

An Aggregate Approach to Estimating Quality of Life in Micropolitan Areas

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Abstract

Because of their reliance on large samples of micro-level housing and wage data, quality of life studies using Rosen-Roback models have focused almost exclusively on metropolitan areas, largely ignoring non-metropolitan areas. Although understandable given data constraints, this dominant focus on metropolitans has limited the data-driven approaches available to policymakers concerned with community and economic development in small cities, or micropolitan areas. To address this gap, we develop an aggregate approach to estimate both quality of life and quality of the business environment in micropolitan areas utilizing county-level housing and wage data that can be used when large samples of micro-level data are unavailable. Specifically, we use the county residuals from wage and housing regressions to replace the fixed effects typically estimated from the micro-level estimations in quality of life studies. We find compelling evidence that higher quality of life is not only associated with higher employment and population growth and lower poverty rates, but that it is more important than quality of the business environment in determining the success of micropolitan areas.

JEL Codes: R1, R5, H4

Key words: quality of life, quality of the business environment, revealed preference, consumption amenities, micropolitan areas

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1. Introduction

Urban planners and urban economists have long noted the importance of quality of life (QOL) in determining the success of cities (see Jacobs, 1961; Rogerson, 1999; Florida, 2002; Shapiro, 2006). Indeed, the importance of quality of life has likely increased over time with the rise of the “consumer city” (Glaeser, Kolko, Saiz, 2001; Rappaport, 2009). While cities in general are well positioned to benefit from the consumer amenities they offer, recent work by Brown and Tousey (2020) finds that small urban areas (mostly micropolitan areas) face slower population and employment growth than do large urban areas. It remains an open question whether quality of life functions in a similar way, attracting population and facilitating growth and development, in micropolitans as it does in large urban areas.

The primary reason this question remains unanswered is a matter of data constraints. The most common model for estimating quality of life, Rosen-Roback, requires large samples of micro-level data in order to reveal when and under what circumstances households are willing to pay higher housing prices and/or forego higher wages in order to live where they do. Their willingness to pay for location, their “revealed preference,” is a reflection of amenities and the quality of life (Rosen, 1979; Roback, 1982; Albouy, 2008). Similarly, estimations of the quality of business environment (QOBE) reveals where businesses are willing to pay more for location. Because the publicly available micro-level data required to make these estimations is primarily available for metropolitan areas, however, the quality of life literature has necessarily focused on large urban centers. One consequence of this nearly exclusive focus on metropolitan areas in the QOL literature is that policymakers in smaller urban areas are less able to utilize research to develop effective and sustainable community and economic development strategies. Despite some prominent assumptions to the contrary (Brown, Cromartie and Kulcsar, 2004), micropolitan areas are not simply scaled-back versions of metropolitans; we cannot assume that either research findings or successful policy prescriptions in major metropolitan areas like San Francisco are accurate or appropriate in small cities like Wooster, Ohio.

The 542 micropolitan statistical areas (μ SA) in the United States, which are defined by a population core between 10,000 and 50,000 people, are home to over 27 million people (Census, 2019),¹ and they vary in distance to larger urban areas, industrial structure, population, local and spatially contiguous amenities, and government structure. Moreover, micropolitans differ significantly in their levels of human capital and natural capital endowments, which influences their vastly different growth rates. Between 2010 and 2018, population growth in micropolitan counties ranged between negative 16.8 percent to positive 56.5 percent, with an average of 0.2 percent growth. The range of outcomes for employment growth was even wider, ranging between a 32.5 percent loss and an 81.2 percent gain, with an average of 6.0 percent growth.

¹ Calculated using county population data from the Bureau of Economic Analysis

Four of the top five micropolitan area counties with the highest employment growth between 2010 and 2018 (Table 1) are dependent on natural resource amenities and/or extraction. The counties in Texas and North Dakota, for example, have grown as a result of shale development (oil and gas drilling), whereas the mountains of Wasatch County, Utah have given rise to its growing reputation as a ski resort town. Capitalizing on natural resources has long been a successful economic strategy for small towns and cities (Nord and Cromartie, 1997; Beale and Johnson, 1998; McGranahan, 1999; English et al., 2000; Deller et al., 2001), but the inclusion of Lafayette County, Mississippi in the top five micropolitan growth counties highlights that it is not the *only* strategy. Instead, Lafayette County’s growth stems from its institution of higher education, the University of Mississippi (Ole Miss). Reliance on natural resources or universities is not feasible for the majority of micropolitan area counties, however, so it is important to understand what *other* options policymakers in small cities have available to them. Because of the data constraints explained above, however, we must rely on an aggregate method in order to estimate QOL and QOBE in micropolitan areas and provide policymakers with a data-driven approaches to understanding the revealed preferences of residents and businesses in small towns. Ultimately, we expect that research findings explicitly about micropolitan areas will better help policymakers invest in the amenities that will improve quality of life and the business environment in their communities rather than adapting findings from research focused on metropolitans.

Table 1: The Top 5 Micropolitan Area Counties with the Highest Employment Growth

| Rank | County | μSA | Population Growth 2010-2018 | Employment Growth 2010-2018 |
|------|------------------|---------------|--------------------------------|--------------------------------|
| 1 | Reeves County | Pecos, TX | 13.50% | 81.20% |
| 2 | Williams County | Williston, ND | 56.50% | 70.50% |
| 3 | Wasatch County | Heber, UT | 40.60% | 55.90% |
| 4 | Lafayette County | Oxford, MS | 15.20% | 39.80% |
| 5 | Andrews County | Andrews, TX | 22.10% | 37.90% |

Source: BEA (micropolitan area counties with populations between 10,000 and 50,000)

In order to estimate quality of life and quality of the business environment in micropolitan areas and geographies that are too small for breadth and depth of data necessary for traditional QOL methods (Rosen 1979; Roback, 1982), we instead use aggregate county-level data to run average wage and median home value regressions on county-level characteristics that affect wages and home values. We then use the residuals from these regressions to replace the fixed effects typically estimated from the micro-level estimations in QOL studies. In order to test the validity of this approach, we compared our findings using aggregate data to previous findings using the traditional micro-level data approach to estimating QOL in metropolitan areas and find that our aggregate approach produces similar results. We then focus our analysis on micropolitan area counties using our aggregate approach to estimate QOL and QOBE environment for these non-metropolitan counties. We find that micropolitan area counties with higher quality of life experience both higher population growth *and* higher employment growth, but we find no statistically significant relationship between the quality of the business environment and growth in micropolitan areas. Furthermore, we find higher quality of life in micropolitan areas is associated with lower poverty rates in these counties. Finally, we examine a rich set of amenities to discover which amenities are associated with higher quality of life in micropolitan area counties. This examination complements the comparison of our findings to the micro-level data approach. If the use of the error term in our county regressions yields findings comparable to other studies of amenity preferences, we can be more confident of our approach.

2. Literature Review

Regardless of the model, quality of life studies use the preferences revealed by households to estimate willingness to pay (through higher housing prices and lower wages) to live in an area. Although sample sizes of micro-level data are too small or unavailable for non-metropolitan areas to conduct a traditional Rosen-Roback type quality of life estimation, that is not to say non-metropolitan areas are devoid of QOL research. Previous research instead estimates the impact of various amenities separately on growth in county-level housing prices and wages (Wu and Gopinath, 2008; Yu and Rickman, 2012). Using county housing prices and wages in non-metropolitan counties, Yu and Rickman (2012) identify household preferences for higher government spending on highways and for lower taxes (similar to previous studies on larger cities for example, Gyourko and Tracy, 1991). Preferences for infrastructure suggest the importance of connectedness between non-metropolitan areas and nearby metropolitan areas found in other research (Partridge et al., 2008b; Wu and Gopinath, 2008). Yu and Rickman (2012) consider the preferences of firms, finding preferences for investments in public safety and education.

Non-metropolitan research has also focused on other measures of success, particularly growth. Irwin et al. (2010) offer valuable insights from several decades of economic research in nonmetropolitan America in their review of methods that have been used to examine rural growth and change. Economic research in these geographies have largely focused on rural migration and population change (Nord and Cromartie, 1997; Beale and Johnson, 1998; McGranahan, 1999), population and employment change (Carlino and Mills, 1987; Duffy -Deno, 1998, Carruthers and Vias, 2005), and simultaneous population, employment, and income change (Deller et al., 2001; Nzaku and Bukenya, 2005; Deller and Lledo, 2007). This literature has documented the transformation of nonmetropolitan economies over the last century, moving from an overwhelming dependence on agriculture and extractive industries to a greater dependence on manufacturing and services related to natural amenities. There are a number of reasons for this shift, including labor-saving technological progress, transportation cost declines, and rising household incomes (see Nord and Cromartie, 1997, and Irwin et al., 2010 for a review).

Today, natural amenities are an important aspect of growth in much of nonmetropolitan America (Deller et al., 2001; Nzaku and Bukenya, 2005; McGranahan and Wojan, 2007; McGranahan, 2008; Davidsson and Rickman, 2011; Rickman and Rickman, 2011). But higher than average endowments of natural amenities do not guarantee higher than average employment growth. There is significant variation in outcomes for natural amenity-rich micropolitan areas due both to spatial variation in the growth effects of natural amenities and variation across different natural amenities (Kem et al., 2005; Partridge et al., 2008a). Moreover, natural amenities typically require some type of public or private investment, such as building a ski resort (as in Wasatch County) or land conservation, in order to realize the growth effects (McGranahan, 2008).

