LOS ANGELES AREA
CHAMBER OF COMMERCE

CALIFORNIA'S COMPETITIVENESS: A REGIONAL APPROACH

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BANK OF AMERICA

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For over 130 years, the Los Angeles Area Chamber of Commerce has tirelessly advocated for the growth of our business community. Over the years, the Los Angeles economy and business sector has grown in its size, influence and connectivity to the rest of the state and even the rest of the world. With that in mind, Bank of America is proud to support this research commissioned by the Los Angeles Area Chamber of Commerce to provide data and insights that will help convene key business leaders, policy makers, and entrepreneurs across the state to develop a more regional approach to California's business competitiveness.

The state's diverse regions are distinctively successful and impactful when we learn from each other and work in collaboration. We know this study will shed more light on the reasons why California should be optimistic about the future - while also calling us to be more alert and prepared for the changes in population and business dynamics which will challenge our economic competitiveness.

We thank all of the Chamber's key stakeholders, our Board of Directors, The CEO Council, our members, and our executive staff for making this study a unifying moment for our greater business community.

We are all fully committed to tap into the data, dialogue, and decisions that will emanate from this effort. Together, we will realize our vision of creating a more golden state that can grow inclusively, responsibly, and boldly.

Raul A. Anaya
Head of Business Banking – Bank of America
Los Angeles Board Member – Los Angeles Area Chamber of Commerce

LOS ANGELES AREA CHAMBER OF COMMERCE

California is the innovation state, home to emerging industries and entrepreneurs which fuel an economy, recognized as the fourth largest in the world. California's economy is complex and regional; centers of excellence in technology and automation, media and entertainment, manufacturing, and logistics exist throughout the diverse regions of the state.

Despite our economic position, jobs continue to leave California for other states. Employers cite affordability challenges, taxes, and a complex regulatory environment. Yet, California still boasts the fastest per capita GDP growth among the most populous U.S. states in recent years, and there continues to be opportunities to grow California's industries and to create jobs.

We launched this study to understand the drivers of our economic strength and the shifts in our economy due to the movement of people and businesses. In a post-pandemic world, we see shifts in how we live, work, and play, which adds a new dimension for California and Los Angeles region to remain competitive. This study will highlight the varied regional approaches and opportunities to work collaboratively in creating an economic plan that considers all elements of an economy.

As we look to the future, we understand the importance of leading with the same entrepreneurial spirit which has made California a leader in the global marketplace.

We thank Bank of America for their generous support enabling this study, California's Competitiveness: A Regional Approach. This study is the foundation to help not only the Los Angeles region, but the entire state to develop the strategies needed for growth with intent to create A Thriving Region for All.

Maria S. Salinas
President & CEO
Los Angeles Area Chamber of Commerce

Executive Summary

If it were a country, California would be the fifth largest economy in the world, soon to become the fourth largest by passing Germany. The state leads the U.S. economy in a wide array of industries, including agriculture, manufacturing, logistics, tourism, and technology. Its multifaceted and dynamic economy is supported by an exceptional higher education system, a diverse, talented, and “deep” workforce, and its advantageous geographic location.

While California boasts economic success, little of this is reflected either in the popular press and in general popular perception. Instead, you frequently hear stories of businesses and people leaving California, citing housing affordability, homelessness, high taxes, stringent regulations, and raising concerns about California’s competitiveness. Yet, California boasts the fastest per capita GDP growth among the most populous U.S. states in recent years, and there continue to be opportunities to grow California’s industries and create jobs.

This report assesses California’s competitiveness relative to other states. The central message is that California’s economy and its evolution over time are best analyzed and understood by looking at its regions. Some of the regional problems, such as affordability and the high cost of living, may be statewide phenomena, but if we look for solutions, we must abandon the idea of focusing our analysis on one homogeneous state and concentrate on the state’s regions instead. By better understanding the strengths and weaknesses of the regions within the state, as well as their differences, we can gain a better understanding of the state’s performance as a whole. In turn, shaping economic policies for the state that are rooted in a clear understanding of its regions will better enable both the state and its regions to thrive.

As for analyzing regions within California, the report primarily focuses on Southern California, citing the experiences elsewhere in the state where applicable. Southern California is a vast, diverse region and is home to most of the state’s population. Its importance to the state economy is reflected in its 9 million jobs that represent 56% of statewide employment and 2021 Gross Domestic Product (GDP) of $1.3 trillion or two-fifths of statewide GDP.

Insights from Business Executives

As part of this study, a group of business executives from prominent companies in Southern California were interviewed. In general, these business leaders expressed optimism about the long-term prospects of the region. There was a clear acknowledgment of the benefits from their firm’s presence in the Southern California market. This included recognition of a talented regional labor force, an excellent higher education system, a diverse and dynamic economy, and extensive resources to support their businesses. However, a recurring theme centered on the concern for the state’s ability to remain competitive, given the high cost of doing business in the area and the chronic lack of housing affordability. Executives also mentioned concerns about taxation and regulation, as well as a sense that elected officials either ignore the needs of business or do not understand how business works. Indeed, these concerns prompted some firms to explore investment and job creation opportunities both outside of Southern California and the state.

Regional Findings

Several metrics can be used to establish California’s standing as the first among states: largest gross domestic product, largest number of employees and labor force, recipient of most of the nation’s venture capital, most patents registered, and among the highest in per capita income (only New York, Massachusetts, and Washington have a higher per capita GDP; both Texas and Florida are far behind and not in the top 15 of U.S. States). However, state-level comparisons of California to other states are not particularly meaningful for policy purposes and can potentially be quite misleading. The analysis presented in this report drills down to the regional level to explore where California has gained or lost its competitiveness, looking at the industry composition of Southern California and comparing it over time with that of other regions. In particular, we examine regional industry clusters, a term that refers to geographic groupings of interconnected industries and institutions that are related or have significant supply-chain linkages. The comparison shows:

- The Los Angeles region’s industry composition has diverged from that of other high productivity and high cost-of-living areas, such as Austin, Boston, and Seattle. Over the period from 2011 to 2022, the region has become more similar to areas such as Miami, Saint Louis, and Birmingham, which have a mix of industries with low productivity growth and low cost-of-living. By contrast, San Francisco’s industry composition resembles that of Austin and Washington DC, while the Silicon Valley’s mix of industries is quite unique, looking mostly like that of Seattle. When we measure employment growth across “traded industry clusters” we find that the Los Angeles-Inland Empire region is growing faster in clusters with lower productivity growth, while other regions in the state such as San Diego or the Silicon Valley are growing in their high-productivity growth clusters. Traded clusters are important since they represent a

region's ability to trade, and hence its competitiveness, with other regions.

- The Greater Los Angeles region has historically had an advantage in key industry clusters such as Aerospace, Video Production, and Apparel, but as these industries have become less geographically concentrated and have grown clusters in other metro areas, it has reduced the economic advantage for firms to locate in the Greater Los Angeles area.

- As the U.S. economy becomes more integrated, and as transportation and communication technologies advance, collaboration across regions with similar industry compositions is enhanced. Moreover, although California is still the leader in many of these clusters, other regions in the country have aggressively invested in infrastructure, education, and other aspects in an effort to create and grow their own local clusters in these same high-productivity industries. To give an example: Entertainment has expanded in size in Georgia, Information Technology in Austin, or Biomed in North Carolina's Research Triangle. As other regions catch up with those in California, they become more attractive to firms and workers. As a result, there are significant migration flows of workers and firms among cities with similar industry clusters, e.g., Silicon Valley and Austin, San Diego and the Research Triangle in North Carolina, San Francisco and Boston, Los Angeles, and Dallas.

Statewide Findings

California has experienced a net out-migration of firms and households, which has historically been replenished, until recently, with domestic and international migration, and by the birth of new firms on the industry side. Compared to the overall size of the state, the magnitude of population flows in-and-out of the state is small. Nevertheless, the recent exodus marks a departure from the long-term historical patterns experienced by California, which has been a magnet for migration from around the country and the world.

- The data suggest that high cost of living and low housing affordability in the state's largest cities are the primary drivers for out-migration of workers and firms. At the same time, recent changes in immigration policy at the federal government level have contributed to the net out migration. The departure of those with lower incomes and lower levels of educational attainment may be evidence that the state has become less affordable to those individuals. On the other hand, our data analysis, along with that of others, cannot find clear evidence for the hypothesis that the "millionaire tax" is driving high-income, high-wealth households out of the state. In fact, our data show that domestic workers who migrate into California tend to have higher incomes, are more likely to be college graduates, and are younger. This constitutes a "Brain Gain" stemming from domestic immigrants.

- California continues to lead the nation in terms of size, contribution to U.S. job growth, patents (only one country in the world has a higher number of patents: Japan), and venture capital. In fact, because it leads the nation in venture capital and the number of patents registered, there is a continuous birth of new firms. As these firms expand, they take advantage of the local economies in the state: labor markets with a large number of workers and employers, and local communities with many (but never enough) highly-educated creative workers. These local economies also feature an abundance of input providers; a thriving business infrastructure; and knowledge spillovers to businesses from its successful higher education institutions. These firms are willing to locate in California because of the advantages and benefits that its knowledge economy affords them, which clearly outweigh (in their decision process) the higher cost-of-doing business here. Firms in these industry-leading sectors take advantage of the knowledge economies in California (economists refer to this as "localization economies").

- Once these firms are sufficiently large or mature to internalize these economies, they may move to other regions in the country or the world where labor and land are more affordable. The same is true for firms that do not benefit as much from the localization economies that help high-end firms thrive.

- Regardless, as other regions create cluster ecosystems that more closely resemble those of California's regions, their appeal to new firms will grow. Their appeal will be enhanced to the extent that they "compete" effectively with California regions in terms of the cost of living and the amenities they offer residents.

Recommendations

The data imply that to understand California's competitiveness, we must take a regional approach and perspective to economic development. Economically, there is no "one-size-fits-all" policy for the different regions within the state. Each region and their key industry clusters must compete with, and fend off, competition from other regions. Economic policy must be tailored to meet each region's needs in order to be effective.

The following recommendations will result in innovation and improved competitiveness for the state's regions, and in turn, California as a whole.

- Develop an economic strategy that considers and supports regional differences. California excels at hosting high-productivity industry clusters such as Entertainment in Los Angeles, Information Technology in Silicon Valley, Logistics in the Inland Empire, or Biomed in San Diego. An economic strategy that capitalizes on regional expertise can be an integral part of a statewide economic strategy.

- Develop partnerships between higher education and industry that promote occupational skill upgrading to satisfy the demand for talent and skills from the local industry clusters that are interconnected with the rest of the world.

- Define business attraction and retention strategies at the regional level that drive innovation in leading regional clusters and are supported by a statewide plan. Although California is viewed as a knowledge-generating economy, its industry clusters tend to be anchored in one region of the state or another. Regional strategies must account for and exploit regional industry-specific advantages (so called localization economies of scale) in order to maintain a region's competitive edge.

- As regions around the country become more and more competitive, California's regions must leverage their assets to increasingly compete for workers as well as firms. California can do so more effectively by addressing the state's high cost of living and by ensuring that community amenities are on par with those in other states. Without this essential ingredient, the state's supply of educated workers who place high value on quality of life in choosing a place to live will fall short of the demands of its industries.

- Build entrepreneurial infrastructure and support that will attract new firms while also lowering the barriers to entrepreneurship for its homegrown talent.

For Southern California in particular, we believe that economic development through the policies suggested above goes hand-in-hand with affordability, the supply of urban amenities, and the quality of life experience. Examples of urban amenities are the availability of parks and green spaces, alternatives to the long commutes and solutions to traffic problems, and most importantly, increases in the housing supply to feature modern urban life-work amenities. These measures should be part of a comprehensive economic strategy to ensure that the regions can attract and retain their workforce.

I. Introduction

California's economy is the largest among U.S. states. If it were a country, California would be the fifth largest economy in the world, soon to become the fourth largest by passing Germany. The state's economy leads the national economy in a wide array of industries, including agriculture, manufacturing, logistics, tourism, and technology. Its multifaceted and dynamic economy is supported by an exceptional higher education system, a diverse, talented, and "deep" workforce, and its advantageous geographic location.

Data on the location of patents, venture capital, startups, and IPOs point toward California's continuous track record of successes and its uncontested role as the world leader in innovation. For example, only one country in the world (Japan) has more patent applications. In addition, California boasts the fastest per capita GDP growth among the most populous U.S. states in recent years, and there continue to be opportunities to expand California's industries and create jobs.

However, the Golden State's luster appears tarnished in recent years mainly for two reasons: First, a seemingly endless stream of firms is leaving the state, citing high taxation, heavy regulation, other business costs, and anything but a business friendly environment. Second, following decades of steady increases in population, California's growth slowed compared to that of other states such that, for the first time in its history, it lost a seat in the House of Representatives. Affordability and quality of life issues are perceived to be the main driving factors for the exodus. In brief, California seems to be in the midst of a perfect storm as it contends with an exodus of firms and people, reduced influence at the federal level, and, of course, the pandemic and its economic recovery from it.

The media have produced a steady flow of negative news stories over the years critiquing California's economic competitiveness at a minimum, and declaring it a lost cause at the extreme. As far back as 2009, *The Economist* magazine featured the competition between California and Texas on its title page, accompanied by a lengthy analysis of the relative economic performance of the two states and its implication for serving as a model of future economic development in the U.S. The same theme was revisited by the magazine in 2019.

Note that California's reputation as a high cost place in which to live and conduct business is nothing new. Nearly half a century ago, in 1978, voters approved Proposition 13 in direct response to the state's then already high and rapidly rising home prices (and property taxes). In the early 1990s, at the end of the Cold War, a wave of residents and businesses left the state after cutbacks in military expenditures and the coinciding decline in the aerospace industry. In 2006, Nissan moved its U.S. headquarters from California to Tennessee. The Nissan exit was followed by a series of highly visible departures, including, most recently, Toyota, Hewlett Packard, Oracle, McKesson, CoreMark, Jamba Juice, and Charles Schwab. In late 2021 Tesla "abandoned" the state by relocating its headquarters from Palo Alto to Austin, Texas (its production facilities in Fremont remained there). Alarm bells were ringing in the popular press once again.

The deeper question we will address here is, first of all, whether these alarm bells should ring at all, given the state's history of being a high cost location in which to do business. Alarm bells ring if there is a dramatic change in an environment: think of a volcano, or the health status of a human patient, or an incoming blip on a radar during a war. To ensure that these are not false positives or symptoms without a deeper meaning, we need to find an underlying significant change or watershed event that now, suddenly, raises concerns.

We stress from the beginning that it is unproductive to think about state competitiveness by focusing on "one California." The Golden State has roughly forty million residents and more than three million employers. A closer look into the economic dynamics of the state suggests that there are winners and losers at the regional level. While some regions, such as Silicon Valley and San Diego, are currently thriving economically (after controlling for the effects of COVID-19), others are facing serious challenges. The different fortunes of regions or cities can be attributed to two interrelated and well known economic phenomena. The first has to do with the industrial composition of cities and the formation of industry clusters. Clusters allude to the spatial aggregation of workers and employers in closely related industries. The proximity of workers and firms within clusters is reflected in higher productivity, higher wages, and higher cost of living. The second phenomenon is defined as "urbanization economies." As wages and costs of living rise, mature firms that have accrued all the benefits from the cluster will move to other regions where labor, land, and other factors of production are more affordable. As explained in the report, the tug-of-war between the higher productivity of industry clusters and the higher cost of living and salaries in these same regions can explain much of the economic dynamics of our state.

