The Texas Economic Model, Miracle or Mirage? A Spatial Hedonic Analysis

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Abstract

As a state without a personal income tax that has experienced strong employment and population growth in the past, Texas was held up as the economic policy model for Kansas and Oklahoma to follow in recently cutting their personal income tax rates. Using micro-level data, this paper examines whether Texas has benefitted from its mix of public policies by examining the geographic patterns of estimated quality-adjusted wages and housing costs across the U.S. The overall finding is an absence of significantly positive capitalized effects from the policies of Texas. The only significant capitalized policy effect found was lower quality of life in Texas nonmetropolitan areas relative to those in Oklahoma.

JEL: R51, R58, H30

Keywords: State income tax, Kansas, Oklahoma, Texas

1. INTRODUCTION

Because of expected long-term federal budget difficulties, states and localities likely will become increasingly dependent on their economic development policies (Bartik, 2012). Among the policies, state and local government policy makers increasingly have pursued fiscal policies to stimulate economic growth. Encouraged by the perceived success of Texas, which does not have a personal income tax, ten states (Oklahoma, Missouri, South Carolina, Kansas, Idaho, Maine, Nebraska, Indiana, New Jersey and Ohio) considered repealing or reducing their personal income tax rate in 2012 (Wall Street Journal, 2012). Among all U.S. states and the District of

Columbia, during 2000 to 2010 Texas had the third fastest rate of total employment growth and fifth fastest rate of population growth, though per capita income growth was twenty sixth fastest (U.S. Bureau of Economic Analysis, 2014). Texas Governor Rick Perry described the strong employment and population growth as the "Texas Miracle", while weaker income growth and higher poverty suggests that the perception of a strong Texas economy might be a mirage (Khan, 2014; Longman, 2014).

Skeptics of tax cuts are concerned that they will slow down the long-term growth of economy because of accompanying cuts in public services such as education, highways and public safety. The academic literature is mixed on the issue of using state and local fiscal policies to promote economic growth (Wasylenko, 1997). In surveying the literature, Bartik (1991) reported a modest negative relationship between most state and local taxes and regional growth. Among the studies, Helms (1985) showed that taxes used to provide transfer payments significantly reduced economic growth, while taxes to finance highway and education did not reduce growth. Using NLSY data, Gius (2011) found individuals moving from high to low tax states. Fisher (1997) reported positive effects of public spending on highways and transportation. In considering both expenditures and revenues, Dalenberg and Partridge (1995) found greater education expenditures and lower taxes to be associated with stronger metropolitan area employment growth. To be sure, benefits of increased state and government spending can more than offset the negative effects of the taxes used to support them (Brown et al., 2003; Taylor and Brown, 2006). Deskins and Hill (2010) find a lessened impact of state taxes on economic growth from 1985 to 2003; at least in part, the diminished influence is argued to derive from a convergence in inflation-adjusted own-source revenues per capita.[1]

In 2012, Kansas enacted a tax-cut measure that lowered the top marginal personal income tax rate from 6.45 to 4.9 percent and eliminated taxes on non-wage income for small businesses (Peters, 2012). In 2014, Oklahoma enacted a reduction in the top marginal personal income rate

[1] For discussion of other recent studies of state fiscal policies and growth see Rickman (2013).

from 5.25 to 4.85 percent in future years with revenue growth triggers (Washington Times, 2014). This followed a failed earlier attempt in 2012 to reduce the rate to 3.5 percent (Wall Street Journal, 2012). The absence of a state personal income tax in Texas was featured prominently by proponents of the tax cuts in both states.

As noted by McNichol and Johnson (2012) and Rickman (2013, p. 2), opponents of eliminating state income taxes based on the example of Texas, argue that directly comparing Texas's experience to other states is questionable because of its "unique geographic and demographic characteristics, such as: its border location and related international trade and immigration; largely available land and lending regulations that keep housing prices relatively low; and abundant oil and gas resources that generate substantial severance tax revenues for the state besides its diversified industries. Also, Texas contains much larger metropolitan areas than Oklahoma does."

Rickman (2013) considered whether Oklahoma should copy the mix of policies used in Texas in comparing their nonmetropolitan growth in recent decades. He found that the Texas economy had not generally outperformed the Oklahoma economy in terms of growth over the period 2000-2010. The study concluded that it was misguided and potentially harmful for Oklahoma to enact policies to mimic Texas. To avoid the use of any single economic indicator that may lead to an incomplete and incorrect conclusion about economic well-being (Partridge and Rickman 1999, 2003), Rickman selected several economic indicators in his analysis of county economic performance in Oklahoma and surrounding states. He also controlled for numerous exogenous differences in characteristics potentially related to economic performance. Rather than use an extensive array of fiscal policy and other policy measures, policy differences were captured by binary indicator variables for states. In general, based on an analysis of multiple sub-samples of nonmetropolitan counties he could not find consistent evidence that Texas outperformed Oklahoma in terms of economic growth, particularly for the 2000 to 2010 period.

Despite thorough selection of the economic indicators and extensive analysis, Rickman's study did not address the issue of whether policy differences had been capitalized into wages and land rents, which would reflect previous growth advantages. The necessity of examining this question is that the full capitalization of existing and anticipated policy differences into wages and land rents would make current growth across areas to be equal (Partridge et al. 2008).[2] In addition, use of counties for the analysis forced him to use aggregate data rather than micro-data.

Therefore, using the IPUMS-USA database 2000 5% sample and the 2006-2010 ACS 5-year sample, this paper examines whether previous growth advantages for Texas had already been capitalized into wages and land rents, which would suggest the policies had created economic advantages. Because economic growth processes in metropolitan areas might differ from those in nonmetropolitan areas, this paper examines the wages and land rents in metropolitan and nonmetropolitan areas together and then nonmetropolitan areas separately.[3] Only nonmetropolitan areas were examined in Rickman (2013). Using spatial equilibrium conditions, this paper also decomposes the differences in wages into household amenity (quality of life) and firm productivity (quality of business) components.

The remainder of the paper is organized as follows. Section 2 presents the theoretical framework of the paper, while section 3 describes the empirical implementation and data used in the analysis. Section 4 presents and discusses the main findings. The primary finding is that there is little evidence that the mix of public policies in Texas has benefitted its economy relative to those in Kansas and Oklahoma. Section 5 summarizes and concludes the paper.

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[2] Oklahoma also reduced its top marginal personal income tax rate from 6.75 percent in 2000 to 5.5 percent in 2010, though this remained in stark contrast to the absence of a state income tax rate in Texas.

[3] According to 2003 definition by Office of Management and Budget, metropolitan areas include all counties containing one or more urbanized areas: high-density urban areas containing 50,000 people or more; metropolitan areas also include outlying counties that are economically tied to the central counties, as measured by the share of workers commuting on a daily basis to the central counties. Nonmetropolitan counties are outside the boundaries of metropolitan areas and have no cities with 50,000 residents or more. *Source:* http://www.whitehouse.gov/omb/inforeg_statpolicy#ms

2. THEORETICAL FRAMEWORK

This paper follows the theoretical fiscal analysis framework of Yu and Rickman (2013), where spatial differentials in wages and land rents are assumed to reflect capitalized equilibrium values of state and local fiscal characteristics to firms and households. Fiscal policies of state and local governments have been found to be as important as natural amenities in explaining metropolitan area wage and rent differentials (Gyourko and Tracy 1989, 1991). Reynolds and Rohlin (2014) used the approach to assess the effect of location-based tax incentives on the quality of life and quality of business environment. Therefore, I argue that differentials in wages and land rents across areas capture previous and current growth advantages generated from local-based policies.

