

DEVELOPING REGIONAL
ECONOMIC CONNECTIVITY

Key Factors and Strategies for Urban and Rural Communities



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The National League of Cities (NLC) is the voice of America's cities, towns and villages, representing more than 200 million people. NLC works to strengthen local leadership, influence Federal policy and drive innovative solutions. NLC's Center for City Solutions provides research and analysis on key topics and trends important to cities, creative solutions to improve the quality of life in communities, inspiration and ideas for local officials to use in tackling tough issues, and opportunities for city leaders to connect with peers, share experiences and learn about innovative approaches in cities.

About Rural Community Assistance Partnership

The Rural Community Assistance Partnership (RCAP) is a national network of non-profit organizations working to provide technical assistance, training, resources, and support to rural and tribal communities across the United States, tribal lands, and U.S. territories. Alongside the technical assistance provided by the more than 300 technical assistance providers located in every state and territory, who work for the RCAP regional partners, RCAP also focuses on advocacy, research, storytelling and partnerships that provide opportunities for the communities it serves. RCAP reached more than 3.4 million rural and tribal residents through water/wastewater projects last year. RCAP's work has an outsized impact in disadvantaged communities, focused on helping those who need it most.

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Executive Summary

URBAN AND RURAL AREAS perform better and boost each other's economies when they participate in their regional economies. Many urban and rural areas are interdependent and policymakers can develop those economic connections within regions to improve residents' lives. Yet, while connecting to regional economies has been proven to benefit communities, less is known about the assets that communities need to help them connect and whether connectivity drives equity as well as to growth. With support from the U.S. Economic Development Administration and the Robert Wood Johnson Foundation, the National League of Cities and the Rural Community Assistance Partnership have worked to fill this gap through a study of economic connectivity between urban and rural localities in regions.

Through data analysis supported by stakeholder interviews and case studies, this new research identifies factors that support local engagement in regional economies, how these factors vary for urban and rural places, and whether the benefits of economic connectivity are equitably distributed among places and people in regions. In this study, an urban or rural community is "connected" if the economic specializations driving the broader regional economy also have a strong presence locally.

The study identifies the factors that support local participation in regional economic specializations, or industry clusters, and assesses the distribution of benefits to places and people when localities participate in those clusters. We identify four main factors that drive local economic connectivity to regional economies: business ecosystems, infrastructure, planning support and funding, and housing and quality of life.

and break down each factor into several categories for our analysis. We find that the relationship between these local assets, or factors, and regional connectivity vary for different types of communities in the U.S., including urban, mixed urban-rural and rural counties. Specifically, health and transportation infrastructures are associated with economic connectivity for all county types. For urban communities, factors driving connectivity include strong small business presence, a workforce aligned with industry needs, reasonable cost of doing business and participation in regional planning. These same factors, as well as drinking water safety, support connectivity for mixed urban-rural communities. For rural communities, latent innovation is associated positively to economic connectivity. These varying results indicate that policymakers and practitioners seeking to increase economic connectivity to their regional economies should

carefully choose factors that will generate the most beneficial, widely felt outcomes.

This report also provides an analysis of the relationship between connectivity and geographic and racial equity in regions. To assess whether the benefits of economic connectivity are associated with improvements in equity, we analyze employment outcomes and find that connectivity relates positively to reduced employment disparities between high and low employment counties and between people of color and those who are white.

The finding that connectivity is associated with improved geographic equity suggests that strategies to increase connectivity may reduce disparities between the different parts of regions, often urban and rural. We also find a positive relationship between connectivity and improvement in equity at the regional level for different racial groups. While there are limitations to this analysis, which we discuss in the report, these initial findings suggest that regional strategies may be a pathway to strengthen outcomes for all.

Overall, our results show how layers of investment and government economic support can connect local economies, in turn promoting economic prosperity for residents of urban and rural communities. To help economic development practitioners, policymakers and leaders put these findings into practice, we offer the following four recommendations:

1 DEVELOP AN INCLUSIVE INNOVATION ECOSYSTEM. Align innovation assets to regional clusters. To promote connectivity and grow and support a more diverse pipeline of entrepreneurs and small businesses, government and business support organizations can help businesses owned by people of color to expand by connecting them with other firms in regional clusters and opportunities to engage as suppliers. Local sourcing of goods and services to regional businesses is one pathway to a more equitable ecosystem, and also builds local wealth and bolsters economic resilience. Economic developers can also engage with small business and entrepreneurial support organizations to increase participation by people of color in tech entrepreneurship and to increase access to capital.

2 ENSURE ACCESS TO BROADBAND AND DIGITAL INCLUSION. Reduce the consumer cost of adoption and support digital literacy. Efforts to ensure access to broadband connect residents to more employment opportunities, educational resources and health care, and allow businesses to reach new markets and apply new technologies to improve and expand. They also promote digital inclusion and greater access to regional opportunities for people of color and businesses owned by people of color, as well as economically disadvantaged communities, all of whom have lower rates of broadband access, on average.

3 ALIGN WORKFORCE SKILLS WITH INDUSTRY NEEDS. Communities with strong workforce development programs aligned to industry needs can better tap into and support regional cluster growth. This is of particular importance to urban communities. Discussions with practitioners confirm that this is also important for rural communities, which often have less-specialized and more-limited labor pools compared with their urban neighbors. Economic developers can serve as conveners of communities, businesses, universities, community colleges and technical colleges to develop and refine workforce programs, such as apprenticeship programs or tailored technical skills programs, to meet local and regional demand.

4 ENABLE STRONG REGIONAL ORGANIZATIONS AND BUSINESS PARTICIPATION. Regional development organizations (RDOs) can help localities overcome competition and perceived cultural and political divisions to collaborate and strengthen their shared regional infrastructure and economy. For example, RDOs have been instrumental in a model called WealthWorks that focuses on increasing local ownership and connecting natural assets and existing resources to market demand. Policymakers and officials can convene business associations, development organizations, and nonprofits to share perspectives and help design regional plans for collaboration.

While urban and rural communities may reflect cultural and political differences, their economies are or can be interdependent.

Regional collaboration has never been more important, particularly as U.S. communities rebuild their economies in the wake of the damaging effects of the COVID-19 pandemic. Strengthening regional economies through a frame of connectivity is important for all communities, but especially for those experiencing economic decline, isolation and depleted economic opportunity for their residents.

Expanding the local industrial base to align with and leverage the broader region's economic strengths may offer a path forward. In addition to analyzing the factors associated with connectivity and the impact of connectivity on equity, this report provides case studies and recommendations to advance an economic connectivity framework that not only drives growth but also contributes to more equitable economies in which all people can participate, prosper and reach their full potential.



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Introduction

URBAN-RURAL INTERDEPENDENCIES OFTEN drive regional growth and reduce economic divides. For example, the Sacramento, California region’s successful food cluster relies not only on rural agriculture but on food processing capabilities in urban parts of the region. Shared economic fortunes often define the relationship between urban and rural areas. Yet, despite the proven benefits to both urban and rural communities stemming from connections to their regional economies, less is understood about which assets, or factors, are needed in different types of communities to enable them to connect.

To address this gap, this research examines factors in local communities that enable or are associated with intraregional economic relationships, which we call connectivity. An urban or rural community is connected if the economic specializations driving the broader *regional* economy also have a strong presence in the *local* community.

While there are other ways to define and measure economic connectivity within regions, for example commuting patterns, our measure is distinct because it intends to help communities identify opportunities to reimagine their economic base. Moreover, regional relationships defined by commuting patterns include core urban areas and their proximate communities, often leaving out outlying rural communities. Studying regional economies through a broader frame is important for all communities but especially for those experiencing economic decline, isolation and depleted economic opportunity for their residents. Expanding the local industrial base to align with and leverage the broader region’s economic strengths may offer a more equitable path forward.

To assess the factors that drive economic connectivity between local communities and their regions, the equity impacts of connectivity, and the implications of this connectivity framework for economic development in practice, we use data analysis, stakeholder interviews and case studies. We hypothesize that if a local community is economically connected to the regional economy, then the factors necessary to support regional industry clusters and broader regional growth are present locally, therefore contributing to local growth.

Our analysis finds, with some variation among urban and rural localities, that the following factors support communities' ability to connect to their regional economies:



a strong business ecosystem, including small businesses, an aligned workforce, innovation assets and reasonable cost of business;



planning support and funding, including intentional, active engagement in regional planning efforts and state funding and programs from communities of all sizes throughout the region;



robust transportation, water, health and broadband infrastructure; and



affordable housing and vibrant quality of life.

Understanding how these four factors relate to connectivity differently in different types of communities can help urban, rural and regional economic development practitioners and policymakers strategize for their future.

For our analysis, we use a regional economic specialization, or industry cluster, frame. Industry clusters are firms and supporting organizations within regions that leverage the benefits of their proximity through mutually advantageous relationships through knowledge spillovers, skilled labor pools and specialized suppliers.¹ Industry clusters operate at a regional scale, tend to include urban and rural parts of regions and depend on strong inter-industry linkages throughout their regions. They are proven to improve overall *regional* wages, wage growth, employment growth and innovation.² Urban and rural economic connectivity to regional clusters also increases *local* economic outcomes, including county employment growth.³ Overall, economic connectivity benefits constituent localities in regions and can bridge urban-rural divides by promoting interdependencies. Given the benefits that local communities gain by participating in their broader regional industry clusters, this report assesses factors enabling urban-rural connectivity that are common among different industries and types of regions. Additionally, while

promoting competitiveness and growth, economic development must consider how growth is distributed among places and people. Prior research confirms that growth associated with economic connectivity benefits both rural and urban counties, underscoring connectivity as a strategy to promote overall regional economic development.^{4,5} We expand this analysis by examining a new element: the extent to which economic connectivity affects the *equitable distribution* of positive economic outcomes among places and people in regions.

Our findings indicate that greater levels of economic connectivity in regions improve overall regional economic outcomes and the equitable distribution of outcomes.

In addition to analyzing the above-noted factors and the impact of connectivity on equity, this report provides case studies and recommendations for practitioners and leaders to advance an economic connectivity framework that not only drives growth but also contributes to more equitable economies in which all people can participate, prosper and reach their full potential.⁶ In the next two sections, we provide background information on the relationship between economic development and connectivity in regions, and briefly describe our research approach. Then we explain our findings regarding the four main factors driving connectivity: business ecosystem, infrastructure, planning support, and housing and quality of life. We discuss the implications for policy and practice related to our findings, including recommendations for practitioners seeking to drive connectivity in their regions. The Appendix outlines our data and research methodology in more detail.

The Case for Connectivity

IN THIS SECTION, we outline the benefits of connectivity, describe the need for an economic developmental strategy that emphasizes collaboration rather than competition, and explain the importance of a regional approach to achieve equitable outcomes.

Across the country, instances abound of interdependencies between rural and urban areas that provide mutual economic benefits.⁷ In a study of the economic relationship between rural hops growers and urban markets in Oregon, Martin (2011) finds that “rural connections to metropolitan areas facilitate the development of niche markets that can test and refine products in adjacent urban areas before taking them to the global market.”⁸ Similarly, in their study of European rural entrepreneurship, Mayer and colleagues (2016) find that “rural entrepreneurs with linkages to proximate urban areas can access some urban features, such as knowledge and markets, while at the same time profiting from the advantage of their peripheral location.”⁹ Furthermore, McFarland (2018) finds that urban traded sector businesses such as those in the legal, financial, trade and transportation industries often thrive when they provide economic support to rural-based industries.¹⁰ Examining the interdependence between Minnesota’s urban and rural areas,

Searls (2011) finds that urban regions receive substantial economic benefits from improved prosperity in rural areas. Every \$1 billion increase in rural manufacturing output produces a 16 percent increase in urban jobs, significant additional business-to-business transactions and statewide consumer spending and investment.¹¹

The rural economic development field also points to connectivity as a key driver of growth. The generally uneven economic recoveries in our nation have resulted in vastly different outcomes for urban and rural communities. For instance, since the Great Recession, rural areas have experienced substantially lower economic growth than urban areas have had (measured between 2010–2018), and poverty rates over 30 percent higher.^{12,13} This disparity results in part from rapid changes in the economy’s industrial and employment structure, the rise of new technologies and the consolidation of the financial sector, each of which have created unique challenges and demands for new approaches for rural and tribal communities. While state and local governments often rely on incentives as a central economic development approach, including more than \$45 billion annually provided by states, evidence suggests little connection between incentives and economic growth.^{14,15} Specifically, research has found that in most instances, businesses

receiving incentives would have located in the same community even without receiving the incentives; thus, the incentives provide no net economic benefit to the community.¹⁶

Regional approaches emphasize generating and retaining community wealth, reinvesting that wealth for future productivity and improving quality of life.¹⁷ Specific to regional strategies for rural communities, rural development hubs prioritize small businesses and entrepreneurs and create the quality of life, talent and infrastructure necessary to drive prosperity. Thriving rural communities find benefits by considering assets holistically and looking for growth regionally, especially as technology fosters more interconnectivity than ever before. That interconnectivity can lift communities up together, promoting collaboration instead of competition.

A regional approach is also important for advancing equitable outcomes, especially for people of color and those with lower incomes. PolicyLink, a national organization dedicated to economic and social equity, describes the demographic and employment trends that make regional cooperation so crucial:

Today, more than ever, people of color, immigrants, and low-income residents reside not only in central cities, but also the surrounding suburbs and exurbs. Even as more low-income workers and people of color move to the suburbs in pursuit of quality

schools and decent homes, the jobs are not necessarily following, making regional cooperation across jurisdictions essential to implementing an equitable growth strategy. The economy is regional, and equitable growth must likewise be pursued through regionally coordinated strategies.¹⁸

To advance equity through regional economic development, PolicyLink recommends developing jobs in industries that have growth potential, pay higher wages, provide more benefits, offer better career opportunities than the region on average and have a clear career pathway. Jobs in industry clusters are particularly notable for such outcomes because the presence of clusters in a region has been proven to improve regional wages, wage growth, employment growth and innovation.¹⁹ When a regionally competitive cluster is also strong in a community, that community possesses the assets to support the cluster such as available sites, tailored workforce programs, high quality of life and transportation access. Economic connectivity between local communities, both urban and rural, and regional clusters increases local economic outcomes, and is associated with improved equity.²⁰ In the next section, we describe our use of these concepts in this study.