We find it useful to employ real life analogies to explain more complicated economic phenomena. We argue that California has been, and continues to be, the perennial winner in the overall competition that is the economic equivalent of an Olympic decathlon among the nation's states. However, other states have narrowed the gap or even captured top honors in an increasing number of event contests.

As the study findings show, regions across the nation have transformed themselves over time to become more similar ("caught up") to successful regions in California, making them more attractive places to operate business, and to live, compared to just a few years ago. This pattern accelerated during the period since the Great Recession.

A central message of our report on California's competitiveness relative to other states is that California's economy and its evolution over time are best analyzed and understood by looking at its regions. Some of the regional problems, such as affordability and the high cost of living, may be statewide phenomena, but if we look for solutions, we must abandon the idea of focusing our analysis on one homogeneous state and concentrate on the state's regions instead. By better understanding the strengths and weaknesses of the state's regions, as well as their differences, we can better comprehend the state's performance as a whole. In turn, shaping economic policies for the state that are rooted in a clear understanding of its regions will better enable both the state and its regions to thrive.

This study primarily focuses on Southern California, a vast, diverse region that is home to most of the state's population. Its importance to the state economy is reflected in the 9 million jobs that represent 56% of statewide employment and 2020 GDP of $1.3 trillion or nearly half of statewide GDP.

The report proceeds as follows. Section II presents the results from a survey of business executives regarding their concerns about the state's competitiveness. Section III analyzes the movement of people and firms in and out of California, putting claims of a massive exodus from the state into perspective. Sections IV and V examine some of the causes behind these movements. Here we show that drilling down to the metro level leads to novel insights in the state's competitive situation, revealing that industry linkages are better described in metro-to-metro terms rather than state-to-state terms. In Section VI, we give a general overview of the performance of California's economy in recent years and decades relative to other prominent states. The final section concludes by summarizing the findings of the report and describing the essential ingredients needed to maintain the state's trajectory of economic growth.

II. Survey of Business Executives

Various studies have focused on reasons as to why companies relocate outside of California, often citing the high cost of doing business (including the cost of labor, energy/utilities, and litigation), unfriendly tax policies, a difficult regulatory environment, and a declining quality of life. Many of these studies fail to focus on the positives of doing business in California, and perhaps more importantly, they do not present recommendations for mitigating the negatives from the perspectives of the people who run the companies – the CEOs.

In this section, we summarize interviews with 23 Southern California CEOs. Those CEOs reflect companies which, for the most part, have conducted business in California for well over 10 years, and run the gamut of industries including real estate, finance/banking, manufacturing, transportation and warehousing, health care, media, sports, entertainment, and both retail and wholesale trade We summarize CEOs' perspectives of the positives of doing business in California as well as the challenges. We focus on their recommendations of what state and local officials, and members of Chambers of Commerce could do to make California a better place to conduct business in. Direct quotes from CEOs are in italics to best capture the tone and sentiment of the CEOs' perspectives.

QUESTION: Based on your experience, what are the most significant positive aspects of operating a business in California?

The first and most-often mentioned "positive aspect" mentioned by CEOs is people, both in terms of quantity of potential customers and quality of the workforce (i.e., "talent"). Nearly all CEOs mentioned that California attracts a highly educated, highly motivated, talented, and creative workforce. And as one CEO put it:

> *"The diversity of the workforce and California's population helps create a 'better product' and better company, with different points of view and perspectives coming together."*

CEOs also mentioned that California has a diverse, dynamic economy which includes innovation hubs, hospitality hubs, blossoming industries around environmental protections and climate change, etc., as well as the presence of well-established companies in banking, entertainment, transportation, tech, pharma, fashion, entertainment, manufacturing, and media. Further, there are Centers of Excellence

and organizations in California that work actively to support industry. In addition, the proximity to Mexico and Asia Pacific is seen as an advantage in the global marketplace. All of these factors provide opportunities to pivot and overcome economic downturns that have occurred throughout the history of the state.

Finally, any discussion of the positives of doing business in California eventually comes around to a discussion of the weather and California lifestyle. One CEO said:

> *"We can do business 12 months a year instead of 9 months or less in other states with worse weather conditions."*

The weather is also a factor of quality-of-life for people in upper-level management positions as well as employees at the lower ranks. And California's natural resources (and the resulting opportunities for outdoor sports and other activities) are aspects of the California lifestyle that make the state a good place to raise a family while doing business.

QUESTION: What are the most significant challenges associated with operating a business in California?

Typically the immediate response to this question was:

> *"California is a very difficult place to do business."*

CEOs perceive California to have an anti-business culture, where business is perceived by the media, lawyers, and politicians at the local and state levels as "evil" and "caring only about profits." The CEOs feel that the relationship between public and private organizations is adversarial rather than collaborative and supportive, thus making it difficult to work as partners to meet the consumer needs for products/outcomes, while also creating opportunities for employees and for business innovation. Here is a typical quote:

> *"I have dealt with governments around the country, but the most business unfriendly adversarial government is California."*

Another challenge mentioned by many CEOs centers on taxation in California (income tax, property tax, sales tax, gas tax, etc.), which is seen as excessive. That feeling is also reflected in numerous studies and surveys of the business climate across the country. For example, the Tax Foundation rated California #48 in the nation in 2022 based on its State Business Tax Climate Index. This index ranks states based on individual income tax, sales tax, corporate income tax, property tax, and unemployment insurance tax. The high tax rate was mentioned by respondents as a major reason some of their fellow CEOs have chosen to relocate to other states (e.g., Texas, Nevada, Georgia).

In addition, CEOs mentioned that California's highly regulated environment relative to land use/building and employment regulations is a determinant in the decision process to leave the state. The regulatory environment is seen as excessive and a great burden for business in terms of cost of compliance with regulations and labor costs (which are higher than those in states like Texas, Tennessee, Nevada, and Arizona). When added to California's higher fuel/energy costs, cost of industrial space, maintenance expenses, and higher overall cost-of-living for employers and employees alike, the potential outflow of talent and businesses must not be understated.

Adequate infrastructure in the form of roads, bridges, rail, ports and airports, power lines, water, and telecommunication are vital for smooth movement in the supply chain and the ability to move goods, services, and workers throughout the region. The CEOs interviewed believe that aging and inadequate infrastructure are major challenges to efficient goods movement in Southern California. Further, they note that employees are often only able to find affordable housing somewhat distant from their work, thus commuting and traffic are challenges for finding "talent" which is central to business success.

Finally, homelessness and crime were issues mentioned by most CEOs. Of course, these problems are not specific to California. To make matters worse, these issues have deteriorated over time. CEOs noted that solutions have not been forthcoming from urban political leaders. They perceive that law enforcement turns a blind eye to visible homelessness. The CEOs perceived that customers have an aversion to encountering the homeless, and that this keeps customers from frequenting businesses. If an area has a high crime rate, the community's attractiveness as a place to live and work suffers. Healthy behaviors such as exercising and socializing outdoors diminish, stress increases, residents and visitors begin to abandon the area, and businesses often follow that exodus.

The majority of CEOs believe that companies leaving the state are feeling both the "push" of the negatives/challenges cited above as well as the "pull" of other states' recruiting efforts (e.g., discussions about lower sales or payroll taxes, fewer regulations, more incentives for business, and a friendlier business environment in which companies are welcomed and promised streamlined permitting). Yet the vast majority of CEOs interviewed have made a commitment to stay in California,

either because it is “too hard to pick up and leave” or because they believe that the positives of doing business in California still outweigh the negatives. That said, several noted that they are shifting at least some of their capital to other states to get better returns and “hedge their bets.” In addition, several commented that when it comes time for expansion, they will look to do so elsewhere, i.e., in places where governors and city officials are more welcoming to firms which, in turn, brings sales taxes and jobs to their region. The following quote is representative for the statements of many:

> *“It feels very different to have allies and supporters in the ecosystem that wants to help you for the common good rather than having government put up barriers and roadblocks…for my own mental health I will look for environments more conducive to business and a healthy balance in communities.”*

QUESTION: If the state government, local government, or Chamber of Commerce could do one thing to make California a more attractive place to do business, what would it be?

CEOs had much to say on this issue and were unable to restrict themselves to only “one thing” that could be done to make California a more attractive place to do business. Here are some of suggestions made:

- Change in attitude from “business is the enemy” to “business is a partner.”

CEOs recommended that state and local officials seek direct input from the business community (including small and medium-sized businesses). They feel that business needs to have a seat at the table to help promote California as a business-friendly state while helping to find ways to clear the layers of bureaucracy impacting business.

- Reduce taxes or provide tax incentives.

The perception from CEOs is that the state needs to address the issue of high taxes (corporate taxes, real estate, capital gains, income taxes, California’s “wealth tax,” etc.). They believe that if taxes are reduced across the board, companies will reinvest to build and clean the environment and train more people.

- Assess and streamline the overall regulatory environment.

CEOs see a need to reduce the regulatory burden on businesses. They recommended the formation of a citizen’s commission headed by respected people to look through the state, county, and local regulatory apparatus to draw attention to multiple conflicting goals and unintended consequences of policies. The objective would be to streamline the permitting process so that projects can be built in a timely fashion.

- Reform the California Environmental Quality Act (CEQA).

When asked about what the state could do to make California a more attractive place to do business, multiple CEOs immediately responded: *“Reform CEQA.”* They agree that responsible environmental laws are needed and that CEQA (in theory) is a good tool, however they perceive that the time it takes for the necessary approvals is *“extraordinarily cumbersome,”* with high costs of compliance.

- Improve quality of life.

CEOs believe that more needs to be done to reduce crime, improve public schools, speed up transit-oriented development, improve housing production (which would then reduce housing costs), and solve the homeless issue.

- Create a balance.

The perception is that there needs to be a balance between California’s *“left leaning social philosophies”* and growing a business environment. CEOs commented that such a balance might be achieved by focusing on issues important to multiple parties: creating a well-educated, healthy and stable workforce; building housing close to work; and improving access to education and services such as broadband, food, and healthcare.

The above comments were made relative to the state government. But CEOs also noted that there is a need to improve coordination among local government entities which have different regulations regarding licensing, wages, permitting, and benefits. Further, they strongly felt the need to improve coordination between local government leaders and businesses to develop viable plans for issues such as sustainable housing, entry level housing, “food deserts” (areas that are underserved by grocery stores), “broadband deserts” (areas with limited or no high-speed internet access), and rent control. Highly engaged and business-centric economic development groups that are focused on the community should be involved in efforts to address local issues. Local Chambers of Commerce which

are actively involved with state and local elected officials can be helpful in connecting the strength of the business community with the strength of the general community, especially if these chambers can advocate for solution-based activities instead of simply lamenting that “California has problems.”

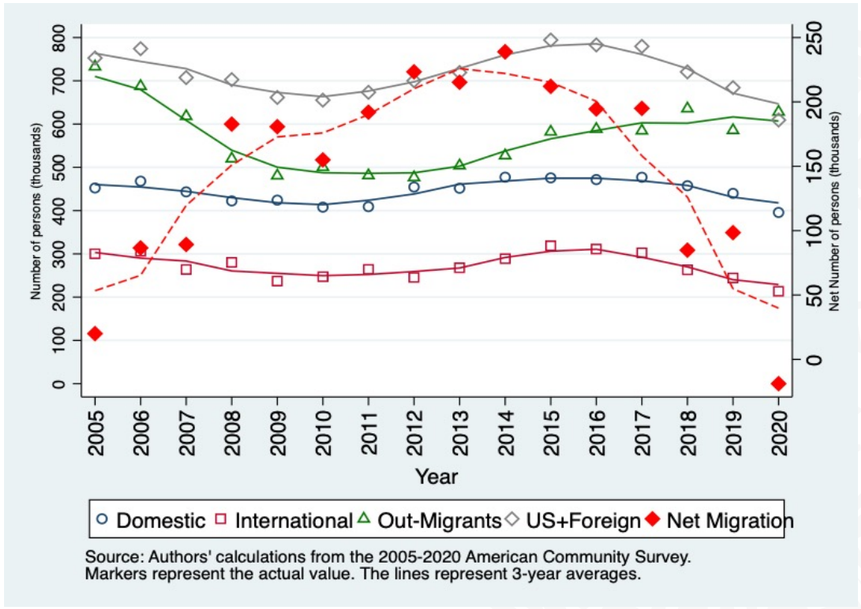
III. Migration of Population and Businesses

In this section, we describe the movement of people and firms in and out of the state. In the following sections, we look at some of the causes behind these movements.

Migration of Population

Recently policymakers, and the public in general, have paid increased attention to population flows in and out of California. This was triggered, in part, by the loss of a Congressional seat for the state. Figure 1 shows the migration into California by domestic and international migrant households, and the migration out of California. The data suggest that these migration flows are a normal economic phenomenon with ups and downs, where net migration has historically been positive: more people move into California than are leaving the state. However, while the number of people leaving California each year fell between 2005 and 2012, the trend reversed from that year forward as the number of households leaving California increased.

Figure 1: Migration Flows California, in 1000s, 2005-2020, American Community Survey (ACS)



Note: Left vertical axis shows Domestic and International "in-migration." US+Foreign represents the sum of these in-migration flows. Out-Migrants are the total number of individuals leaving the state although foreigners leaving the U.S. are not included. Right vertical axis shows net out-migration (out-migration minus in-migration). An alternative data set is available from the California Department of Finance (section E6) which shows different numbers but is based on driver's license records, and hence does not include, for example, children.

Net migration into California became negative starting in 2020 when the declining trend of in-migration 2015/2016 converged with increases in out-migration that began after 2012.[1] At that point, more people were leaving the state than arriving.

As Figure 1 shows, some of the explanation is simply the result of the decrease in international migration. This can be attributed, in part, to the enhanced border controls imposed by the Trump administration. However, it cannot explain the increase in the number of outmigrants. Instead, academics and policymakers have focused on taxation and regulation, affordability and amenities, and quality of life issues to explain the increase of non-migrant households.

Having described the phenomenon, the next task is to find the underlying causes. Given the time-line, it is tempting to look for a policy change that occurred around 2012.[2] Over the last few years, the tax-code of California has primarily relied on high-income individuals to generate state revenue. It is estimated that almost half of the state's revenues are collected from the 1% highest earners (Walters, 2022). In 2004, the state approved the Mental Health Services Tax which raised taxes on households earning more than $1 million dollars. In 2012, the state approved Proposition 30 which again increased taxes on high-earner households. This proposition progressively increased the top tax rate by one percentage point for individuals who earn more than $250,000, two percentage points for those who earn more than $300,000, and three percentage points for income earners in excess of $500,000 ($500,000, $600,000 and $1,000,000 for married couples respectively). Proposition 55, approved in 2016, extended the tax increases through 2030.[3]

Of course, determinants other than state tax policy may also help explain migration in-and-out of California during this time. For example, the federal 2017 Tax Cuts and Jobs Act capped the amount of State and Local Taxes (SALT) households can deduct from their federal taxes, and additionally this same act limited the mortgage interest deduction. Overall, the effect of the Tax Cuts and Jobs Act resulted in increased federal tax payments for households in high cost-of-living areas. The effect of these tax reforms on migration are still being debated by academics and policy makers alike.

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[1] ACS data was not available for 2021 and 2022 at the time this research was undertaken. The Department of Finance shows larger net out migration for the post Coronavirus period, but it is too soon to separate out the effects from the Coronavirus downturn and the subsequent fallout from the shutdown of businesses. For example, by September 2022, neither Orange County nor Los Angeles County, or the State of California had recovered the labor force or employment levels they experienced in February 2020.

[2] It is also possible that a determining event occurred earlier but was masked by factors that encouraged increased in-migration. We do not consider this possibility here.

