INNOVATE

2019 GREATER PALM SPRINGS ECONOMIC REPORT

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A MESSAGE FROM THE CHAIRPERSON **JAN HARNIK**

At the 2018 Economic Summit, CVEP introduced its second forward-looking video, Coachella Valley 2050. It illustrated the massive potential that the Coachella Valley holds for tourism, logistics, and education. The vision of a future with the Salton Sea as California's leading inland lake destination with an educational institution dedicated to environmental and food sciences brought a gasp of excitement to last year's attendees. That vision was further augmented by the transformation of Thermal's Jackie Cochran Airport into a state-of-the-art intermodal facility located at the nexus of rail, air, and ground transportation serving both domestic and international trade. Viewers also saw a destination university with STEM degrees that will prepare our students for lucrative careers and a brighter future for us all. Visionary? Yes … and achievable.

For the first time, Riverside County and each of the nine Coachella Valley cities are sponsors of the CVEP Economic Summit. This is testament to the region-wide realization that when it comes to economic development, regional action is the key to making big things happen. Buckminster Fuller is credited with the quote:

"You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete."

That is precisely what CVEP is doing by concentrating on a regional approach to fostering entrepreneurship. That is how CVEP, in partnership with the CVB, will move forward with a targeted business attraction campaign in 2020. It is also how CVEP, the City of Palm Desert and CSU San Bernardino have worked together to bring cybersecurity opportunities and state-of-the-art bandwidth to the soon-to-be-opened Palm Desert Digital iHub.

In my time as chairperson of CVEP I have had the privilege to observe incredible milestones achieved. The thoughtful guidance of the CVEP Board of Directors and the relentless efforts of the small but mighty CVEP team have culminated in an organization that is sustainable and more impactful than ever. As chairperson and as an observer, I assure you of this – with the team that CVEP has in place, the partnerships that have been developed, and a vision for a future that regional action can facilitate, the best is yet to come.

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TABLE OF CONTENTS

TOPIC	PAGE
A Message from the Chairperson	1
Leadership and Investors	4
A Message from the Chief Executive Officer	6
Vision-Driven Transformation	10
ECONOMIC REPORT:	
Party Like It's 1999 vs 2019: Which Hangover Will Be Worse?	16
Coachella Valley	40

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LEADERSHIP AND INVESTORS

2019 – 2020

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Chair: Jan Harnik	City of Palm Desert
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Treasurer: Randy Florence	US Bank
Secretary: Rick Axelrod	LifeStream Blood Bank
Immediate Past Chair: Gary Honts	Desert Care Network

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Richard Balocco	City of Indian Wells
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Sandra Cuellar	Charter Communications
Jennifer Cusack	Southern California Edison
Tom Davis	Agua Caliente Band of Cahuilla Indians
Lindsay Grant	The Desert Sun
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Robert Griffith	City of Desert Hot Springs
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Kristi Hanson	KHA Arhictects
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Joel Kinnamon	College of the Desert
Erin Klink	Pacific Western Bank
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John McMullen	iHub Radio
Robert Moon	City of Palm Springs
Richard Oliphant	Oliphant Enterprises
Lee Osborne	Osborne Rincon
Julie Rogers	Palm Springs Life
Patrick Sinclair	California Alliance for Renewable Energy Solutions
Phil Smith	Sunrise Company
Joaquin Tijerina	Riverside County EDA
Jill Tremblay	Best, Best & Krieger
Jerry Upham	Gulf California Broadcasting
Ted Weill	City of Rancho Mirage
Ken Wheat	Eisenhower Medical Center
Scott White	Greater Palm Springs CVB
To be determined	Wells Fargo Bank

HONORARY BOARD MEMBERS

Ron Vito	Riverside County Office of Education
Michael Walbridge	Palm Springs Unified School District
Dr. Jake Zhu	CSUSB Palm Desert Campus

CVEP INVESTORS

BUSINESS DEVELOPMENT
Greater Coachella Valley Chamber of Commerce
Riverside County Economic Development Agency

EDUCATION
College of the Desert
CSUSB Palm Desert Campus
UCR Palm Desert Center

ENERGY
California Alliance for Renewable Energy Solutions

FINANCIAL AND CAPITAL SERVICES
BBVA Compass
Pacific Western Bank
US Bank
Wells Fargo Bank

GOVERNMENT: CITIES
City of Cathedral City
City of Desert Hot Springs
City of Indian Wells
City of Indio
City of Palm Desert
City of Palm Springs
City of Rancho Mirage

GOVERNMENT: TRIBAL
Agua Caliente Band of Cahuilla Indians

HEALTH SERVICES/HOSPITALS
Desert Care Network (Desert Regional Medical Center, Hi-Desert Medical Center and JFK Memorial Hospital)
Eisenhower Medical Center
LifeStream Blood Bank

MANAGEMENT SERVICES
Oliphant Enterprises

MARKETING, ADVERTISING, DESIGN AND PUBLIC RELATIONS
Hunter | Johnsen
The Dolphin Group

MEDIA
Gannett Foundation/The Desert Sun
Gulf California Broadcast Company
iHub Radio
Palm Springs Life

PROFESSIONAL SERVICES
Best Best & Krieger
KHA Architects
Osborne Rincon

REAL ESTATE DEVELOPMENT
GLC Enterprises
Sunrise Company

RETAIL
Gelson's
Massage Envy

TOURISM
Greater Palm Springs Convention & Visitors Bureau

TECHNOLOGY AND COMMUNICATIONS
Charter Communications

UTILITIES
Imperial Irrigation District
Southern California Edison
Southern California Gas Company

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MESSAGE FROM THE CEO **JOE J. WALLACE**

WELCOME to the 2019 CVEP Economic Summit. This year has been the first of my eight years in the Coachella Valley during which CVEP was predictable and sustainable. Our revenue exceeded expectations, and we maintained our frugal approach to spending. A reliable revenue stream allowed the CVEP staff to spend more time doing what our mission calls for. Our focus has shifted from survival to actions: actions designed to enhance the probability of prosperity with a less cyclical economic future for the Greater Palm Springs region.

Despite the predictions of a recession in 2019, the national economy has continued to grow. The economy of the Coachella Valley has benefitted from this trend. Unemployment is at a 50-year low, interest rates are at lifetime lows for most people, and the competition for talent is driving wages higher in nearly every business sector. The only downside of this good economic performance is that entrepreneurship is down across the country. This is happening because the opportunities for employment are so good that entrepreneurship appears considerably less attractive than it did when good jobs were scarcer.

We watched with much interest as the Amazon HQ2 project concluded with no single location named as the winner. Much like the Amazing Race, the field of competitors was winnowed down until there were only a small number of contenders. Then Amazon decided to grow or establish operations over a larger number of sites, leaving perplexed the 238 aspiring locations that had submitted proposals.

For the Coachella Valley, the RFP for Amazon HQ2 caused us to analyze our capacity to bid for major projects, and the result was the identification of areas in need of improvement. The bandwidth in our region has improved by a factor of four in most places and by a factor of forty in some places. In January 2020, cybersecurity, entrepreneurship, and a business degree in hospitality management will be offered at the CSUSB-Palm Desert Campus. CVEP is particularly pleased that these programs will be embedded in the Palm Desert Digital iHub. For developers ready to pursue opportunities in the rapidly growing field known as the Internet of Things (IoT), the Palm Desert Digital iHub will also have the Comcast MachineQ IoT platform as part of its infrastructure.

There has been an improvement to the critical infrastructure necessary to allow Greater Palm Springs to compete for the jobs of the future, but we cannot allow ourselves to be complacent. New technologies continue to change the competitive landscape for cities and regions: 5G technology will soon be deployed, and “smart” cities are becoming the norm thanks to the IoT. Major employment sectors in our region face disruption due to automation. A mindset of continuous improvement and a willingness to invest in the region’s future prosperity is crucial. This is what will enable us to realize the vitality of Coachella Valley 2050 as envisioned in CVEP’s videos from the last two Summits.

INNOVATE

The College of the Desert (COD) is in growth mode, with a West Valley Campus already underway and a doubling of the capacity of the Indio Campus soon to follow. Both of these campuses are poised to strategically partner with CVEP and their respective host cities to make state-of-the-art communication protocols available to cutting-edge businesses and students alike. I am pleased to report that CVEP is actively working with the City of Indio and COD to investigate the needs for an Eastern Coachella Valley iHub.

With the endless news of crippling housing prices, a degrading lifestyle and mind-numbing commutes in Coastal California, the reality is that Greater Palm Springs is one of the only places on the planet that has a California lifestyle coupled with tranquility and affordable housing. Our proximity to the major Southern California markets remains a driving factor for businesses to take advantage of our location for both lifestyle and business purposes.

CVEP is excited to have entered into a partnership with the Greater Palm Springs Convention and Visitors Bureau to actively market our region as an ideal place to do business. The GPSCVB will be the marketing arm of this partnership, utilizing their considerable talents to acquire leads for businesses interested in relocating or expanding to Greater Palm Springs. CVEP will then manage those leads to bring in the kind of companies with year-round jobs that promote both business travel and lucrative careers.

As new businesses and entrepreneurs with considerable talent relocate here, we can someday aspire to feel the impacts of the Medici Effect. That is what happened in Florence, Italy when the Medici family seeded the city with the talent that launched the Renaissance. The talents of people like Leonardo da Vinci and his cohort of high achievers will not be eliminated by automation. Such people are also the key to transforming our region into one that is capable of tackling any problem, from mitigating the environmental issues of the Salton Sea to retraining mid-career people who have seen their skills obsoleted by automation.

Through regional efforts that leverage all of the assets that Greater Palm Springs has to offer, we will rise to meet our challenges together. As emblazoned on the flag of my native state of Kentucky, "United We Stand and Divided We Fall." It is our time to keep the commitment to **ELEVATE**, moving forward, together.

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DesertCareNetwork.com

A COMMUNITY BUILT ON CARE

KEY FACTS

desertcarenetwork.com

709	Beds	$25.1M	Charity care provided
3,004	Employees	$55.8.2M	Discounts to uninsured
5,190	Babies delivered	$350.8M	Salaries, wages, benefits
28,274	Admissions	$2.0M	Property tax taxes paid
154,108	ER visits	$3.7M	Sales taxes paid
7,565	Inpatient surgeries	$23.4.5M	Capital funds reinvested

Desert Regional Medical Center, JFK Memorial Hospital, and Hi-Desert Medical Center have joined together to provide a new community of care: Desert Care Network. With three hospitals, specialty centers and one of the largest physician networks in the Coachella Valley, Desert Care Network sets a new standard of service and dedication to the health and well-being of the people of the desert region.

DesertCareNetwork.com

More than 3,000 employees

Hospitals

Outpatient centers/clinics

Local impact

$4.5M

$4.5M pledged to Desert AIDS Project for the Get Tested Coachella Valley initiative and for support of expanded healthcare options for the underserved in the Coachella Valley.

$900K

Provided $900,000 since 2010 for Volunteers in Medicine to serve the healthcare needs of immigrants and the uninsured.

In partnership with UC Riverside School of Medicine, the new Family Medicine Residency Program at Desert Regional is training new physicians to address the local shortage of primary care doctors.