Research Approach

TO BETTER UNDERSTAND the factors in communities that promote economic connectivity to regional economies, this analysis uses a blended approach of statistical modeling, practitioner interviews and case studies. We identify four primary factors needed to sustain and grow clusters (business ecosystems, infrastructure, planning and funding support, and housing and quality of life) based on a literature review focused on assets responsible for the emergence and growth of industry clusters in regions over time.²¹

While there are other important factors, such as market demand, we include factors representing place-based assets and those that governments, nonprofits and other intermediaries can directly develop, coordinate, market and leverage to help grow. These four factors form the basis of our statistical modeling, which we use to understand their relationships with economic connectivity. Practitioner interviews and case studies complement the quantitative findings regarding how the factors influence local communities' interactions with their regional economies.

We analyze the following variables which make up the four main factors associated with connectivity:

-  **BUSINESS ECOSYSTEM:** small business environment, innovation, workforce alignment and cost of doing business;
-  **INFRASTRUCTURE:** transportation, water, health and broadband access;
-  **PLANNING & FUNDING SUPPORT:** economic Development Districts (EDDs), regional development organizations (RDOs), and state funding and program support; and
-  **HOUSING AND QUALITY OF LIFE:** home ownership, rent burden, libraries, farmers markets and absence of air pollution.

We examine the relationship between these categories and the extent of economic connectivity between county-level employment and regional industry clusters (see *Appendix for detailed methodology*). The study evaluates connectivity by using standard county definitions, regions that include both urban and rural communities as defined by the U.S. Bureau

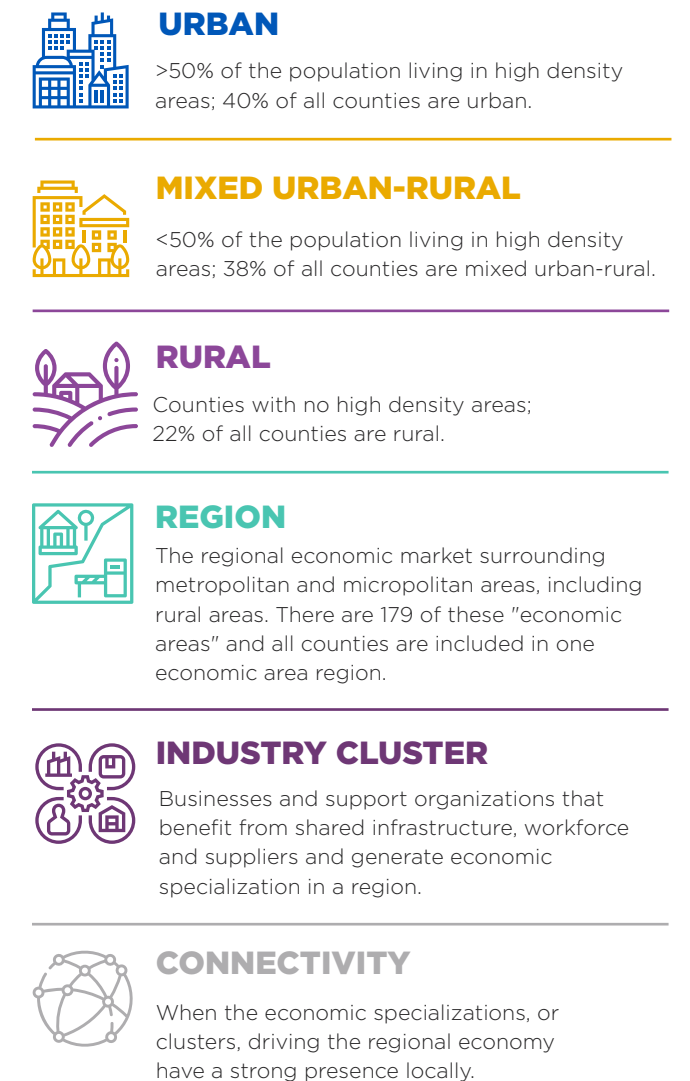
of Economic Analysis (economic areas), traded sector industry cluster definitions developed by the U.S. Cluster Mapping Project, and county rurality categories developed by the Census and adapted here to urban, rural and mixed urban-rural (**Figure 1**).²² This analysis uses traded sector clusters (rather than local clusters), or industries that serve markets beyond their regions, since they are highly concentrated in a few regions, have competitive advantages and drive high levels of overall regional economic performance (Ketels 2017).

ECONOMIC CONNECTIVITY: Building on prior work by McFarland and Grabowski (2021), this analysis measures economic connectivity as industry clusters at different levels of geography within economic regions.²³ To measure the extent of counties' connectivity to their regional economies, this analysis determines:

- ◆ all economic specializations, or industry clusters, that are present outside of each county but within the county's broader economic region; and
- ◆ the extent to which the county participates in those regional clusters, indicated by county-level employment concentration in those industry clusters.

The observations, or units of analysis, are county-clusters, or traded sector industry clusters with at least 10 jobs in the county and a cluster location quotient greater than one in the economic region outside of the county (which we call the "rest-of-region" location

FIGURE 1: KEY CONCEPTS





quotient).²⁴ A common economic development metric, a location quotient greater than one for an area indicates a higher employment concentration and greater economic specialization than the national average.

This calculation results in a total of 34,914 industry cluster observations spanning 3,132 counties.^{25,26} The county-level observations represent clusters that are viable candidates for connectivity.

For example, Caledonia County, Vermont is part of the Burlington-South Burlington Vermont Economic Area. Food Processing

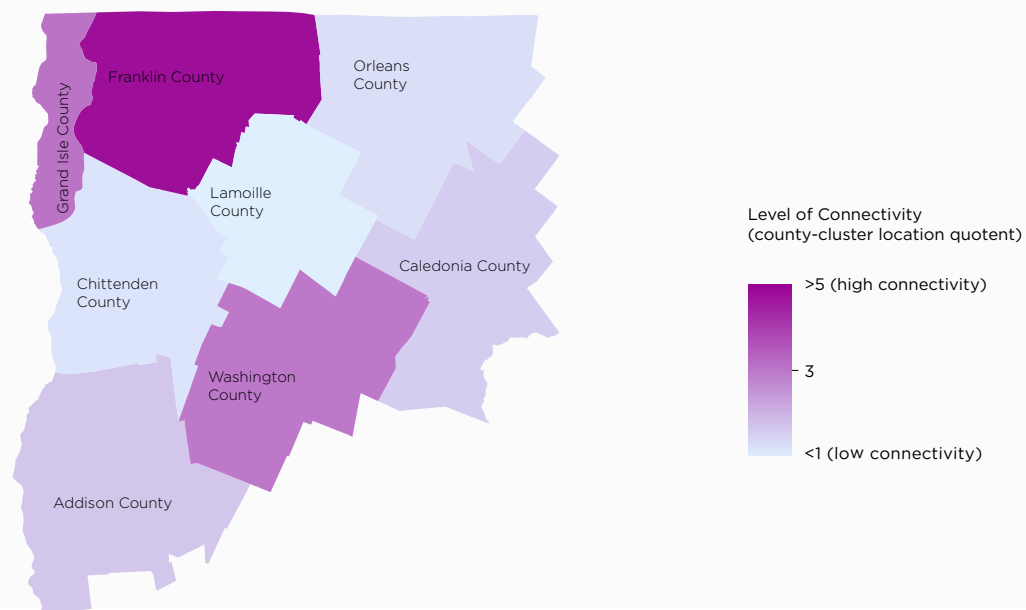
and Manufacturing is a cluster that is present in Caledonia County and is strong in the rest of the Burlington-South Burlington Economic Area surrounding Caledonia County. With a rest of region location quotient of 3.5, the cluster is 3 and a half times more specialized than the national average in the portion of the Vermont economic area outside of Caledonia. Caledonia County itself has a presence of 170 jobs in the cluster. Because this county-cluster meets the threshold rest of region location quotient, and minimum job number, it is included in our analysis. To assess the extent to which the county is participating in the regional cluster, we look at the county location

quotient. With a county location quotient of 2.6 in the Food Processing and Manufacturing, Caledonia is clearly specializing in, and therefore connected to, this regional cluster.

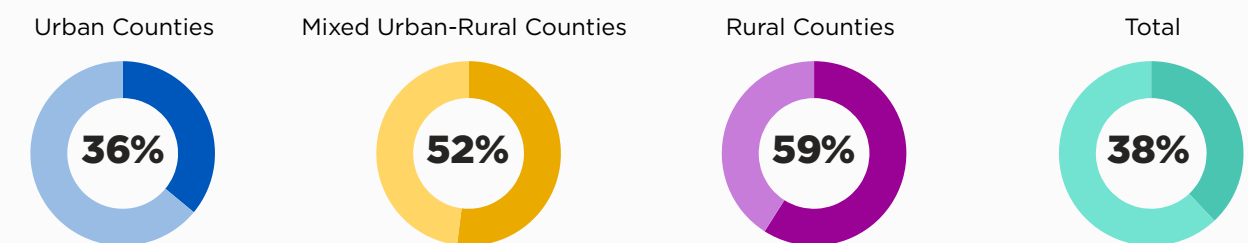
Overall, our research indicates that nearly four in 10 county jobs are connected to regional industry clusters and, as such, to the businesses, services, workers and institutions that lie outside of county boundaries and within the economic region.²⁷ This means that in many instances economic activity in the county is

helping to drive regional clusters and, in turn, to provide economic opportunities back to local residents. When we look across urban and rural communities, we find that the share of county-level jobs connected to regional industry clusters is highest in rural counties (59%), followed by mixed urban-rural (52%) and urban (36%) counties.²⁸ In these counties, a high share of jobs are in industry clusters that are also specialized and competitive in the region outside of the county.

FIGURE 2. LOCAL CONNECTIVITY TO THE BURLINGTON-SOUTH BURLINGTON, VT REGION FOOD PROCESSING AND MANUFACTURING CLUSTER



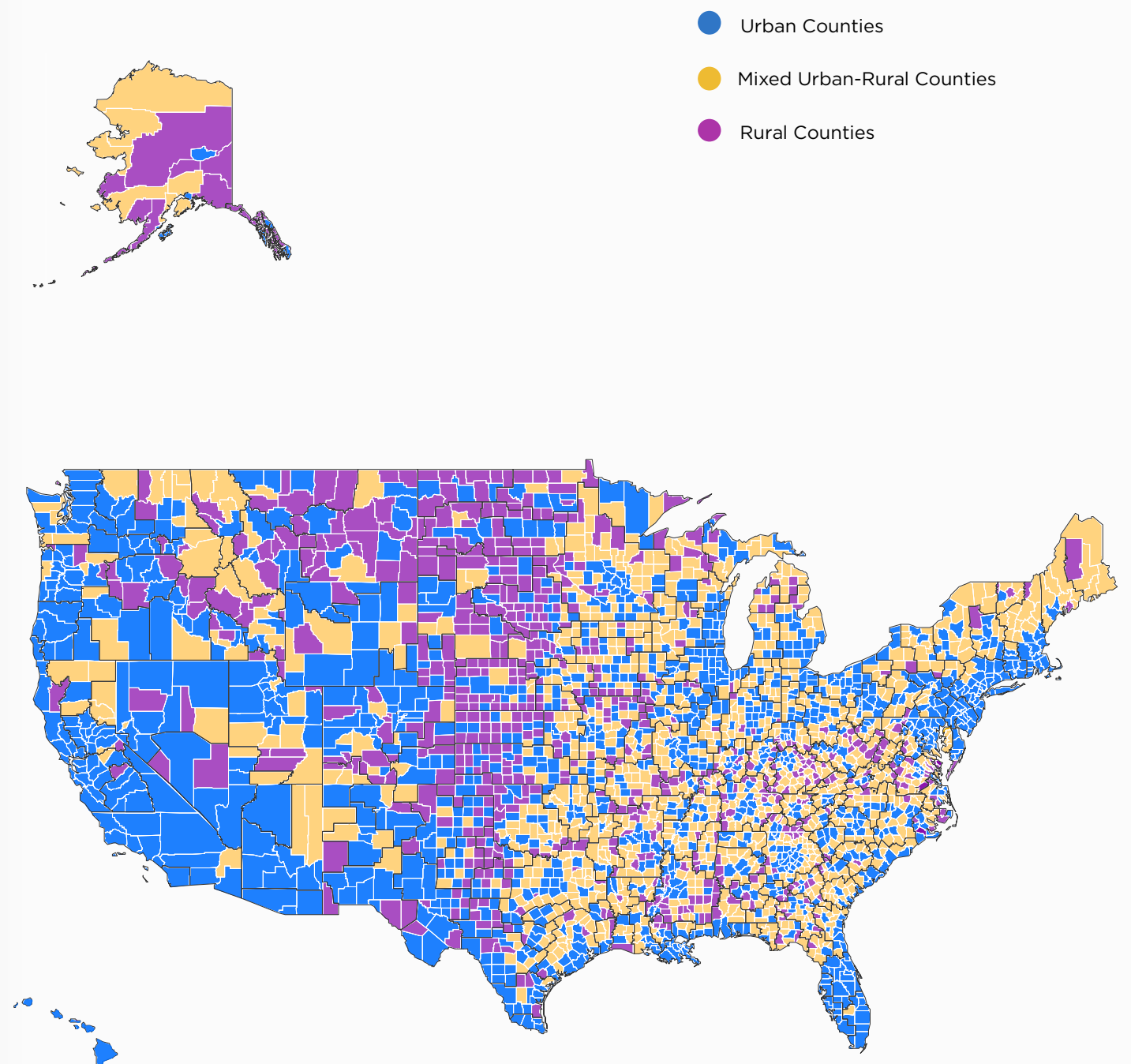
GRAPHIC: SHARE OF JOBS CONNECTED TO REGIONAL INDUSTRY CLUSTERS, BY COUNTY TYPE



RURALITY: Prior research confirms that economic connectivity's influence on growth varies based on rurality.²⁹ Therefore, our analysis assesses the relationship between factors and economic connectivity separately for different county types based on the U.S. Census Bureau rural designations. Using population density, physical characteristics and geography, the Census classifies counties as “mostly urban,” “mostly rural” or “completely rural,” which represent the share of the population residing in urbanized parts of the county. Throughout this report, to simplify terminology we refer to “mostly urban,” “mostly rural” and “completely rural” as “urban,” “mixed urban-rural” and “rural,” respectively. **Figure 3** maps the distribution of counties by urban, mixed urban-rural and rural, and displays economic area regions of which the counties are part.

We use four multiple regression models to assess the relationship of business ecosystem factors, infrastructure factors, planning and funding support factors, and quality-of-life factors to connectivity. We apply these four regression models to data sets for the urban county-clusters, mixed urban-rural county-clusters and the rural county-clusters. We selected the measures by starting with those that the literature and interviews with experts indicate as important, and by testing for statistically significant relationships with our measure of connectivity. The measures we included have a statistically significant relationship with connectivity in at least one type of county.

