef.	Std.Err	t	p>|t|	[95% Conf. Interval]	
Unemployment Lagged	0.9776	0.0670	14.6000	0.0000	0.8401	1.1150
DOM	0.0098	0.0054	1.8300	0.0790	-0.0012	0.0208
PriceSpread	0.2713	3.1586	0.0900	0.9320	-6.2096	6.7522
Year2	0.1193	0.3275	0.3600	0.7180	-0.5526	0.7912
Year3	-2.8015	0.3693	-7.5900	0.0000	-3.5593	-2.0438
Year4	-2.8312	0.3558	-7.9600	0.0000	-3.5612	-2.1013
Year5	-2.1983	0.3401	-6.4600	0.0000	-2.8961	-1.5006
Constant	0.8150	2.9519	0.2800	0.7850	-5.2419	6.8718
No.Obs.	35					
Adj. R-Squared	0.9248					

[29] The Northeast is comprised of Connecticut, Maine, New Hampshire, New Jersey, New York, Pennsylvania and Rhode Island.

Table 16: Midwest Region Sample Statistics

Sample Statistics					
Variable	Obs	Mean	Std.Dev	Min	Max
Unemployment	45	7.689	2.242	3.800	13.900
Unemployment Lagged	45	7.336	2.434	3.000	13.900
DOM	45	125.738	17.535	97.308	174.917
PriceSpread	45	1.003	0.127	0.859	1.697

Table 17: Midwest Region Least-Squares Dummy Variables (LSDV) Regression Results

Dependent Variable: Unemployment in the Midwest Region[30]

Regression Results							
Variable	Coef.	Std.Err	t	p>|t|	[95% Conf. Interval]	
Unemployment Lagged	0.9166	0.0625	14.6800	0.0000	0.7900	1.0431
DOM	0.0182	0.0079	2.3100	0.0270	0.0022	0.0341
PriceSpread	0.0250	0.8976	0.0300	0.9780	-1.7937	1.8438
Year2	0.5973	0.3770	1.5800	0.1220	-0.1667	1.3612
Year3	-2.6030	0.4609	-5.6500	0.0000	-3.5368	-1.6691
Year4	-2.4571	0.4325	-5.6800	0.0000	-3.3335	-1.5807
Year5	-1.9342	0.4447	-4.3500	0.0000	-2.8353	-1.0332
Constant	-0.0634	1.2689	-0.0500	0.9600	-2.6344	2.5076
No.Obs.	45					
Adj. R-Squared	0.8899					

[30] The Midwest is comprised of Iowa, Illinois, Indiana, Michigan, Minnesota, Missouri, Nebraska, Ohio and Wisconsin.

Table 18: Top 10 Most Populous State Sample Statistics

Sample Statistics					
Variable	Obs	Mean	Std.Dev	Min	Max
Unemployment	50	9.142	1.647	6.000	13.900
Unemployment Lagged	50	8.546	2.270	4.400	13.900
DOM	50	126.671	24.451	67.673	183.000
PriceSpread	50	0.957	0.077	0.815	1.179

Table 19: Top 10 State Least-Squares Dummy Variables (LSDV) Regression Results

Dependent variable: Unemployment in the top 10 Most Populous States[31]

Regression Results						
Variable	Coef.	Std.Err	t	p>|t|	[95% Conf.	Interval]
Unemployment Lagged	0.9005	0.0839	10.7400	0.0000	0.7313	1.0697
DOM	0.0048	0.0043	1.1200	0.2710	-0.0039	0.0135
PriceSpread	0.2828	1.4241	0.2000	0.8440	-2.5911	3.1567
Year2	0.3187	0.4128	0.7700	0.4440	-0.5144	1.1519
Year3	-2.9110	0.5628	-5.1700	0.0000	-4.0468	-1.7753
Year4	-3.0415	0.5006	-6.0800	0.0000	-4.0517	-2.0313
Year5	-2.8942	0.4535	-6.3800	0.0000	-3.8093	-1.9791
Constant	2.2714	1.4828	1.5300	0.1330	-0.7210	5.2638
No.Obs.	50					
Adj. R-Squared	0.8278					

[31] The most populous states include California, Florida, Georgia, Illinois, Michigan, North Carolina, New York, Ohio, Pennsylvania, and Texas.

