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Abstract.

The influence of the housing market bubble on U.S. business cycle dynamics during the previous decade has been well-documented. Yet, little if anything is known about how nonmetropolitan areas fared during the period. This study examines the association of regional housing market bubbles with relative nonmetropolitan economic performance during the business cycle phases of the decade. To better infer causality the study makes extensive use of exogenous measures of asymmetric labor demand shocks. Among the primary findings, the study establishes the important role of natural amenity attractivness in regional housing market cycles and regional employment population growth dynamics.

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1. Introduction

Following the longest recorded economic expansion in U.S. history and a mild short-lived recession, the recent decade contained an expansion of much shorter length and weaker employment growth, and the longest and most severe contraction since the 1930s. While economic growth had become remarkably even across regions at the end of the 1990s (Partridge and Rickman, 2002), economic performance during the most recent business cycle, including both the expansion and contraction phases, was distinctly uneven. Yet, the initial phase of the recovery has been fairly evenly weak across the nation (Williams, 2012). Although numerous studies have emerged to examine factors related to these patterns, little is known about how nonmetropolitan America (Figure 1) fared during the last decade and what the future likely will look like.

A dominant feature of the national and regional economic landscape during the recent decade was the emergence and bursting of housing market bubbles. Housing market bubbles were associated with fast-growing regions during the expansion and more dramatic economic losses during the recession (Brown, 2009; Mian and Sufi, 2009; 2011; Gabe and Florida, 2011). States believed to be hard hit by the housing bubble include Arizona, California, Florida and Nevada, where high rates of investor and second-home purchases occurred in their metropolitan areas during the expansion and subsequently followed by high rates of foreclosure (Brown, 2009).

Some have argued that nonmetropolitan areas were less likely affected by the housing market bubble (Edmiston and Zaleraitis, 2007; Wilkerson, 2008; Henderson and Akers, 2009). Given the role of housing supply inelasticity in housing price appreciation and leveraging during 2002-2007 (Mian and Sufi, 2009), if housing supply is more elastic in nonmetropolitan areas they would have been less likely to have experienced rapidly rising housing prices. Yet, persistently lower incomes in nonmetropolitan areas may increase subprime lending and make them more vulnerable to economic shocks.

According to the Carsey Institute (2006), based on Home Mortgage Disclosure Act (HMDA) data, among the 555,941 rural mortgage loan originations reported in 2004, 17.4 percent, or nearly 97 thousand, were classified as high APR loans (HALs)[1]. This was slightly higher than the national and metropolitan rates. Further analysis of these data showed that HALs were concentrated in rural areas with chronic poverty, and, often, a high proportion of minorities.

A cursory examination of aggregate employment and housing price data suggest that nonmetropolitan areas may not have escaped the ravages of the housing market bubble. Figure 2 shows a pattern of Federal Housing Finance Authority (FHFA) housing prices and U.S. Bureau of Economic Analysis (BEA) employment growth that follows the narrative for metropolitan areas.[2] Housing prices increased dramatically over the period 2002-2007, declining slightly in 2008, and then falling more noticeably through 2011. Both total and wage and salary employment likewise peaked in 2007, declining somewhat in 2008 before dropping dramatically in 2009. Employment moderately declined further in 2010 before rebounding in 2011.

Housing prices peaked earlier in 2006 in the nonmetropolitan portions of California, Hawaii, Michigan and Nevada; whereas, sixteen states experienced housing price declines during 2008. In 2009, thirty six state nonmetropolitan portions experienced housing price declines. Only Kansas, North Dakota and West Virginia experienced housing price appreciation in their nonmetropolitan areas during 2010, which were joined by Alaska, Iowa, Nebraska in 2011.

Table 1 displays nonmetropolitan growth rates of employment and housing prices during the previous expansion period (2002-2007), the period containing the recession (2007-2009) and the first two years of recovery (2009-2011). Growth rates also are presented for additional nonmetropolitan economic indicators: total employment in manufacturing, mining and construction, population, and the BEA annual average nominal wage rate.

[1] These data are reported through HMDA using the "rate spread" variable.
[2] Metropolitan/nonmetropolitan designation for FHFA prices and BEA employment is based on the most recent definition. See: http://www.fhfa.gov/Default.aspx?Page=196 and http://www.bea.gov/faq/index.cfm?faq_id=109 (March 2, 2013).

The increase in nonmetropolitan employment during the 2002-2007 expansion lagged the annual growth rate for metropolitan areas (1.2 versus 1.8 percent). Yet, nonmetropolitan America employment declined more during the recession (1.9 versus 1.6 percent) and recovered less robustly initially (0.3 versus 0.5 percent). The growth in mining and construction employment was comparable across metropolitan and nonmetropolitan areas, though there was less decline in manufacturing employment in nonmetropolitan areas. During the recession years nonmetropolitan areas suffered greater percentage losses in manufacturing but smaller losses in construction. Nonmetropolitan areas continued to experience smaller employment losses in construction during the initial phase of the recovery, but also smaller declines in manufacturing employment and larger gains in mining employment.

The nonmetropolitan housing price increase during the expansion was only slightly below the average for the nation (36.7 versus 38.3 percent). The nonmetropolitan decline during the recession though was much less than the overall average (2.4 versus 12.5), where the decline from 2009 to 2011 was identical. This fits the pattern of comparable growth in construction employment during the previous expansion and greater subsequent decline.

Population growth in nonmetropolitan areas consistently lagged that in metropolitan areas. During 2002-2007, there was net migration from metropolitan to nonmetropolitan areas, which subsequently reversed during the recession and subsequent initial recovery. Nonmetropolitan areas consistently received fewer immigrants as a share of the population and lower natural rates of population increase. Only during the initial phase of the recovery does wage growth differ in nonmetropolitan areas (positively).

The economic indicators then suggest that much of nonmetropolitan America may have gone through a housing market cycle similar to that experienced in many metropolitan areas. An unanswered question is how much the housing cycle is a causal factor versus an effect. Differences in industry composition, population growth dynamics and housing markets may contribute to varying cyclic growth patterns. Previous studies of the role of housing in

metropolitan area business cycle patterns did not address the role of other external demand conditions (e.g., Mian and Sufi, 2009; 2011; Gabe and Florida, 2011).

Therefore, in this study we examine economic outcomes for the nonmetropolitan portions of U.S. states during distinctive periods of the recent business cycle and current recovery: 2002-2007, 2007-2009 and 2009-2011. We examine the association of regional housing market bubbles with relative economic performance during the periods, while accounting for the roles of regional natural amenity attractivness and asymmetric labor demand shocks.

Among our primary findings, we find natural amenity attractiveness to be strongly associated with employment and population growth during the expansion and with the emergence of regional housing market bubbles. A more stringent residential land use regulatory environment further fueled regional housing market bubbles, while stricter home mortgage financial regulations dampened them. Asymmetric labor demand shocks played a much smaller role in explaining regional variation in economic performance during the expansion period.