FIGURE 3: U.S. COUNTIES BY URBAN, MIXED URBAN-RURAL AND RURAL DESIGNATIONS WITH REGION BOUNDARIES





Research Findings

IN THIS SECTION, we first report our general findings on the four main factors driving economic connectivity and our findings on the distribution of benefits in terms of equity. Then, we describe our results for each of the four factors in detail. Overall, we find a statistically significant association between each factor and at least one type of county, but the results vary by community type, and we discuss those nuances in detail.

As noted above, we consider four factors associated with economic connectivity: business ecosystem, infrastructure, planning and funding

support, and housing and quality of life (see **Figure 4**). These factors represent local assets that sustain and grow regional industry clusters. Many of these factors link firms within an industry cluster, thereby economically connecting the localities within which these businesses are located. Often, factors can be specialized to the needs of the cluster, such as workforce development programs tailored to broader industry specializations in the region. These economic relationships between businesses generate greater economic impact than do firms operating independently outside of a cluster. Communities throughout regions

FIGURE 4: FACTORS ASSOCIATED WITH CONNECTIVITY



that house these cluster businesses experience greater economic impact. While industry cluster studies often examine how these factors in regions contribute to the growth of regional industry clusters and other regional economic outcomes, our research uniquely examines how these factors in *local* communities allow them to reap the economic benefits associated with *regional* industry clusters.

Using the above-noted indicators for the four factors, we examine the relationship between these categories and economic connectivity for urban, mixed urban-rural and rural counties, and we find a statistically significant association between them and at least one type of county (see Figure 5). This implies that the factors are associated with county participation in their regional economies and that these factors' influence varies among urban and rural counties. Below, we discuss in detail each of the four factors that support local communities' economic connectivity to their regions and how this relationship varies by urban and rural communities.



Connectivity and Equity

The success of economic development strategies depends not only on growth but also on how growth is distributed among communities and regions. Prior research establishes that connectivity leads to economic growth.³⁰ Before diving into factors that promote economic connectivity, we explore whether economic connectivity relates to increased equity as well as growth. We assess whether greater economic connectivity, measured as the percentage of jobs that are connected, in a region is associated with stronger distribution of benefits to economically disadvantaged parts of regions and people of color within regions.

Geographic equity is indicated by employment rates between counties in a region that become more similar over time (2010-2019). Racial equity is indicated by employment rates between people of color and white populations that become more similar over time (2010-2019).

Our analysis illuminates promising trends regarding geographic and racial equity, notably that connectivity is associated with increases in equity. We perform two sets of t-test analyses: one for geographic equity, and

FIGURE 5: SUMMARY OF FINDINGS



one for racial equity. These analyses compare levels of connectivity between two types of regions: those where county outcomes became more equitable over time, and those where county outcomes became more disparate over time. We find that regions with improving equity also demonstrate greater levels of connectivity. For geographic equity, these findings indicate that the gap between high-performing and low-performing counties within regions decrease over time when that region is more economically connected (measured as the share of traded jobs in clusters that are strong in both the county and the region). For racial equity, this means that employment rates for people of color grew more quickly than for white people indicating that more-connected regions tend to see gaps between employment rates for white populations and for communities of color decrease over time.

Further analysis is needed to better understand the implications of economic connectivity as a

strategy for equity. The analysis was limited by lack of comprehensive economic outcome data for local units such as counties, by race, across time. A closer examination of regions or time periods where data is complete is needed to provide more nuance and to illuminate trends. Furthermore, deeper analysis is necessary to demonstrate associations between connectivity and outcomes for different racial groups or geographic areas that are particularly disadvantaged, for example Black communities and Indigenous communities, which have been particularly excluded from economic opportunity historically. Nonetheless, we find a significant relationship between regional levels of economic connectivity and racial and geographic equity. Overall, it suggests that greater economic connectivity is associated with improved regional economic outcomes and the equitable distribution of growth, with the greatest benefits to disadvantaged people and places.

REGIONS WITH INCREASES IN GEOGRAPHIC EQUITY HAVE GREATER ECONOMIC CONNECTIVITY

Average share of jobs in region that are connected (%)

43%

Regions where equity improved

39%

Regions where equity declined

REGIONS WITH INCREASES IN RACIAL EQUITY HAVE GREATER ECONOMIC CONNECTIVITY

Average share of jobs in region that are connected (%)

43%

Regions where equity improved

38%

Regions where equity declined

Factors Driving Connectivity

We now detail each of the four factors supporting local communities' economic connectivity to their regions, how this relationship varies by urban and rural communities, and how the factors interact with racial and geographic outcomes and subsequently influence connectivity's ability to impact equity.

Business Ecosystem

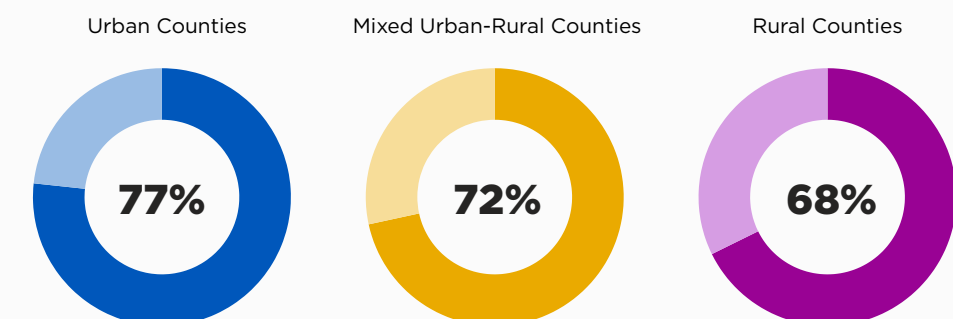
A strong business ecosystem is a critical ingredient in the success of regional economies, and our model shows that the business ecosystem overall relates positively to connectivity in regions. Particularly important to such ecosystems are a robust small business presence, innovation assets, a workforce with appropriate and aligned skills, and reasonable cost of living and doing business. We include each of these ecosystem elements in our

quantitative model, finding that a higher share of small businesses, innovation (particularly for rural places), workforces aligned with industry demand and lower costs of doing business (in some environments) all drive connectivity. We discuss each of these elements in detail below.

Small Business

We start with small businesses, which we measure as the share of county businesses with fewer than 20 employees. Businesses with fewer than 20 employees make up 89% of all U.S. employer firms. Small businesses are especially innovative, and contribute to local sourcing for cluster firms.³¹ Small business alignment and sourcing to regional clusters can serve as a strong pathway for local connectivity to regional economies. For example, local sourcing, in contrast to sourcing from more-distant suppliers, lowers inventory and importing costs, shortens delivery times, allows suppliers to provide better support services and enables buyers and suppliers to solve problems more quickly and innovate together.³² Local sourcing is more resilient to global supply chain disruptions, as demonstrated recently in 2020

SHARE OF BUSINESSES WITH FEWER THAN 20 EMPLOYEES, BY COUNTY TYPE



during the COVID-19 pandemic. Local sourcing can also drive local wealth generation, keeping assets and resources in a region. While not all small businesses serve as sourcing firms, communities with higher shares of small businesses offer greater opportunities for local sourcing, wealth creation and supply chain participation.

WealthWorks, an economic development approach dedicated to developing and better connecting rural communities to regional economies, identifies “regional ownership and control” as a core tenet of wealth building because it ensures that “stocks of capital stay in place” and can be managed by rural residents and businesses.³³ Keeping resources in place is particularly important for rural communities, which often experience a “brain drain” of human capital and loss of financial resources, especially through extractive economic development approaches of the past.³⁴ One study of three communities in Maine found that small and locally owned businesses in rural areas contribute three times as much to the local economy as chain stores do, making them invaluable to regional ownership and control.³⁵ Several studies in other communities have found similar results.³⁶ Indeed, our analysis demonstrates that a **higher share of small businesses is associated with economic connectivity, particularly for urban and mixed urban-rural counties.**

Innovation

Another element of a strong business ecosystem is the capacity for innovation, which raises the economic productivity of the community and region. **Traditionally, patenting activity has served as the proxy for innovation. However, this measure disregards elements of innovation that are critical to raising productivity, such as improved production processes or product and service upgrades.**³⁷ Referred to as “latent” innovations, these elements are particularly important for considering innovation in rural communities, where patenting may be low relative to urban areas but innovations related to process and product improvements are more prevalent. For example, innovation in a rural community may present as a niche startup that creates a tailored technical upgrade for a precision manufacturer to convert operations from producing auto supplies to medical equipment. This type of innovation comes from close relationships between businesses or suppliers and buyers in the same supply chain, notably from “the benefits of observing failures among businesses as clues for which new ideas may work and which may not,” as well as understanding new opportunities for growth.³⁸ While measures of patenting activity may not capture latent innovation, the latter is a critical part of an innovative, productive economy. Latent innovation relies on spatial proximity and inter-firm relationships and is at the core of successful clusters.

We hypothesize that economic connectivity is associated with strong innovation assets. We test this in our analysis by using a novel index measure of latent innovation by Goetz and Han (2020), which relies on input-output models and inter-industry collaborations. Since collaboration is integral to local innovation processes, we test whether a high presence of latent innovation in a county also drives economic connectivity with the rest of the county’s region. Our quantitative model indicates that **latent innovation is positively associated with connectivity of rural county-clusters but negatively associated with urban-based ones.**

This finding underscores Goetz and Han’s (2020) conclusion that while many types of innovative activity remain concentrated in urban areas, rural innovation is understood best by local participation in diverse industry interactions. These industry interactions frequently include innovative activities driven by urban centers outside of rural jurisdictions, thereby driving connectivity. This view of rural innovation and our finding that latent innovation is associated with regional connectivity for rural counties imply that latent innovation drives connectivity for rural places.

Workforce Alignment

An appropriately skilled and deep labor pool is foundational to successful economic development in general and industry clusters in particular. In fact, corporate surveys rank workforce as the top factor in business location and expansion decisions.³⁹ For instance, Amazon chose to locate its “HQ2” in northern Virginia, largely because of the region’s highly skilled

and educated workforce, despite much higher labor and housing costs than those in other regions that Amazon was considering.⁴⁰ Surveys of both small and large businesses consistently show that finding workers with appropriate job skills is among the largest hiring challenges, emphasizing the need to locate businesses in regions with an appropriately skilled workforce.⁴¹

However, an August 2020 survey found that roughly one-half of firms whose employees have been remote during the pandemic expect more than 20 percent of the workforce to remain at least partially remote after the pandemic ends.⁴² The industries that have shifted most toward remote work during the pandemic tend to be highly skilled.⁴³ These facts suggest that while the workforce will likely remain an important consideration for businesses, many workers may be able to perform their jobs from rural areas that require only occasional commutes to nearby urban centers.

Economic development official Stephen Moret, President and CEO of the Virginia Economic Development Partnership, notes that innovative and attractive businesses often choose to locate or expand in larger metropolitan areas rather than disconnected rural communities because larger regions offer a deep labor pool and many workers with the appropriate skills.

Moret suggests that an area with a smaller labor pool, such as those in many predominantly rural regions, can compete for such projects if the area can offer a labor pool that is workforce-ready, with specialized skills that are tailored to the needs of regional industries. Robust workforce development

programs that recruit and screen workers, as well as provide customized training, such as Georgia Quick Start or the Virginia Talent Accelerator Program, can serve the needs of growing companies in regional clusters. Often such programs are delivered in partnership with postsecondary education institutions, such as community colleges or technical colleges. Apprenticeship programs also can provide similar benefits to growing firms.⁴⁴

For our analysis, we hypothesize that places with a workforce that is aligned with industry demand will have stronger opportunities for economic connectivity to their regions. We obtained data from LinkUp, a job search engine that measures the open and close date of all traded sector jobs across every county, to determine the average annual time to fill positions. Time-to-fill is a common metric that human resources professionals use to understand how well the labor market is suited to in-demand industries. Our use of the data in this analysis is unique and provides a robust measure of an aligned workforce.

We find that time-to-fill has a strong relationship with connectivity, particularly in urban counties. Our quantitative models show a highly significant relationship between a shorter average duration of job postings and a higher concentration of jobs in strong regional clusters for urban counties. This result indicates that when the workforce is well aligned with industry demand, the community can better expand its business and job base to participate in industries driving the regional economy.

Cost of Business

Although factors such as workforce and infrastructure are often more important, lower-cost opportunities for business development and expansion, particularly in rural areas, influence these communities' ability to engage in regional economies. For example, Mayer and Provo (2007) investigate the potential of domestic outsourcing, or "farmshoring," from urban firms to more rural areas of Virginia. Like outsourcing,

farmshoring occurs when businesses engage with external producers and service providers, but farmshoring outsources these activities from urban to proximate rural locations.

The authors note that farmshoring is often "driven by needs like lower costs, data security, skilled and stable labor forces, and geographic constraints."⁴⁵ Rather than simply redistributing opportunity from rural to urban regions, farmshoring benefits both by reducing costs for urban firms and making them more economically competitive. For instance, Northrop Grumman, a major company based in the high-cost Washington, D.C. region, located over 400 information technology jobs in the rural town of Lebanon, Virginia. The residents benefit from a large number of high-paying jobs, and Northrop Grumman benefits because the wages, due to lower costs of living, are still below those for equivalent jobs in the D.C. area.⁴⁶

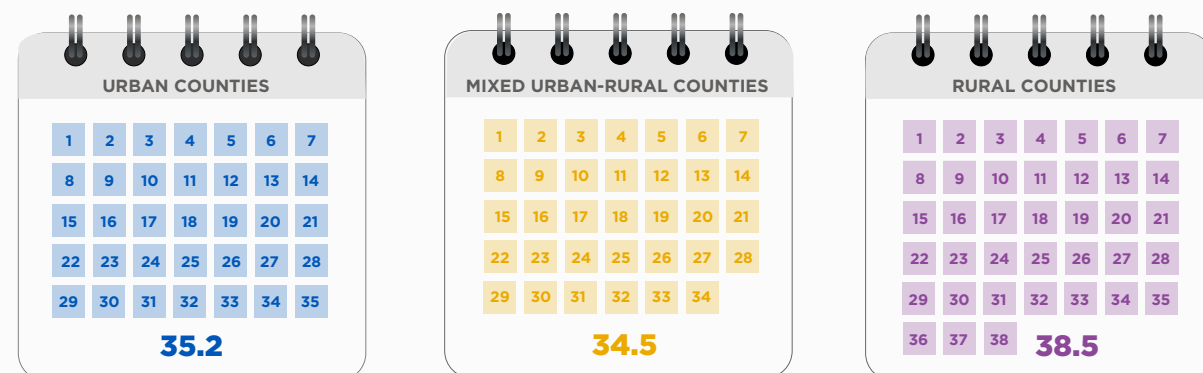
with strategies such as near-shoring and regionalizing supply chains.⁴⁷ This pivot provides opportunities for growth and recovery in smaller and rural communities--places that can offer cost savings, unique assets and workforce stability to industries in more-urban areas.