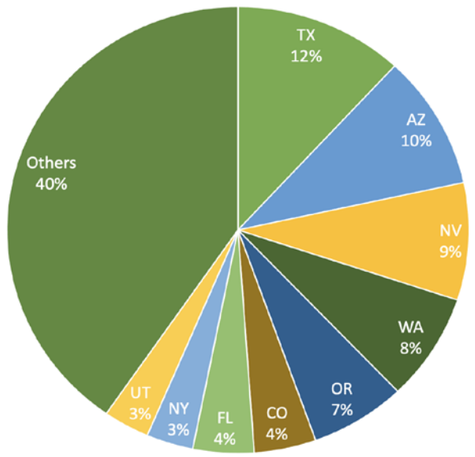
[3] The effect of these tax reforms is still being debated by academics and policy makers alike. Varner et al. (2018) argue that the effects of the tax increases did not influence net migration. Rauh and Shuy (2022) show that tax increases have an effect both on out-migration and on the monetary amount of income reported by households.

Tax policy is, of course, not the only determinant of migration in and out of the state. Two other important components that determine households' behavioral responses are (i) affordability (housing prices relative to income, but also real estate taxes) and (ii) amenities. For example, a report by Rice University shows a strikingly close correlation between housing prices in California and migration from the state to Texas (Fulton, 2022). The same argument is corroborated by the state Legislative Analyst Office: housing costs and out-migration are strongly correlated.

Amenities include the quality of local public spaces, such as parks and green areas, while airports and transportation are part of the infrastructure. Amenities can also contain the availability of mixed-used urban spaces and the quality of available housing. These have traditionally been associated with migration across states in the U.S. For example, the increased availability of air conditioning explains the growing attractiveness of the Sun Belt over time. While California still boasts a beautiful coastline, thriving urban centers, and improved environmental amenities, other areas have invested in attracting highly educated, professional workers, reducing the gap in amenities between California and elsewhere.

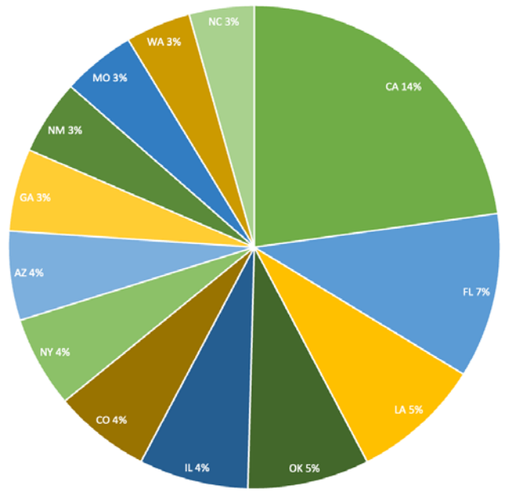
Figure 2 shows the destination states for Californians who moved during 2015-2019. Note that 46% of those leaving California end up in just five states: Texas, Arizona, Nevada, Washington, and Oregon. The remaining states each receive 4% percent or less of the migrants.

Figure 2: Destination States of California Out Migration, Annual Data, 2015 to 2019, ACSFigure



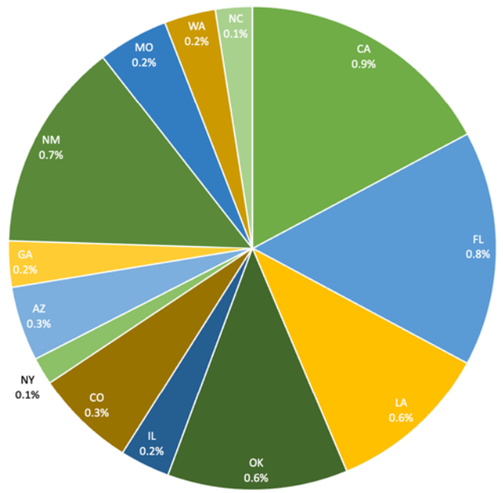
By way of comparison, Figure 3 shows in-migration patterns to Texas over the same time period. Note that the percentage points listed now are not for all migrants moving into Texas, but instead just the percentage of the 13 states listed. Of these, the majority (342,000) came from California, 165,000 from Florida, 129,000 from Louisiana, 109,500 from Oklahoma, and 108,000 from Illinois. These five states make up roughly half of the migrants of the 13 states listed. The top 13 states represent 62% of a total of almost 2,430,000, in-migration for Texas.

Figure 3: Migration from Top 13 Origin States of Texas In-migration, Annual Data, 2015 to 2019, ACS



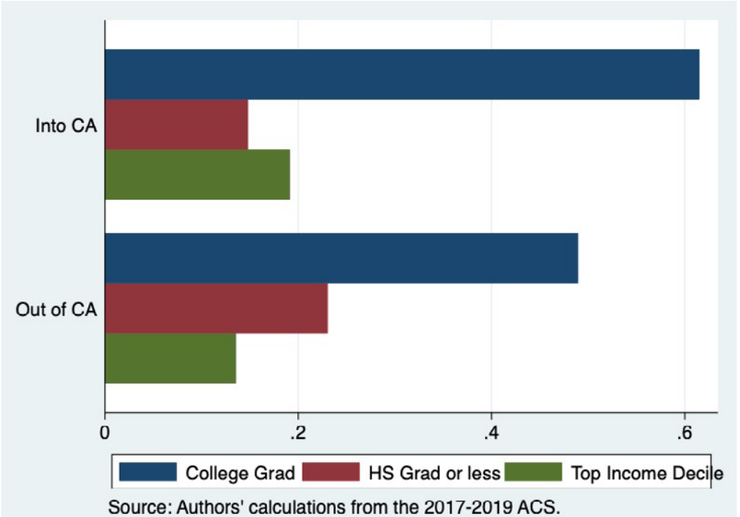
One possibility is, of course, that California migration flows just appear to be very large as a result of its larger population. Figure 4 uses the same numbers but adjusts the flows for population size. While California's share now becomes smaller, surprisingly little else changes in the graph. The most notable differences are for New Mexico, which has a large outmigration flow relative to its population size. California and Florida basically have the same population adjusted quantity for the period under consideration.

Figure 4: Top 13 Origin States of Texas In-migration as percentage of State Population, Annual Data, 2015 to 2019, ACS



A deeper question is related to the attributes of people leaving California. Some claim that tax increases, for example due to Proposition 30, have encouraged highly-educated, high-earner households to leave the state. Yet, data from the ACS suggest that California benefits from "brain gain." That is, those moving into California are more likely to be highly educated, often college-educated, and more likely to be in the top wage and salary income decile than those leaving the state (see Figure 5). These data are corroborated by research from the Public Policy Institute of California (PPIC) which shows that the households leaving the state tend to be in the lower and middle part of the income distribution (McGahee, 2022; Johnson, 2022).

Figure 5: Socioeconomic Characteristics of Domestic Immigrants, 2017-2019



Source: Authors' calculations from the 2017-2019 ACS.

Migration of Business

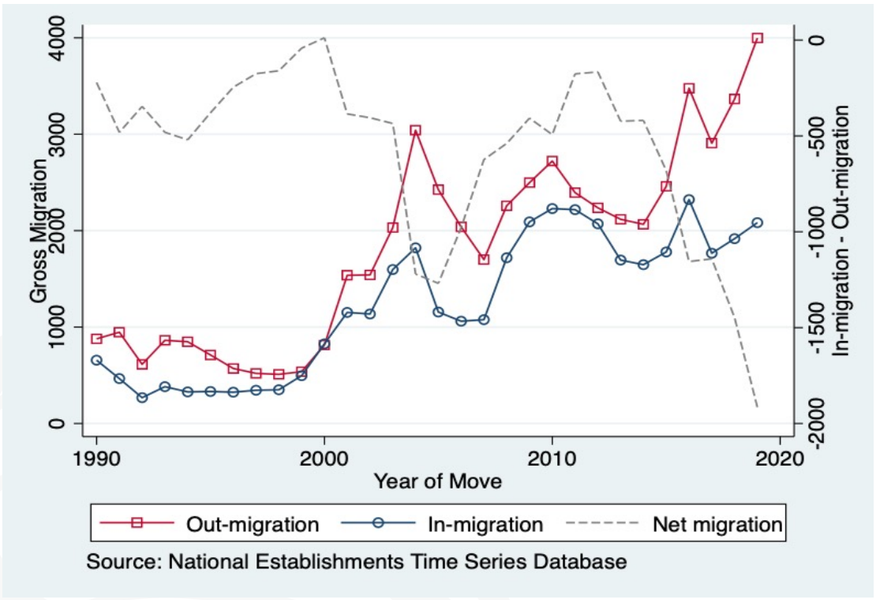
A household's location decision involves a solution to a multidimensional optimization problem that contains a home and its property, neighborhood and community attributes, amenities and other quality of life considerations, affordability, and availability of jobs. Similarly, a firm's location decision is a comparable process that evaluates the cost of doing business along with other decision criteria such as access to suppliers, availability of workers, the tax environment, and the presence or absence of public services. Moreover, simple economic reasoning suggests that higher worker productivity and broad-based business success drives costs up in the location where those successful businesses are located, forcing less productive firms to leave to make room and release resources for the more productive ones.

In this section, we examine the net migration of firms to and from California. Our source is a unique data set called National Establishment Time-Series (NETS) by Walls Associates, which contains a wide array of information on over 70 million U.S. firms since 1990, including establishment location. Note that this data is restricted to domestic migrations, and we can say little of international (out) migrations. The data on firm migration reveal an overall pattern that is similar to that of household

migration, although there are noteworthy differences between firms that have left California and those that have migrated into the state.

Figure 6A shows that firm migration in and out of California generally followed a similar trajectory for most of the period between 1990, the earliest year available to us, until 2012. Throughout this period, the number of firms leaving California each year exceeded the number of firms entering California. Net migration was relatively low and stable between 1990 and 2000, then tripled between 2000 and 2005, leading up to the Great Recession. Net migration fell from 2005 until 2012, at which point there is an acceleration in the outmigration of firms. By 2020, net migration was eight times larger than in 2012.

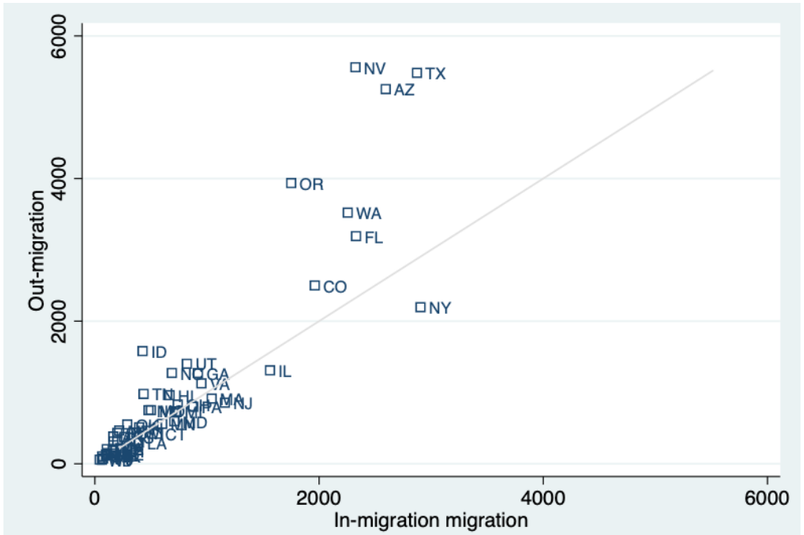
Figure 6A: Net Migration of Firms from California, Annual Data, 1990 - 2020.



Source: National Establishments Time Series Database

As Figure 6B shows, firm migration is not a one-way street. On the one hand, there has been a net out-migration of firms from California to nearby states such as Nevada, Arizona, Oregon, and Washington, and to Texas, Florida, and Colorado. On the other hand, there has been a net in-migration of firms from other states, notably New York state, Illinois, and a number of East Coast states, including Massachusetts, New Jersey, and Connecticut.

Figure 6B: Net Migration of Firms from California to Other States



Source: 1990-2019 National Establishments Time Series Database.

The fact that more firms are leaving California than migrating to California should not be surprising. California is a knowledge-based economy that incubates many new firms. Entrepreneurs in the state take advantage of the availability of knowledge through the state's outstanding higher education system, the availability of both a common set of suppliers and of highly productive workers to innovate and create new firms. As expected, California leads the nation, for example, in patents registered or in venture capital invested. Yet, once firms are able to internalize the location benefits from California, the same firms will migrate to other, more affordable, areas.

What is less clear is why the outmigration of firms accelerated after 2012. Although we highlighted the importance of higher income taxes through Prop 30 above, we cannot distinguish between this hypothesis and the alternative that firms might be leaving due to eroding affordability in California and growing concerns about the quality of life. In economics, we refer to this as observation-equivalence, meaning different theories resulting in the same outcome.

While the data is not as clear-cut for firms, there are two salient results: First, California tends to attract firms in industries where it has a competitive advantage (technology, logistics, media). Second, firms moving into California are smaller than firms leaving the state. For example, based on data over the

last three years, firms that left California include large well-known firms such as Wells Fargo Bank (to South Dakota with 6,000 employees), Disney Worldwide Services Inc (to Florida with almost 3,650 employees), Bechtel Group (to Virginia with 2,100 employees), and Parsons Corp (to Virginia with 2,000 employees). By contrast, firms that move into California are smaller in terms of employees. For example, they include Edge Logistics Service Corp (from Arizona with roughly 500 employees), Mediabrands Worldwide (from New York with 550 employees), PMC Inc (from Kansas with about 450 employees), and International Vitamin Corp (from New Jersey with 400 employees).

The fact that out-migrating firms are larger than firms migrating to California is not surprising. The urban economics literature refers to it as "industrialization economies." Firms may be born in a state that has large market opportunities, a skilled labor force, or that may offer significant benefits from a knowledge economy. As these firms grow and reach maturity, they are able to internalize the benefit from being in the region. At some point, they may migrate to a new region with lower costs of business and wages, depending on the location of their customer base. This may be true for large, mature manufacturing and technology firms that have left the state, especially if their market is national or global. Their business is at the stage in a firm's life cycle where it relies less on innovation and more on maintaining market share while containing costs.

Based on a more granular analysis of firms leaving California and firms coming to the state, the firms that are leaving not only appear to outnumber those coming in, but they also have more employees and higher revenues. The state's economy is thus in many ways based on the state's ability to attract young firms with high growth prospects, essentially serving as an incubator of new firms. According to the NETS data, for the period from 2015 to 2019, the average firm leaving California has 12 employees, compared to an average of eight for firms coming into the state. Very large firms, those with at least 500 employees, were twice as likely to move from California than to California.

[4] Nonetheless, policy makers must better understand if the departure of these firms is due to a weakening of the industrial base of California, declining affordability, or heavy regulation as argued by Ohanian (2022).
Ohanian, Lee and Joseph Vranich (2002) "Why Company Headquarters Are Leaving California in Unprecedented Numbers" Economics Working Paper 21117, Hoover Institute Stanford University

IV. Analysis of Industry Clusters

A firm's location decision is important for a variety of reasons. The choice is basically to be closer to a resource or On the one hand, firms might choose to locate close to a resource; on the other hand, they might locate close to their market or customer base. In addition, firms may prefer proximity to linked industries, firms, and the institutions that they are interconnected to, that is, their industry cluster or clusters. We want to stress the fact that firms benefit from being in a cluster,[5] not only because they benefit from the proximity to suppliers or because they have access to a common infrastructure, but also because they have their proximity to workers and to knowledge spillovers that occur as a result of deep, industry-specific labor pools.