The underlying model used for the analysis follows the spatial equilibrium framework (Roback, 1982, Beeson and Eberts, 1989), in which household utility and firm productivity are affected by differentials in site characteristics. In the framework, following the presentation of Yu and Rickman (2013), the economy has two rational representative agents: the household and the firm. The household is assumed to have complete mobility across regions and earns income from selling one unit of labor. Subject to a budget constraint, the household chooses amounts of the composite traded good ($\boldsymbol{X}$) with a normalized price of unity, residential land (L_h), and site characteristics($\boldsymbol{s}$) to maximize utility,

$$(1) \qquad \max U(\boldsymbol{X}, L_h; \boldsymbol{s}) \; s.t. w + I = \boldsymbol{X} + rL_h$$

where w represents wage; I denotes non-labor income that is independent of work location(s); r represents rental rate of land. Assume at equilibrium, the utility value (V^*) of the household will be equalized across regions. Then, the indirect value function can be derived:

$$(2) \qquad V(w, r; \boldsymbol{s}) = V^*$$

where V_w> 0, V_r< 0 and the sign of V_s is ambiguous. V_s> 0 if $\boldsymbol{s}$ is amenity; V_s< 0 if $\boldsymbol{s}$ is disamenity.

The firm in this model produces the composite good ($\boldsymbol{X}$). Its production function is assumed as $X(N, L_f; \boldsymbol{s})$, a constant-returns-to-scale production function in terms of labor (N), land (L_f) and site characteristics ($\boldsymbol{s}$). Given the quantity of production the firm will choose the quantities of labor and land to minimize costs. Similar to the household, the model assumes that the firm is perfectly mobile. Therefore, in equilibrium, costs are equal across locations. After normalizing the price of the traded good to unity, the cost function can be shown as:

$$(3) \qquad C(w, r; \boldsymbol{s}) = 1$$

where $C_w > 0$, $C_r > 0$ and the sign of C_s is ambiguous while $\boldsymbol{s}$ acts a profitability shifter. If $\boldsymbol{s}$ represents the vector of site characteristics that increases the efficiency of the firm, $C_{\boldsymbol{s}} < 0$ then. If site characteristics reduce the efficiency of the firm, $C_{\boldsymbol{s}} > 0$.

Assuming the values of site characteristics are capitalized into wages and land rents, in spatial equilibrium, the effects of site characteristics on wages, dw/ds, and land rents, dr/ds, can be derived from Equations (2) and (3). If site characteristics are primarily favorable for households, land rents are higher and wages are lower; whereas, if site characteristics are primarily valued by firms, both land rents and wages are higher. If site characteristics are considered attractive by both households and firms, land rents are higher. Yet, whether wages will be higher or lower depends on whether the firm or household effect dominates (Yu and Rickman, 2013).

3. EMPIRICAL IMPLEMENTATION AND DATA

The data used in this paper to estimate wages and housing costs come from the micro-level data of the United States provided by the Integrated Public Use Microdata Series (IPUMS).[4] I use the Census 2000 5% sample and the American Community Survey 2006 to 2010 5-year sample. Due to their special locations, I exclude Alaska and Hawaii from the sample. To ensure that all workers are at working age and mobile, workers are restricted to those of age

[4] IPUMS-USA website is https://usa.ipums.org/usa/ (Ruggles et al., 2010).

ranging from 25 to 55 and not belonging to any group quarters. They work at least 14 weeks per year and 20 hours per week. Still, there might be misreporting of incomes or typographical errors. To eliminate these errors, I impose an additional criterion that the minimum salary should be $2,678 in the 2000 5% sample and $3,770 in the ACS 2006-2010 5-year sample.[5]

One advantage of using the 5% sample of Census 2000 and the ACS 2006 to 2010 5-year sample is the smallest identifiable geographic unit is the Public Use Microdata Area (PUMA), containing at least 100,000 persons, which gives me the necessary degrees of freedom to statistically control for factors that may underlie region and state differences in growth at the PUMA level.[6] However, the Census Bureau redraws PUMA boundaries every ten years based on population information gathered from the most recent Decennial Census and ACS samples incorporate the new PUMAs within a few years of the Decennial Census.[7] This problem makes the comparison more difficult for different time periods. To solve this problem, I select CONSPUMA as my base region definition. CONSPUMA is the code provided by IPUMS of the most detailed geographic areas that can consistently be identified across samples from 1980 onwards. It splits the nation into 543 areas that can be consistently identified in microdata samples using PUMAs and County Groups. To restrict the data to only nonmetropolitan areas, I use the 2003 metropolitan classification that can be obtained from the website of Economic Research Service (ERS) of the United States Department of Agriculture (USDA).[8]

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[5] Under the Fair Labor Standards Act the federal minimum wage rate was raised from $5.15 to $7.25 an hour for all covered nonexempt workers effective July 24, 2009 (http://www.dol.gov/whd/minwage/coverage.htm.). So, $2,768 in 2000 is obtained by $5.15 times 20 hours times 26 weeks and $3,770 is obtained by $7.25 times 20 hours times 26 weeks.

[6] According to the description of IPUMA-USA database, counties are unavailable in public-use microdata from 1950 onwards.

[7] Although the boundaries and PUMA codes generally are the same for the 2000 Census and the 2006-2011 ACS samples, population displacement following Hurricane Katrina caused one notable exception in Louisiana. Three PUMA's (01801, 01802, and 01905) are combined into code 77777 for the 2006-onward ACS and for all cases in the 2005-2007 ACS 3-Year file.

[8] Source: Economic Research Service of the United States Department of Agriculture website: http://www.ers.usda.gov/. Some CONSPUMAs contain both metropolitan and nonmetropolitan counties. In these cases, the population weighted ERS rural-urban continuum code is used to classify the area. When metropolitan counties are removed in constructing the nonmetropolitan sample, some mixed areas previously classified as metropolitan areas become nonmetropolitan areas.

3.1 First-stage Wage and Housing Cost Regressions

To compare wages and housing costs across areas, the first step is to calculate characteristic-adjusted wages and housing costs. I run a linear regression of the natural logarithm of individual wages on fixed effects for CONSPUMA, while controlling for characteristics of individuals. The basic regression equation is given by the following:

$$(4) \qquad lnw_{ij} = \beta \boldsymbol{X}_{ij} + \delta_j + \varepsilon_{ij}$$

where lnw_{ij} is the natural log wage of individual i in CONSPUMA j. $\boldsymbol{X}_{ij}$represents the vector of characteristics of individual i in area j. δ_j is the fixed effect of area j. ε_{ij} is the error term.