For this analysis, we include a measure of cost of business based on the Cost of Living Index (COLI) developed by the Council for Community and Economic Research (C2ER). Using over 60 goods and services collected at the local level from over 300 independent researchers, COLI is the only local-level cost of living index available for the U.S.⁴⁸ Businesses and economic development organizations frequently use COLI to assess cost of doing business and quality of life. To obtain a relative measure of the cost of living and doing business in the region, we examine the percent difference between a county's COLI value and the average COLI value in the county's region. The COLI value can be interpreted as the percent of the average cost of living. So, a value of 101 means that the county's cost of living is 1 percentage point higher than average. We see that rural and mixed urban-rural counties tend to have lower costs of living, compared to the costs in their regions. Urban counties have higher relative

Amidst out environment, significant global supply chain disruptions reveal the importance of connected regional economies, the value of rural communities to economic resilience and the role of cost of doing business.

A recent McKinsey study found that due to pandemic-related disruptions, 93 percent of supply chain leaders are prioritizing resiliency

AVERAGE JOB POSTING DURATION





costs of living in their regions. Our quantitative model demonstrates a negative relationship between COLI relative to a county's region and connectivity, especially for urban and mixed urban-rural counties, indicating that **in some environments lower cost is associated with stronger connectivity.**

Overall our model shows that the relationship between business ecosystem and connectivity is largely positive: a higher number of small businesses, innovation (particularly latent innovation for rural places), workforces aligned with industry demand and lower costs of doing business all drive connectivity. Our model suggests that a greater representation of small businesses and lower costs are particularly impactful for connectivity in urban and mixed urban-rural counties; and that workforce alignment is important for urban counties, whereas innovation is important for connectivity in rural counties.



Infrastructure

Key infrastructure elements such as access to highways, affordable broadband, safe water and hospitals are critical to ensuring that businesses and their employees have high quality of life and the ability to accelerate and leverage business opportunities. Moreover, robust physical infrastructure allows businesses to connect with one another throughout their region (and beyond). With regard to regional industry clusters, researchers find that infrastructure and other regional asset-based economic development “shift[] the focus from firm-level subsidies and tax breaks to more widely shared competitive problems.”⁴⁹ An individual business might not justify strategic investments, such as regional transit systems, high-speed internet or shared research labs, to support groups of businesses, but such investments will create longer-lasting economic impact and broader community benefit.^{50,51}

Our analysis measures the extent to which transportation, water, broadband and health infrastructure are associated with economic connectivity to regional clusters. Overall, we find that these infrastructure elements relate

positively to connectivity, with some variation in the results. Our model confirms the importance of access to highways for economic connectivity, especially for urban and rural counties. Water safety relates positively to connectivity, particularly for rural and mixed urban-rural counties. We find that broadband access relates positively to connectivity for rural counties, and the relationship between the presence of hospitals and connectivity is positive for all types of counties. We discuss the details of our findings for each category below.

Transportation

Access to markets through transportation infrastructure, especially in rural areas, is a core element of business growth, opportunity and connectivity.^{52, 53} For example, the Appalachian Regional Commission (ARC) found in 1995 that counties within the ARC region with at least three miles of Appalachian Highway Development System (AHDS) highway routes experienced faster economic growth than did control regions, including throughout the poorest parts of Appalachia.⁵⁴ Nonetheless, we acknowledge the mixed legacy of highway systems in the United States. While highways have been important for connecting places and

their economies, the emphasis on highway development over public transportation in the U.S. since the end of World War II has had disparate impacts on communities of color and people with low income. Lack of public transportation directly impacts these communities, which impedes peoples' access to job opportunities, child care, groceries, education opportunities, and more. These effects compound over time and over generations. **The construction of highways has also been a means of displacing and physically dividing communities of color and communities with low income from other parts of cities and regions.** Placing highways in the path of communities with less social and political capital has resulted in mass displacement and destruction of communities and their wealth.⁵⁵

In our analysis we take a broad perspective to highway access: community access to highways is important for economic connectivity, but such access can also be a general proxy for the importance of transportation options and literal, physical connectivity, which can take more forms than simply highway systems. Practitioners should also remember the importance of public transportation systems, both within and between

communities, for creating social and economic opportunities for residents with less privilege, such as communities of color and those with low income.

Our quantitative analysis confirms the importance of access to highways for economic connectivity. We find a positive and statistically significant relationship between our measure of highway access and county-cluster connectivity in our models for all types of counties. This result reinforces discussions with practitioners who note that **access to transportation makes a critical difference in communities ability to engage in regional industries.** Highways represent not only transportation for residents and commuting throughout regions but also critical infrastructure that connects regional markets.

Water

A reliable, safe water supply is necessary for production of food and goods, for quality of life and for the health of residents. The U.S. Water Alliance finds race to be the strongest predictor of whether a household has access to safe water and sanitation.⁵⁶ Access to water is also essential for basic business operations. For example, the U.S. Water Alliance's Value of Water Campaign finds that at a national scale, one day of disruption in water service would cause \$43.5 billion in lost sales for businesses.^{57,58,59} Water is a part of the supply chain for just about every type of industry, and both sufficient quantity and quality are concerns.⁶⁰ The U.S. Department

of Agriculture's Task Force on Agriculture and Rural Prosperity confirms the importance of safe drinking water and sanitation systems for both quality of life and rural industries such as farming and manufacturing.⁶¹

The nonprofit organization United for Infrastructure emphasizes the importance of water infrastructure to the manufacturing sector, which accounts for 11.6 percent of the nation's GDP.⁶² For example, in Washington County, Nebraska, which is part of the Omaha-Council Bluffs-Fremont, Nebraska-Iowa region, a bio-based manufacturing company wanted to locate close to corn crops. With support from the manufacturer, the community updated its water and wastewater infrastructure to encourage business development in the area. The improved systems not only allowed the original manufacturer to open its doors in the county, but it also attracted additional bio-based manufacturing companies and drew workers from throughout the region.⁶³ The water system is a local asset contributing to the development of a regional biomanufacturing cluster.

Establishing a reliable water supply is beneficial not only for attracting new and expanding existing businesses, but a reliable system allows communities to focus on other efforts to improve quality of life and the economy.

For example, in Royal City, in Grant County, Washington, the regional Economic Development District (EDD) secured funding

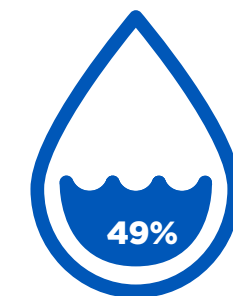
from the U.S. Economic Development Administration (EDA) to fund water system improvements at two industrial parks, allowing businesses to locate there and economic development practitioners to focus on other development and infrastructure ideas.⁶⁴

Although the impact of stormwater systems is difficult to measure quantitatively, we note the benefits of a properly designed and maintained stormwater system. Similar to safe drinking water and sanitary wastewater systems, an efficient stormwater system benefits communities and their ability to grow and evolve with their regions. A well-functioning stormwater system can increase communities and businesses' resiliency in the face of increasing heavy rain and disaster-level flooding. As 100-year floodplains expand and risks of wet weather events increase, investment in green stormwater infrastructure may benefit communities, their residents and the businesses operating there.⁶⁵

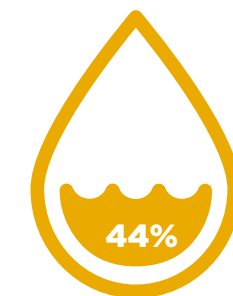
We hypothesize that access to safe water is associated with county-cluster connectivity to regional economies. This is a proxy for general investment in drinking water, wastewater and stormwater in counties. Our models include an indicator of whether the county has had a health-based drinking water violation in its local water system in 2016. The models show that water safety is positively associated with connectivity, especially for rural and mixed urban-rural counties.

SHARE OF COUNTIES WITH AT LEAST ONE HEALTH-BASED DRINKING WATER SYSTEM VIOLATION (2016), BY COUNTY TYPE

Urban Counties



Mixed Urban-Rural Counties



Rural Counties



Broadband Access

The gap in broadband access between urban and rural areas is one of the most cited indicators of the urban-rural divide in America.⁶⁶ Lack of broadband access is particularly prevalent for people of color, businesses owned by people of color, and lower-income communities. Lack of access is also more prevalent overall in urban areas but affects a greater percentage of the population in rural areas, illustrating the need for expanded access in both.⁶⁷ Given that quality internet access is essential for conducting modern business operations, collaborating with industry partners and enabling communications and marketing, we expect a positive relationship between broadband access and county connectivity.

Particularly for rural communities, transitioning from traditional agriculture- and resource-based economies relies heavily on broadband. A report from the U.S. Department of Agriculture's Task Force on Agriculture and Rural Prosperity states, "Non-agricultural rural industries that have shown high levels of innovation include the telecommunications and commercial electronics industries (Wojan & Parker, 2017). With these markets leading the way in rural innovation, the need for high-speed internet access in rural America is heightened."⁶⁸ Internet connectivity and device access are even more important as jobs and education shift to remote work in the COVID-19 era. Indeed, Partridge and colleagues (2008) find that for the most remote rural communities, the key factor contributing to regional connectivity is infrastructure, namely high-speed internet, which allows for remote

work.⁶⁹ The Center on Rural Innovation confirms limited broadband availability as a key obstacle to the success of small businesses, workers and students in rural areas, which means that technology and innovation can actually become negative forces in those communities:

While technology and innovation are driving economic growth in cities, these forces have actually contributed to economic decline in rural areas. Workers without technology skills have been left behind, as industries like farming, low-cost manufacturing, and mining, are increasingly automated, eliminating thousands of middle class jobs. Combined with the rapid decline of rural entrepreneurship, this means rural places are now facing a dramatic opportunity gap.⁷⁰

Our quantitative analysis measures broadband access as the percentage of county households with broadband. Our model demonstrates a positive relationship between broadband access and connectivity in rural counties but a greater, negative relationship in urban counties. This result is difficult to interpret and likely stems from the challenges of measuring broadband access (see **discussions of data and limitations in Appendix**). However, stakeholder interviews reinforce the importance of broadband for regional economic connection and shed light on how broadband impacts counties' ability to

engage in their regional economies. We discuss these findings further in our section below on the policy implications of our findings.

Health

Like other aspects of infrastructure, health infrastructure is vital not only for quality of life but also for equity, economic growth and access to regional industry drivers. In addition to providing health services, hospitals serve as core anchor institutions necessary to sustain equitable economic growth. PolicyLink describes the importance of anchor institutions for both innovation and equity:

Through their spending and investment, employment and contracting, and their ability to generate ideas, information, and talent, anchor institutions can spark innovative enterprises grounded in place. In a growing number of places, local and regional organizations are engaging anchor institutions as important partners to advance equitable growth by creating opportunities for low-income residents and communities of color to be the workers, innovators, and leaders who will propel the economy.⁷¹

cyclical relationship with employment and population, whereby these institutions attract and grow populations and businesses over time and, in turn, are sustained by population and employment growth.⁷² **Unfortunately, many**

rural communities are already disadvantaged in terms of health infrastructure, with growing threats of hospital closures as people and businesses leave. An April 2020 report released by Guidehouse, using pre-COVID data, found that 25 percent of the nation's rural hospitals are at "a high risk of closing unless their financial situations improve."⁷³ In six states, all southern and primarily rural, at least 50 percent of rural hospitals were found to be at high risk of closure. In Tennessee, this number was 68 percent. Largely because of the financial and economic consequences of the COVID-19 pandemic, a record 20 rural hospitals closed in 2020.⁷⁴

Moreover, health access is a challenge not only for rural communities but also for people of color in both urban and rural places. Even in locations with the best access overall, disparities persist for people of color. The Robert Wood Johnson Foundation's Culture of Health Blog notes, "...Not everyone in every part of the county has access to opportunities for safe housing, adequate physical activity or a good education...highlighting the meaningful health gaps that persist by race."⁷⁵

Given the importance of health infrastructure to community stability, economic growth and equity, we hypothesize a strong relationship between health infrastructure and connectivity. We include a measure of hospitals relative to population in our quantitative model. The model demonstrates a significant positive relationship between hospitals and connectivity across all types of counties. Specifically, a higher



ratio of hospitals to population indicates that accessible healthcare infrastructure supports connectivity between local and regional clusters. These findings confirm literature indicating the importance of hospitals for economic growth and development.

For instance, a 2008 Brookings Institution report notes that because hospitals and other medical institutions generally pay above-average wages, a larger medical sector puts upward pressure on wages for all local workers.⁷⁶ Additionally, because many individuals travel from outside the community to receive medical treatment, hospitals bring new income and spending to their communities, stimulating local growth.⁷⁷ A report from the American Hospital Association found that “each hospital job supports about two additional jobs, and every dollar spent by a hospital supports roughly \$2.30 of additional business activity.”⁷⁸

Overall, our model shows that essential infrastructure relates positively to connectivity, with particularly strong findings for transportation, water and health. Although our model revealed inconsistent results for broadband access, this element is essential for ensuring economic growth opportunities for all county types, particularly rural ones.



Planning and Funding Support

When governments or regional economic development organizations (EDOs) invest in a public good relevant to a cluster, such as specialized infrastructure or educational programs, they can enhance business productivity and improve the area’s ability to support a cluster.⁷⁹ Such organizations can also work together to strategically align policy and investments to support clusters. For example, the regional organization Sacramento Area Council of Governments (SACOG) worked to better take advantage of the regional food system, first by doing a feasibility analysis of implementing a regional food hub. This analysis included a business model which showed that a food hub was actually financially viable and determined that a for-profit model would be most likely to succeed.⁸⁰

The role of regional organizations in planning and pre-development processes is important to identifying critical infrastructure gaps and needs, like those identified earlier in this report. Whether with water, broadband, transportation or other infrastructure related projects, without proper planning, equity issues persist and projects do not lead to regional prosperity in ways that better planned, coordinated and developed projects do. The planning process is often an overlooked and undervalued part of the economic development process, especially when

considering regional implications. When rural and urban communities come together to conduct strategic, focused planning processes, better and more equitable outcomes are achieved.

Our analysis confirms that government entities and regional organizations play a strong role in nurturing industry clusters and ensuring that assets throughout a region are leveraged to support economic growth.