Key facts are inclusive of the three Tenet operated hospitals and do not include urgent care centers or foundation clinics. Figures are for calendar year 2018. Local impact includes salaries, wages and benefits, capital spending and local taxes paid. Cha9rity care includes discounts to uninsured patients.

Mission

To incite vision-driven transformation in the Greater Palm Springs region.

Values

Purposeful • Resourceful
Pragmatic • Spirited

Vision

The Greater Palm Springs region is a nationally recognized destination for high-wage businesses.

I N N O V A T E

CVEP FILLS AN IMPORTANT NEED for the region's economic development community. By specializing in technology- and innovation-led economic development and fostering entrepreneurship, **CVEP** aims to add higher value jobs that will improve career opportunities for Greater Palm Springs residents.

CVEP's vision statement is a lofty one, and while a nationally-recognized business destination can't be cultivated overnight, it can be done. Much of the vision-driven work that **CVEP** does goes on behind the scenes: convening regional task forces to address key obstacles to growth; communicating with other regions that have developed successful initiatives; and tirelessly studying and applying best practices in economic development.

Economic development often means, as they say in sports, playing a long game. But each year **CVEP** also takes time to deliver value for today: sharing industry expertise, hosting educational opportunities, and providing business services unavailable elsewhere in Greater Palm Springs.

Sustainability Forum Series

SPONSORED BY SOCAL GAS (5 FORUMS, 154 ATTENDEES)

JULY 2018
Sustainability in Waste Management

AUGUST 2018
Smart & Sustainable Development

MARCH 2019
USMC & the Environment

MAY 2019
Sustainability and Regulatory Considerations for California's Canna-Businesses

JUNE 2019
Factfulness

November 2018

GREATER PALM SPRINGS ECONOMIC SUMMIT

Small Business Forums & Workshops

(PALM DESERT, CATHEDRAL CITY, JOSHUA TREE, 165 ATTENDEES)

JULY 2018
Preparing for the Holidays (or, Christmas in July!)

AUGUST 2018
Small Business Saturday

SEPTEMBER 2018
Free Tools for Building Your Business

SEPTEMBER 2018
Reaching the LGBT Market

OCTOBER 2018
Tips for Local Business Success

NOVEMBER 2018
From Military to a Civilian Workforce

JANUARY 2019
Are You Ready?

FEBRUARY 2019
Social Media Marketing

APRIL 2019
Finding Your Stories (Public Relations)

APRIL 2019
3rd Annual Fast Pitch Greater Palm Springs

MAY 2019
Coachella Valley Loan Fair

Provided Speakers/Judges/Educators For:

Leadership Coachella Valley Economic Drivers Seminar; CSUSB-PDC Entrepreneurship Day; CSUSB-PDC Own It! Workshop; DSUSD Goldfish Bowl; Pueblo Unido CDC's Financial Literacy for Small Business Workshop; Career Girls Summit; Coachella Valley Women's Business Center's It's Your Time Business Plan Competition; Coachella's SoCal Cannabis Summit; Desert Best Friend's Closet; Wells Fargo Economic Development Panel; Coachella Valley Dialogue Series ... and more!

BUSINESS SERVICES

Small Business Assistance & GIS Projects

(for **105+** current and potential local businesses)

Provided over **1,500** hours of small business consulting

(combined iHub/general business support)

Created and published **39** custom infographics & demographic maps for the public

GIS EFFORTS 2018-2019

Produced **220+**

custom demographic reports

Provided

DEMOGRAPHICS and **ANALYSIS** for city partners

Generated **60+**

custom demographic spreadsheets for partners and businesses

Analyzed Poverty

and Access to Grocery stores for the City of Palm Springs

Studied Rent Burden

for the Desert Healthcare District

Provided Design and **3D** Graphic Support for Corklane

(new showroom coming to Palm Springs downtown)

Dollar value of the 1,570 direct consulting hours is conservatively valued at

$160,500

FY 18-19 RESULTS, PALM SPRINGS IHUB

35 Companies in Palm Springs iHub Program

12 of those are at the Accelerator Campus

Palm Springs iHub was awarded **$45,000** through CASCADE Innovation Voucher Pilot Program, to be sub-granted entirely to iHub portfolio companies. ($24,000 was sub-granted in FY 2018-19).

METRIC	RESULT
Number of resident companies	6
Number of Virtual Companies	17
Accelerator Campus Clients	12
Number of graduating companies (cumulative)	28 TOTAL TO DATE
Number of jobs created by PSiHub companies to date (cumulative)	193
Investment Dollars Raised by PSiHub Clients (FY 18-19 only)	$10.7 M
Number of patent applications and issued patents (cumulative)	22

Focus (in partnership with Palm Springs Life)

- July 2018
- October 2018
- May 2019

VISION (in partnership with Palm Springs Life)

- November 2018

Greater Palm Springs Economic Report

- November 2018

Custom 32-Page Economic Reports for:

- Cathedral City
- Desert Hot Springs
- Indian Wells
- Indio
- La Quinta
- Palm Desert
- Palm Springs
- Rancho Mirage

iHub Radio:

Time to Prosper, economic development and innovation-focused radio program: new episodes recorded weekly.

PARTY LIKE IT'S 1999 VS 2019:

WHICH HANGOVER WILL BE WORSE?

BY MANFRED KEIL, PH.D., G.U. KRUEGER, DAVID ROBINSON

RESEARCH ASSISTANTS

YAO LI, STUDENT MANAGER | AMANDA HUANG, JUNIOR STUDENT MANAGER | PLACIDE GATABAZI
GAGE HORNUNG | ZAIKANG LIN | STEPHEN MARZO | YINGHE MEI | TRISHUL RAJA | ABHINUV UPPAL
XINRAN XING | JETT ZIEMANTZ | XINYI ZHANG

LAST YEAR, we spent a significant amount of the annual economic report discussing the state of the national economy and the likelihood of a recession. This was due to a variety of economic forecasters raising the specter of an imminent downturn; Fortune Magazine went as far as having a picture on its title page of "The End is Near." Looking at the national economy, we wanted you to go with us on a ride that led us to the conclusion that there was no national or regional recession in sight (within a year – maybe two). Our conclusion was that we had difficulties interpreting the recessionary signals in the same way as the majority of professional economists did (the folks at Goldman Sachs, JP Morgan, etc.) – 60% predicted a recession by 2020, and 80% a downturn by 2021. Instead we forecasted that there would be no recession. Not to worry, we will focus much more of our time and space on the Coachella Valley economy this time.

We will reflect a little though on the near-term outlook of the U.S. economy. Time has moved on by a year: the U.S. economy set a new record for the longest expansion in post World War II history last July (121 months), and we continue to attach less than a one in twenty (5%) chance of a recession within a year. All of this despite further yellow lights flashing as a result of the continued trade war with China and other countries, Germany and Europe slipping into a recession, concerns regarding Brexit, oil refineries in flames in Saudi Arabia, continued stock market volatility, consumer sentiment reaching a three-year low in August, impeachment proceedings initiated by Congress, the manufacturing sector showing weakness, and, perhaps most importantly, an inverted yield curve (10-Year Government Bond minus 3-Month Treasury Bill) since late March 2019. Frankly, the inversion of the yield curve caught us, and many others, by surprise. We did not anticipate for that to happen before August at the earliest.

Taking all of this into account, here is what you can expect to read about over the next 12-month period:

• Although real GDP growth did not quite reach the value of 3% President Trump had promised for 2018 (after data revisions, it grew year-to-year by 2.9% - let's not argue here), it was close. Forget the President's earlier claim that he will produce 4% growth rates – that is not going to happen, although he will blame, most likely, the Federal Reserve for that. We were on the slightly more optimistic side and had forecasted growth to be 3.2%. For the coming year, our outlook is not that rosy. While the Q1 real GDP growth was surprisingly strong (3.1%), this was not the result of higher consumer expenditures. Instead, there were extraordinary/one-time factors such as an increase in inventories resulting from the then-imminent increases in tariffs, coinciding with unusual increases in exports, and decreases in imports related to the tariffs policy. Finally, there were high levels of state and local government expenditures. Subtracting these one-off factors, GDP would have only grown by 1.2% in the

Figure 1 | Historical Duration of Expansion in Months

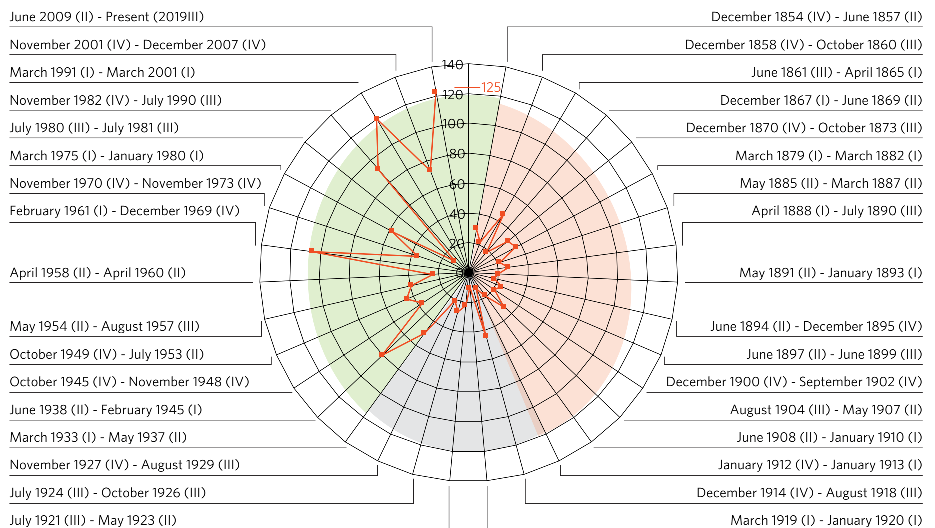

Figure 1 | By November 2019, the current expansion will have lasted for 125 months. It broke the previous record in July 2019.

first quarter. Growth in Q2 was more in line with expectations, and it came in at 2%. We forecast that Q3 and Q4 will show even weaker growth, particularly due to weak investment expenditures by businesses. For the year as a whole, we see a growth rate of slightly above 2%. Barring any major shock from oil prices, we believe that GDP growth will slow down to 1.1% in 2020, but pick up again to 1.7% in 2021. Hence, we do not anticipate a recession for the next two years.