I control for several individual characteristics in the regression. Firstly, I use age interval indicators: age from 31 to 35, 36 to 40, 41 to 45, 46 to 50, and 51 to 55, to capture the effects of age and work experience. The age interval from 25 to 30 is omitted to avoid perfect collinearity. Secondly, I add dummy variables to capture the wage impacts of different education levels. The binary indicator variables for education level include grade 10, grade 11, grade 12, 1 year of college, 2 years of college and 4 years of college, where category grade 9 and below is omitted from the regression to avoid perfect collinearity. To remove errors and extreme outliers, I restrict the sample by eliminating the individuals that report education levels below grade 4. Thirdly, I include indicator variables for the ACS working time intervals: working 27 to 39 weeks, 40 to 47 weeks, 48 to 49 weeks, over 50 weeks, working 30 to 34 hours per week, 35-39 hours, 40 hours 41-48 hours, 49 to 59 hours and working over 60 hours per week. I omit those reporting working weeks from 14 to 26 and reporting working hours from 20 to 29 hours per week. Fourthly, I control for race using a vector of indicators: Hispanic origin, Black or African American, Asian and other nonwhite, whereas, white people as a group is omitted. In addition, I include binary indicators of married, having a child, having a child below age of 5, speaking English at home, poor English level proficiency, veteran status and immigrated.

To control for sorting by occupation and industry, using the IND1990 code I include a vector of industry indicators for the industries of: agriculture, forestry and fisheries; mining;

construction; manufacturing; transportation; communications and other public utilities; wholesale trade; retail trade; finance, insurance and real estate; business and repair services, personal services; entertainment and recreation services; professional and related services; and public administration. To avoid perfect collinearity, I omit the category of active duty military. A vector of occupation indicators based on OCC1990 code are included: managerial and professional specialty occupations, technical, sales and administrative support occupations, service occupations, farming, forestry and fishing occupations, precision production, craft and repair occupations and operators, fabricators and laborers. The category of military occupations is omitted. [9]

The baseline characteristics-adjusted wages can be obtained by $ln\widehat{w}_j = \widehat{\boldsymbol{\beta}}\overline{\boldsymbol{X}} + \hat{\delta}_j$ where $ln\widehat{w}_j$ represents baseline characteristics-adjusted wages in area j. $(\widehat{\boldsymbol{\beta}}\overline{\boldsymbol{X}} + \hat{\delta}_j)$ is predicted average wages whereas $\overline{\boldsymbol{X}}$ represents the national mean of characteristics for individuals. I run the regressions separately for males and females to capture labor market differences between the groups:

$$(5) \qquad ln\widehat{w}_j = \alpha\, ln\widehat{w}_j^m + (1-\alpha) ln\widehat{w}_j^f$$

where α represents the proportion of males in the sample, while $(1-\alpha)$ tells the proportion of females in the sample. $ln\widehat{w}_j^m$ denotes the baseline characteristics-adjusted wages of males; $ln\widehat{w}_j^f$ represents the baseline characteristics-adjusted wages of females.

Housing costs in this paper refer to rent or a housing-price-based imputed rent for homeowners plus the costs of utilities, water, electricity, gas, and the costs of fuel, oil, coal, kerosene, wood, etc. Following previous studies (Beeson and Eberts, 1989; Blomquist et al., 1988; Gabriel and Rosenthal, 2004; Glaeser et al., 2006; Partridge et al., 2010), I convert owner-occupied median housing prices into imputed annual rent using a discount rate of 7.85% by Peiser and Smith (1985).[10] The basic housing regression is given by the following:

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[9] In the sensitivity analysis, I also calculated characteristic-adjusted wages without industry and occupation controls.

[10] In sensitivity analysis, I also use only rents to measure housing costs because housing prices can reflect both consumption and investment motives (Winters, 2009). See footnote 14 for discussion of the results.

$$(6) \qquad lnh_{ij} = \boldsymbol{\rho Z}_{ij} + \gamma_j + \mu_{ij}$$

where lnh_{ij} is the natural log of housing costs for individual i in CONSPUMA area j. $\boldsymbol{Z}_{ij}$ represents the vector of house characteristics, which include whether the housing unit has a business on the property, is located on over 10 acres, number of rooms indicators of 2-4 rooms, 5-8 rooms and over 9 rooms (the 1 room category is omitted to avoid perfect collinearity), and whether the residence contained complete plumbing facilities, contained kitchen facilities, bedroom-to-room ratio, and structure age. For the structure's age, I include indicators for 2-5 years, 6-10 years, 11-20 years, 21-30 years, 31-40 years, 41-50 years and over 50 years in 2000 sample, while using whether the structure was built in 2000-2004, 1990-1999, 1970-1989, 1940-1969 and earlier than 1940 as indicators in the 2010 ACS sample. The category of 1-year old and structure was built after 2005 are omitted for the 2000 and 2006-2010 samples, respectively. γ_j is the fixed effect of area j whereas, μ_{ij} is the error term.

I run the regression for house owners and renters separately to obtain the estimated housing cost of owners, $ln\hat{h}_j^o = \boldsymbol{\rho}\overline{\boldsymbol{Z}}^o + \hat{\gamma}_j^o$, and housing cost of renters, $ln\hat{h}_j^r = \boldsymbol{\rho}\overline{\boldsymbol{Z}}^r + \hat{\gamma}_j^r$. I then generate the weighted housing cost of each area j:

$$(7) \qquad ln\hat{h}_j = \sigma\, ln\hat{h}_j^o + (1-\sigma)ln\hat{h}_j^r$$

where $ln\hat{h}_j$ is baseline characteristics-adjusted housing costs in area j. σ is the percent of a house unit owned by the household; $(1-\sigma)$ is the percent of the rented house unit.

3.2 Second-stage Regressions

After obtaining baseline characteristic-adjusted wages and housing costs for each COMSPUMA, I next run regressions using the wage and housing cost fixed effects as dependent variables to obtain the differential effects across regions relative to Oklahoma. Based on the theoretical model shown in section 2, if the values of site characteristics are capitalized into wages and land rents, the fixed effect differential across regions of wages and housing cost regressions can suggest whether there are any policy advantages, controlling for the exogenous differences in characteristics potentially related to economic performance. Thus, previous growth advantages will be captured in the fixed effect differentials across regions of wage and housing cost levels.

Exogenous factors that have been found to underlie regional growth differences should be included as control variables. Following Rickman (2013), the exogenous factors controlled in the regressions are natural amenity attractiveness, the position along the rural-urban continuum, industry composition and immigration shocks. The natural amenity attractiveness of the area is measured using a ranking produced by Economic Research Service (ERS) of the United States Department of Agriculture (USDA) (McGranahan, 1999). The amenity ranking is based on the natural amenity scale composed by the combination of six measures: average January temperature, average January days of sun, average July temperature, average July humidity, topographic variation and water area-to-county area ratio. The ranking ranges from a value of one to seven that indicates the lowest to highest amenity-attractiveness. Also included is the forest coverage ratio (McGranahan et al, 2011). In addition, the analysis for only nonmetropolitan areas includes the nonmetropolitan recreation county indicator by the USDA Economic Research Services as an additional indicator of natural amenity attractiveness of the area. Yet, the above listed data are all provided at the county level. I use population of each county in the CONSPUMA as the weight to construct CONSPUMA-level data, where county-level population is the estimated population of county on April 1, 2000 by the Census Bureau of the United States.