Our model shows a positive relationship between cluster connectivity and county participation in an Economic Development District (EDD), a federally designated regional planning organization, for urban and mixed urban-rural counties. Although data limitations did not allow us to include variables for state funding and programmatic support, our interviews with stakeholders confirm the importance of state-level support for economic connectivity to regional economic drivers, particularly for rural communities.

Economic Development Districts

A major source of regional planning support for U.S. communities is participation in an EDD. Participation in an EDD indicates that a region has a comprehensive economic development strategy (CEDS) (**see sidebar**) and meets regional distress criteria.⁸¹ The U.S. EDA requires areas seeking EDA’s public works or economic adjustment assistance grants to have an EDA-approved CEDS. EDDs are also the primary administrators of EDA revolving loan funds, which fill a critical business ecosystem need by providing loans to businesses that struggle to obtain traditional bank capital, enabling those businesses to grow, generate new jobs, and retain employees.⁸² EDDs are not restricted by county lines. One EDD often serves an area extending across multiple counties. EDDs provide support in many different ways, for example, by providing training on e-commerce and digital literacy to small businesses and entrepreneurs; helping an owner of a general store apply for a loan to refurbish in the face of renewed interest in tourism to the area; enlist a lending institution to provide emergency micro-loans to help a community rebuild after a wildfire; establish business innovation centers that serve as incubators for startups; recognize new potential for old infrastructure; and much more.^{83,84,85,86,87}

Regional economic development planning is especially crucial for rural communities. A tailored approach that focuses on connecting locally owned businesses with regional markets is taking hold in many rural areas with great

success. At the heart of these approaches are organizations called intermediaries, or rural development hubs. The Aspen Institute Community Strategies Group defines rural and regional intermediary organizations as “place-based organizations that work to improve prosperity and well-being by harnessing local and outside resources to design and deliver services and products to people, firms and organizations in their region.” Focused on wealth creation, intermediaries help communities build wealth from the resources and natural assets they already possess. These intermediaries connect with EDDs to advance economic development planning and ensure that rural regions are included in planning processes.

For this study, we designate all counties served by an EDD as having an EDD. Our analysis demonstrates a positive relationship between cluster connectivity and county participation in an EDD for urban and mixed urban-rural counties. This result supports our hypothesis that participation in an EDD will promote connectivity. As EDDs extend their reach across their regions, extensive outreach is essential to ensure that all areas of the region are connected and engaged in the CEDS process. This promotes better collaboration and ensures that the economic development planning process is as equitable as possible. When parts of the region are excluded from this process, it leads to long-term inequities and further divides communities. EDDs help align and secure resources specific to filling the gaps in the communities they are serving. This alignment encourages cross-border collaboration, and helps promote economic connectivity between urban and rural areas.

SHARE OF COUNTIES SERVED BY AN ECONOMIC DEVELOPMENT DISTRICT, BY COUNTY TYPE



Comprehensive Economic Development Strategies (CEDS)

The U.S. EDA requires areas seeking EDA’s public works or economic adjustment assistance grants to have an EDA-approved CEDS. The CEDS is a locally led, regional economic development planning process that fosters economic growth for regions across the country and engages community leaders, private sector partners and Economic Development Districts to create a strategic blueprint for regional collaboration.

Economic development strategy that guides regional partners in a more diverse, equitable and comprehensive fashion. An effective CEDS also allows a region to maximize economic development opportunities and engage federal and state partners for infrastructure and technical assistance grants that align with the planning process achieved through the CEDS.

The CEDS provides capacity-building opportunities that allow economic growth through a strategic vision that partners throughout a region, and aligns economic, workforce and community development in a collaborative regional approach. An effective CEDS exemplifies planning that provides a roadmap for regions to grow together, urban and rural communities together, in a spirit of collaboration.

State Funding and Programmatic Support

Although data limitations prevent us from including in our model variables for state funding and programmatic support, our interviews confirm that state-level support is critical to ensuring growth and connectivity to regional economies, particularly for rural and distressed communities. For example, some practitioners mentioned state funding for broadband infrastructure (in Idaho and Pennsylvania), state investment in workforce development (in Pennsylvania) and community college programs (in Virginia), and a state-funded program to purchase surplus food from farmers and distribute it to local charitable organizations (in Pennsylvania). These are a few ways in which states are supporting connectivity and economic development. Additionally, a report from the University of North Carolina School of Government exemplifies the importance of state support, describing how leaders in eastern North Carolina recognized the marine trades cluster's competitive potential in the region. Leaders partnered throughout the region and state to secure resources to grow the cluster.

The report describes how this partnership works:

Industry-targeted technical assistance is provided by a regional Small Business and Technology Development Center (SBTDC), a state-sponsored business and technology extension service. The SBTDC hosts the N.C. Boating Industry Service, an initiative that serves the needs of marine trades small businesses by providing technical assistance and by matching businesses with potential suppliers and customers. Additionally, the regional economic development commissions, North Carolina's Eastern Region and North Carolina's Southeast, actively market and recruit businesses that enhance and complement [sic] this industry cluster.⁸⁸

These activities demonstrate the importance of public-sector funding and planning support both to bolster the cluster and help connect it throughout the region.

Housing and Quality of Life

To assess the relationship between housing and quality of life and connectivity, we examine the following variables: home ownership, rent burden, absence of air pollution, and amenities, including libraries and farmers' markets. We find that home ownership rate, clean air and the presence of libraries and farmer's markets are all positively associated with connectivity for most county types, whereas a high rent burden is negatively associated with connectivity in rural counties. We discuss our findings in more detail below.

Home Ownership and Rent Burden

Housing, especially quality affordable housing, is critical to economic growth and connectivity. Affordable housing gives individuals more discretionary income for other necessities or to save for long-term goals, thereby stimulating the local economy.⁸⁹ Housing affordability is associated with better educational and health outcomes for low-income children, which provide positive long-term economic impacts.⁹⁰ Economist Ed Glaeser found that high housing prices resulting from low supply "lead to declines in employment and income" in part because businesses flee high costs.⁹¹ When housing supply is low in a region, communities are not prepared for population growth or even to sustain current populations, which hinders the region's overall economic potential. Rural areas face significant challenges related to supply of quality of housing, particularly in

terms of repair and rehabilitation needs.⁹² For these reasons, **we expect to see that access to quality, affordable housing is an important quality-of-life baseline for a healthy economy.** Accordingly, our model includes two indicators of housing stability. The first is the county home ownership rate, which has a positive relationship with connectivity in urban counties and mixed urban-rural counties. The second measure we assess is rent-burdened county population, defined as the population paying more than 35 percent of income for rent. We expect a negative relationship, with rent burden being a detriment to connectivity, and we find that this is true for rural counties, supporting the hypothesis that access to housing is an important prerequisite to economic connection, in rural counties.

Libraries, Farmers' Markets and Environmental Quality

We also include the local environment and amenities in our quantitative analysis and find that libraries, farmers' markets and clean air are all associated with greater connectivity in our models. Prior literature has documented the roles of farmers' markets and local libraries in promoting local economic development, with particularly strong benefits for local entrepreneurs.^{93,94} Studies have shown that farmers' markets and local farms generate far more jobs than large agribusinesses, and farmers' markets by definition promote urban-rural connectivity by putting urban and suburban residents in direct contact with rural farmers.^{95,96} **A communities surrounding their own, thereby enhancing quality of life and**



overall well-being. In addition to amenities, the quality of the environment is essential to a healthy environment that is attractive to a workforce. Carnegie Mellon University research finds that air pollution causes significant damage to the agriculture, utilities, manufacturing, and transportation industries.⁹⁷ Air pollution is not only directly detrimental to the activities in these sectors, but it has harmful health impacts that surely impact employee health, satisfaction, and productivity.

Overall, we find that housing and quality of life relates positively to connectivity, strengthening the relationship between urban and rural places. In particular, clean air has a strong relationship with connectivity for every type of county. This finding, along with emerging research linking clean air to productivity, suggests that clean air is a prerequisite both for local health and for fostering a healthy business environment.⁹⁸

Housing and quality of life are pre-conditions to a strong, connected regional economy. Home ownership has a strong positive relationship with connectivity for urban and for mixed urban-rural counties. Our model also indicates that unaffordable rent is a detriment to connectivity, particularly in rural counties. Libraries and farmer’s markets are especially beneficial to urban counties, indicating that availability of housing and of local amenities is essential to creating a connected region. These amenities incentivize growth for key drivers of innovation such as entrepreneurs as well as universities, which tend to have strong place-based identities.⁹⁹

Summary of Findings




Figure 6 below shows the factors that we found to be significantly associated with economic connectivity across different types of counties (see **Appendix for more detail**). Health infrastructure, transportation infrastructure and clean air emerge as factors associated with economic connectivity for all county types. Our analysis also controls for industry cluster type, meaning that regardless of whether the cluster focuses on harvesting grapes or making computer chips, these factors relate to economic connectivity and are foundational to vibrant, well-integrated economic regions that include urban and rural communities.

For urban communities, in addition to infrastructure and quality-of-life amenities, a strong small business presence, aligned workforce, reasonable cost of doing business and participation in regional planning all contribute to participation in broader regional economic specializations. For mixed urban-rural communities, the factors driving connectivity largely mirror those for urban communities, but drinking water safety also emerges as a critical factor. For rural communities, latent innovation is strongly related to economic connectivity. In other words, rural innovation contributes to economic connectivity, but how innovation is conceptualized matters. While patenting captures new knowledge creation and often drives innovation in urban places, latent innovation captures innovation related to the more micro adaptations within an economy that allow it to grow and change to meet new demands or technologies. Furthermore, the

finding that broadband is positively associated with connectivity for rural counties indicates that digital connectivity is important for these activities.

In the next section, we discuss the policy implications of our findings for each of the factors we examined, including recommendations for how practitioners can encourage economic connectivity in their regions.

FIGURE 6: FACTORS ASSOCIATED WITH CONNECTIVITY IN DIFFERENT TYPES OF COUNTIES

	Business Ecosystem	Planning Support and Funding	Infrastructure	Housing and Quality of Life
Urban 	Small businesses	Economic	Hospitals	Housing stability
	Workforce alignment	Development	Highways	Libraries
	Lower cost of doing business	District		Farmers’ markets Clean air
Mixed Urban-Rural 	Small businesses	Economic	Drinking water safety	Housing stability
	Lower cost of doing business	Development	Hospitals	Clean air
Rural 		District	Highways	
			Drinking water safety	Housing stability
	Latent innovation		Broadband	Libraries
			Hospitals	Clean air
			Highways	



Recommendations for Policy and Practice

IN THIS SECTION, we use our findings outlined above to recommend four primary strategies to help practitioners develop economic connectivity among urban, mixed urban-rural and rural counties.

- ◆ Develop an inclusive innovation ecosystem
- ◆ Ensure access to broadband and digital inclusion
- ◆ Align workforce skills with industry needs
- ◆ Enable stronger regional organizations and business participation.

As we detail, these strategies are not wholly new to the economic development field. However, implementing these strategies within a framework of economic connectivity toward the goal of equitable growth results in unique applications of well-known tools.

We begin by contrasting our recommendations with the field's typical practice and by describing how our four main factors relate to connectivity in specific county types. We then discuss each of our four recommendations in detail. Interviews with over a dozen economic development practitioners and leaders have informed these strategies.

DEVELOP AN INCLUSIVE INNOVATION ECOSYSTEM

Entrepreneurship and innovation offer a pathway to equity for people who have been systematically and economically disadvantaged in the U.S., by empowering communities to become the owners and drivers of the economy. It enables communities to build wealth and become less dependent on wages. In the 2019 report “Building Entrepreneurship Ecosystems in Communities of Color,” the Federal Reserve Bank of Kansas City (KC Fed) recommends investing in talent and tech development, entrepreneurship, and capital. Authors Dell Gines and Rodney Sampson note that inclusive entrepreneurship ecosystem building “works to ensure that individuals of different races, ethnicities, genders and geographies have equal ability to build a thriving high-growth company.”¹⁰⁰

In our interview, Gines further highlighted the importance of business ownership as a pathway to economic empowerment and wealth creation. Gines and Sampson also

emphasize the importance of building inclusive tech ecosystems: “By prioritizing inclusive tech ecosystems, Black households will be able to leverage the power of innovation and the increased global reliance on technology to create wealth and contribute to enhanced productivity and quality of life in the nation’s local economies.”¹⁰¹ Empowering more individuals to participate in entrepreneurship drives economic growth and connectivity and is imperative to achieving equity. A strong innovation ecosystem not only nurtures entrepreneurship and innovation but includes participation by people of color as a key driver.¹⁰²

Economic developers can implement strategies to grow a more diverse pipeline of entrepreneurs and help their startups and small businesses engage with prominent and emerging cluster firms in the region. For example, the city of Houston and Port of Houston connects small businesses owned by people of color with procurement opportunities

in the Construction Products and Services cluster, the Greater Houston Partnership engages small businesses to grow the Oil and Gas cluster, and the Houston Minority Supplier Diversity Council supports networking events for businesses within the Business Services cluster.^{103, 104} In Vermont, the Center for an Agricultural Economy (CAE) supports local farmers in Harwick, Vermont as they work to develop a regional food specialization. CAE bolsters participation by those historically excluded from the local food cluster by providing capital to residents of color through a revolving loan fund and a micro grant program.

Ecosystem development is particularly crucial for rural communities that experience significant hurdles such as lack of capital and access to broadband. The Center on Rural Innovation (CORI) notes, “Startups are the biggest drivers of jobs and wealth creation in rural areas; however, rural entrepreneurship rates have been declining, and less than one percent of venture capital investments go to rural areas. As a result, wealth and talent have continued to accumulate in cities, perpetuating the misconception that tech startups can’t be successful in small towns and communities.”¹⁰⁵ The lack of venture capital in rural areas at least partly reflects the limited infrastructure and pool of skilled workers relative to metropolitan areas, which raises costs for prospective venture capital firms.¹⁰⁶

CORI is working to change this by investing in rural startups located in Opportunity Zones across the country. CORI’s goal is to find attractive technology-enabled operating businesses in rural locations, which are under-served by traditional venture capital institutions. For example, CORI supports the business Agile Space Industries, which develops rocket engines used in space vehicles and is based in Durango, Colorado.¹⁰⁷ Other microlending, equity crowdfunding and targeted financing initiatives seek to facilitate affordable, risk-tolerant microloans and startup capital to entrepreneurs disregarded by venture capital firms, traditional banks and even mission-driven nonprofit lenders. For instance, ecosystem builders can connect with organizations like CDFI Friendly America, Kiva, WeFunder and Collab Capital to provide equal access to capital for historically underrepresented entrepreneurs.