Table 20: Bottom 10 Least Populous State Sample Statistics

Sample Statistics					
Variable	Obs	Mean	Std.Dev	Min	Max
Unemployment	50	7.192	2.447	3.800	13.800
Unemployment Lagged	50	6.684	2.641	3.000	13.800
DOM	50	123.981	15.609	85.308	152.563
PriceSpread	50	0.918	0.094	0.764	1.267

Table 21: Bottom 10 State Least-Squares Dummy Variables (LSDV) Regression Results

Dependent variable: Unemployment in the 10 Least Populous States[32]

Regression Results						
Variable	Coef.	Std.Err	t	p>|t|	[95% Conf.	Interval]
Unemployment Lagged	0.9753	0.0521	18.7100	0.0000	0.8701	1.0804
DOM	0.0178	0.0084	2.1200	0.0400	0.0008	0.0348
PriceSpread	-0.2621	1.2569	2.0900	0.0430	0.0846	5.1575
Year2	0.4094	0.3674	1.1100	0.2710	-0.3320	1.1508
Year3	-2.1326	0.4050	-5.2700	0.0000	-2.9499	-1.3153
Year4	-2.3165	0.4072	-5.6900	0.0000	-3.1382	-1.4947
Year5	-2.0692	0.4259	-4.8600	0.0000	-2.9286	-1.2098
Constant	-2.7201	1.7796	-1.5300	0.1340	-6.3114	0.8713
No.Obs.	50					
Adj. R-Squared	0.8996					

[32] The least populous states include Arkansas, Delaware, Hawaii, Iowa, Nebraska, New Hampshire, Nevada, Oklahoma, Rhode Island, and West Virginia.

Appendix B: Sample 2012 state data

No.	State	DOM	Sales/List Price Spread	Unemployment Rate
1	AL	132.7885	0.8599	6.90
2	AR	122.0577	0.7926	7.20
3	AZ	81.5577	0.8497	8.00
4	CA	67.6731	0.9206	9.50
5	CO	74.6346	0.8903	7.60
6	CT	132.7500	0.8812	8.30
7	DE	116.9135	0.9013	7.00
8	FL	110.4038	0.8023	8.00
9	GA	110.7115	0.8122	8.70
10	HI	88.5385	0.7986	5.30
11	IA	113.8558	0.9060	4.90
12	IL	119.2308	0.9253	8.70
13	IN	119.8846	0.8136	8.40
14	KY	110.8462	0.9563	8.00
15	LA	115.3077	0.9863	5.70
16	MA	99.5962	0.8824	6.70
17	MD	117.3462	0.8489	6.70
18	MI	108.5577	0.9830	9.00
19	MN	107.8654	0.9349	5.50
20	MO	100.3846	0.9951	6.60
21	NC	116.5769	0.8722	9.40
22	NE	97.3077	1.0130	3.80
23	NH	119.5577	0.8799	5.70
24	NJ	151.4615	0.8611	9.60
25	NV	85.3077	0.9136	10.00
26	NY	169.3462	1.0656	8.20
27	OK	103.4615	0.8245	5.10
28	OR	91.2692	0.8331	8.40
29	PA	123.8269	0.8253	8.10
30	RI	127.9615	0.9300	10.00
31	SC	132.8654	0.8425	8.60
32	TN	112.5481	0.8269	7.70
33	TX	77.9423	0.8731	6.30
34	VA	89.9231	0.8586	5.70
35	WA	86.9423	0.9120	7.60
36	WI	122.8654	0.9456	6.70
37	WV	127.8365	0.9382	7.50

