Regional Economic Connectivity:

A Strategy to Build Opportunity in Distressed Communities

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Executive Summary

Economic development is primarily a generative activity whose goal is to expand the economic "pie." However, some people and communities benefit much more than others and some people's slices may even become smaller as the pie expands. Equity-oriented policies, on the other hand, are primarily distributive. They are designed to ensure that people with the smallest slices of the pie receive bigger slices, regardless of what happens to the size of the entire pie. This report explores another option—regional economic connectivity strategies that ensure distressed communities benefit from the expansion of the regional economic pie.

Regional economic connectivity is an emerging strategy for place-based economic development in under-resourced communities (URCs)—highly populated areas of concentrated poverty and low income located in central cities and suburbs within metropolitan areas. Regional economic connectivity occurs when an industry cluster driving growth and competitiveness in a broader metropolitan region also has a strong presence in URCs. Regional economic connectivity indicates that cluster benefits and opportunities are not isolated within the region but bring jobs to distressed communities. Economic developers and their partners can promote regional economic connectivity by identifying cluster opportunities for URCs and targeting asset development and other strategic investments that support the growth of regionally strong clusters within URCs.

Prior research has shown that when cluster-related activities in distressed communities are aligned with specialized clusters in the broader region, clusters in distressed communities exhibit stronger wage and employment growth. This suggests that a connectivity-based development strategy can be a pathway for opportunity in URCs. This report builds on that insight using a combination of data analysis and case study evidence. The report describes the basic features of economic connectivity, identifies how connectivity has been achieved for a diverse set of industry clusters in five metropolitan areas, and draws conclusions for economic development policy and practice.

Fresno, California

Features of Economic Connectivity

We analyzed connectivity patterns in the 181 metropolitan areas that have URCs and the 45 connected industry clusters defined by the U.S. Cluster Mapping Project and found that:

Small and medium-sized metropolitan areas are more connected than larger ones.

Among the 10 metro areas with the greatest economic connectivity (averaged across all clusters that are strong in their respective metro area), only two (New Orleans and Providence) have populations of at least a million, while most of the rest have populations below 500,000.

Suburban URCs are more connected than central city URCs.

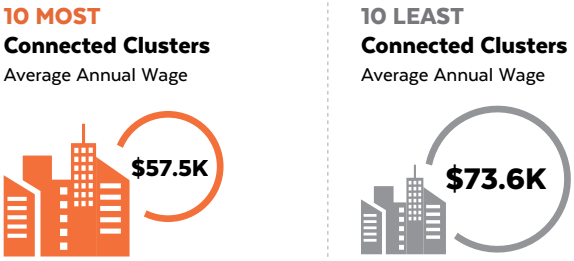
This is especially true for manufacturing-based clusters. The connectivity of service-based clusters, however, does not differ significantly between central city and suburban URCs. Service-based clusters have above average connectivity in both types of URCs.

The most connected clusters are those that are manufacturing-based and do not require workers to have high levels of formal education.

Three of the 10 most connected clusters include many manufacturing industries, but only one of the 10 least connected clusters includes substantial manufacturing activity. While all the 10 most connected clusters have many jobs that are accessible to people without bachelor's degrees, the 10 least connected clusters include some with fewer jobs for less educated workers.

Clusters with lower average wages are more connected than those with higher wages.

The 10 most connected clusters have an average annual wage of $57,489. The 10 least connected clusters have an average wage of $73,609.



These nationwide findings may not hold for all metro areas or all clusters. Therefore, we have created an economic connectivity dashboard that shows the features of connectivity in each of the metro areas and clusters we analyzed. Economic developers can use the dashboard to identify the locations and clusters that offer the best opportunities to improve connectivity.

Case Studies of Connectivity

Connectivity varies depending on the needs of specific industry clusters as well as on assets and other features of each URC and metro area. To understand how these features combine to create connectivity in specific clusters and metro areas, we conducted case studies of connected clusters in five metro areas of different sizes, industry compositions, and regions of the country:

Production Technology and Heavy Machinery

Cleveland-Elyria, OH

The Production Technology and Heavy Machinery industry cluster primarily manufactures machines designed to produce parts and devices used in the production of downstream products. Many of its jobs do not require advanced education. In the Cleveland region, connectivity is driven by retaining key cluster employers, implementing cluster-specific development and redevelopment strategies, offering accessible industry-led training, and providing key wrap-around workforce services.

Communications Equipment and Services

Hickory-Lenoir-Morganton, NC

Hickory-Lenoir-Morganton is a small metropolitan area of about 400,000 people in west-central North Carolina. The Communications Equipment and Services cluster produces goods and offers services for the communications industry. The cluster is thriving in the region's URCs due to preexisting and new cluster supply chain and infrastructure assets, employer-led training programs, and conveniently located workforce support organizations.

Education and Knowledge Creation

Fresno, CA

The major Education and Knowledge Creation assets in Fresno are California State University-Fresno and Fresno City College, both of which are in or near URCs. Although degree requirements limit URC residents from obtaining many high-wage cluster jobs, there are many opportunities for living wages for those with less than a bachelor's degree within the cluster. This case study shows the role of postsecondary institutions as anchors of economic and community development and the importance of providing key resources and services to help URC residents overcome challenges that inhibit their ability to access cluster jobs.

Insurance Services

Miami-Fort Lauderdale-West Palm Beach, FL

The cluster has long been important throughout the Miami area, including in URCs, because of the area's exposure to hurricanes and its large retiree population, which create high demand for property and health insurance. Recent growth in the cluster stems from the development of the related Financial Services cluster, which has been a major target of economic development efforts in the region. Strategies such as customized, industry-centered workforce development and access to small business support services have been instrumental in advancing connectivity and opportunity in the region's URCs.

Information Technology and Analytical Instruments

Austin-Round Rock, TX

The cluster has grown rapidly in the Austin metro area during the past two decades. Although most of its establishments are located outside of URCs, some semiconductor manufacturers have plants in the southeast Austin URC. The cluster has been a major target of both economic development (including entrepreneurial support) and workforce development efforts in the region, and these have included equity-oriented provisions to benefit the region's diverse URC communities and residents.

Austin, Texas

Implications for Economic Development Policy and Practice

Our data analysis, case studies, and discussions with regional stakeholders have several important implications for economic development policy and practice.

State and local governments and regional organizations should consider incentives and strategies structured to attract and retain cluster-related firms in URCs.

Incentives, including workforce development, small business technical assistance, infrastructure improvements, and site preparation, should be targeted toward fundamental business development challenges within URCs and toward firms that are part of strong regional clusters and are located or planning to locate in URCs.

Attracting investment in URCs to develop regional economic connectivity requires special approaches for anchor institutions.

If anchors, whether nonprofit or for-profit, are driving connectivity (as are colleges and universities in Fresno), they have special roles and responsibilities to train and hire URC residents, contract with URC businesses, and avoid or minimize gentrification and displacement of current URC residents. In so doing, they can attract other businesses and jobs to URCs.

Related clusters, especially those that include professional and business services or infrastructure, can be the basis for connectivity of other clusters.

Some clusters support the growth of related clusters, as professional and business services-related clusters supported the growth of the Insurance Services cluster in Miami and fiber-optic cable supported the growth of Communications Equipment and Services in Hickory-Lenoir-Morganton. Therefore, helping firms in related clusters grow in URCs can be a means of creating connectivity for targeted clusters.

By itself, the presence of regional cluster employment in URCs does not guarantee greater prosperity or opportunity for URC residents.

To ensure that jobs in URCs are accessible to URC residents, a combination of workforce development, wrap-around services (such as child care, transportation, and career counseling) and employer commitments to hire residents is necessary.

Introduction

Without intervention, poverty and economic distress have devastating patterns of persistence in neighborhoods. Those communities that are at risk remain at risk or worsen.[1] This trend has become pronounced with increases in technology- and innovation-driven economic activity over the past 40 years and more recently with the disproportionate economic, social, and health impacts of COVID-19.[2] The purpose of this report is to describe and illustrate an alternate path to opportunity for distressed communities. That path, regional economic connectivity, is based on fostering the growth of industries in distressed communities that are strong in the broader regions of which they are a part.

This report is part of a policy research effort funded by the Kresge and Robert Wood Johnson Foundations to explore regional economic connectivity as an opportunity for economic development in under-resourced communities (URCs). URCs are heavily populated areas of high poverty and low income located in metropolitan areas. To demonstrate potential pathways for URC growth, we explore the extent to which URCs in 181 metropolitan areas have employment within industry clusters that are also strong in their regions. We also examine the factors that encourage the presence and growth of those jobs.

Prior research confirms the positive economic impact of connectivity between communities and strong regional industry clusters, including for employment and wage growth.[3] Industry clusters are groups of firms in related industries that operate within regions and benefit from their proximity. The advantages they gain from proximity, such as knowledge spillovers, thick labor markets, and specialized suppliers, give them the potential for greater growth and productivity than if they were operating outside of the cluster.[4] This report describes under-resourced communities and the concept and strategy of regional economic connectivity; presents key features of connectivity, including the kinds of communities and clusters that have the greatest opportunities for connectivity; presents five case studies of connectivity in action; and discusses implications for economic development policy and practice.

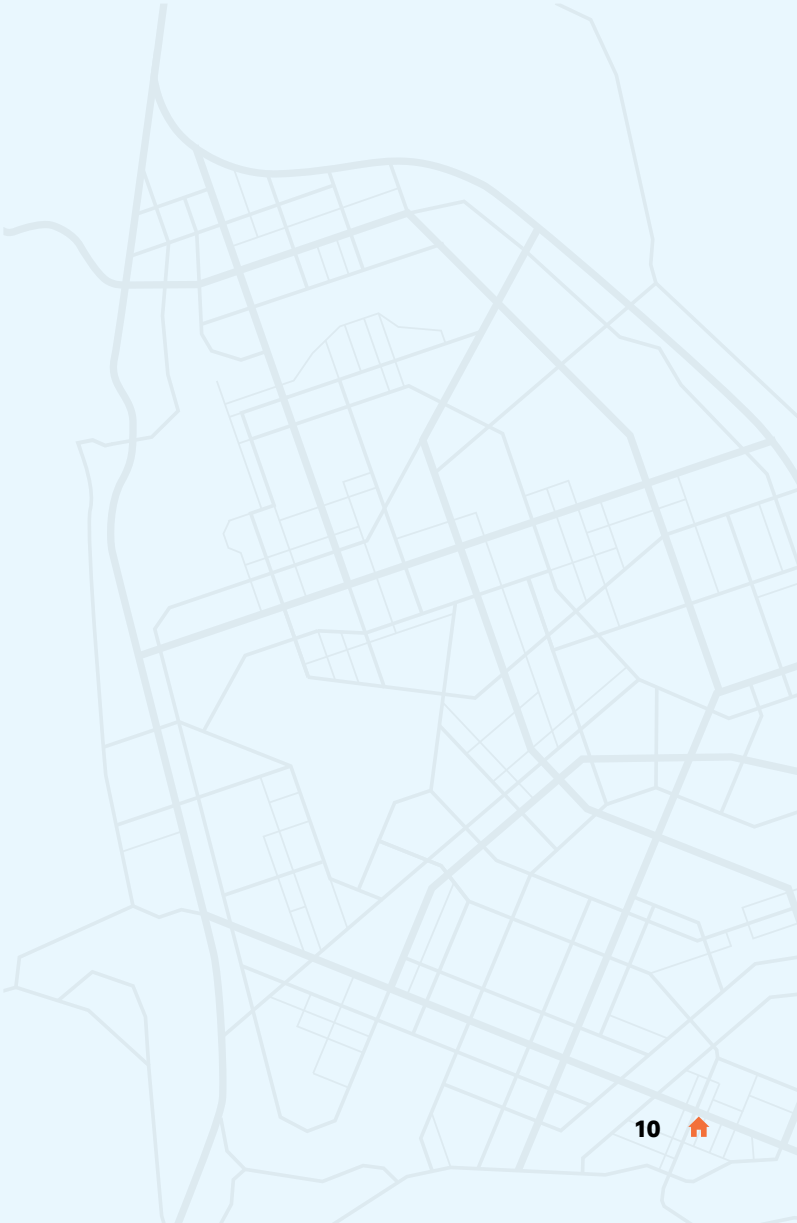
Fort Lauderdale, Florida

Background

Regional economic connectivity has foundations in prior research on employment growth and business development in distressed communities and on the role of regional industry clusters in driving growth locally. Delgado and Zeuli found that regional cluster strength contributes to employment growth in more localized inner-city clusters.[5] Growth opportunities derived from regional economic connectivity may stem from URCs' higher population and employment density, more central location within MSAs (i.e., not rural), access to transportation (rail or highway, passenger or freight), proximity to non-URC businesses (which may be suppliers or customers of URC firms), and available labor force.[6] These potential connectivity advantages of URCs may exist in both central city and suburban URCs but take different forms in each (e.g., central city URCs may have better access to public transportation while suburban URCs may have better highway access).

Research on strategies to provide opportunity and growth in distressed communities indicates that success is based on identifying and building on strengths and assets (such as those identified above) and targeting problems that impede business growth in distressed communities. These strategies can include infrastructure improvements, business services, customized job training, and site preparedness to incentivize private sector investment and encourage connectivity to regional clusters. From the perspective of the region, these investments in URCs have better returns than similar investments in more prosperous places. Economist Timothy Bartik found that "[t]argeting job opportunities in a poor community has benefits at least double that of creating jobs in a booming area, and potentially can boost overall employment without increasing inflationary pressures."[7]

Driving growth in URCs through regional economic connectivity, however, does not guarantee that residents of URCs will be hired into new cluster jobs in their communities. Low-income communities typically have lower educational attainment levels or worse social conditions that limit access to available jobs.[8] Critical to overcoming these barriers and ensuring equitable development within regional connectivity strategies is addressing barriers to job access, such as child care, transportation, and workforce development needs, to support resident employment.



Definitions and Approach

Under-Resourced Communities

Place-based economic development policies designed to improve the well-being of residents in metropolitan areas have long focused on inner cities. In recent decades, though, the economic and social challenges faced by poor central cities have expanded to some suburban areas as well.[9] To respond to shifts in the location of concentrated disadvantage within metropolitan areas, the Initiative for a Competitive Inner City (ICIC) has defined URCs as a generalization of the idea of an inner city. URCs are heavily populated areas of high poverty and low income that may be in central cities, suburbs, or both, but not in low-density exurbs or rural or semi-rural areas. Box 1 gives a more detailed definition of a URC. URC residents are 14 percent of the total U.S. population and 31 percent of the nation's poor, and most URC residents are people of color.[10]

This report is based on data analysis of economic connectivity patterns of URCs in 181 metropolitan areas, paired with case studies of connectivity in five metropolitan areas. See Appendix B for the full list of metros used in our quantitative analysis.

What Is a URC?

A neighborhood (census tract) is part of a URC if it:

- Is part of a group of two or more contiguous census tracts that have a combined population of at least 8,000 people.
- Is in a metropolitan area whose population is at least 250,000.
- Has a non-student poverty rate of at least 20 percent.
- Has a median household income less than the nationwide median household income.
- Has no more than 65 percent of its population made up of undergraduate or graduate students.
- Has no more than 65 percent of its population made up of residents of group quarters, such as nursing homes, dormitories, or prisons.
- Meets requirements designed to exclude low-density exurban and semi-rural areas that are often located at the fringes of metropolitan areas.

Source: The complete definition of a URC may be found in Peter Eberhardt, Howard Wial, and Devon Yee, *The New Face of Under-Resourced Communities* (Boston: Initiative for a Competitive Inner City, 2020).

Economic Connectivity

URCs experience regional economic connectivity when economic and industrial specializations that are driving their broader metropolitan region are also present within local communities. More specifically, URCs are connected if an industry cluster with a high regional employment concentration outside of the URC (location quotient greater than 1.25) also has a high employment concentration in the URC.[11] The research includes URC-cluster pairs only for clusters with high regional employment concentration outside of the URC (625 URC-cluster pairs), so that the strength of URC connectivity is measured by the strength of the cluster in the URC. This is indicated by its location quotient (LQ), or by the employment concentration in the URC. The median connectivity score (location quotient) is 1.8. The higher the cluster's location quotient in the URCs, the higher its connectivity score.

For example, the Cleveland-Elyria, OH MSA has a competitive advantage in the Production Technology and Heavy Machinery industry cluster, with an employment concentration almost five times the national average (location quotient of 4.68). The industry's location quotient for the region's URCs is 1.71, with one in five regional cluster jobs located in URCs. The competitive advantage of the cluster in both the broader region and in URCs reflects regional economic connectivity of the Production Technology and Heavy Machinery industry cluster in Greater Cleveland.

Appendix C summarizes key characteristics of each cluster included in this report.

Characteristics of Metropolitan Areas and Industry Clusters

This report examines how connectivity differs between metropolitan areas of different sizes, between central cities and suburbs, and between different types of industry clusters, including manufacturing-based and service-based clusters (as categorized by U.S. Cluster Mapping Project cluster relatedness measures), those that offer different wages (measured by the cluster's average annual wage), and those with different educational requirements for entry-level workers. We grouped URC-cluster pair LQ data for the 181 metros by these characteristics and compared their average connectivity scores (average URC LQ, unweighted). We report comparisons between average connectivity scores that are statistically significant at the .05 level. Exploring these differences enables us to understand specific features of connectivity that inform regional economic connectivity strategies.

Each region and cluster are unique. Some regions have been successful in growing clusters in URCs that our data would suggest are less amenable to connectivity. Therefore, we supplemented the data analysis with five case studies. For our case studies, we selected connected industry clusters in five geographically and economically diverse metropolitan areas. We conducted interviews and reviewed policies, programs, priorities, and investments to generate insights into the drivers of connectivity for URCs in the region and lessons learned for practitioners. See Appendix A for a more detailed description of our methodology for both the quantitative analysis and the case studies.

Regional Economic Connectivity Dashboard:

A Tool for Economic Developers

The general nationwide patterns identified in this report may not hold for all metro areas or all clusters. Therefore, we have created an **economic connectivity dashboard** that shows the features of connectivity in each of the metro areas and clusters we analyzed. Economic developers can use the dashboard to see which locations and clusters that are of interest to them offer the best opportunities to improve connectivity.

Features of Economic Connectivity

From the vantage point of local and regional economic developers and their key partners, a regional economic connectivity strategy can be informed by regional and cluster-based characteristics of connectivity. This section of the report presents the key findings from our data analysis describing the most common features of regions and clusters associated with economic connectivity.

Table 1. Summary of Features of Connectivity

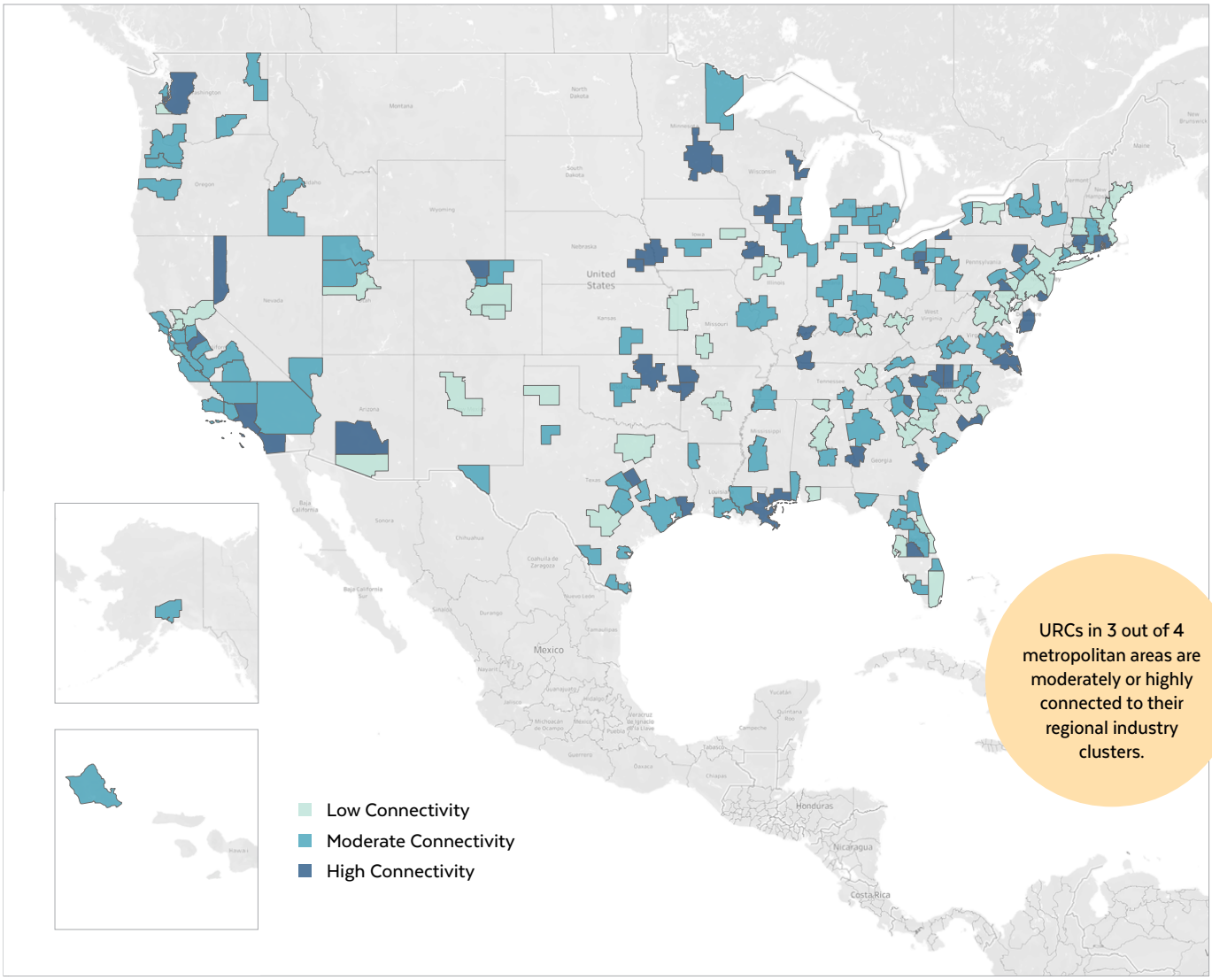
Feature	More Connected	Less Connected
Metropolitan area size	Small and medium-sized	Large
Location within metro	Suburban	Central city
Manufacturing-based or service-based clusters	Manufacturing-based	Service-based
Education requirements for entry-level positions	Do not require high levels of formal education	Require high levels of formal education
Average cluster wages	Lower average wages	Higher average wages

Western shoreline, Cleveland, Ohio

Most URCs have moderate levels of economic connectivity.