SHARE OF BUSINESSES OWNED BY PEOPLE OF COLOR (2017), BY COUNTY TYPE

Urban Counties



14%

Mixed Urban-Rural Counties



5%

Rural Counties



3%

ENSURE ACCESS TO BROADBAND AND DIGITAL INCLUSION

Strategies to build a more racially and geographically diverse innovation ecosystem also depend on access to the internet. Broadband is critical to promoting economic connectivity because it allows residents to connect to more employment opportunities, educational resources and health care, and allows businesses to reach new markets and apply new technologies. Researchers Goetz and Han (2020) note, “Importantly, urban inventive advantage persists even after controlling for variations in the levels of key drivers of innovation. Larger marginal and spillover effect estimates for rural counties suggest that policies promoting technological diversity and communication infrastructure in rural counties can be more effective in mitigating the rural-urban divide.”¹⁰⁸

Our stakeholder interviews reinforce the importance of broadband for regional economic connection and shed light on how broadband impacts counties’ ability to engage in their regional economies. Nearly every regional development organization, nonprofit and government official we spoke with emphasized the need for strong broadband connection throughout their regions. In order for rural communities to use their natural assets to grow wealth locally and strengthen the region, smaller local producers must be able to connect digitally. For example, Roberto Gallardo of Purdue University has extensively researched

broadband and spoke of the need for digital infrastructure to allow smaller firms in Indiana to tap into artificial intelligence (AI) development in the region’s manufacturing cluster. Although Indiana is highly ranked in manufacturing, smaller manufacturers in the state are not adopting AI as a tool to improve efficiency. Currently, there is great potential for AI startups in the region to fill strategic needs in the regional ecosystem. There are also opportunities for startups specializing in product maintenance and design. A core issue is that although manufacturing facilities may have broadband, their employees working remotely do not. Businesses need fast and reliable household broadband to send and receive information, and attract skilled workers and high-level executives who will be working from home. Gallardo also notes the benefit of a regional approach to broadband adoption.

Broadband is also imperative for connectivity that increases equity. Black households and lower-income households have low broadband adoption rates. In Census tracts with at least 50 percent Black residents, the household broadband adoption rate is only 67.4 percent (in contrast to 85.1% of households nationally).¹⁰⁹ Lower-income communities have far lower rates of broadband access than wealthier communities, indicating that affordability and access may be major barriers. Survey data from Pew Research Center (2019) confirms the need

to address affordability. The data also suggests that lack of high-speed connection reflects evolving digital habits, as younger Americans use mobile technology more than at-home broadband.¹¹⁰

For these reasons, policymakers should focus on reducing the consumer cost of adoption and on helping individuals acquire the digital literacy necessary to reap the benefits of broadband access. For example, in February 2021, the Federal Communications Commission (FCC)

introduced an emergency broadband credit, which helps low-income households cover the initial cost to set up broadband service and monthly costs thereafter.¹¹¹ The COVID-19 pandemic and recent demand for remote work and schooling, telehealth services and online sales for businesses underscore the need for quality broadband infrastructure. Therefore, increasing broadband for regional economic connectivity is also a pathway to a more equitable economy.

ALIGN WORKFORCE SKILLS WITH INDUSTRY NEEDS

Communities with strong workforce development programs aligned to industry needs can better tap into and support regional cluster growth and bolster connectivity. This is of particular importance to rural communities that often have less-specialized and more-limited labor pools compared with their urban neighbors. Aligning workforce skills with industry needs requires broad collaboration between communities, businesses, universities, community colleges and technical colleges and can lead to apprenticeship programs or tailored technical skills programs based on local and regional needs. Although community colleges are often critical to providing strategic workforce development programs, one obstacle is the cost of programs focused on technical skills compared with general education. Economic development practitioners and

policymakers can work with community college presidents to find solutions, including working with cluster business to help support these programs, or finding ways for general education programs to subsidize technical-skill programs to promote both vocational programs and general education.

Workforce development programs that promote general education as well as vocational skills are important components of ensuring local workers have the skills in demand in the regional economy.

For example, in the burgeoning drone industry in rural Allegheny Highlands, Virginia, brain drain and lack of talent was threatening growth. To support the

development of the industry, several colleges and universities created an intra-regional talent pipeline via specialized offerings and research. For example, the Dabney S. Lancaster Community College (DSLCC) provides high school students drone-centered learning and training opportunities through dual enrollment. The program is seeing early success, with over 20 students participating and plans to expand to two additional high schools in 2020. Liberty University has also instituted an unmanned systems program. Additionally, the Virginia Tech Mid-Atlantic Aviation Partnership (MAAP), an FAA-designated test site for unmanned aircraft systems, is active in the area working with the private sector to provide research-driven solutions to critical challenges in the industry. These higher education partnerships open pathways for students throughout the region to become aware of the growing new industry, to help them obtain the foundational knowledge and skills needed to perform drone-related jobs, and to help them engage directly with drone businesses.

In Austin, as the economic base began shifting from manufacturing to services and technology-driven industries, the city's workforce initiative developed Project QUEST to help low-income individuals enroll in full-time occupational training programs at local community colleges, complete the training, pass certification exams and begin well-paying careers in high-growth sectors of the local economy.¹¹² Similarly, KC Rising was launched in the greater Kansas City region to offer workforce initiatives to drive the regional economy, focusing on creating and improving access to opportunities by aligning the region's education pipeline with workforce needs in specific industries.¹¹³ In New Orleans (for more **see the Greater New Orleans case study**), workforce development programs sought to promote equitable opportunity and to connect the different parts of the region to new industries by ensuring that these programs were available in rural locations and other areas with limited transportation access.

ENABLE STRONGER REGIONAL ORGANIZATIONS AND BUSINESSES PARTICIPATION

Nearly all of our discussions with experienced leaders revealed that competition between urban and rural localities is an impediment to collaboration for economic development.

Regional strategies for connectivity require

localities to overcome competition, to bridge cultural and political divisions, and to coordinate efforts to strengthen their shared regional infrastructure and economy. Ted Abernathy, the Managing Partner of Economic

Leadership LLC, with more than three decades of experience in economic development and workforce strategies, noted this challenge in Virginia, where cities are designated separately from counties and cities and counties compete. This issue is often exacerbated by political and cultural differences between city leaders and rural county leaders. While mapping supply chains in North Carolina, Abernathy found that urban and rural areas are interwoven even though officials and people do not necessarily see themselves that way. Smaller communities are often economically co-dependent because they are linked to core regional assets such as a port, a set of supply chains or a strong community college program. Similarly, Dell Gines of the KC Fed described how areas around Kansas City participate in the same regional clusters, but in practice the Kansas and Missouri sides of the region fiercely compete, using business incentives "in an economic border war that has cost hundreds of millions of dollars and created barely any new jobs."¹¹⁴

These examples demonstrate that communities within regions are often economically interwoven, but not necessarily strategically aligned for growth. RDOs or business associations can tap into these ties and create deliberate strategies that help these communities recognize and capitalize on their shared interests. Abernathy emphasizes the need for third-party facilitators to build collaborative capacity. Brett Schwartz from National Association of Development

Organizations (NADO), the membership organization for RDOs, also noted the importance of RDOs, particularly for smaller rural communities that benefit from the expertise and assets of a development organization. RDOs can also help communities shift from a reliance on attracting businesses from elsewhere to strategies that tap into local resources. RDOs can identify, develop and enhance assets in regions. For example, in Southwest Virginia, the New River Valley Regional Commission (NRVRC) brings together 13 local governments and three higher education institutions to encourage regional collaboration on economic and community development initiatives, connecting the rural areas to the larger surrounding urban areas such as Roanoke. NRVRC identified assets in the region and helped to create a new consortium in solar energy, recently receiving recognition from the national SolSmart program for advancing solar energy options in the region. NRVRC is one of only seven regional organizations nationally to be designated by SolSmart.¹¹⁵

The strategies for promoting connectivity, including developing an inclusive innovation ecosystem, ensuring access to broadband, aligning workforce skills and industry needs, and engaging regional organizations, focus on investments in places and the people who live there. Initial evidence and case study examples suggest that these strategies not only contribute to economic connectivity but also improve equity and inclusion within regions.



Case Studies

Aerospace and the Coeur d'Alene, ID - Spokane, WA Region

Few small cities have benefited as much from intentional connectivity with nearby urban centers and each other as the group of cities in rural Kootenai County in the Idaho Panhandle: county seat Coeur d'Alene (about 50,000 residents), Post Falls (about 33,000 residents), Hayden (about 14,000 residents) and Rathdrum (about 8,000 residents). A trifecta of regional partnerships, targeted industry attraction and desirable amenities have accelerated economic growth in these cities and have integrated them into the fabric of a strong regional economy. These cities worked with each other and the county to build a partnership in order to collaborate closely and make sure they were all on the same page, which allowed them to then successfully reach across the state border to Washington to develop a partnership with the larger region, including the city of Spokane (with over 200,000 residents).

Coeur d'Alene is located approximately 30 miles from Spokane, Washington, and is the focal point of a metropolitan area with roughly 600,000 residents. Economic development expert and current president of the Coeur d'Alene Area Economic Development Corporation (CdAEDC) Gynii Gilliam arrived in the Idaho area in 2015. In an interview, Gilliam described to us an effective strategy for growing the economies of smaller communities. To develop an economic development strategy in a small community, Gilliam looks at the

strength of the surrounding region, particularly in the next-largest cities in the region, to identify economic similarities with the small community. She looks for opportunities to collaborate with other parts of the region on economic activities. When Gilliam examined the data on industry clusters in the Coeur d'Alene metropolitan statistical area (which is the same as the county boundaries in this case) and the surrounding region, the growing aerospace industry in the greater northern Idaho and eastern Washington areas stood out as a prime opportunity for connecting the regional economies.

Aerospace manufacturing, which offers industry wages substantially higher than state and local averages, has been growing in eastern Washington thanks to the available land and relatively low cost of facilities. While regional connection was blooming between Spokane, Washington and the greater Seattle area in this industry, nearby towns in Idaho were not seeing the benefits. A 2013-2014 report found that the aerospace industry employed only 2,000 workers in all of Idaho, compared to over 8,000 in just the Spokane region of Washington. Gilliam recognized that a major opportunity for the Coeur d'Alene area was to develop its aerospace industry in tandem with the growth in the Spokane area.

In 2015, Gilliam saw the opportunity to bring together the aerospace industries in Idaho and

eastern Washington from interests from the leadership of Idaho Labor in North Idaho, the Idaho Aerospace Industry and Inland NW Aerospace Consortium. Until that point, the two areas had separate aerospace associations and little interaction. A partnership of service providers convinced the groups to work together. The partnership saw that businesses would be more attracted to the general region, with more businesses and resources available, regardless of where state lines fell. Together, the aerospace industry associations of eastern Washington and Idaho launched the annual I-90 Aerospace Corridor Conference and Expo.

This conference brings together several hundred aerospace businesses annually, including companies as large as Boeing. The conference was driven by relationships among the heads of the two industry associations, Idaho Labor, other business service providers in the region, and the CdAEDC, enabling industry leaders to develop connections. Gilliam emphasizes the importance of these opportunities to develop relationships and she credits the success of the I-90 conference with local business service providers' willingness to work together to bring companies into the Coeur d'Alene region. "It took a village," she tells us.

The conference also created important opportunities for small businesses in the region to connect with the procurement officers of large businesses, creating huge growth opportunities for those small businesses. The success of the I-90 Conference is not limited to the aerospace industry. As times and demand change, the relationships that have developed continue to benefit businesses in Idaho. To participate in the growth of the aerospace manufacturing industry in the region, Coeur d'Alene and its neighboring small cities in Kootenai County have developed businesses with specialized precision technology and a strong, specialized workforce, which have proven to be important to economic resilience and adaptability.

Recently, aerospace manufacturing has slowed, while the pharmaceutical and healthcare industries have picked up in response to the global COVID-19 pandemic. With their technology and labor force, Kootenai County businesses have been able to pivot to fill supply-chain gaps and are now well-poised to attract healthcare and scientific research industries to the region. These two

industries leverage pre-existing strengths in nearby areas, such as the U.S. Department of Energy's Idaho National Laboratory and the local North Idaho College's Parker Technical Education Center, which offers degree programs in composite machinery and other specialized science/engineering fields.

Locating in Idaho brings significant business advantages, which CdAEDC has been responsible for communicating to prospective companies. These include lower operating costs for the business (including facilities, utilities, taxes and wages) and reasonable living costs for employees. For instance, although housing costs are rising, they are reasonable compared to urban coastal area prices. Thus with salaries only slightly lower than those offered in nearby urban hubs, workers can afford a home in the Coeur d'Alene area but not necessarily in Seattle. Coeur d'Alene and the surrounding environs have become a desirable place to live, attracting the workforce needed to fill jobs in those industries, thanks in part to Idaho state infrastructure initiatives. In recent years the state has focused on expanding broadband access. Idaho's Broadband Task Force, launched in 2019, has already connected nearly 50,000 residents to broadband, primarily in rural areas including the Coeur d'Alene area. CdAEDC is also working on making work more accessible to residents with lower incomes - for example, they are working with the county to expand bus service and with United Way of North Idaho to develop daycare programs.

Assets such as the federal laboratory, a local tech-focused community college and modern infrastructure investments, and, efforts to make access to work more equitable, make Kootenai County an attractive place to grow businesses in desirable industries such as research and precision manufacturing. Those same assets are attractive to a well-educated workforce, accelerating the Coeur d'Alene region's development. Strong relationships between the Idaho and Washington markets, along with the attractiveness of living in Idaho, have proven to be a pathway to success and growth for this small city and surrounding rural region.



Post-Hurricane Katrina Rebuilding and Greater New Orleans, Inc.

In the greater New Orleans area, a regional strategy that brought together rural and urban communities in southeast Louisiana has been vital to the region's path forward and to rebuilding the greater New Orleans economy in a more resilient way. In 2005, Hurricane Katrina exposed not only southeast Louisiana's susceptibility to climate change, but also its stark workforce challenges and high degree of racial, economic and geographic inequities. Officials in the region needed to reimagine their economic future to address these challenges directly. Economic connectivity among urban and rural communities was at the heart of their approach, and the regional economic development organization Greater New Orleans, Inc. (GNO, Inc.) was a key player in the development of that connectivity.