• The Federal Reserve already lowered the Federal Funds Rate once in July, and it did so again during its September meeting. This follows several increases over the previous years. Markets had initially forecasted three increases for 2019. There is much controversy regarding this decrease within the profession, with most economists expressing surprise by the Fed's decision to lower interest rates in the face of record low unemployment rates. The next meeting will be at the end of October, and it happens after this report goes to print. Forecasters are split on whether the Federal Reserve will lower interest rates by another 0.25%, as the markets seem to suggest. If they do, then this will go against the wisdom of the majority of economists who, frankly, cannot understand why interest rates are being lowered rather than raised to begin with. However, while formally independent, the current chairman of

Figure 2 | Yield Curve, 10-Year Government Bond Minus 3-Months Treasury Bill, Monthly Data, U.S., 1982-2019

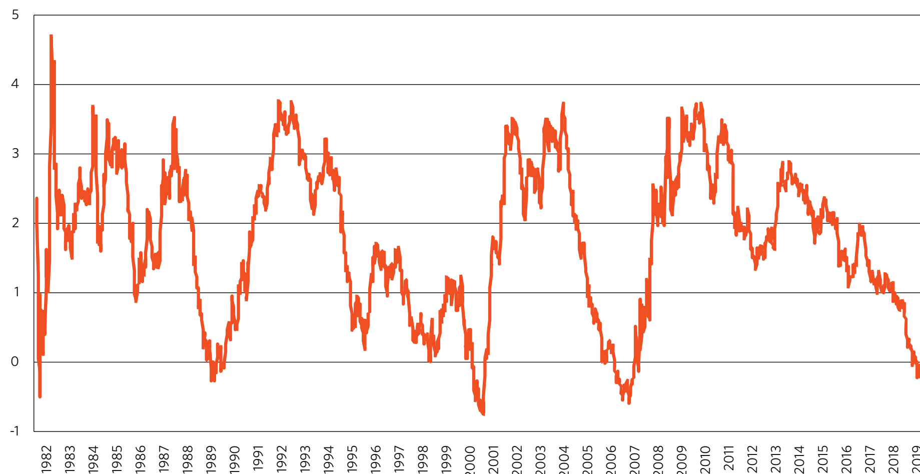

Figure 2 | Since late March 2019, we began to observe an inverted yield curve for the first time during the current expansion.

the Federal Reserve, Jerome Powell, was appointed by President Trump, who has repeatedly demanded for the central bank to lower interest rates further. There were even threats to remove Mr. Powell from his position. However, Mr. Powell would have to convince the majority of the policy committee that a further decrease was warranted while the unemployment rate has reached a 50-year low of 3.5%. We simply do not believe that Mr. Powell will follow the President's wishes so openly at this point and therefore see no further decreases for 2019. Should the economy deteriorate significantly and unexpectedly before the end of the year, then all bets are off. Perhaps you should look at this like the Dodgers potentially winning the World Series this year. We predicted that this would not happen. However, had we been wrong, you would not have been too upset...

• We do not expect oil prices to change significantly over the next year. This is despite the drone attack on the Saudi oil facilities which had a significant effect on 65% of the country's oil production capacity. In the near future, any shortfall can be made up in the short run by using U.S. and Saudi Arabia's national oil reserves. Also, U.S. production will increase if oil prices spike. West Texas Intermediate oil prices rose by less than 10% as a result of the event. We assume

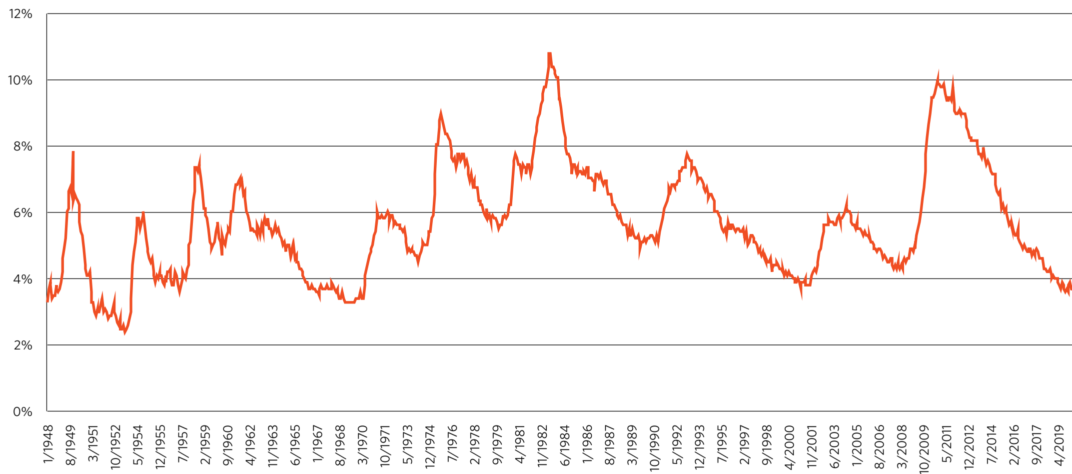

Figure 3 | Unemployment Rate, U.S., Monthly Data, 1948-2019

Figure 3 | The unemployment rate is currently around 3.5% and should remain below 4% next year.

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that security measures will be put into place to ensure that similar incidents will not happen in the future. U.S. troops have already moved into Saudi Arabia. Hence, oil prices should remain around $65 a barrel. If that proves to be substantially wrong, meaning if they increase significantly, then all forecasts, including those for GDP growth, will have to be revised downward. However, we are talking about an unlikely event here.

We believe that employment growth will continue to slow down, since the U.S. economy is basically at full employment. Other than through population growth, additional employment can only come from previously "discouraged" workers re-entering the labor market. Consider the participation rate of 25 to 54 year olds (the ratio of the labor force, which are the employed plus the unemployed, to the population). It is basically the same as the pre-Great Recession peak of 83.2%, and roughly 1.8% below the all-time high of January 1999: there is not much more employment coming from this source. Hence, we do not expect employment to grow by more than 1%. There will be some effect in California from companies having to move independent contractors into employee positions as a result of Assembly Bill (AB)5– but it is not clear at this point, how this will play itself out.

Figure 4 | Housing Starts, U.S., monthly data, seasonally adjusted, 1959-2019, (in thousands)

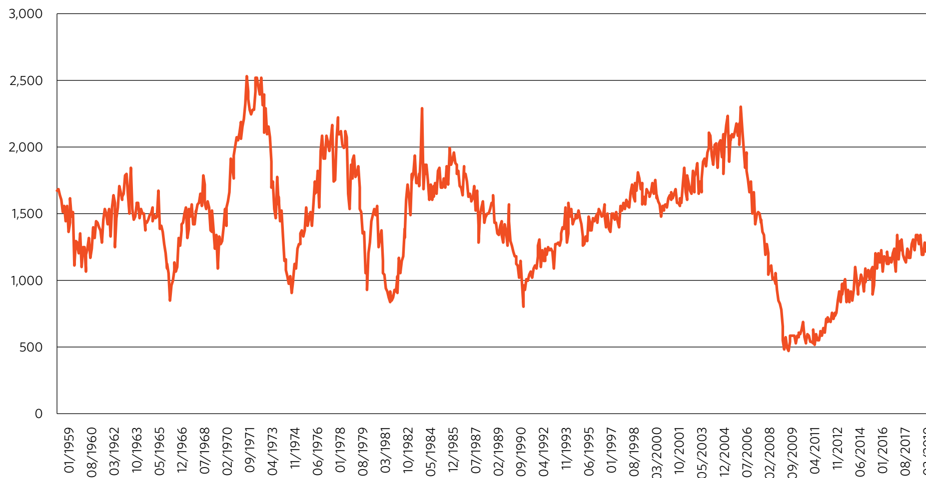


Figure 4: The current expansion has not reached the long-run average of 1.5 million/year. We do not expect to see a significant increase in the coming year.

Also there will be a purely temporary effect from hiring Census workers early in the year. This would imply that the unemployment rate for the U.S. should remain below 4% (it is currently at 3.5%). For California and for the Inland Empire, we expect these to be slightly higher at a little over 4%.

• Housing starts continue to be one of the puzzles for the national, state, and local economy. During the entire 10-year expansion, cumulative new housing starts have not reached 10 million units; they are at 9.7 million currently. For the previous expansions, which lasted only 6 years, they reached 10.8 million by 2007. The expansion that ended in 2001 produced 14.3 million housing starts over 10 years; and before that we had 12.4 million in 1990, accumulated over 8.5 years. This also implies low average monthly housing starts. These have not reached the long-run monthly average of 1.5 million/year. We will see further below that this is crucial for our forecast of a possible imminent recession. Our optimistic outlook at this stage of the expansion is primarily based on the low number of cumulative and average housing starts. This carries sufficient weight for us not to believe that this expansion will die of old age, at least not yet. We also see no significant pick-up in these numbers for the coming year.

Figure 5 | Consumer Sentiment Index, U.S., Monthly Data, 1978-2019

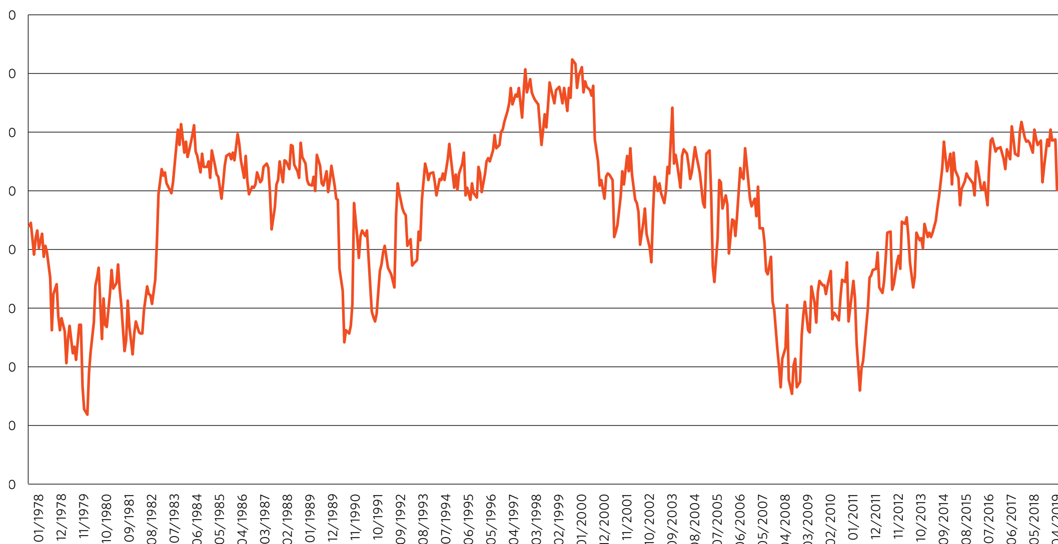


Figure 5: Though consumer sentiment fell to a record three-year low, we expect these numbers to improve based on recent trends.

• Despite the recent significant decline of consumer sentiment (University of Michigan) to a three-year record low, we do not expect a significant impact from these numbers, yet. There had been a large decline in January due to the government shutdown during the previous month; but it was not sustained. Instead, the index almost immediately bounced back. The decline in August was even more severe, and by September, the numbers have only partially recovered. We believe that much here will depend on the trade negotiations with China, and the general feeling of uncertainty these days regarding economic policy. We also believe that President Trump will ensure that the trade problems will be solved before the upcoming election in 2020. Hence we expect consumer sentiment to improve from recently observed numbers.

• As before, we **do not dare to make forecasts for financial variables**, such as stock prices, other than forecasting a small increase in stock prices, based on past average annual increases, and no change in the exchange rate; that includes the strategically important Canadian Dollar/U.S. Dollar exchange rate – crucial for the Coachella Valley both in terms of tourism and the local housing market. The Canadian dollar only slightly depreciated over the previous year, and changes of this amount will not result in drastic fluctuations, similar to what we saw from April 2011 to early 2016, when the Canadian Dollar depreciated by more than 40%.

• Inflation continues to be below the 2% target set by the Federal Reserve. This is one of the reasons that the Federal Reserve lowered the Federal Funds Rate in July and September. We expect the inflation rate to increase slightly due to the small stimulus resulting from the expansionary monetary policy, but strongly believe it will remain in the 2%-2.5% range for the next year.