The URCs in most of our 181 metropolitan areas have moderate levels of economic connectivity. Figure 1 illustrates the connectivity of URCs in all metropolitan areas included in this report. URCs in more than half (53 percent) of these metropolitan areas are moderately connected to regional industry clusters (weighted average URC location quotient across regionally strong industry clusters greater than 1.25 and less than or equal to 5). About one in four metropolitan areas has low connectivity (weighted average URC location quotient 1.25 or below), and a similar share has high connectivity (LQ above 5).

Figure 1. Regional Economic Connectivity of URCs in Metropolitan Areas

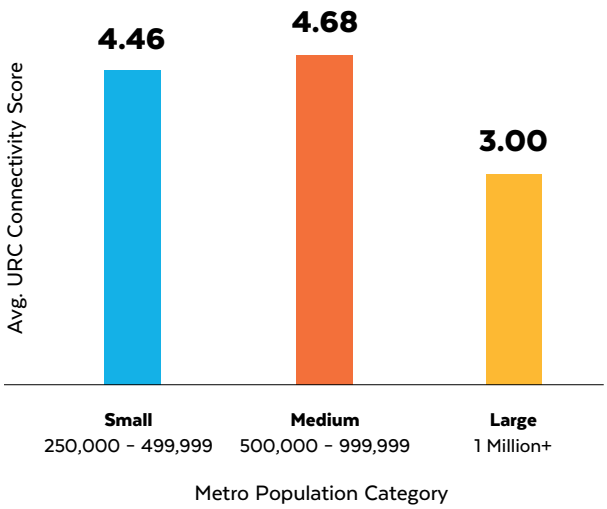


Source: ICIC and SRI analysis of 2019 Data Axle industry employment data via Your-economy Time Series, using ICIC URC boundaries.

URCs in small and medium-sized metros are more connected than those in larger ones.

Figure 2 shows that small and medium-sized metropolitan areas have higher connectivity than large metropolitan areas. Small metropolitan areas (those with populations of at least 250,000 but less than 500,000) have an average connectivity score of 4.46, meaning that industry clusters that are strong in small metros have, on average, URC employment in connected clusters that is more than four times as concentrated as in the entire United States, on average. Medium-sized metropolitan areas (those with populations of at least 500,000 but less than one million) have an average connectivity score of 4.68 and large metropolitan areas (those with populations of one million or more) have an average connectivity score of 3.00.

Figure 2. Average Metro Connectivity Score by Metro Population Category



Source: ICIC and SRI analysis of 2019 Data Axle industry employment data via Your-economy time series, using ICIC URC boundaries. Metro population data are from the 2015–2019 American Community Survey.

Downtown Hickory, North Carolina

Features of Economic Connectivity

The 10 regions with the strongest connectivity for URCs include two metropolitan areas with populations above one million (New Orleans and Providence), but the rest are smaller regions, such as Fayetteville-Springdale-Rogers, AR-MO; Fort Smith, AR-OK; and Salisbury, MD-DE (see Table 2). The clusters driving connectivity across the 10 most connected metropolitan areas are primarily manufacturing-based clusters. Most have relatively low educational requirements for workers, e.g., Automotive, Livestock Processing, and Food Processing. It is likely that cluster-specific features, such as the need for larger sites or greater demand for knowledge workers, make it easier for some clusters than others to develop a strong presence in under-resourced communities. We further discuss cluster characteristics and their relationship to connectivity below.

Table 2. The 10 Metropolitan Areas with the Most Connected URCs

Metro Area	Connectivity Score (Average URC LQ)	Clusters That Are Strong in the URC and Strong in the Rest of MSA
Fayetteville-Springdale-Rogers, AR-MO	51.82	Livestock Processing Food Processing and Manufacturing
Fort Smith, AR-OK	47.94	Livestock Processing Furniture Oil and Gas Production and Transportation Paper and Packaging
Salisbury, MD-DE	37.17	Fishing and Fishing Products
Akron, OH	24.45	Vulcanized and Fired Materials Plastics Automotive Metalworking Technology Production Technology and Heavy Machinery Recreational and Small Electric Goods
Modesto, CA	22.58	Food Processing and Manufacturing
Columbus, GA-AL	21.86	Trailers, Motor Homes, and Appliances Apparel Paper and packaging Automotive
Hickory-Lenoir-Morganton, NC	20.72	Furniture Textile Manufacturing Wood Products Lighting and Electrical Equipment Communications Equipment and Services Construction Products and Services
New Orleans-Metairie, LA	19.61	Water Transportation Oil and Gas Production and Transportation Downstream Chemical Products
Canton-Massillon, OH	16.69	Livestock Processing Upstream Metal Manufacturing Downstream Metal Products Automotive
Providence-Warwick, RI-MA	16.31	Jewelry and Precious Metals Textile Manufacturing Recreational and Small Electric Goods

Source: ICIC and SRI analysis of 2019 Data Axle industry employment data via Your-economy Time Series, using ICIC URC boundaries. The metro connectivity score, or metro average URC LQ for connected clusters, is weighted by URC cluster employment. URC clusters that are strong in the URC and strong in the rest of region have URC LQ > 1.25 and rest of MSA LQ > 1.25.

The regions with the least connected URCs are generally larger than the ones with the most connected URCs. Of the ten least connected metropolitan areas, five (Kansas City, New York City, Baltimore, Philadelphia, and San Antonio) have populations above a million (Table 3). The industry clusters that are strongest within the ten metropolitan areas with the least connected URCs include Financial Services; Distribution and Electronic Commerce; Marketing, Design, and Publishing; Education and Knowledge Creation; Transportation and Logistics; and Hospitality—all of which are knowledge- and/or service-based clusters. Jobs in knowledge-based clusters often have higher educational or credential requirements, which may pose a barrier to employment for residents of URCs.

Table 3. The 10 Metropolitan Areas with the Least Connected URCs

Metro Area	Connectivity Score (Average URC LQ)	Clusters That Are Weak in the URC and Strong in the Rest of MSA
Olympia-Tumwater, WA	0.38	Hospitality and Tourism
Kansas City, MO-KS	0.38	Financial Services
Augusta-Richmond County, GA-SC	0.42	Distribution and Electronic Commerce
Cedar Rapids, IA	0.47	Financial Services
Lancaster, PA	0.47	Distribution and Electronic Commerce
Santa Cruz-Watsonville, CA	0.49	Distribution and Electronic Commerce Education and Knowledge Creation
New York-Newark-Jersey City, NY-NJ-PA	0.55	Financial Services Marketing, Design, and Publishing
Baltimore-Columbia-Towson, MD	0.59	Education and Knowledge Creation
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	0.63	Marketing, Design, and Publishing Transportation and Logistics Financial Services
San Antonio-New Braunfels, TX	0.64	Marketing, Design, and Publishing Transportation and Logistics

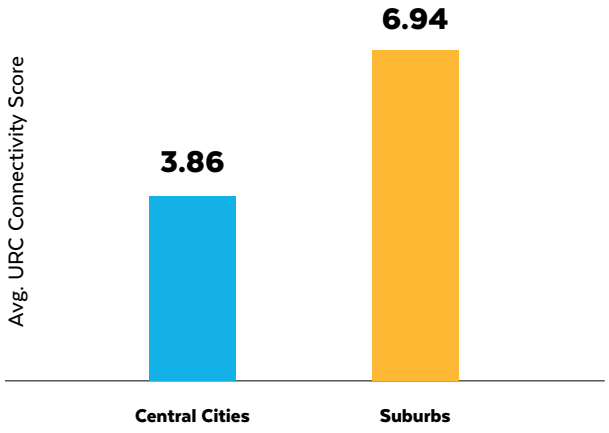
Source: ICIC and SRI analysis of 2019 Data Axle industry employment data via Your-economy Time Series, using ICIC URC boundaries. The metro connectivity score, or metro average URC LQ for connected clusters, is weighted by URC cluster employment. URC clusters that are weak in the URC and strong in the rest of region have URC LQ ≤ 1.25 and rest of MSA LQ > 1.25.

Suburban URCs are more connected than central city URCs.

Figure 3 shows that suburban URCs are more connected than those in central cities. Suburban URCs have an average connectivity score of 6.94, while those in central cities have an average connectivity score of 3.86. In Figure 4, we see that manufacturing-based clusters are also more connected in suburban URCs (average connectivity score of 7.01) than in central city URCs (average connectivity score of 4.25). For service-based clusters, we do not see statistically significant differences in connectivity between central cites (average connectivity score of 1.63) and suburbs (average connectivity score of 1.66).

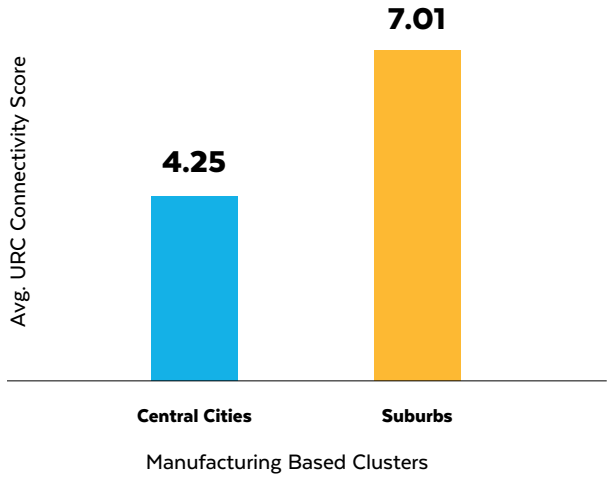
Lenoir, North Carolina

Figure 3. Average Central City and Suburban Connectivity Scores, Clusters Overall



Source: ICIC and SRI analysis of 2019 Data Axle industry employment data via Your-economy Time Series, using ICIC URC boundaries. Central city and suburb definitions based on those developed in Elizabeth Kneebone and Emily Garr, *The Suburbanization of Poverty: Trends in Metropolitan America*, 2000 to 2008 (Washington: Brookings Institution, 2010). See Appendix A for more information.

Figure 4. Average Central City and Suburban Connectivity Scores, Manufacturing-Based Clusters



Source: ICIC and SRI analysis of 2019 Data Axle industry employment data via Your-economy Time Series, using ICIC URC boundaries. Central city and suburb definitions based on those developed in Elizabeth Kneebone and Emily Garr, *The Suburbanization of Poverty: Trends in Metropolitan America*, 2000 to 2008 (Washington: Brookings Institution, 2010). Manufacturing-based clusters definition derived from U.S. Cluster Mapping Project cluster relatedness measures. See Appendix A for more detail.

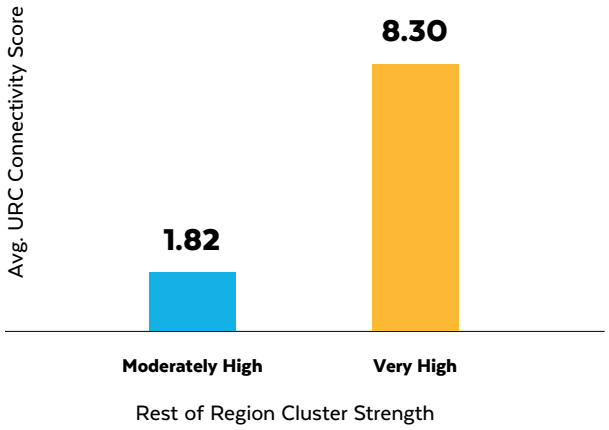
Clusters with very high employment concentration in a region outside of the URCs have greater connectivity.

Clusters with very high employment concentration in a region outside of URCs (rest of region LQ) are more connected than those with lower specialization in the region outside the URC in the same metropolitan area. For each metropolitan area, we categorize clusters that are strong in the metropolitan area excluding the URC (rest of region LQ > 1.25) by the strength of their employment concentration. We find that clusters with very high employment concentration in the rest of region (top 25 percent of strong clusters in the rest of region) have an average connectivity score of 8.30 (highly connected), while those with lower but still strong employment concentration (bottom 25 percent of strong clusters in the rest of region) have an average connectivity score of 1.82 (moderate levels of connectivity). (See Figure 5.)

Clusters that are manufacturing-based have greater connectivity.

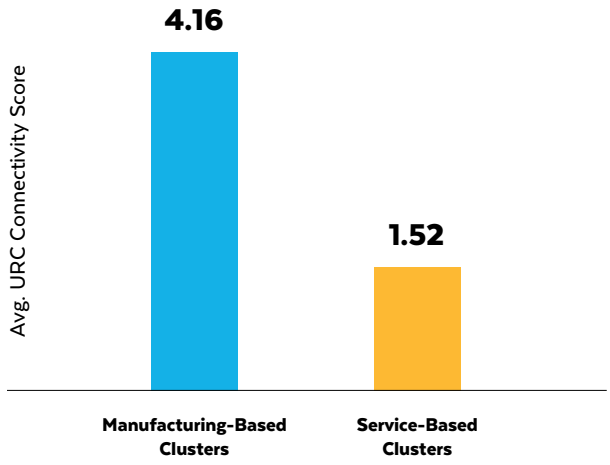
Manufacturing-based clusters are more connected than service-based clusters. Figure 6 shows that the average connectivity score of manufacturing-based clusters is 4.16, while that of service-based clusters is 1.52.

Figure 5. Average Connectivity Score by Rest of Region (non-URC) Cluster Strength



Source: ICIC and SRI analysis of 2019 Data Axle industry employment data via Your-economy Time Series, using ICIC URC boundaries. In each metro, clusters with "moderately high" employment concentration in the metropolitan area excluding the URC (rest of region LQ in the bottom 25 percent of strong clusters) and "very high" regional employment concentration (rest of region LQ in the top 25 percent of strong clusters) are identified.

Figure 6. Average Connectivity Scores for Manufacturing- and Service-Based Clusters

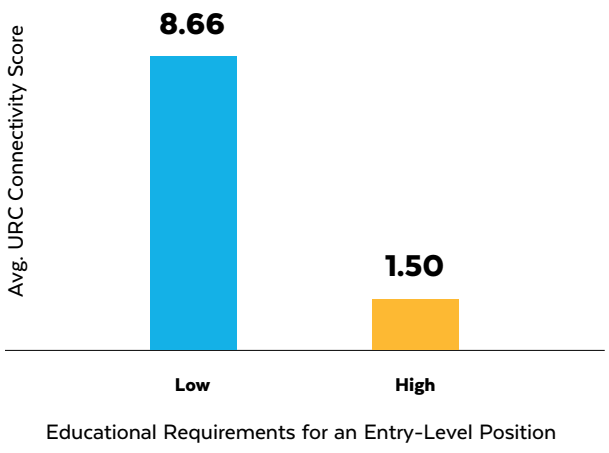


Source: ICIC and SRI analysis of 2019 Data Axle industry employment data via Your-economy Time Series, using ICIC URC boundaries. Manufacturing- and service-based cluster categorization based on cluster relatedness measures from the U.S. Cluster Mapping Project. See Appendix A for more detail.

Clusters that are more accessible to workers with lower levels of formal education have greater connectivity.

Clusters that are more accessible to entry-level workers without bachelor's degrees are more connected than those that require greater educational credentials for entry-level workers. Figure 7 shows clusters with low educational requirements for entry-level workers have an average connectivity score of 8.66 (high connectivity), while those with high educational requirements have an average connectivity score of 1.50 (moderate connectivity).

Figure 7. Average Connectivity Score Among Clusters with Low and High Entry-Level Educational Requirements



Source: ICIC and SRI analysis of 2019 Data Axle industry employment data via Your-economy Time Series using ICIC URC boundaries. Clusters with "low" entry-level educational requirements are those with the 10 lowest entry-level educational requirement scores (calculated from 2018 Lightcast data). Clusters with "high" entry-level educational requirements are those with the 10 highest scores. See Appendix A for more information on entry-level educational requirement scores.

Right: Cleveland, Ohio

Features of Economic Connectivity

Tables 4 and 5 show the 10 most connected and the 10 least connected industry clusters, as measured by their average connectivity scores across all metropolitan areas where they are strong. The tables broadly reflect the generalizations about connectivity noted above. Three of the 10 most connected clusters include many manufacturing industries. These three clusters are Trailers, Motor Homes, and Appliances; Jewelry and Precious Metals; and Upstream Chemical Products. Only one of the 10 least connected clusters (Recreational and Small Electric Goods) include substantial manufacturing activity. While all the 10 most connected clusters have many jobs that are accessible to people with less formal education, the 10 least connected clusters include some (Financial Services; Marketing, Design, and Publishing; Business Services; Local Health Services; and Education and Knowledge Creation) with fewer jobs for less educated workers.

Several clusters stand out as showing strong connectivity across many metropolitan areas. For example, all 26 metropolitan areas with a strong presence in Downstream Metal Products contain URCs that are connected to their regional Downstream Metal Products cluster. By contrast, only 12 of the 41 metropolitan areas with a strong presence in the Education and Knowledge Creation cluster contain URCs that are connected to their regional Education and Knowledge Creation cluster. The latter include Fresno, CA; Ann Arbor, MI; Syracuse, NY; and Durham-Chapel Hill, NC.

Table 4. The 10 Most Connected Industry Clusters

Cluster	Cluster Connectivity Score (Average URC LQ)	Number of URCs Where Clusters are Strong in the URC and Strong in the Rest of Region
Coal Mining	111.42	1
Fishing and Fishing Products	91.73	1
Forestry	53.81	1
Trailers, Motor Homes, and Appliances	47.71	1
Livestock Processing	47.38	11
Agricultural Inputs and Services	40.08	3
Jewelry and Precious Metals	34.77	1
Vulcanized and Fired Materials	31.63	3
Water Transportation	22.74	11
Upstream Chemical Products	21.40	3

Source: ICIC and SRI analysis of 2019 Data Axle industry employment data via Your-economy Time Series, using ICIC URC boundaries. The cluster connectivity score, or average URC LQ for connected clusters, is weighted by metro URC cluster employment. URCs with substantial connectivity are those in which the URC cluster LQ is greater than 1.25.

Table 5. The 10 Least Connected Industry Clusters

Cluster	Cluster Connectivity Score (Average URC LQ)	Number of URCs Where Clusters are Strong in the URC and Strong in the Rest of Region
Financial Services	0.88	1
Marketing, Design, and Publishing	1.18	2
Business Services	1.20	5
Local Health Services	1.33	10
Communications Equipment and Services	1.34	8
Education and Knowledge Creation	1.36	12
Distribution and Electronic Commerce	1.42	9
Recreational and Small Electric Goods	1.70	16
Transportation and Logistics	1.92	20
Construction Products and Services	1.94	24

Source: ICIC and SRI analysis of 2019 Data Axle industry employment data via Your-economy Time Series, using ICIC URC boundaries. The cluster connectivity score, or average URC LQ for connected clusters, is weighted by metro URC cluster employment. URCs with substantial connectivity are those in which the URC cluster LQ is greater than 1.25.

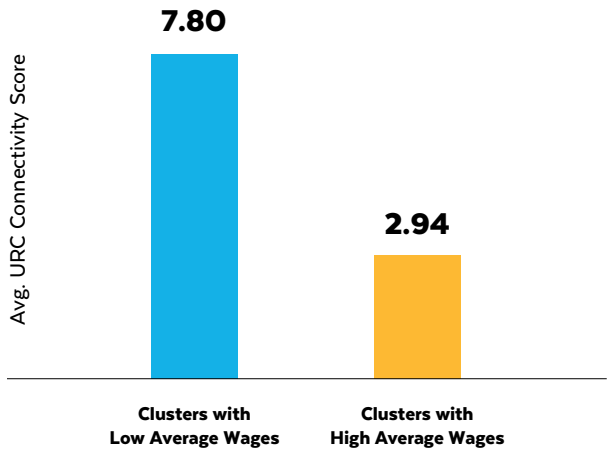
Clusters with lower average wages are more connected than those with higher wages.

Figure 8 shows that clusters with low average wages (bottom 10 clusters by average wage) have an average connectivity score of 7.80 (highly connected), while clusters with high average wages (top 10 clusters by average wage) have an average connectivity score of 2.94 (moderate levels of connectivity). Similarly, the 10 most connected clusters have a lower average wage ($57,489) than the 10 least connected clusters ($73,608).