GNO, Inc. serves 10 parishes, the Louisiana equivalent of a county, in southeast Louisiana: Jefferson, Orleans, Plaquemines, St. Bernard, St. Charles, St. James, St. John the Baptist, St. Tammany, Tangipahoa and Washington parishes. This diverse group of communities spans rural, urban, suburban and coastal geographies, with each having a unique character and economic advantage.

GNO, Inc. has consistently ranked among the country's most successful economic development organizations, and its planning, convening and leveraging activities have been invaluable in strengthening the region's economy and promoting workforce alignment with target industries. In the wake of Hurricane Katrina, economic development in the region expanded from its traditional anchors of tourism, oil and gas, ship-building and aerospace manufacturing to include technology, healthcare, logistics, wind energy sectors and reshoring manufacturing. Not only does this diversity of industry sectors maximize the region's assets, but it also provides increased stability during economic downturns and supplies stable, wealth-creating jobs. The region's rural communities on the Northshore of Lake Pontchartrain, along the Mississippi River (the "River Parishes,") and the Gulf of Mexico provide cost-effective locations for businesses, quality of life for residents and recreational opportunities for visitors. GNO, Inc. markets these communities as key to the region's economic strength.

Yet there were significant challenges to implementing a strategy focused on integrating urban and rural communities and workers in the region, namely lack of transportation infrastructure and a need for tailored workforce development initiatives. Due to high

quality of life and lower cost of living, the rural communities were often of interest to diverse businesses, particularly manufacturers. But as innovative businesses demand greater technical skills they often choose instead to locate or expand in urban areas where they can draw from deep labor pools and maximize the likelihood of finding workers with the appropriate skills.¹¹⁶ Evidence suggests that an area with a smaller labor pool, like many rural communities in the region, can be attractive if that labor pool is more workforce-ready and has the specialized skills for the regional cluster. With limited transit and transportation options, GNO, Inc. recognized the need to provide curriculum development and training near where workers lived, often in more rural parishes.

Robin A. Barnes, formerly the executive vice president and COO of GNO, Inc., spoke about her experience in the region during the recovery period after Hurricane Katrina. Economic recovery efforts revealed the potential for regional clusters, but traditional workforce development centers were not set up to support regional economic development. GNO, Inc.'s solution was to partner with higher education institutions to help them re-envision their relationships with business and industry.

First, GNO, Inc. invited the presidents and chancellors of all of the higher education institutions in the region to become ex-officio members of the GNO, Inc. board of directors. At the organization's monthly board meetings, business and education leaders engaged together, learning about and tackling regional

challenges. Second, GNO, Inc. produced a series of reports, most recently the *2020 Greater New Orleans Jobs Report*, detailing job projections and career paths in various industries and occupations. These reports noted skills and educational requirements that inform curriculum and job training development at schools and other workforce development providers, including career and technology education programs. Lastly, GNO, Inc. created a signature workforce development program: GNOu. Serving as a workforce development intermediary, GNOu connects employers to education and training providers to produce industry-relevant programming and curricula. GNOu describes itself as a "triple win" for the region: companies receive the employees they need, higher education partners receive market-relevant curricula for their students and residents are better equipped for high-demand jobs in the region.¹¹⁷

One GNOu program emblematic of the region's strong urban and rural connection is the innovative Mechatronics Apprenticeship Program. This initiative connects three manufacturing companies (Elmer Chocolate, Laitram, and Zatarans) with a consortium of three community colleges (Delgado, Nunez and Northshore Technical Community Colleges) to train community college students, through paid apprenticeships, in mechatronics, an interdisciplinary branch of engineering that combines skills and knowledge in electrical and mechanical systems, electronics, robotics and control systems.¹¹⁸ The locations of the companies and schools span urban and rural communities in the region.

Bolstering workforce development strategies is particularly critical to closing the racial wealth gap. PolicyLink notes that white workers are more likely to be secure in their jobs over time as the economy's structure changes and increased automation reduces service workers and other positions disproportionately held by workers of color. People of color are underrepresented in "jobs that are well-compensated, stable, and resilient to automation" by 1.6 million workers, according to PolicyLink. The disparity between white workers and those of color in holding these kinds of jobs increases as educational attainment decreases.¹¹⁹ This broad national economic impact has local and regional consequences including the ability of people of color to generate and sustain wealth and gain equitable access to well-paying jobs in competitive clusters. In New Orleans, for example the 2016 median value of a home owned by a person of color was approximately half that of a home owned by a white person, the unemployment rate for households of color was approximately three times more than that of white households, and a family of color was approximately six times more likely than a white family to be living below the poverty line.¹²⁰

Recently, GNO, Inc. established the HBCU Startup Internship in partnership with Xavier, Dillard and Southern University of New Orleans. This program's goal is to increase startup activity of students from historically black colleges and universities (HBCUs) in the region by providing real-time experience to foster entrepreneurial ideation and development. In the New Orleans metropolitan area, only 24 percent of firms are Black-owned, as opposed

to 63 percent white-owned firms. Developing Black students' skills and entrepreneurialism in them is a long-term strategy to create wealth in the region's Black community.¹²¹

Workforce development programs targeted to diverse urban and rural communities and located where people live provide high-quality traditional education as well as practical technical skills and strategic training. These programs, such as those initiated by GNO, Inc., can simultaneously address economic growth, wealth creation and connectivity. Stakeholders can achieve this through apprenticeships; universities, community colleges and technical colleges that refine their programs based on local and regional needs; and other strategic workforce training programs. GNOu has successfully developed workforce programs on five different topics (cloud computing, mechatronics, cyber security, water management and public health) with 19 different companies and many educational institutions, consisting mostly of public schools, community colleges, and HBCUs.¹²² The GNO, Inc. workforce development programs exemplify a regional strategy implemented by an EDO to align workforce development with the needs of businesses that drive high-growth sectors in both urban and rural parts of the region.

Conclusion

DESPITE OTHER DIFFERENCES, the economic fates of urban and rural communities are inextricably linked. Communities across the urban - rural spectrum have assets that they can creatively develop to connect with one another and to strengthen their contributions to and benefits of their regional economies. Our research demonstrates how communities can collaborate to build a regional ecosystem that is connected, resilient and equitable. As our nation grapples with new and uncertain economic and public health realities, strengthening these connections will be critical to economic resilience and recovery in the years ahead.¹²³ Based on our analysis of the factors that have significant quantitative associations with connectivity, interviews with experienced regional development practitioners, and case studies of regions with strong connectivity, we conclude that communities of all types should develop inclusive innovation systems, ensure broadband access and digital inclusion, cultivate workforce development opportunities in alignment with a regional strategy, and pursue opportunities to foster regional collaboration through regional development organizations.

Informed by the expertise of economic development practitioners and experts, this research identifies factors that drive regional economic connectivity and explores the relationship between regional connectivity and improvements in both racial and geographic equity.

Our findings indicate that economic connectivity may reduce gaps in geographic and racial outcomes. However, further research is needed to explore regional factors that influence the gaps in economic outcomes between places and people in regions. For example, future research might explore regional connectivity while controlling for industry composition, economic growth trends, and existing programs and strategies to reduce inequities. It should also explore how connectivity affects outcomes for more specific racial groups and populations of regions.

Additionally, we see important parallels between economic connectivity and economic resilience. For example, tools that measure the resilience of communities assess factors that we find to be important for connectivity, such as the business environment, industrial diversification and emerging industries, and educational attainment as integral to regional economic resilience.¹²⁴ This is particularly pertinent as global supply chain disruptions during the pandemic have left industries struggling to resume operations. As cluster studies and our findings suggest, investments such as state and federal business development and capacity-building programs connect local small businesses to regional subcontracting and supplier opportunities, bolstering supply chains, regional value creation and overall economic resiliency. Further research examining the relationship between connectivity and resilience factors would illuminate strategies that not only promote growth and equity, but also resilience.

To better position communities for equitable economic recovery, we encourage leaders to prioritize policies that root assets locally while participating in regional networks. The

COVID-19 era has revealed structural gaps that community leaders, ecosystem developers and government or government-funded programs can fill to improve economic outcomes and quality of life overall. These actors should participate in regional collaboration, understand disparate economic outcomes for people and places within regions, and apply a connectivity lens to help promote equitable outcomes for communities of color and economically struggling communities. Urban and rural economies are already intertwined. Regional strategies recognize this and support the ways that urban and rural economies complement one another. By developing the assets that are shown to promote regional connectivity, communities can see benefits locally and initiate a ripple effect throughout their regions as well. Rural and urban areas are distinct, though not as divided as they may seem. As this research shows, they have shared opportunities for connecting and growing together.

Appendix: Data and Methodology

Delineating Urban and Rural Counties

Throughout this report we refer to urban counties, mixed urban-rural counties and rural counties, which correspond to the Census Bureau's categories of mostly urban, mostly rural and completely rural, respectively. The Census Bureau created these delineations based on 2010 population counts, specifically the percentage of county population living in an urbanized block. Whether a block is urbanized depends on its population density and physical characteristics.

URBAN: More than 50 percent of the population lives in an urbanized block.

MIXED URBAN-RURAL: Less than 50 percent of the population lives in an urbanized block.

RURAL: Zero percent of the population lives in an urbanized block.

One challenge with these 2010 Census delineations is the age of the data. While county Core Based Statistical Area (CBSA) status is more current, that designation does not take into account the same factors that the Census Bureau designations use. The Office of Budget

and Management (OMB) designates CBSA status, by which counties can be classified as "metropolitan," "micropolitan" or non-metropolitan, is used to refer to urban and rural, by both researchers and federal agencies. However, OMB specifies that the CBSA classification is not an urban-rural classification, and advises against using it as such for statistical purposes. While a CBSA classification system would use more current data, we use the Census Bureau delineations because they are based on factors that encompass the extensive variation among types of urban and rural places.

Connectivity and Units of Measurement

Connectivity, in our quantitative analysis, refers to the county-cluster unit of analysis. Connectivity is a continuous variable: it is the county location quotient of industry clusters for which the location quotient in the surrounding region is greater than 1. The location quotient of the surrounding region is calculated as the share of traded jobs in that cluster relative to the average regional share of traded jobs in the cluster across the U.S. The county location

quotient is calculated as the share of traded sector jobs in the cluster for the county relative to the average share of traded jobs in the cluster across counties.

A location quotient greater than 1 in the surrounding region indicates that the region is specialized in that industry, independent of the county. The location quotient of the county-cluster, then, measures the extent to which the county, too, is specialized in the cluster. Connectivity is the extent to which a county is specialized in the industry clusters that drive the regional economy.

The U.S. Cluster Mapping Project identifies industry clusters, sectors with high inter-industry linkages, by grouping NAICS codes, and provides calculations of job totals by cluster at the county level. The clusters are either traded or local. This analysis uses only traded clusters because traded clusters have strong relationships with employment growth and wage growth.

Region refers to economic areas. We use the economic areas delineated by the U.S. Department of Commerce's Bureau of Economic Analysis because these economic areas, like counties, are continuous across the United States. Economic areas center around a metropolitan or micropolitan area with a high level of economic activity, and they include the surrounding counties. Every county in the U.S. is part of the 179 economic areas.¹²⁵

Primary Analysis: Connectivity and County-level Drivers

We use regression analysis to address our research question: what are the factors driving regional connection? We use a complete data set of total jobs by industry cluster for all 51 traded clusters and 3,142 counties. Each county-cluster observation represents the presence of one of the 51 traded industry clusters identified by the U.S. Cluster Mapping Project in one of the 3,142 counties or county-equivalents for which data is available. For example "Aerospace Vehicles and Defense - Autauga County, AL" is a separate county-cluster from "Aerospace Vehicles and Defense - Baldwin County, AL." We identify county-clusters that have a presence of at least 10 jobs and a rest-of-region location quotient greater than 1. After we filter by these criteria, our data set consists of 34,914 unique county-cluster observations for the 3,132 counties that have at least one county-cluster with at least 10 county jobs and a regional presence. The county-clusters are then filtered to three different groups: county-clusters in urban counties, county-clusters in mixed urban-rural counties and county-clusters in rural counties. We use linear regression on each of these three groups (urban, mixed urban-rural, rural) to assess the effect of the county-level independent variables on the county location quotient. We use fixed effects for the 51 clusters, to control for industry-specific variation. We also control for the regional size of the cluster.

The dependent variable is the natural logarithm of the county-cluster location quotient. Because the data set is already filtered to observations with a regional presence, the county LQ represents the extent to which the county participates in regional industry clusters. The dependent variable is log transformed for ease of interpretation. County location quotients are right skewed, with a minimum of 0 and no maximum value. A location quotient greater than 1 represents greater than average specialization; however, there is no upper limit, so clusters with a very small national presence will have very high LQs.

We selected the independent variables for the analysis through a process of literature review, testing, expert interviews and revision. Through

this process, we identified four primary areas of influence on connectivity: business ecosystems; infrastructure; planning support; and housing and quality of life. We selected independent variables representing these areas of influence by testing iterations of the regressions, testing for R-squared and checking for multicollinearity. We further revised the variables included, based on interviews with experts who illuminated key areas to investigate. We grouped the data by type of county, and then we ran a separate ordinary least squares regression for each area of interest. We grouped independent variables topically so that we can demonstrate a more comprehensive picture of each area. This allows us to include a greater number of relevant variables and avoid overfitting.