Natural amenity attractiveness greatly fell off as an explanatory for population growth growth during the recession, and ceased to influence employment growth. The existence of a housing market bubble during the previous expansion caused employment declines but did not significantly influence population. The most influential employment growth factors during the recession were asymmetric labor demand shocks in nonmetropolitan areas and corresponding metropolitan areas in the state. Yet, population was not responsive to the labor demand shocks.

Asymmetric labor demand shocks continued as the dominant force in the initial years of the subsequent recovery, though with less regional variability and influence. Natural amenity attractiveness re-emerged as an employment growth determinant, with the influence far less than during the 2002-2007 period. The bursting of the housing market bubble ceased to have an influence on regional employment growth. Population again became responsive to labor demand shocks, with the exception of areas more dependent on manufacturing.

The near-term future for nonmetropolitan areas appears to depend on continued increased natural amenity demand, though likely at lower than recent historical rates. Areas experiencing

energy development can expect both employment and population growth. Manufacturing-based employment shifts will more likely influence internal labor supply (i.e., unemployment and labor force participation) than internal migration.

2. Empirical Framework

The general thrust of our approach is to assess the role of regional housing market bubbles in explaining nonmetropolitan growth dynamics during recent phases of the U.S. business cycle, while controlling for spatial variation in labor demand shocks. Controlling for labor demand shocks allows us to more strongly infer causal housing market bubble effects on nonmetropolitan economic performance during the business cycle phases, which was not done in previous studies of the U.S. housing market bubble and regional economies (Mian and Sufi 2009; 2011; Gabe and Florida, 2011). This is particularly important for an analysis of nonmetropolitan areas which have been thought to be more vulnerable to negative economic shocks and less part of the national housing market bubble (Edmiston and Zaleraitis, 2007; Wilkerson, 2008; Henderson and Akers, 2009). We also assess the association of the natural amenity attractiveness of an area with regional housing market bubbles and growth.

Growth is measured for both total employment and population, provided by the U.S. Bureau of Economic Analysis (BEA) for the nonmetropolitan portions of the states. Measures of the more exogenous components of population growth are included as labor supply shifters. Firstly, the component of population growth attributable to the excess of births over deaths is obtained from the U.S. Census Bureau. Secondly, the percent of the foreign born population that entered the U.S. during the 1990s is included to instrument immigration during post-2000 business cycle phases.[3]

We measure the housing market bubble at the regional level by the ratio of housing price appreciation relative to that for apartment rents because speculation likely affects prices more

[3] BEA data are obtained from the state annual personal income and employment series (http://www.bea.gov/regional/index.htm, last accessed February 21, 2013). Components of state population growth are from Census population estimates data (last accessed at http://www.census.gov/popest/ on February 21, 2013). The foreign born population share is from the Census 2000 SF3 file, available through American Fact Finder (http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml).

than rents (Winters, 2009; Krupka and Donaldson, 2013). Unfortunately, there is limited annual housing price data for nonmetropolitan areas. Thus, we use housing prices aggregated across nonmetropolitan areas for each state by the Federal Housing Finance Authority (FHFA). Rental prices are for two bedroom apartments as provided by the U.S. Housing and Urban Development, aggregated across nonmetropolitan areas for each state to match the housing price data.[4] With the absence of nonmetropolitan areas in New Jersey and Rhode Island, housing market bubble measures are constructed for 48 states. The paucity of housing price data then greatly limits the number of units of analysis. However, this is a limitation shared by studies of metropolitan areas that rely on FHFA data; FHFA housing prices were only available for 123 metropolitan counties examined by Mian and Sufi (2009).

Factors argued to be related to the creation of the housing market bubble include the elasticity of housing supply (Mian and Sufi,2009). In an attempt to identify the effect of housing prices on borrowing behavior, Mian and Sufi (2009) use MSA variation in housing elasticity to instrument housing prices because the increase in household debt and housing price growth may be jointly detemined by the expectation of income growth. As Glaeser,Gyourko and Saiz (2008) explain, MSAs with elastic housing supply should experience only modest increase in house prices in response to large shifts in the demand for housing because housing supply can be expanded relatively easily. In contrast, inelastic housing supply MSAs should experience large house price changes in response to the same-sized housing demand shock.

We measure the elasticity of housing supply with the Wharton Residential Land Use Regulation Index (WRLURI).[5] The WRLURI is an index of the stringency of the regulatory environment based in part on a survey of jurisdictions across the nation of varying size and on other publicly available measures (Gyourko et al., 2008). The index reflects both local and state

[4] Housing prices for state nonmetropolitan aggregates are available for all transactions (sales and appraisal) at http://www.fhfa.gov/Default.aspx?Page=87, while housing rental data can be found at http://www.huduser.org/portal/datasets/fmr.html, both last accessed February 19, 2013. In most instances, HUD uses the latest definition of metropolitan areas for designating counties as metropolitan or nonmetropolitan.

[5] The data can be found at http://real.wharton.upenn.edu/~gyourko/LandUseSurvey.htm, last accessed February 19, 2013

regulatory characteristics. For this paper, the index is averaged across all nonmetropolitan areas in each state. Although regulations can be endogenous to local economic conditions, Saiz (2010) reports the regulations as strongly correlated with exogenous physical measures of land scarcity for metropolitan areas across the nation.

Variation in the regulation of home mortgage lending also may have affected subprime lending rates and regional housing market bubbles. Ernst, Farris and Stein (2002) performed a market shift analysis on data provided to federal regulators under the Home Mortgage Disclosure Act (HMDA), examining changes in credit flows from prime lenders and subprime specialists both within North Carolina and between it and the rest of the nation. They report that the North Carolina law passed in 1999 appeared to be associated with a 6.6 percent reduction in the number of loans from predominantly subprime lenders. Alternatively, also using HMDA data, Ho and Pennington-Cross (2005; 2006) examine changes in lending in 10 states with predatory lending legislation by comparing patterns in the border counties of such states with the border counties of neighboring states. Generally, they find no clear patterns in changes in origination or application volumes among states that have passed predatory lending laws.

Thus, we include measures of home mortgage lending considered related specifically to subprime lending and predatory mortgage lending (National Conference of State Legislatures, 2013). The regulations reflect laws passed prior to the middle of 2008. If areas experiencing stronger housing price appreciation relative to housing rents passed more strict legislation, the estimated effects of stricter regulation on housing market bubbles will be biased upwards.