These investments do not guarantee success, however. If growth in the tourism-based service sector hollows out the distribution of income, for example, natural amenities can actually increase inequality in non-metropolitan areas (Leatherman and Marcouiller, 1999; Marcouiller et al., 2004). In part, this is why previous research suggests policymakers take caution in promoting amenity-led migration and population growth; various congestion effects of population growth can adversely impact quality of life (Rickman and Rickman, 2011; Davidsson and Rickman, 2011), and some researchers assert that micropolitan area growth and development should focus primarily on the wellbeing of its residents (Irwin et al., 2010; Partridge and Rickman, 2003b).

The QOL research for both non-metropolitan and metropolitan areas tends to focus on a few broad categories of amenities. For example, Deller et al. (2001) uses principle component analysis to compress a large number of amenities into smaller indices (climate, land, water, winter recreation, and developed recreational infrastructure). Recent work by Reynolds and Weinstein (forthcoming) incorporates a rich set of location-specific amenities associated with higher quality of life to provide policymakers with a data-driven approach to urban development policy in metropolitan areas using a least absolute shrinkage and selection operator approach to pare down the number of amenities. With more detailed information on the importance of quality of life and the specific amenities that improve quality of life for micropolitan areas, policymakers in these geographies can pursue policies tailored to their community rather than pursuing ineffective sector-based policies that fight against the larger economic trends (for example, by narrowly focusing on agriculture, extractive industries, and other export base development).²

3. Data and Methodology

Indexing or restricting the number of amenities in QOL research is understandable, given the sheer quantity to consider. Yet, concerns arise when estimating quality of life (or quality of the business environment) with an incomplete set of amenities (see for example, Gyourko, 1991). Given that we likely do not have a complete list of amenities, and because some amenities are imperfectly measured, we first infer preferences for locations using wages and rents to estimate quality of life, and then look to the amenities that affect quality of life. As desirable amenities increase the utility and disamenities decrease the utility of residents, the assumption of spatial equilibrium suggests that prices will adjust across areas to reflect preferences for amenities.

To estimate the QOL for a location (j), wage and housing regressions are conducted typically for individuals (i) controlling for individual attributes (X_i^r) and housing characteristics (X_i^w) using large samples of micro-level data. From these wage and housing regressions (equations 1 and 2), we can estimate fixed effects for each location, or the premium that households are willing to pay in higher housing costs (θ_j^r) or lower wages (θ_j^w) to live in location j . This premium is the location-specific amount above or below what the housing characteristics would suggest. After we establish the premium, we then incorporate these fixed effects to estimate the quality of life for each location (equation 3).

$$\log(r_{ij}) = \alpha^r + \beta^r X_i^r + \theta_j^r + \varepsilon_{ij}^r \quad (1)$$

$$\log(w_{ij}) = \alpha^w + \beta^w X_i^w + \theta_j^w + \varepsilon_{ij}^w \quad (2)$$

$$\overline{QOL}_j = \theta_j^r - \theta_j^w \quad (3)$$

We use these same fixed effects to estimate a firms' willingness to pay to locate in a place that is more productive. Businesses are willing to pay higher real estate prices, estimated with the fixed effect from the housing regressions (θ_j^r), and are also willing to pay higher wages (θ_j^w) in order to locate in more productive places (Beeson and Eberts, 1989; Gabriel and Rosenthal, 2004). We call this the quality

² Evidence that gains in farm incomes have improved the outcomes of counties is mixed (Irwin et al., 2010), and Kilkenny and Partridge (2009) fail to find evidence that export base development improves growth in rural areas between 1980 and 2005.

of business environment (QOBE), we estimate QOBE for each location j , incorporating the fixed effects into equation 4.

$$\widehat{QOBE}_j = \theta_j^r + \theta_j^w \quad (4)$$

This commonly used methodology is utilized for large metropolitan areas that can meet the data requirements, a large micro-level sample of individuals i to estimate the fixed effects (θ_j^r and θ_j^w). Reynolds and Rohlin (2014) address these data limitations for smaller locales, Empowerment Zones (j), by replacing individual micro-level data (i) with data available at the census tract and block group level. They then estimate fixed effects (θ_j^r and θ_j^w) to calculate QOL and QOBE in Empowerment Zones. They find that this small-area aggregate approach, replacing individual data with census tract and block group data, replicates the results produced from individual-level data for metropolitan areas. Additionally, Wu and Gopinath (2008) and Yu and Rickman (2012) estimate the impact of various amenities separately on growth in non-metropolitan county-level housing prices and wages, and Welch et al. (2007) use metropolitan county-level median rents and wages to estimate the QOL impact of public services by estimating a seemingly unrelated regression. Building off this research, we utilize aggregate county-level data (see Appendix A for a full list of the data sources) to first estimate QOL and QOBE for all counties in the U.S., and then estimate the impact of amenities on QOL.

Seen in equation 5, we regress the 2010 median home values in county j on county-level housing characteristics (X_j^r), such as the share of the housing stock that has 2-3 bedrooms, the share of the housing stock that was built after the year 2000, etc. We also regress 2010 county average wages on county-level individual characteristics (X_j^w), such as the share of the population with a bachelor's degree, the share of employment in manufacturing, etc. (equation 6; see Appendix B for the full list of factors and the regression results for equations 5 and 6).

$$\log(r_j) = \alpha^r + \beta^r X_j^r + \varepsilon_j^r \quad (5)$$

$$\log(w_j) = \alpha^w + \beta^w X_j^w + \varepsilon_j^w \quad (6)$$

Where our research diverges from previous research is in the use, or lack of use, of county fixed effects in the estimations of QOL and QOBE. Because we are using 2010 county-level data, we cannot include county fixed effects (θ_j^r and θ_j^w) in these regression equations. Instead, we replace or approximate these county fixed effects in the QOL and QOBE estimations with the residuals from equations 5 and 6. The residuals (the difference between observed and predicted values) are our proxy for the premium that households and firms are willing to pay to locate in county j ; they are the portion of the county housing values and wages above or below what the characteristics of the housing stock or workforce would suggest they should be (equations 7 and 8).³

$$\theta_j^r = \log(r_j) - \widehat{\log(r_j)} \quad (7)$$

$$\theta_j^w = \log(w_j) - \widehat{\log(w_j)} \quad (8)$$

³Specifically, we use studentized residuals. We also estimated quality of life using normalized residuals with similar results (the correlation in the quality of life estimates between the two was approximately 0.97).

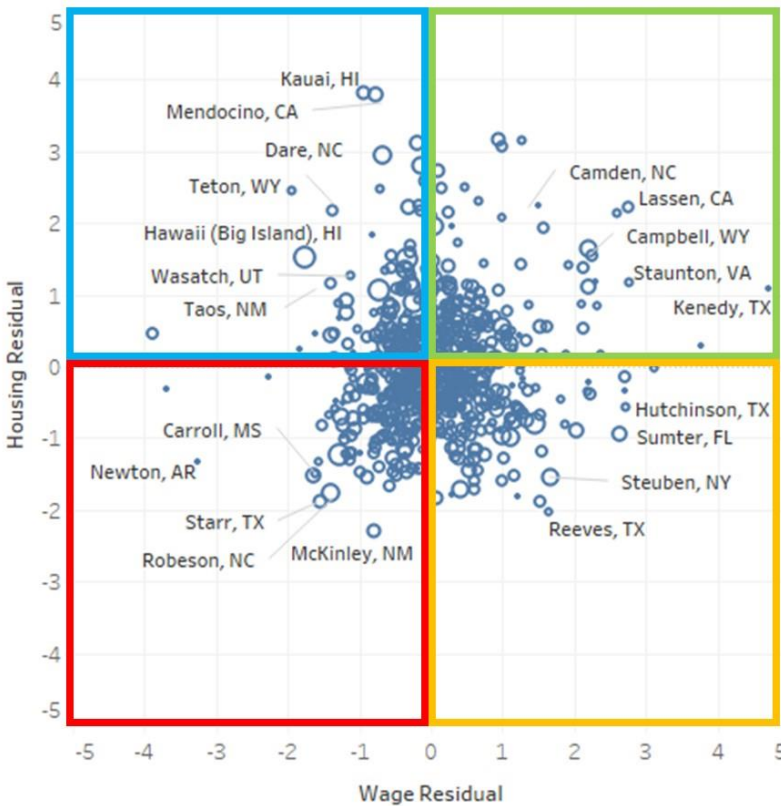
We then incorporate our estimated θ_j^r and θ_j^w from equations 7 and 8 back into equations 3 and 4 to calculate QOL and QOBE environment for all U.S. counties. This allows us to rank and compare all counties and also separately rank and compare all metropolitan counties and all non-metropolitan counties, focusing on micropolitan area counties. We use metropolitan county estimates as a validity check by comparing our methodology results with previous research using micro-level individual data. Though our methodology produces similar results for metropolitan areas in previous studies, we fully acknowledge that using micro-level data has clear advantages for geographic areas that have micro-level data at their disposal. However, we suggest that our methodology has clear advantages for geographic areas that do *not* have publicly available micro-level data to understand the revealed preferences of households and businesses in these geographies.