A simple account of which firms left California in 2019 (before the pandemic) and entered California during the same year confirms the importance of clusters. For example, among the out-migrating companies is the defense technology firm Parsons (formerly in Pasadena, now in Centerville, VA). By moving to Virginia, the company is not only closer to the government procurement centers, but also to a whole interconnected defense infrastructure that includes suppliers, workers, research centers, etc.

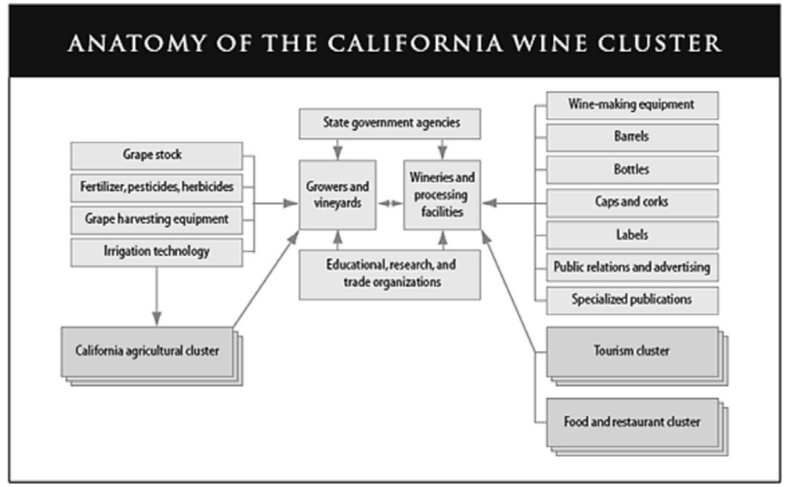
In discussing the composition and performance of a given area, the regional economy is often described in terms of 18 or so major industry groups, which consist of several individual industries. The industry groups include readily recognized segments of the economy such as construction, manufacturing, financial and professional services, health, education, and leisure and hospitality. A more substantive understanding of a region's economic composition is made possible by organizing individual, closely-related industries into so-called industry clusters, where inter-industry linkages are based upon empirically estimated input-output relationships between industries. In this section we explore the "health" of California's industry clusters. We analyze the evolution of industry clusters using the Quarterly Census of Employment and Wages (QCEW), where we collapse industry data into clusters using the definitions by *Delgado et al.* (2014)[6]

To illustrate the idea of cluster, we present a specific example. Figure 7 shows the anatomy of the wine cluster in California. Note that this cluster does not only include grape growers and vineyards, but it includes a varied group of industries in the cluster's supply chain, such as advertising and marketing, universities that generate knowledge, and even label printers. (Through the remainder of this report, industry clusters will be capitalized and their definitions will include the array of individual industries to which they have linkages. Individual industries will be identified in lowercase).

[5] For a formal explanation of Clusters please see: Porter, Michael E., "Clusters and the New Economics of Competition" *Harvard Business Review* November-December 1998 https://hbr.org/1998/11/clusters-and-the-new-economics-of-competition.

[6] Delgado, Mercedes, Michael E. Porter, and Scott Stern (2014) Defining Clusters of Related Industries. NBER Working Paper No. 20375 August 2014.

Figure 7: Anatomy of the California Wine Cluster[7]



An important characteristic of industry clusters is whether their output is consumed locally or exported to markets beyond their local area, regardless of whether that is within the state, nationally, or even internationally. Food Services and Retail Trade are examples of so-called local clusters that tend to employ large numbers of workers – both within their primary industries and across their supply chains – yet have lower wage premiums. Local cluster output is consumed within a geographical region. By contrast, clusters that serve larger markets that extend beyond a given region, state, or metro area are referred to as traded clusters. Although they tend to employ fewer workers, workers in these industries tend to have the largest wage premiums and present a source of growth for the entire region. Specifically, growth of traded industry clusters "spills over" into the local segments of the economy as workers in traded industries spend part of their wages on local goods and services, creating a multiplier effect at the regional level. Information Technology, Aerospace, Motion Picture and Sound Recording are all examples of traded industries that have a significant presence in the California economy.

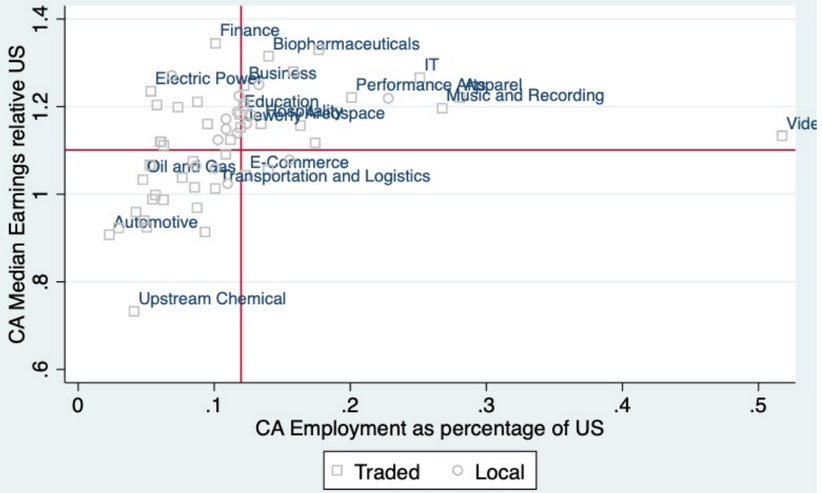
We first look at industry clusters at the state level, followed by an examination of industry clusters at the regional or metro level.

[7] Source: Porter, Michael E. (1998) Clusters and the New Economics of Competition. Harvard Business Review. 1998/11.

Industry Cluster Analysis - California

Figure 8 shows the distribution of clusters of California relative to the rest of the United States. The horizontal axis measures the percentage of the cluster's employment that works in California, and the vertical axis shows the differences in median earnings within the cluster between California and the rest of the United States. The red lines reflect the average cluster density for California and the average cluster wages. Not surprisingly, this relationship is positive: clusters that are concentrated in California tend to have higher wages, reflecting higher worker productivity within the cluster. Among the largest clusters in the state are Video Production and Distribution, Pharmaceuticals, or Apparel.

Figure 8: Crossplot of Relative California Earnings and Industry Cluster Concentration, QCEW, 2022



Source: Authors calculations using 2022 QCEW Data. The vertical and horizontal lines represent the relative CA-US cluster employment and the relative cluster median earnings respectively.

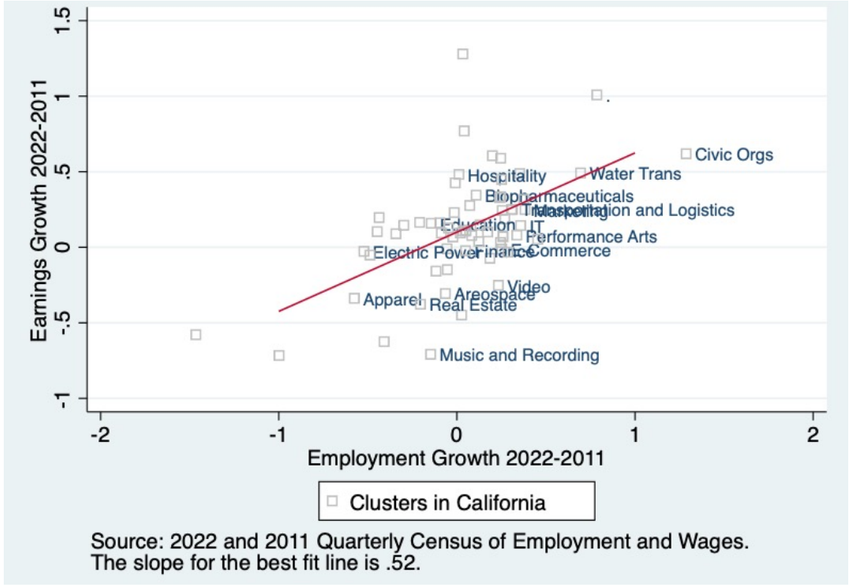
Figure 9 shows the average employment growth and wage growth of clusters across U.S. states. We highlight California in red, and also highlight some (often used) comparison states in green. Because the data is averaged across clusters, these estimates are weighted averages. California ranks eighth in wage growth and twelfth in employment growth. While not shown as the leader, note that California is in the top quartile of the state distribution even though it began this period in a relatively high position. Moreover, many of the states to which California is often compared to tend to perform as well as or better than California, including several western states (WA, UT, CO, OR, ID, AZ, and NV).

Figure 9: Crossplot of Earnings Growth and Employment Growth, QCEW, 2011-2022

Source: 2022 and 2011 Quarterly Census of Employment and Wages.

In addition to the state-to-state comparisons, we also need to focus on competitiveness *within* the state. Restricting the analysis to California data only, we estimate the within state wage and employment growth of each cluster. Figure 10 represents the relationship. Industry clusters farther to the northeast display the fastest growth rates of both wages and job creation or employment. These include Marketing, Water Transportation, Civic Organizations, Real Estate, and Transportation and Logistics. The slope of the best-fit line is 0.94. A best-fit slope of one implies that wage and employment grow at the same rate. A best-fit slope of less than one suggests that employment is growing faster than wages. For California, within-state cluster employment is growing faster than wages in the faster growing clusters.

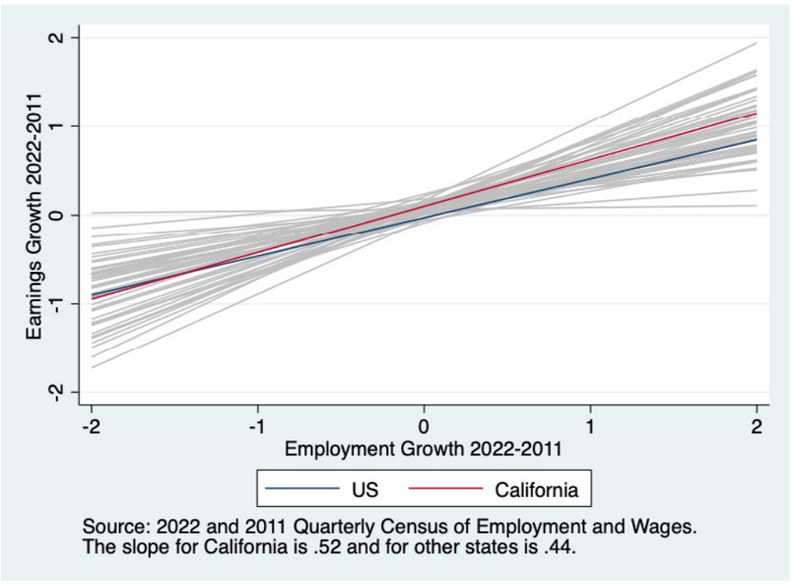
Figure 10: Crossplot of Earnings Growth and Employment Growth, QCEW, 2011-2022, Within-State and Across-Cluster Wage and Employment Growth



Source: 2022 and 2011 Quarterly Census of Employment and Wages.
The slope for the best fit line is .52.

How does California compare with the other states and the U.S. as a whole? Figure 11 shows the best-fit line for California in red, for the U.S. in blue, and for all 49 states in gray. The red lines in Figures 9 and 10 are identical. California's slope is not statistically different from that of the US as a whole, meaning that employment growth and earnings growth in California are essentially the same as the nation's.

Figure 11: Earnings Growth and Employment Growth Fitted Line, 49 U.S. States, California (Red), United States (Blue)



Source: 2022 and 2011 Quarterly Census of Employment and Wages.
The slope for California is .52 and for other states is .44.

The findings based on Figures 10 and 11 imply that the state's economy remains strong thanks to the strength of its clusters. But as the next section will show, aggregated data fail to capture important differences across regions. Some clusters are thriving, as are the regions within which they are located. In the same vein, other clusters are faltering, and the regions that host these clusters are struggling.

There are two possible explanations for this result: First, the high-wage clusters in California have lost some gravitational attraction, that is they are less powerful than they used to be, reflecting lower wage growth within each cluster. Alternatively, in 2011, California already had both a relatively high average wage and a high employment level, and other states played catch up between 2011 and 2019. This is what macro-economists who study economic growth call "unconditional convergence." The data supports both hypotheses to some extent, yet policy perspectives depend on which hypothesis better explains the actual situation.

California is home to a high-skill, innovative economy. However, and we feel the need to stress this here, the clusters that give the state this reputation appear at the regional level rather than at the

state level. In thinking about the state's leading industries, Entertainment is associated with Los Angeles, Agriculture with the San Joaquin Valley, Information Technology with the Silicon Valley, Biomed with San Diego, and Bio-pharmaceuticals with San Francisco. The strength of a cluster is related to the "thickness" of the labor market (the number of specialized workers in the cluster), linkages between different suppliers, and the diffusion of knowledge across various stakeholders. Each of these dimensions is both industry- and geographically specific. Their presence is largely confined to the metro areas shown above, not diffused throughout the entire state.

Not surprisingly, placed-based policies across the nation tend to promote the development of traded clusters. State and local governments spend vast amounts of resources to attract investments and workers that will establish and develop traded clusters. If place-based policies do succeed in attracting firms and workers, then it is possible that the industry composition of other states may replicate that of California. We explore this question with the data from Figure 12 and Figure 13.

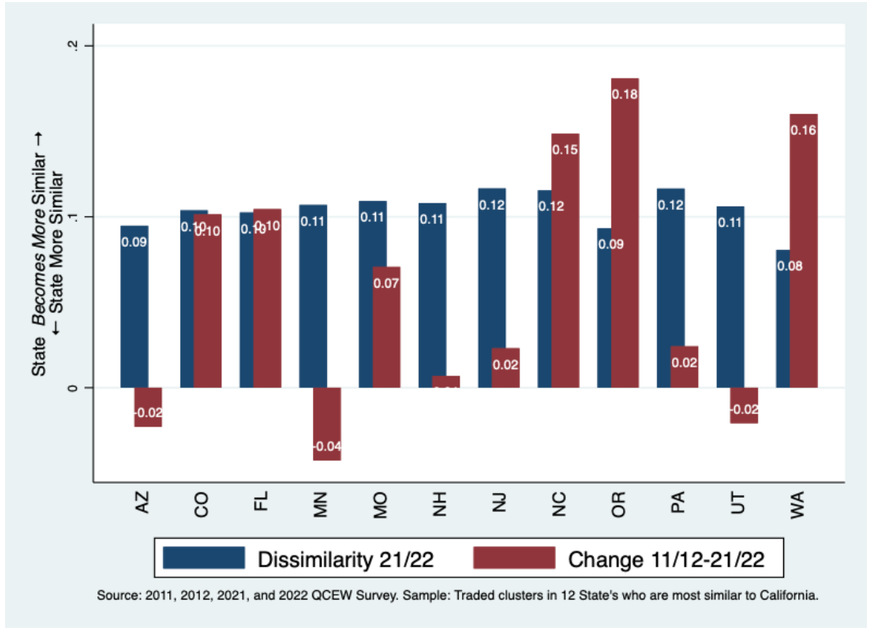
In Figure 12 we explore whether the industrial composition of other states is similar or not to that of California, and whether any differences across states disappear across time. We calculate a dissimilarity index, which measures the extent to which one region is different from another. Index values range between 0 and 2, with 0 implying that the two regions are exactly the same in terms of industry composition and 2 implying that the two regions are completely different. The dissimilarity index is given by the following formula:

$$DI = \sum_{i=1}^{N} |IC_i^C - IC_i^J|.$$

The dissimilarity index measures the difference in absolute value terms between the proportion of workers employed in California in industry i and the proportion of workers in state J in industry i, summed overall industry clusters.