We follow the regional labor market literature in constructing several measures of exogenous labor demand shocks that are associated with differences in labor market composition. Firstly, we follow Bartik (1991) and numerous other subsequent studies (see Partridge et al., 2012b for a review) and use an industry mix employment growth measure, which is the growth expected over a period based on an area's initial composition of fast- and slow-growing industries nationally. This was calculated at the county level using four-digit NAICs data purchased from

EMSI, and aggregated across counties for each nonmetropolitan portion of a state.[6] Following Partridge et al. (2012a), we also construct a similar measure based on occupational employment rather than industry employment; we use Occupational Employment Statistics (OES) from the U.S. Bureau of Labor Statistics (BLS) to derive beginning-period occupational employment weights for each state nonmetropolitan aggregate, the geographic scope of the data available from BLS, multiply these by the national growth rates in the corresponding occupations and sum the products.[7]

Following Partridge and Rickman (1996), we also construct a wage composition measure as the growth in area wages attributable to the area's beginning period composition of high- and low-wage occupations using OES data from BLS. The local area occupational employment weights described above are multiplied by corresponding occupational wage growth nationally. Stronger growth in wages can cause positive consumption multiplier effects (Partridge and Rickman, 1996), while negative effects can occur through spillovers on average wages in all sectors (Treyz, 1991), reducing area labor intensity in production. Thus, the expected effect of the wage composition measure is ambiguous.

We also use OES data to create wage inequality effects associated with an area's occupational composition. Wage inequality can have negative effects because those with lower incomes have greater marginal propensities to consume (Stiglitz, 2013) and because if they are pushed into subprime mortgages because of wage inequality effects on housing prices, this leaves them less income for other consumption (Bardhan and Walker, 2011; McNichol et al., 2012). We multiply the local occupational employment weights for each area by the average annual wage change for the 90^{th} and 10^{th} percentile, respectively, sum them and then take the difference. The measure is interpreted as the expected change in wage inequality attributable to an area's composition of occupations in the tails of the distribution. These wage changes in the

[6] For details of their procedure, see Dorfman et al. (2011). We are grateful to the authors for providing the data.
[7] For years prior to 2006, the nonmetropolitan aggregates were obtained by subtracting the metropolitan portions from the state totals. The calculations involved 22 major occupational categories and the overall sum in terms of employment and wage quintiles (10 percentile to the 90^{th} percentiles). http://www.bls.gov/oes/oes_dl.htm#2009.

tails may be occurring at the national level because of a number of national and international factors (Autor and Dorn, forthcoming).

Finally, we utilize the typology codes of the United States Department of Agriculture Economic Research Service (ERS). To understand the spatial pattern of the industry and occupational employment mix measures, and to augment them when necessary, we included nonmetropolitan aggregates of county economic dependence on mining, manufacturing and farming. Dependence is based on industry shares of earnings during 1998-2000, making them pre-determined to the post-2000 periods.[8]

Because of the role of natural amenities in regional growth patterns generally (Deller et al., 2001; Goetz et al., 2011; Rickman and Rickman, 2011) and their possible association with the housing market bubble across metropolitan economies (Brown, 2009), we include the ERS natural amenity scale in the analysis of growth and the housing market. The county scale values are aggregated using population weights to obtain a nonmetropolitan aggregate for each state. ERS does not provide values for Alaska and Hawaii, which further reduces our sample for analysis by two states.

In addition to the natural amenity scale, we also experiment with the degree a state's nonmetropolitan area is a retirement destination and the forest cover of the nonmetropolitan areas of the state. The ERS natural amenity scale is a composite of six measures and was based on their relationship to population growth for the period 1970 to 1996 (McGranahan, 1999). More recent research suggests that forest cover, which was not included in the ERS index because it was not correlated to growth, is an important positive natural amenity attribute (McGranahan et al., 2011; Rickman and Rickman, 2011). Yet, in extensive analysis (below), forest cover never nears being statistically significant and we omit it from the analysis.[9]

[8] Documentation of the classification is available at http://www.ers.usda.gov/data-products/county-typology-codes/documentation.aspx, last accessed February 19, 2013.
[9] The correlation between the amenity scale and forest cover is 0.29.

The extent the nonmetropolitan area of the state is a retirement destination also may reflect amenity attractiveness not reflected in the ERS natural amenity measure. Other unobserved (natural and man-made) amenities may be reflected by destinations of retirement migration, while retirees also are likely to avoid areas with productivity-based higher wages and rents (Gabriel and Rosenthal, 2004). Retirement destination is correlated with the natural amenity scale (r=0.54).

3. Results and Analysis

We examine nonmetropolitan growth patterns in population and employment for three periods: 1) the expansion period from 2002 to 2007; 2) a period encompassing the national recession, 2007-2009; and 3) the first years of the current recovery, 2009-2011. The determinants of regional housing market bubbles are examined soley for 2002-2007; whereas, for the latter periods the magnitude of the bubble in the first period is used as an explanatory variable in the employment and population growth regressions. Because of possible endogeneity of employment and population, along with housing prices, considerable effort is devoted to constructing and testing instruments in an attempt to overcome the weak instrumentation and lack of testing typically found in empirical estimation of employment and population growth equation systems (see Rickman, 2010 for a critque).

Table 2 contains the descriptive statistics for the variables used in all the regressions. For each period, the subsequent tables (Tables 3-6) show the first-stage and second-stage results, along with the standard deviation impacts of the significant variables in the second-stage regressions. The tables also contain equation diagnostics and the results of the instrument tests.

3.1 2002-2007

The scatterplots shown in Figures 3 and 4 illustrate the nexus between area natural amenity attractiveness, employment growth and the housing market bubble during 2002-2007. Amenity attractiveness alone is associated with approximately 40 percent of the variation in both employment growth and speculative rises in housing prices. Notable examples of high amenity attractiveness and strong growth and rapidly rising housing price to rent ratios include Arizona,

Florida, Nevada and Oregon. Yet, energy prices also strengthened during the period, while manufacturing states experienced significant job losses, both of which may have influenced economic growth and relative housing price appreciation.

So, we next use regression analysis to assess the association between the housing market bubble and nonmetropolitan area employment growth,while controlling for natural amenity attractiveness and exogenous demand factors. The three dependent variables are total employment growth, population growth and the increase in housing prices relative to apartment rents. Because of the potential difficulty of causal identification, we report both the reduced-form and instrumental variable regressions.

Pre-testing the various measures of labor demand revealed no dominant measure for the 2002-2007 period; each was sensitive to the inclusion of the other measures. Partridge et al. (2012a) similarly found an occupational employment mix variable to provide independent information on labor demand shocks from that of industry mix employment growth post-2000 for U.S. counties. Thus, given the lack of clear choice of measure and the limited number of observations, we performed a principal component analysis of the measures. The correlations between the extracted common component and each of the measures are presented in Table 3.

The common component is most correlated with the industy mix employment measure, followed by the occupational employment mix measure. Manufacturing dependence is negatively correlated with positive labor demand shocks during the period (Friedhoff and Wial, 2006), while mining dependence is positively correlated. Wage growth attributable to the beginning period composition of industries is positively correlated with the common component, while increased wage inequality is negatively correlated.

Because a number of laws may have affected subprime lending and regional housing market bubbles, we also use the principal components method to construct a single measure of the regulatory strictness of financial mortgage lending laws. The indicators used include whether flipping, finance insurance credit or negative amortization was banned in the state (National Conference of State Legislatures, 2013). Whether there was a law restricting the debt to income

ratio was the final indicator. All indicators were strongly positively correlated with the extracted principal component, with values ranging between 0.73 and 0.88 (not shown).