Appendix C: Sample 2012 regional metro data

No.	State	Metro Region	DOM	Sales/List Price Spread	Unemployment Rate
1	AL	Albertville	132.7885	0.7546	6.90
2	AL	Auburn	132.7885	0.9260	6.90
3	AL	Birmingham	132.7885	0.9173	6.90
4	AL	Daphne	132.7885	0.8181	6.90
5	AL	Huntsville	132.7885	0.8734	6.90
6	AL	Mobile	132.7885	0.8659	6.90
7	AL	Montgomery	132.7885	0.8633	6.90
8	AL	Tuscaloosa	132.7885	0.8969	6.90
9	AR	Batesville	122.0577	0.6490	7.20
10	AR	Camden	122.0577	0.7346	7.20
11	AR	El Dorado	122.0577	0.8451	7.20
12	AR	Fayetteville	122.0577	0.7852	7.20
13	AR	Fort Smith	122.0577	0.8103	7.20
14	AR	Harrison	122.0577	0.6704	7.20
15	AR	Hot Springs	122.0577	0.7504	7.20
16	AR	Jonesboro	122.0577	0.8531	7.20
17	AR	Little Rock	122.0577	0.8641	7.20
18	AR	Memphis	122.0577	0.9217	7.20
19	AR	Mountain Home	122.0577	0.7163	7.20
20	AR	Paragould	122.0577	0.9109	7.20
21	AR	Pine Bluff	122.0577	0.7438	7.20
22	AR	Russellville	122.0577	0.7897	7.20
23	AR	Searcy	122.0577	0.8861	7.20
24	AR	Texarkana	122.0577	0.7050	7.20
25	AZ	Flagstaff	81.5577	0.7333	8.00
26	AZ	Lake Havasu City	81.5577	0.8650	8.00
27	AZ	Nogales	81.5577	0.9675	8.00
28	AZ	Payson	81.5577	0.7478	8.00
29	AZ	Phoenix	81.5577	0.9211	8.00
30	AZ	Prescott	81.5577	0.8657	8.00
31	AZ	Show Low	81.5577	0.8298	8.00
32	AZ	Sierra Vista	81.5577	0.8775	8.00
33	AZ	Tucson	81.5577	0.9460	8.00
34	AZ	Yuma	81.5577	0.9199	8.00
35	CA	Bakersfield	67.6731	0.9695	9.50
36	CA	Chico	67.6731	0.9485	9.50
37	CA	Crescent City	67.6731	0.8721	9.50
38	CA	El Centro	67.6731	0.9958	9.50
39	CA	Eureka	67.6731	0.9106	9.50

No.	State	Metro Region	DOM	Sales/List Price Spread	Unemployment Rate
41	CA	Los Angeles	67.6731	0.9643	9.50
42	CA	Madera	67.6731	1.0539	9.50
43	CA	Modesto	67.6731	0.9938	9.50
44	CA	Napa	67.6731	0.7760	9.50
45	CA	Phoenix Lake	67.6731	0.8235	9.50
46	CA	Red Bluff	67.6731	0.8599	9.50
47	CA	Redding	67.6731	0.9285	9.50
48	CA	Riverside	67.6731	0.9275	9.50
49	CA	Sacramento	67.6731	0.9626	9.50
50	CA	Salinas	67.6731	0.8225	9.50
51	CA	San Diego	67.6731	0.9343	9.50
52	CA	San Francisco	67.6731	0.9553	9.50
53	CA	San Jose	67.6731	0.9441	9.50
54	CA	San Luis Obispo	67.6731	0.8723	9.50
55	CA	Santa Barbara	67.6731	0.8356	9.50
56	CA	Santa Cruz	67.6731	0.9196	9.50
57	CA	Santa Rosa	67.6731	0.8822	9.50
58	CA	Stockton	67.6731	0.9863	9.50
59	CA	Susanville	67.6731	0.8572	9.50
60	CA	Truckee	67.6731	0.8839	9.50
61	CA	Ukiah	67.6731	0.9393	9.50
62	CA	Vallejo	67.6731	0.9533	9.50
63	CA	Ventura	67.6731	0.8828	9.50
64	CA	Visalia	67.6731	0.9675	9.50
65	CA	Yuba City	67.6731	1.0003	9.50
66	CO	Boulder	74.6346	0.8465	7.60
67	CO	Canon City	74.6346	0.8686	7.60
68	CO	Colorado Springs	74.6346	0.9357	7.60
69	CO	Denver	74.6346	0.9468	7.60
70	CO	Durango	74.6346	0.9469	7.60
71	CO	Edwards	74.6346	0.6213	7.60
72	CO	Fort Collins	74.6346	0.8747	7.60
73	CO	Fort Morgan	74.6346	1.0245	7.60
74	CO	Grand Junction	74.6346	0.9318	7.60
75	CO	Greeley	74.6346	0.9396	7.60
76	CO	Pueblo	74.6346	0.8954	7.60
77	CO	Sterling	74.6346	0.9713	7.60
78	CT	Hartford	132.7500	0.9473	8.30
79	CT	New Haven	132.7500	0.9144	8.30
80	CT	New London	132.7500	0.8800	8.30
81	CT	Stamford	132.7500	0.8820	8.30