• We do not expect additional expansionary fiscal policy in the near future. Following the November 2018 election results, the House is unlikely to agree with President Trump on much needed infrastructure investment at the federal level. Instead, Congress will spend most of its time on the impeachment process.

• There are further minimum wage increases on the horizon for California. If you employ 26 or more workers, then minimum wages will increase to $13 in January. We believe that this will continue to primarily impact teenagers working in the leisure and hospitality industry, who will increasingly be replaced by robots and other machines.

Table 1 below lists some of the general economic conditions since 2016, and Table 2 gives our forecast for real GDP growth for the nation, the state, and our region.

There are two ways for you to proceed from here within this report. You can go to the next section which explains a bit more how we came up with a probability of only 5% or less for a recession within a year, when others, such as the most recent UCLA Anderson Forecast, have set a probability as high as 45%. Still, this is probably a good time to do a stress test for your business, personal finances, or the government agency that you are associated with. Alternatively, skip this section and go forward to the discussion of the Coachella Valley and our Inland Empire analysis.

Come to think of it, there is a third alternative – you can say "enough of this" and enjoy your favorite brew of the hour – no, Nitro Cold Brew, not what you were thinking.

TABLE 1: GENERAL ECONOMIC CONDITIONS, 2016-2019

	2016 Q4	2017 Q3	2018Q3	2019 Q3
PRESIDENT	OBAMA	TRUMP	TRUMP	TRUMP
STOCK MARKET	17,930 (EARLY NOV)	22,268	26,828	26,077
$CAD/$US	1.28	1.21	1.3	1.33
CONSUMER SENTIMENT	87.2	93.4	96.2	89.9
Urus	4.8 (OCTOBER)	4.3	3.7	3.7
URCA	5.3	5.1	4.2	4.1
URIE	5.8	5.3	4	4.2
INFLATION	1.6	1.7	2.7	1.8
OIL PRICES (WEST TEX INT)	$46.83	$46.46	$75.37	$54.09
FEDERAL FUNDS RATE	0.25-0.50	1.00-1.25	2.00-2.25	1.75-2.00
HOUSING STARTS U.S.	1,328,000	1,155,000	1,282,000	1,191,000

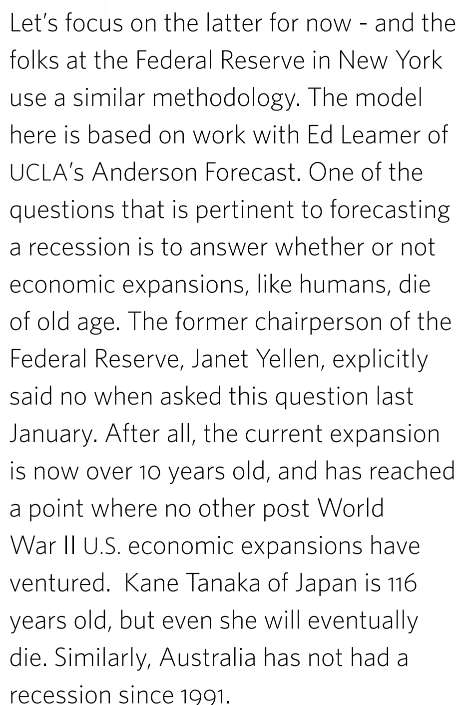
TABLE 2: REAL GDP FORECAST, IN %, 2019-2021

	2019	2020	2021
UNITED STATES	2.1	1.1	1.7
CALIFORNIA	2.5	1.7	2.2
INLAND EMPIRE	2.7	1.8	2.3

Time for a Personal Stress Test? Or, Do Recessions Die of Old Age?

We use two methods to forecast a recession in the near future. One is a straightforward (well, sort of straightforward...) econometric model that makes predictions regarding real GDP growth (among other variables). From this model, we get our quarterly and annual forecasts. If they turn negative, then we would write that winter is coming (a recession is about to happen). However, there is another technique that focuses simply on predicting whether or not there will be a recession within a year's time regardless of how much output will decrease. Rather than making numerical predictions, this probit model simply attempts to determine whether there will be a recession or not.

The analogy for a business would be to forecast the amount of profits you are predicted to make next year versus whether or not you will make a profit at all. The first question will be answered with a dollar amount or a growth figure, while the second is a simple yes or no response. Public officials can think of a similar example involving the annual budget surplus/deficit. Or simpler: you consider going out for dinner. The first question is how much you will spend or save by dining out, the second is a simple determination of whether or not you will go out.



Let's focus on the latter for now - and the folks at the Federal Reserve in New York use a similar methodology. The model here is based on work with Ed Leamer of UCLA's Anderson Forecast. One of the questions that is pertinent to forecasting a recession is to answer whether or not economic expansions, like humans, die of old age. The former chairperson of the Federal Reserve, Janet Yellen, explicitly said no when asked this question last January. After all, the current expansion is now over 10 years old, and has reached a point where no other post World War II U.S. economic expansions have ventured. Kane Tanaka of Japan is 116 years old, but even she will eventually die. Similarly, Australia has not had a recession since 1991.

Of course there are reasons why Ms. Tanaka has reached the age of 116. She probably did not have the excessive consumption of In-N-Out hamburgers and fries that some of us were exposed to early on by our parents. Similarly, excessive consumption of homes and automobiles shorten the lives of many expansions resulting from the Federal Reserve fattening us with a diet of low interest rates. It is in such situations that the slope of the yield curve matters. Let's refer to lending standards loosely as "lax" when banks get higher rates from longer-term loans than they have to pay short-term depositors. That's when the yield curve is positive, which is usually the case. When the difference between the long-term and short-term loan disappears or even reverses, as has been the case since the end of March 2019, banks start to think twice about making loans and hence fewer ones are issued. This is the basic idea behind including the yield curve as a leading indicator of a recession.

We incorporate this into our forecasting model, and indeed currently get a recession probability of roughly 35%. When we now add (a function of) the age of the expansion, this probability shoots up to 95%, which is almost a certainty. If this was the end of our story, then we would tell you that the red light is on and there will be a recession almost for sure before our next meeting in 2020. However, "old age" in itself does not matter; it is what hides behind it that does. This is where we replace the age of the expansion with cumulative and average housing and automobile (consumer durables) expenditures. Think about it: if I add up housing starts or automobile sales over the expansion, it looks very similar to the age of the expansion, meaning it just goes up and up. And this is where the difference to previous expansions comes in: the current expansion has seen fewer housing starts, even after 10 years, both cumulatively and on average than during previous expansions (see Figure 4 on housing starts). Currently there have been 9.7 million housing starts in the U.S. since we came out of the Great Recession. This number is 1 million less than during the previous expansion, which lasted only 6 years, and even more substantially less than during the two expansions before that. Replacing the age of the expansion with cumulative and average housing starts turns the 95% probability into a less than 5% probability for a recession within a year: the house that saved America. Add further variables that might be leading indicators, such as the change in the unemployment rate (or the average unemployment rate over the last three months relative to the smallest unemployment rate observed over the previous year) and consumer confidence, and the probability remains very low since neither one of these signals a problem ahead (yet).

So, the bottom line is that "this time it's different" and currently we don't think that there is a recession coming, at least not in the next year. However, a Chinese proverb says "未雨绸缪" which, if you don't speak Mandarin, means "repair (or bind with silk) your house before the rain comes." How appropriate for Southern California and the Coachella Valley just as we are getting into the rainy season. But more seriously, it is a figurative way of saying "be prepared" or "plan ahead." To be there, it is probably a good idea if you undertake a stress test, whether it is for your firm or your city (I know that certain cities have done so recently), just like the Federal Reserve does with commercial banks. It is also a good time for a personal stress test. When the recession comes eventually (yes, even Ms. Tanaka will die), stocks and home prices will become soft. There will be reduced income and increases in vacancies coinciding with higher unemployment. It is a time when it will become harder for individuals and firms to make payments on debt and otherwise. Moreover, that will not be a good time to sell assets in order for you to continue with debt payments. When too many individuals are not prepared, then home foreclosures and bankruptcies follow. Hence it is time to do a personal stress test now to see if your income is sufficiently robust in such a scenario. If not, then it is time to liquidate some assets now and to build up cash balances.

You can still worry about "two thousand zero zero party over, oops, out of time, so tonight I'm gonna party like it's nineteen ninety- nine." But look ahead! If you're gonna party like it's 1999, just remember how bad the hangover was then.

Zooming In: California and the Inland Empire

Let's talk a bit about our great state of California and the Inland Empire. Here is the big picture: California, as you know, is the most populous state in the U.S. with more than 10% of the American population living here. Perhaps lesser known is the statistic that if California was a country, it would have the 5th largest economy in the world as measured by GDP or output after RUST (or Rest of the United States), China, Japan, and Germany. Roughly 12% of Californians live in the Inland Empire (San Bernardino County and Riverside County) also called the Riverside-San Bernardino-Ontario Metropolitan Statistical Area (MSA). MSAs typically consist of one or two counties (Greater Los Angeles MSA is Los Angeles County and Orange County). There are 26 MSAs in California, and roughly 390 in the United States. The Inland Empire is the 13th largest MSA in the U.S. by population (4.2 million people), and 3rd largest in California (behind Greater Los Angeles, and only about 100,000 fewer residents than the San Francisco MSA; but it is more populous than the San Diego MSA).

What else do you need to know to get a rough understanding of the Inland Empire? Approximately 20% of the labor force commutes primarily into the Greater Los Angeles area, and to a lesser extent down the I-15 into San Diego County. This is why it takes me over 3 hours to drive to UCLA four times a year to attend the Anderson School Forecast, which starts at 9:30 on a Tuesday. If I don't leave Upland by 6:30, I won't get there in time; and that includes having at least one research assistant with me so that they can learn something; and so that I can drive in the HOV lane.