Figure 12 presents both the dissimilarity index and the change in the dissimilarity index between 2011/12 and 2021/22. The blue bars represent the dissimilarity index in 2021/2022. The red bars show how much these indexes have changed during these twelve years. States that are more similar to California have the smallest blue bars. In this figure we present the twelve states that are most similar to California. States that have become more like California would have the largest red bars. The data in Figure 12 suggests that Washington, Oregon, and Arizona are the states most like California. The data also suggests that North Carolina, Florida, and Colorado are becoming more like California over time. These data present evidence that across states we have seen a convergence of their industry composition.

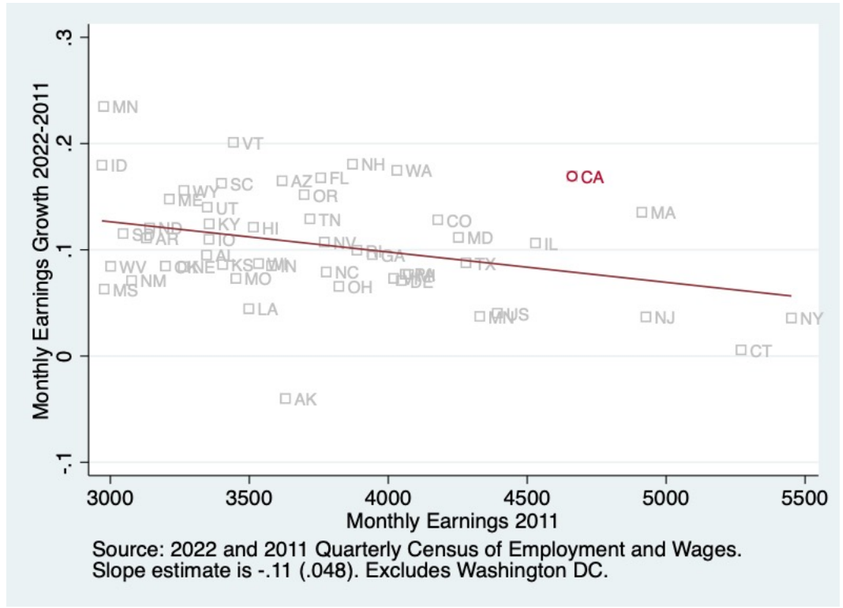
Figure 12. California-Other States Dissimilarity Index



Source: 2011, 2012, 2021, and 2022 QCEW Survey. Sample: Traded clusters in 12 State's who are most similar to California.

To support the evidence in Figure 12, data in Figure 13 indicates whether the earnings across states are converging or diverging. The data in this figure span 2011 to 2022. Convergence implies that states who started with high relative earnings would have smaller earnings increases than states who started with low earnings. Convergence in the industry cluster composition across states is in line with earnings convergence. The data in Figure 13 suggests that, in fact, states that had lower earnings at the start of our period of interest observe larger changes in their earnings. Interestingly enough, California is somewhat of an outlier, as it started off with relatively high earnings and still experienced relatively high increases in earnings. In the next section, we will argue however, that the focus in the state as a whole masks some important regional differences.

Figure 13: Crossplot of Average Earnings Growth Rates against Monthly Earnings in Base Period, Unconditional Convergence



Source: 2022 and 2011 Quarterly Census of Employment and Wages.
Slope estimate is -.11 (.048). Excludes Washington DC.

Industry Cluster Analysis - Metro Areas

It is fairly common to identify states in terms of their leading industries: New York is the financial hub, Texas and Alaska are oil states, and California is home to high tech as well as the entertainment industry. But in all states, and especially in one as large as California, there are distinct differences in the economic composition of individual regions within the state: Los Angeles, for example, is known for its entertainment, media and logistics sectors, Orange County for real estate and fin tech, the Inland Empire for logistics, and the Silicon Valley for information technology.

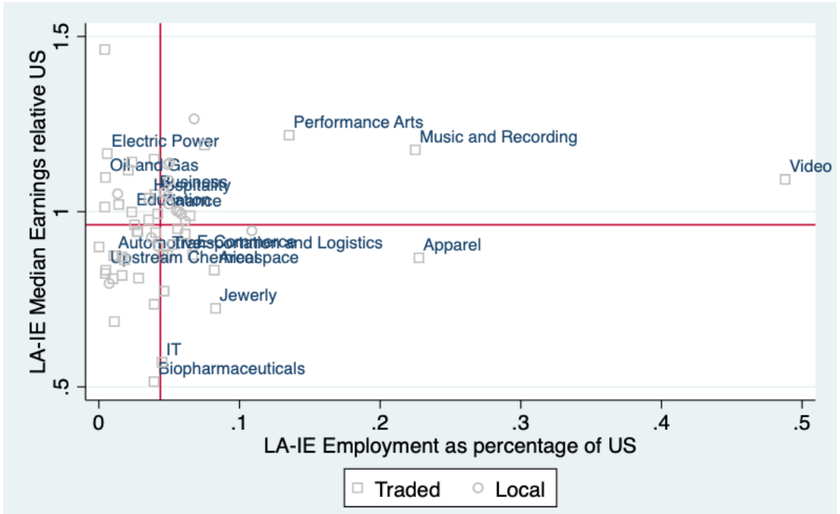
In this section we focus on regional clusters to better understand the geographic areas, and, with the whole being the sum-of-the-parts, the overall state economy. Our attention is primarily directed to the Greater Los Angeles-Inland Empire (LA-IE) area, which is composed of Los Angeles County, Orange County, Riverside County and San Bernardino County. For comparison purposes, we also look at the industry cluster composition of selected Consolidated Business Statistical Areas (CBSAs) in California, such as San Diego-Carlsbad, San Francisco-Oakland-Hayward, and San Jose–Sunnyvale-Santa Clara.

We have several objectives in this section. First, we identify relevant industry clusters in the LA-IE region and categorize the clusters as traded or local. Second, we evaluate their relative importance. Third, we gauge their performance by estimating changes in cluster wages relative to changes in cluster employment growth. Finally, we compare patterns in industry clusters across the CBSAs over time to determine the extent to which the regions have grown to resemble each other or whether catch-up has occurred.[8]

The most readily recognized signature industry clusters in Southern California include Distribution and Electronic Commerce, Information Technology and Analytical Instruments, and Video Production and Distribution, all of which are traded clusters. The most prominent traded industry clusters in the LA-IE region are identified in Figure 14. The gray markers refer to other traded (square) and local (circle) clusters. The top ten traded and local industry clusters in the LA-IE region are shown in Appendix 2. Video Production, Aerospace, and Financial Services tend to play a more important role in the region than in the state. On the other hand, Information Technology and Education and Knowledge Creation play a more important role in the state than in the region. Ranking the top industries allows us to draw comparisons with other regions. By computing each region's relative shares of industry employment, one can compare these with other regions. We can then establish more definitively a region's industry strengths and weaknesses, as well as its similarities and dissimilarities, relative to other regions.

Next, we estimate the changes of the within MSA variation in cluster density and the change in cluster wage growth. Each dot in the graph represents a different traded cluster for a given MSA. Those for the region in question are represented in red. The gray line represents the relationship between change cluster importance at the local level and wages across all observations in the US. The red line represents the same relationship for the traded clusters in the relevant region. The data in this section is restricted to traded industry clusters that serve markets beyond the metropolitan area. The economic interpretation of these graphs is that the more concentrated a cluster's labor force is within a region, the stronger the cluster force will be and the more advantageous it is for firms and workers in the cluster to operate within that region. Note that Video Production, Music and Recording, Apparel, and Performance Arts tend to be over-represented in the LA-IE region, and not surprisingly, workers within these clusters are more productive and command an earnings premium.

Figure 14: Leading Clusters in the LA-IE Region



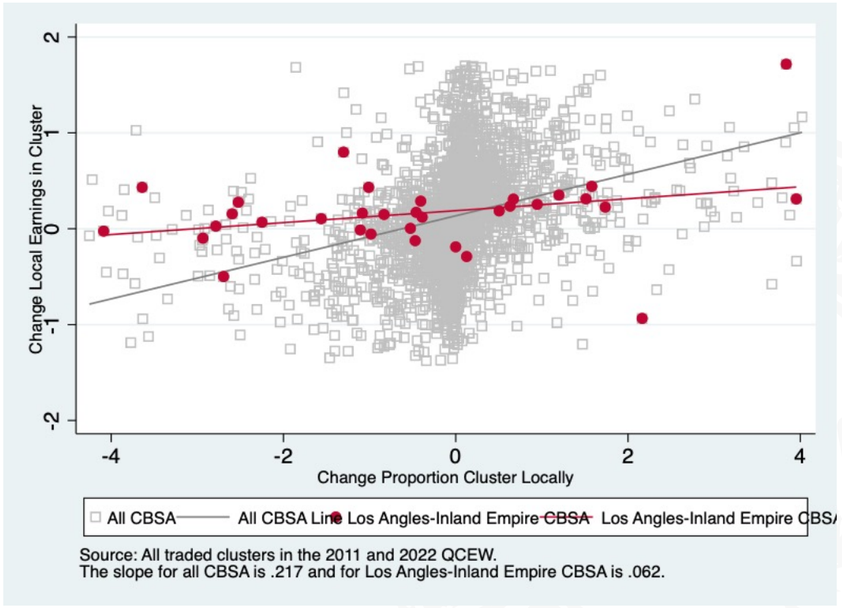
Source: Authors calculations using 2022 QCEW Data. The vertical and horizontal lines represent the relative LA/IE-US cluster employment and the relative cluster median earnings respectively.

[8] The linefit represents the relationship between the average growth rate in monthly earnings over the sample period (2011-2022) and the monthly (log)earnings in the base period (2011). If the slope is negative, then this is evidence that areas that started further back in the initial period are catching up, or converging towards the leaders ("beta convergence"). A running track analogy would be if you lined up runners at the starting of the race not in the same spot but allowed some of them to be ahead of the others, then if those who were lined up furthest behind ran faster than those at the front, there would be "catch-up."

[9] Note that the variable on the horizontal axis differs from that of Figures 9 and Figure 10. Here, the distribution is within each metropolitan area.

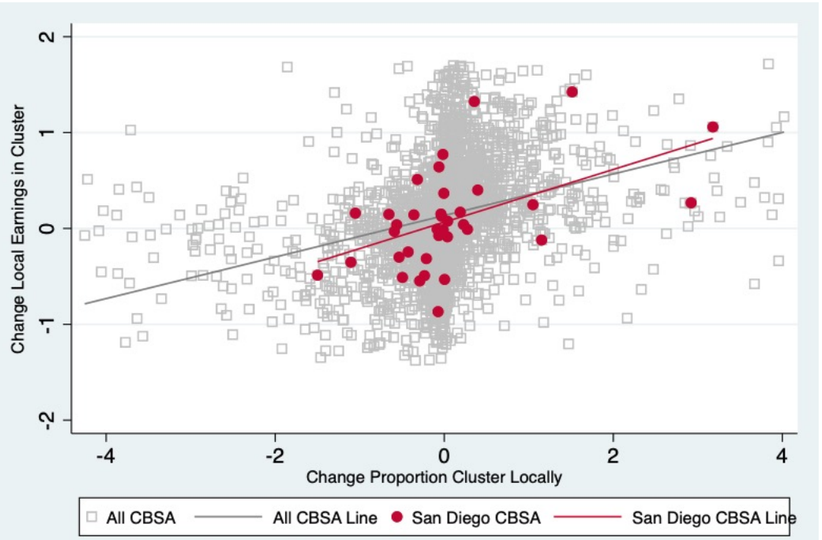
Figures 15A to 15D show the relationship between cluster density and earnings in the four California metropolitan areas. The figures also show the best-fit line for all traded industry clusters in the US metropolitan areas in gray. The gray line suggests that a one percentage point change in the cluster density at the local level is associated with an 0.21 percentage point increase in the earnings of workers in the cluster. Figure 15A shows the relationship for the larger LA-IE area is almost one-third the national estimate, that is, a one percentage point increase in cluster density is associated with a 0.062 percentage point increase in earnings. Stated differently, while the LA-IE region is growing in terms of employment, earnings growth falls short of average earnings growth across all US metropolitan areas. For reference, Figure 15B, 15C, and 15D show the same relationship for the San Diego CBSA, San Francisco CBSA, and the San Jose CBSA, respectively. As shown in the figures, earnings growth in the other California regions' clusters has been at least as robust as that of the US as a whole. Regardless, the clusters in these regions have experienced earnings growth that has far outpaced that of the clusters' in the LA-IE region.

Figure 15A: Cluster Employment and Earnings Growth Los Angeles-Inland Empire



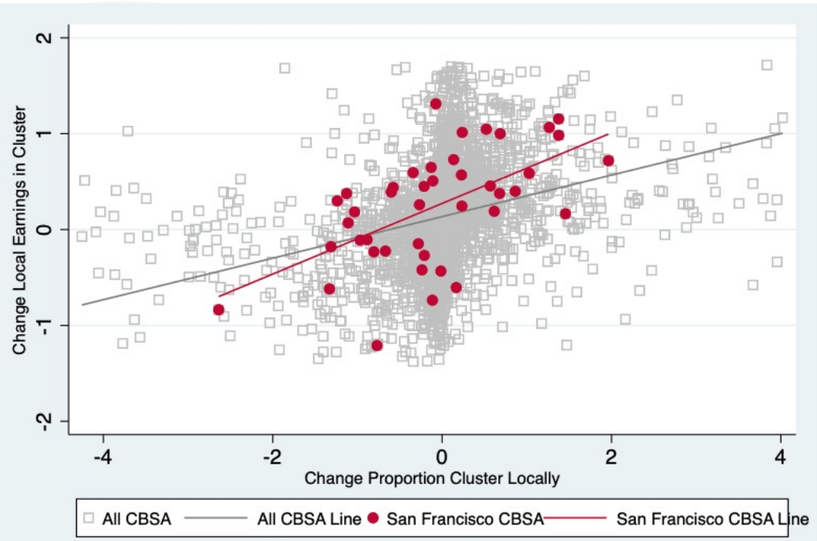
Source: All traded clusters in the 2011 and 2022 QCEW.
The slope for all CBSA is .217 and for Los Angles-Inland Empire CBSA is .062.

Figure 15B: Cluster Employment and Earnings Growth San Diego



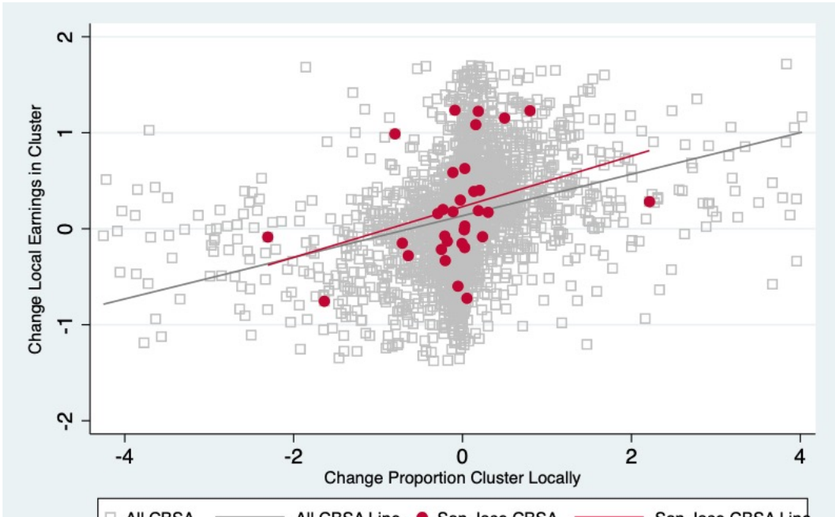
Source: All traded clusters in the 2011 and 2022 QCEW.
The slope for all CBSA is .217 and for San Diego CBSA is .275.