The rural-urban continuum codes are based on the 2003 USDA Economic Research Service's nine category codes.[11] Similar to the amenity attractiveness variables, to compose

[11] According to USDA, the codes from one to nine denote whether a county is: 1) in a metropolitan area with population of 1 million or more; 2) in a metropolitan area of 250,000 to 1 million people; 3) in a metropolitan area with population fewer than 250,000; 4) a nonmetropolitan county with urban population of 20,000 or more , and adjacent to a metropolitan area; 5) a nonmetropolitan county with urban population of 20,000 or more, but not adjacent to a metropolitan area; 6) a nonmetropolitan county with urban population of 2,500 to 19,999, adjacent to a metropolitan area; 7) a nonmetropolitan county with urban population of 2,500 to 19,999, not adjacent to a metropolitan area; 8) a nonmetropolitan county completely rural or less than 2,500 urban population, adjacent to metropolitan area; or 9) a nonmetropolitan county completely rural or less than 2,500 urban population, not adjacent to metropolitan area.

CONSPUMA-level data, I use county population-weighted rural-urban codes. Therefore, I create dummy variables using scale [1,2), [2,3), [3,4), [4,5), [5,6), [6,7), [7,9] where the lower bound is included, while the upper bound is not included; the category [7, 9] is the omitted group.[12]

Industry composition variables based on the classification by USDA Economic Research Services where counties are designated as primarily dependent on farming, mining, manufacturing, federal or state government, and services. The diversified counties are treated as the omitted category. Similar to the other control variables listed above, the industry composition variables are weighted by county population to compose CONSPUMA-level data. The weighted industry composition variables indicate the proportion of the specialized counties by industry of each CONSPUMA.

The growth in population can be driven by natural population increases, immigration or internal migration. To capture the impact of international migration I use the immigration-to-population ratio in the regressions. To make the immigration ratio more exogenous, I calculate the immigration-to-population ratio using 1990 to 1999 net international migration population divided by population in 1990. County-level population and net international migration population can be obtained from Census Bureau of the United States. Similar to the other exogenous control variables, this ratio is weighted by the county population to compose CONSPUMA region data. Although Rickman (2013) found the share of the adult population possessing a Bachelor's degree to be an important growth determinant, as did Mollick and Mora (2012) for Texas, I do not control for education as it may be related to tax policy, for which we are attempting to estimate overall net growth effects.

I then create dummy variables to obtain fixed effects for Census divisions, that include New England, Middle Atlantic, East North Central, East South Central, Mountain, Pacific and West North Central, excluding Kansas and Missouri, where the West South Central region is

[12] Because there are too few observations in category [8, 9], I merge the categories [8, 9] and [7, 8) to create the category that the rank is greater than or equal to 7.

excluded, and states in the West South Central region and those with long borders with Oklahoma (Kansas, Missouri, Arkansas, Louisiana and Texas). CONSPUMAs belonging to Oklahoma are treated as the omitted category; thus, the coefficients for the regional dummy variables are interpreted as the effects relative to Oklahoma. The regression equations follow below:

$$(8) \qquad ln\widehat{w}_j = Control_j + Division_n + State_s$$

$$(9) \qquad ln\widehat{h}_j = Control_j + Division_n + State_s$$

where $Control_j$ represents the control variables, including natural amenity attractiveness, the position along the rural-urban continuum, industry composition and the 1990 immigration ratio. $Division_n$ represents the Census division dummy variables, while $State_s$ represents the dummy variables of the included states in the West South Central division and states with long borders with Oklahoma. The dummy variables capture differences between Kansas, Oklahoma and Texas after controlling for numerous potential exogenous sources of growth, which include policy differences between the states. This is in lieu of including policy measures, which may be endogenous, collinear, poorly measured, and difficult to interpret (Yu and Rickman, 2013); use of the dummy variables also fits nicely within the narrative of comparing recent state economic experiences in policy discussions.

4. FINDINGS AND DISCUSSION

4.1 Regression Results

Tables 1 and 2 display the results of regression analysis of wages and housing costs for the periods of 1990, 2000 and growth during 2000 to 2010. Table 1 reports the results across all areas that include both metropolitan and nonmetropolitan areas, while Table 2 reports the corresponding results across nonmetropolitan areas.

Columns (1) to (3) of each table show the regression results of the natural logarithm of wages for 2000, 2010 and the growth from 2000 to 2010, respectively; whereas, columns (4) to

(6) of each table show the regression analysis of the natural logarithm of housing costs for 2000, 2010 and the growth from 2000 to 2010, respectively.

From the first three columns of Table 1, it can be seen that wages and salaries were highest in the largest metropolitan areas and declined as one moved down the urban hierarchy, consistent with agglomeration economies of scale. Yet, relative to the omitted category of the smallest and most rural areas, only metropolitan areas experienced significantly slower wage and salary growth. Wages and salaries were lower the greater the natural amenity attractiveness according to the ERS amenity ranking, suggesting that amenities were at least in part capitalized into wages and salaries. Immigration in the 1990s was positive and significant, opposite in sign from its interpretation as a supply shifter. It could be though that immigrants were attracted to the most economically-vibrant areas. In terms of industry dependence, wages and salaries were significantly lower in farming dependent areas and significantly higher in services dependent areas, relative to non-specialized areas; wages and salaries significantly increased in government dependent areas and decreased in manufacturing dependent areas from 2000 to 2010.

The housing cost results for the control variables in columns (4) to (6) mostly confirmed the interpretations of the wage and salary results. The positive housing cost effects for the natural amenity ranking combined with the lower wages and salaries indicated lower real wages in more amenity-attractive areas; i.e., natural amenities were capitalized into both lower wages and salaries and higher housing costs. Housing costs were not significantly related to forest cover. The negative housing cost change for forest cover taken together with the negative change in wages and salaries suggested negative labor demand shifts in these areas during 2000- 2010. Immigration was positively related to higher levels of housing costs in both periods, increasing significantly from 2000-2010.

Consistent with a dominant demand interpretation (Partridge et al., 2010), when combined with the wage and salary results, housing costs were highest in the largest metropolitan areas, declining in the next two categories down the hierarchy, becoming insignificant for the three nonmetropolitan categories above the last omitted category. Farm dependence was associated with lower relative housing costs in both years, declining significantly over the decade, while energy and manufacturing dependence were associated with relative declines in housing costs from 2000 to 2010. Dependence on services was associated with higher housing costs in both periods, consistent with the wage and salary results and dominant demand interpretation.

The regional dummy variable results reveal that wages and salaries and housing costs in all other Census Bureau divisions were statistically higher than in Oklahoma during both 2000 and 2010. Relative declines in wages and salaries during 2000-2010, however, occurred in the East North Central, East South Central and West North Central (excluding Kansas and Missouri) divisions; wages and salaries significantly increased in the New England division. Relative to Oklahoma, housing costs mostly significantly increased in all divisions, the exceptions being the East and West North Central divisions, and the Mountain division.

Arkansas and Louisiana had higher wages and salaries and housing costs than Oklahoma in 2000 and 2010, with the differences significantly increasing in Louisiana during the decade. Wages and salaries and housing costs did not significantly differ in Kansas either year, though relative wages and salaries and housing costs significantly declined during the decade. Missouri had higher housing costs and insignificantly different wages and salaries, though the wage and salary effect significantly declined during the decade.