We then regress traditional measure of growth (population and employment growth between 2010 and 2018) on our QOL and QOBE estimations and include QOL and QOBE of neighboring counties for micropolitan areas in 2010 to examine the potential for regional and spatial effects. We also consider the impact of QOL and QOBE on other measures of development and wellbeing, specifically poverty rates between 2010 and 2018. Finally, we examine a rich set of location-specific amenities associated with QOL in micropolitan areas. This approach helps translate market-based responses to community characteristics which may respond to place-based policies.

4. Results & Discussion

Figure 1 shows the housing and wage residuals for micropolitan area counties from equations 5 and 6. Counties with a large positive housing residual and large negative wage residual are more likely to be high amenity counties that are great places to live, given that households are willing to pay higher housing prices and accept lower wages to live there (the blue quadrant – Figure 1). The micropolitan areas that stand out most in this quadrant, including Wasatch County in Utah, are well known for their natural amenities, which comes at no particular surprise (Appendix C verifies the relationship between QOL and the natural amenity score for all U.S. counties). Teton County in Wyoming (Jackson, WY-ID μ SA) includes sections of both Yellowstone National Park and Grand Tetons National Park, as well as part of the Bridger-Teton National Forest. Similar to Wasatch County, UT, Taos County, New Mexico is a well-known skiing destination. Kauai, the Big Island in Hawaii, and Dare County in North Carolina (Kill Devil Hills, NC μ SA) are well known for their beautiful beaches, while Mendocino County (Ukiah, CA μ SA) is positioned on coastal waters and a national forest in addition to being part of California's wine country.

Figure 1: Housing and Wage Residuals Depict Micropolitan Counties as a Great Place to Live, Great Place to Live and Work, Great Place to Work, or Neither a Great Place to Live or Work



The top right quadrant of Figure 1 (in green) are counties with large positive housing and wage residuals. These counties tend to be viewed by firms as high productivity counties and households view them as a great place to live and work (they are willing to pay more for housing, but they also require more in wages). Many of these economies rely on federal institutions, from a Naval Air Station in the Kingsville, TX μ SA (Kenedy County), to the largest Coast Guard Station in the U.S. located in the Elizabeth City, NC μ SA (Camden County), and Herlong Federal Correctional Institution in the Susanville, CA μ SA (Lassen County). The economy of Campbell County in the Gillete, WY μ SA relies on its extractive industries, dubbing itself the “Energy Capital of the Nation.” Staunton County (Staunton-Waynesboro μ SA) is home to Mary Baldwin University. Many of these counties are also near natural amenities such as coastal waters (Camden, NC; Kenedy, TX) or national forests (Lassen, CA).

Counties with a large negative housing residual and large positive wage residual are more likely to be low amenity areas, but great places to work. These counties are in the lower right quadrant (in yellow) in Figure 1. Many of these counties rely on extractive industries and agriculture (Reeves County in the Pecos, TX μ SA; Hutchinson County in the Borger, TX μ SA). Steuben County in the Corning, NY μ SA is the headquarters for the Fortune 500 company Corning Incorporated. Sumter County in The Villages, FL μ SA, which has the highest median age of any county in the U.S., is made up of 17 Community Development Districts with numerous retirement communities.

Finally, households and firms view counties with both large negative housing and wage residuals as a low amenity places and low that are neither a great place to live nor a great place to work. These

counties are in the lower left quadrant (in red) in Figure 1. Many of these counties have natural amenity scores below 0 (Newton County in the Harrison, AR μ SA; Carroll County in the Greenwood, MS μ SA; Robeson County in the Lumberton, NC μ SA), a history of racism and strained race relations (Newton County in AR; Carroll County in MS), or notably high crime rates (Robeson County, NC; McKinley County in the Gallup, NM μ SA), all of which make them less desirable places to live. Many of these counties also have a history of nearly non-existent economic development (such as McKinley County, NM), have relied on industries that are in decline, such as manufacturing (Robeson County, NC and Carroll County, MS), or have low educational attainment (Starr County in the Rio Grande City, TX μ SA).

Figure 2 shows the estimated QOL for all counties from Equation 3 (see Appendix C for our robustness check using metropolitan counties).⁴ As expected, the maps shows us high estimated QOL for many counties that are well known to have high amenity values, such as coastal counties and mountainous counties in the West (Appendix D). A scatter plot of the relationship between the Natural Amenity Scale (USDA ERS) and our estimated quality of life in micropolitan areas (Figure 3) shows there is a positive and significant relationship between higher estimated QOL and higher quality of natural amenities in micropolitan area counties.⁵ Yet, we can also see from the map in Figure 2 that Appalachia, despite the beautiful Great Smoky Mountains, Blue Ridge Mountains, Appalachian Mountains, and other natural amenities, has a notable cluster of counties with a low estimated QOL. Similarly, most of the counties in Alaska have a low estimated QOL, despite significant natural amenity endowments. Both of these examples indicate that while natural amenities can be leveraged to improve QOL, they are not the last word in what makes a county a good place to live.

⁴ As a robustness check, we also compare the correlation between our aggregate approach to estimating quality of life across counties to Albouy's (2008) estimation. We match metropolitan counties to the appropriate metropolitan statistical areas and all non-metropolitan counties to Albouy's non-metro area within the state. Despite Albouy (2008) estimating quality of life in 2000 while we estimate quality of life in 2010, we still find a moderate and statistically significant correlation between the two quality of life estimations (a correlation of about 0.3). The correlation in our quality of life estimates was slightly higher using unweighted residuals as opposed to using Albouy's weighting scheme $QOL = 0.33\theta_j^r - 0.51\theta_j^w$.

⁵ We focus our analysis on μ SA counties. Although there are 542 μ SAs, some μ SA encompass more than one county giving us a sample size of about 686 depending on data availability.

Figure 2: Quality of Life across Counties in the U.S. (2010)

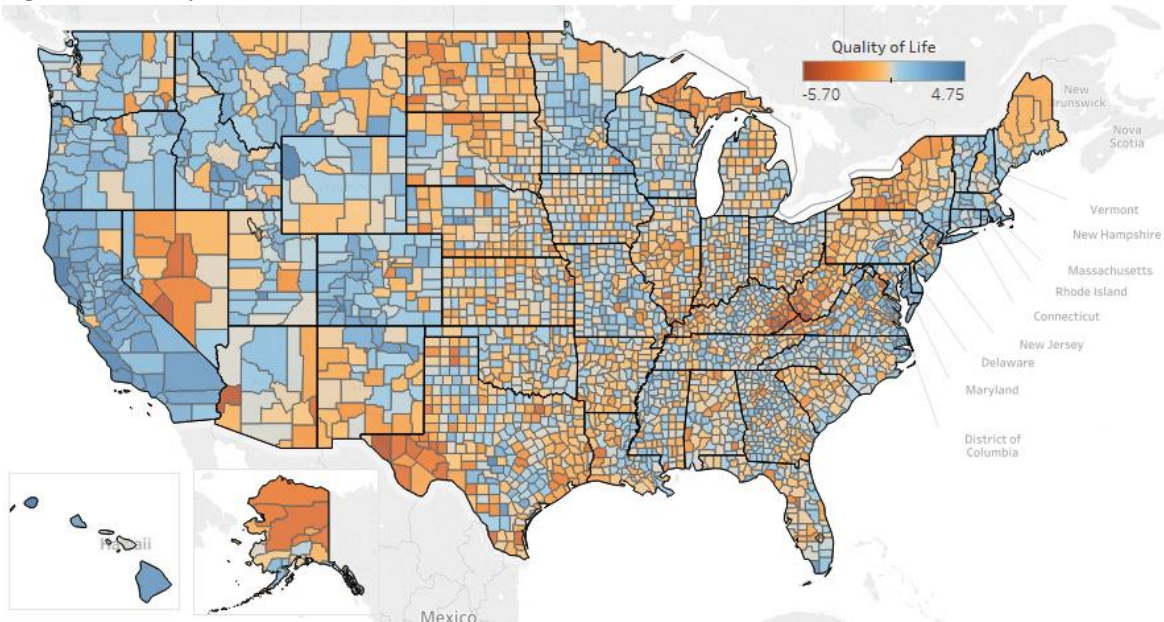


Figure 3: Higher Quality of Life in Micropolitan Area Counties with Natural Amenities