This finding raises concerns from a policy perspective. Economic development policies and programs should aim to increase wages and, therefore, seek to target higher-wage clusters. However, high-wage clusters likely have higher education requirements, creating a barrier to employment for many URC residents. Lower-wage clusters are more accessible and more likely to connect. However, any policy with the goal of job growth must ensure that the new jobs that are created have living wages. Economic developers and partners can support the creation of high-paying job opportunities for URC residents by pursuing clusters that typically exhibit a favorable combination of factors, including higher levels of connectivity, lower educational barriers, and living wages. Water Transportation and Nonmetal Mining are examples of such clusters.

Economic developers and partners can support the creation of high-paying job opportunities for URC residents by pursuing clusters that typically exhibit a favorable combination of factors, including higher levels of connectivity, lower educational barriers, and living wages.

Figure 8. Average Connectivity Scores for the 10 Lowest-Wage and 10 Highest-Wage Clusters



Source: ICIC and SRI analysis of Data Axle industry employment data via Your-economy Time Series. We categorize clusters using 2020 average cluster wages from U.S. Cluster Mapping Project data. Clusters with low average wages are the 10 clusters with lowest average annual wages among clusters included in this report. Clusters with high average wages are the 10 with the highest average annual wages.

Case Studies

Connectivity results from the needs of specific industry clusters as well as assets and other features of the URCs and their metropolitan area that support economic integration, attraction, and growth of cluster activity in the URC. To complement the data analysis, we developed case studies of regions where URCs are connected to regional industry clusters, demonstrating growth and high-quality job opportunities. As described in Appendix A, we selected one highly connected cluster in each of five geographic regions with various industrial compositions, sizes, and demographics:

Production Technology and Heavy Machinery
Cleveland-Elyria, OH
pg. 24

Communications Equipment and Services
Hickory-Lenoir-Morganton, NC
pg. 29

Education and Knowledge Creation
Fresno, CA
pg. 33

Insurance Services
Miami-Fort Lauderdale-West Palm Beach, FL
pg. 39

Information Technology and Analytical Instruments
Austin-Round Rock, TX
pg. 44

For each region, we conducted deeper data analysis and interviews with key stakeholders to obtain an in-depth understanding of the region and the cluster-specific contexts that affect the ability of URCs to generate growth and development from regionally competitive clusters. In each region, we examined the extent to which economic developers targeted problems that impeded URC growth with specific strategies, including infrastructure improvements, business services, customized job training, zoned and permitted real estate for business usage, and unique features and assets of the community leveraged for business development.

Production Technology and Heavy Machinery

Cleveland-Elyria, OH

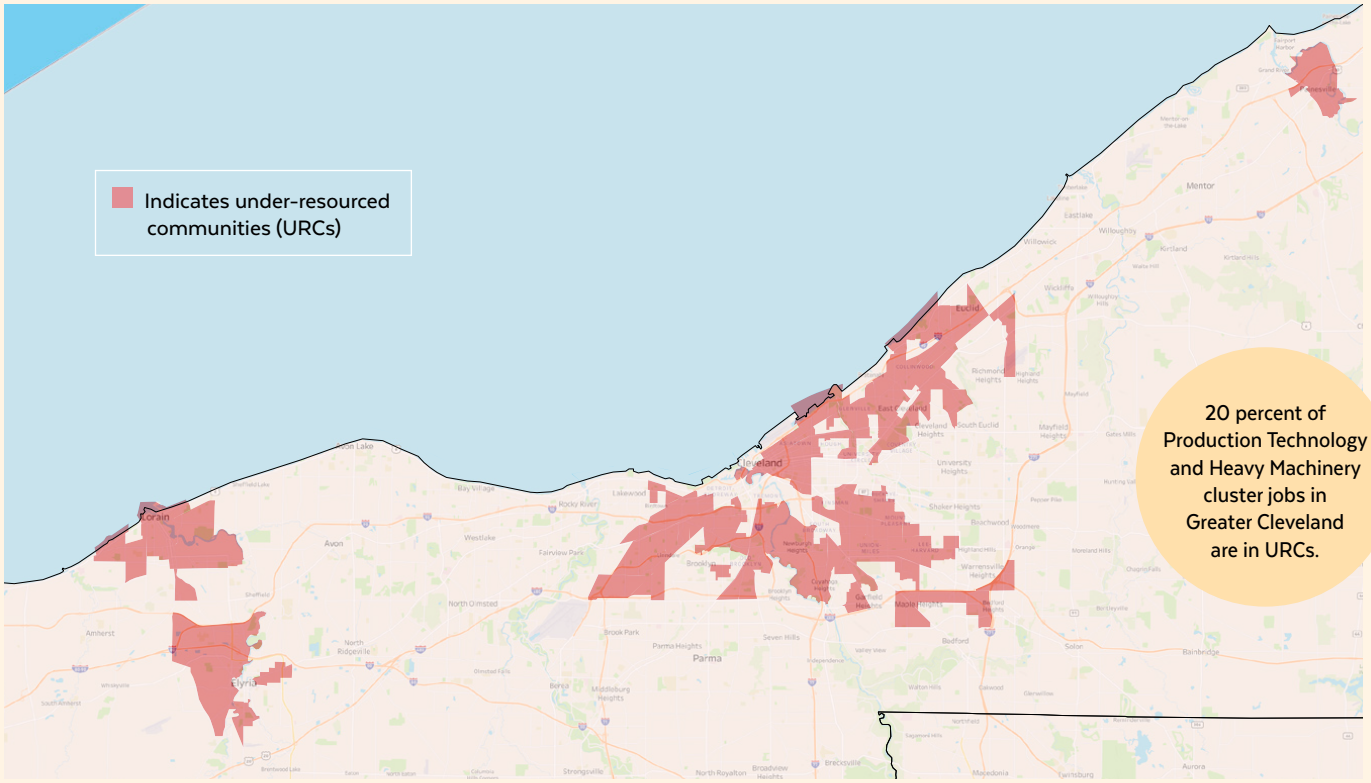
Introduction

The Cleveland-Elyria, OH MSA is in northeast Ohio along Lake Erie. Nearly a quarter of Greater Cleveland's 2.1 million residents live in URCs. The MSA has multiple URCs spread across several cities, including central city neighborhoods in Cleveland, Elyria, and Lorain (Figure 9). Other URCs exist in and around suburbs such as East Cleveland, Euclid, Painesville, Newburgh Heights, Garfield Heights, Warrensville Heights, Brooklyn, Brooklyn Heights, and Bedford.

In addition to having greater racial and ethnic diversity than the broader MSA, URCs in Greater Cleveland have substantially higher poverty rates, lower educational attainment, and gaps in broadband access.[12]

These trends reflect historical and current policies and practices, including redlining, policing, public health, exclusionary zoning, and more, resulting in racial and economic disparities. Despite these challenges, URCs in the Cleveland MSA contribute to and benefit from the success of the Production Technology and Heavy Machinery industry cluster. This case study of Production Technology and Heavy Machinery in the Cleveland metro area demonstrates the importance of retaining key cluster employers, cluster-specific development and redevelopment strategies, offering accessible industry-led training, and providing key wrap-around services to advance connectivity and opportunity in URCs.

Figure 9. Location of URCs in the Cleveland-Elyria, OH MSA



Source: URCs are based on ICIC boundaries.

Background

The Production Technology and Heavy Machinery industry cluster primarily manufactures machines designed to produce parts and devices used in the production of downstream products. This cluster also includes end-use heavy machinery such as air and material handling equipment. The technologies and machinery are used for industrial, agricultural, construction, commercial, and related purposes. The cluster employs over 12,000 people in Greater Cleveland and had strong 12 percent growth between 2011 and 2022.[13] Forty-one industries comprise the cluster; the top three by employment are Fluid Power Valve and Hose Fitting Manufacturing, Other Metal Valve and Pipe Fitting Manufacturing, and All Other Industrial Machinery Manufacturing.

The Production Technology and Heavy Machinery cluster has been a staple of the Greater Cleveland economy for decades. During the United States industrial revolution, the region's economy grew to become highly specialized in metal manufacturing and diversified over time to include other industries.[14] Cleveland's manufacturing sector now encompasses a wide array of industries, including advanced materials, aerospace, biotechnology, chemicals, plastics, electronics, and industrial burners and controls.[15] Large employers, such Sherwin-Williams, have served as key anchor employers for the region's Production Technology and Heavy Machinery cluster. Sherwin-Williams, founded in 1866, is headquartered in a URC in the city of Cleveland, has 1,200 on-site employees, and generated nearly $19.9 billion in sales in 2022.[16] Furthermore, the region's development of shipping on the Great Lakes, the Ohio and Erie Canal (no longer used for shipping), and the area's network of railroads, major highways, and airports have enabled the region to support the intensive logistical needs of the Production Technology and Heavy Machinery cluster. Stakeholders shared that this infrastructure has been important in connecting Greater Cleveland to other key manufacturing hubs within the Great Lakes region such as Detroit, Pittsburgh, and Youngstown.

Despite some job and specialization loss in manufacturing industries over the past decade, the Production Technology and Heavy Machinery industry cluster in Greater Cleveland has been able to grow and benefit disparate parts of the region because of the key factors mentioned above. Important to note, however, is that Greater Cleveland's historical success with heavy manufacturing has had adverse environmental and public health impacts on the communities where production facilities are located, including URCs. Steel, brass, and paint all use lead as part of their manufacturing process, contributing to the lead poisoning of workers and residents. Efforts to expand this cluster in URCs and other parts of the region must consider amelioration of environmental and health impacts.

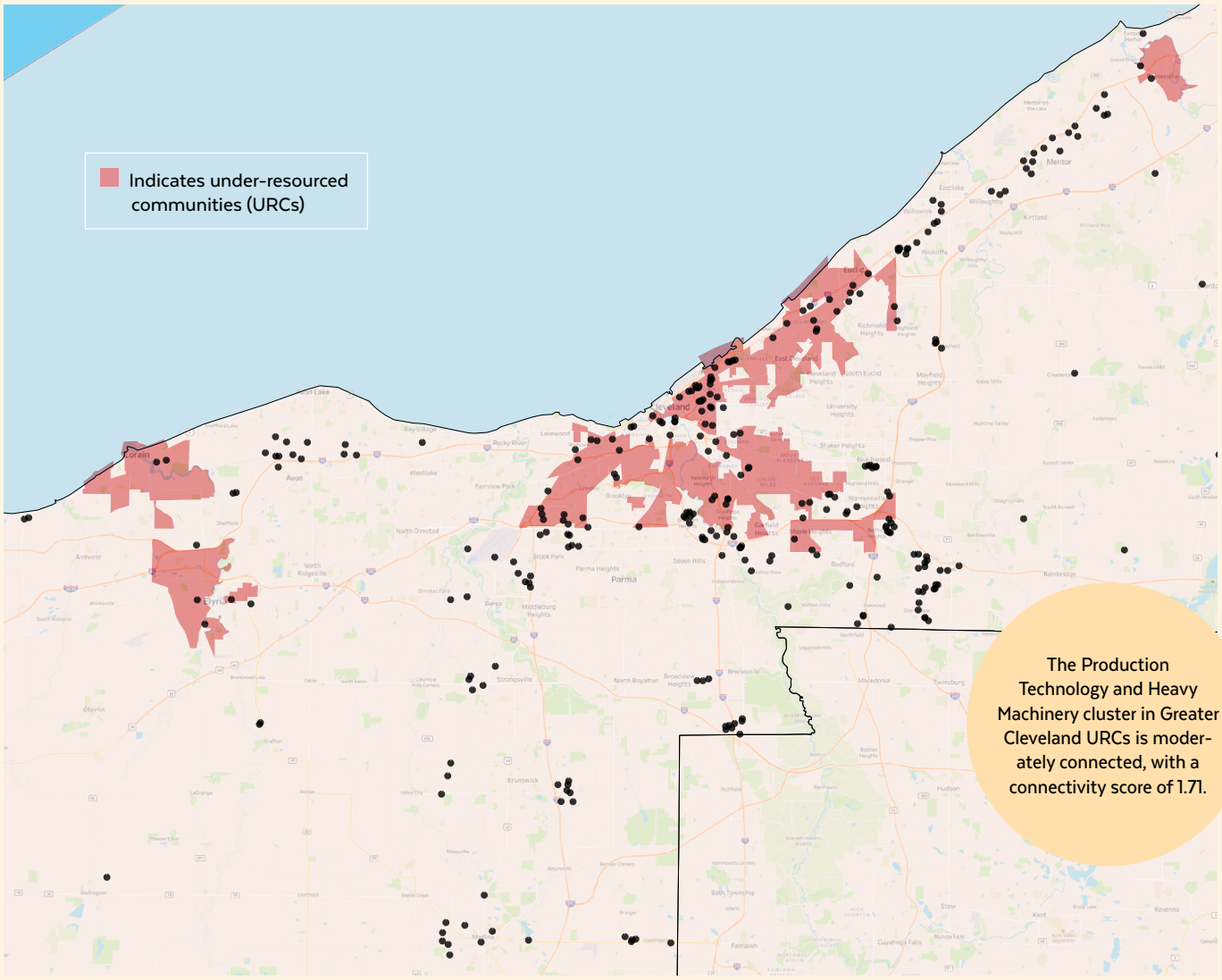
Cleveland, Ohio

Cluster Connectivity

The Cleveland-Elyria, OH MSA has a competitive advantage in the Production Technology and Heavy Machinery industry cluster. The cluster's employment concentration in the region is almost five times the national average (location quotient of 4.68) and its location quotient in the region's URCs is 1.71, with one in five total regional cluster jobs in URCs.[18] This indicates that the cluster has a competitive advantage in the URCs and is well connected in the region.

To further understand cluster employment dynamics, we map the location of cluster establishments within the region (see Figure 10). There are important concentrations of cluster establishments in URCs in the city of Cleveland and in East Cleveland, Euclid, Newbury Heights, and Garfield Heights. A few cluster establishment firms also exist in URCs in Elyria, Lorain, and Painesville.

Figure 10. Production Technology and Heavy Machinery Cluster Establishments in the Cleveland-Elyria, OH MSA and Its URCs



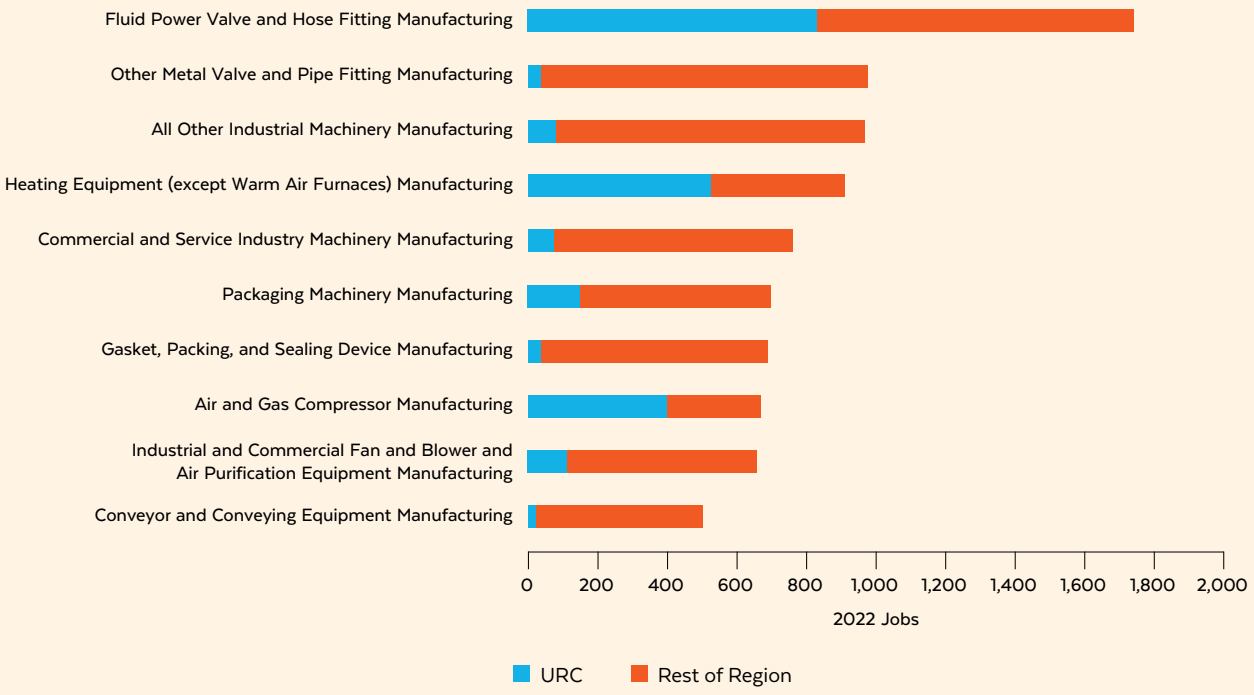
Source: Establishment locations are from DatabaseUSA.com. URCs are based on ICIC boundaries.

Understanding the employment distribution of specific industries within the Production Technology and Heavy Machinery cluster and the performance of those industries can help gauge cluster stability and growth opportunities within URCs. Figure 11 highlights the top 10 employing industries in the cluster. The cluster industries with the most jobs in URCs are Fluid Power Valve and Hose Fitting Manufacturing, Heating Equipment (except Warm Air Furnaces) Manufacturing, and Air and Gas Compressor Manufacturing.

All these top-employing industries within the URCs are growing (Table D1 in Appendix D). Within the cluster, the Air and Gas Compressor Manufacturing industry experienced the greatest employment and employment concentration growth from 2011 to 2022. About 60 percent of Air and Gas Compressor Manufacturing jobs are in URCs. Other cluster industries with relatively high proportions of their jobs located in URCs also grew, including Heating Equipment (except Warm Air Furnaces) Manufacturing and Fluid Power Valve and Hose Fitting Manufacturing. However, Commercial and Service Industry Machinery Manufacturing declined in the region, including in the URCs. Although jobs in the broader MSA grew for both Conveyor and Conveying Equipment Manufacturing and Packaging Machinery Manufacturing, those industries lost jobs in URCs.

Eight of the top 10 employing occupations in the Production Technology and Heavy Machinery cluster require only a high school diploma or the equivalent, making these job opportunities more accessible to URC residents (see Table E1 in Appendix E). Despite the availability of jobs for URC residents in the Production Technology and Heavy Machinery cluster, most of these jobs are not well-paying. By far the largest occupation in this cluster in Greater Cleveland is Miscellaneous Assemblers and Fabricators, which pays about $5 per hour less than the MSA's median hourly wage.[19]

Figure 11. Top 10 Production Technology and Heavy Machinery Industries by Jobs in 2022 in Cleveland-Elyria, OH



Source: Jobs are from the authors' analysis of Lightcast data. URCs are based on ICIC boundaries.

Factors Driving Connectivity

URCs are connected in the metro area's Production Technology and Heavy Machinery industry cluster for several reasons. Greater Cleveland has had significant success retaining key employers over time because of its reliable labor and supply chain assets. Additionally, many jobs in Production Technology and Heavy Machinery have lower educational requirements, making them more accessible to URC residents. In addition, leaders in Greater Cleveland, and the state of Ohio more broadly, support the connectivity of URCs in the Production Technology and Heavy Machinery cluster through strategies that target challenges that impeded growth in employment and business development in URCs. These strategies include expanding the available labor pool through customized training, addressing the environmental impacts of manufacturing, identifying and preparing sites, and expanding transit infrastructure.

Regional and state leaders have been very intentional about working with employer networks and post-secondary institutions to create customized short-term and experiential learning programs to support industry and reduce education and credential barriers that disproportionately impact URC residents. For example, the Manufacturing Experiential Advancement Readiness Network (EARN), a project of the Ohio Manufacturing Workforce Partnership (OMWP), identifies, replicates, and scales successful earn-and-learn or work-based learning models. EARN leverages existing industry partnerships and provides colleges with hands-on guidance in adapting models to meet their needs. EARN is funded through the U.S. Department of Labor's Scaling Apprenticeship Through Sector-Based Strategies initiative, which provided a $12 million grant. OMWP is currently supporting 12 earn-and-learn programs throughout the state through EARN, including two programs that are in URCs in the Greater Cleveland area.[20] Lorain County Community College operates one of these programs and MAGNET (the region's Manufacturing Extension Partnership center) operates the other in downtown Cleveland. The physical accessibility of these programs to URCs allows URC residents greater access to affordable training opportunities in the cluster and incentivizes cluster employers to expand operations in URCs with a ready labor pool.