Texas had higher wages and salaries in 2000 and 2010, where the difference from Oklahoma significantly declined during the decade. Housing costs do not significantly differ from those in Oklahoma. The lack of housing cost differentials in Texas could in part be thought to reflect unrestricted housing policies and largely available land in Texas (McNichol and Johnson, 2012), but Oklahoma is considered to have equally or more favorable housing policies and availability of land than Texas.[13] After controlling for other factors, the higher wages relative to housing costs suggests lower quality of life in Texas relative to Oklahoma in terms of its policies.

The only statistically significant difference between Texas and Kansas (not shown) is the larger Texas coefficient for wages and salaries in 2010 (p=0.057). There are no significant differences in the changes in wages and salaries and housing costs between 2000 and 2010. Similar to Oklahoma, the higher Texas wages and salaries in 2010 relative to Kansas, and the absence of housing cost differences, suggests Texas was less policy attractive to households then, all else equal.

Because economic growth patterns in metropolitan areas may differ greatly from those of nonmetropolitan areas, I analyze wages and housing costs in nonmetropolitan areas separately. Table 2 displays the regression results for the period of 1990, 2000 and the growth from 2000 to 2010. An additional variable from Economic Research Service is available for nonmetropolitan areas and is added to the regressions: whether the county is dependent on recreation activities for its economic livelihood.

The first three columns of Table 2 show that the nonmetropolitan areas further up the ERS rural-urban continuum had higher wages and salaries relative to the omitted category of the smallest and most rural areas. Consistent with the results across all areas, no nonmetropolitan areas experienced significantly slower wage and salary growth than the smallest and most rural nonmetropolitan areas. In contrast to the results for all areas, wages and salaries were not significantly affected by the natural amenity attractiveness. Recreation county status increased wages and salaries in nonmetropolitan areas, suggesting the areas were boosted by area tourism. Immigration in the 1990s was not significant, in contrast to the results for all areas. In terms of industry dependence, only for 2000, were wages and salaries significantly higher in

[13] Gyourko et al. (2008) ranks Texas as having the 30th most restrictive local and state regulatory environment for housing supply, while Oklahoma is ranked 38th, suggesting it is less restrictive than Texas.

manufacturing dependent areas relative to non-specialized areas, though this advantage disappeared during 2000-2010.

The housing cost results for the control variables in columns 4-6 mostly confirmed the interpretations of the wage and salary results. The positive housing cost effects for the natural amenity ranking indicated household demand-driven impacts on housing prices in more amenity-attractive areas; i.e., natural amenities were capitalized into higher housing costs. Housing costs were not significantly related to forest cover, though there was a significant decline during 2000-2010. Combined with declining wage and salary effects during the period, this suggests adverse firm effects in areas with greater forest cover during the decade. Both recreation dependence and immigration were not related to higher housing costs in nonmetropolitan areas, though housing costs significantly increased in recreation-dependent areas during the decade, consistent with the change in wages and salaries, suggesting increased beneficial labor demand effects in recreation counties.

Housing costs were positively but not statistically significantly related to the position in the rural-urban continuum, except for the second nonmetropolitan category above the omitted category for the period of 2010. Industry dependence was not associated with the level of housing costs in both years, while there were negative relative changes associated with farming, energy and manufacturing dependence relative to non-specialized areas from 2000 to 2010.

The regional binary indicator coefficients reveal that wages and salaries in all other nonmetropolitan portions in other Census Bureau divisions, except the West North Central division in 2010, were statistically higher than in nonmetropolitan Oklahoma during both years. Relative declines in wages and salaries during 2000-2010, however, occurred in the East North Central division. Nonmetropolitan housing costs in all Census Bureau divisions were statistically higher than in Oklahoma during both 2000 and 2010. Relative housing costs significantly increased in the nonmetropolitan areas of the New England, South Atlantic and Pacific divisions.

Wages and salaries were significantly higher in Arkansas, Louisiana and Texas in both years, while controlling for the exogenous factors. Housing costs were significantly higher in Missouri, Louisiana in both years and in Texas in 2010. Only in Louisiana did wages and salaries and housing costs significantly increase relative to Oklahoma from 2000 to 2010, where both significantly decreased in Kansas. The absence of statistically significant growth in wages and salaries and housing costs is consistent with the Texas-Oklahoma nonmetropolitan employment and population growth results of Rickman (2013). In results not shown, wages and salaries and housing costs are statistically larger in Texas relative to Kansas in 2010 below the five percent level, but not 2000, where the change in relative housing costs also is statistically significant.

4.2 Growth Decomposition

To understand the sources of the higher wages and salaries in Texas relative to Oklahoma, decomposition of the wage and salary differences into productivity and amenity effects is needed. Wages and rents are determined by the interaction of the spatial equilibrium conditions from the model above for firms and workers (Beeson and Eberts, 1989). Thus, household and firm amenities are capitalized into wages and rents (Partridge et al., 2010). As shown in Figure 1, the workers' equilibrium condition can be shown by the upward sloping isoutility curves in wage (*w*) and rent (*r*), while the firms' equilibrium condition can be shown by the downward sloping isocost curves. Isoutility curves to the right are associated with more amenity attractiveness, while isocost curves to the right are associated with higher productivity values of site characteristics. Assume S^h and S^f represent the amenity and productivity of the average area, $S^{h'}$ represents a high-amenity area and $S^{f'}$ represents a low-productivity area.

As given by Beeson and Eberts (1989), in equilibrium, wages, w_1, and rents, r_1, in the average area is determined by the intersection of the isocost curve, $C(w, r; S^f)$, and the isoutility curve, $V(w, r; S^h)$. The wages and rents in the area that have high-amenity and low productivity are w_2 and r_2 as determined by $C(w, r; S^{f'})$ and $V(w, r; S^{h'})$. The wage and rent differential relative to the average area will be $(w_2 - w_1)$ and $(r_2 - r_1)$ where the magnitude of the differential depends on the size and direction of the shifts of the curves and the slopes of the curves. The net wage differential $(w_2 - w_1)$ is made up of the productivity component ($[dw/ds]^c$) (the shift in the isocost curve $(w_1 - w_3)$), and the amenity component ($[dw/ds]^v$) (the shift in the isoutility curve $(w_3 - w_2)$).

Under labor and land market clearing conditions, the labor used in production, N_f, equals the total number of workers in area, N, and the total land area of the area L equals the summation of the land used in production, L_f, and total residential lands, Nl_h, where l_h represents residential land per person. Assuming linearity around the factor space of inquiry, the slopes of isoutility and isocost curves are, respectively (Beeson and Eberts, 1989):

$$(10) \qquad (dw/ds)^c/(dr/ds)^c = l_h$$

$$(11) \qquad (dw/ds)^v/(dr/ds)^v = -L_f/N_f$$

Solving equations (10) and (11), the total wage differential between two areas can be rewritten as:

$$(12) \qquad dw/ds = l_h(dr/ds)^c - (L_f/N_f)(dr/ds)^v$$

Using the expression (dr/ds) as the sum of the amenity and productivity components and solving for $(dr/ds)^v$ in equation (11), equation (12) can be solved for the amenity component as the following:

$$(13) \qquad (dw/ds)^v = [(L_f/N_f)/(l_h + (L_f/N_f))] * (dw/ds - l_h dr/ds)$$

The profit component can be obtained from subtracting the results $(dw/ds)^v$ from (dw/ds). As the model assumes that consumer prices only vary geographically because of the land prices, $(dw/ds - l_h dr/ds)$ reflects the change in real wages (Beeson and Eberts, 1989; Partridge et al., 2010).