The regression results for 2002-2007 are shown in Table 4. From Panel A, the amenity component is positive and significant in the employment and population growth reduced-form regressions, and is positive and significant when retirement destination status is removed from the housing price bubble specification (because of collinearity). This occurs despite controlling for labor demand, which is significant in the employment and housing price bubble regressions. The Wharton housing regulatory index (rising in value for greater restrictiveness) was associated with significantly faster rising housing prices relative to housing rents, while greater financial system regulations statistically tempered the relative increase in housing prices. The weak performance of the labor demand measure in the population growth equation fits the U.S. county level findings of Partridge et al. (2012a) of labor demand shocks having small population/migration effects post-2000.

Using variation in exogenous shifters in an attempt to identify causality suggests that amenity attractiveness spurred population growth during the period, which greatly increased employment and inflated housing market bubbles across nonmetropolitan areas (Panel B). The strong correlation between employment and population growth, however, makes it difficult to sort out their relative influences on the housing market bubble; employment growth becomes significant when population growth is omitted from the regression.

The amenity variable was insignificant when added to the employment equation given the inclusion of population growth, supporting its omission from the equation. Restrictiveness in the housing regulatory environment increased housing prices relative to rents, while financial regulations reduced them. Regional housing market bubbles appeared to reduce growth primarily through inhibiting employment growth.

Panel C displays the impacts of one standard deviation changes in the statistically significant independent variables in the Panel B regressions. The calculations suggest that variation in amenity/retirement based population growth was more responsible for the variation

in employment growth than asymmetric labor demand shocks during the period, consistent with Partridge et al. (2012a). The limits imposed on employment growth by the housing market bubble had somewhat more influence than labor demand.

Population growth (and employment because of collinearity) effects on housing market bubbles was the single most influential factor. Yet, both housing supply and financial restrictions had substantial influence on the variation of housing price appreciation relative to rents. Taken together their influence equaled that of population/employment growth.

Although the equations pass the over identification tests and are relevant based on Anderson canonical correlation likelihood ratio tests, the instruments appear to generally be weak. According to Angrist-Pischke F-tests the housing market bubble measure is best identified (not shown). Thus, the second stage results should be viewed cautiously, though the reduced-form results confirm many of the interpreted patterns.

3.2 2007-2009

With the collapse of the housing market bubble, a number of states that experienced the fastest growth and greatest rise in housing prices relative to rents from 2002 to 2007 experienced the greatest employment declines over the 2007 to 2009 period. Among the states in the sample, the largest employment declines occurrred in Nevada (-8.2 percent), followed by Michigan (-7.8 percent), Arizona (-7.0 percent), Alabama (-6.8 percent) and Florida (-6.4 percent). Housing prices relative to rents increased the most in Florida during 2002-2007, while Nevada had the fourth largest increase and Arizona the tenth greatest increase. Michigan and Alabama have a significant presence of auto assembly and auto supplier plants (Klier and McMillen, 2008), which was hit hard during the recession.

We use regression analysis to examine the regional patterns of decline during the recession. Because of the bursting of the housing market bubble prior to 2007, the magnitude of the housing market bubble is used as an explanatory variable in employment and population growth regressions for 2007-2009. We do not attempt to explain the variation in the bursting of the regional housing market bubbles and subsequent recoveries.

Pre-testing with the various measures of labor demand revealed industry mix employment growth as the most significant measure. In contrast to the expansion period, the occupation employment mix measure is not significantly associated with overall employment growth. In addition, predicted industry mix employment growth in metropolitan areas relative to that for nonmetropolitan areas also is significantly associated with overall nonmetropolitan employment growth (where it was not for the other periods of analysis). Among the economic dependence measures, only farm dependence is statisically significant after controlling for employment growth attributable to the industry composition of the state nonmetropolitan and metropolitan areas. The nonmetropolitan industry mix employment growth is significantly negatively correlated with manufacturing dependence (r=-0.70) and positively correlated with mining dependence (r=0.29). The positive influence of farm and mining dependence confirm popular perceptions (Henderson, 2010). The wage composition and inequality measures also are statistically insignificant after controlling for industry mix employment growth, though of signs consistent with 2002-2007, and are omitted.

The regression results shown in Table 5 confirm the significant influence of industry composition on employment growth or decline during the recession. The reduced-form regression in Panel A suggests variation in employment growth as primarily driven by asymmetric labor demand shocks. The results suggest that the demand shocks did not redistribute population; instead variation in population growth appeared mostly related to natural population growth and amenity/retirement migration.

The coefficients in the second stage employment growth regression in Panel B of Table 5 suggest employment multipliers of approximately 2.4 and 2.1 for exogenous job losses in nonmetropolitan and corresponding metropolitan areas, respectively. The multipliers are comparable to that reported by Partridge and Rickman (1996) for U.S. states, though considerable lower than those reported by Moretti (2010) for U.S. cities. The large effect for metropolitan job losses may in part result from close connections between auto assembly and auto part plants in metropolitan areas with those in nearby nometropolitan areas.

Areas that experienced larger housing market bubbles during 2002-2007 saw greater employment declines during the recession. Consistent with Mian and Sufi (2009; 2010; 2011), the declines are more consistent with negative consumption impacts of deleveraging than of reduced residential construction. In regressions not shown, the r-squared of the housing market bubble with declines in residential housing permits in 2008 and 2009 relative to 2002-2007 equals 0.10, while that for retail employment growth equals 0.24. Area retail employment would be expected to be positively affected by the emergence of the housing market bubble and credit expansion, and negatively affected by subseqent deleveraging with the bursting of the housing market bubble (Gabe and Florida, 2011; Mian and Sufi, 2009; 2011). To be sure, the percent of creditcard balances more than 90 days late were the highest during this period in Nevada and Florida, followed by California and Arizona (Federal Reserve Bank of New York, 2012).

Despite the dramatic effects of the housing market bubble in key states, industry composition appears to have been the dominant force underlying the variation in the recessionary effects on employment. The standard deviation impacts shown in Panel C indicate the primacy of the impacts associated with industry composition in explaining variation in employment growth during the recession. The industry mix measures explained two to three times the variation explained by the housing market bubble, while farm dependence was nearly equal in importance to the housing market bubble.

In contrast to the expansion period, amenities had greatly diminished influence on population growth and had no influence on employment growth, consistent with the decline in the amenity value of housing during the recession found by Cho et al. (2011). The lack of employment effect on population fits the findings of Saks and Wozniak (2011) that internal migration collapsed during the recession. Natural population growth became a greatly more important factor in explaining the variation in population growth across nonmetropolitan areas during the recession.

The apparent dramatic reduction of amenity demand and of internal migration responses to asymmetric labor demand shocks leads to better identification of causality. The instruments

are strong, relevant, and pass an overidentification test in each equation. To be sure, exogeneity fails to be rejected in each case. Ordinary least squares of each second stage equation (not shown) produces virtually identical results to those from two stage least squares.