Cleveland has also leveraged state brownfield funding to support the responsible redevelopment of vacant land in URCs and develop what the local government has dubbed the "Opportunity Corridor."[21] The Opportunity Corridor Plan emphasizes the importance of addressing environmental impacts by planning for the assessment of environmental data and working with stakeholders to identify projects, guidelines, and remediation strategies that support Cleveland's long-term redevelopment goals. Because of Cleveland's challenges with lead exposure, environmentally conscious redevelopment of brownfields in Greater Cleveland's URCs is especially critical for improving public health and economic outcomes for URC residents. This plan has the city's manufacturing industries in mind as top drivers of economic development and jobs. The plan details the city's desire to use larger parcels of land for manufacturing, light industry, and logistics. The Opportunity Corridor Plan allocates 1.12 million square feet of space to support manufacturing and production sites, warehousing, distribution, and commercial transit. The plan also highlights the city's plans to establish partnerships with neighborhood groups, educational providers, and other organizations to support manufacturing job training programs.[22]

Beyond high levels of regional investment to support business and workforce development for the cluster, URCs are also connected in this cluster because the concentration of top employers in and around URCs makes those jobs more physically accessible. That said, several opportunities for work do exist outside of areas in and immediately around URCs, reflecting the region's high connectivity in Production Technology and Heavy Machinery. To address transportation-related job access barriers, the Greater Cleveland Regional Transit Authority (RTA), with the support of the industry association Manufacturing Works, partnered with SHARE Mobility to expand its ConnectWorks program. ConnectWorks is a micro-transit program that addresses gaps in public transit by providing scheduled rides from bus stops to the front door of participating employers.[23]

Communications Equipment and Services

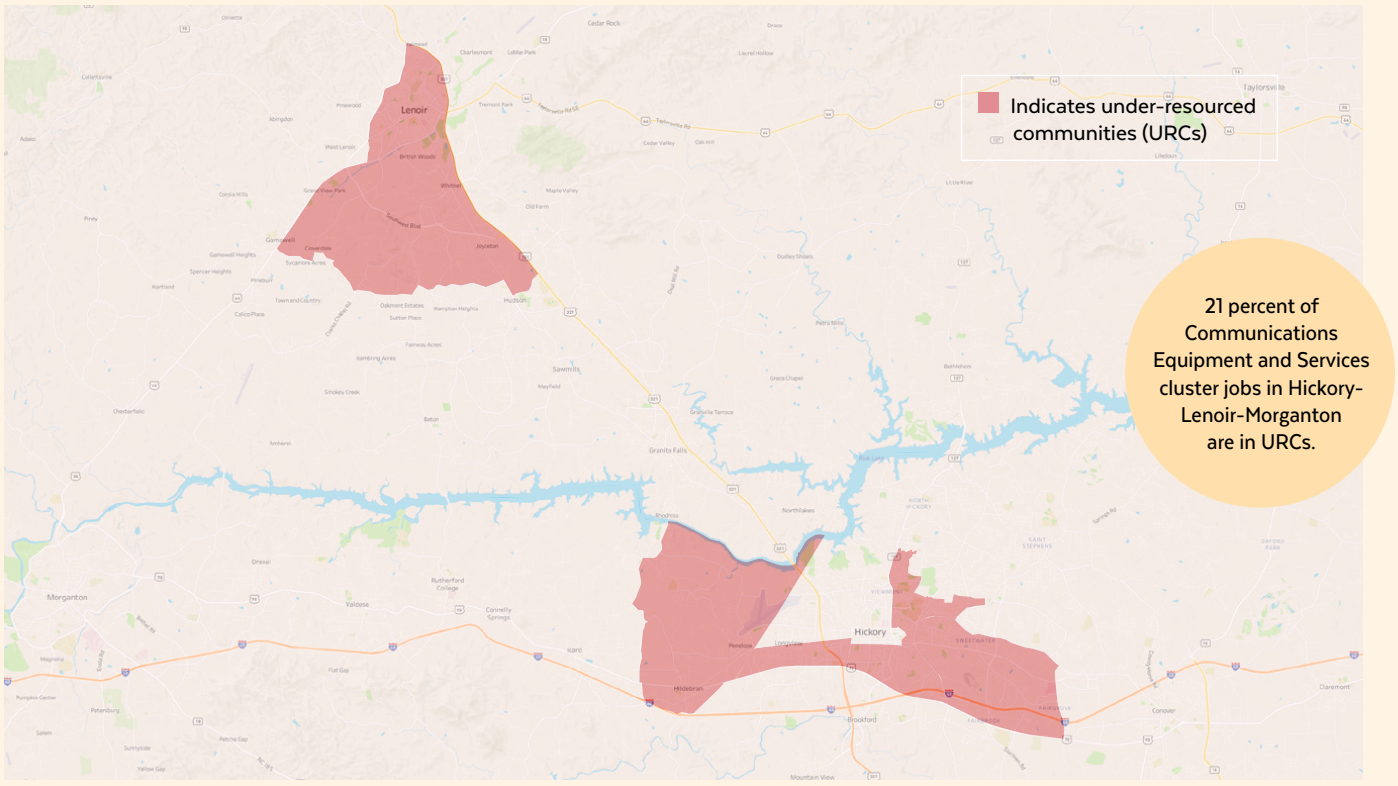
Hickory-Lenoir-Morganton, NC

Introduction

The Hickory-Lenoir-Morganton, NC MSA is a small metropolitan area located in west-central North Carolina. About 400,000 people reside in the metro area, of whom only nine percent live in URCs. The region has two geographically separate URCs, one centered on Lenoir and extending into the smaller communities of Gamewell and Hudson and the other centered on Hickory and including part of the outlying town of Hildebran (Figure 12).

The URCs in Hickory-Lenoir-Morganton are more racially and ethnically diverse than the broader MSA. They also have much higher poverty rates and lower educational attainment.[24] These racial and economic disparities are common to URCs in many metro areas. Despite these challenges, URCs in the region are contributing to and benefiting from the success of the Communications Equipment and Services industry cluster. This case study illustrates the role of preexisting and new cluster supply chain and infrastructure assets, employer-led training programs, and conveniently located workforce support organizations in advancing connectivity and opportunity in URCs.

Figure 12. Location of URCs in the Hickory-Lenoir-Morganton, NC MSA



Source: URCs are based on ICIC boundaries.

Background

The Communications Equipment and Services cluster provides goods and services for the communications industry, including cable, wireless, and satellite services and telephone, broadcasting, and wireless communications equipment. The cluster employs 796 people in the Hickory-Lenoir-Morganton metro area[25] and had modest 5 percent job growth between 2011 and 2022. Eight industries comprise the Communications Equipment and Services industry cluster, with Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing and Telephone Apparatus Manufacturing representing large shares of the cluster's employment.

Hickory-Lenoir-Morganton is home to several well-established and legacy Communications Equipment and Services companies such as CommScope, Prysmian, and Corning Cable Systems. The region has two very large CommScope factories and a large Prysmian production complex.

In addition to these communications equipment manufacturers, battery manufacturing companies support the Communications Equipment and Services cluster. For example, the Interstate All Battery Center, Interstate Batteries, and Rainey Battery, located in or immediately adjacent to URCs in Hickory and Lenoir, are crucial suppliers for batteries in end-user products and heavy machinery developed for the rest of the cluster.

Discussions with business leaders revealed that these companies chose to locate in Hickory-Lenoir-Morganton because of the region's existing fiber optic cable infrastructure. Before these companies came to the region, Superior Cable Corporation was founded in 1954. Corning and Siemens formed a joint venture (Siecor) in 1977 to purchase Superior Cable in 1980 as an independent entry point into the then mostly regulated telecommunications landscape, with the goal of establishing a sales channel to independent telecommunications operators. After deregulation following the 1983 AT&T antitrust consent decree, fiber optic cable demand skyrocketed. Siecor divested the Superior Cable (copper telecommunications) side of the business in the late 1980's to concentrate on its core fiber optic cable business. In 1999, Superior TeleCom (formerly Superior Cable) acquired Essex International (formerly Essex Wire) to form Superior Essex, now based in Atlanta, Georgia.[27] Superior Cable created the infrastructure that has allowed other Communications Equipment and Services companies to transition into the area with ease. These anchor employers and others have played a crucial role in establishing a highly connected Communications Equipment and Services cluster in Hickory-Lenoir-Morganton.

Main square in downtown Hickory, North Carolina

In addition to historical infrastructure assets in the region's URCs that have allowed other large employers to settle into the region, business leaders mentioned employer-led training and certification programs that exist for non-degreed workers. CommScope does not require a post-secondary degree or certification for many of its jobs because it offers a variety of training and certification programs through its CommScope University and CommScope Infrastructure Academy. These programs cover a wide range of topics, including wired, wireless, wireline, and fiber-optic technologies.[28] Employer led training programs such as the ones at CommScope have made jobs generally more accessible to local workers, especially to URC residents who are less likely to be college-educated.

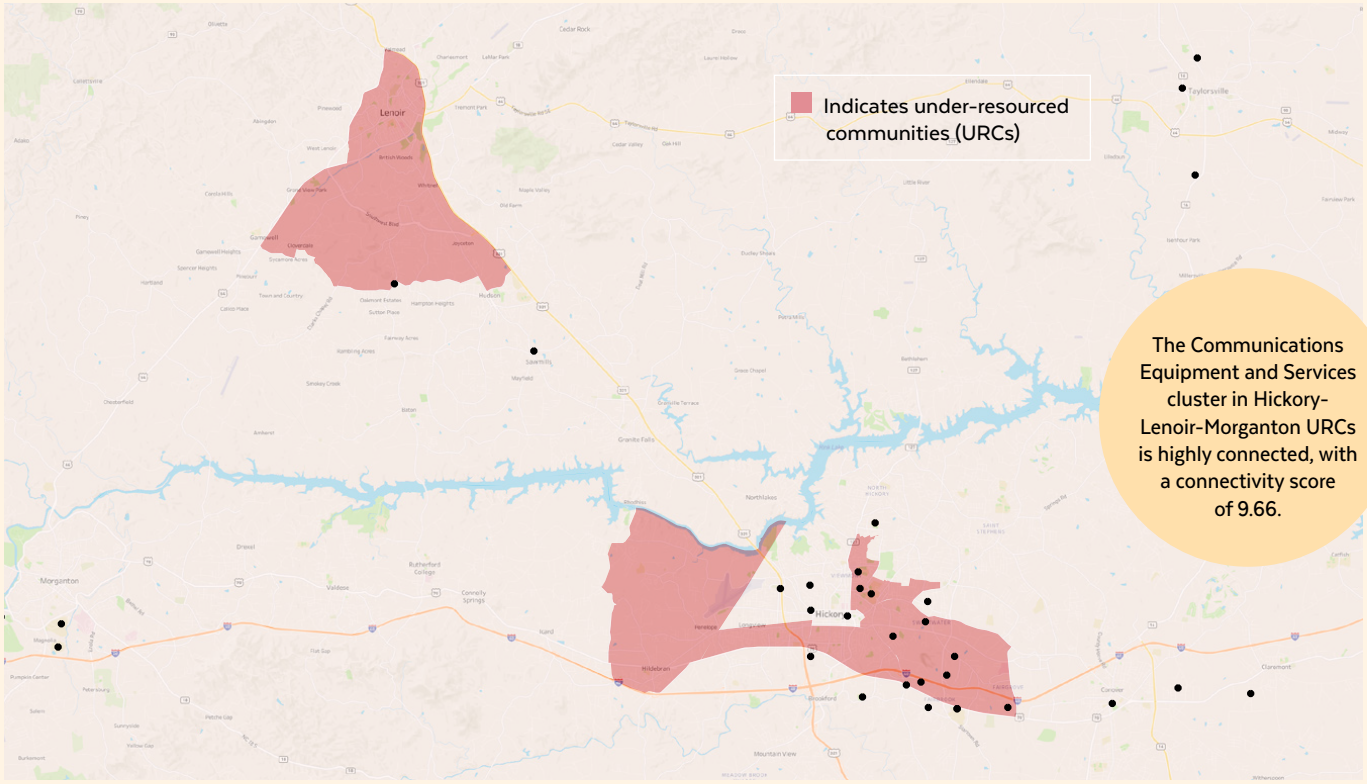
Cluster Connectivity

The region has a competitive advantage in the Communications Equipment and Services industry cluster, with an employment concentration almost double the national average (location quotient of 1.82). The location quotient for the region's URCs is 9.66, nearly 10 times the national average. More than one fifth of total regional cluster employment is in URCs. This indicates that the cluster has a competitive advantage in the URCs and is highly connected in the region.

Figure 13 shows the locations of cluster establishments within the region. Several firms in this cluster are in URCs in and around Hickory because those locations have fiber optic cable infrastructure and are near Interstate 40. There are other cluster establishments located in URCs in Lenoir.

Understanding the employment distribution of specific industries within the Communications Equipment and Services cluster and the performance of those industries can help gauge cluster stability and growth opportunities within URCs. Because of the presence of CommScope as well as of Corning Optical, Prysmian, and other significant regional employers, the region's top employing industry in this cluster is Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing. To a lesser degree, Telephone Apparatus Manufacturing and Battery Manufacturing also have a strong employment presence in the cluster.[29]

Figure 13: Communications Equipment and Services Cluster Establishments in the Hickory-Lenoir-Morganton, NC MSA and Its URCs



Source: Establishment locations are from DatabaseUSA.com. URCs are based on ICIC boundaries.

Six of the 10 largest occupations in the cluster in Hickory-Lenoir-Morganton require only a high school diploma or the equivalent, making these job opportunities more accessible to URC residents (see Table E2 in Appendix E). The most common occupation in the Communications Equipment and Services cluster is Electrical, Electronic, and Electromechanical Assemblers Except Coil Winders, Tapers, and Finishers. This occupation requires only a high school diploma and pays nearly $3 per hour more than the MSA's median hourly wage.[30]

Factors Driving Connectivity

The region's URCs are driving the cluster with an exceptionally large employment concentration. Like Greater Cleveland, Hickory-Lenoir-Morganton has had significant success retaining key employers because of its pre-existing supply chain and infrastructure assets. Several Communications Equipment and Services employers are located along Interstate 40, in or adjacent to URCs, helping these companies conveniently connect to major supply chain infrastructure and access larger cities in North Carolina, including Charlotte, Winston-Salem, and Greensboro. There is also a concentration of large employers in and around the URCs, making jobs more physically accessible to URC residents.

Economic developers in Hickory-Lenoir-Morganton have been very intentional in their recent efforts to attract new Communications Equipment and Services businesses and other industries in and around the region's URCs. They have done so through the substantial development of commercial and industrial space and redevelopment of utilities. In 2020, the city of Hickory, Catawba County, and the Catawba County Economic Development Corporation broke ground on the Trivium Corporate Center, a 270-acre business park in Hickory.[31] The Trivium Corporate Center is located south of Interstate 40 on the edge of one of the region's URCs. The Trivium Corporate Center is home to Corning Optical Communications, one of the region's largest Telecommunications and Equipment Services employers. At the Trivium Corporate Center, Corning Optical Communications employs over 300 workers.[32]

Economic developers and local governments in Hickory-Lenoir-Morganton have also worked together to redevelop local utilities to better support business and community needs. The city of Hickory has partnered with CommScope to provide complimentary Wi-Fi in the city's downtown neighborhoods.[33] Economic developers and local government leaders have also worked together to relocate and update utility and water lines in URCs to improve the city's livability and support business attraction.[34] Reliable water utilities are especially important for manufacturing companies, like those in the Communications and Equipment Services cluster, that rely on water for machine cooling, product development, and other manufacturing processes.

Although the Hickory-Lenoir-Morganton region is less populous than the other regions we profile, employers believe that the local labor pool is well-equipped to support their needs. Employers often do not require post-secondary credentials, making their jobs accessible to URC residents. Employer-led training programs have enabled employers to meet their skill needs while reducing education and credential burdens that disproportionately disadvantage URC residents.

CommScope and other employers have been able to tap directly into the URCs for talent because workforce support organizations have deliberately located in URCs. For example, in Ridgeview, a URC in south Hickory, Ridgeview Works was established in 2022 as a collaboration between the city of Hickory and Western Piedmont Workforce Development to provide career services to the neighborhood's residents. Ridgeview Works established a location for its workforce development center at the Ridgeview Branch of the Hickory Public Library, where workforce programs such as career coaching, job fairs, and resume writing assistance are offered. The location of and programming offered by Ridgeview Works were determined by a steering committee that engaged with URC residents to identify specific needs.[35] CommScope and other employers have already shown interest in Ridgeview Works, participating in a recent Ridgeview Works Job Fair.[36]

Education and Knowledge Creation

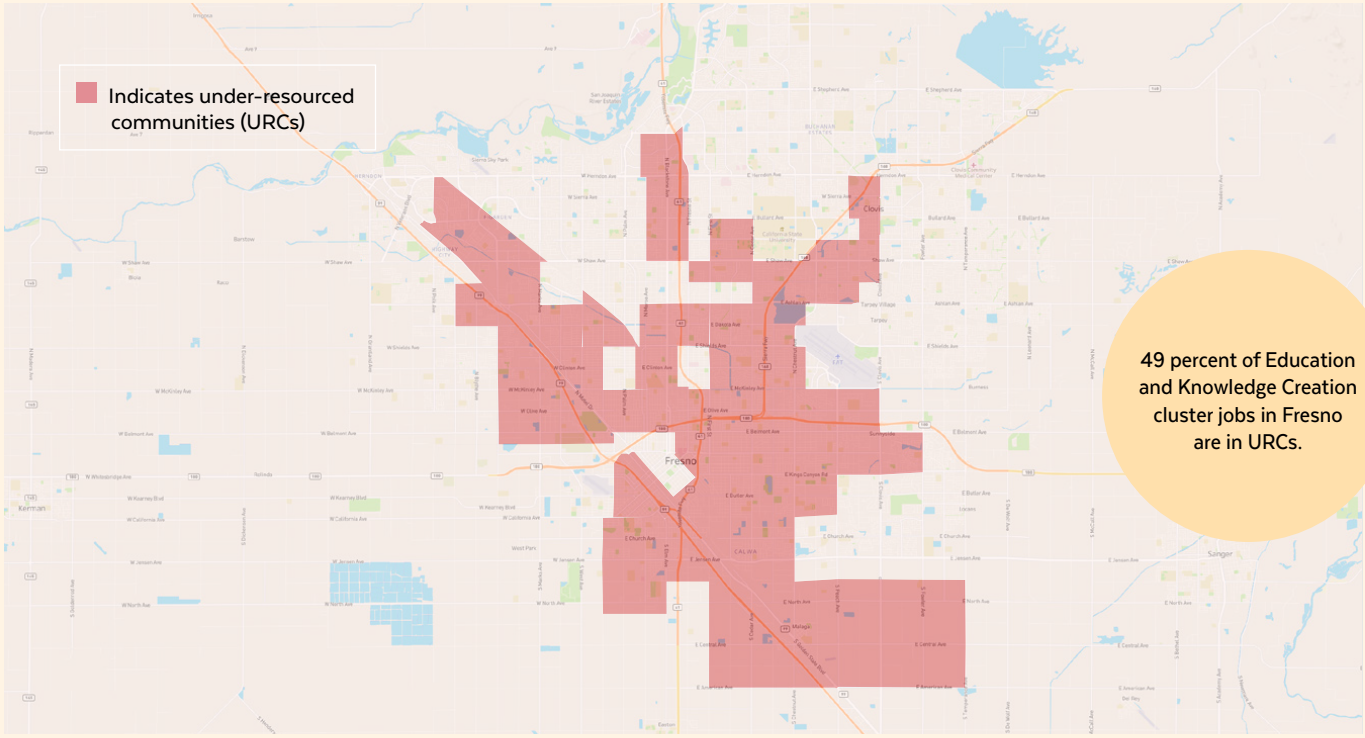
Fresno, CA

Introduction

The Fresno, CA MSA is in California's Central Valley and is home to about one million residents. One in three of the region's residents live in URCs. Unlike URCs in the other regions profiled in this report, Fresno's URCs are contiguous and spread throughout much of the city of Fresno and parts of the suburbs of Clovis and Calwa (Figure 14). California State University-Fresno and other post-secondary institutions are in URCs. Unsurprisingly, many URC residents are students.[37]

In Fresno, the URC population is more racially and ethnically diverse than that of the broader MSA. The URCs also have much higher poverty rates than the rest of the region, although poverty is very high throughout the metro area.[38] Historical redlining, public health issues (addiction, lack of health care access), and immigration-related challenges are among the reasons why poverty is so pervasive in Fresno's URCs and the broader MSA. Despite the concentration of universities and community colleges in Fresno's URCs, educational attainment rates are substantially lower in URCs than in the rest of the region. Nevertheless, URCs in Fresno are contributing to and benefiting from the success of the Education and Knowledge Creation industry cluster. This case study demonstrates the role of post-secondary institutions as anchors of economic and community development and the importance of providing key resources and services to help URC residents overcome challenges that inhibit their ability to access cluster jobs.

Figure 14. Location of URCs in the Fresno, CA MSA



Source: URCs are based on ICIC boundaries. Note: This map does not show the entire MSA because the geographic area of the MSA is quite large. The map shows the portion of the Fresno MSA where most of the population resides and where all the MSA's URCs are located.

Background

The Education and Knowledge Creation industry cluster employs 12,455 people in the Fresno MSA and had modest 3 percent growth from 2011 to 2022.[39] The cluster includes all educational and training institutions as well as related supporting establishments. It also includes research and development institutions in biotechnology, physical sciences, engineering, life sciences, and social sciences. Fifteen industries comprise the Education and Knowledge Creation industry cluster, with the largest employers being state and local colleges, universities, and professional schools.

The Fresno MSA is home to California State University-Fresno (Fresno State), and Fresno City College. Fresno State and Fresno City College are in or immediately adjacent to URCs. These, among other institutions, serve as key anchors for the Education and Knowledge Creation industry cluster in the region. Fresno State has 3,000 employees, while Fresno City College has 1,279.[40]

Conversations with economic and community development leaders in the region highlighted that the Fresno economy has undergone significant transformation from a railway and agricultural hub to an innovation- and education-based economy since Fresno State's integration into the California State University System in 1961. Since then, economic development leaders have intentionally developed assets and elevated Fresno's Education and Knowledge Creation industry cluster to advance the region's broader innovation economy. For example, through Fresno State, the MSA has about 2,000 acres of test bed facilities that can be used to support technology commercialization. Fresno State also participates in the Central Valley Higher Education Consortium, which was formed in part to establish Education and Knowledge Creation industry leaders as drivers of industry activity and decision-making in California's Central Valley. Finally, the region is home to several research and testing companies, including Valley Diagnostics Labs and Zendner Histology Laboratory.