Following Beeson and Eberts (1989) and Partridge et al. (2010), I assume that differentials in housing prices do not relate to differences in replacement costs of structures but to land price differentials: $p^h = rl_h/h$, where p^h denotes the unit price of housing and h

represents quantity of housing units. Substituting the log differential of the expression for the unit price of housing into the log differential of equation (7) and the market clearing condition, it will yield:

$$(14) \qquad (dlogw/ds)^v = [(rL_f/wN_f)/(rL/wN)] * (dlogw/ds - \theta^h dlogr/ds)$$

where θ^h is the household budget share spent on housing. Because price adjustment is in terms of the housing price change, the second term reflects the real wage rate (Partridge et al., 2010). The value for the first term in brackets in Equation (14) is 0.6414 (Partridge et al., 2010). Following Glaeser and Tobio (2008), I set the housing budget share in equation (14), θ^h to equal 0.3.

As shown in Table 3, the results calculated based on the regression for both metropolitan and nonmetropolitan areas and Equation (14) for Texas relative to Oklahoma show that the (dis)amenity component of relatively higher wages is 0.030; whereas, the relative productivity component is 0.024 in 2000. The (dis)amenity component of the policies is 0.032 and the productivity component is 0.007 in 2010. For wage and salary growth from 2000 to 2010, the (dis)amenity component is 0.002, while the productivity component is -0.017.

The decomposition reveals that the required compensation for less policy amenity attractiveness contributes more to the higher wages and salaries in all areas of Texas relative to Oklahoma than the contribution from productivity attractiveness. This suggests that while the policies of Texas have contributed to relatively stronger productivity, they also were unfavorably viewed by households. However, the estimated amenity and productivity differences are imprecisely measured and are not statistically significant.[14] The differences between Kansas and Texas are one standard error or less (using either the standard error for Kansas or Texas). The decomposition of wages and salary growth indicates that the decrease in wages and salaries in Texas relative to Oklahoma resulted from the decrease in relative productivity, though the result

[14] Examination of statistical differences in the coefficients was performed using LINCOM for the wage and housing cost regressions together in STATA (www.stata.com/manuals13/rlincom.pd).

is statistically insignificant. Texas and Kansas had approximately equal declines in productivity relative to Oklahoma.

The Texas-Oklahoma decomposition results for nonmetropolitan areas (Table 4) show that the (dis)amenity component is 0.037, whereas, the productivity component is 0.031 in 2000. The (dis)amenity component is 0.025 and the productivity component is 0.32 in 2010. Only the year 2000 Texas (dis) amenity component is statistically significant. The differences between Kansas and Texas are all less than approximately 1.5 standard errors (not shown). For wage and salary growth from 2000-2010, the Texas amenity component is -0.012 and the productivity component is 0.01, where both are statistically insignificant. However, productivity growth in Kansas relative to Texas significantly declined during the decade.

The results show the higher wages and salaries across nonmetropolitan areas in Texas are caused by both less amenity attractiveness and greater productivity in 2000 and 2010, where only the (dis) amenity effect is statistically significant. The absence of a nonmetropolitan employment growth advantage for Texas relative to Oklahoma found by Rickman (2013) during the decade then can be attributed to an absence of significantly positive changes in relative productivity or amenities, all else equal. The significant household disamenity effect would have been capitalized into factor prices.[15]

5. SUMMARY AND CONCLUSION

This paper examined whether evidence could be found to support Texas as an example for Kansas and Oklahoma to follow in terms of public policies. Analysis by Rickman (2013) for nonmetropolitan areas suggested that Texas no longer enjoyed growth advantages over Oklahoma once numerous exogenous factors were controlled for econometrically. However,

[15] Using only housing rents to calculate housing costs, because housing prices may reflect both consumption and investment motives (Winters, 2009), does not much affect the results. For all areas, there are no significant differences in amenity attractiveness or productivity between Texas and either Kansas or Oklahoma. For nonmetropolitan areas, Texas is both significantly more household unattractive and more productive than those in Oklahoma in 2000, where both differences become insignificant in 2010; the changes from 2000 to 2010 are statistically insignificant. No significant differences exist between the nonmetropolitan areas of Texas and Kansas.

because the positive effects of Texas policies may have already been capitalized into wages and rents, examination of growth alone may not reveal the economic advantages the policies created for Texas. Therefore, using micro-level data from the IPUMS-USA Census 2000 database 5% sample and the 2006-2010 ACS 5-year sample for the nation, this paper examines whether Texas has benefitted from its mix of public policies by estimating quality-adjusted wages and housing costs. Because economic growth processes in metropolitan areas may differ from those in nonmetropolitan areas, this paper examined the wages and housing rents in metropolitan and nonmetropolitan areas together and then in nonmetropolitan areas separately, while controlling for the same exogenous factors used in Rickman (2013).

The only statistically significant difference found for Texas relative to Oklahoma was lower amenity attractiveness of Texas for nonmetropolitan areas in year 2000, all else equal. No significant growth differences were found for amenity attractiveness or firm productivity between the two states. There were not any statistically significant differences between Texas and Kansas in either year. Yet, nonmetropolitan areas in Kansas experienced a statistically significant decline in productivity from 2000 to 2010 relative to Texas.

Overall, there is little evidence to suggest that the policies of Texas have been economically-beneficial compared to those in Kansas and Oklahoma. No significant positive capitalized amenity or productivity effects were found. Other exogenous non-policy factors appear to explain the differences between the states. In addition, the apparent relative unattractiveness of the policies to households casts doubt on the efficacy of Oklahoma following the example of Texas. Although Texas may not have a state personal income tax rate, property taxes in Texas are much higher.

Not all differences identified in the study may be necessarily attributable to public policy differences, but the estimated differences are obtained after extensive controls for other factors, and provide stronger evidence than simple comparisons of state growth rates and economic outcomes. In short, simple growth comparisons may create the “mirage” of stronger economic performance, but such comparisons should not be used in formulating public policy. More extensive analysis is needed and the potential effects on both households and firms should be carefully considered in formulating policies.