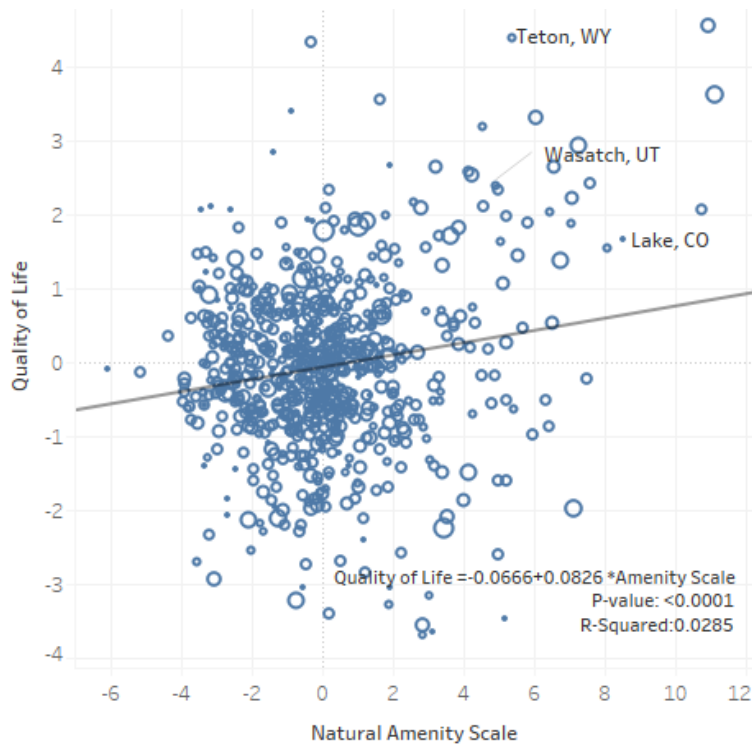
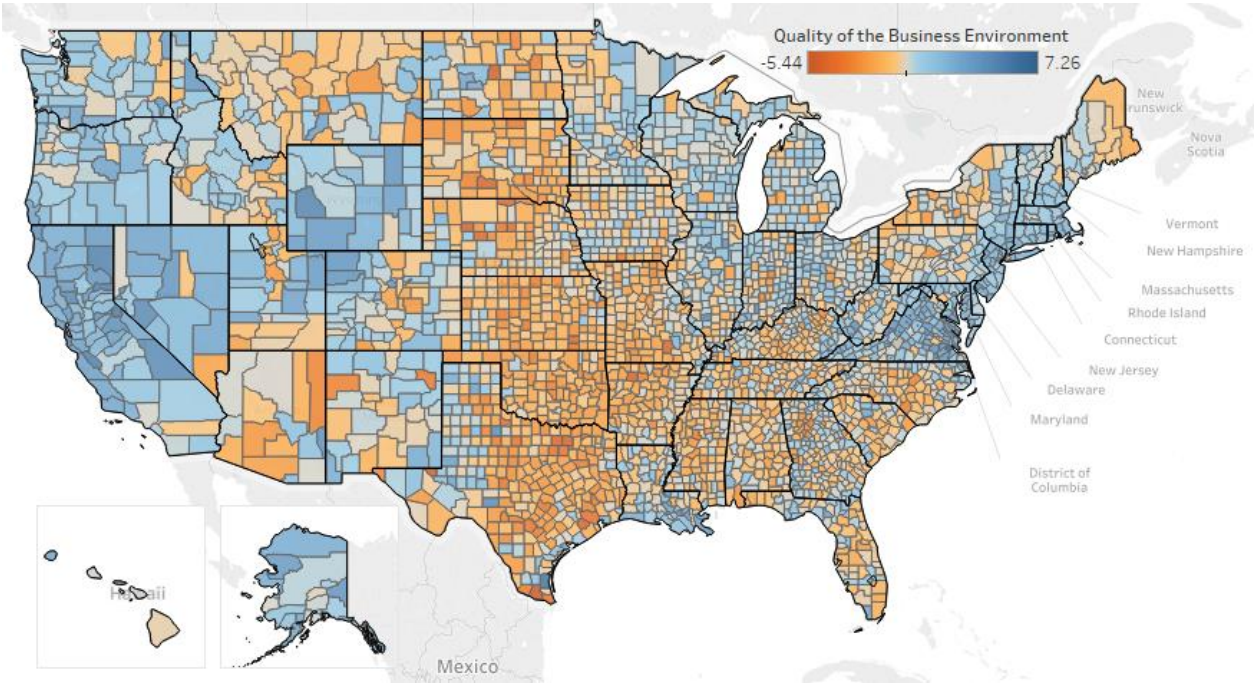


Figure 4 depicts results from equation 4, our estimation of QOBE in all U.S. counties. Clearly, and perhaps unsurprisingly, counties along the northeastern seaboard (which includes New York and Washington D.C.) and along the west coast (which includes Silicon Valley) have *both* high QOBE as well as high QOL (figure 2), while other areas, such as in Appalachia which had a cluster of low QOL counties,

rank higher in terms of its estimated QOBE. Table 2 shows the top 10 ranked micropolitan area counties for QOL along with their QOBE rankings. Although none of these counties rank within the top 10 for QOBE, half of them are ranked within the top 55. We find a small positive but not statistically significant correlation between QOL and QOBE for micropolitan counties, indicating that firms and households do not necessarily *disagree* on what makes a micropolitan area nice, but that they do not have strong agreement either.⁶ This is in line with previous research which finds that while households and firms are increasingly valuing the same locations (Chen and Rosenthal, 2008), that they do not always agree on what makes a place nice (Gabriel and Rosenthal, 2004). This finding also suggests that policymakers in micropolitan areas can focus on QOL or QOBE without necessarily causing a large tradeoff between the two, but it does not answer the question about which, QOL or QOBE, provides more returns in terms of growth and development.

Figure 4: Quality of the Business Environment across Counties in the U.S. (2010)



⁶ The correlation coefficient between QOL and QOBE is 0.0271 with a p-value of 0.4788. For metropolitan areas, the correlation coefficient between QOL and QOBE is 0.1189 with a p-value <0.0001.

Table 2: The Top 10 Micropolitan Areas for Quality of Life and Quality of the Business Environment

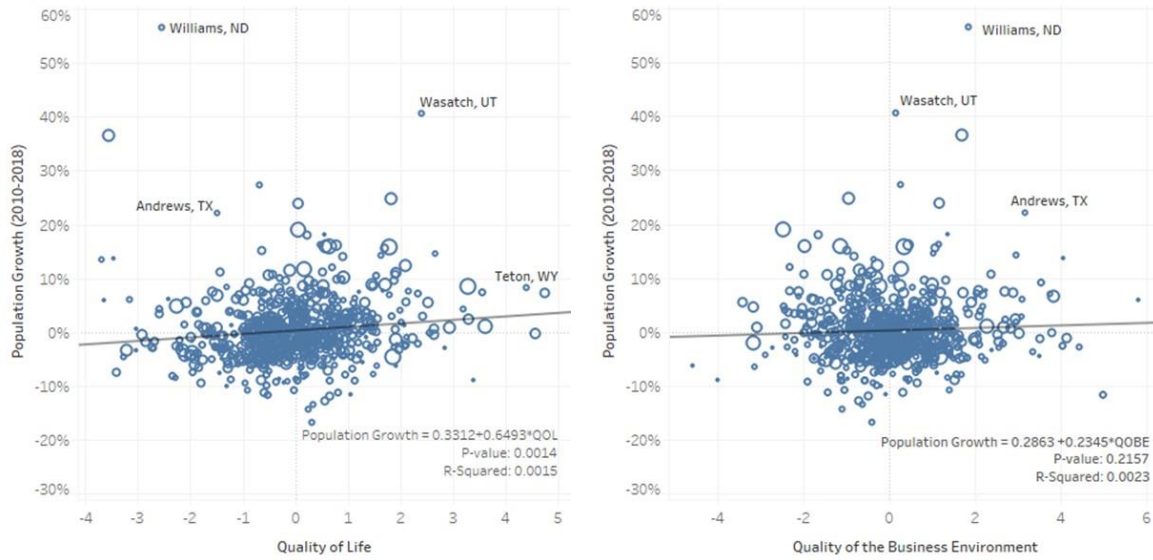
| County | μSA | Housing Residual | Wage Residual | QOL | QOL Rank | QOBE | QOBE Rank |
|-------------------|-------------------------------|------------------|---------------|---------|----------|---------|-----------|
| Kauai County | Kapaa, HI | 3.8113 | -0.9330 | 4.7443 | 1 | 2.8783 | 25 |
| Mendocino County | Ukiah, CA | 3.7909 | -0.7723 | 4.5632 | 2 | 3.0186 | 20 |
| Teton County | Jackson, WY-ID | 2.4581 | -1.9345 | 4.3927 | 3 | 0.5236 | 228 |
| Danville City | Danville, VA | 0.4595 | -3.8837 | 4.3432 | 4 | -3.4242 | 685 |
| Humboldt County | Eureka-Arcata-Fortuna, CA | 2.9483 | -0.6675 | 3.6158 | 5 | 2.2808 | 36 |
| Dare County | Kill Devil Hills, NC | 2.1709 | -1.3850 | 3.5560 | 6 | 0.7859 | 176 |
| McPherson County | North Platte, NE | -0.3051 | -3.6988 | 3.3937 | 7 | -4.0040 | 570 |
| Monroe County | Key West, FL | 3.1238 | -0.1826 | 3.3063 | 8 | 2.9412 | 24 |
| Hawaii County | Hilo, HI | 1.5265 | -1.7717 | 3.2982 | 9 | -0.2452 | 411 |
| Hood River County | Hood River, OR | 2.4857 | -0.7020 | 3.1877 | 10 | 1.7838 | 55 |
| County | μSA | Housing Residual | Wage Residual | QOL | QOL Rank | QOBE | QOBE Rank |
| Kenedy County | Kingsville, TX | 1.0800 | 4.7209 | -3.6409 | 687 | 5.8009 | 1 |
| Lassen County | Susanville, CA | 2.2314 | 2.7436 | -0.5122 | 462 | 4.9750 | 2 |
| Waynesboro City | Staunton-Waynesboro, VA | 2.1449 | 2.5899 | -0.4450 | 439 | 4.7348 | 3 |
| Inyo County | Bishop, CA | 3.1546 | 1.2783 | 1.8763 | 41 | 4.4329 | 4 |
| Tuolumne County | Sonora, CA | 3.1720 | 0.9474 | 2.2246 | 22 | 4.1194 | 5 |
| Greenlee County | Safford, AZ | 0.2876 | 3.7606 | -3.4730 | 685 | 4.0481 | 6 |
| Del Norte County | Crescent City, CA | 3.0603 | 0.9804 | 2.0799 | 29 | 4.0408 | 7 |
| Staunton City | Staunton-Waynesboro, VA | 1.1686 | 2.7756 | -1.6070 | 633 | 3.9443 | 8 |
| St. Mary's County | California-Lexington Park, MD | 1.6363 | 2.1948 | -0.5584 | 476 | 3.8311 | 9 |
| Campbell County | Gillette, WY | 1.5446 | 2.2370 | -0.6925 | 517 | 3.7816 | 10 |