Historic downtown district of Fresno, California

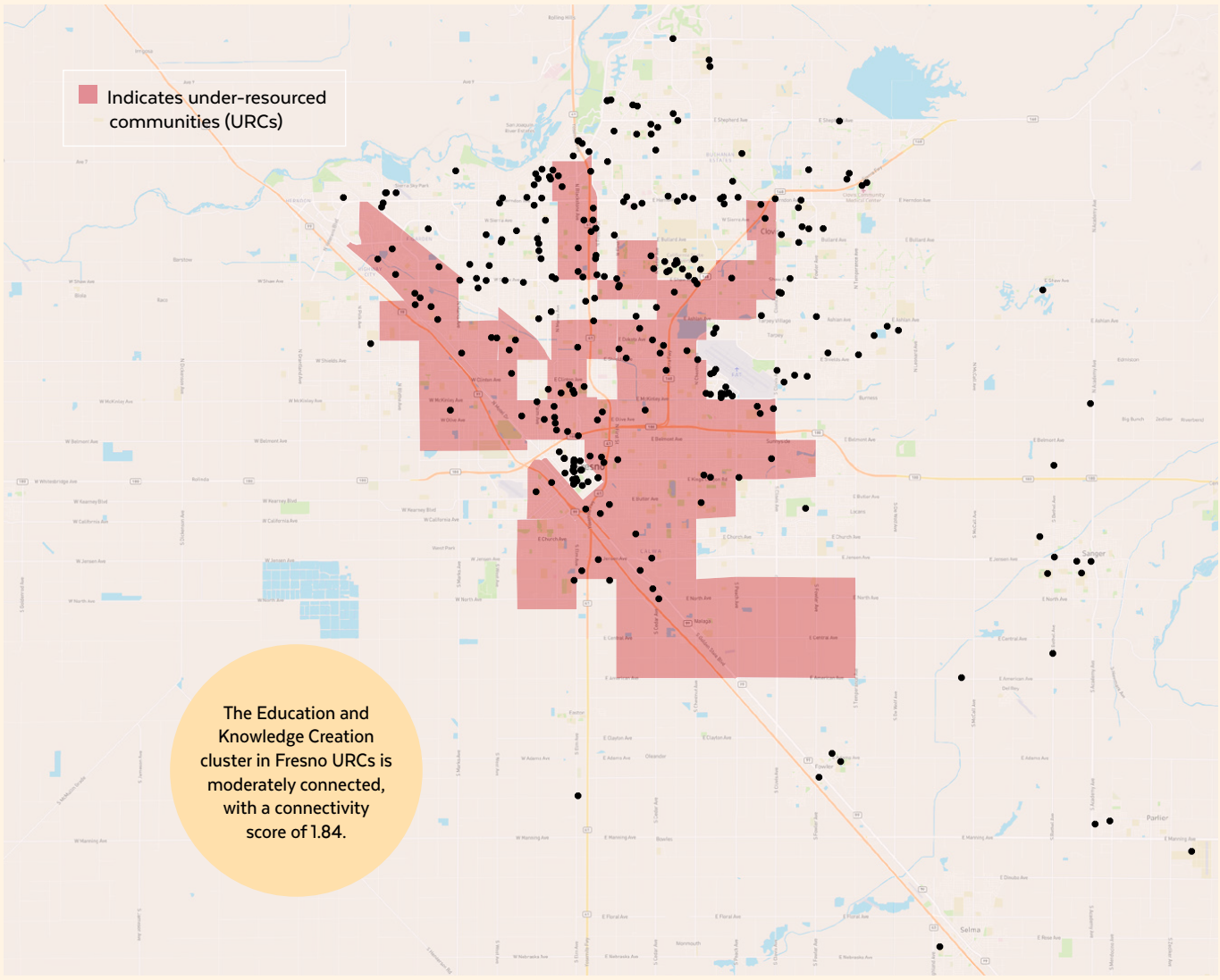
The Fresno economy has undergone significant transformation from a railway and agricultural hub to an innovation- and education-based economy since Fresno State's integration into the California State University System in 1961.

Cluster Connectivity

The Fresno MSA has a competitive advantage in the Education and Knowledge Creation industry cluster, with an employment concentration almost twice the national average (location quotient of 1.73). The location quotient for the region's URCs is 1.84, with 49 percent of total regional cluster employment located in URCs. This competitive advantage of the cluster in both the broader region and in URCs indicates that the cluster is well connected.

Figure 15 shows the locations of cluster establishments within the region. Most establishments in the cluster are in or near Fresno's URCs. Several of these are located near Fresno City College, which is in a URC, and Fresno State, which is immediately adjacent to one.

Figure 15. Education and Knowledge Creation Cluster Establishments in the Fresno, CA MSA and Its URCs



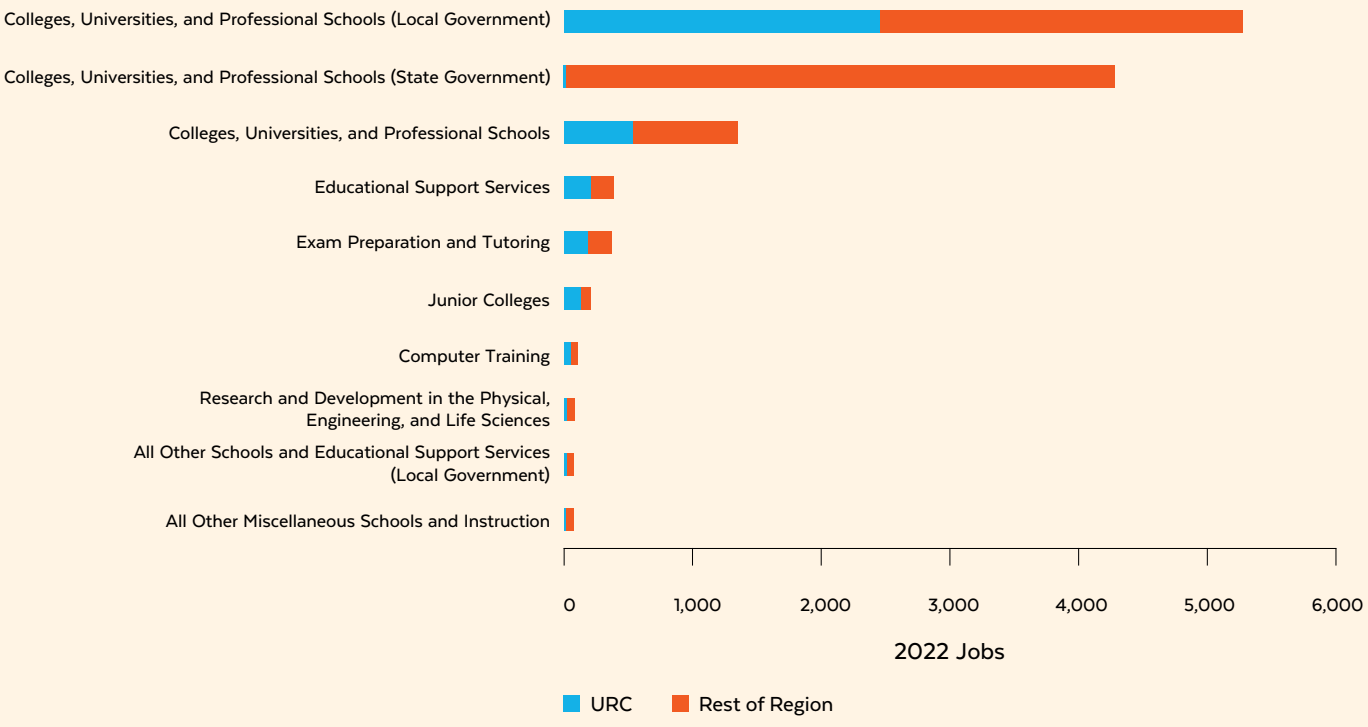
Source: Establishment locations are from DatabaseUSA.com. URCs are based on ICIC boundaries.

Figure 16 highlights the metro area's top employing industries in the cluster. The industries in the cluster with the most jobs in URCs are Colleges, Universities, and Professional Schools (Local Government), Colleges, Universities, and Professional Schools (State Government), and Educational Support Services.

Colleges, Universities, and Professional Schools contain 88 percent of the region's jobs in this cluster. Among the cluster's industries with that are present in URCs, Colleges, Universities, and Professional Schools (Local Government) and Educational Support Services gained jobs over the past decade, while Colleges, Universities, and Professional Schools lost jobs (Table D2 in Appendix D). Fresno State is located adjacent to a URC rather than in one, so although these jobs are not explicitly located in a URC, there are still many jobs at Fresno State that would be accessible to URC residents.

Several of the largest occupations in Fresno's Education and Knowledge Creation cluster are accessible to URC residents with a high school diploma, but many of the most common high-paying occupations are not accessible to most URC residents because they require at least a bachelor's degree (see Table E3 in Appendix E). An example of a well-paying occupation in this cluster that is more accessible to URC residents is Secretaries and Administrative Assistants, Except Legal, Medical, and Executive. This occupation requires only a high school diploma or GED and pays nearly $2 per hour more than the MSA's median hourly wage.[41]

Figure 16. Top 10 Education and Knowledge Creation Industries by Jobs in 2022 in the Fresno MSA



Source: Jobs are from the authors' analysis of Lightcast data. URCs are based on ICIC boundaries.

Factors Driving Connectivity

URCs in Fresno are connected in the Education and Knowledge Creation cluster because large higher education employers that are regional anchor institutions, including Fresno State and Fresno City College, are in or immediately adjacent to them. Longer-term sustainability and growth for the cluster will require URCs to benefit from and contribute to the cluster's anchor institutions and overcome impediments to growth. Ways of helping URCs do so include enabling the business environment with greater infrastructure investments, providing technical assistance and capital for URC small businesses, making targeted workforce development investments to help URC residents transition from routine service-related jobs to more technical jobs within the cluster, and providing wrap-around services to residents to help them overcome barriers to job access.

Blight in URCs has become a major barrier to attracting private investment. Decay is especially prominent in downtown Fresno, which includes portions of URCs. Blight creates significant investment risks for developers and encourages them to build further away from downtown, where they can more easily assess building costs because infrastructure is newer or has more recently been updated.[42] In an effort to revitalize URCs and make them more appealing for residents and businesses alike, the city of Fresno, with state funding, has developed and begun to implement a plan to upgrade the infrastructure in the city's downtown core and neighboring historic Chinatown district.[43] The focus of the plan is to infill affordable housing, water and sewer line upgrades, a multimodal transit center, and pocket parks and other green space.

Small businesses, specifically anchor suppliers, are important sources of economic opportunity for surrounding neighborhoods and connectivity with anchor-based clusters such as Education and Knowledge Creation. Local anchor institutions have enormous purchasing power and using local suppliers is an important way for anchors to contribute to the economies of URCs. Anchors can make efforts to purchase from local vendors, especially minority-owned and women-owned businesses, and examine contracting processes to identify any structural barriers that are preventing local vendors from bidding successfully on projects.[44]

Fresno State has several ongoing efforts in this vein that connect the university to local businesses and regional entrepreneurs to business resources. For example, Fresno State's Small Business University program offers Fresno and San Joaquin Valley entrepreneurs access to business services and technical assistance. The Small Business University also improves Fresno State's ability to provide experiential learning opportunities to students, who are matched to internship opportunities with small businesses and entrepreneurs through the program.[45] The city government and a Fresno-based technology firm are developing an ADA-compliant digital business hub, a "one-stop shop" with information on how to start and operate businesses, such as business licenses and related permits, grants, funding opportunities, and business creation programs and assistance, with resources available in Spanish, Punjabi, Hmong, and English.[46]

Most jobs within the cluster require higher education credentials. Although one in three jobs are accessible to those with less than a bachelor's degree, these are mainly routine service jobs that offer lower wages. To expand opportunities in the cluster for URC residents beyond those jobs, workforce efforts can target expansion of the skilled technical workforce (STW)—occupations requiring technical skills but not a bachelor's degree. For example, Fresno's Education and Knowledge Creation cluster employs several types of technicians, such as Library Technicians, Agricultural Technicians, and Life, Physical, and Social Science Technicians. The cluster's colleges and universities are well positioned to train and immediately hire for these and other STW occupations. Fresno State's Division of Continuing and Global Education highlights many short-term training options available to URC residents to build technical skills and career pathways.[47]

Regional partners are also working to identify and help residents overcome barriers to obtaining or maintaining cluster employment, particularly barriers related to transportation and health. For example, in Highway City, a URC neighborhood in northwest Fresno, Highway City Community Development (HCCD) offers residents health and wellness services, such as free clinics, as well as transportation services. HCCD has also worked to develop a healthier environment for the community through greenspace initiatives that support local water conservation and environmental efforts. HCCD partners with Fresno State and other community-based organizations and health care providers to support programming.[48] Other organizations, such as the Fresno Community Health Improvement Partnership (FCHIP), do similar public health work with a special focus on vulnerable youth. FCHIP is a network of community health leaders and partners that aims to improve the health of Fresno County residents through initiatives that include Fresno HOPE, the Fresno Food Security Network, and the Youth Leadership Council. FCHIP was founded in collaboration with Fresno State, various local public institutions, community-based organizations, and healthcare service providers.[49] FCHIP and HCCD are key examples of how Education and Knowledge Creation cluster anchors, such as Fresno State, play an important role in promoting equitable access to cluster jobs for URC residents by addressing employment barriers.

Historic downtown district of Fresno, California

In Highway City, a URC neighborhood in northwest Fresno, Highway City Community Development (HCCD) offers residents health and wellness services, such as free clinics, as well as transportation services. HCCD has also worked to develop a healthier environment for the community through greenspace initiatives that support local water conservation and environmental efforts. HCCD partners with Fresno State and other community-based organizations and health care providers to support programming.

Insurance Services

Miami-Fort Lauderdale-West Palm Beach, FL

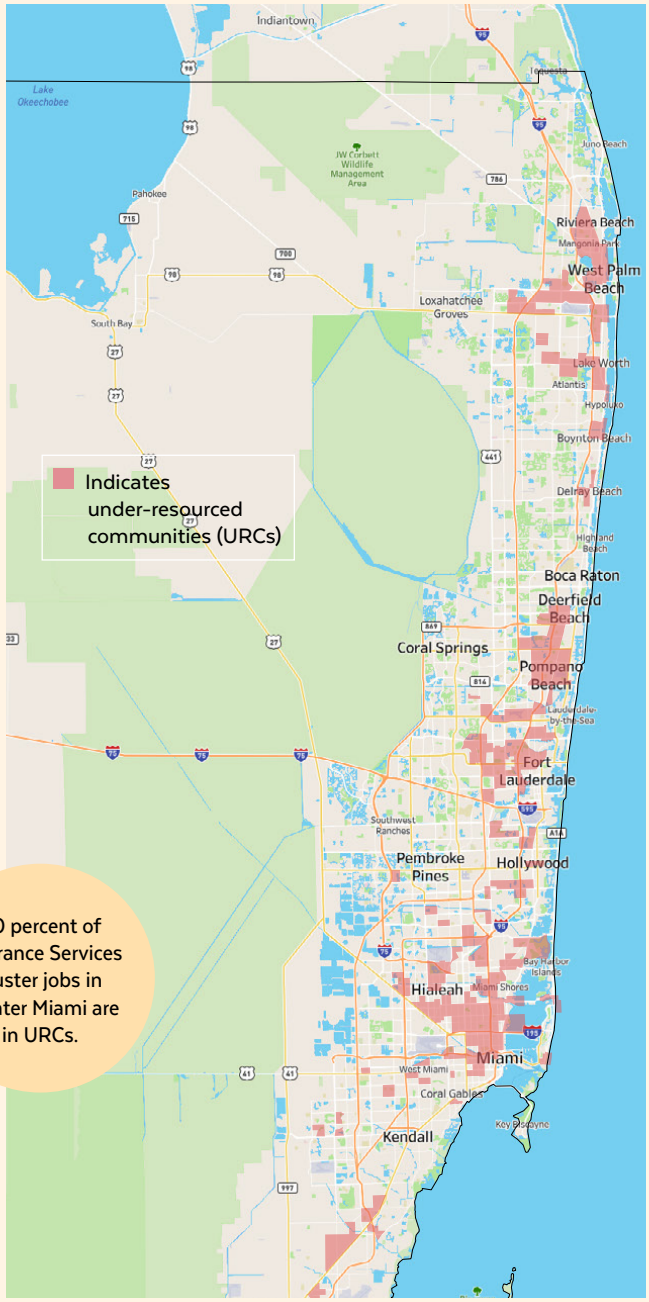
Introduction

The Miami-Fort Lauderdale-West Palm Beach, FL MSA is situated along the southeastern coast of Florida. More than 28 percent of Greater Miami's six million residents live in URCs. The metro area has multiple URCs spread across several coastal cities, including neighborhoods in Miami, West Palm Beach, Coral Springs, Hialeah, and Homestead. Other URCs exist in smaller coastal communities such as Lake Worth, Boynton Beach, and Delray Beach (Figure 17).

Because of its strong Latin American and Caribbean immigrant population, Greater Miami is a very racially and ethnically diverse region. The region's URCs are even more diverse. The poverty rate of the area's URCs is almost double that of the broader MSA and educational attainment in the URCs is lower than in the rest of the region.[50] Despite these challenges, URCs in Greater Miami are contributing to and benefiting from the success of the Insurance Services industry cluster. This case study shows how customized, industry-centered workforce development and training, investment in related clusters, and access to small business support services have advanced connectivity and opportunity in URCs.

Despite challenges with high poverty and lower educational attainment, URCs in Greater Miami are contributing to and benefiting from the success of the Insurance Services industry cluster.

Figure 17. Location of URCs in the Miami-Fort Lauderdale-West Palm Beach, FL MSA



Source: URCs are based on ICIC boundaries.

Background

The Insurance Services industry cluster employs over 60,000 people in Greater Miami and had very rapid 50 percent growth between 2011 and 2022.[51] Insurance Services firms provide a range of insurance types as well as support services such as reinsurance and claims adjustment. The cluster includes 13 industries, the largest of which are Insurance Agencies and Brokerages and Direct Health and Medical Insurance Carriers.

Greater Miami is home to several well-established insurance services companies such as the National Council on Compensation Insurance (NCCI) and Solstice Benefits. NCCI employs 300 workers in the region, has been operating for over 100 years, and generated over $200 million in revenue in 2022.[52] Solstice Benefits has been operating in Plantation, Florida, since 1998, and currently employs 130 people. Both employers are located in or very close to URCs.

Economic development leaders shared in interviews that Insurance Services has been a prominent industry in Greater Miami for many years because of the region's high demand for property insurance (connected to hurricanes) and health insurance (perhaps related to the area's large retiree population). The development of related industry clusters, mainly Financial Services, helped spur the recent growth of Insurance Services in the region.[53] The Financial Services cluster relies heavily on insurance services, specifically property insurance and other insurance services related to wealth or fund management (Trust, Estates, and Agency Accounts and Pension Funds). Financial Services grew rapidly in Miami during the pandemic as companies such as Goldman Sachs[54] and MRA Capital Partners[55] relocated to Florida from the Northeast.

Central Beach neighborhood in Fort Lauderdale, Florida

The development of related industry clusters, mainly Financial Services, helped spur the recent growth of Insurance Services in the region.

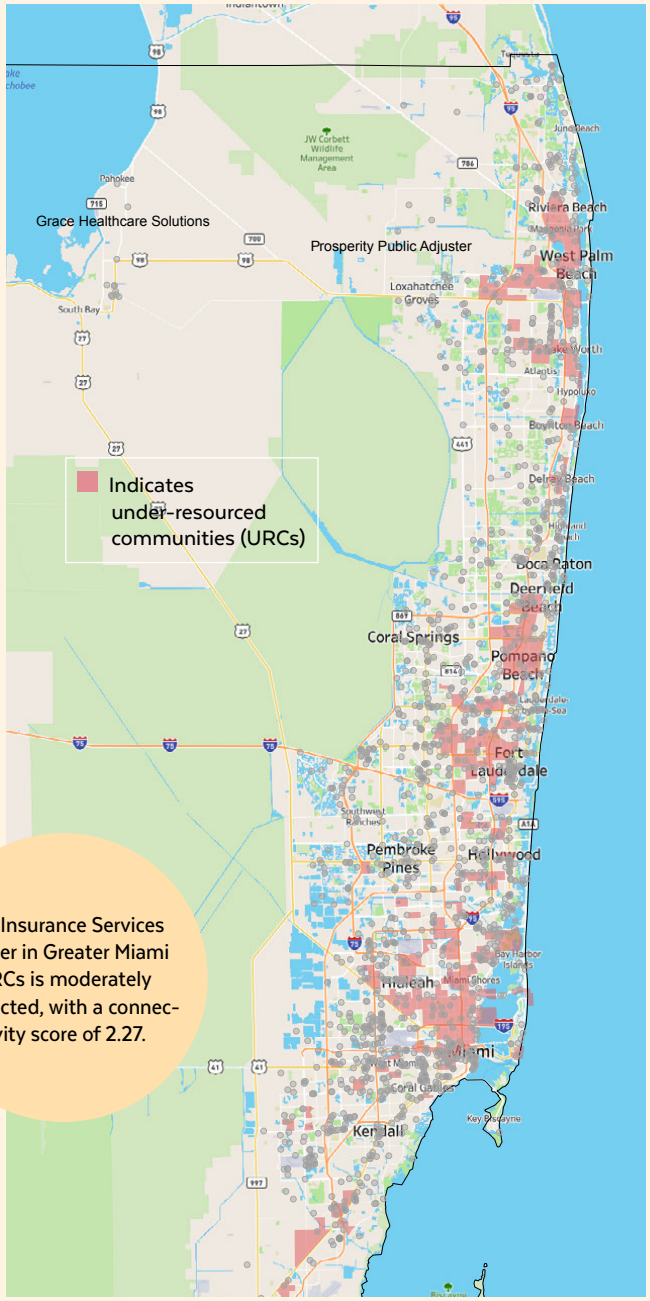
Cluster Connectivity

Greater Miami has a competitive advantage in the Insurance Services industry cluster with an employment concentration almost twice the national average (location quotient of 1.73). The cluster's location quotient in the region's URCs is 2.27, with 30 percent of total regional cluster employment located in URCs. This competitive advantage of the cluster in both the broader region and URCs indicates that the cluster is very well connected.