3.3 2009-2011

Because of the absence of an industry-based employment composition growth measure for 2011, we use the remaining labor demand measures in its place. We use the individual measures because a principal component extracted from the measures failed to be consistently correlated with the measures in the manner they were with employment and population growth. From Panel A in Table 6, we see farm, manufacturing and mining dependence all positively related to employment growth, as is the occupational employment mix measure. Consistent with that during 2002-2007, wage inequality is negatively related to employment growth.

Only farm and mining dependence is positively related to population growth, suggesting that manufacturing growth variation does not induce population responses; manufacturing dependence was only slightly positively correlated with the occupation employment mix measure (r=0.10), which also was not significantly related to population growth. This may be attributable to the availability of excess labor supply in manufacturing areas because of the recession. Alternatively, it could be that labor avoided manufacturing dependent areas because of anticipatory effects related to trade (McLaren and Hakobyan, 2010), causing jobs to be filled by previous local residents.

From Panel B of Table 6, we see that the typical two-way relationship between employment and population re-emerged during the beginning of the current recovery. Based on both the coefficients and standard deviation impacts, the two variables have approximately equal effects on each other (Panel C). Each of the industry dependence measures have about an equal effect on employment growth. The negative effect of increased wage inequality exceeds that of any of the other labor demand measures. Occupational employmix growth is not strongly correlated with the mining and farming dependence measures (not shown). Collectively, the influence of labor demand on employment growth far exceeds the population growth effect.

Amenity attractiveness and retirement destination continue to significantly influence population growth, but now also have a similar influence on employment growth in the first-stage regressions. The housing market bubble in the previous expansion has less than one-half the negative effect it had during the recession, and now is significantly positively associated with population growth. Taken together, these results suggest that amenity and retirement migration and related employment growth will continue in the upcoming decade and the adverse effects of the housing market ceased to be a significant negative influence.

Although exogeneity fails to be rejected in each equation, the instruments only exceed the Stock Yogo critical value at the 20 percent for bias. The instruments are relevant, though the over identification test is rejected for employment growth. OLS estimation of the two second-stage equations yields qualitatively the same results though, with only minor quantitative differences.

4. Summary and Conclusion

In this paper we examined the relative performance of U.S. state nonmetropolitan regions during the most recent business cycle phases to prognosticate on likely post-recession economic trends in nonmetropolitan America. We specifically assessed the relative role of regional housing market bubbles during the varying phases of the business cycle, while also examining the influence of industry composition and natural amenity attractiveness. Although regional housing market bubbles featured prominently in the patterns of expansion during 2002-2007 and recession during 2007-2009, the influence ceased during the initial phase of the subsequent recovery.

Strong amenity-related growth appeared to be associated with the emergence of regional housing market bubbles, further fueled in states with more restrictive residential land use regulations and lax regulations on home mortgage financial regulations. Although the size of the housing market bubbles led to reductions in employment growth during the recession, this effect was dominated by asymmetric demands shocks associated with area industry composition. The negative employment effects of the bursting of housing market bubbles appeared to be related

more to reduced spending from deleveraging than from reduced residential building (Mian and Sufi, 2009; 2011). The demand for natural amenities also dropped significantly during the recession, ceasing to be an influence on employment growth. Finally, the recession appeared to cause migration to be unresponsive to labor demand shocks.

During the initial phase of subsequent recovery, natural amenities re-emerged as a determinant of overall economic growth, though the rate of increased demand for amenities appears to have slowed compared to the previous expansion based on its reduced association with both employment and population growth. Migration appears to again respond to shifts in labor demand, though this may not hold for manufacturing-based shifts, which may influence local employment rates more. The magnitude of the housing market bubble during 2002-2007 ceased to influence employment growth, and was in fact positively related to population growth. In the near term it appears unlikely that the patterns of 2002-2007 will be repeated in terms of the central role of natural amenities. Industry composition likely will be more consequential for both employment and population growth.

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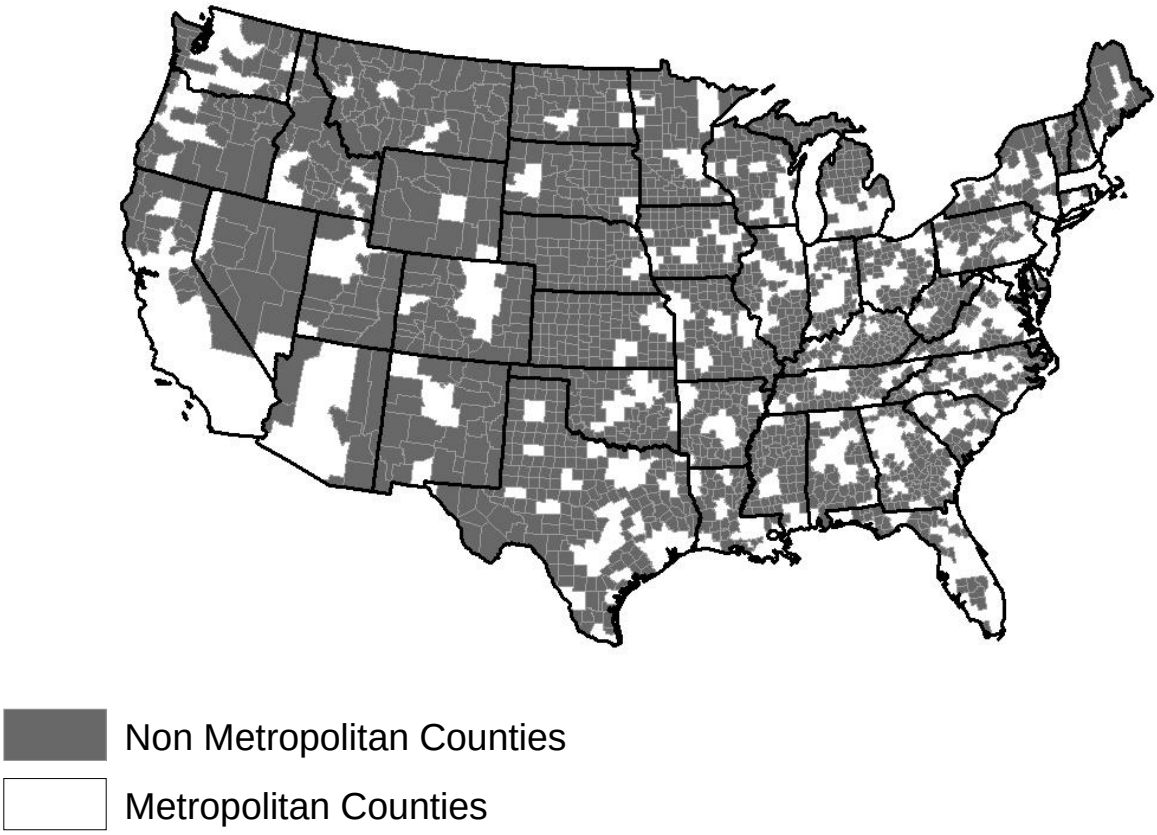