What else is important to know about the Inland Empire? It is "First In, Last Out" when it comes to typical business cycle movements in output and employment. Why is that? Here is the

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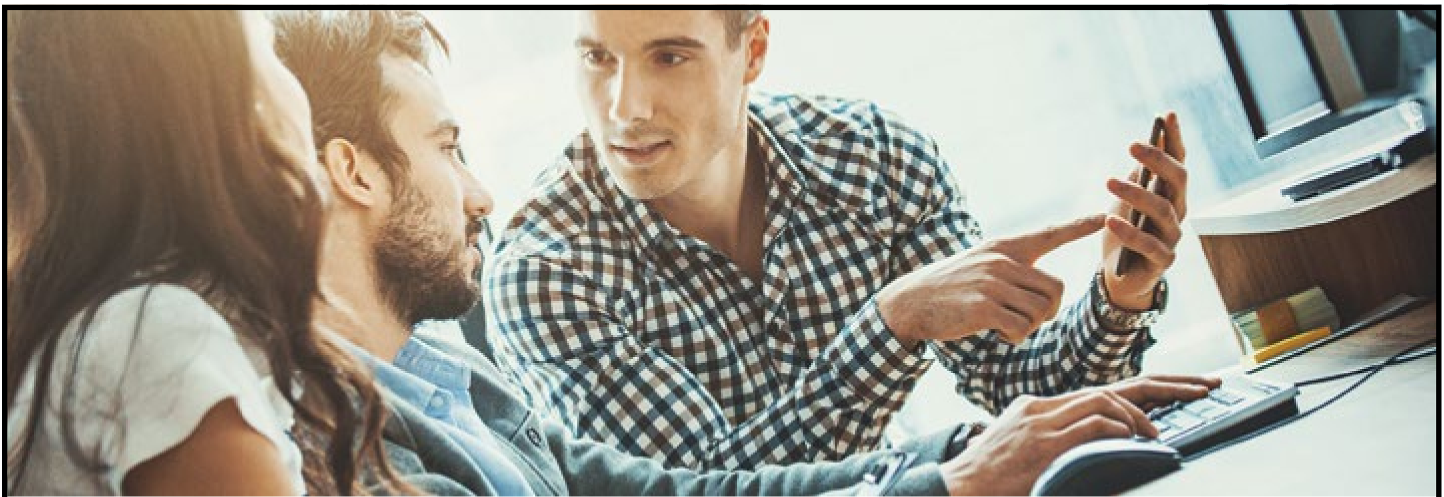
explanation: let's divide the labor force in Southern California into A, B, and C people as follows: A are employees who live and work in Greater Los Angeles, B are employees who reside in the Inland Empire but work in the coastal areas, and C employees who live and work in the Inland Empire. It stands to reason that the A people have higher human capital since they can afford to live in the coastal area - this must be true unless you claimed that people actually get satisfaction out of commuting. If not, then the B people have less human capital, which means they have to live in more affordable places and commute. But they have higher skills and income than the C people. If that were not the case, then the B people would not commute and just take on a local job.

Now what happens if Greater Los Angeles enters into the early phase of an economic downturn? First, the B employees get laid off, since they are relatively less valuable to the firms located in the coastal areas and hiring both A and B workers. Next, the B people reduce their spending in general but also in the Inland Empire (Home Depot, furniture stores, etc.) and C people lose their jobs. Finally, the A people get laid off. Unemployment is measured by residency (I live in Upland but work in Claremont - if I lost my job at Claremont McKenna College, the unemployment rate of Upland would go up but that of Claremont would be unaffected). Hence the unemployment rates in the Inland Empire will rise first, and it thereby becomes a leading economic indicator (!) for the Greater Los Angeles area in a downturn. Note that this happened in the early '90s and again at the beginning of the Great Recession.



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When the economy recovers, the A employees will be recalled first, before the B people are offered jobs again - hence the “Last Out.” Figure 6 shows this pattern for unemployment rates since 1990, when labor market data first becomes available for MSAs. Note that the recession at the turn of the millennium was centered in NorCal, and hence did not follow the same pattern. Silicon Valley was more severely impacted than Southern California.

Bottom line, think of the Inland Empire as a lake that freezes: ice forms first at the periphery, and that is where it takes longest to melt. At any rate, California and the Inland Empire have been completely ice-free for some time now, although these were areas right at the epicenter of the housing crisis. The U.S. has reached a 50-year low in the unemployment rate (3.5%), and California and the Inland Empire are at slightly higher levels of just above 4% due to differences in demographics. We are clearly at a “full-employment unemployment rate” if not below.

Unemployment rates can change either because employment increases/decreases or because workers leave the labor force (“discouraged workers”) or enter it. It is relatively easy to show that the change in the unemployment rate is the result of the difference between the growth rate of the labor force and employment growth.

Figure 6 | Unemployment Rates, U.S., California, Inland Empire, 1990-2019

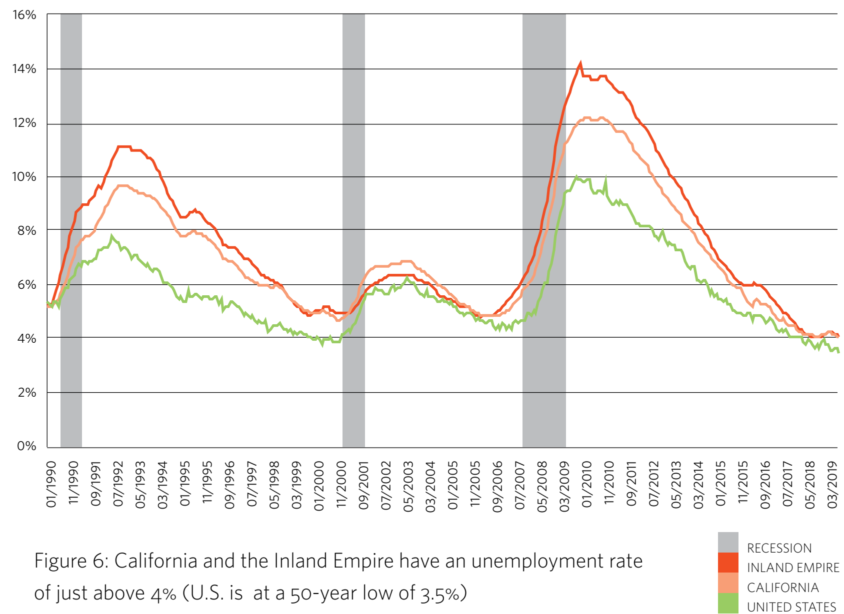


Figure 6: California and the Inland Empire have an unemployment rate of just above 4% (U.S. is at a 50-year low of 3.5%)

As a policy maker, ideally you want employment growth to outpace positive growth in the labor force - this would signal a healthy economy.

Figure 7 shows how the three quantities (change in the unemployment rate, growth in employment, growth in the labor force) have behaved over the previous year. (It is also an example of an optical illusion: the horizontal axis is a straight line in Excel, it just looks like it is downward sloping.)

Clearly, the Inland Empire looks the most attractive: the 0.2 percentage point reduction in the unemployment rate was the result of strong employment growth of over 2% and was achieved despite the fact that the labor force grew strongly at the same time. Not only did the extra workers who entered the labor force get absorbed, we added workers beyond that. Should the labor force have grown as slowly as it did in the U.S., for example, then the Inland Empire unemployment rate would have

Figure 7 | Changes in the Unemployment Rate, Labor Force, Employment in the U.S., California, Greater Los Angeles Area, Inland Empire, 2017:Q4-2018:Q4
SOURCE: FEDERAL RESERVE ECONOMIC DATA

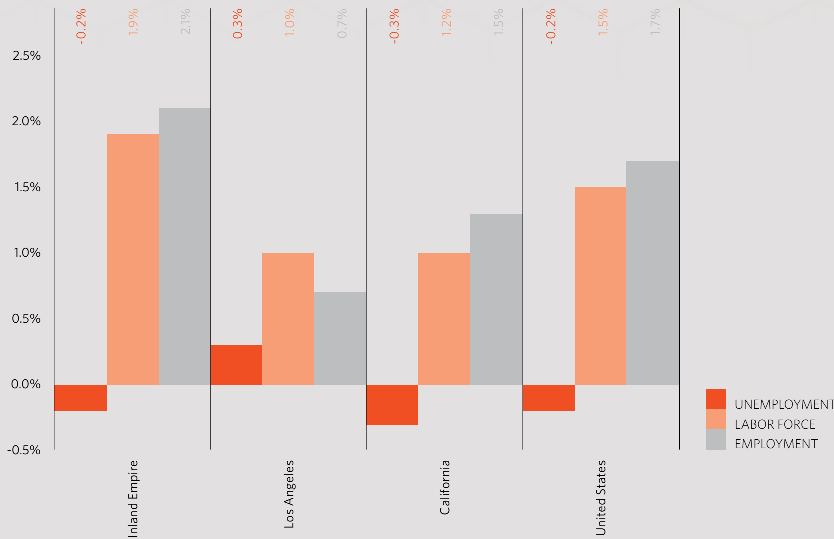
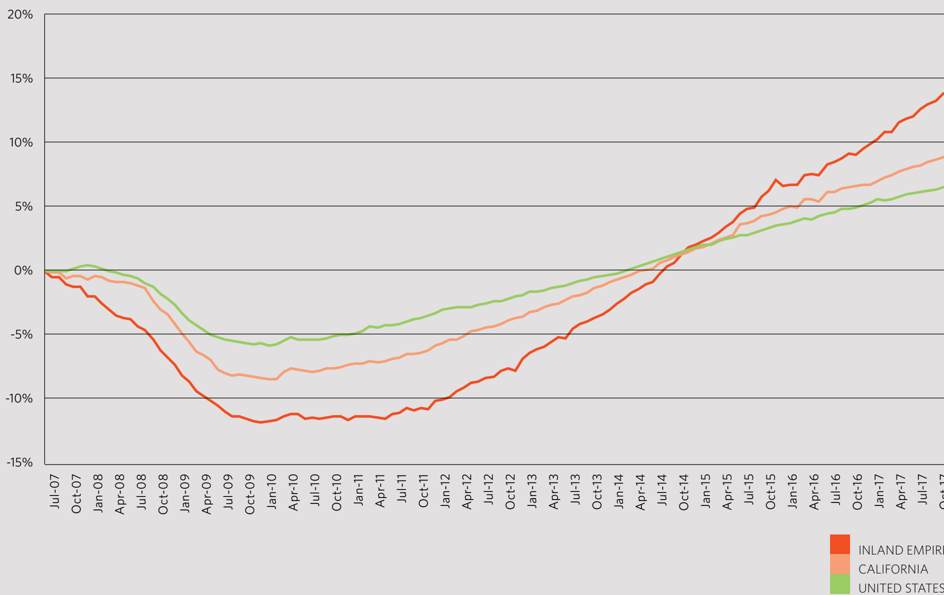


Figure 7: The Inland Empire saw a 0.2% reduction in the unemployment rate as a result of strong employment growth despite labor force growth occurring simultaneously.

Figure 8 | Employment Growth, Monthly Data, Seasonally Adjusted, U.S., California, Inland Empire, July 2007 - October 2017
SOURCE: CA EDD, FEDERAL RESERVE ECONOMIC DATA



decreased more dramatically (by 0.6 percentage points). Note how relatively weak the Greater Los Angeles area looks in this respect.

Focusing on employment rather than unemployment (Figure 8) shows you how much harder California, but especially the Inland Empire, was hit by the downturn compared to the U.S. as a whole. We start the graph in July of 2007, rather than the start of the recession in January 2008, since employment peaked in the Inland Empire earlier ("First In"). At the worst point in the recession, every 8th person in the Inland Empire had lost their job, which is massive. But then, around 2014, things started to look quite rosy for the Inland Empire. Once it had recovered the jobs lost during the recession, the area became the poster child of MSA employment growth in California and elsewhere, often outpacing the San Jose (Silicon Valley) MSA. Going from zero to hero! Newspapers started to talk about the employment boom in North Dakota, the second largest oil producing state in the U.S. But let's face it, only 20 people live there (ok, jk, 750,000). The Inland Empire is almost five times that size...

Unfortunately the picture is not as rosy as it appears at first - looks can be deceiving. Having gained back the jobs lost (note that it took seven years for that to happen, much longer than in previous recoveries) does not mean that the Inland Empire gained back the same jobs it lost. Remember, the Great Recession was also called a "Mancession" because most of the jobs lost were in sectors dominated by male workers: manufacturing and construction. Those were high paying jobs. Figure 9 shows the jobs that replaced those lost mainly in those two sectors and also shows that to this day, the Inland Empire has not recovered the jobs in manufacturing and construction. We ordered the sectors by size of employment from left to right.