Figure 18 shows the location of cluster establishments within the region. The cluster is pervasive throughout Greater Miami. The bulk of its establishments are small businesses employing fewer than 10 people.

Although many well-paying jobs that do not require a post-secondary education exist in the cluster in URCs, there are also programs for URC residents to grow their skills and improve their access to good jobs.

Figure 18. Insurance Services Cluster Establishments in the Miami-Fort Lauderdale-West Palm Beach, FL MSA and Its URCs



Source: Establishment locations are from DatabaseUSA.com. URCs are based on ICIC boundaries.

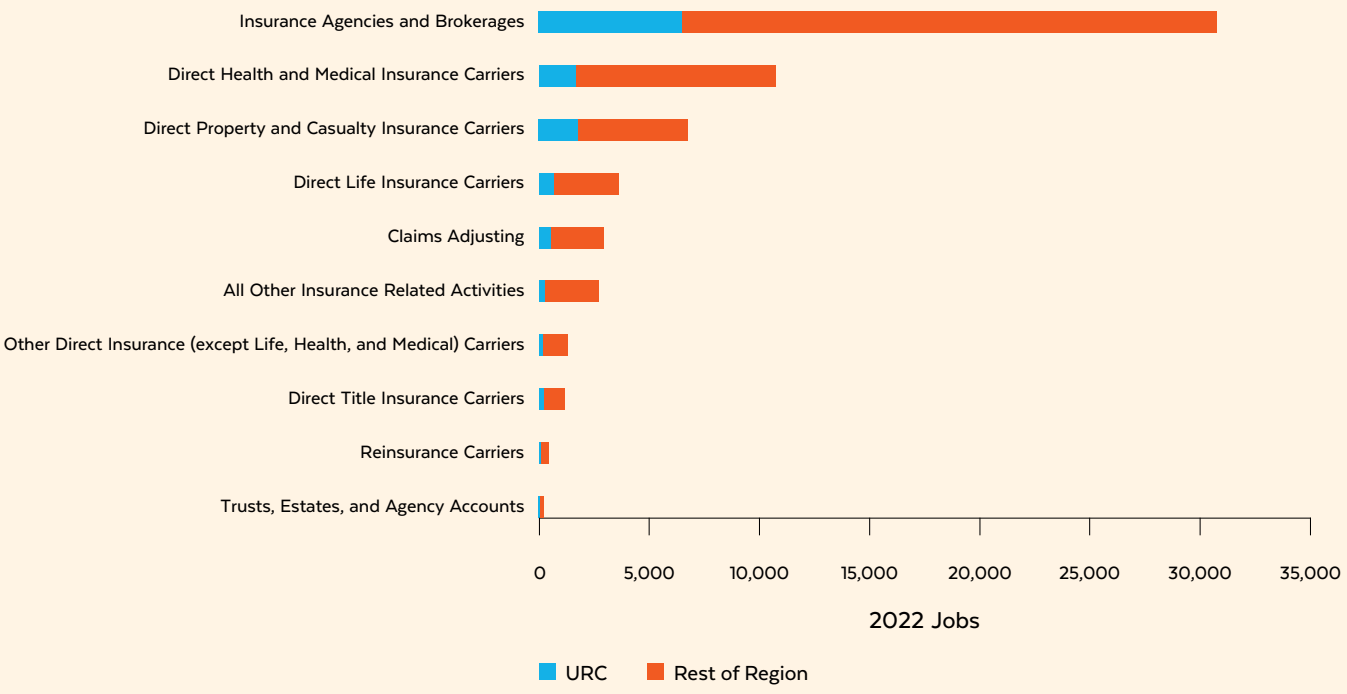
Source: Establishment locations are from DatabaseUSA.com. URCs are based on ICIC boundaries.

Figure 19 shows the cluster's top employing industries in the Miami area. The industries within the cluster with the most jobs in URCs are also the largest regional cluster employers overall: Insurance Agencies and Brokerages, Direct Health and Medical Insurance Carriers, and Direct Property and Casualty Insurance Carriers.

Of those industries with jobs in URCs, Insurance Agencies and Brokerages, Direct Health and Medical Insurance Carriers, and Claims Adjusting grew substantially over the past decade, while Direct Property and Casualty Insurance Carriers also have many jobs in URCs and have experienced some growth since 2011 (Table D3 in Appendix D).

Seven of the 10 largest occupations in the Insurance Services cluster require only a high school diploma or the equivalent, making many cluster jobs highly accessible to URC residents with low levels of formal education (Table E4 in Appendix D). Many jobs in the Insurance Services cluster pay well. (The average annual wage in the cluster in Miami is $107,205.[56]) Claims Adjusters, Examiners, and Investigators, the second largest occupation in the cluster, requires only a high school diploma or GED and pays more than $9 per hour more than the MSA's median hourly earnings.[57]

Figure 19. Top 10 Insurance Services Industries by Jobs in 2022 in the Miami-Fort Lauderdale-West Palm Beach, FL MSA



Source: Jobs are from the authors' analysis of Lightcast data. URCs are based on ICIC boundaries.

Factors Driving Connectivity

Recently, Insurance Services have been able to grow in Greater Miami because of significant growth in the related Financial Services industry during the pandemic. Local and regional leaders were very intentional in their efforts to expand Financial Services and these efforts indirectly helped expand Insurance Services as well.

Regional economic development leaders identified several reasons why Greater Miami was able to attract new financial services firms to the region and, in turn, support continued growth in insurance services. State and local policies and institutions helped Greater Miami attract both businesses and workers. Florida's COVID-19 restrictions at the onset of the pandemic were far looser than those in other states. Florida added the second highest number of residents among all states during the early stage of the pandemic.[58] The state's long-standing lack of an income tax may also have attracted residents and businesses. Locally, Greater Miami has anchor institutions that have supported the growth of the insurance services industry, such as the Financial & International Business Association (FIBA) and Miami-Dade Beacon Council. FIBA is one of the world's largest associations for financial institutions; its membership includes several compliance and risk management firms.[59] Miami-Dade Beacon Council has a Financial Services Committee, which helps recruit and retain companies in several industries in the Insurance Services cluster.[60]

Small business technical assistance providers play an important role in assisting small businesses in URCs. Most of the insurance services companies in Greater Miami are small; many employ only a few individuals. The concentration of small businesses in the metro area's Insurance Services cluster makes access to small business support services especially important. Within the Greater Miami region, there are two Small Business Development Centers (SBDCs) that are proximate to URCs, one at Florida International University in Miami[61] and the other at Florida Atlantic University in Boca Raton.[62] The Florida Women's Business Center, located in a URC in Delray Beach, provides business counseling, workshops, funding support, and other services to support female business owners in the region.[63] Also located in a URC in downtown Miami is the Miami Minority Business Development Agency Business Center, which supports entrepreneurs from historically underserved communities and has special programs for female and formerly incarcerated entrepreneurs from those communities.[64]

Although many well-paying employment opportunities that do not require a post-secondary education exist in the cluster in URCs, there are also programs for URC residents to grow their skills and improve their access to good jobs. For example, Miami-Dade College offers affordable training and certification opportunities relevant to the Insurance Services cluster.[65] Miami-Dade County offers support programs to improve job access for economically disadvantaged groups, including a public-private training partnership with Microsoft, called Accelerate Miami-Dade, to bridge the digital skills divide and expand access to job opportunities for residents of underserved communities.[66]

URC residents are also able to access Insurance Service jobs because many of those jobs are in or within easy access of URCs. Many of Greater Miami's URC residents live around or east of Interstate 95, and many Insurance Services firms are located there as well. URC residents working in Insurance Services can take advantage of shorter commutes and, in the future, should have even more access because of planned transportation improvements in Miami-Dade County. A multimodal transit network that includes trams, rails, buses, and trolleys serves the county. This network operates in Hialeah and Downtown Miami, both of which include URCs. Currently, there are plans to further develop the region's transit network through additional rail service and new rapid transit corridors that will expand URC residents' access to other locations in the region where Insurance Services jobs are available.[67]

Information Technology and Analytical Instruments

Austin-Round Rock, TX

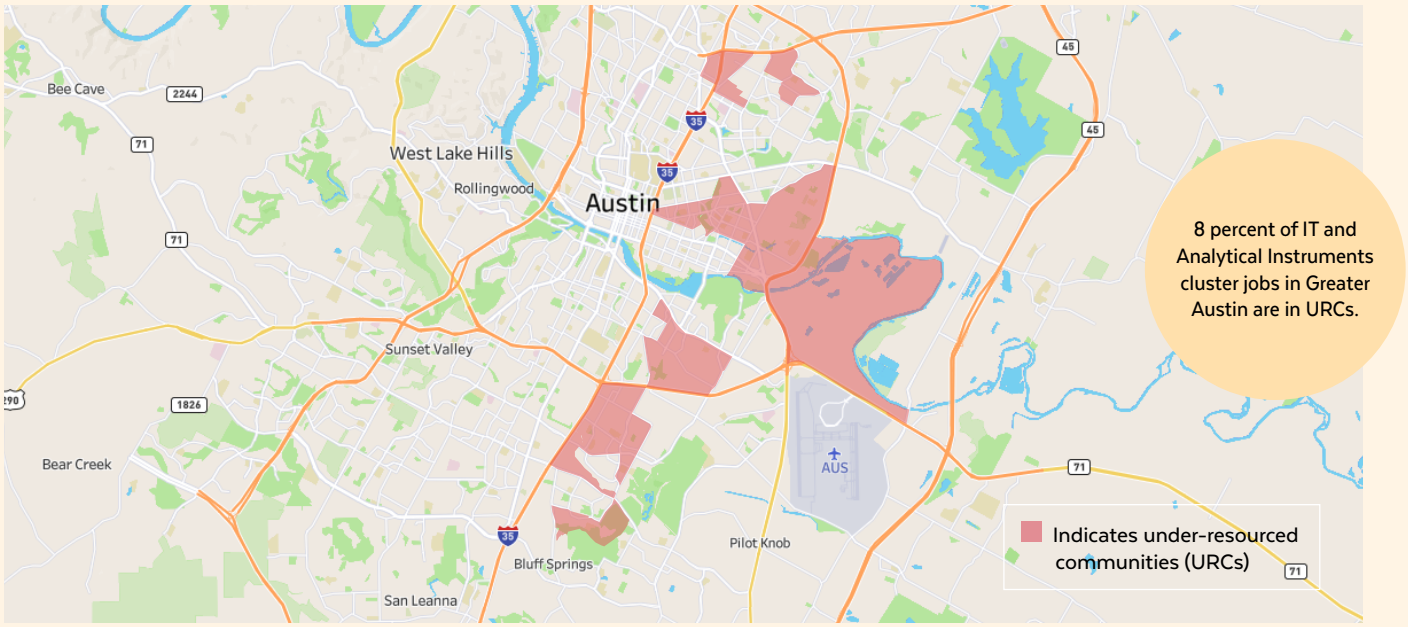
Introduction

The Austin-Round Rock, TX MSA, located in central Texas, includes the state's capital city of Austin. According to the 2020 Census, more than 40 percent of Greater Austin's nearly 2.3 million residents lived in the city of Austin. The region has grown rapidly during the past four decades and evidence suggests that some URCs have gentrified and that their low-income residents have been displaced.[68] Greater Austin has a large student population because of the presence of the University of Texas-Austin (UT Austin) and Texas State University (Texas State, located in San Marcos). During the 2015-2019 period, 10 percent of Greater Austin's residents (206,823 people) lived in URCs.[69] The MSA has multiple URCs in areas east of Interstate 35 in Austin and in San Marcos, home of Texas State. (Figure 20).

Because of its large Latino population. Greater Austin is an exceedingly racially and ethnically diverse MSA. Like those in many other regions, Greater Austin's URCs are even more diverse than the rest of the region. In addition to greater diversity, Greater Austin's URC poverty rate is nearly three times that of the entire MSA. These disparities in poverty rates are reflected in the URCs' lower educational attainment, greater dependence on public transit, and challenges with housing affordability.[70] Similar racial economic disparities exist in URCs in many U.S. regions.

Despite these challenges, URCs in Greater Austin are contributing to and benefiting from the success of the Information Technology and Analytical Instruments cluster. This case study illustrates the roles of industry-focused workforce development and training, intentional efforts to support career access and prosperity for diverse populations, and entrepreneurial support and incentives in advancing connectivity and opportunity in URCs.

Figure 20. Location of URCs in the Austin-Round Rock, TX MSA



Source: URCs are based on ICIC boundaries.
Note: There is an additional URC in San Marcos, TX, that is not shown on this map.

Background

Firms in the Information Technology and Analytical Instruments cluster make products such as computers, software, audio-visual equipment, laboratory instruments, and medical apparatus. The cluster also includes the standard and precision electronics used by these products, such as circuit boards and semiconductor devices.

Greater Austin has a diverse array of established and newer IT and Analytical Instruments companies. One such company is Cirrus Logic, a manufacturer of semiconductors and related devices. Cirrus Logic was founded in 1981 and, as of 2022, employed 1,500 workers and generated $1.9 billion in revenue.[71] Another example is Silicon Labs, a semiconductor manufacturer that was founded in 1996. As of 2022, Silicon Labs employed 1,838 workers and generated $1 billion in revenue.[72] Samsung opened its first semiconductor plant in Austin in 1997. In addition, discussions with regional economic development leaders indicated excitement about the IT and Analytical Instruments cluster's potential for growth as a supplier to the automotive industry. The vehicle production process relies on computer parts and systems that are produced in the IT and Analytical Instruments cluster. Auto companies such as Tesla have recently located in the Austin area, highlighting the interconnectedness of IT and Analytical Instruments and the auto industry.

The IT and Analytical Instruments talent pipeline has been well developed to support industry needs. The University of Texas at Austin and Texas State both play a significant role in educating workers for the cluster. Texas State[73] and UT Austin[74] offer degrees and advanced degrees in informatics and computer and electrical engineering. A training program that is more accessible to URC residents is the new Tesla START Manufacturing Program launched jointly by the Austin Community College District and Tesla. Tesla START is a 14-week intensive training and certification program that provides students with hands-on learning and essential skills for a career in manufacturing.[75] Short-term training opportunities such as Tesla Start remove credential barriers, helping make good jobs more accessible to URC residents.

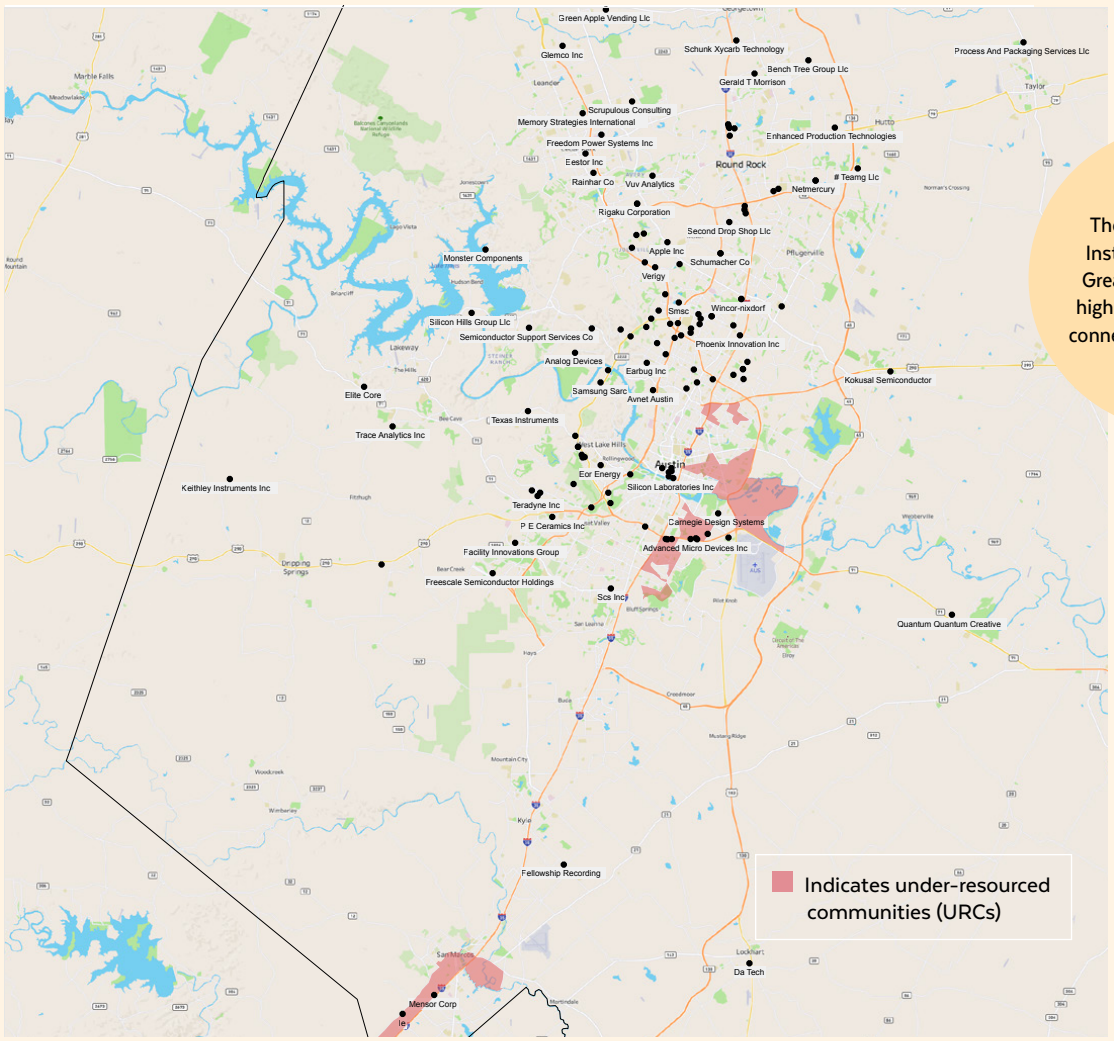
Congress Bridge, downtown Austin, Texas

Cluster Connectivity

The IT and Analytical Instruments cluster in Greater Austin's URCs is highly connected (URC LQ=5.55). Education and Knowledge Creation is the only other strong cluster outside of URCs in the Austin metro area, but it has a lower overall URC connectivity score (URC LQ=0.86).

Figure 21 shows that there are dozens of IT and Analytical Instruments factories dispersed throughout the region. Although a vast majority of IT and Analytical Instruments jobs exist outside of Greater Austin's URCs, there are a few firms, primarily semiconductor manufacturers, clustered in Southeast Austin's URCs. There are also two IT and Analytical Instruments establishments in the URCs in San Marcos, where Texas State University is located.

Figure 21. Information Technology and Analytical Instruments Cluster Establishments in the Austin-Round Rock, TX MSA and Its URCs



The IT and Analytical Instruments cluster in Greater Austin URCs is highly connected, with a connectivity score of 5.55.