4.1 QOL, QOBE, and Development in Micropolitan Areas

The next logical step in our analysis is an examination of how QOL and QOBE contribute to growth and development in micropolitan areas, which we have operationalized as population and employment growth. By examining the impact of QOL and QOBE on growth in micropolitan areas, we can test whether amenity-led migration or firm-led growth is stronger for micropolitan area development. Figure 5 shows the relationship between QOL, QOBE, and population growth. There is a positive and statistically significant relationship between QOL and population growth, with high QOL counties experiencing more growth. We find *no statistically significant relationship* between QOBE in micropolitan area counties and population growth.⁷

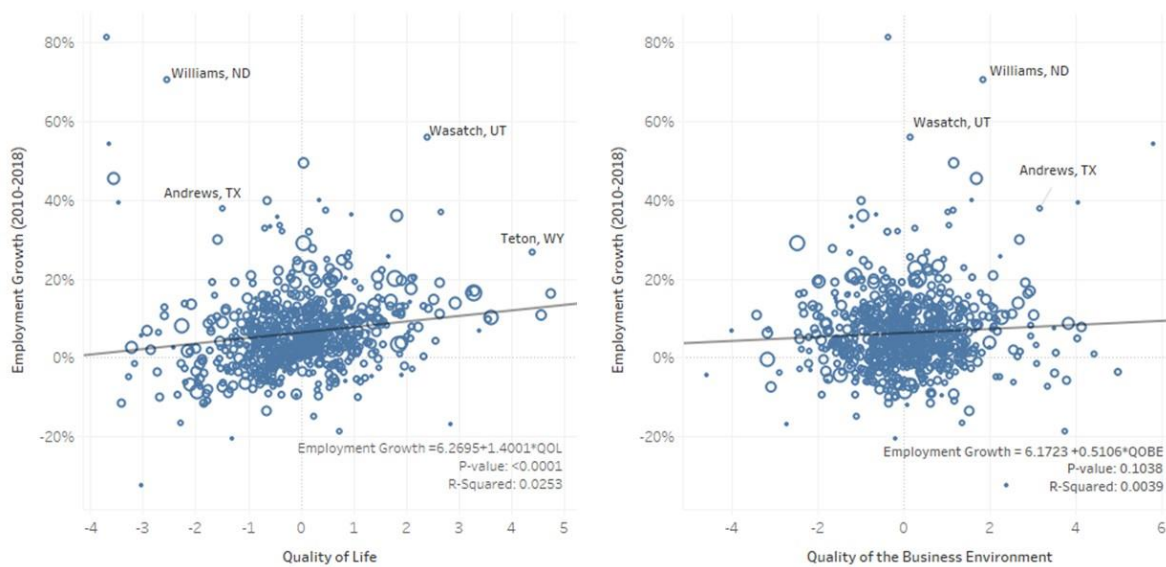
⁷ If we remove the outlier counties of Williams County, ND and Wasatch County, UT the relationship between QOL and population growth gets slightly stronger (0.0070) while the relationship between QOBE and population growth only gets weaker (with a coefficient of 0.0014 and p-value of 0.4164).

Figure 5: QOL (more than QOBE) Drives Population Growth



We might expect that population growth tends to follow high QOL places while job growth tends to occur in high QOBE places; indeed, traditional economic development strategies would suggest that this is true. Yet, again, we see a stronger relationship between QOL and employment growth than between QOBE and employment growth,⁸ as seen in Figure 6. Taken together, results presented in Figures 5 and 6 provide compelling evidence to support amenity-led growth over firm-led growth (as Vias, 1999; Partridge, 2010 have suggested). Furthermore, we find that quality of life is even more important for micropolitan areas than for metropolitan areas in predicting future employment and population growth between 2010 and 2018.

Figure 6: QOL (more than QOBE) Drives Employment Growth



⁸ If we exclude the three outlier counties (Reeves County, TX; Williams County, ND; Wasatch County, UT), the relationship between QOL and employment growth gets stronger (0.0178) and the relationship between QOBE and employment growth gets weaker (a coefficient of 0.0042 and a p-value of 0.1310).

Our results suggest that a one standard deviation increase in the estimated QOL is associated with 0.77 percentage point increase in population and a 1.66 percentage point increase in employment (Figures 5 and 6). In table 3, we provide the results when we regress population and employment growth on both QOL and QOBE to compare the growth effects of each within the same model. We also include the effect of the QOL and QOBE of the neighboring county to examine spillover effects,⁹ and Table 3 verifies that the growth relationship is stronger for QOL than the QOBE. The coefficient on the interaction between QOBE and neighboring QOBE suggests that high QOBE counties may be in competition for jobs with neighboring high QOBE counties, whereas the interaction between QOBE and neighboring QOL suggests that high QOBE counties will experience lower growth as people and jobs go to the neighboring county with high quality of life. High QOL counties neighboring other high QOL counties experience even *higher population and employment growth* as a result and do not seem to be impacted by neighboring high QOBE counties. These results provide clear evidence for a regional approach to quality of life.

Table 3: The Impact of QOL and QOBE on Growth

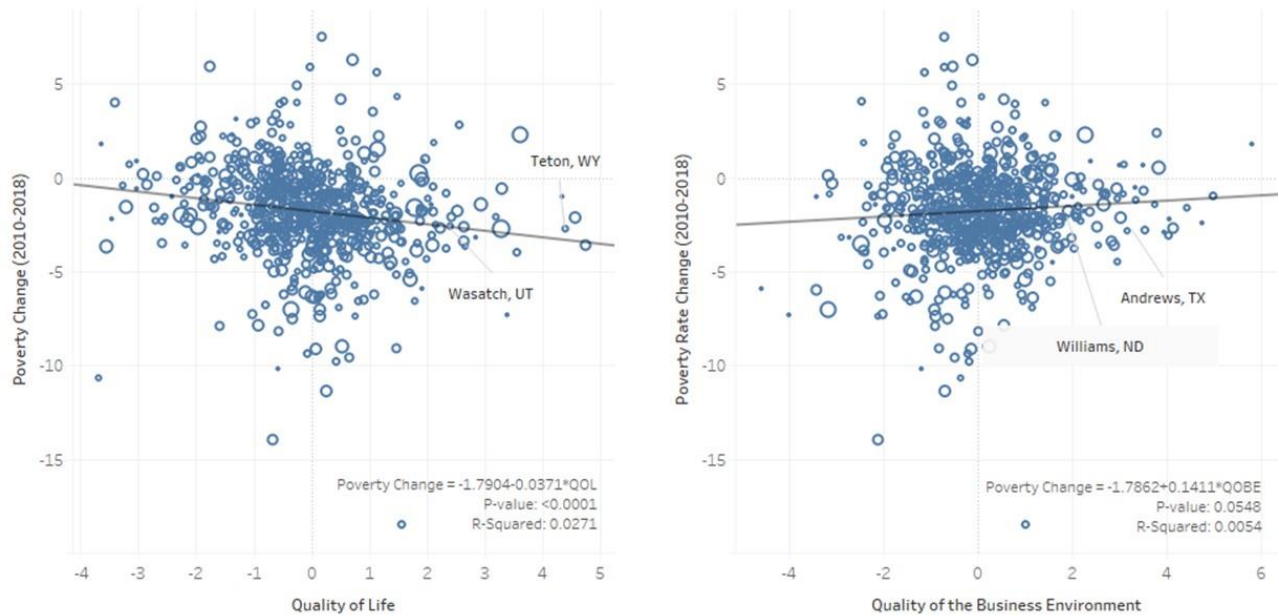
| Variable | 2010-2018 Population Growth (%) | | 2010-2018 Employment Growth (%) | |
|-------------------------------------|---------------------------------|----------------|---------------------------------|----------------|
| | Coefficient | Standard Error | Coefficient | Standard Error |
| Quality of Life | 0.5654* | (0.3307) | 1.7514*** | (0.5453) |
| Quality of the Business Environment | 0.3233 | (0.3075) | 0.7472 | (0.5629) |
| Neighboring QOL | 0.1363* | (0.0742) | 0.0683 | (0.1133) |
| Neighboring QOBE | -0.1141* | (0.0620) | -0.2240** | (0.1037) |
| QOL*Neighboring QOL | 0.1272** | (0.0532) | 0.2676* | (0.1450) |
| QOL*Neighboring QOBE | 0.0295 | (0.0490) | 0.0525 | (0.0877) |
| QOBE*Neighboring QOL | -0.1260** | (0.0608) | -0.1892* | (0.1069) |
| QOBE*Neighboring QOBE | -0.0199 | (0.0317) | -0.1099** | (0.0486) |
| Intercept | -0.0026 | (0.2511) | 5.8214*** | (0.4593) |
| Adjusted R ² | 0.0427 | | 0.0702 | |
| N | 680 | | 680 | |

Note: Robust standard errors are in parentheses. *p<0.01, **p<0.05, ***p<0.10

Development in micropolitan areas is distinct from growth (Irwin et al., 2010). With rising inequality in the U.S., growth may leave some residents behind. To examine this issue, we turn our focus to the relationship between QOL, QOBE, and the change in poverty rates between 2010 and 2018 and find that high QOL micropolitan area counties have had a statistically significant impact on lowering poverty, but high QOBE micropolitan areas have had a statistically significant impact on *increasing* poverty (see Figure 7). Our results here, coupled with our results on the relationship between QOL and employment growth, are in line with previous research by Partridge and Rickman (2005; 2007) that showed job growth can help lower poverty rates in non-metropolitan area counties.