The sectors that compensated for the job losses were (in order):

- Health Care and Social Assistance
- Logistics (including Wholesale Trade)
- Leisure and Hospitality
- Government

Figure 9 | Change to Sectoral Employment, Inland Empire, July 2007 - January 2019

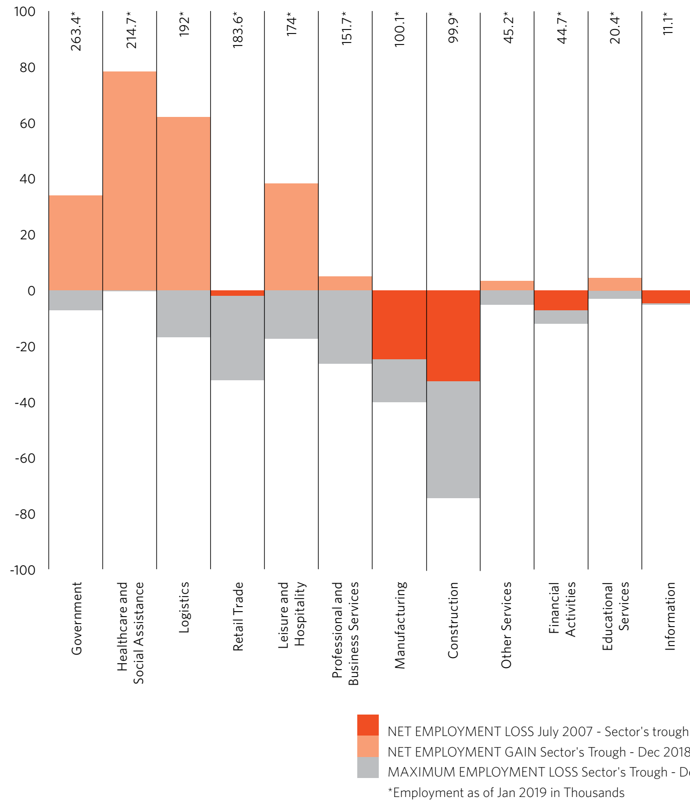


Figure 9 | The Inland Empire still has not recovered the jobs lost in manufacturing and construction from the Great Recession. The light orange bars indicate sectors that compensated for the job losses.

Those of you who have criticized Obamacare should at least take note that job creation in that sector alleviated the pain of job losses elsewhere to a large extent. Now the pressing question is, were those jobs as well-paying as the ones that were lost? Table 3 looks at that.

Table 3 shows that employment had recovered by June of 2014, and is now almost 18% above the pre-recession level in the Inland Empire. That is the impressive part. Average nominal wages increased over this time period as well: we are now almost 15% above pre-recession levels. Unfortunately there has been inflation as well; and while it has been low over the same time period, it eats away at the nominal wage gains or your "command over goods." If I look at inflation adjusted ("real") wages, then these are roughly 4% lower than they were in 2007. Not only did the average wage in the Inland Empire not go up year by year, say by the amount of productivity increases, it actually is below the 2007 level, and that is 12 years later! Talk about a lost decade.... so, how does this balance out with the tremendous employment gains?

TABLE 3: INLAND EMPIRE: COMPARISON OF EMPLOYMENT, NOMINAL AND REAL WAGES, AND INCOME: BEGINNING OF NATIONAL RECESSION, POINT OF JOB RECOVERY, MOST RECENT DATA

TIME	EMPLOYMENT (IN 1,000)	NOMINAL WAGES	REAL WAGES	INCOME = REAL WAGES* EMPLOYMENT (IN 1,000)
DECEMBER 2007	1,285.6	$21.30	$21.30	$27,328.83
JUNE 2014	1,285.9	$21.77	$19,40	$24,949.16
MARCH 2019	1,514.3	$24.48	$20.37	$30,840.66

Here is the good news: the Inland Empire is doing well relative to 2007. But it is not the result of decent wages. Instead, the Inland Empire was rescued by the tremendous amount of jobs created. This is where the logistics sector also played a big role. When you compare 2007 to 2014, meaning the point in time when jobs lost during the Great Recession were recovered, income was actually a full 9% below pre-recession levels. We cannot stress enough the implication here: good jobs were replaced with poorly paying jobs! Hence income (here obtained by multiplying employment by real wages) was down by such a large fraction. However, these not-so-well paying jobs continued to increase until now, where we are at a 13% higher income than we were at the pre-recession level.

Finally, perhaps we are painting a picture that is too bleak. The data in Table 3 does not include the employment and wages of the commuters. These are bound to be higher than employment and wages produced by firms within the Inland Empire. Unfortunately, there is no simple way to compute these.

Figure 10 | Change to Sectoral Employment, United States, July 2007 - January 2019

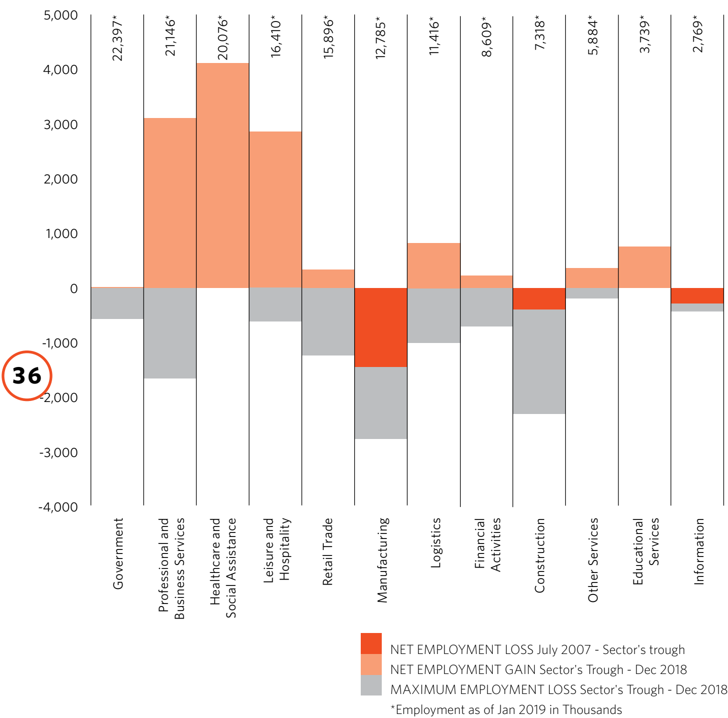


Figure 10 | Professional and Business Services, a high-paying sector, helped grow employment in the state and nation.

Figure 11 | Change to Sectoral Employment, California, July 2007 - January 2019

Figure 11 | The Inland Empire benefits from job growth in the Leisure and Hospitality, Healthcare, and Professional and Business Services sectors.

What does the same picture look like for our state and the nation? Figures 10 and 11 give the answer to that.

Here are the major differences that evolve if you compare Figures 10 and 11 with Figure 9. It is true that at the national and state level Obamacare has also played a major role in terms of job recovery, as has Leisure and Hospitality. Government has played much less of a role, but the Professional and Business Service sector is very important for both the state and the nation. The punchline? This sector is high-paying. That is the major difference: the well-paying jobs from this sector are the missing ingredient. In the Inland Empire, employment had recovered by 2014. By 2019, job growth in the nation and the state were clearly above the 2007/2014 level, with California outperforming the U.S. in terms of employment growth. What about wages and income?

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Table 4 reproduces the layout used in Table 3 for the nation. The major difference is that employment is only roughly 9% higher, which is not as impressive as for the Inland Empire, where it increased by 18%. But, and this should be capitalized BUT: given the superior wage structure, nominal wages in the U.S. increased by 30% rather than 15% for the Inland Empire. Even though real wages only increased by 9% for the U.S., this is substantially higher than the 4% wage loss in the Inland Empire. Finally, even though U.S. employment increased by less than that of the Inland Empire, income increased by more, namely 19% (US) vs. 13%. (IE) Hence the superior employment gains in the Inland Empire have been offset by having gained those jobs in sectors that are not as well paying.

Note that the Inland Empire and the U.S. basically started with the same nominal and real wages, but have now drifted apart - in a negative way for the Inland Empire.

We include Table 5 for completeness, which shows the numbers for California. In essence, California resembles the nation, and therefore performs superior when compared to the Inland Empire. All numbers look better for the state, with the exception of the employment numbers. Finally, note how state average wage numbers are also higher than those of the nation: on average, we have better paying jobs in California.

TABLE 4: UNITED STATES: COMPARISON OF EMPLOYMENT, NOMINAL AND REAL WAGES, AND INCOME, BEGINNING OF NATIONAL RECESSION, POINT OF JOB RECOVERY, MOST RECENT DATA

TIME	EMPLOYMENT (IN 1,000)	NOMINAL WAGES	REAL WAGES	INCOME = REAL WAGES* EMPLOYMENT (IN 1,000)
DECEMBER 2007	138,409	$21.18	$21.18	$2,931,503
JUNE 2014	138,857	$24.44	$21.78	$3,024,540
MARCH 2019	150,796	$27.71	$23.05	$3,476,375

TABLE 5: CALIFORNIA: COMPARISON OF EMPLOYMENT, NOMINAL AND REAL WAGES, AND INCOME, BEGINNING OF NATIONAL RECESSION, POINT OF JOB RECOVERY, MOST RECENT DATA

TIME	EMPLOYMENT (IN 1,000)	NOMINAL WAGES	REAL WAGES	INCOME = REAL WAGES* EMPLOYMENT (IN 1,000)
DECEMBER 2007	15,481.2	$24.47	$24.47	$378,825
JUNE 2014	15,553.1	$27.41	$24.45	$380,080
MARCH 2019	17,357.5	$32.06	$26.67	$462,968

COACHELLA VALLEY

Enough said about the area outside the Coachella Valley. Let's zoom in further to talk about what most of you came here for. We will give you the employment picture, including seasonality of work and commutes within the Coachella Valley, but we also want to talk about three new issues that we had not addressed in previous reports. They include the possibility of attracting residents from the coastal areas, the danger posed by the 4th industrial revolution (artificial intelligence, automation, robotics) to jobs in the area, and examples of analyzing the effect of neighborhoods in the Coachella Valley on subsequent income outcomes.

POPULATION

Let's start with the broadest measure of people living and working in Coachella Valley, the population. When we talk about population numbers in the Coachella Valley, we are looking only at people residing in the nine major cities. That is Cathedral City, Coachella, Desert Hot Springs, Indian Wells, Indio, La Quinta, Palm Desert, Palm Springs, and Rancho Mirage. For this analysis, we exclude unincorporated areas and smaller places.