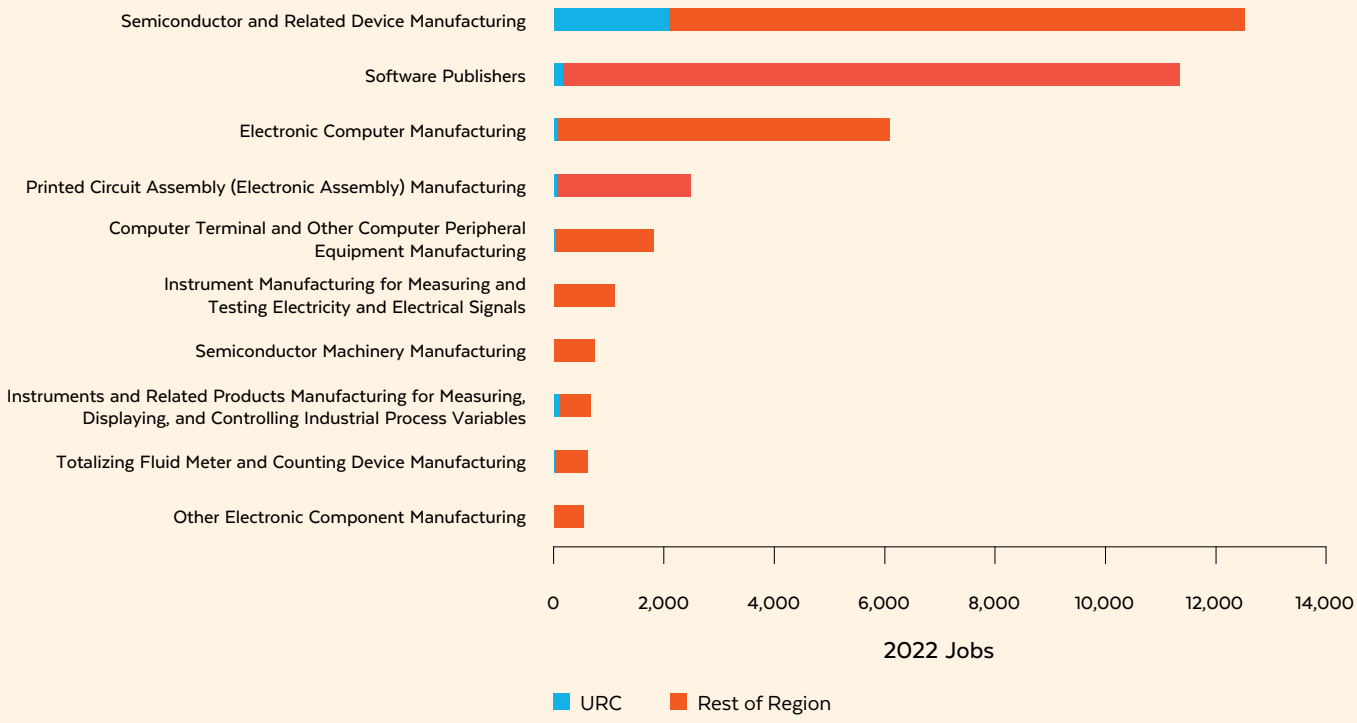
Source: Establishment locations are from DatabaseUSA.com. URCs are based on ICIC boundaries.

Figure 22 shows the 10 industries in the cluster with the most jobs in 2022. There were over 40,000 jobs in the IT and Analytical Instruments cluster in Greater Austin, only 8 percent of which were in URCs. By far, the cluster industry with the greatest employment presence in metropolitan Austin's URCs is Semiconductor and Related Device Manufacturing.

This cluster in Greater Austin has experienced strong growth of 43 percent (12,085 jobs) between 2011 and 2022.[76] The cluster's growth in Austin is due to several legacy firms in the region that have been able to expand through federal and private investments in semiconductor and quantum computing R&D. In addition, several other technology-related firms (e.g., Tesla) have recently moved to Austin or are planning to do so, further supporting the cluster's growth. Job totals and job growth rates for most industries in the cluster reflect these developments, as shown in Table D4 in Appendix D. Among the 10 largest IT and Analytical Instruments industries, two had extraordinarily high job growth rates between 2011 and 2022: Printed Circuit Assembly (Electronic Assembly) Manufacturing grew by 494 percent (2,055 jobs) and Semiconductor Machinery Manufacturing grew by 217 percent (508 jobs).[77]

Furthermore, despite the skills and technical knowledge needed for some IT and Analytical Instrument occupations, five of the 10 largest occupations in the cluster do not require any formal post-secondary credential (Table E5 in Appendix E). However, none of these occupations are well-paying, with employees earning far less than the state's median hourly wage of $22.90.[78]

Figure 22. Top 10 Information Technology and Analytical Instruments Industries by Jobs in 2022 in the Austin-Round Rock, TX MSA



Source: Jobs are from the authors' analysis of Lightcast data. URCs are based on ICIC boundaries.

Factors Driving Connectivity

Although many companies in the IT and Analytical Instruments cluster in Austin-Round Rock, TX, are geographically distant from URCs, the cluster has a strong presence in several URCs because of proactive policies and initiatives, including customized workforce efforts and targeted incentives. At the same time, the cluster's strong connectivity and rapid growth have likely contributed to gentrification and displacement in some URCs in the city of Austin, creating a need for equity-oriented policies to enable URC residents to benefit from the cluster's success.

Discussions with stakeholders revealed that state and local economic and workforce development organizations and community-based nonprofits have made significant efforts to create an aligned talent pipeline in URCs and for URC residents into the cluster. For example, Austin Urban Technology Movement supports local Black and Hispanic communities through job placement, career development, and networking opportunities in tech-related industries. The Austin City Council approved two other nonprofits, Skillpoint Alliance and Capital Idea, for $4.6 million in funding to augment their efforts to train thousands of workers for Central Texas' growing manufacturing sector, including advanced manufacturing industries that support or are included in the IT and Analytical Instruments cluster.[79]

Greater Austin and the State of Texas support the IT and Analytical Instruments cluster through industry-targeted entrepreneurial support and incentives. For example, from 2005 to 2015, Texas's Emerging Technology Fund (ETF) provided educational institutions and 145 startups with grants totaling $422 million to support technology research and product development.[80] Although no longer operational, the ETF played a crucial role in developing Greater Austin's entrepreneurial ecosystem for high technology companies. Local incubators, especially the Austin Technology Incubator and Capital Factory, helped create this ecosystem.[81] These sources of funding and business assistance encouraged Facebook, Google, and other high-tech companies to locate in Greater Austin prior to the COVID-19 pandemic. Since the pandemic, the strong entrepreneurial ecosystem has made the region an attractive place for IT and Analytical Instruments companies from Silicon Valley to relocate or expand their operations.

The Austin city government is pursuing equity-oriented policies to enable URC residents to benefit from the growth of the IT and Analytical Instruments cluster. Although economic development incentives often fail to benefit residents, the city of Austin is intentionally including community benefit requirements in its financial incentive packages. An incentive to expand a semiconductor manufacturing facility in an Austin URC was refined to include a child care component.[82] In addition, the city, where most of the region's URC residents live, launched an Equity Office in 2016 to advance racial equity across city operations and increase opportunity for city residents. Among the office's strategic priorities are (1) to increase the number of and access to middle-skill jobs to benefit communities experiencing high unemployment or lacking access to jobs and (2) to align local workforce skills with the needs of employers and track outcomes with a special focus on economic improvement for people of color and historically marginalized communities.[83]

The city of Austin is also currently working on an expansion of its transit system through an initiative called Project Connect. Project Connect will provide residents with expanded transit options, including new light rail, busing, and other transportation services.[84] Project Connect emphasizes equitable transit development, building transit infrastructure in URCs, and supporting existing residents with anti-displacement funding and services.[85] Because most of the jobs in the IT and Analytical Instruments cluster are not located in or near URCs and because URC residents are especially dependent on public transportation, expanding public transit infrastructure and opportunities in Greater Austin's URCs is especially crucial for supporting URC residents' access to those jobs.

Implications for Economic Development Policy and Practice

Our analysis of the features of connectivity demonstrates that connectivity strategies have a stronger likelihood of success in smaller metropolitan areas, clusters that are highly specialized regionally, manufacturing-based clusters, and lower-wage clusters. These are the kinds of locations and clusters that generally have high connectivity. Economic developers and their partners can start by identifying clusters in the broader region and those within distressed communities. They should try to maintain regional economic connectivity in clusters where it is already high, while targeting strategic investments in those clusters that are strong outside the URCs but not as strong in them.

Our case studies and interviews with regional stakeholders provide further insights on the implications of connectivity for the practice of economic development. The case studies highlight strategies that enhance connectivity and/or improve access for URC residents to jobs in connected clusters. The usefulness of specific strategies will vary by cluster and location but policymakers and practitioners in other regions can consider the following strategies as a starting point.

Table 6. Connectivity Strategies in Five Case Study Regions

Strategies	Cleveland	Miami	Austin	Hickory-Lenoir	Fresno
Cluster-specific development and redevelopment strategies	x				
Accessible industry- or employer-led training	x	x	x	x	
Resources and services, such as wrap-around workforce services, to help URC residents obtain jobs in highly connected clusters	x				x
Colleges and universities acting as anchor institutions for URCs	x				x
Workforce support organizations located in or near URCs				x	
New or pre-existing investment in related clusters or industries		x	x		
Use of pre-existing infrastructure				x	
Small business support services		x			
Equity-oriented programs to support career access and prosperity for diverse populations			x		
Entrepreneurial support and incentives			x		

State and local governments and regional organizations should consider incentives and strategies structured to attract and retain cluster-related firms in URCs.

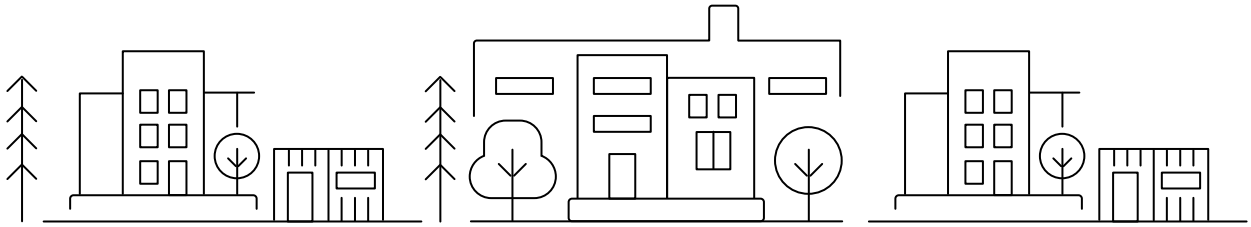
Incentives, including workforce development, small business technical assistance, infrastructure improvements, and site preparation, should be targeted toward fundamental business development challenges within URCs and toward firms that are part of strong regional clusters and are located or planning to locate in URCs. However, these activities should avoid or minimize negative impacts on current URC residents, such as environmentally destructive activities that threaten residents' health and activities that directly or indirectly displace current residents.

As economist Timothy Bartik has concluded, "Governments can create jobs more cost-effectively by providing things that businesses need to be successful, such as an educated and trained workforce, advice on new technologies and markets, efficient transportation systems and other infrastructure, and buildable land."[86] Incentives that are tailored to distressed places and limited to high-multiplier industries, such as those that are part of successful regional clusters, create the most jobs for the money invested, compared with financial incentives.[87]

By itself, the presence of regional cluster employment in URCs does not guarantee greater prosperity or opportunity for URC residents.

Policymakers and stakeholders should ensure not only that jobs are created in URCs and that businesses are successful, but that the residents of URCs benefit from cluster employment opportunities within their communities. Often, new jobs in distressed communities go to people who may already have aligned skillsets but are not from the distressed community. To increase job access and labor force participation for residents within URCs, policymakers and key stakeholders can consider neighborhood-based services that support job access, including child care, career counseling, and transportation assistance.

Additionally, job training programs work better when employment opportunities are available in the URCs where many people in need of training live. Although the presence of jobs in URCs does not ensure that those jobs will go to URC residents, it is easier for URC residents to obtain and keep the jobs for which they are trained if those jobs are in URCs. To ensure that jobs in URCs are accessible to URC residents, a combination of workforce development, wrap-around services (such as child care, transportation, and career counseling), and employer commitments to hire residents is necessary.



Related clusters, especially those that include professional and business services or infrastructure, can be the basis for connectivity of other clusters.

Some clusters support the growth of related clusters, as professional and business services-related clusters supported the growth of the Insurance Services cluster in Miami-Fort Lauderdale-West Palm Beach and fiber-optic cable supported the growth of Communications Equipment and Services in Hickory-Lenoir-Morganton. Therefore, helping firms in related clusters grow in URCs can be a means of creating connectivity for targeted clusters.

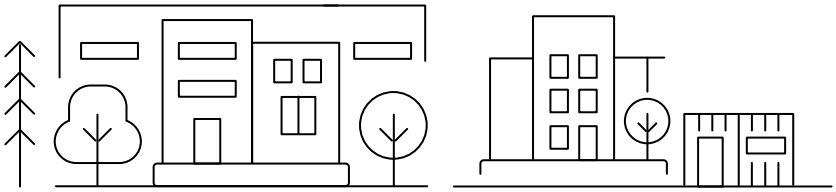
This dynamic was particularly important in Greater Miami, where economic development leaders told us about the role that the relationship between Insurance Services and Financial Services clusters played in the region's connectivity strategies. Insurance Services has been a dominant cluster in the region for decades because of a high demand for health and property insurance. However, the cluster has metamorphosed since the COVID-19 pandemic as financial institutions that rely heavily on Insurance Services relocated from other large metros, such as New York.

Attracting investment in URCs to develop regional economic connectivity requires special approaches for anchor institutions.

If anchors, whether nonprofit or for-profit, are driving connectivity (as are colleges and universities in Fresno), they have special roles and responsibilities to train and hire URC residents, contract with URC businesses, and avoid or minimize gentrification and displacement of current URC residents. In so doing, they can attract other businesses and jobs to URCs.

For example, another California public university, the University of California-Davis, is working with the city of Sacramento on the development of an innovation campus called Aggie Square, located at UC Davis Health immediately adjacent to a Sacramento URC. Aggie Square is expected to provide incubator space, education and training opportunities, retail and entertainment space, and housing. Aggie Square's planned development considered input from business and community leaders and emphasized social equity as a top priority in addition to economic growth and workforce development.[88]

With intentional economic development policies and strategies, growth associated with cluster development can extend to URCs and promote inclusive economic development.



Conclusion

Previous research has shown that economic connectivity between URCs and other parts of their respective metro areas can spur economic development in URCs. This report is the first to examine the characteristics and policy implications of metropolitan-based regional economic connectivity. Using nationwide data analysis and case studies, it provides economic development policymakers and practitioners with information they can use to decide which locations and industry clusters are ones for which a strategy to improve connectivity would be most useful. It also provides guidance about the kinds of policies and practices that they can use to promote connectivity.

Connectivity strategies present unique challenges for economic development. Because they are regional strategies that must be implemented for specific industry clusters in specific URCs, they require a combination of expertise in regional economic development and community development in URCs. Because workforce development is important for creating connectivity as well as for enabling URC residents to obtain good jobs in connected clusters, they also require a combination of expertise in economic and workforce development. Although the idea that there is a synergy between economic development, community development, and workforce development has become a truism, the organizations where these responsibilities fall often do not collaborate. Disconnects can exist not only between nonprofit organizations in a metropolitan area but also within individual state and local governments, where economic development, community development, and workforce development are usually the responsibility of two or even three separate agencies. To implement connectivity strategies, government agencies and nonprofit organizations must overcome their history of working in siloes.

Connectivity strategies are also challenging because they require the integration of policies and practices designed to promote economic development with policies and practices designed to achieve economic, racial/ethnic, and local geographic equity. Economic development is primarily a generative activity whose goal is to expand the economic "pie." However, some people benefit much more than others and some people's slices may even become smaller as the pie expands. Equity-oriented policies, on the other hand, are primarily distributive. They are designed to ensure that people with the smallest slices of the pie receive bigger slices, regardless of what happens to the size of the entire pie. Economic connectivity strategies are designed to ensure that URC residents benefit from the expansion of the regional economic pie. Therefore, they require breaking down the conceptual barrier between economic development and equity. Similarly, because this conceptual barrier is reflected in the separation between economic development-oriented and equity-oriented organizations, connectivity strategies require those organizations to work together across the conceptual divide. As our Austin case study demonstrates, this kind of collaborative work has only recently begun, and it has not yet begun in all metro areas.

A final challenge for connectivity strategies is that they are not always desirable. Increasing the connectivity of environmentally destructive industry clusters can harm the health of URC residents. Increasing the connectivity of the very highest-wage clusters can gentrify URCs and potentially displace their residents, while improving connectivity in the very lowest-wage clusters can channel URC residents into jobs that may not even pay a living wage. Even if connectivity strategies do not harm URC residents, they may not benefit them unless employers in the connected clusters hire URC residents. Policymakers and practitioners interested in pursuing connectivity strategies must choose the locations and clusters for those strategies in ways that avoid these adverse outcomes. This report has shown that it is possible for them to do so.

Appendices

Appendix A. Methodology

Quantitative Analysis Methodology

Approach and Data

This report covers the 181 metropolitan areas that have URCs. (Appendix B lists those metropolitan areas.) For each metropolitan area, we calculate connectivity measures for under-resourced community industry clusters that are strong in the rest of the region (metropolitan area excluding the URC). We identify clusters as strong in the rest of the region if they have a location quotient greater than 1.25 in the rest of the region, which suggests that they export their products or services to other regions.

To calculate employment and location quotients by industry cluster within the under-resourced community and the rest of the region, we use 2019 data from the proprietary data provider Data Axle via Your-economy Time Series. Data Axle estimates employment in each census tract in each metropolitan area, thereby eliminating the data suppressions that exist in public data sources. We use U.S. Cluster Mapping Project industry cluster definitions and ICIC under-resourced community boundaries. We remove under-resourced industry clusters from the sample if employment in the industry cluster within the under-resourced community does not exceed 1 percent of total under-resourced community employment. Our analysis includes 1,030 observations, or cluster/under-resourced community pairs.

To analyze patterns in connectivity across clusters and metropolitan areas, we calculate metro connectivity scores, or average URC location quotients of clusters strong in the rest of region within a particular metro, weighted by URC cluster employment. We calculate cluster connectivity scores as average URC location quotients across metros in which that cluster is strong in the rest of region, weighted by URC cluster employment.

Definitions

Below we provide detail on various definitions we used throughout our quantitative analysis.

Central Cities and Suburbs

For some of our analysis, we distinguish between URCs located in central cities of metropolitan areas and those located in suburbs.[89] We define a central city as the first named principal city in a metropolitan area and up to two additional named principal cities with populations of at least 100,000. We define a suburb as any part of the metropolitan area outside of a central city. Because the work of governmental bodies and many other organizations follows municipal lines, we consider the central city portion(s) of a URC that include(s) portions of both a central city and a suburb to be part of a central city URC and the suburban portion(s) of that URC to be part of a suburban URC.

Manufacturing- and Service-Based Clusters

We categorize clusters as manufacturing- or service-based using a partition of industry clusters into five separate cluster groups: service-based clusters, agriculture and logistics clusters, heavy manufacturing clusters, light manufacturing clusters, and construction and mining clusters. We segment the cluster groups based on the U.S. Cluster Mapping Project's visualization of the industry clusters and its between-cluster relatedness metric, which shows how related two industry clusters are to each other.

Manufacturing-based clusters include both heavy manufacturing clusters (Automotive; Downstream Chemical Products; Downstream Metal Products; Metalworking Technology; Plastics; Production Technology and Heavy Machinery; Trailers, Motor Homes, and Appliances; Upstream Chemical Products; and Upstream Metal Manufacturing) and light manufacturing clusters (Aerospace Vehicles and Defense, Apparel, Biopharmaceuticals, Information Technology and Analytical Instruments, Jewelry and Precious Metals, Lighting and Electrical Equipment, Medical Devices, Paper and Packaging, Printing Services, Recreational and Small Electric Goods, and Textile Manufacturing). Service-based clusters include Business Services; Communications Equipment and Services; Education and Knowledge Creation; Environmental Services; Financial Services; Hospitality and Tourism; Insurance Services; Local Health Services; Marketing, Design, and Publishing; Performing Arts; and Video Production and Distribution.

Clusters with Low Entry-Level Educational Requirements

To assess the educational requirements required to work in an industry cluster, we develop a metric to represent the typical entry-level educational requirements for occupations that represent an industry cluster. Using Lightcast's Staffing Patterns tool, we obtain the occupations that represent an industry cluster, the level of employment for these occupations, and the typical entry-level educational requirement (i.e., high school diploma, bachelor's degree, etc.). Since each occupation within an industry cluster has its own educational requirements, we develop a synthetic entry-level educational requirement metric for each cluster by converting each educational requirement to a numerical value using the scale shown in Table A1.

Table A1. Conversion of Typical Entry-Level Educational Requirement to Numerical Scale

Educational Requirement	Scale
No formal educational credential	1
High school diploma	2
Some college, no degree or postsecondary nondegree award	3
Associate degree	4
Bachelor's degree	5
Master's degree	6
Doctoral degree or professional degree	7

Source: Authors' analysis of Lightcast data.

After converting all typical entry-level educational requirements for all occupations within an industry cluster to a numerical scale, we calculate the typical entry-level educational requirement of the cluster by taking the average educational requirement value for all occupations, weighted by occupation employment. We repeat this process for all industry clusters. Appendix C shows the typical entry-level educational requirement metric for each cluster.

Selection of Case Studies

For our case studies, we selected well-connected industry clusters in a diverse set of metropolitan areas. We wanted to showcase industry clusters that had strong connectivity in different regions of the United States. We also wanted to ensure that small, medium-sized, and large metropolitan areas were represented. To select clusters, we considered job quality (measured by the average annual wage) and chose both manufacturing-based and service-based clusters. Considering these factors, we identified the industry clusters and metropolitan areas shown in Table A2.