⁹ We use the maximum value of the quality of life (and the quality of the business environment) estimations for all neighboring counties. We find similar results using the average value of the quality of life (and the quality of the business environment) estimation for neighboring counties.

Figure 7: High QOL Micropolitan Counties have Lowered Poverty More than High QOBE Counties



These results provide compelling evidence that policymakers in America’s small cities are likely to receive more robust returns by focusing on improving the quality of life in their towns rather than narrowly focusing on improving quality of the business environment, which has been the dominant refrain of economic development specialists for several decades. But what does it mean to focus on QOL? In our last analysis, we consider a rich set of location-specific amenities to discover which amenities are associated with higher QOL in micropolitan area counties. This is our bridge to public policy.

4.2 Location-Specific Amenities and Quality of Life in Micropolitan Areas

Our results thus far verify that natural amenities are important for QOL and growth in micropolitan area counties. While this may give policymakers a better idea of which specific natural amenities in their stock of natural capital they can focus on, whether through land conservation or investments in recreational amenities, most natural amenities are not subject to the whims of policy; policymakers cannot build beaches or mountains or change the weather. Thus, to provide policymakers with a more practical set of suggestions, we examine a rich set of public and private amenities that policymakers can build or invest in to promote QOL in their towns. This list of amenities is large (see Appendix A), so we utilize a least angle regression (LAR) to pare down the number of variables to those with the most predictive power in our model. Descriptive statistics for micropolitan area counties above and below average QOL are provided in Appendix E.

Table 4 provides results for the full model of amenities and the restricted LAR model. We find that while climate (moderate winter and summer temperatures) and other natural amenities matter for the QOL in micropolitan area counties, there are a number of public and private amenities that increase QOL as well. Specifically, improving basic public goods may significantly improve the QOL, as micropolitan areas with lower crime rates and higher school spending are strongly associated with

higher QOL. In addition to basic public goods, we find that access to basic amenities such as food stores and personal care service places are important for QOL, as are various other shopping places such as home furnishing stores. Additionally, micropolitans with better broadband access (which we proxy with the share workers that work from home) have higher estimated QOL, a finding that we expect is likely to strengthen over time as remote working becomes more accepted and normalized.

Table 4: Location-Specific Amenities Associated with Higher Quality of Life in Micropolitan Areas

| Variable | Full Model | | LAR Model | |
|---------------------------------------|-------------|----------------|-------------|----------------|
| | Coefficient | Standard Error | Coefficient | Standard Error |
| Mean January Temperature | 0.0269*** | (0.0083) | 0.0283*** | (0.0066) |
| Mean July Temperature | -0.0597*** | (0.0159) | -0.0595*** | (0.0139) |
| Mean July Relative Humidity | -0.0020 | (0.0050) | | |
| Hilliness | 0.00004 | (0.0000) | 0.00003 | (0.0000) |
| Miles to Coast | -0.0001 | (0.0004) | | |
| Water Square Miles | -0.0003 | (0.0002) | | |
| Park Square Miles | 0.00002 | (0.0001) | | |
| Forest Coverage | -0.9889*** | (0.2322) | -0.9593*** | (0.2062) |
| Miles to Metro | -0.0043** | (0.0019) | -0.0043*** | (0.0016) |
| Metro Adjacent | 0.1161 | (0.0978) | | |
| Road Miles | -0.0008 | (0.0007) | | |
| Share Worked at Home | 0.0930** | (0.0421) | 0.0998*** | (0.0375) |
| Population Density | 0.0006 | (0.0014) | | |
| Ln (2010 Population) | -0.0890 | (0.1223) | | |
| Violent Crime Rate | -0.0006*** | (0.0002) | -0.0006*** | (0.0002) |
| School Spending Share | 7.7235*** | (1.4817) | 7.8447*** | (1.3090) |
| Gini 2010 | -2.0710 | (1.4391) | | |
| Relative Mobility | 0.0289*** | (0.0072) | 0.0206*** | (0.0066) |
| Absolute Mobility | -0.0070 | (0.0068) | | |
| Physically Unhealthy Days | 0.0473 | (0.0525) | | |
| Mentally Unhealthy Days | -0.0834 | (0.0521) | | |
| Urgent Care Facilities 2009 | 0.0327 | (0.0562) | | |
| Health Service Places per cap 2010 | 2.0471 | (90.6128) | | |
| YPLL Rate | 0.00001 | (0.0000) | | |
| Arts & Culture Places 2010 | 0.0549*** | (0.0201) | 0.0484** | (0.0197) |
| Places of Worship 2009 | -0.0240*** | (0.0078) | -0.0240*** | (0.0068) |
| Recreation Places 2010 | 0.0517*** | (0.0123) | 0.0507*** | (0.0112) |
| Fitness Places per capita 2010 | 1070.91 | (1040.0904) | 1063.19 | (929.9467) |
| Golf Courses per capita 2010 | -748.19 | (689.1970) | | |
| Bowling Places per capita 2010 | -834.98 | (1374.5120) | | |
| Movie Theaters per capita 2010 | 349.11 | (1736.9377) | | |
| Eating & Drinking Places per cap 2010 | 67.71 | (75.7456) | | |
| Food Stores per capita 2010 | 767.95*** | (231.6414) | 846.09*** | (243.1766) |
| Home Furnishing Places per cap 2010 | 2465.65*** | (1133.8796) | 2388.70** | (1058.4589) |
| Personal Care Places per cap 2010 | 526.15*** | (182.0613) | 436.91** | (176.0051) |

| | | |
|--------------------|-------------------|------------------|
| Intercept | 3.7151** (1.8311) | 1.7589* (1.0467) |
| N | 677 | 677 |
| Adj-R ² | 0.3236 | 0.3267 |

Note: Robust standard errors are in parentheses. *p<0.01, **p<0.05, ***p<0.10

Interestingly, we do not find a statistically significant relationship between inequality (measured by the Gini index) and QOL, but, rather, find that higher relative mobility increases QOL. This suggests that residents are less concerned with inequality than they are with mobility. Thus, government services that increase mobility (in addition to school spending) can improve economic outcomes and promote the success of all of its people while also improving the QOL. Finally, we find evidence that arts and cultural places are associated with higher QOL, whereas places of worship seem to lower QOL. While this may seem inconsistent with the literature, particularly coming out of sociology (Putnam, 2001), it is consistent with economic findings in metropolitan areas. For example, Reynolds and Weinstein (2020) show the number of places of worship and religiosity is also associated with less progressive gender role attitudes and that less progressive gender role attitudes decrease the estimated QOL in an area, especially for women.

Overall, we find evidence that there are a number of policy-responsive amenities that may increase QOL in micropolitan areas. In addition to building recreation places to capitalize on natural resources endowments, policymakers should ensure they are promoting QOL and the success of all their residents by focusing on basic public amenities. Although we do not have data to estimate the quality of local amenities (such as the quality of eating and drinking establishments), we do find that better access to shopping, from food stores to home furnishing stores, increases quality of life, as does quality broadband access and the opportunity for social mobility.

These findings complement the comparison of our aggregate approach to previous micro-level data studies of QoL. If the error term contained no amenity information, but was merely a randomly generated disturbance, we would not expect covariates with amenity measures. That our results mimic those of earlier QoL studies that focused on identifying specific amenities we feel more confidence in our approach.

5. Conclusion

Data constraints in non-metropolitan areas has left policymakers in these geographies at a disadvantage when considering and targeting community and economic development strategies. Because large samples of micro-level data are necessary to estimate traditional QOL models, the vast majority of this literature has focused on metropolitan areas, where the data is available. Thus, data-driven approaches to effective and successful growth and development strategies are based primarily on the experience of large urban centers. To fill this gap, we create a new approach using aggregate county-level data based on the revealed preferences of residents and firms to estimate QOL and QOBE in micropolitan area counties.

Our results confirm previous literature emphasizing the importance of QOL (particularly natural amenities) for growth and development. We find that higher QOL drives *both* population growth and employment growth more than QOBE in micropolitan area counties. Indeed, our results a one standard

deviation increase in estimated QOL is associated with a 0.77 percentage point increase in population and a 1.66 percentage point increase in employment. Thus, policies that focus on the aspects of a community that increase QOL will more likely generate higher levels of employment *and* population growth, which is a nearly universal policy interest in micropolitan areas. Furthermore, we find that higher QOL in micropolitan areas is also associated with improvements in poverty rates. A deeper look at the location-specific amenities shows that many of the amenities associated with higher QOL – higher school spending and programs to increase mobility, for example – also promote the success of all of its residents. We also find that there are local amenities that can be built to improve the QOL life in small cities. In addition to building recreation sites that capitalize on natural amenities, policymakers and businesses can invest in local arts and cultural sites and provide access to food stores, personal care services places, and home furnishing stores. As high QOL counties benefit from neighboring high QOL counties, our findings also suggest that micropolitan counties would likely benefit from a regional approach to QOL.