TABLE 1: VARIABLES INCLUDED BY REGRESSION

Business Ecosystem	Infrastructure
<ul style="list-style-type: none"> Small business Latent innovation Time to fill Cost of living 	<ul style="list-style-type: none"> Drinking water safety Household broadband Hospitals Highways
Planning and Funding Support	Housing and Quality of Life
<ul style="list-style-type: none"> Economic Development District Unemployment (control for distress criteria) Median household income (control for distress criteria) 	<ul style="list-style-type: none"> Home ownership Rent burden Libraries Farmers markets Air pollution

TABLE 2: DATA UNITS AND SOURCES

Economic Development District	Binary. Is there an EDD in the county?	U.S. Economic Development Administration: Internal EDD Database 2016
Small businesses	The percentage of businesses with less than 20 employees	U.S. Census Bureau: County Business Patterns 2016
Highways	Highway entrances and exits per 1,000 county residents	Department of Transportation Highway Performance Monitoring System 2016
Drinking water safety	Binary. Did the county have at least 1 health-based drinking water violation in 2016?	County Health Rankings analysis of U.S. Environmental Protection Agency Safe Drinking Water Information System 2016
Household broadband	Percentage of households with broadband connection in home	American Community Survey 2013–2017 ¹²⁶
Hospitals	Hospitals per 10,000 county residents	U.S. Department of Health and Human Services 2016
Home ownership	Percentage of housing units owner occupied	U.S. Census Bureau American Community Survey 2012–2016 5-yr estimates
Rent burden	Percentage of county renters spending more than 35% of income on housing	U.S. Census Bureau American Community Survey 2012–2016 5-yr estimates
Latent innovation index	Diversity and volume of firm interactions within county (see data discussion subsection for more information)	Goetz, S. J. & Han, Y. (2020) <i>Latent Innovation in Local Economies</i> [Latent innovation data]
Time to fill	Average duration of online job postings in days during 2016	LinkUp, 2021
Cost of living	Cost Of Living Index (COLI) (scale 80–245)	Council for Community and Economic Research (C2ER), 2016
Food environment (control for general accessibility)	Food Environment Index (scale 1–10, with 10 being best access)	County Health Rankings analysis of USDA Food Environment Atlas, 2016
Libraries	Libraries per 1,000 residents	Institute for Museum and Library Services Public Libraries Survey, 2016
Farmers' markets	Farmers' markets per 1,000 residents (2012)	USDA Food Environment Atlas, 2016
Air pollution	Average daily density of fine particulate matter (2014)	Center for Disease Control Public Health Tracking Network

TABLE 3: INDEPENDENT VARIABLE SUMMARY STATISTICS

	Mean	Median	Minimum	Maximum
Small businesses	70%	69.6%	20.7%	100%
Latent innovation index	0.20	0.25	-8.67	3.16
Mean job posting duration	35 days	35 days	1 day	171 days
Cost Of Living Index (percent difference between county and region)	-0.19%	-0.34%	-32.33%	46.93%
Economic Development District (binary)	0	1	0	1
Unemployment	5.13%	4.9%	1.7%	24.1%
Median household income	\$50,348	\$48,415	\$18,972	\$125,672
Water violation (binary)		0	0	1
Household broadband	72.5%	73.2%	24.5%	94.6%
Hospitals per 10,000 residents	0.20	0.05	0.00	9.41
Highway exits per 1,000 residents	0.16	0.04	0.00	12.93
Food environment index (control for accessibility)	7.63	7.80	0.00	10.00
Home ownership rate	70.1%	71.4%	19.1%	93.1%
Rent-burdened residents	38%	38.5%	0.00	76.4%
Libraries per 1,000 residents	0.63	0.38	0.00	10.87
Farmers' markets per 1,000 residents	0.05	0.03	0.00	1.44
Air pollution density (micrograms per cubic meter)	9.34	9.60	3.00	19.70

We examine the coefficients for the county-level independent variables on county participation in regional clusters for groups of counties based on the county's urban-rural designation. The results indicate that the different county factor associations with local industry connection depend on the type of county assessed. For example, the housing and amenities variables strongly impact mixed urban-rural counties; innovation and infrastructure play a larger role in rural counties; and hospital and highway infrastructure show positive relationships across county types.

TABLE 4: BUSINESS ECOSYSTEM AND CONNECTIVITY

	Urban counties	Mixed urban-rural counties	Rural counties
% of businesses small business	0.019***	0.015***	0.003
Latent innovation index	-0.235***	0.003	0.117***
Mean job posting duration	-0.003**	-0.001	0.002**
Cost Of Living Index (percent difference between county and region)	-0.021***	-0.015***	-0.0001
R²	0.148	0.341	0.531

TABLE 5: PLANNING SUPPORT AND CONNECTIVITY

	Urban counties	Mixed urban-rural counties	Rural counties
Economic Development District	0.104***	0.048*	0.066
Unemployment (control for distress criteria)	0.025***	0.029***	-0.061***
Median household income (control for distress)	-0.00001***	-0.0000**	-0.00001***
R²	0.121	0.340	0.528

Throughout the Appendix, * indicates a p value < 0.1, ** indicates p < 0.05 and *** indicates p < 0.01.

TABLE 6: INFRASTRUCTURE AND CONNECTIVITY

	Urban counties	Mixed urban-rural counties	Rural counties
Drinking water violation	0.011	-0.044**	-0.079**
Household broadband	-0.025***	-0.008***	0.004**
Hospitals	0.570***	0.302***	0.038**
Highways	0.130***	0.087**	0.052***
Food environment index (control for general accessibility)	0.058***	-0.062***	-0.157***
R²	0.138	0.347	0.541

TABLE 7: HOUSING/QUALITY OF LIFE AND CONNECTIVITY

	Urban counties	Mixed urban-rural counties	Rural counties
Home ownership	0.012***	0.007***	-0.011***
Rent burden	0.005***	-0.002	-0.005***
Libraries	0.252***	0.023	0.113***
Farmers' markets	1.465***	0.076	-0.408***
Air pollution density	-0.040***	-0.026***	-0.043***
R²	0.134	0.339	0.530

According to this model, some of the variables we studied significantly impact regional connectivity for particular county-clusters in one type of county (urban, mixed urban-rural or rural), while some impact two types of counties or all three, indicating that these independent variables interact with connectivity differently for different types of counties.

To interpret the coefficients of a linear regression when the dependent variable is log transformed, we exponentiate the coefficient, subtract one and multiply by 100 to find the percentage increase in the dependent variable for a one-unit increase in the independent variable. For example, in the regression model of urban counties and business ecosystem variables, a 1 percentage point increase in the percentage of county businesses that are small businesses is associated with a 2.4 percent increase in county-cluster location quotient; in the model for rural counties, it is associated with a 1.8 percent increase in county-cluster location quotient.

The models indicate that relationship strength between the factors and connectivity varies by geography. Connectivity in urban counties has significant relationships with small businesses, Economic Development Districts, home ownership, libraries and farmers' markets. Connectivity in mixed urban-rural counties has a significant relationship with small businesses, Economic Development Districts and home ownership. In rural counties, connectivity has a significant relationship with latent innovation, household broadband and libraries. Across county types, connectivity is highly associated

with hospitals, highways and clean air (negatively associated with air pollution).

Measures Selected

We selected the county-level independent variables for our models through literature review, which indicated major drivers of economic growth and connection. We further refined the analysis through interviews with experts in regional development and by testing various measures for significance. The areas of interest to measure at the county level were the local business ecosystem, funding and planning support, infrastructure, and housing and quality of life. The measures selected for broadband and for innovation, in particular, are discussed further below.

Broadband

There are limitations to the inferences that can be drawn from the broadband measures included in our models. We include broadband because we know from both literature and interviews that it is integral to a community's ability to connect to regional economies. To account for county broadband access in our model, we include the American Community Survey variable, which is the percentage of county households with broadband. The Census Bureau defines "broadband" as any connection faster than 12mbps. This variable, in our model, shows small positive effects on connectivity for rural counties but larger negative effects on connectivity for urban and mixed urban-rural counties. A recent study on broadband measures in relation to labor productivity also finds no significant effect of the same

household access measure of broadband on labor productivity. Variables that measure the divide between broadband quality/internet access in a county holistically by accounting for actual speeds and modes of access are more telling regarding labor productivity and may better explain connectivity. However, we find that neither a digital divide index, which accounts for speeds and household access, nor a business connectivity index, which accounts for speeds and farm operator access, provide significant results. Broadband access and speeds have been shown to have a limited effect on labor productivity, suggesting the need for a more nuanced analysis of adoption.

Innovation

We use an index of latent innovation (Goetz & Han, 2020). The latent innovation index captures county-level industry structure, diversified inter-industry interactions and spatial collocation of industries within counties. The index of latent innovation includes a measure of buyer/seller interaction through the volume of buyer/seller interactions in the U.S. Dept of Commerce BEA input-output table and is broken down to the county level by using Census County Business Patterns employment data. Goetz and Han (2020) also include a measure of spatial collocation of industries, measured by the degree to which firms in different industries are located in the same county. The measure is significantly associated with per capita income growth, even after we include the effect of patents, and the association is four times larger than that of patents with per capita income growth.

Analysis: Regional Equity and Connectivity

To determine how the benefits of connectivity are distributed in the region, we assess the distance between employment rates in different counties in the same regions. There is significant variation in employment rates among counties in the same regions. Our sample contains 178 economic areas (San Diego-Carlsbad, CA is excluded because it contains only one county). In these regions, the standard deviations of the county employment rates ranged from 0.45 to 19.36 in 2010, with the maximum being an outlier (Columbus-Auburn-Opelika, GA-AL). The median standard deviation was 2.15. Overall, regions have become less equitable between geographies from 2010 to 2019. The standard deviation of county employment rate within regions increased on average across the regions. The median increased from 2.15 to 2.35, and the mean increased from 2.72 to 2.84. By defining improvements in equity as a decrease in the standard deviation of county employment rates in the region over time (2010 to 2019), we observe that there are 61 regions which experienced improvements over time while 117 experienced declining equity of employment outcomes.

To test the relationship between connectivity and the geographic improvement of equity in employment rates, we first determine a measurement of connectivity for a region: the percentage of traded sector jobs in the region

that were in county-clusters with both a county LQ greater than 1 and a rest of region LQ greater than 1 in the base year of 2010. We performed a t-test on the two groups of data: regions where equity in employment outcomes improved and regions where equity declined.

With a t-test of the difference in regional connectivity between the two groups, we find that there is a significant difference (p-value = 0.031). Connectivity was significantly higher (M = 42.61; SD = 11.81) in regions in which employment outcomes became more equal across geographies in the region. Connectivity was lower (M = 38.6; SD = 11.27) in regions in which employment outcomes declines in equity. This finding indicates that connectivity is associated with equity, suggesting that regions where localities specialized in shared industry clusters in 2010 experienced an equalizing effect that lasted over time. Further research should explore this effect by conducting analysis on data from different time periods and controlling for factors like regional strategies and advantages.

TABLE 8: T-TEST OF REGIONAL CONNECTIVITY AND CHANGES IN COUNTY EMPLOYMENT RATE VARIATION

	% of traded jobs connected	# of regions
Increase in equity	43%*	61
Decline in equity	39%*	117

Across counties, on average white populations tend to have higher employment rates than their non-white counterparts. In 2010, the average white employment rate at the county level was 5.5 percentage points higher for white populations than for non-white populations. While the average county employment rate improved from 2010 to 2019 for the total population a, the gap between groups did not improve over time. In 2019, the gap between the white and non-white employment rates was 5.9 percentage points.

While the gap between employment rates for white populations and for people of color became more disparate over time, we find that in regions with stronger connectivity, outcomes became more equitable over time. To determine the extent to which connectivity is associated with racial equity within the regions, we use a t-test analysis of regional connectivity in two groups: regions in which employment rates for white and non-white populations became more equitable and regions in which employment rates became less equitable. We determine that employment outcomes for white and non-white populations became more similar in a region if the absolute value of the difference in the

employment rates (calculated as total employed in region / total labor force in the region) for the populations decreased from 2010 to 2019, indicating that employment outcomes became more equal over time; we determine that employment outcomes became less equitable for white and non-white populations if the outcomes became less equal over time.

Using the measure of regional connectivity from the previous t-test, we find that regions with improving equity in outcomes between white and non-white populations were more connected (M =43.12; SD = 10.91) in the base year of 2010. Regions with outcomes that became less equitable between white and non-white populations were less connected (M =38.17; SD = 11.61). The difference between the mean regional connectivity for the groups is significant (p-value = 0.005). This finding suggests that regional connectivity is associated with long-term (2010-2019) improvements in equity.

This analysis attempts to characterize the relationship between a strong regional economy, in which localities are working together through shared clusters, and improvements in equity in the region. The finding that regions connected in this way experienced outcomes that became more equal over the period of 2010-2019 raises the question of how connectivity brings about this equalization. Future research should assess the extent to which improvements in racial outcomes at the regional level are driven by improvements in geographic equity (racial groups tend to be located in different areas of a region, so if the outcomes of localities are made

more equal from participating in a regional strategy then this might lead to the improvement in racial equity). This analysis suggests that if a region is more connected, then the economic profiles of localities will become more similar and racial outcomes less disparate.

TABLE 9: T-TEST OF REGIONAL CONNECTIVITY AND CHANGES IN WHITE AND NON-WHITE EMPLOYMENT RATE DISPARITIES 2010-2019

	% of traded jobs connected	# of regions
Increase in equity	43%**	65
Decline in equity	38%**	113

This analysis suggests promising results for regional connectivity as a strategy for equitable economic development, specifically reducing disparities in employment rates. However, limitations exist in the amount of economic data available for analysis at the county level (for example, minority-owned business ownership is not used in this analysis because estimates are only available for 2012 and 2017, and a portion of the data is missing for 2017; Unemployment estimates by race and gender at the county level can be derived from Census Bureau data but are not available from the Bureau of Labor Statistics (BLS); Likewise, wages by race are not available at the county level from BLS.) To further develop research on equity, accessible economic and financial outcome data for groups of people within local geographies is imperative. The county is the unit of analysis in this report

because it is the smallest unit for which comprehensive industry cluster data is available. Counties can be large in population and encompass many cities or areas with differing economic profiles, but they are the most appropriate unit for this analysis which attempts to assess trends in regional economies across the whole nation.

This analysis attempts to establish whether the benefits of connectivity are distributed in an

equitable way to localities within regions and to populations within regions. We find that connectivity is associated with reduced disparities within regions. Future research should expand on this analysis by assessing different time periods, taking a closer look at smaller geographies within certain regions, controlling for economic growth factors, and assessing a variety of economic outcomes.

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- ²⁴ Location quotients are used to measure economic specialization or concentration and are commonly used in industry cluster and economic development analysis. The location quotient (LQ) is the ratio of the cluster's share of total county or regional employment (outside of the county) relative to its share of total national employment. A location quotient greater than one indicates a higher-than-average cluster concentration in a location.
- ²⁵ These criteria exclude 10 counties that have no presence of at least 10 jobs in any of the clusters in which their surrounding regions have a strong presence (rest of region LQ > 1). Ninety-nine percent of U.S. counties have at least one of the clusters in which their region is strong. The 10-job threshold is intended to capture some presence of the cluster, and for more rural communities, this minimal level of employment can be critical and have a large impact locally and regionally.
- ²⁶ Or county equivalents (i.e., Parishes in Louisiana, Census Areas in Alaska, and independent cities in Virginia).
- ²⁷ Share of jobs connected to regional clusters are the proportion of traded sector jobs that are part of county-clusters with location quotients greater than one in both the county and in the rest of the region.
- ²⁸ Using population density, physical characteristics, and geography, the Census classifies counties as "mostly urban," "mostly rural" or "completely rural," which represent the share of the population residing in urbanized parts of the county. We use the Census definitions to designate county rurality, but to simplify terminology we refer to "mostly urban," "mostly rural" and "completely rural" as "urban," "mixed urban-rural" and "rural," respectively.
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