No.	State	Metro Region	DOM	Sales/List Price Spread	Unemployment Rate
83	DE	Dover	116.9135	0.8912	7.00
84	DE	Philadelphia	116.9135	0.9320	7.00
85	FL	Arcadia	110.4038	0.7134	8.00
86	FL	Clewiston	110.4038	0.5488	8.00
87	FL	Daytona Beach	110.4038	0.8295	8.00
88	FL	Destin	110.4038	0.8364	8.00
89	FL	Fort Myers	110.4038	0.8193	8.00
90	FL	Gainesville	110.4038	0.8807	8.00
91	FL	Homosassa Springs	110.4038	0.7883	8.00
92	FL	Jacksonville	110.4038	0.8339	8.00
93	FL	Key West	110.4038	0.7317	8.00
94	FL	Lake City	110.4038	0.8221	8.00
95	FL	Lakeland	110.4038	0.8471	8.00
96	FL	Melbourne	110.4038	0.8847	8.00
97	FL	Miami-Fort Lauderdale	110.4038	0.7522	8.00
98	FL	Naples	110.4038	0.7354	8.00
99	FL	Ocala	110.4038	0.8192	8.00
100	FL	Orlando	110.4038	0.8482	8.00
101	FL	Palatka	110.4038	0.2937	8.00
102	FL	Palm Coast	110.4038	0.7711	8.00
103	FL	Panama City	110.4038	0.9137	8.00
104	FL	Pensacola	110.4038	0.8204	8.00
105	FL	Port St. Lucie	110.4038	0.8161	8.00
106	FL	Punta Gorda	110.4038	0.7260	8.00
107	FL	Sarasota	110.4038	0.8225	8.00
108	FL	Sebring	110.4038	0.9694	8.00
109	FL	Tallahassee	110.4038	0.8964	8.00
110	FL	Tampa	110.4038	0.8269	8.00
111	FL	The Villages	110.4038	0.8599	8.00
112	FL	Vero Beach	110.4038	0.7818	8.00
113	GA	Albany	110.7115	0.8676	8.70
114	GA	Athens	110.7115	0.8258	8.70
115	GA	Atlanta	110.7115	0.9356	8.70
116	GA	Augusta	110.7115	0.7924	8.70
117	GA	Brunswick	110.7115	0.8661	8.70
118	GA	Cedartown	110.7115	0.8761	8.70
119	GA	Chattanooga	110.7115	0.8339	8.70
120	GA	Columbus	110.7115	0.8138	8.70
121	GA	Cornelia	110.7115	0.5046	8.70
122	GA	Dalton	110.7115	0.7648	8.70
123	GA	Fort Valley	110.7115	0.9097	8.70

No.	State	Metro Region	DOM	Sales/List Price Spread	Unemployment Rate
125	GA	LaGrange	110.7115	0.9608	8.70
126	GA	Macon	110.7115	0.8594	8.70
127	GA	Milledgeville	110.7115	0.6333	8.70
128	GA	Savannah	110.7115	0.8271	8.70
129	GA	Thomaston	110.7115	0.5359	8.70
130	GA	Thomasville	110.7115	0.7364	8.70
131	GA	Valdosta	110.7115	0.9334	8.70
132	GA	Warner Robins	110.7115	0.8384	8.70
133	HI	Hilo	88.5385	0.7372	5.30
134	HI	Honolulu	88.5385	0.9116	5.30
135	HI	Kahului	88.5385	0.8224	5.30
136	IA	Cedar Rapids	113.8558	0.9437	4.90
137	IA	Davenport	113.8558	0.7755	4.90
138	IA	Des Moines	113.8558	0.9107	4.90
139	IA	Dubuque	113.8558	0.8803	4.90
140	IA	Iowa City	113.8558	0.8777	4.90
141	IA	Omaha	113.8558	0.9953	4.90
142	IA	Waterloo	113.8558	0.8642	4.90
143	IL	Bloomington	119.2308	0.9457	8.70
144	IL	Champaign-Urbana	119.2308	1.0281	8.70
145	IL	Chicago	119.2308	0.9492	8.70
146	IL	Davenport	119.2308	0.9656	8.70
147	IL	Marion	119.2308	0.8445	8.70
148	IL	Mount Vernon	119.2308	0.9456	8.70
149	IL	Peoria	119.2308	0.9217	8.70
150	IL	Rockford	119.2308	0.9937	8.70
151	IL	Springfield	119.2308	0.9527	8.70
152	IL	St. Louis	119.2308	0.9780	8.70
153	IL	Sterling	119.2308	0.7649	8.70
154	IN	Chicago	119.8846	0.9820	8.40
155	IN	Cincinnati	119.8846	0.7583	8.40
156	IN	Greensburg	119.8846	0.7113	8.40
157	KY	Cincinnati	110.8462	0.9377	8.00
158	KY	Lexington	110.8462	0.8714	8.00
159	KY	Louisville/Jefferson County	110.8462	0.9974	8.00
160	LA	New Orleans	115.3077	0.9890	5.70
161	MA	Boston	99.5962	0.9249	6.70
162	MA	Cape Cod	99.5962	0.8481	6.70
163	MA	Pittsfield	99.5962	0.8170	6.70
164	MA	Providence	99.5962	0.9166	6.70
165	MA	Springfield	99.5962	0.9192	6.70