As with any work, however, there are specific elements of this work which require additional exploration. Although we incorporate a rich set of amenities into our analysis, there are still likely amenities that we miss altogether or measure imperfectly. For example, we do not have data on the *quality* of amenities. For example, fast food restaurants are included in the same category as fine-dining establishments, but it is reasonable to assume that their impact on QOL may be quite different. This warrants more research on not only the quality of amenities but other qualitative aspects that our quantitative approach may miss. Furthermore, qualitative work evaluating programmatic design of policy is critical to translating these findings into state and local public policy. This might best be approached through a sample selection process which employs outlier (extreme) micropolitan areas as a tool for contrasting state and local public policy.

This research also examines a relatively brief, but recent period of time. More detailed work examining QOL and QOBE in previous decades would be important in understanding population change in micropolitan regions, as would extensions of this work across the business cycle and the role of QOL and QOBE in the resiliency of micropolitan areas in the face of labor demand shocks. Additionally, while we have spoken to the role of QOL and QOBE on wellbeing – operationalized as poverty – this question requires more analysis. Research should address whether QOL or QOBE affects intergenerational mobility, or whether or not intra-micropolitan population dynamics explains part of the effect. For example, does the composition of migration across communities affect poverty in ways that are influenced by QOL or QOBE? Finally, we acknowledge there are limitations to using aggregate data when large samples of micro-level data are available – as is the case for metropolitan area counties. In the absence of such data, however, we believe that this aggregate approach focused specifically on micropolitan area counties provides important insights and considerations regarding community and economic development for policy makers in these geographies.

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Appendix A: Data Sources

| Variable | Source |
|---------------------------------------|--|
| Absolute Mobility | Chetty, et. al., 2014 |
| Arts & Culture Places 2010 | Census |
| Bachelors Popn Share | Census |
| Bowling Places per capita 2010 | County Business Patterns (Census) |
| Children Popn Share | Census |
| Construction Share | Bureau of Economic Analysis, Regional Economic Information System |
| Eating & Drinking Places per cap 2010 | County Business Patterns (Census) |
| Emp/Pop Ratio | Census |
| Employment | Bureau of Economic Analysis, Regional Economic Information System |
| Fitness Places per capita 2010 | County Business Patterns (Census) |
| Food Stores per capita 2010 | County Business Patterns (Census) |
| Forest Coverage | US Department of Agriculture, Economic Research Service |
| Forest Share | US Department of Agriculture, Economic Research Service |
| Gini 2010 | Chetty, et. al., 2014 |
| Golf Courses per capita 2010 | County Business Patterns (Census) |
| Government Share | Bureau of Economic Analysis, Regional Economic Information System |
| Health Service Places per cap 2010 | County Business Patterns (Census) |
| Herfindahl Index | Bureau of Economic Analysis, Regional Economic Information System and author's calculation |
| Hilliness | US Department of Agriculture, Economic Research Service |
| Home Furnishing Places per cap 2010 | County Business Patterns (Census) |
| Manufacturing Share | Census |
| Mean January Temperature | US Department of Agriculture, Economic Research Service |
| Mean July Relative Humidity | US Department of Agriculture, Economic Research Service |
| Mean July Temperature | US Department of Agriculture, Economic Research Service |
| Median Age | Census |
| Mentally Unhealthy Days | CDC/NCHS via County Health Rankings |
| Metro Adjacent | OMB (author's calculation) |
| Miles to Coast | National Oceanic and Atmospheric Administration |
| Miles to Metro | Author's Calculations |
| Mining Share | Census |
| Movie Theaters per capita 2010 | County Business Patterns (Census) |
| Park Square Miles | US Department of Agriculture, Economic Research Service |
| Percent Black | Census |
| Percent Hispanic | Census |
| Percent Immigrant | Census |
| Percent Single Headed House | Census |
| Percent White | Census |
| Personal Care Places per cap 2010 | County Business Patterns (Census) |

| | |
|----------------------------------|---|
| Physically Unhealthy Days | CDC/NCHS |
| Places of Worship 2009 | County Business Patterns (Census) |
| Population | Census |
| Population Density | Census, author's calculations |
| Poverty Rate Change (2010-2018) | Census, author's calculations |
| Recreation Places 2010 | County Business Patterns (Census) |
| Relative Mobility | Chetty, et. al., 2014 |
| Retail/Trade Share | Bureau of Economic Analysis, Regional Economic Information System |
| Road Miles | Department of Transportation, Bureau of Transportation Statistics |
| School Spending Share | Census |
| Share of Housing 2-3 Bedrooms | Census Housing Characteristics (HC01-HC03) |
| Share of Housing Built > 2000 | Census Housing Characteristics (HC01-HC03) |
| Share of Housing Built 1940-1959 | Census Housing Characteristics (HC01-HC03) |
| Share of Housing Built 1960-1979 | Census Housing Characteristics (HC01-HC03) |
| Share of Housing Built 1980-1989 | Census Housing Characteristics (HC01-HC03) |
| Share of Housing Built 1990-1999 | Census Housing Characteristics (HC01-HC03) |
| Share of Housing >4 Bedrooms | Census Housing Characteristics (HC01-HC03) |
| Share Worked at Home | Census Housing Characteristics (HC01) |
| Transport/Ware Share | Bureau of Economic Analysis, Regional Economic Information System |
| Urgent Care Facilities 2009 | County Business Patterns (Census) |
| Utilities Share | Bureau of Economic Analysis, Regional Economic Information System |
| Vacancy Rate | Census Housing Characteristics (HC01-HC03) |
| Veteran Popn Share | Census |
| Violent Crime Rate | FBI via County Health Rankings |
| Water Square Miles | US Department of Agriculture, Economic Research Service |
| Wholesale Share | US Department of Agriculture, Economic Research Service |
| YPLL Rate | Chetty, et.al, 2014 |

Appendix B: Table of results from county housing and wage regressions (2010)

| Variable | ln(Median House Value) | | Variable | ln(Average Wage) | |
|----------------------------------|------------------------|----------------|-------------------------|------------------|----------------|
| | Coefficient | Standard Error | | Coefficient | Standard Error |
| Intercept | 12.5877*** | (0.3192) | Intercept | 8.4015*** | (0.1939) |
| Share of Housing 2-3 Bedrooms | -0.0218*** | (0.0025) | Median Age | 0.0405*** | (0.0098) |
| Share of Housing >4 Bedrooms | -0.0154*** | (0.0026) | Median Age ² | -0.0006*** | (0.0001) |
| Share of Housing Built > 2000 | 0.0028** | (0.0014) | Construction Share | -0.5957*** | (0.1485) |
| Share of Housing Built 1990-1999 | 0.0121*** | (0.0015) | Manufacturing Share | 0.2148*** | (0.0515) |
| Share of Housing Built 1980-1989 | 0.0021 | (0.0014) | Retail/Trade Share | -1.0943*** | (0.1472) |
| Share of Housing Built 1960-1979 | 0.0021** | (0.0010) | Transport/Ware Share | 0.3487*** | (0.1203) |
| Share of Housing Built 1940-1959 | -0.0048*** | (0.0014) | Wholesale Share | -0.8232*** | (0.1537) |
| Vacancy Rate | 0.2815*** | (0.0789) | Forest Share | 0.0041 | (0.0134) |
| Population Density | 0.00002* | (0.0000) | Mining Share | -0.0115*** | (0.0041) |
| ln(Popn) | 0.1028*** | (0.0062) | Utilities Share | 0.0110 | (0.0334) |
| Children Popn Share | -0.9153*** | (0.2620) | Government Share | -0.0016 | (0.0016) |
| Percent Single Headed House | -1.2702*** | (0.1520) | Herfindahl Index | 0.000001* | (0.0000) |
| Bachelors Popn Share | 0.0222*** | (0.0011) | Bachelors Popn Share | 0.0008 | (0.0008) |
| Veteran Popn Share | 0.0193*** | (0.0025) | Veteran Popn Share | 0.0080*** | (0.0019) |
| Percent White | -0.2260** | (0.0943) | Percent White | -0.2413*** | (0.0501) |
| Percent Black | -0.2957*** | (0.0862) | Percent Black | -0.0183 | (0.0529) |
| Percent Hispanic | -0.4434*** | (0.0766) | Percent Hispanic | -0.0346 | (0.0508) |
| Percent Immigrant | 1.9374*** | (0.3229) | Percent Immigrant | 0.2290 | (0.1546) |
| | | | Emp/Pop Ratio | 0.5597*** | (0.0392) |
| | | | ln(Popn) | 0.1090*** | (0.0043) |
| N | 3140 | | N | 3139 | |
| Adj R ² | 0.7013 | | Adj R ² | 0.6065 | |