Figure 1. Nonmetropolitan America

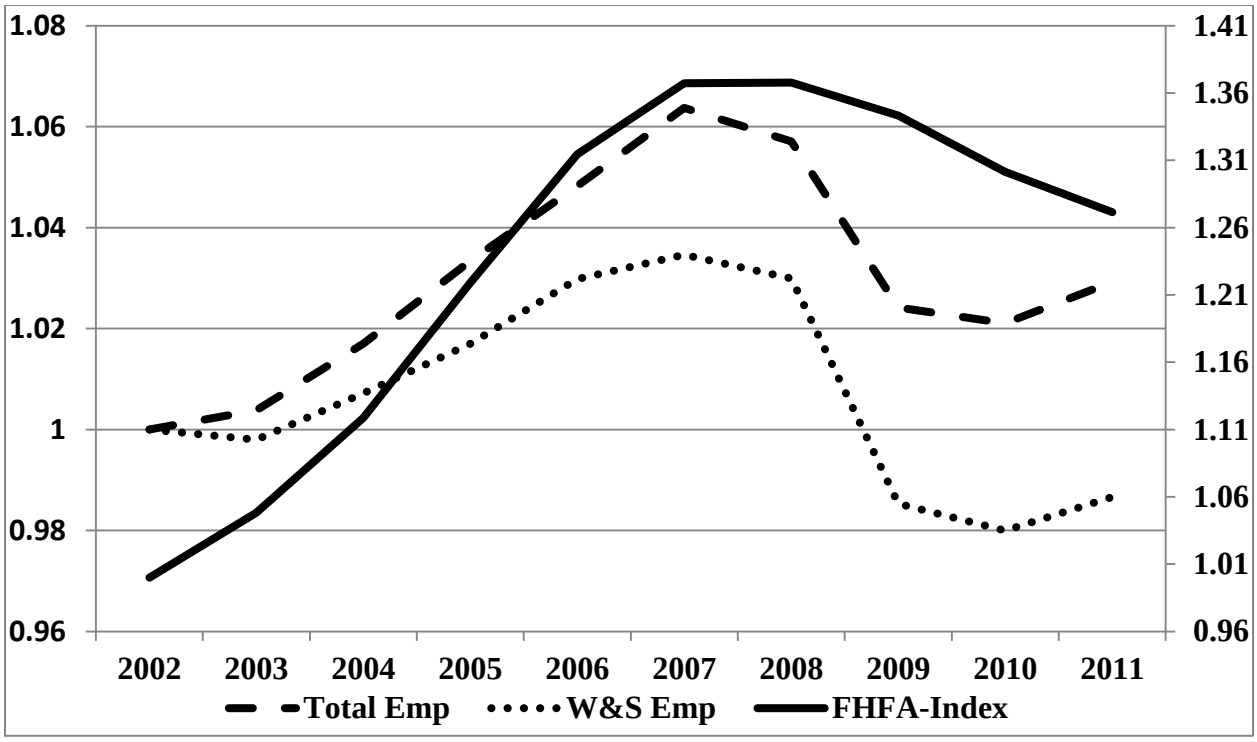

Figure 2. Non-metropolitan housing price and employment indices (2002=1).
Employment data are from Bureau of Economic Analysis (BEA) reported annual average levels for the nonmetropolitan portion of the U.S. The housing price index is based on annual average Federal Housing Finance Authority housing prices (all transactions indexes) for nonmetropolitan portions of states, aggregated using BEA year 2002 nonmetropolitan population weights.