No.	State	Metro Region	DOM	Sales/List Price Spread	Unemployment Rate
167	MD	Baltimore	117.3462	0.9189	6.70
168	MD	Cambridge	117.3462	0.7348	6.70
169	MD	Cumberland	117.3462	0.7022	6.70
170	MD	Easton	117.3462	0.7903	6.70
171	MD	Hagerstown	117.3462	0.9199	6.70
172	MD	Lexington Park	117.3462	0.9414	6.70
173	MD	Ocean Pines	117.3462	0.8255	6.70
174	MD	Philadelphia	117.3462	0.8349	6.70
175	MD	Salisbury	117.3462	0.8689	6.70
176	MD	Washington	117.3462	0.9245	6.70
177	MI	Adrian	108.5577	0.8744	9.00
178	MI	Allegan	108.5577	0.9244	9.00
179	MI	Ann Arbor	108.5577	0.9564	9.00
180	MI	Battle Creek	108.5577	1.0263	9.00
181	MI	Bay City	108.5577	1.1302	9.00
182	MI	Detroit	108.5577	0.9584	9.00
183	MI	Flint	108.5577	1.0018	9.00
184	MI	Grand Rapids	108.5577	0.9327	9.00
185	MI	Holland	108.5577	0.8555	9.00
186	MI	Jackson	108.5577	0.8848	9.00
187	MI	Kalamazoo	108.5577	0.9325	9.00
188	MI	Lansing	108.5577	0.9596	9.00
189	MI	Midland	108.5577	1.0611	9.00
190	MI	Monroe	108.5577	1.1231	9.00
191	MI	Muskegon	108.5577	1.0048	9.00
192	MI	Niles	108.5577	0.9407	9.00
193	MI	Saginaw	108.5577	0.9360	9.00
194	MI	Sturgis	108.5577	0.8380	9.00
195	MI	Traverse City	108.5577	0.7520	9.00
196	MN	Duluth	107.8654	0.8840	5.50
197	MN	Fargo	107.8654	0.9462	5.50
198	MN	Faribault	107.8654	0.8717	5.50
199	MN	Minneapolis-St Paul	107.8654	0.9539	5.50
200	MN	Red Wing	107.8654	1.0898	5.50
201	MN	Rochester	107.8654	0.9780	5.50
202	MN	St. Cloud	107.8654	0.9261	5.50
203	MN	Winona	107.8654	0.8607	5.50
204	MO	St. Louis	100.3846	0.9912	6.60
205	NC	Albemarle	116.5769	0.7038	9.40
206	NC	Asheville	116.5769	0.7694	9.40
207	NC	Boone	116.5769	0.6927	9.40

No.	State	Metro Region	DOM	Sales/List Price Spread	Unemployment Rate
209	NC	Charlotte	116.5769	0.9385	9.40
210	NC	Dunn	116.5769	0.8589	9.40
211	NC	Durham	116.5769	0.8875	9.40
212	NC	Fayetteville	116.5769	0.8752	9.40
213	NC	Forest City	116.5769	0.6389	9.40
214	NC	Greensboro	116.5769	0.9119	9.40
215	NC	Greenville	116.5769	1.0475	9.40
216	NC	Hickory	116.5769	0.7807	9.40
217	NC	Jacksonville	116.5769	0.8859	9.40
218	NC	Kill Devil Hills	116.5769	0.8074	9.40
219	NC	Morehead City	116.5769	0.8054	9.40
220	NC	New Bern	116.5769	0.8891	9.40
221	NC	Raleigh	116.5769	0.8789	9.40
222	NC	Rocky Mount	116.5769	0.9806	9.40
223	NC	Salisbury	116.5769	0.9356	9.40
224	NC	Sanford	116.5769	0.8793	9.40
225	NC	Shelby	116.5769	0.8045	9.40
226	NC	Southern Pines	116.5769	0.8489	9.40
227	NC	Statesville	116.5769	0.7971	9.40
228	NC	Thomasville	116.5769	0.7560	9.40
229	NC	Wilmington	116.5769	0.9008	9.40
230	NC	Winston-Salem	116.5769	0.8947	9.40
231	NE	Lincoln	97.3077	0.9838	3.80
232	NE	North Platte	97.3077	0.8973	3.80
233	NE	Omaha	97.3077	0.9500	3.80
234	NH	Boston	119.5577	0.8796	5.70
235	NH	Concord	119.5577	0.8551	5.70
236	NH	Laconia	119.5577	0.7611	5.70
237	NH	Lebanon	119.5577	0.8739	5.70
238	NH	Manchester	119.5577	0.9142	5.70
239	NJ	Allentown	151.4615	0.8679	9.60
240	NJ	Atlantic City	151.4615	0.8489	9.60
241	NJ	New York	151.4615	0.8917	9.60
242	NJ	Ocean City	151.4615	0.7824	9.60
243	NJ	Philadelphia	151.4615	0.9363	9.60
244	NJ	Trenton	151.4615	0.8838	9.60
245	NJ	Vineland	151.4615	0.8664	9.60
246	NV	Carson City	85.3077	0.8146	10.00
247	NV	Elko	85.3077	0.9441	10.00
248	NV	Fallon	85.3077	0.9678	10.00
249	NV	Fernley	85.3077	0.9386	10.00