Figure 15C: Cluster Employment and Earnings Growth San Francisco



Source: All traded clusters in the 2011 and 2022 QCEW.
The slope for all CBSA is .217 and for San Francisco CBSA is .368.

Figure 15D: Cluster Employment and Earnings Growth San Jose



Source: All traded clusters in the 2011 and 2022 QCEW.
The slope for all CBSA is .217 and for San Jose CBSA is .264.

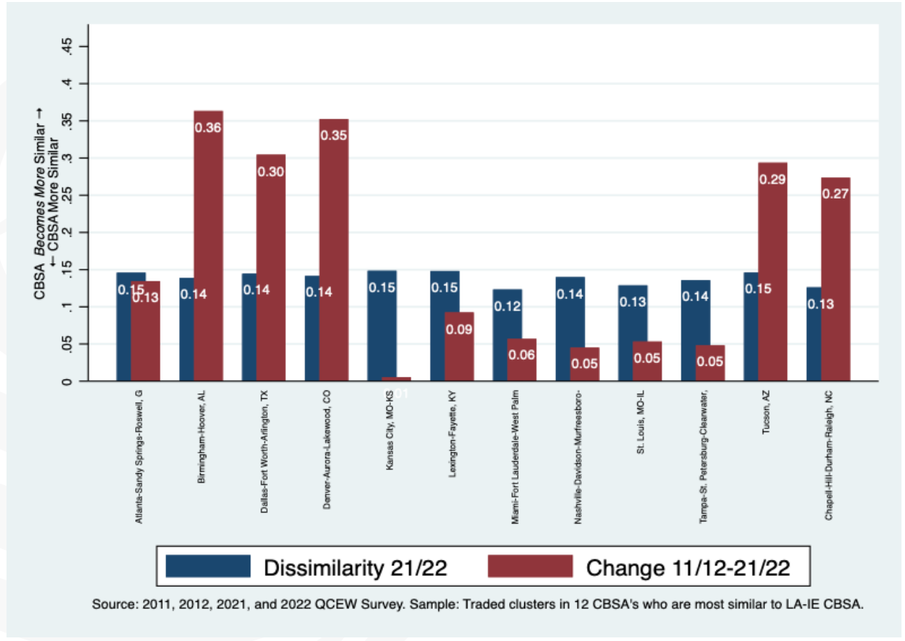
It is useful to determine how the composition of the LA-IE regional economy based on its industry clusters has changed over time relative to other regions. This section compares the LA-IE region with several other regions over time, the goal being to establish whether certain regions have become more similar or less similar to the LA-IE region over time. The significance of this analysis is that workers and population tend to flow between metro areas that are similar with respect to their economic composition. In turn, as metro areas in other parts of the country become more like California metro areas in terms of economic composition, their economies become more integrated with California's cities and these cities become more attractive as destinations for workers and firms that consider leaving California's metro areas.

As we did for California in Figure 12, our analysis in this section compares the regions of California with all large Core Based Statistical Areas in other parts of the country. Because we are interested in the networks between different metropolitan areas, we restrict our attention to traded clusters in CBSAs with at least 500,000 workers. Our results for the Los Angeles-Inland Empire are presented in Figure 16. Table A3 in the appendix shows the dissimilarity index for all four metropolitan areas in California.

The data for the cluster distribution for other regions in the state shows some interesting results. First, geography seems to matter. Cities in the western states are similar to the cities in California. Yet the set of results from our dissimilarity analysis present some interesting insights. The CBSA that is most like San Diego is Knoxville, TN (Figure 16B). Yet, Tucson AZ, Dayton, OH, and Knoxville's industry composition has become more like that of San Diego. The city that is most like San Francisco is the Austin-Round Rock CBSA (Figure 16C). Not only is this area very much like San Francisco, but the cluster distribution has become very much like that of the city. Finally, most other CBSAs are very different from San Jose (Figure 16D). This is not surprising. Seattle and Cape Coral-Fort Myers FL. are the most like San Jose, but Madison WI is the CBSA that has become more like Silicon Valley.

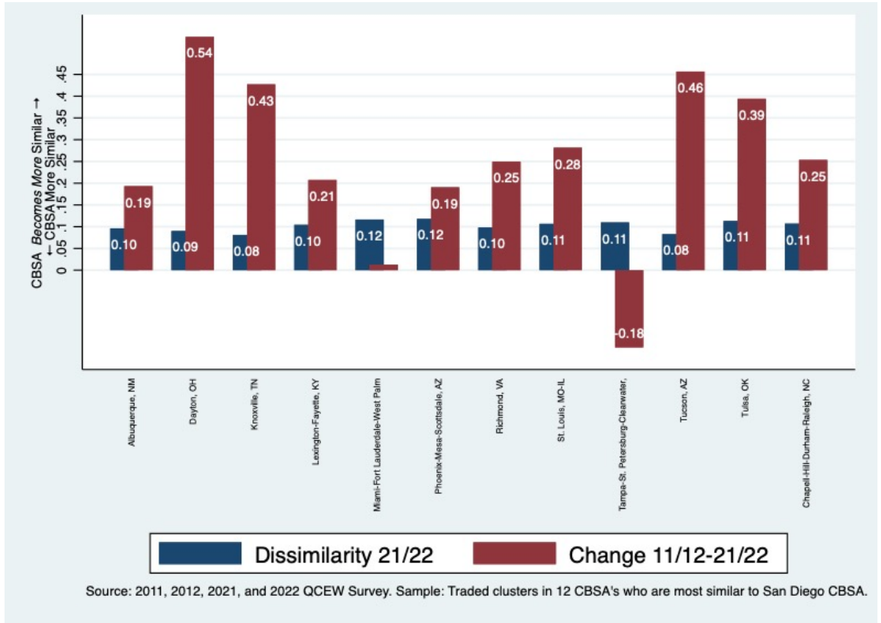
The important lesson from figures 15 and 16 is that there is not one California story. The clusters in the regions in the state are linked vertically with metropolitan areas that host similar clusters. For example, Los Angeles and Dallas have clusters in Aerospace and Financial Services. San Francisco and Austin have clusters in Information Technology and Education. Clusters in regions across the United States are vertically integrated, highlighting the importance to disaggregate data beyond the state level.

Figure 16A: Dissimilarity Analysis Los Angeles- Inland Empire



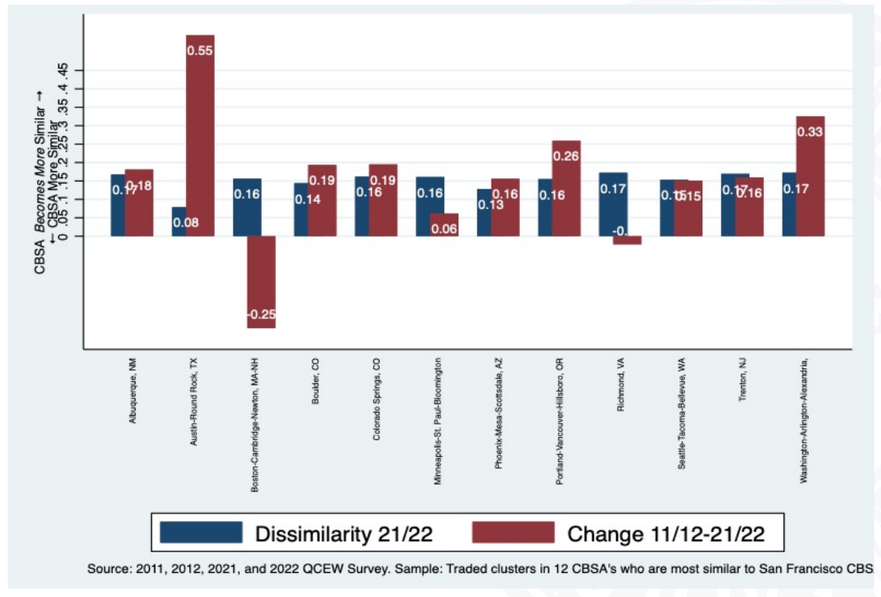
Source: 2011, 2012, 2021, and 2022 QCEW Survey. Sample: Traded clusters in 12 CBSA's who are most similar to LA-IE CBSA.

Figure 16B: Dissimilarity Analysis San Diego



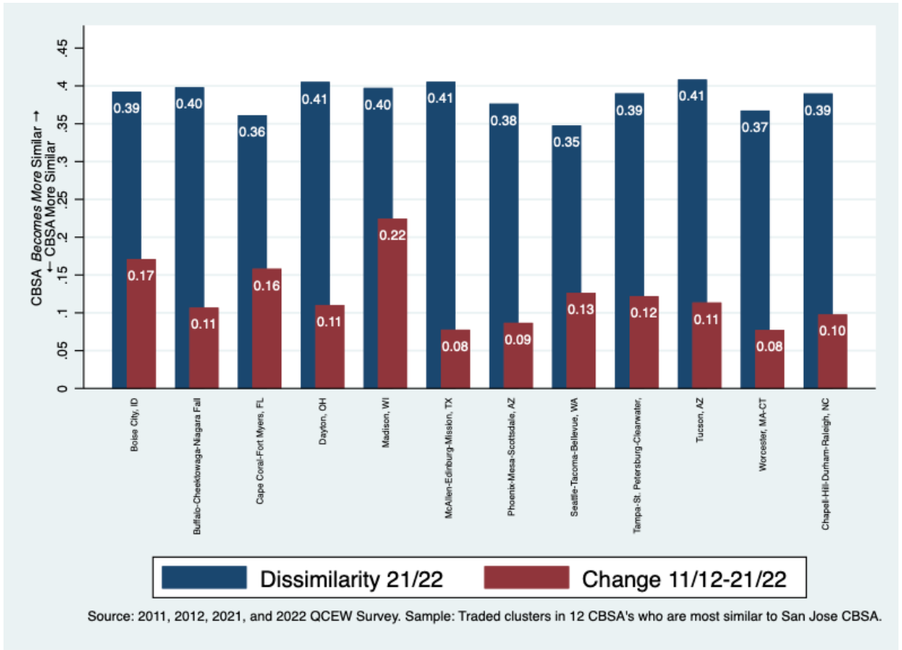
Source: 2011, 2012, 2021, and 2022 QCEW Survey. Sample: Traded clusters in 12 CBSA's who are most similar to San Diego CBSA.

Figure 16C: Dissimilarity Analysis San Francisco



Source: 2011, 2012, 2021, and 2022 QCEW Survey. Sample: Traded clusters in 12 CBSA's who are most similar to San Francisco CBS

Figure 16D: Dissimilarity Analysis San Jose



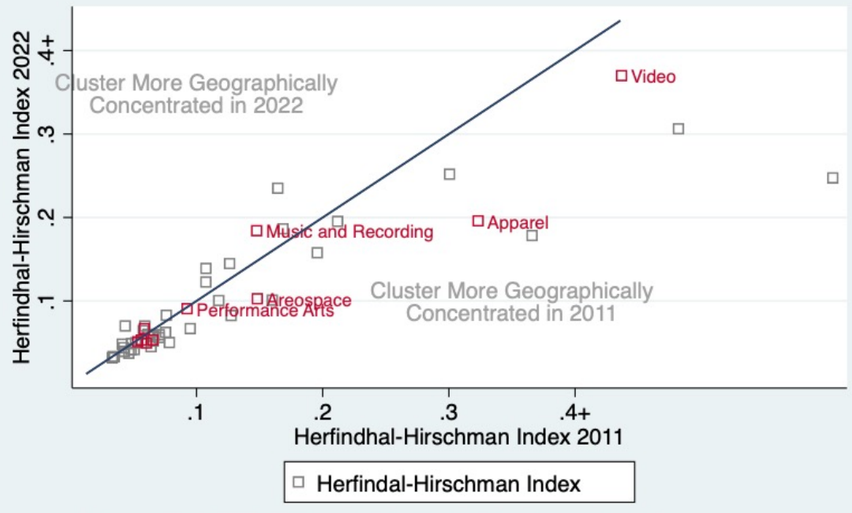
Source: 2011, 2012, 2021, and 2022 QCEW Survey. Sample: Traded clusters in 12 CBSA's who are most similar to San Jose CBSA.

Clusters, Industry Composition, and Interregional Competition

The health of a cluster is determined by its ability to attract and retain firms and workers within the regional economy. When a cluster is successful, the cluster firms and industries will be concentrated in a few locations. Successful clusters attract more firms and clusters. When the cluster weakens, its gravitational attractiveness diminishes, and the distribution expands to different locations. For example, Enrico Moretti[10] shows that in the Semiconductor cluster, seventy-seven percent of all inventors are located in ten clusters. The hypothesis that other metropolitan areas' industrial composition is converging to that of California's regions should reflect a dispersion in the distribution of the tradable industry clusters. One way of addressing this question is by looking at the Herfindal-Hirshman (HH) Index at the cluster level across two periods of time. The HH Index measures the concentration of an industry cluster at various points in time. If the HH index increases over time, then the cluster has become more concentrated. If the HH Index decreases, the cluster has become less concentrated, or more dispersed across regions.

[10] https://www.nber.org/digest/nov19/most-us-high-tech-inventors-live-just-few-urban-clusters

Figure 17: Herfindahl-Hirschman Index Traded Clusters



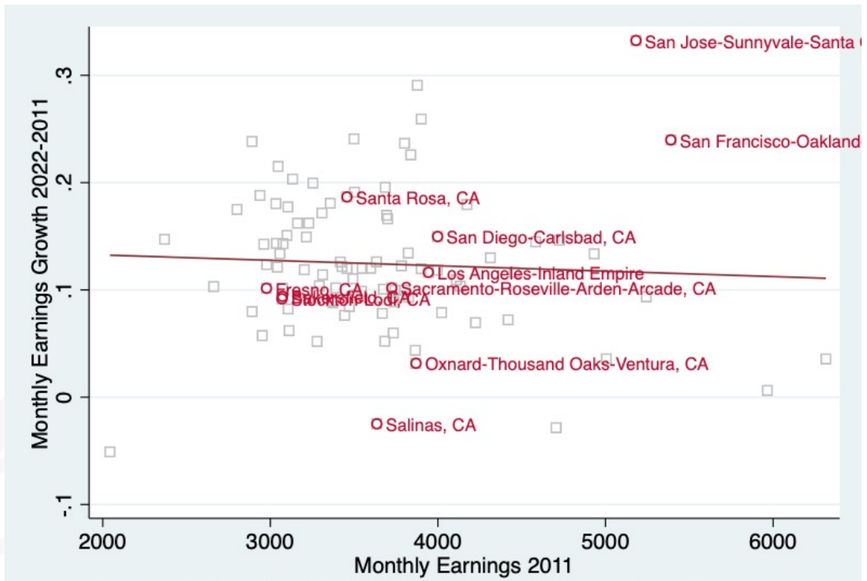
Source: 2011-2022 Quarterly Census of Employment and Wages
HH Index Represents the industry geographic concentration.
The largest the HH Index, higher the concentration.
Red markers represent the Top 10 Industry Clusters in LA-IE Metro Area.

Figure 17 shows the HH index for all tradable clusters. The horizontal axis shows the HH index in 2011, and the vertical axis shows the HH index in 2022. The diagonal line is a 45-degree line. Combinations of 2011 and 2022 HH Index that are above the 45-degree line represent clusters that became more geographically concentrated in 2022. Combinations of 2011 and 2022 HH Index under the 45-degree line represent clusters that become more dispersed (or less concentrated). The clusters highlighted in red are the top ten traded clusters in the LA-IE area, most of which are on or below the 45-degree line, with the exception of Music which is just above the 45-degree line. In particular, Video Production and Distribution, Aerospace Vehicles and Defense, and Apparel are clusters that are disproportionately important to the Los Angeles area, yet have become less geographically concentrated during this period.