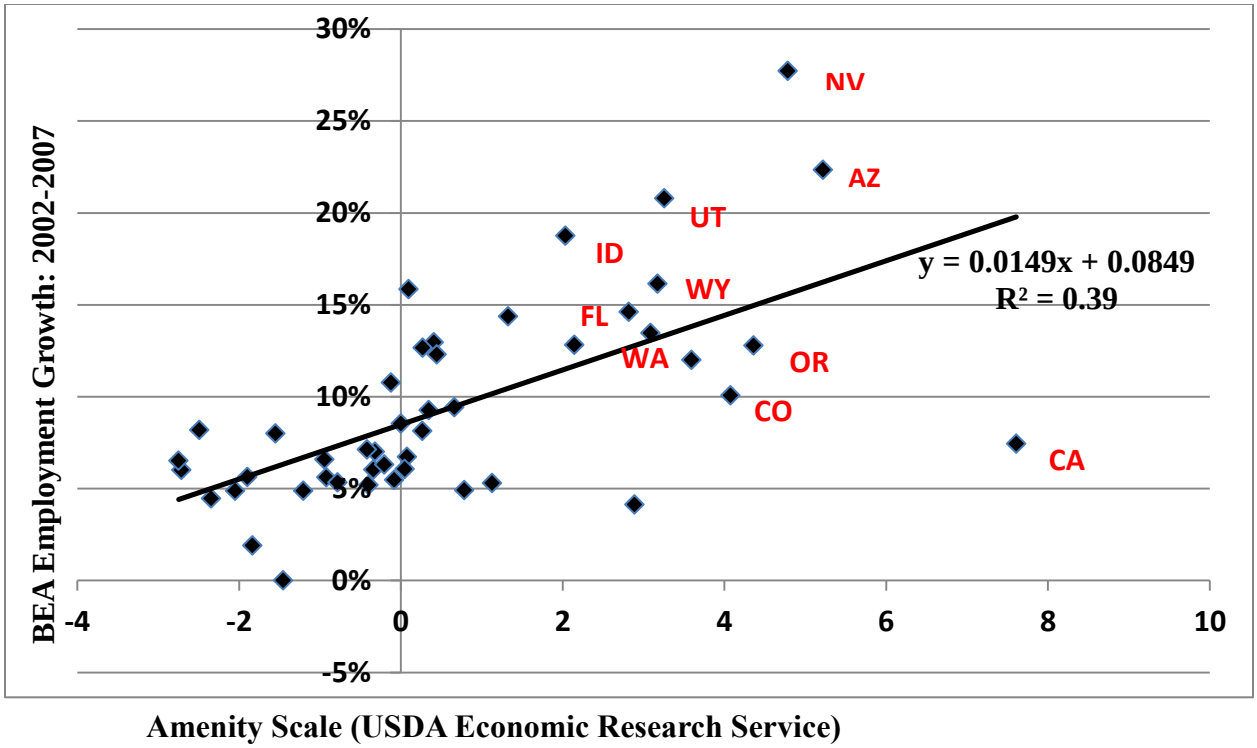

Figure 3. BEA Employment Growth 2002-2007 and Amenity Attractiveness

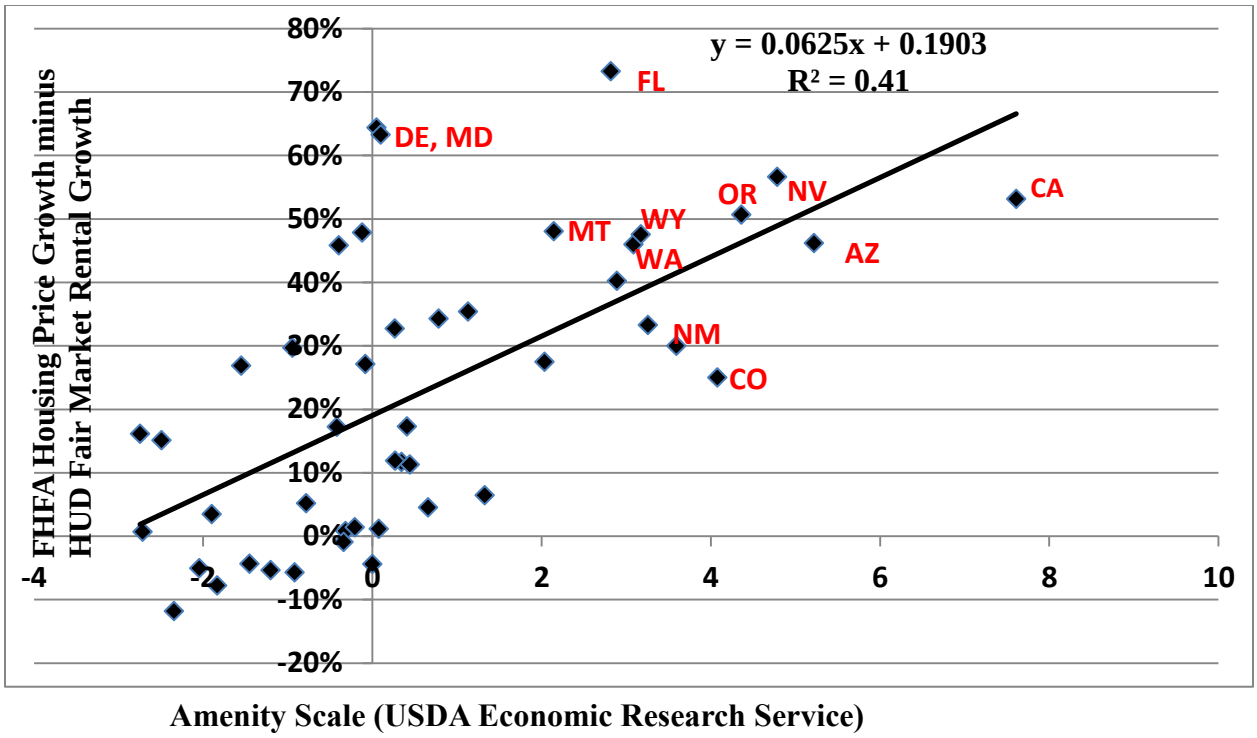

Figure 4. FHFA Housing Price Growth minus HUD Fair Market Rental Growth and Amenity Attractiveness

Table 1. Nonmetropolitan Economic Performance by Period (Percent Growth)

	2002-2007	2007-2009	2009-2011
Total Employment	1.2	-1.9	0.3
W&S Employment	0.7	-2.4	0.1
Manufacturing Employment	-1.5	-8.3	-0.7
Mining Employment	6.1	5.5	11.5
Construction Employment	3.5	-7.0	-4.3
Population	2.7	0.7	0.4
Housing Price Index (FHFA)	36.7	-2.4	-7.2
Wage Rate ($)	3.8	2.2	2.7

[a]Note: Calculations represent annual compounded growth rates, except for population and housing prices, which are cumulative growth rates.

Table 2. Descriptive Statistics (means, with standard deviation in parentheses)

Variable	2002-2007	2007-2009	2009-2011
Employment Growth	0.095 (0.055)	-0.028 (0.023)	0.003 (0.010)
Population Growth	0.037 (0.041)	0.010 (0.015)	0.006 (0.009)
Housing Market Bubble	0.247 (0.243)	-0.144 (0.095)	-0.106 (0.071)
Industry Mix Growth	0.073 (0.024)	-0.034 (0.011)	NA
Occup. Mix Growth	0.050 (0.013)	-0.034 (0.008)	-0.021 (0.005)
Natural Pop. Growth	0.0145 (0.013)	0.006 (0.005)	0.003 (0.004)[a]
Metro Industry Mix Growth	0.091 (0.011)	-0.031 (0.008)	NA
Wage Inequality	-0.003 (0.004)	-0.012 (0.002)	-0.012 (0.003)
Wage Mix	0.151 (0.012)	0.057 (0.012)	0.083 (0.002)
Farm Dependence	0.070 (0.106)	--	--
Mining Dependence	0.058 (0.088)	--	--
Mfg. Dependence	0.280 (0.275)	--	--
Amenity Scale	0.628 (2.28)	--	--
Retirement Destination	0.209 (0.248)	--	--
Foreign Born (90s) %	1.512 (1.266)	--	--
Wharton Index (WRLURI)	-0.338 (0.714)	--	--
Flipping Banned	0.40 (0.495)	--	--
Negative Amort. Banned	0.46 (0.503)	--	--
Finance Insur. Credit Banned	0.36 (0.485)	--	--

NA denotes not available

[a] Because of data constraints, calculated for 2010-2011.

-- Denotes repeat value from previous column

Table 3. Labor Demand Principal Component: 2002-2007

	Common Factor	Industry Mix	Occupational Mix
Industry Mix (02-07)	0.81		
Occupational Mix (02-07)	0.72	0.48	
Wage Mix (02-07)	0.59	0.26	0.64
Wage Inequality (02-07)	-0.49	-0.23	-0.07
Manufacturing Dependence	-0.63	-0.64	-0.30
Mining Dependence	0.60	0.37	0.19
Farming Dependence	0.01	-0.16	0.11

Table 4. Regression Results: 2002-2007 (absolute value t-statistics in parentheses)