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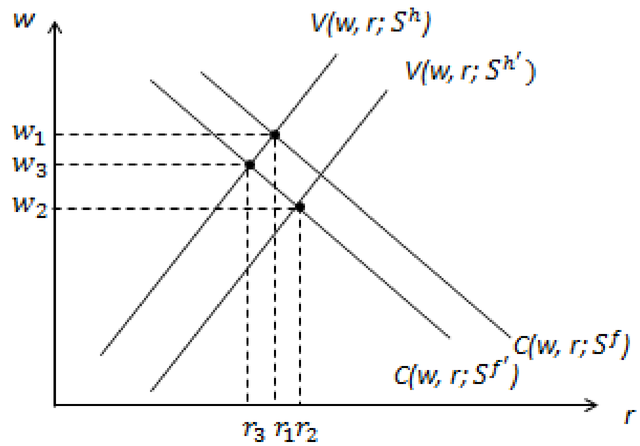

Figure 1: Determination of Equilibrium Wages and Rents

Table 1: Regression Results of Income and Housing across All Areas

	Income			Housing Cost		
	2000	2010	change	2000	2010	change
Variables	(1)	(2)	(3)	(4)	(5)	(6)
amenity rank	-0.00760**	-0.00624*	0.00137	0.0103**	0.0167***	0.00642**
	(-2.567)	(-1.902)	(0.953)	(1.977)	(2.590)	(2.113)
forest percent	-0.000112	-0.000306*	-0.000194***	0.000506	-7.69e-05	-0.000583***
	(-0.660)	(-1.738)	(-2.690)	(1.468)	(-0.219)	(-2.898)
immigration 1990*100	0.0137***	0.0140***	0.000325	0.0283***	0.0399***	0.0115***
	(5.648)	(5.524)	(0.416)	(6.794)	(8.990)	(5.904)
farm city	-0.0773***	-0.0725***	0.00479	-0.143*	-0.237***	-0.0938*
	(-2.921)	(-3.053)	(0.362)	(-1.690)	(-3.482)	(-1.936)
energy city	-0.0400	-0.0467	-0.00666	-0.0179	-0.0942	-0.0763**
	(-0.997)	(-1.012)	(-0.454)	(-0.273)	(-1.151)	(-2.227)
manufacturing city	0.00768	-0.0196	-0.0272***	0.0329*	-0.0165	-0.0494***
	(0.642)	(-1.568)	(-6.199)	(1.746)	(-0.706)	(-3.849)
government city	0.00476	0.0139	0.00912*	0.0461**	0.0826***	0.0365**
	(0.341)	(0.945)	(1.666)	(2.171)	(3.084)	(2.564)
services city	0.0304***	0.0246**	-0.00586	0.0939***	0.109***	0.0154
	(2.710)	(2.084)	(-1.466)	(4.826)	(4.728)	(1.293)
rururb 1 - 2	0.237***	0.225***	-0.0117*	0.189***	0.206***	0.0166
	(15.61)	(14.85)	(-1.814)	(6.190)	(5.418)	(0.937)
rururb 2 - 3	0.152***	0.135***	-0.0167***	0.114***	0.0940***	-0.0204
	(10.90)	(9.687)	(-2.679)	(3.928)	(2.598)	(-1.213)
rururb 3 - 4	0.107***	0.104***	-0.00227	0.0712**	0.0794**	0.00823
	(7.928)	(7.725)	(-0.367)	(2.535)	(2.241)	(0.503)
rururb 4 - 5	0.0696***	0.0615***	-0.00811	0.0397	0.0422	0.00251
	(5.207)	(4.695)	(-1.201)	(1.379)	(1.161)	(0.153)
rururb 5 - 6	0.0499***	0.0483***	-0.00163	0.0306	0.0537	0.0231
	(3.721)	(3.437)	(-0.225)	(1.095)	(1.449)	(1.278)
rururb 6 - 7	0.0476***	0.0405***	-0.00704	0.0354	0.0411	0.00567
	(3.557)	(2.999)	(-0.994)	(1.195)	(1.139)	(0.342)
New England	0.149***	0.164***	0.0157**	0.155***	0.311***	0.156***
	(5.341)	(6.268)	(2.165)	(3.153)	(6.335)	(8.217)
Middle Atlantic	0.120***	0.118***	-0.00178	0.152***	0.248***	0.0961***
	(5.602)	(5.791)	(-0.311)	(6.260)	(8.478)	(6.283)
East North Central	0.130***	0.0787***	-0.0512***	0.202***	0.187***	-0.0146
	(6.518)	(4.199)	(-7.489)	(8.338)	(6.901)	(-0.994)
East South Central	0.0680***	0.0526***	-0.0155**	0.0927***	0.120***	0.0272**
	(3.700)	(3.033)	(-2.551)	(4.349)	(5.162)	(2.137)
West North Central excl KS MO	0.0596***	0.0473**	-0.0123*	0.151***	0.162***	0.0115
	(2.877)	(2.426)	(-1.774)	(6.099)	(5.408)	(0.660)

South Atlantic	0.0748***	0.0789***	0.00405	0.182***	0.243***	0.0611***
	(4.079)	(4.653)	(0.719)	(8.839)	(11.26)	(4.549)
Mountain	0.0812***	0.0800***	-0.00124	0.0988***	0.0850***	-0.0138
	(4.151)	(4.395)	(-0.160)	(4.012)	(3.189)	(-0.937)
Pacific	0.162***	0.171***	0.00930	0.247***	0.332***	0.0853***
	(7.186)	(7.753)	(1.404)	(7.882)	(9.504)	(4.169)
Kansas	0.0292	0.00419	-0.0250***	0.0377	-0.0219	-0.0597***
	(1.376)	(0.224)	(-3.414)	(1.330)	(-0.743)	(-3.685)
Missouri	0.0274	0.00393	-0.0234***	0.0882***	0.0808***	-0.00736
	(1.137)	(0.179)	(-3.936)	(2.883)	(2.736)	(-0.508)
Arkansas	0.0461**	0.0583***	0.0123	0.0409*	0.0612***	0.0203
	(2.296)	(3.369)	(1.148)	(1.921)	(3.313)	(1.578)
Louisiana	0.0660***	0.0931***	0.0270***	0.104***	0.166***	0.0614***
	(2.930)	(4.196)	(3.532)	(4.211)	(5.420)	(3.922)
Texas	0.0540**	0.0388*	-0.0152**	0.0259	-0.0350	-0.0609***
	(2.574)	(1.897)	(-2.130)	(1.040)	(-1.146)	(-4.352)
Constant	9.983***	10.28***	0.293***	6.868***	7.147***	0.279***
	(386.1)	(402.9)	(29.26)	(162.0)	(139.8)	(10.98)
Observations	539	539	539	539	539	539
R-squared	0.751	0.746	0.530	0.651	0.746	0.610

Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 2: Regression Results of Income and Housing across Nonmetropolitan Areas