No.	State	Metro Region	DOM	Sales/List Price Spread	Unemployment Rate
251	NV	Las Vegas	85.3077	0.9420	10.00
252	NV	Pahrump	85.3077	1.1198	10.00
253	NV	Reno	85.3077	0.8775	10.00
254	NY	Albany	169.3462	0.8818	8.20
255	NY	Auburn	169.3462	0.7213	8.20
256	NY	Batavia	169.3462	1.0899	8.20
257	NY	Binghamton	169.3462	0.9139	8.20
258	NY	Buffalo	169.3462	0.8875	8.20
259	NY	Corning	169.3462	0.8688	8.20
260	NY	Cortland	169.3462	0.9324	8.20
261	NY	Elmira	169.3462	0.9421	8.20
262	NY	Glens Falls	169.3462	0.8065	8.20
263	NY	Gloversville	169.3462	0.6888	8.20
264	NY	Ithaca	169.3462	0.8088	8.20
265	NY	Jamestown	169.3462	0.7344	8.20
266	NY	Kingston	169.3462	0.8607	8.20
267	NY	New York	169.3462	0.8783	8.20
268	NY	Ogdensburg	169.3462	0.8749	8.20
269	NY	Olean	169.3462	0.7274	8.20
270	NY	Oneonta	169.3462	0.9492	8.20
271	NY	Plattsburgh	169.3462	0.7828	8.20
272	NY	Poughkeepsie	169.3462	0.9044	8.20
273	NY	Rochester	169.3462	0.9273	8.20
274	NY	Syracuse	169.3462	0.9014	8.20
275	NY	Utica	169.3462	0.8586	8.20
276	NY	Watertown	169.3462	0.8869	8.20
277	OH	Akron	112.9712	0.9068	6.80
278	OH	Ashtabula	112.9712	0.8305	6.80
279	OH	Bellefontaine	112.9712	1.0811	6.80
280	OH	Bucyrus	112.9712	1.0354	6.80
281	OH	Canton	112.9712	0.8946	6.80
282	OH	Chillicothe	112.9712	0.8501	6.80
283	OH	Cincinnati	112.9712	0.9542	6.80
284	OH	Cleveland	112.9712	0.9367	6.80
285	OH	Columbus	112.9712	0.9575	6.80
286	OH	Dayton	112.9712	0.9656	6.80
287	OH	Defiance	112.9712	1.1242	6.80
288	OH	East Liverpool	112.9712	0.8484	6.80
289	OH	Findlay	112.9712	0.8416	6.80
290	OH	Fremont	112.9712	1.1391	6.80
291	OH	Huntington	112.9712	0.6517	6.80