Panel A: First Stage Regressions			
	Employment Growth	Population Growth	Housing Price Bubble
Constant	0.054 (4.55)*	0.012 (1.55)	0.284 (7.09)*
Labor Demand	0.011 (2.39)**	0.004 (1.50)	0.037 (3.53)*
Amenity Scale	0.073 (1.92)***	0.072 (2.88)*	0.009 (0.07)
Retirement Destination	0.065 (1.67)	0.067 (2.60)**	-0.032 (0.24)
Natural PopGrowth	1.20 (2.10)**	0.23 (0.66)	-2.52 (1.41)
Wharton RegIndex	-0.022 (1.99)***	-0.004 (0.57)	0.132 (3.53)*
Financial Regulation	-0.001 (0.40)	0.001 (0.53)	-0.021 (1.77)***
Adjusted R-Squared	0.52	0.52	0.65
Panel B: Second Stage Regressions			
Constant	0.066 (6.01)*	-0.007 (0.59)	0.133 (1.77)***
Population Growth	1.524 (5.19)*		3.258 (2.25)**
Housing Price Bubble	-0.096 (1.99)***	0.015 (0.52)	
Employment Growth		0.27 (1.69)***	0.565 (0.30)
Labor Demand	0.009 (1.81)***		
Natural PopGrowth		-0.045 (0.13)	
Amenity Scale		0.054 (2.90)*	
Retirement Destination		0.050 (2.83)*	
Wharton RegIndex			0.156 (3.00)*
Financial Regulation			-0.025 (1.78)***
Wald Stat: Weak Inst.	4.80	2.70	1.52
Anderson LM statistic	17.4 (p=0.00)	7.91 (p=0.02)	6.20 (p=0.10)
J-Stat Over Iden	8.74 (p=0.03)	1.52 (p=0.22)	11.87 (p=0.00)
J-Stat Endogeneity	5.26 (p=0.07)	1.51 (0.47)	0.45 (0.80)
Adjusted R-Squared	0.66	0.75	0.64
Mean Dependent Var	0.095	0.034	0.222
# of Observations	45	45	45
Panel C: Standard Deviation Impacts			
Population Growth	0.059		0.127
Employment Growth		0.015	0.031
Housing Price Bubble	-0.021		
Labor Demand	0.014		
Amenity Component		0.071	
Retirement Destination		0.108	
Wharton RegIndx			0.108
Financial Regulation			-0.042

*Significant at or below the 0.01 level; **Significant at or below the 0.05 level; ***Significant at or below the 0.10 level

Table 5. Regression Results: 2007-2009 (absolute value t-statistics in parentheses)

Panel A: First Stage Regressions		
	Employment Growth	Population Growth
Constant	0.043 (3.84)*	-0.003 (0.49)
Nonmetro Industry Mix Growth	2.268 (7.94)*	0.102 (0.51)
Metro Industry Mix Growth	1.932 (5.99)*	0.341 (1.40)
Farm Dependence	0.063 (3.16)*	0.003 (0.22)
Natural Population Growth	0.654 (1.57)	1.656 (5.72)*
Amenity Scale	-0.015 (1.48)	0.013 (1.81)***
Retirement destination	-0.013 (1.26)	0.012 (1.75)***
Housing Market Bubble 02-07	-0.016 (1.24)	0.013 (1.42)
Adjusted R-Squared	0.71	0.60
Panel B: Second Stage Regressions		
Constant	0.051 (4.64)*	-0.004 (1.16)
Population Growth	0.033 (0.16)	
Employment Growth		0.037 (0.47)
Housing Price Bubble 02-07	-0.039 (3.57)*	0.014 (1.68)
Nonmetro Industry Mix Growth	2.418 (8.51)*	
Metro Industry Mix Growth	2.149 (6.80)*	
Farm Dependence	0.077 (3.83)*	
Natural Population Growth		1.596 (5.43)*
Amenity Scale		0.014 (1.85)***
Retirement Destination		0.014 (1.84)***
Wald Stat: Weak Inst.	17.43[a,c]	26.67[a,b]
J-Stat Over Iden	5.22 (p=0.07)	2.17 (p=0.34)
Anderson LM statistic	26.64 (p=0.00)	31.19 (p=0.00)
J-Stat Endogeneity	1.03 (p=0.31)	1.00 (0.32)
Adjusted R-Squared	0.69	0.61
Mean Dependent Var	-0.030	0.010
# of Observations	46	46
Panel C: Standard Deviation Impacts		
Housing Price Bubble 02-07	-0.009	
Natural Population Growth		0.009
Amenity Scale		0.018
Retirement Destination		0.029
Nonmetro Industry Mix Growth	-0.030	
Metro Industry Mix Growth	-0.022	
Farm Dependence	0.008	

*Significant at or below the 0.01 level; **Significant at or below the 0.05 level;***Significant at or below the 0.10 level

[a]Exceeds the Stock Yogo critical value for maximal IV relative bias at the 5% level

[b]Exceeds the Stock Yogo critical value for maximal IV relative size at the 10% level

[c]Exceeds the Stock Yogo critical value for maximal IV relative size at the 15% level

Table 6. Regression Results: 2009-2011 (absolute value t-statistics in parentheses)

Panel A: First Stage Regressions		
	Employment Growth	Population Growth
Constant	-0.017 (2.35)**	-0.007 (0.27)
Occupation Emp Mix Growth	0.695 (2.29)**	0.042 (0.17)
Mining Dependence	0.060 (4.12)*	0.023 (1.83)***
Farm Dependence	0.064 (5.03)*	0.039 (3.58)*
Manufacturing Dependence	0.012 (1.74)***	0.002 (0.38)
Natural Population Growth	-0.454 (1.04)	0.716 (1.93)**
Amenity Scale	0.012 (2.05)**	0.015 (3.12)*
Retirement Destination	0.013 (2.29)**	0.017 (3.37)*
Wage Inequality Mix Growth	-2.030 (2.95)*	-0.076 (0.13)
Housing Market Bubble 02-07	-0.009 (1.22)	0.018 (1.80)**
Adjusted R-Squared	0.52	0.54
Panel B: Second Stage Regressions		
Constant	-0.016 (2.21)**	-0.004 (2.25)**
Population Growth	0.502 (1.94)***	
Employment Growth		0.454 (3.69)*
Housing Price Bubble 02-07	-0.017 (2.50)**	0.013 (2.30)**
Occupation Emp Mix Growth	0.842 (2.77)**	
Mining Dependence	0.036 (2.50)**	
Farm Dependence	0.037 (2.47)**	
Manufacturing Dependence	0.014 (2.17)**	
Wage Inequality Mix Growth	-2.39 (3.47)*	
Natural Population Growth		1.110 (3.61)*
Amenity Scale		0.009 (2.09)**
Retirement Destination		0.010 (2.22)**
Wald Stat: Weak Inst.	7.39[a]	8.92[a,b]
Anderson LM statistic	17.53 (p=0.00)	25.77 (p=0.00)
J-Stat Over Iden	6.11 (p=0.05)	3.24 (p=0.52)
J-Stat Endogeneity	0.28 (p=0.60)	1.42 (0.23)
Adjusted R-Squared	0.49	0.55
Mean Dependent Var	0.003	0.005
# of Observations	46	46
Panel C: Standard Deviation Impacts		
Population Growth	0.005	
Employment Growth		0.004
Occupation Emp Mix Growth	0.004	
Mining Dependence	0.003	
Manufacturing Dependence	0.004	
Farm Dependence	0.004	
Wage Inequality Mix Growth	-0.007	
Amenity Scale		0.011
Retirement Destination		0.022
Housing Price Bubble 02-07	-0.004	0.003

Natural Population Growth		0.006

*Significant at or below the 0.01 level; **Significant at or below the 0.05 level; ***Significant at or below the 0.10 level

[a]Exceeds the Stock Yogo critical value for maximal relative bias at the 20% level

[b]Exceeds the Stock Yogo critical value for maximal IV relative size at the 25% level