Unconditional Convergence

In the section where we described the clusters of California, we showed that state level earnings were converging towards each other. In this section, we explore the same question using CBSAs as our unit of analysis. Our exercise regresses the change in earnings between 2011 and 2022 on the initial (2011) earnings. A negative relationship between these two variables suggests that lower earnings regions are converging to regions with higher earnings.

Figure 18: Unconditional Convergence at the Regional Level



Source: 2022 and 2011 Quarterly Census of Employment and Wages.

Figure 18 shows the convergence data for the CBSA's with at least 500,000 workers, and unlike the state-level exercise, we find no evidence that the regions across the United States are converging in earnings. This divergence highlights the fact that under the new economy, one where skilled labor and thick labor markets are increasingly important, we do not divide winners and losers at the state level. Rather, the successful regions will be those that are able to connect to other high productivity regions around the world. Figure 18 highlights the CBSAs of California in red, and not only do we not see a negative relationship that supports the regional convergence story, but we in fact see a strong positive within-state relationship. This positive relationship suggests that the areas within the state are diverging: those who have originally higher earnings will have even higher earnings in the future. Those who had originally lower earnings will have even lower earnings in the future.

V. Affordability, Amenities, and Population Migration

Affordability

In the previous section, we argue that regional competitiveness and population dynamics may be explained in part by each region's industry clusters. When a region's clusters are thriving, workers and firms will migrate into the region. These clusters are also horizontally integrated with similar clusters in other regions, promoting at the same time the migration of workers, firms, and ideas between similar regions.

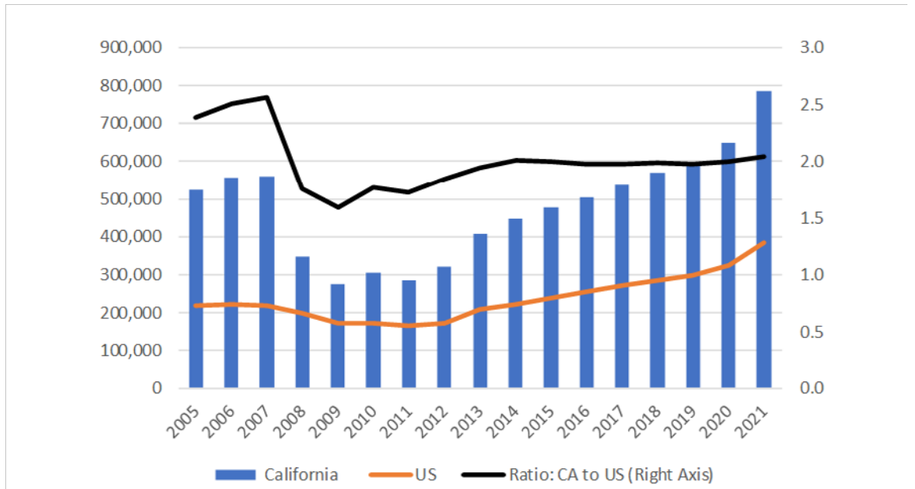
Yet, cluster competitiveness does not completely explain population dynamics. Research by the California Policy Lab (Holmes, 2022) shows that the San Francisco region has lost the most workers to migration since the COVID-19 pandemic, despite evidence presented in the previous section that suggests San Francisco's industry clusters are thriving, experiencing both increases in employment and productivity. How can we reconcile these two facts?

In this section we move beyond a "one-size-fits-all" or a "smoking-gun" mentality to elaborate more carefully how the various economic forces interact, and to examine other factors that may determine a region's productivity and population movements. To complement the cluster's productivity hypothesis, we introduce two more hypotheses that are simultaneously interacting within a region. The first one is affordability. The second one is amenities.

As metro areas in other parts of the country have increasingly resembled the economic composition of California's metro areas, they have become more attractive places in which to conduct business. They are often attractive places to live, if for no other reason than the cost of living is lower.

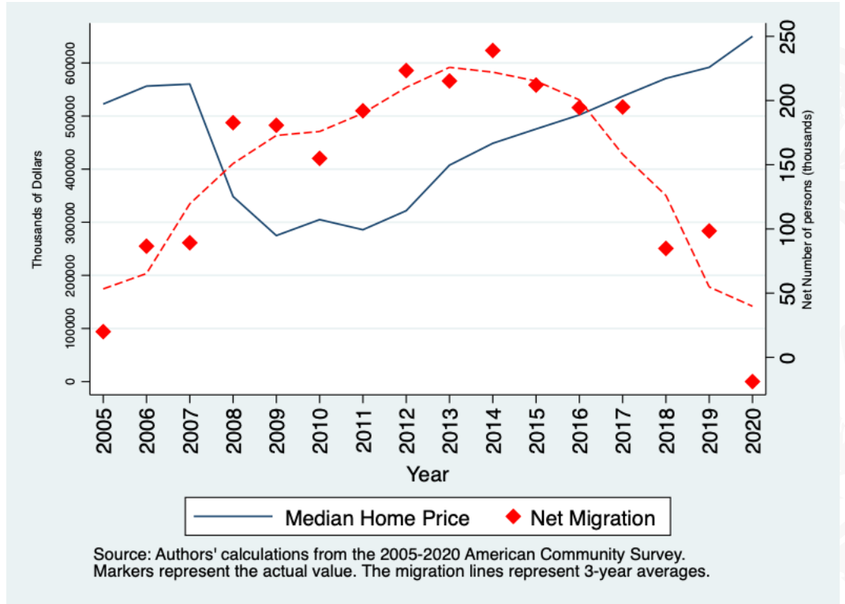
Fifty years ago, California's median home price was roughly the same as the U.S. median price. California's median diverged from the U.S. median over the ensuing decades, and since 2005, California's home price has been between 1.5 and 2.5 times higher than the national median (Figure 19). In 2021, the California median price was $790,000, 2.04 times the national median of $386,000.

Figure 19: Median Home Price in California Twice That of The U.S.



Source: California Association of Realtors, National Association of Realtors

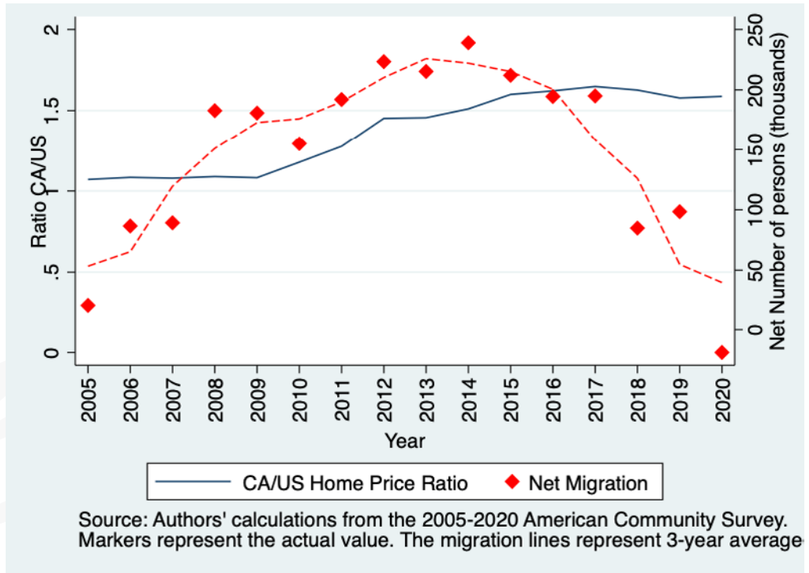
Figure 20: Median California Home Price and Net Migration



Source: Authors' calculations from the 2005-2020 American Community Survey.
Markers represent the actual value. The migration lines represent 3-year averages.

Figure 20 shows a strong negative relationship between migration to California and home prices. This figure includes the same net-migration data as Figure 1. The data shows that as the median home price of California decreases, migration is positive. As median home prices increase, migration decreases, until net migration is negative by 2020. Yet, we should caution that the relationship in Figure 20 does not necessarily imply causation. To further explore this issue, Figure 21 instead plots net migration again, but with the ratio of home prices between California and the rest of the nation. The relationship is less clear now, as the price ratio monotonically increases during this period of time, showing little correlation between the two data series.

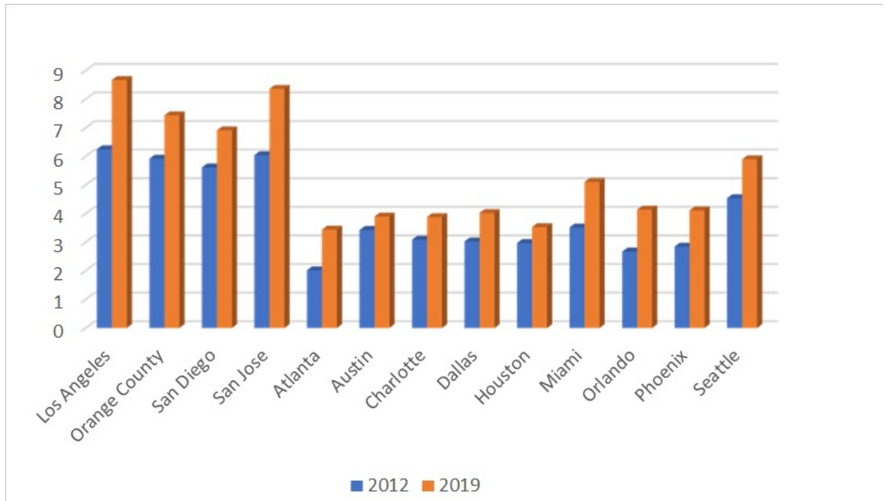
Figure 21: CA/US Home Price Ratio and Net Migration



Source: Authors' calculations from the 2005-2020 American Community Survey.
Markers represent the actual value. The migration lines represent 3-year average

Again, we want to highlight the importance of comparing regions and not states. California metro area home prices, which were already high by national standards, rose steadily during the 2010s, making these areas less affordable places to live, both in absolute terms and relative to other parts of the country. Figure 22 shows the home prices as a multiple of income in selected areas. In 2012, home prices in the non-California metro areas shown were roughly 3 times their median household incomes. By comparison, median prices in the California metro areas shown were 6 times their median household incomes. Home prices increased faster than incomes during the 2010s across much of the country, and by 2019, the non-California multiple increased to four, while that of California's metros increased to eight.

Figure 22: From Bad to Worse-Housing Affordability In California vs. Other MSAs: Price to Income Ratios by Metro Area



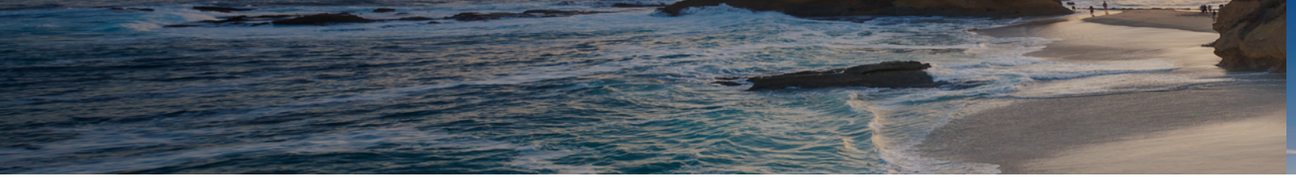
Source: Redfin, American Community Survey, Author's Calculations

The implications of these findings cannot be overemphasized. As other metro areas in the country have become more like California metro areas in terms of economic composition, they have also become attractive places in terms of the cost of living. All else equal, if an out-of-state community offers economic opportunities that are the same as or better than those available in a California community, and if the cost of living in an out-of-state community is half that of a comparable California community, the scales increasingly tip in favor of the out-of-state community.

Amenities

If affordability alone is not sufficient to lure residents from California metro areas to other parts of the nation, it may be due to a change in the availability of amenities. There is a seemingly endless list of reports on the best or most livable cities. A recent Google search of "best places to live in the U.S. 2022" resulted in more than 3 million hits with links to reports and articles that include CBS News. Money and Forbes magazines, and an array of lesser known sites.

As communities across the country increasingly offer amenities to their residents that are on a par with those in California communities, they become more suitable alternatives. The term "amenity" encompasses a wide range of community attributes, such as access to the arts, recreation



opportunities, other consumer experiences, quality education institutions, walkability, limited highway congestion, and safe neighborhoods. In general, a better quality of life is associated with communities that have more amenities. Accordingly, to the extent that California communities receive poor rankings with respect to overcrowding, congestion, crime, homelessness, and quality of education, along with the high cost of living, they become relatively less attractive places to live relative to communities in other parts of the country that may have newer infrastructure s together with more flexibility around housing supply.

Finally, as Glaeser (2008) points out, amenities are also associated with the availability of air conditioning and more affordable electricity costs, both of which served as catalysts to growth in the Sun Belt. California's climate, which has historically given it an edge over many other parts of the country, notably the South and the West, was largely negated by the advent of air conditioning. Regions that were once uncomfortable, or even inhospitable, places to live and work have become more attractive relative to California communities. All in all, California communities must increasingly compete with cities in Arizona, Texas, or Georgia where residents can enjoy much the same lifestyle as in California, but can do so more affordably.

VI. California: Perennial Economic Decathlon Winner

Despite high profile relocations of firms and recent declines in population, California remains the top economic powerhouse among U.S. states. It is not only the most populous state, but its economy is the largest of the 50 states by far. In fact, California would be the 5th largest economy globally if it were a sovereign country.

California has maintained this position as the nation's leading state for several decades. It is home to the most dynamic tech sector concentrations in the country, attracts an exceptionally large share of venture capital, and is among the top states, if not the top, in many key industry clusters ranging from technology and biosciences to entertainment, tourism, and trade.

It is impossible to accurately assess California's economic performance, or that of any economy, with just one metric. Indeed, progress among economies over time must be gauged with the help of a variety of indicators. The "economic development competition" among states can be compared to an Olympic decathlon in which each athlete must compete across a number (10, as the name suggests) of sporting disciplines. The winner does not have to come in first across all or the majority of all disciplines, but he or she must earn the highest cumulative score across all disciplines to win the event.

There is no universally agreed upon set of economic performance indicators that may collectively be used to establish how states rank, although such a collection of indicators would likely include some combination of output, jobs and workforce, leading industries and industry clusters, wages, income per capita, educational attainment, patents, venture capital attraction, an assessment of the business climate, and the tax climate. California leads the nation in terms of state Gross Domestic Product, employment, the number of patents, and venture capital. It also benefits from relatively high levels of educational attainment, and significantly, the presence of major higher education institutions such as the University of California campuses, Stanford, Cal Tech, USC, and other higher learning institutions.