Table A2. Case Study Industry Clusters and Metropolitan Areas

Industry Cluster	Industry Cluster Characteristics	Metropolitan Area	Region	Size of Metropolitan Area
Production Technology and Heavy Machinery	Heavy Manufacturing	Cleveland-Elyria, OH	Midwest	Large
Communications Equipment and Services	High-wage, Service-based	Hickory-Lenoir-Morganton, NC	South	Small
Education and Knowledge Creation	Service-based	Fresno, CA	West	Medium
Insurance Services	High-wage, Service-based	Miami-Fort Lauderdale-West Palm Beach, FL	South	Large
IT and Analytical Instruments	High-wage, Light Manufacturing	Austin-Round Rock, TX	South	Large

Appendix B. Metropolitan Areas with Under-Resourced Communities

A
Akron, OH
Albany-Schenectady-Troy, NY
Albuquerque, NM
Allentown-Bethlehem-Easton, PA-NJ
Amarillo, TX
Anchorage, AK
Ann Arbor, MI
Asheville, NC
Atlanta-Sandy Springs-Roswell, GA
Atlantic City-Hammonton, NJ
Augusta-Richmond County, GA-SC
Austin-Round Rock, TX

B
Bakersfield, CA
Baltimore-Columbia-Towson, MD
Baton Rouge, LA
Beaumont-Port Arthur, TX
Birmingham-Hoover, AL
Boise City, ID
Boston-Cambridge-Newton, MA-NH
Boulder, CO
Bremerton-Silverdale, WA
Bridgeport-Stamford-Norwalk, CT
Brownsville-Harlingen, TX
Buffalo-Cheektowaga-Niagara Falls, NY

C
Canton-Massillon, OH
Cape Coral-Fort Myers, FL
Cedar Rapids, IA
Charleston-North Charleston, SC
Charlotte-Concord-Gastonia, NC-SC
Chattanooga, TN-GA
Chicago-Naperville-Elgin, IL-IN-WI
Cincinnati, OH-KY-IN
Clarksville, TN-KY
Cleveland-Elyria, OH
College Station-Bryan, TX
Colorado Springs, CO
Columbia, SC
Columbus, GA-AL
Columbus, OH
Corpus Christi, TX

D
Dallas-Fort Worth-Arlington, TX
Davenport-Moline-Rock Island, IA-IL
Deltona-Daytona Beach-Ormond Beach, FL
Denver-Aurora-Lakewood, CO
Des Moines-West Des Moines, IA
Detroit-Warren-Dearborn, MI
Duluth, MN-WI
Durham-Chapel Hill, NC

E
El Paso, TX
Erie, PA
Eugene, OR
Evansville, IN-KY

F
Fayetteville, NC
Fayetteville-Springdale-Rogers, AR-MO
Flint, MI
Fort Collins, CO
Fort Smith, AR-OK
Fort Wayne, IN
Fresno, CA

G
Gainesville, FL
Grand Rapids-Wyoming, MI
Greeley, CO
Green Bay, WI
Greensboro-High Point, NC
Greenville-Anderson-Mauldin, SC
Gulfport-Biloxi-Pascagoula, MS

H
Hagerstown-Martinsburg, MD-WV
Harrisburg-Carlisle, PA
Hartford-West Hartford-East Hartford, CT
Hickory-Lenoir-Morganton, NC
Houston-The Woodlands-Sugar Land, TX
Huntington-Ashland, WV-KY-OH
Huntsville, AL

I
Indianapolis-Carmel-Anderson, IN

J
Jackson, MS
Jacksonville, FL

K
Kalamazoo-Portage, MI
Kansas City, MO-KS
Kennewick-Richland, WA
Killeen-Temple, TX
Kingsport-Bristol-Bristol, TN-VA
Knoxville, TN

L
Lafayette, LA
Lakeland-Winter Haven, FL
Lancaster, PA
Lansing-East Lansing, MI
Laredo, TX
Las Vegas-Henderson-Paradise, NV
Lexington-Fayette, KY
Lincoln, NE
Little Rock-North Little Rock-Conway, AR
Los Angeles-Long Beach-Anaheim, CA
Louisville/Jefferson County, KY-IN
Lubbock, TX
Lynchburg, VA

M
Madison, WI
Manchester-Nashua, NH
McAllen-Edinburg-Mission, TX
Memphis, TN-MS-AR
Merced, CA
Miami-Fort Lauderdale-West Palm Beach, FL
Milwaukee-Waukesha-West Allis, WI
Minneapolis-St. Paul-Bloomington, MN-WI
Mobile, AL
Modesto, CA
Montgomery, AL
Myrtle Beach-Conway-North Myrtle Beach, SC-NC

N
New Haven-Milford, CT
Naples-Immokalee-Marco Island, FL
New York-Newark-Jersey City, NY-NJ-PA
New Orleans-Metairie, LA
Norwich-New London, CT

O

Ocala, FL
Ogden-Clearfield, UT
Oklahoma City, OK
Olympia-Tumwater, WA
Omaha-Council Bluffs, NE-IA
Orlando-Kissimmee-Sanford, FL
Oxnard-Thousand Oaks-Ventura, CA

P

Palm Bay-Melbourne-Titusville, FL
Pensacola-Ferry Pass-Brent, FL
Peoria, IL
Philadelphia-Camden-Wilmington, PA-NJ-DE-MD
Phoenix-Mesa-Scottsdale, AZ
Pittsburgh, PA
Port St. Lucie, FL
Portland-South Portland, ME
Portland-Vancouver-Hillsboro, OR-WA
Providence-Warwick, RI-MA
Provo-Orem, UT

R

Raleigh, NC
Reading, PA
Reno, NV
Richmond, VA
Riverside-San Bernardino-Ontario, CA
Roanoke, VA
Rochester, NY
Rockford, IL

S

Sacramento—Roseville—Arden-Arcade, CA
Salem, OR
Salinas, CA
Salisbury, MD-DE
Salt Lake City, UT
San Antonio-New Braunfels, TX
San Diego-Carlsbad, CA
San Francisco-Oakland-Hayward, CA
San Jose-Sunnyvale-Santa Clara, CA
Santa Cruz-Watsonville, CA
Santa Maria-Santa Barbara, CA
Santa Rosa, CA
Savannah, GA
Scranton-Wilkes-Barre-Hazleton, PA
Seattle-Tacoma-Bellevue, WA
Shreveport-Bossier City, LA
South Bend-Mishawaka, IN-MI
Spartanburg, SC
Spokane-Spokane Valley, WA
Springfield, MA
Springfield, MO
St. Louis, MO-IL
Stockton-Lodi, CA
Syracuse, NY

T

Tallahassee, FL
Tampa-St. Petersburg-Clearwater, FL
Toledo, OH
Trenton, NJ
Tucson, AZ
Tulsa, OK

U

Urban Honolulu, HI
Utica-Rome, NY

V

Vallejo-Fairfield, CA
Virginia Beach-Norfolk-Newport News, VA-NC
Visalia-Porterville, CA
Waco, TX

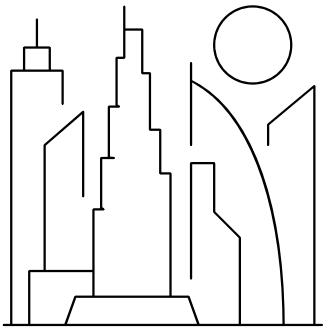
W

Washington-Arlington-Alexandria, DC-VA-MD-WV
Wichita, KS
Wilmington, NC
Winston-Salem, NC
Worcester, MA-CT

Y

York-Hanover, PA
Youngstown-Warren-Boardman, OH-PA

Source: Metropolitan areas with URCs are identified using ICIC URC boundaries. We include only metros with at least one cluster that both has significant employment in the URC (URC cluster employment greater than 1 percent of total URC employment) and is strong in the rest of the MSA (location quotient in the rest of MSA greater than 1.25).



Appendix C. Industry Clusters by Connectivity Score, Employment, Average Annual Wage, and Entry-Level Educational Requirements

Cluster	Cluster Avg Connectivity Score (Cluster Avg URC LQ, Weighted)	Employment (2019)	Job Quality (Avg Wage)	Entry-Level Educational Requirement Metric
Aerospace Vehicles and Defense	9.17	229,649	$93,546	3.57
Agricultural Inputs and Services	40.08	222,684	$48,882	1.58
Apparel	6.33	61,574	$31,781	1.82
Automotive	4.68	178,473	$59,746	2.38
Business Services	1.20	7,253,256	$89,612	3.77
Coal Mining	111.42	1,865	$76,325	2.08
Communications Equipment and Services	1.34	156,804	$87,714	3.64
Construction Products and Services	1.94	446,403	$70,495	2.30
Distribution and Electronic Commerce	1.42	3,924,632	$71,825	2.29
Downstream Chemical Products	4.92	77,747	$68,565	2.72
Downstream Metal Products	2.82	150,421	$56,944	2.43
Education and Knowledge Creation	1.36	2,181,351	$70,645	4.67
Environmental Services	4.58	40,815	$62,760	2.29
Financial Services	0.88	1,441,971	$167,763	3.83
Fishing and Fishing Products	91.73	11,225	$53,485	1.51
Food Processing and Manufacturing	15.06	257,064	$53,781	2.06
Forestry	53.81	8,888	$51,932	2.19
Furniture	18.28	121,497	$42,760	2.23
Hospitality and Tourism	4.87	1,957,813	$31,724	1.82
Information Technology and Analytical Instruments	5.13	887,081	$142,441	3.83
Insurance Services	2.86	844,356	$99,045	3.33
Jewelry and Precious Metals	34.77	14,632	$43,245	2.35
Lighting and Electrical Equipment	3.54	59,702	$65,637	2.79
Livestock Processing	47.38	51,629	$44,069	1.56
Local Health Services	1.33	12,028,733	$57,275	3.56
Marketing, Design, and Publishing	1.18	1,205,751	$115,089	3.91
Medical Devices	12.12	164,213	$76,619	2.83

Appendix C. Industry Clusters by Connectivity Score, Employment, Average Annual Wage, and Entry-Level Educational Requirements

Cluster	Cluster Avg Connectivity Score (Cluster Avg URC LQ, Weighted)	Employment (2019)	Job Quality (Avg Wage)	Entry-Level Educational Requirement Metric
Metalworking Technology	4.44	227,888	$54,080	2.44
Nonmetal Mining	16.34	9,302	$72,235	2.15
Oil and Gas Production and Transportation	9.04	241,202	$94,603	2.62
Paper and Packaging	6.29	76,892	$67,051	2.25
Performing Arts	2.88	272,493	$47,192	2.84
Plastics	6.11	173,383	$55,477	2.34
Printing Services	2.17	276,379	$45,884	2.49
Production Technology and Heavy Machinery	2.34	181,895	$63,482	2.74
Recreational and Small Electric Goods	1.70	67,756	$50,527	2.59
Textile Manufacturing	17.12	23,225	$43,089	2.17
Trailers, Motor Homes, and Appliances	47.71	5,343	$49,662	2.35
Transportation and Logistics	1.92	1,071,772	$58,799	2.51
Upstream Chemical Products	21.40	40,817	$93,874	2.85
Upstream Metal Manufacturing	6.22	78,114	$63,205	2.39
Video Production and Distribution	13.03	214,220	$96,262	3.74
Vulcanized and Fired Materials	31.63	28,098	$53,314	2.32
Water Transportation	22.74	134,473	$70,560	2.31
Wood Products	10.17	56,192	$46,074	2.10

Source: Authors calculate average connectivity (LQ) and employment estimates for clusters from 2019 Data Axle data via Your-Time Series. Average cluster wage is from U.S. Cluster Mapping project data. Authors use ICIC URC boundaries and cluster definitions from the U.S. Cluster Mapping Project. The authors developed the entry-level educational requirement metric using Lightcast data. See Appendix A for more information about these definitions.

Appendix D.
Tables for Case Study Clusters Top Industries Job and LQ Change Analysis (2011-2022)

Table D1. Job and LQ Change for the Top 10 Employing Industries in the Production Technology and Heavy Machinery Cluster in Cleveland-Elyria, OH

NAICS	Description	2011 - 2022 % Jobs Change	2011 Jobs	2022 Jobs	2022 LQ	2011 LQ	2011-2022 LQ % Change
332912	Fluid Power Valve and Hose Fitting Mfg	6%	1,651	1,743	7.62	6.79	11%
332919	Other Metal Valve and Pipe Fitting Mfg	302%	244	978	10.06	2.10	79%
333248	All Other Industrial Machinery Mfg	40%	691	970	2.15	1.61	25%
333414	Heating Equipment (except Warm Air Furnaces) Mfg	25%	730	912	8.58	5.73	33%
333310	Commercial and Service Industry Machinery Mfg	-30%	1,088	763	1.29	1.62	-25%
333993	Packaging Machinery Mfg	173%	257	700	4.49	2.01	55%
339991	Gasket, Packing, and Sealing Device Mfg	199%	231	691	3.63	1.09	70%
333912	Air and Gas Compressor Mfg	549%	103	670	5.47	0.73	87%
333413	Industrial and Commercial Fan and Blower and Air Purification Equipment Mfg	86%	354	658	3.24	1.77	45%
333922	Conveyor and Conveying Equipment Mfg	3%	491	504	2.08	2.44	-17%

Source: Authors' analysis of Lightcast data.

Table D2. Job and LQ Change for the Top 10 Employing Industries in the Education and Knowledge Creation Cluster in Fresno, CA

NAICS	Description	2011 - 2022 % Jobs Change	2011 Jobs	2022 Jobs	2022 LQ	2011 LQ	2011 - 2022 % LQ Change
–	Colleges, Universities, and Professional Schools (Local Government)	5%	5007	5274	3.24	2.65	22%
–	Colleges, Universities, and Professional Schools (State Government)	32%	3242	4278	0.61	0.50	23%
611310	Colleges, Universities, and Professional Schools	-15%	1597	1353	0.27	0.34	-21%
611710	Educational Support Services	45%	268	387	0.62	0.74	-16%
611691	Exam Preparation and Tutoring	-24%	493	373	1.12	1.65	-32%
611210	Junior Colleges	-67%	628	208	2.31	3.09	-25%
611420	Computer Training	932%	10	103	1.66	0.04	4271%
541715	Research and Development in the Physical, Engineering, and Life Sciences (except Nanotechnology and Biotechnology)	-25%	113	85	0.06	0.11	-44%
611699	All Other Miscellaneous Schools and Instruction	45%	54	79	0.28	0.32	-12%
–	All Other Schools and Educational Support Services (Local Government)	7900%	1	79	0.53	0.01	5197%

Source: Authors' analysis of Lightcast data.

Table D3. Job and LQ Change for the Top 10 Employing Industries in the Insurance Services Cluster in Miami-Fort Lauderdale-West Palm Beach, FL

NAICS	Description	2011 - 2022 % Jobs Change	2011 Jobs	2022 Jobs	2022 LQ	2011 LQ	2011 - 2022 % LQ Change
524113	Direct Life Insurance Carriers	9%	3,327	3,619	0.77	0.65	18%
524114	Direct Health and Medical Insurance Carriers	82%	5,905	10,735	1.31	0.92	42%
524126	Direct Property and Casualty Insurance Carriers	10%	6,122	6,750	0.72	0.68	6%
524127	Direct Title Insurance Carriers	38%	852	1,175	0.84	0.80	5%
524128	Other Direct Insurance (except Life, Health, and Medical) Carriers	21%	1,053	1,277	3.29	4.11	-20%
524130	Reinsurance Carriers	105%	207	424	0.70	0.41	71%
524210	Insurance Agencies and Brokerages	60%	19,156	30,732	1.29	1.30	-1%
524291	Claims Adjusting	126%	1,303	2,947	2.10	1.31	60%
524298	All Other Insurance Related Activities	24%	2,172	2,699	1.40	2.16	-35%
525920	Trusts, Estates, and Agency Accounts	100%	108	217	2.74	0.74	270%

Source: Authors' analysis of Lightcast data.

Table D4. Job and LQ Change for the Top 10 Employing Industries in the IT and Analytical Instruments Cluster in Austin-Round Rock, TX

NAICS	Description	2011 - 2022 % Jobs Change	2011 Jobs	2022 Jobs	2022 LQ	2011 LQ	2011-2022 % LQ Change
334413	Semiconductor and Related Device Mfg	31%	9,570	12521	7.87	8.40	-6%
513210	Software Publishers	150%	4,535	11319	2.26	2.78	-19%
334111	Electronic Computer Mfg	16%	5,223	6070	6.75	9.67	-30%
334418	Printed Circuit Assembly (Electronic Assembly) Mfg	494%	416	2471	5.30	1.31	305%
334118	Computer Terminal and Other Computer Peripheral Equipment Mfg	-17%	2,163	1801	6.95	7.55	-8%
334515	Instrument Mfg for Measuring and Testing Electricity and Electrical Signals	25%	880	1097	3.62	3.48	4%
333242	Semiconductor Machinery Mfg	217%	235	743	3.22	2.46	31%
334513	Instruments and Related Products Mfg for Measuring, Displaying, and Controlling Industrial Process Variables	-43%	1,147	653	1.47	3.26	-55%
334514	Totalizing Fluid Meter and Counting Device Mfg	63%	368	600	8.64	5.52	57%
334419	Other Electronic Component Mfg	4%	521	543	1.07	1.26	-15%

Source: Authors' analysis of Lightcast data.

Appendix E.
Tables for Case Study Occupation, Education, and Wage Analysis

Table E1. Top 10 Employing Occupations in the Production Technology and Heavy Machinery Cluster in Cleveland-Elyria, OH

Description	Employed in Industry Group (2022)	Median Hourly Earnings	Typical Entry Level Education
Miscellaneous Assemblers and Fabricators	1,666	$17.84	High school diploma or equivalent
Machinists	755	$22.33	High school diploma or equivalent
Welders, Cutters, Solderers, and Brazers	495	$22.21	High school diploma or equivalent
Mechanical Engineers	463	$41.52	Bachelor's degree
Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	396	$20.92	High school diploma or equivalent
First-Line Supervisors of Production and Operating Workers	396	$30.14	High school diploma or equivalent
Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	361	$32.78	High school diploma or equivalent
Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	351	$18.80	High school diploma or equivalent
Computer Numerically Controlled Tool Operators	327	$22.35	High school diploma or equivalent
Industrial Engineers	300	$44.01	Bachelor's degree

Source: Authors' analysis of Lightcast data.

Table E2. Top 10 Employing Occupations in the Communications Equipment and Services Cluster in Hickory-Lenoir-Morganton, NC

Description	Employed in Industry Group (2022)	Median Hourly Earnings	Typical Entry Level Education
Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers	203	$21.31	High school diploma or equivalent
Miscellaneous Assemblers and Fabricators	65	$17.61	High school diploma or equivalent
Inspectors, Testers, Sorters, Samplers, and Weighers	34	$17.36	High school diploma or equivalent
First-Line Supervisors of Production and Operating Workers	22	$28.62	High school diploma or equivalent
Laborers and Freight, Stock, and Material Movers, Hand	21	$17.97	No formal educational credential
Software Developers	20	$54.26	Bachelor's degree
Industrial Engineers	16	$37.50	Bachelor's degree
Shipping, Receiving, and Inventory Clerks	14	$17.00	High school diploma or equivalent
General and Operations Managers	14	$44.08	Bachelor's degree
Electrical Engineers	14	$48.37	Bachelor's degree

Source: Authors' analysis of Lightcast data.

Table E3. Top 10 Employing Occupations in the Education and Knowledge Creation Cluster in Fresno, CA

Description	Employed in Industry Group (2022)	Median Hourly Earnings	Typical Entry Level Education
Postsecondary Teachers	4,838	$38.52	Doctoral or professional degree
Tutors	594	$16.00	Bachelor's degree
Education Administrators, Postsecondary	551	$45.70	Master's degree
Educational Instruction and Library Workers, All Other	463	$15.00	Bachelor's degree
Office Clerks, General	420	$18.21	High school diploma or equivalent
Secretaries and Administrative Assistants, Except Legal, Medical, and Executive	315	$21.37	High school diploma or equivalent
Educational, Guidance, and Career Counselors and Advisors	295	$37.56	Master's degree
Teaching Assistants, Postsecondary	262	$15.00	Bachelor's degree
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	217	$16.21	No formal educational credential
Self-Enrichment Teachers	216	$19.70	High school diploma or equivalent

Source: Authors' analysis of Lightcast data.

Table E4. Top 10 Employing Occupations in the Insurance Services Cluster in Miami-Fort Lauderdale-West Palm Beach, FL

Description	Employed in Industry Group (2022)	Median Hourly Earnings	Typical Entry Level Education
Insurance Sales Agents	3,942	$21.05	High school diploma or equivalent
Claims Adjusters, Examiners, and Investigators	3,596	$30.46	High school diploma or equivalent
Customer Service Representatives	3,187	$17.64	High school diploma or equivalent
Insurance Claims and Policy Processing Clerks	1,728	$19.91	High school diploma or equivalent
Insurance Underwriters	877	$31.87	Bachelor's degree
Management Analysts	870	$38.32	Bachelor's degree
First-Line Supervisors of Office and Administrative Support Workers	702	$29.01	High school diploma or equivalent
Registered Nurses	684	$38.28	Bachelor's degree
General and Operations Managers	679	$42.80	Bachelor's degree
Software Developers	653	$51.96	Bachelor's degree

Source: Authors' analysis of Lightcast data.

Table E5. Top 10 Employing Occupations in the Information Technology and Analytical Instruments Cluster in Austin-Round Rock, TX

Description	Employed in Industry Group (2022)	Median Hourly Earnings	Typical Entry Level Education
Software Developers	4,347	$52.74	Bachelor's degree
Sales Representatives, Wholesale and Manufacturing, Technical and Scientific Products	1,570	$35.99	Bachelor's degree
Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers	1,525	$17.65	High school diploma or equivalent
General and Operations Managers	1,465	$44.24	Bachelor's degree
Inspectors, Testers, Sorters, Samplers, and Weighers	1,158	$20.72	High school diploma or equivalent
Miscellaneous Assemblers and Fabricators	1,075	$16.12	High school diploma or equivalent
Semiconductor Processing Technicians	1,072	$19.87	High school diploma or equivalent
Computer and Information Systems Managers	1,041	$79.47	Bachelor's degree
Customer Service Representatives	973	$18.29	High school diploma or equivalent
Industrial Engineers	951	$49.17	Bachelor's degree

Source: Authors' analysis of Lightcast data.

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