Figure 12 summarizes the population levels for Coachella Valley and the rest of Riverside County. In 1989, there were roughly 1,057,000 people living in Riverside County, 169,000 in the Coachella Valley, and 888,000 in the Rest of Riverside. That meant that approximately 16% of Riverside's population resided in the Coachella Valley in 1989. By 2019, the numbers had grown by approximately the same amount, namely by 130% to end up at 388,000 residents in the Coachella Valley, and 2,052,000 in the rest of Riverside County. The total county population is therefore close to 2.4 million people. The share of the Coachella Valley population remained therefore roughly constant over this time period, despite significant growth areas. The lesson is that even though the Coachella Valley is quite different from the rest of Riverside County, both seem to follow a common trend in population, at least of longer periods of time. As Figure 12 shows, if we let both areas

Figure 12 | Population Levels Compared to 1989, Population Set to 100 in 1989

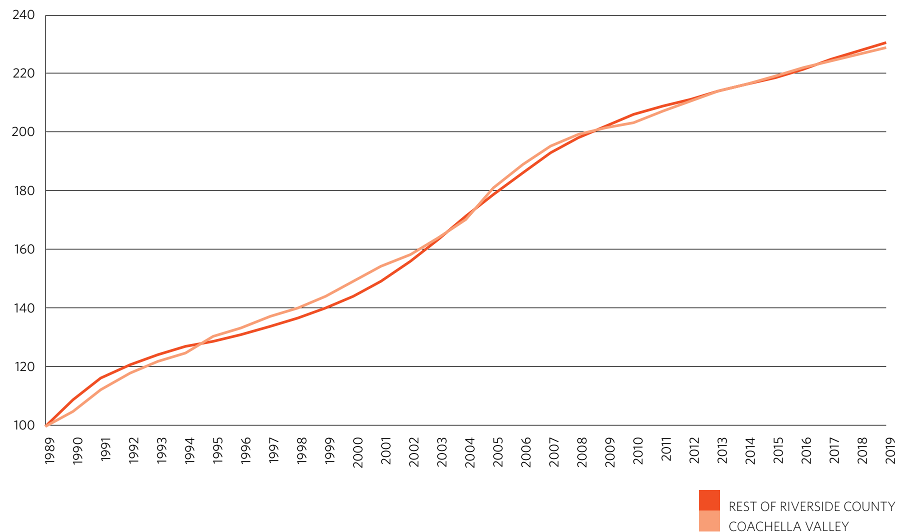
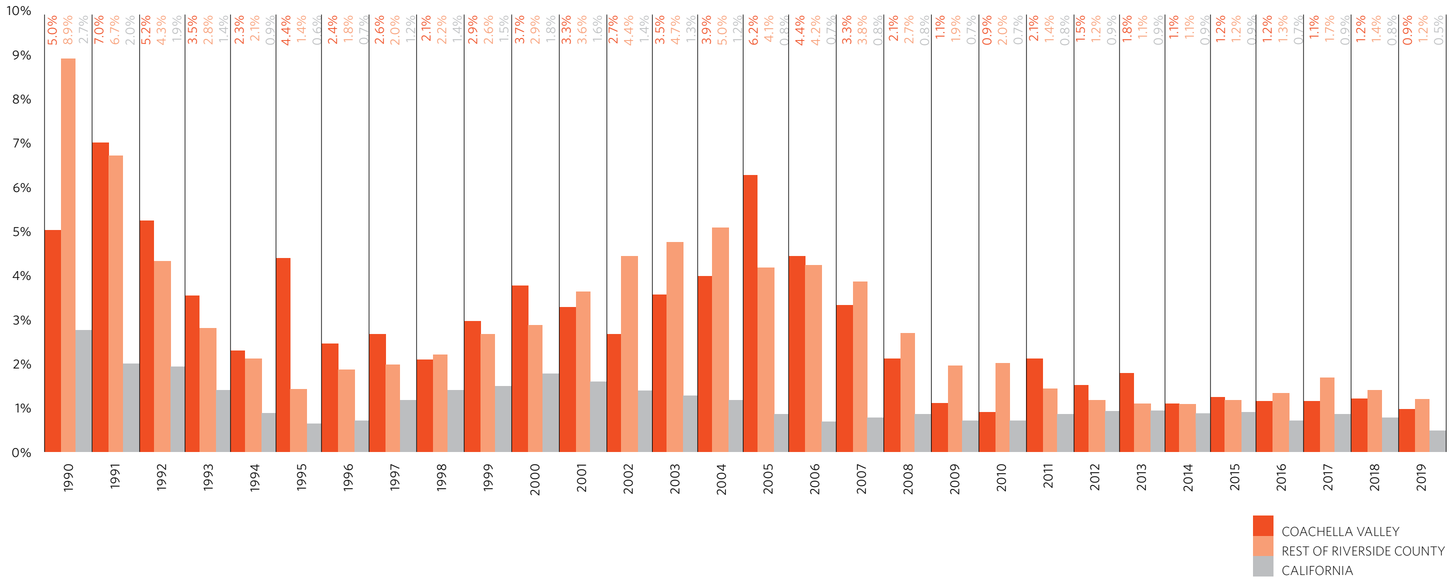


Figure 13 | Population Growth Rates, Coachella Valley, Rest of Riverside, California, 1990-2019



start at 100 in 1989, then they end up at roughly 230 in 2019. This translates into an average growth rate of 2.8% per year. That number is relatively high, and implies that the population would double every 25 years. However, the story is more complicated. As you can see from Figure 12, growth during the period was far from constant from year to year.

Early on, the Coachella Valley saw higher growth rates, but the rest of Riverside County eventually caught up. The slope then flattens out following the Great Recession, meaning growth rates slowed down dramatically. This is a combination of two effects: lower fertility rates and, more significantly, less in-migration. Lower fertility rates is a national phenomenon. This slowdown has implications for colleges and universities, including for College of the Desert, CSUSB-Palm Desert campus and UCR - Palm Desert campus since there will be substantially fewer students starting in about six years. Of course this could be offset by certain demographic groups that have sent a lower percentage to higher education, changing their behavior; meaning incentives may be needed.

The Great Recession also caused a significant decrease in housing starts (more on this later in the report). The combined effect of lower fertility rates and fewer people migrating into the area has resulted in a dramatic drop in population growth rates in the Inland Empire, the rest of Riverside County, and the Coachella Valley.

Figure 13 provides a more detailed picture into the year-on-year percentage changes in the population growth rate of the Coachella Valley, the RORC (Rest Of Riverside County), and California.

From this data, the following details stand out.

• Since the end of the Great Recession, Coachella Valley and Riverside County both displayed relatively small population growth rates of less than 2%. While this is low compared to the high growth rates experienced prior to the Great Recession, it is slowly converging to the average U.S. population growth rate of 1%. The population growth rate from 2014-2019 was slightly less than 1.2% in the Coachella Valley.

• Growth rates for the Coachella Valley and Riverside County have remained within two percentage points since 1990, with the exception of 1990 and 1995. This explains why the two populations move closely together in Figure 12. However, in the early 2000s, there was a sharp increase in the growth rates of Riverside County's population, whereas Coachella Valley grew more slowly until the growth rate spiked in 2005.

• Before the Great Recession, in-migration into the Coachella Valley and Riverside County resulted in higher population growth rates when compared to California as a whole. However, growth rates have yet to return to pre-recession levels.

There is still too much information to digest in Figure 13 properly. Let's make

Figure 14 | Annual Population Growth Rates, Coachella Valley, Rest of Riverside County, California, 1999-2007 and 2009-2019

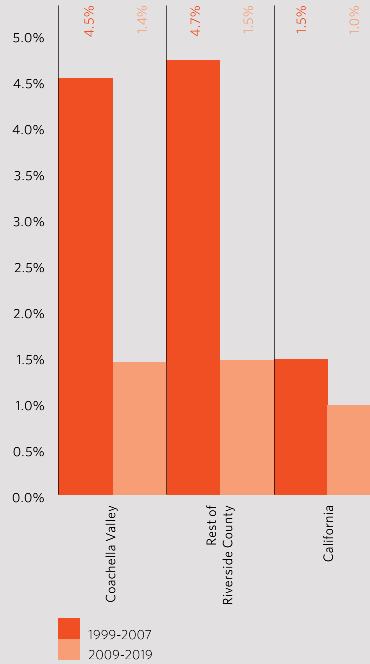
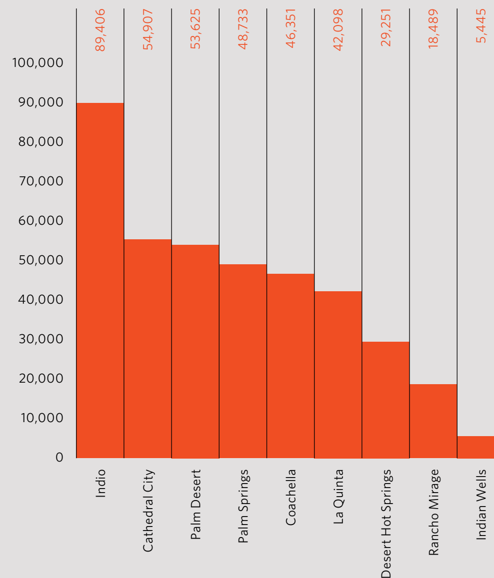


Figure 15 | Population by City, Coachella Valley, 2019



it simpler by comparing the average growth rate for the pre-Great Recession period with the one thereafter. The compounded annual population growth rate differs sharply prior to and following the recession. For Coachella Valley, the population growth rate during this period is around 1.4%, slightly higher than the 1% overall growth rate for California. On the other hand, population growth rates of 7% or even more are not sustainable. These would imply that the population doubles every 10 years.

These dramatically lower population growth rates at first look, perhaps, alarming. However, you need to step back and see the bigger picture in the U.S. to understand what is going on. At least a small part of the decline is the result of significantly lower fertility rates in the U.S. starting with the Great Recession. For example, fertility rates in the U.S. fell in excess of 12 percent after 2007. While this shows up in population growth rates immediately, it will have larger consequences for primary and secondary education, and, starting in 2026, for junior colleges and colleges/universities. While fertility rates bottomed out in 2013, they have not recovered since then. Increased population growth will therefore have to depend on inmigration into areas (or tertiary educational institutions accepting more foreign students).

For 2019, so far, and using simple projections, we will observe a population growth rate of nearly 1% in the Coachella Valley. Its population increased by roughly 4,000 people. This data does not differ much from last year's growth rate of 1.1%. If this trend continues, we can expect the population of the nine cities to reach 400,000 early in the next decade. This assumes no bounce back in fertility rates and/or an uptick in in-migration.

Figure 15 shows the current distribution of the population across the nine cities. Indio is by far the largest city, with a population of roughly 90,000, while Indian Wells only has 5,500 residents. There are five cities with more than 45,000 residents. These are, in decreasing order, Indio, Cathedral City, Palm Desert, Palm Springs, and the city of Coachella. These five cities actually make up over 75% of the overall population.

Figure 16 displays time series for the nine cities since 1989. Note that Palm Springs, which was the most populated city in 1989, has now been surpassed by Indio, Cathedral City, and Palm Desert due to its inablity to grow faster as a result of its geography. The most notable trend is the growth of Indio and the city of Coachella, which doubled in population between 1989 and 2006 primarily due to the mid-2000s population boom. From 2018 to 2019, there has been minimal change in the populations across all nine cities, reflecting the relative stabilization of the population size over the last decade.