	Income			Housing Cost		
	2000	2010	change	2000	2010	change
Variables	(1)	(2)	(3)	(4)	(5)	(6)
amenity rank	-0.00274	-0.00413	-0.00139	0.0213**	0.0256**	0.00430
	(-0.663)	(-0.924)	(-0.581)	(2.313)	(2.478)	(0.932)
forest percent	-0.000414*	-0.000694**	-0.000279*	-5.85e-06	-0.000490	-0.000484*
	(-1.685)	(-2.485)	(-1.856)	(-0.0115)	(-0.864)	(-1.741)
recreation county	0.0789***	0.105***	0.0264**	0.0620	0.128	0.0664**
	(3.104)	(3.666)	(2.468)	(0.834)	(1.459)	(2.123)
immigration 1990*100	0.00333	-0.000604	-0.00393	0.0142	0.00846	-0.00573
	(0.609)	(-0.102)	(-1.518)	(1.487)	(1.018)	(-1.188)
farm city	-0.0291	-0.0237	0.00548	0.00748	-0.0826	-0.0901**
	(-1.016)	(-0.792)	(0.282)	(0.126)	(-1.507)	(-2.483)
energy city	-0.00353	0.00224	0.00577	0.00261	-0.0550	-0.0576*
	(-0.137)	(0.0769)	(0.507)	(0.0412)	(-0.817)	(-1.865)
manufacturing city	0.0392**	0.00675	-0.0324***	0.0334	-0.0207	-0.0540**
	(2.485)	(0.410)	(-3.871)	(0.901)	(-0.445)	(-2.216)
government city	-0.00736	0.0131	0.0205	-0.0673	-0.0312	0.0361
	(-0.242)	(0.515)	(1.559)	(-1.147)	(-0.533)	(1.171)
services city	0.00912	0.00919	6.26e-05	0.0312	0.0860	0.0548
	(0.293)	(0.246)	(0.00416)	(0.378)	(0.846)	(1.511)
rururb 4 - 5	0.0653***	0.0720***	0.00671	0.0496	0.0621	0.0125
	(3.903)	(4.330)	(0.769)	(1.139)	(1.225)	(0.741)
rururb 5 - 6	0.0560***	0.0576***	0.00158	0.0249	0.0488*	0.0238*
	(4.653)	(4.964)	(0.229)	(1.079)	(1.720)	(1.756)
rururb 6 - 7	0.0497***	0.0439***	-0.00574	0.0320	0.0399	0.00787
	(4.198)	(3.703)	(-0.815)	(1.573)	(1.645)	(0.631)
New England	0.0922***	0.101***	0.00898	0.178***	0.271***	0.0931***
	(3.054)	(2.947)	(0.718)	(3.995)	(5.022)	(2.847)
Middle Atlantic	0.120***	0.108***	-0.0118	0.161***	0.205***	0.0437
	(5.477)	(4.234)	(-1.034)	(3.188)	(3.615)	(1.564)
East North Central	0.126***	0.0748***	-0.0514***	0.253***	0.234***	-0.0188
	(6.159)	(3.192)	(-3.919)	(5.121)	(4.470)	(-0.703)
East South Central	0.0838***	0.0704***	-0.0133	0.0992***	0.124***	0.0249
	(5.035)	(3.613)	(-1.362)	(2.831)	(3.861)	(1.142)
West North Central excl KS MO	0.0453**	0.0311	-0.0142	0.121***	0.120***	-0.00118
	(2.316)	(1.502)	(-1.285)	(3.155)	(3.299)	(-0.0500)
South Atlantic	0.110***	0.0947***	-0.0148	0.230***	0.278***	0.0478**
	(5.973)	(4.364)	(-1.429)	(6.063)	(7.411)	(2.129)
Mountain	0.0920***	0.0921***	0.000116	0.120***	0.121***	0.000895
	(4.852)	(4.510)	(0.00984)	(2.904)	(3.182)	(0.0392)

Pacific	0.165***	0.173***	0.00838	0.254***	0.354***	0.101**
	(6.891)	(6.277)	(0.800)	(6.193)	(8.087)	(2.357)
Kansas	0.0285	-0.000587	-0.0291**	0.0244	-0.0203	-0.0447**
	(1.265)	(-0.0273)	(-2.455)	(0.649)	(-0.643)	(-2.166)
Missouri	0.0306	0.00727	-0.0234***	0.125***	0.105***	-0.0199
	(1.575)	(0.353)	(-2.856)	(3.528)	(3.288)	(-1.029)
Arkansas	0.0542***	0.0513**	-0.00287	0.0161	0.0448	0.0287
	(2.634)	(2.363)	(-0.236)	(0.442)	(1.327)	(1.332)
Louisiana	0.100***	0.124***	0.0244***	0.119**	0.155***	0.0361*
	(5.272)	(6.232)	(2.693)	(2.075)	(2.828)	(1.810)
Texas	0.0679***	0.0567**	-0.0112	0.0361	0.0593*	0.0232
	(3.642)	(2.496)	(-0.974)	(0.950)	(1.856)	(1.138)
Constant	9.919***	10.22***	0.302***	6.991***	7.241***	0.250***
	(369.3)	(366.1)	(23.17)	(128.5)	(126.5)	(9.220)
Observations	153	153	153	153	153	153
R-squared	0.670	0.656	0.558	0.626	0.708	0.555

Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 3: Decomposition of Wage differentials across All Areas

	Income					
	2000		2010		change	
	amenity	productivity	amenity	productivity	amenity	productivity
Variables	(1)	(2)	(3)	(4)	(5)	(6)
New England	0.066[c]	0.083[c]	0.045[b]	0.119[c]	-0.020[a]	0.036[b]
Middle Atlantic	0.048[b]	0.072[b]	0.028	0.090[c]	-0.020[a]	0.018
East North Central	0.045[a]	0.085[c]	0.014	0.064[a]	-0.030[b]	-0.021
East South Central	0.026	0.042	0.011	0.042	-0.015	0.000
West North Central excl KS MO	0.009	0.050	-0.001	0.048	-0.010	-0.002
South Atlantic	0.013	0.062[b]	0.004	0.075[b]	-0.009	0.013
Mountain	0.033	0.048	0.035	0.045	0.002	-0.003
Pacific	0.056[b]	0.106[c]	0.046[b]	0.125[c]	-0.010	0.020
Kansas	0.011	0.018	0.007	-0.003	-0.005	-0.020
Missouri	0.001	0.027	-0.013	0.017	-0.014	-0.010
Arkansas	0.022	0.024	0.026	0.033	0.004	0.008
Louisiana	0.022	0.044	0.028	0.065[a]	0.006	0.021
Texas	0.030	0.024	0.032	0.007	0.002	-0.017

[a]denotes significant at or below the 10 percent level
[b]denotes significant at or below the 5 percent level
[c]denotes significant at or below the 1 percent level

Table 4: Decomposition of Wage differentials across Nonmetro Areas

	Income					
	2000		2010		change	
	amenity	productivity	amenity	productivity	amenity	productivity
Variables	(1)	(2)	(3)	(4)	(5)	(6)
New England	0.025	0.067[c]	0.013	0.088[c]	-0.012	0.021
Middle Atlantic	0.046[b]	0.074[c]	0.030[a]	0.078[c]	-0.016	0.004
East North Central	0.032[a]	0.094[c]	0.003	0.072[c]	-0.029[c]	-0.022[a]
East South Central	0.035[a]	0.049[b]	0.021	0.049[b]	-0.013	0.000
West North Central excl KS MO	0.006	0.040[b]	-0.003	0.034	-0.009	-0.005
South Atlantic	0.026	0.084[c]	0.007	0.087[c]	-0.019	0.004
Mountain	0.036[b]	0.056[c]	0.036[b]	0.056[c]	0.000	0.000
Pacific	0.057[c]	0.108[c]	0.043[b]	0.130[c]	-0.014	0.022[a]
Kansas	0.014	0.015	0.004	-0.004	-0.010	-0.019[a]
Missouri	-0.004	0.035	-0.016	0.023	-0.011	-0.012
Arkansas	0.032	0.023	0.024	0.027	-0.007	0.004
Louisiana	0.041[b]	0.059[c]	0.050[c]	0.074[c]	0.009	0.016
Texas	0.037[a]	0.031	0.025	0.032	-0.012	0.000

[a]denotes significant at or below the 10 percent level
[b]denotes significant at or below the 5 percent level
[c]denotes significant at or below the 1 percent level