No.	State	Metro Region	DOM	Sales/List Price Spread	Unemployment Rate
293	OH	New Philadelphia	112.9712	0.8327	6.80
294	OH	Norwalk	112.9712	0.9357	6.80
295	OH	Parkersburg	112.9712	0.7725	6.80
296	OH	Portsmouth	112.9712	0.8218	6.80
297	OH	Sandusky	112.9712	0.8169	6.80
298	OH	Sidney	112.9712	0.9558	6.80
299	OH	Springfield	112.9712	0.8842	6.80
300	OH	Toledo	112.9712	0.9113	6.80
301	OH	Urbana	112.9712	1.0584	6.80
302	OH	Van Wert	112.9712	0.9252	6.80
303	OH	Wapakoneta	112.9712	0.9700	6.80
304	OH	Wheeling	112.9712	0.7537	6.80
305	OH	Wilmington	112.9712	1.0536	6.80
306	OH	Wooster	112.9712	0.9386	6.80
307	OH	Youngstown	112.9712	0.8728	6.80
308	OH	Zanesville	112.9712	0.8417	6.80
309	OK	Ada	103.4615	0.7888	5.10
310	OK	Altus	103.4615	0.5856	5.10
311	OK	Ardmore	103.4615	0.7973	5.10
312	OK	Bartlesville	103.4615	0.7941	5.10
313	OK	Duncan	103.4615	0.7160	5.10
314	OK	Durant	103.4615	0.8646	5.10
315	OK	Elk City	103.4615	0.7078	5.10
316	OK	Enid	103.4615	0.8044	5.10
317	OK	Fort Smith	103.4615	0.6671	5.10
318	OK	Lawton	103.4615	0.8266	5.10
319	OK	McAlester	103.4615	0.7906	5.10
320	OK	Miami	103.4615	0.6132	5.10
321	OK	Muskogee	103.4615	1.0747	5.10
322	OK	Oklahoma City	103.4615	0.8834	5.10
323	OK	Ponca City	103.4615	0.8881	5.10
324	OK	Shawnee	103.4615	0.9292	5.10
325	OK	Stillwater	103.4615	0.9388	5.10
326	OK	Tahlequah	103.4615	0.8373	5.10
327	OK	Tulsa	103.4615	0.8931	5.10
328	OR	Albany	91.2692	0.9225	8.40
329	OR	Astoria	91.2692	0.7674	8.40
330	OR	Bend	91.2692	0.7084	8.40
331	OR	Coos Bay	91.2692	0.7900	8.40
332	OR	Corvallis	91.2692	0.8831	8.40
333	OR	Eugene	91.2692	0.9382	8.40

No.	State	Metro Region	DOM	Sales/List Price Spread	Unemployment Rate
335	OR	Hood River	91.2692	0.8373	8.40
336	OR	Klamath Falls	91.2692	0.7847	8.40
337	OR	La Grande	91.2692	0.9143	8.40
338	OR	Medford	91.2692	0.9149	8.40
339	OR	Pendleton	91.2692	0.8148	8.40
340	OR	Portland	91.2692	0.9527	8.40
341	OR	Prineville	91.2692	0.6482	8.40
342	OR	Roseburg	91.2692	0.8278	8.40
343	OR	Salem	91.2692	0.8853	8.40
344	PA	Allentown	123.8269	0.8999	8.10
345	PA	Altoona	123.8269	0.8480	8.10
346	PA	Bloomsburg	123.8269	0.7059	8.10
347	PA	DuBois	123.8269	0.5254	8.10
348	PA	East Stroudsburg	123.8269	0.8476	8.10
349	PA	Erie	123.8269	0.9571	8.10
350	PA	Harrisburg	123.8269	0.9171	8.10
351	PA	Indiana	123.8269	0.9392	8.10
352	PA	Johnstown	123.8269	0.8069	8.10
353	PA	Lancaster	123.8269	0.8843	8.10
354	PA	Lebanon	123.8269	0.8271	8.10
355	PA	Oil City	123.8269	0.7474	8.10
356	PA	Philadelphia	123.8269	0.8711	8.10
357	PA	Pittsburgh	123.8269	0.8377	8.10
358	PA	Pottsville	123.8269	0.9214	8.10
359	PA	Reading	123.8269	0.8618	8.10
360	PA	Scranton	123.8269	0.8580	8.10
361	PA	State College	123.8269	0.8763	8.10
362	PA	Warren	123.8269	0.6681	8.10
363	PA	Williamsport	123.8269	0.7248	8.10
364	PA	York	123.8269	0.8937	8.10
365	PA	Youngstown	123.8269	0.7846	8.10
366	RI	Providence	127.9615	0.9344	10.00
367	SC	Anderson	132.8654	0.8076	8.60
368	SC	Augusta	132.8654	0.7501	8.60
369	SC	Charleston	132.8654	0.8770	8.60
370	SC	Charlotte	132.8654	0.9023	8.60
371	SC	Columbia	132.8654	0.9191	8.60
372	SC	Florence	132.8654	0.8592	8.60
373	SC	Georgetown	132.8654	0.7424	8.60
374	SC	Greenville	132.8654	0.8486	8.60
375	SC	Hilton Head Island	132.8654	0.8000	8.60