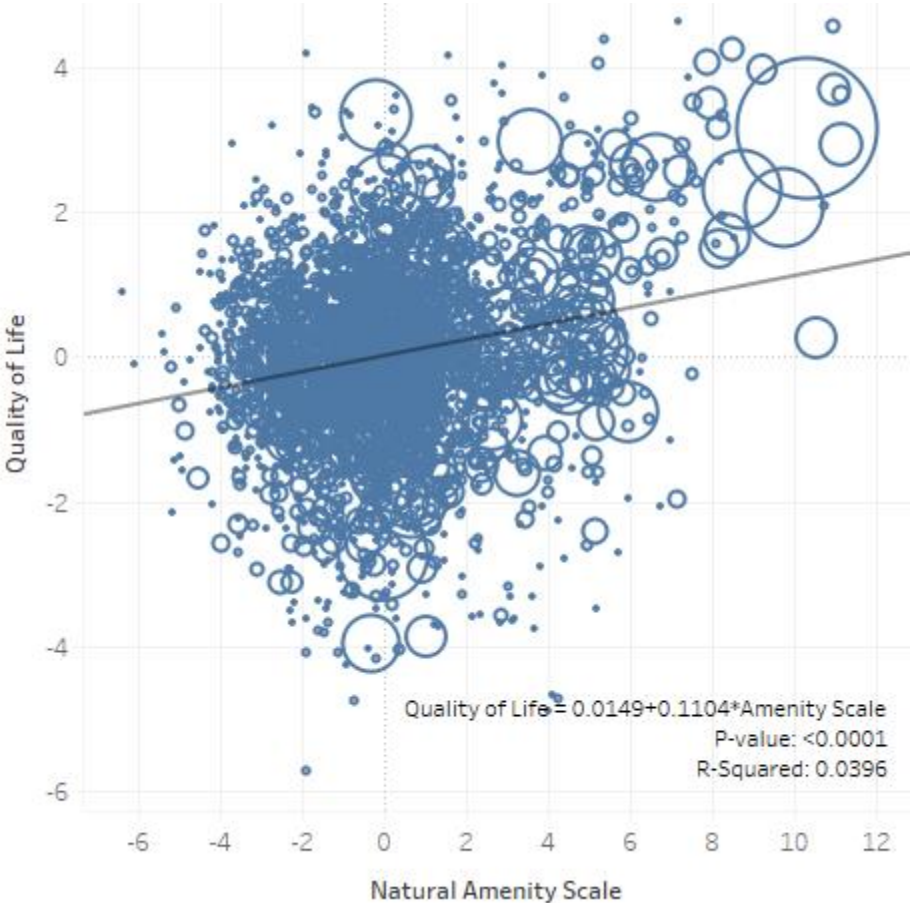
Notes: Robust standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01

Appendix C: Top Ranked Metropolitan Statistical Area Counties in 2010

We list the top ranked counties that are in a Metropolitan Statistical Area (MSA) in 2010 and compare them with the MSA ranking in 2000 from Albouy (2008). Because we rank the quality of life in the county whereas Albouy (2008) ranks the quality of life in the entire MSA, some notable differences are expected to arise. For example, while Clarke county ranks highly in terms of quality of life, other counties in the Washington DC MSA rank much lower. Still, there are notable similarities in our ranking with many MSAs from California topping the list. Overall, we find a moderate and statistically significant (with a p-value of <0.0001) correlation between the two quality of life estimations (a correlation of about 0.3).

| County | Metropolitan Statistical Area (2010) | MSA County Rank in 2010 | Albouy MSA Rank in 2000 |
|-----------------|---|-------------------------|-------------------------|
| Santa Cruz | Santa Cruz-Watsonville, CA | 1 | - |
| San Luis Obispo | San Luis Obispo-Atascadero-Paso Robles, CA | 2 | 5 |
| Monterey | Salinas, CA | 3 | 3 |
| Santa Barbara | Santa Barbara-Santa Maria-Lompoc, CA | 4 | 2 |
| Napa | Vallejo-Fairfield-Napa, CA | 5 | - |
| Sonoma | Santa Rosa, CA | 6 | - |
| Clarke | Washington-Baltimore, DC-MD-VA-WV | 7 | 122 |
| Kings | New York, N. New Jersey, Long Island, NY-NJ-CT-PA | 8 | 51 |
| Marin | San Francisco, CA | 9 | 4 |
| Los Angeles | Los Angeles-Riverside-Orange County, CA | 10 | 15 |

Appendix D: Comparison of the Top Ranked Metropolitan Area Counties to Albouy's (2008) Rankings



Appendix E Descriptive Statistics for Micropolitan Area Counties that are Above and Below Average QOL

| Variable | Above Average QOL N=339 | | Below Average QOL N=347 | | Difference |
|---------------------------------------|----------------------------|--------------|----------------------------|--------------|------------|
| | Mean | StdDev | Mean | StdDev | |
| QOBE | 0.1049 | (1.2890) | 0.0664 | (1.3052) | 0.0386 |
| Employment Growth (2010-2018) | 7.9318 | (9.1517) | 4.5473 | (11.1025) | 3.3845 |
| Population Growth (2010-2018) | 1.0831 | (6.2461) | -0.4551 | (6.1376) | 1.5381 |
| Poverty Rate Change (2010-2018) | -2.2468 | (2.5121) | -1.3181 | (2.3947) | -0.9287 |
| Mean January Temperature | 32.8504 | (11.8763) | 33.3724 | (11.8991) | -0.5220 |
| Mean July Temperature | 74.6767 | (5.9214) | 76.6184 | (5.0982) | -1.9417 |
| Mean July Relative Humidity | 56.3970 | (16.0492) | 55.9713 | (13.6354) | 0.4258 |
| Hilliness | 1865.8600 | (2671.1900) | 1192.2600 | (1748.7400) | 673.6000 |
| Miles to Coast | 200.0874 | (254.7082) | 212.9390 | (201.8093) | -12.8516 |
| Water Square Miles | 30.2990 | (90.0086) | 39.0036 | (162.6248) | -8.7047 |
| Park Square Miles | 150.0777 | (610.4622) | 71.1971 | (284.8790) | 78.8806 |
| Forest Coverage | 0.3186 | (0.2511) | 0.3044 | (0.2509) | 0.0142 |
| Miles to Metro | 51.5151 | (52.2738) | 50.6536 | (31.6912) | 0.8615 |
| Metro Adjacent | 0.3059 | (0.4615) | 0.2808 | (0.4500) | 0.0251 |
| Road Miles | 46.1896 | (65.8370) | 49.8141 | (76.6486) | -3.6245 |
| Share Worked at Home | 4.7018 | (3.0092) | 3.6493 | (2.2745) | 1.0525 |
| Population Density | 70.5498 | (73.8967) | 72.8511 | (121.5406) | -2.3012 |
| 2010 Population | 46803.5500 | (34217.6500) | 43190.2600 | (26459.6500) | 3613.2900 |
| Violent Crime Rate | 254.6712 | (216.0680) | 298.1339 | (217.5894) | -43.4627 |
| School Spending Share | 0.0659 | (0.0355) | 0.0571 | (0.0293) | 0.0089 |
| Gini 2010 | 0.4317 | (0.0359) | 0.4360 | (0.0319) | -0.0043 |
| Relative Mobility | 32.3037 | (9.4272) | 32.5982 | (8.7407) | -0.2946 |
| Absolute Mobility | 41.0139 | (9.3161) | 41.7734 | (9.5953) | -0.7595 |
| Physically Unhealthy Days | 3.6918 | (1.0546) | 3.8519 | (1.2593) | -0.1601 |
| Mentally Unhealthy Days | 3.4135 | (1.0021) | 3.5069 | (1.2206) | -0.0933 |
| Urgent Care Facilities 2009 | 0.5000 | (0.8111) | 0.4527 | (0.7320) | 0.0473 |
| Health Service Places per cap 2010 | 0.0015 | (0.0006) | 0.0015 | (0.0006) | 0.0000 |
| YPLL Rate | 7774.2500 | (2470.8800) | 8196.7800 | (2131.8500) | -422.5300 |
| Arts & Culture Places 2010 | 1.3176 | (2.7306) | 0.6734 | (1.6771) | 0.6443 |
| Places of Worship 2009 | 4.7353 | (5.7602) | 5.4986 | (5.7002) | -0.7633 |
| Recreation Places 2010 | 3.5824 | (5.7778) | 2.0258 | (2.6893) | 1.5566 |
| Fitness Places per capita 2010 | 0.00009 | (0.0001) | 0.00008 | (0.0001) | 0.00001 |
| Golf Courses per capita 2010 | 0.00007 | (0.0001) | 0.00007 | (0.0001) | 0.00000 |
| Bowling Places per capita 2010 | 0.00002 | (0.0000) | 0.00003 | (0.0000) | 0.00000 |
| Movie Theaters per capita 2010 | 0.00002 | (0.0000) | 0.00002 | (0.0000) | 0.00000 |
| Eating & Drinking Places per cap 2010 | 0.00183 | (0.0010) | 0.00169 | (0.0006) | 0.00013 |
| Food Stores per capita 2010 | 0.00049 | (0.0002) | 0.00040 | (0.0002) | 0.00009 |
| Home Furnishing Places per cap 2010 | 0.00002 | (0.0000) | 0.00001 | (0.0000) | 0.00001 |
| Personal Care Places per cap 2010 | 0.00058 | (0.0003) | 0.00056 | (0.0002) | 0.00002 |