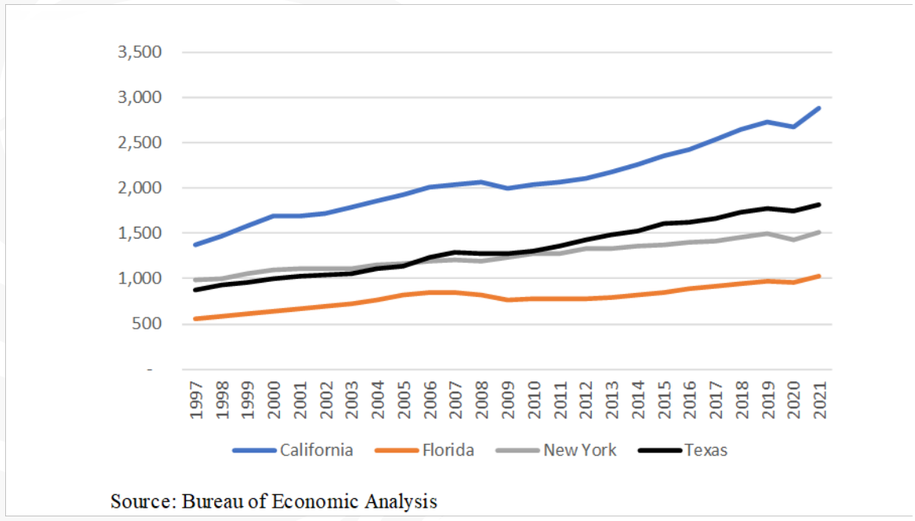
California has been the perennial winner in the economic decathlon of U.S. states for decades, but other states have closed the gap in recent years. California's lead vis a vis other states afforded it the latitude and resources to pursue other goals, such as increasing the social safety net to its residents, pursuing ambitious environmental quality goals, and passing legislation to increase labor protections, to name a few. The state's ambition in terms of knowledge, environment, and labor has given us a first-

mover advantage. Yet, pursuing each of these goals involves costs that were willingly undertaken not the least because they also helped attract human capital and entrepreneurs. This raises the question: Did the benefits of these regulations, and the first-mover advantage, outweigh their costs? Or did they reduce California's advantage relative to other states to an extent that now challenges California's economic leadership position within the United States?

Meanwhile, other states gained ground relative to the California economy over the decades, partially by following California's example. For example, they invested in infrastructure and amenities, and they improved homegrown talent pipelines through investments in K-12 and higher education. Increased business opportunities allowed them to retain and even attract more talent. As a result, although California remained the largest state (the leader), other states grew faster in population. These achievements gradually narrowed California's lead.

With 40 million residents, California is by far the largest state in terms of population, with Texas a distant second at 30 million in 2022. California also leads the nation in terms of employment with 17.7 million nonfarm wage and salary positions, again, well ahead of second-place Texas with 13.7 million as of November 2022. Similarly, it is the largest state in terms of economic activity as reflected in state GDP (Figure 23). In fact, if California were a country, its economy would be among the four or five largest globally, surpassed only by the U.S., China, Japan, and Germany.

Figure 23: Real GDP for Largest States, $ billions



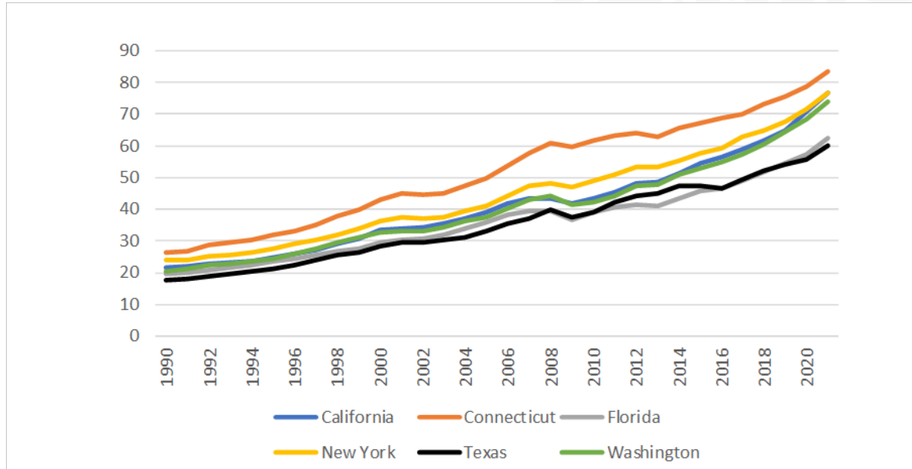
Source: Bureau of Economic Analysis

The state's lead over other parts of the country may be attributed in part to its array of successful industries and firms. As mentioned in Section IV, California dominates or is among the nation's leaders in Information Technology, Biopharmaceuticals, and Aerospace. The same is true of entertainment industries such as Video Production and Distribution and Music and Recording, along with other creative clusters such as Apparel and Jewelry. With its systems of higher learning and research, California is among the world's leaders with respect to Education and Knowledge Creation. Last but not least, its Finance cluster accounts for a significant share of the nation's capacity in these industries.

Given this portfolio of industries and their performance over time, it should be no surprise that California consistently "punches above its weight" in terms of its contribution to the national economy. That is, while California accounts for just 11% of total jobs nationally, it has accounted for 15% of the nation's job changes since the year 2000, and at times, has accounted for as much as one-third of the nation's job growth.

While all of these indicators may be used to describe the overall health of each economy, a separate measure is commonly used to measure the well-being of geographic areas: per capita income. California ranks among the top states, behind Connecticut and New York state, on par with the state of Washington, but well above other large states such as Texas and Florida (Figure 24).

Figure 24: Nominal Per Capita Income of Selected States, $1,000

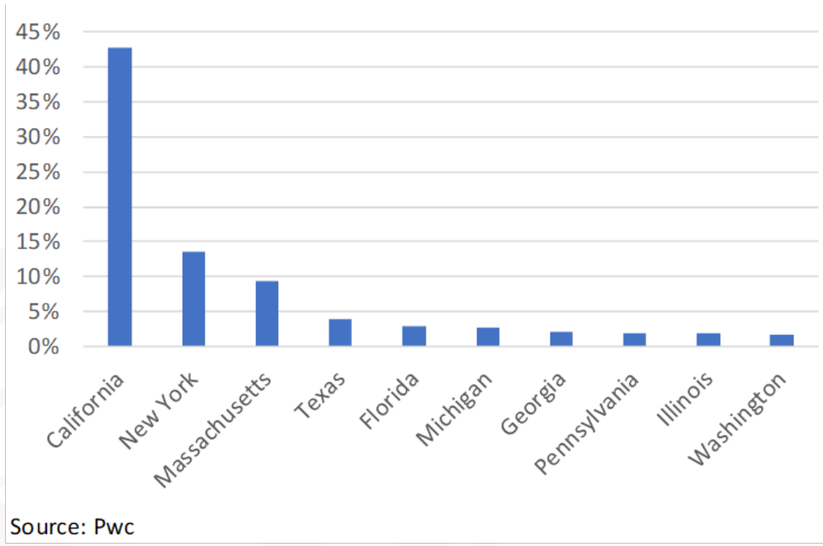


Source: Bureau of Economic Analysis

In terms of economic performance, California is often portrayed as the main innovator within the U.S. economy, but also as a state that has seen better days. Texas, which was once mainly viewed as a major oil and energy producing state, now is gaining the image of attracting major innovative talent. Silicon Valley vs. Austin seems to be a major theme in firm location and migration of high tech individuals.

As always, it is good to rely on solid data, not perceptions. Take the share of U.S. Venture Capital for example. California attracted a higher share (43%) than any other state in 2021, by far. There is quite a distance to second place New York state (14%), Texas (4%), and Florida (3%). While other participants in the economic decathlon are slowly gaining ground, but based on this metric (discipline), California remains the undisputed leader.

Table 25: Shares of U.S. Venture Capital among Top Ten States (2021)



Source: Pwc

Similarly, California is the national leader by far in terms of patents. One third of all patents issued in the U.S. in 2020 were registered in California. With 53,000 patents that year, the only country in the world that surpassed the state with a total of 54,000 patents, was Japan (data source: U.S. Patent Office). These numbers should be no surprise, given the state's top industries, which are global – not just national – leaders; and given the research done at the state's top education institutions.

The state fares less well in terms of business climate, taxation, and other measures. As mentioned earlier, the Tax Foundation ranked California 48th among the nation's states on its State Business Tax Climate Index. The perception is that the state also ranks poorly in terms of regulation, given the state's labor regulations and its array of stringent environmental regulations. Finally, as described above in the previous section of this report, the state has faced cost of living challenges for decades, diminishing its appeal as a location in which to live and do business.

In short, no single metric can paint an accurate picture of a state economy. The collection of indicators cited here shows that California ranks at or near the top in some areas, and does less well in others, but in the overall picture, it is a leader among states. Its success derives in part from its leading industries, partly from its capable workforce, and also from other dimensions such as infrastructure and institutions.

California's ability to maintain its lead over other states in the years ahead depends largely on its success in maintaining its edge in its leading industry clusters: Information Technology, Biopharmaceuticals, Aerospace, Entertainment and Creative Industries, Education and Knowledge Creation, and Business Services, and Finance. As the above analysis implies, California can best position itself for success with these industries by adopting an economic growth strategy that emphasizes the differences and strengths of its regions.

VII. Conclusion: California's Competitiveness in Question

As this study shows, a comprehensive analysis of California's competitiveness relative to other states reveals contradictions about the state's role in the national economic landscape. For example, although its rank as the fourth largest economy globally represents its significance on the national economic stage, recent and historical outmigration of firms and population imply that some of California's constituents are not sharing in that role.

As the economic decathlon discussion illustrates, assessing California's competitiveness involves more than ranking it in terms of business climate, tax impacts, and firm relocations: Despite the perceptions that California offers a poor business climate and is a high tax state, the state continues to outperform other states in many ways.

It is important to keep in mind that some of the state's challenges today are the consequences of its successful past. During the last half of the twentieth century California was an economic powerhouse without peer. Success and prosperity lured individuals and firms from across the country and the globe, but growth also gave rise to negative consequences such as crowding and congestion, pollution and crime. Because of its economic lead over other states, California was able to allocate resources to address these negative externalities. However, these efforts arguably reduced the state's growth potential, enabling other states to compete more effectively with California and its industries, thereby reducing California's lead.

Other states are catching up to California in part because their regions more closely resemble California's in terms of industry composition, workforce opportunities, and amenities. In fact, given the acceleration in firm and population migration over the past decade, it appears that the gap between California and its closest competitor states has narrowed significantly since the Great Recession. The question is, what steps must it take to maintain its advantage over other states in the coming years?

As the metro-area analysis above shows, because California is so large and its regions are so diverse, a one-size-fits-all approach to economic development in the 21st century must give way to a regional approach, one that not only looks at the differences across the state's regions but also incorporates a meaningful understanding of the regions around the country to which the state's regions have economic ties.

This study has gone to great lengths to separate perceptions from realities. Nevertheless, perceptions will shape decision making in the future, as they always do. The more perceptions are anchored in data and reality, and reflect the complexities of California and its regions, the more likely the state can compete effectively with other states in the coming years.

Appendix

Appendix 1. Ranking of Traded Clusters California

California

1. Business Services
2. Distribution and Electronic Commerce
3. Education and Knowledge Creation
4. Hospitality and Tourism
5. Information Technology and Analytical Instruments
6. Agricultural Inputs and Services
7. Transportation and Logistics
8. Food Processing and Manufacturing
9. Video Production and Distribution
10. Marketing, Design, and Publishing

Los Angeles-Inland Empire

1. Business Services
2. Distribution and Electronic Commerce
3. Video Production and Distribution
4. Hospitality and Tourism
5. Education and Knowledge Creation
6. Transportation and Logistics
7. Marketing, Design, and Publishing
8. Aerospace Vehicles and Defense
9. Financial Services
10. Information Technology and Analytical Instruments

San Diego

1. Business Services
2. Distribution and Electronic Commerce
3. Construction Products and Services
4. Transportation and Logistics
5. Automotive
6. Insurance Services
7. Oil and Gas Production and Transportation
8. Marketing, Design, and Publishing
9. Aerospace Vehicles and Defense
10. Hospitality and Tourism

San Francisco

1. Business Services
2. Distribution and Electronic Commerce
3. Hospitality and Tourism
4. Education and Knowledge Creation
5. Information Technology and Analytical Instruments
6. Marketing, Design, and Publishing
7. Financial Services
8. Transportation and Logistics
9. Insurance Services
10. Food Processing and Manufacturing

San Jose

1. Information Technology and Analytical Instruments
2. Business Services
3. Distribution and Electronic Commerce
4. Financial Services
5. Medical Devices
6. Hospitality and Tourism
7. Performing Arts
8. Marketing, Design, and Publishing
9. Transportation and Logistics
10. Biopharmaceuticals

Appendix

Appendix 2. Similarity Index Cities

Los Angeles-Inland Empire

1. Miami-Fort Lauderdale-West Palm Beach, FL
2. Chapell-Hill-Durham-Raleigh, NC
3. St. Louis, MO-IL
4. Tampa-St. Petersburg-Clearwater, FL
5. Birmingham-Hoover, AL
6. Nashville-Davidson-Murfreesboro-Franklin, TN
7. Denver-Aurora-Lakewood, CO
8. Dallas-Fort Worth-Arlington, TX
9. Atlanta-Sandy Springs-Roswell, GA
10. Tucson, AZ
11. Lexington-Fayette, KY
12. Kansas City, MO-KS
13. Cincinnati, OH-KY-IN
14. Indianapolis-Carmel-Anderson, IN
15. Knoxville, TN
16. Cleveland-Elyria, OH
17. Charlotte-Concord-Gastonia, NC-SC
18. Jacksonville, FL
19. Louisville-Jefferson County, KY-IN
20. New York-Newark-Jersey City, NY-NJ-PA

San Jose

1. Seattle-Tacoma-Bellevue, WA
2. Cape Coral-Fort Myers, FL
3. Worcester, MA-CT
4. Phoenix-Mesa-Scottsdale, AZ
5. Chapel-Hill-Durham-Raleigh, NC
6. Tampa-St. Petersburg-Clearwater, FL
7. Boise City, ID
8. Madison, WI
9. Buffalo-Cheektowaga-Niagara Falls, NY
10. Dayton, OH
11. McAllen-Edinburg-Mission, TX
12. Tucson, AZ
13. Boston-Cambridge-Newton, MA-NH
14. Toledo, OH
15. Knoxville, TN
16. Cleveland-Elyria, OH
17. Manchester-Nashua, NH
18. Boulder, CO
19. Albuquerque, NM
20. El Paso, TX

San Diego

1. Knoxville, TN
2. Tucson, AZ
3. Dayton, OH
4. Albuquerque, NM
5. Richmond, VA
6. Lexington-Fayette, KY
7. St. Louis, MO-IL
8. Chapel-Hill-Durham-Raleigh, NC
9. Tampa-St. Petersburg-Clearwater, FL
10. Tulsa, OK
11. Miami-Fort Lauderdale-West Palm Beach, FL
12. Phoenix-Mesa-Scottsdale, AZ
13. Kansas City, MO-KS
14. Oklahoma City, OK
15. Baltimore-Columbia-Towson, MD
16. Cape Coral-Fort Myers, FL
17. El Paso, TX
18. Birmingham-Hoover, AL
19. Little Rock-North Little Rock-Conway, AR
20. Nashville-Davidson-Murfreesboro-Franklin, TN

San Francisco

1. Austin-Round Rock, TX
2. Phoenix-Mesa-Scottsdale, AZ
3. Boulder, CO
4. Seattle-Tacoma-Bellevue, WA
5. Portland-Vancouver-Hillsboro, OR-WA
6. Boston-Cambridge-Newton, MA-NH
7. Minneapolis-St. Paul-Bloomington, MN-WI
8. Colorado Springs, CO
9. Albuquerque, NM
10. Trenton, NJ
11. Richmond, VA
12. Washington-Arlington-Alexandria, DC-VA-MD-WV
13. Atlanta-Sandy Springs-Roswell, GA
14. Tampa-St. Petersburg-Clearwater, FL
15. Tucson, AZ
16. Denver-Aurora-Lakewood, CO
17. Palm Bay-Melbourne-Titusville, FL
18. Boise City, ID
19. Salt Lake City, UT
20. Kansas City, MO-KS

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