No.	State	Metro Region	DOM	Sales/List Price Spread	Unemployment Rate
377	SC	Myrtle Beach	132.8654	0.8549	8.60
378	SC	Spartanburg	132.8654	0.8805	8.60
379	SC	Sumter	132.8654	0.8675	8.60
380	TN	Chattanooga	112.5481	0.8728	7.70
381	TN	Clarksville	112.5481	0.8311	7.70
382	TN	Cleveland	112.5481	0.8553	7.70
383	TN	Columbia	112.5481	0.8568	7.70
384	TN	Crossville	112.5481	0.6693	7.70
385	TN	Harriman	112.5481	0.6236	7.70
386	TN	Humboldt	112.5481	0.7289	7.70
387	TN	Jackson	112.5481	0.8925	7.70
388	TN	Johnson City	112.5481	0.8459	7.70
389	TN	Kingsport	112.5481	0.7625	7.70
390	TN	Knoxville	112.5481	0.7906	7.70
391	TN	La Follette	112.5481	0.4697	7.70
392	TN	McMinnville	112.5481	0.5734	7.70
393	TN	Memphis	112.5481	0.9223	7.70
394	TN	Morristown	112.5481	0.7241	7.70
395	TN	Nashville	112.5481	0.8992	7.70
396	TN	Newport	112.5481	0.7680	7.70
397	TN	Sevierville	112.5481	0.7792	7.70
398	TN	Tullahoma	112.5481	0.6558	7.70
399	TX	Dallas-Fort Worth	77.9423	0.8836	6.30
400	VA	Charlottesville	89.9231	0.9233	5.70
401	VA	Culpeper	89.9231	0.7664	5.70
402	VA	Danville	89.9231	0.8229	5.70
403	VA	Harrisonburg	89.9231	0.8906	5.70
404	VA	Kingsport	89.9231	0.7498	5.70
405	VA	Lynchburg	89.9231	0.7559	5.70
406	VA	Richmond	89.9231	0.9103	5.70
407	VA	Roanoke	89.9231	0.8388	5.70
408	VA	Virginia Beach	89.9231	0.8894	5.70
409	VA	Washington	89.9231	0.8703	5.70
410	VA	Winchester	89.9231	0.9944	5.70
411	WA	Aberdeen	86.9423	0.8589	7.60
412	WA	Bellingham	86.9423	0.9508	7.60
413	WA	Bremerton	86.9423	0.9865	7.60
414	WA	Centralia	86.9423	0.9192	7.60
415	WA	Ellensburg	86.9423	0.8719	7.60
416	WA	Kennewick	86.9423	0.8194	7.60
417	WA	Longview	86.9423	0.9541	7.60

No.	State	Metro Region	DOM	Sales/List Price Spread	Unemployment Rate
419	WA	Mount Vernon	86.9423	0.8437	7.60
420	WA	Oak Harbor	86.9423	0.9101	7.60
421	WA	Olympia	86.9423	0.9654	7.60
422	WA	Portland	86.9423	0.9068	7.60
423	WA	Seattle	86.9423	0.9512	7.60
424	WA	Shelton	86.9423	0.9513	7.60
425	WA	Spokane	86.9423	0.9509	7.60
426	WA	Walla Walla	86.9423	0.9342	7.60
427	WA	Wenatchee	86.9423	0.9720	7.60
428	WA	Yakima	86.9423	0.8344	7.60
429	WI	Appleton	122.8654	0.9576	6.70
430	WI	Beaver Dam	122.8654	0.9313	6.70
431	WI	Chicago	122.8654	0.9737	6.70
432	WI	Eau Claire	122.8654	0.9186	6.70
433	WI	Fond du Lac	122.8654	0.9156	6.70
434	WI	Green Bay	122.8654	0.9872	6.70
435	WI	Janesville	122.8654	0.9951	6.70
436	WI	La Crosse	122.8654	0.9021	6.70
437	WI	Madison	122.8654	0.9940	6.70
438	WI	Manitowoc	122.8654	0.8241	6.70
439	WI	Milwaukee	122.8654	0.9606	6.70
440	WI	Minneapolis-St Paul	122.8654	0.9037	6.70
441	WI	Monroe	122.8654	0.9945	6.70
442	WI	Oshkosh	122.8654	0.8759	6.70
443	WI	Racine	122.8654	0.9411	6.70
444	WI	Sheboygan	122.8654	0.8646	6.70
445	WI	Watertown	122.8654	0.9989	6.70
446	WI	Wausau	122.8654	0.9478	6.70
447	WI	Whitewater	122.8654	0.8178	6.70
448	WV	Charleston	127.8365	0.9964	7.50
449	WV	Parkersburg	127.8365	0.8926	7.50

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