Figure 16 | City Population, Coachella Valley, 1989-2019

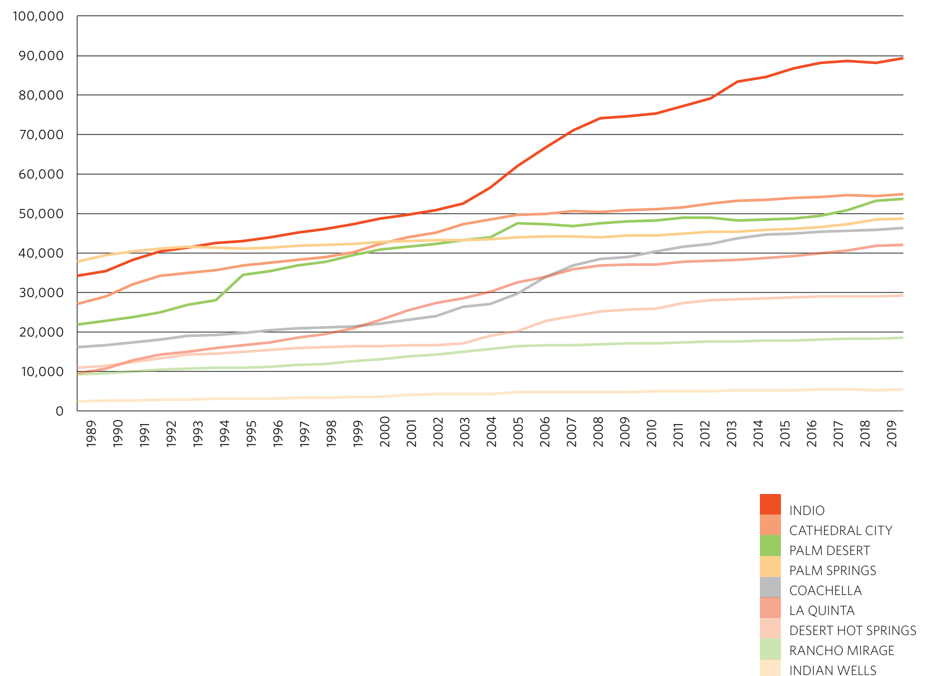
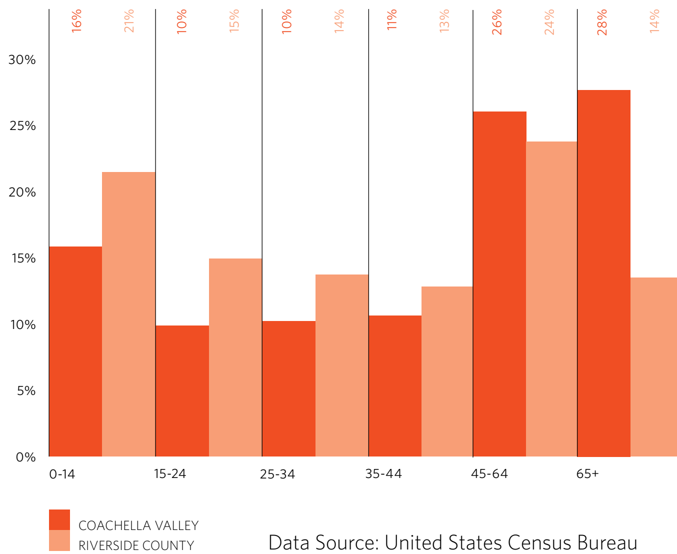


Figure 17 | Age Distribution, Coachella Valley and Rest of Riverside County 2017



Data Source: United States Census Bureau

Figure 18 | Migration Patterns Within Selected California Counties, % Staying in CA, 2013-2017

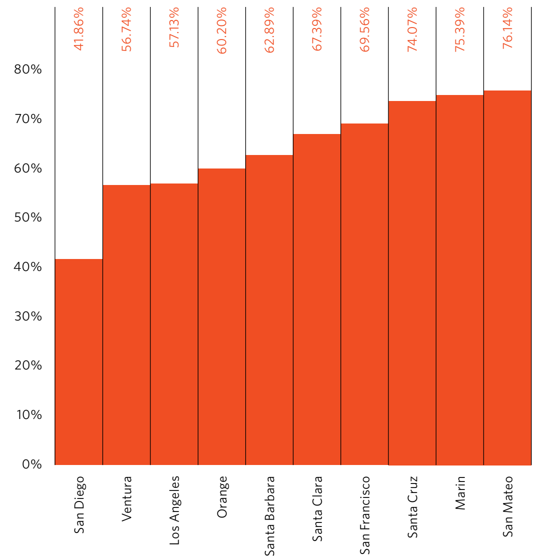


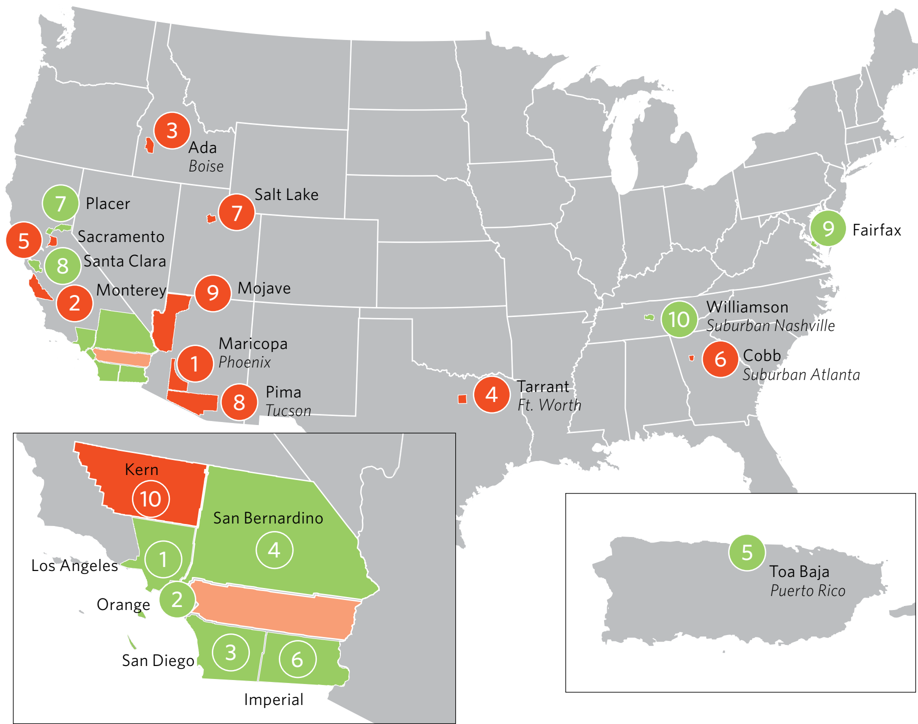
Figure 17 illustrates the differences in the age compositions between the Coachella Valley and Riverside County. The Coachella Valley is traditionally known to have a high proportion of people above retirement age. The figure clearly reflects that. Roughly 54% of the population is above the age of 45, a 9 percentage point increase from the previous year's data.

NET MIGRATION

In the population section, we mentioned that fertility rates in the U.S. have fallen dramatically since the onset of the Great Recession in 2008. We also talked about the population potentially growing through net migration, namely if in-migration is larger than out-migration. Let's start our analysis of migration patterns by looking at where Riverside County, and the Coachella Valley, could expect in-migration to come from.

Figure 18 displays the migration patterns of residents of Southern California coastal counties (Santa Barbara, San Diego, Ventura, Orange, and Los Angeles) and five counties in NorCal (Santa Clara, Santa Cruz, San Mateo, San Francisco, and Marin) in terms of where they are moving. If they relocate elsewhere in California, then the Coachella Valley has a higher chance of attracting them than if they left the state altogether. For example, residents in coastal counties in Southern California could either move inland, or leave the state completely.

Figure 19 | Net Migration Into and Out of Riverside County



Note that NorCal residents are more likely to stay within the state than SoCal residents. Perhaps they just move into less expensive counties in NorCal, but that would be difficult since they would have to commute over fairly large distances, for example from Stockton.

Of those migrating out, a surprising 58% of San Diego residents are moving out of the state during this period. It is doubtful that Riverside County and the Coachella Valley could attract those migrants. It is tempting to suggest that there is a better chance to attract people from Northern California, but we would need more detailed data about where most of these individuals move to. If they are currently working in the tech industry, then they will not relocate to Riverside County to look for employment in Logistics or Leisure and Hospitality. Clearly tech firms would have to move here first and that probably requires a local labor force that is more fluent in Python and SQL than the current high school and community college graduates are. It is therefore encouraging to see the College of the Desert expanding into Palm Springs with a more tech-heavy curriculum. Of course having a significantly lower cost of living environment will help.

Figure 19 tries to give a partial answer to migration patterns from the ten counties in Figure 18 by looking at in- and out-migration for Riverside County (Census figures for migration are only available by county at the micro level).

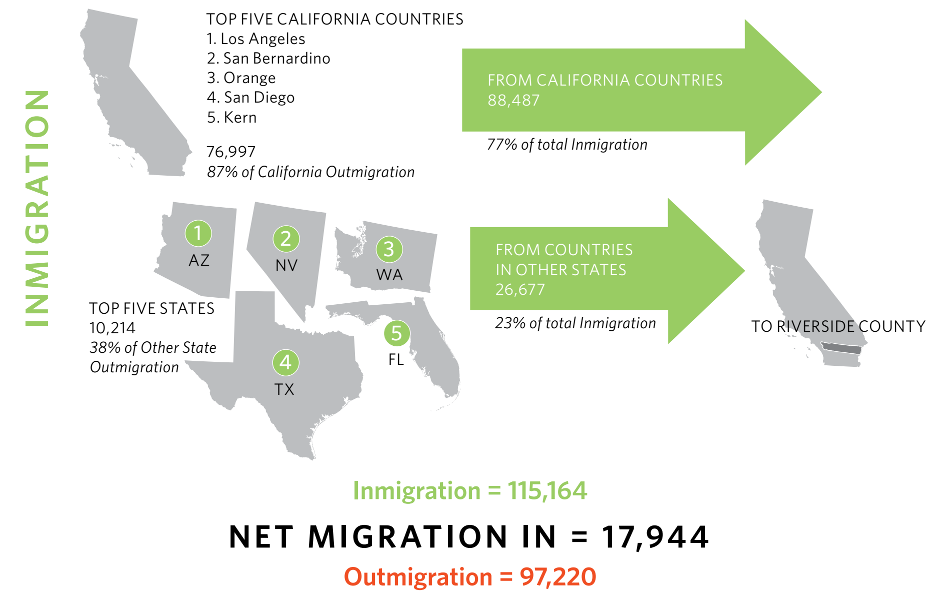
Figure 19 displays the rank, rather than the raw numbers, of net migration: the green counties are those with which Riverside County has a positive migration balance (positive net migration in; in-migration exceeded out-migration), meaning, there are more people migrating in from another county into Riverside County than migrating there from Riverside County. Note that five out of the top six green-labeled counties are in Southern California. These residents most likely want to continue to work in Southern California but cannot afford living in their current residences. Or, alternatively, they can sell their houses and buy more attractive properties in the Inland Empire, although that will now involve a longer

commute. Next, there are two counties up north, Placer and Santa Clara, that are in the top 10 (don't ask me about Puerto Rico...). The bottom line is that seven out of the top 10 net-in migration counties are located in California, most of them in Southern California.

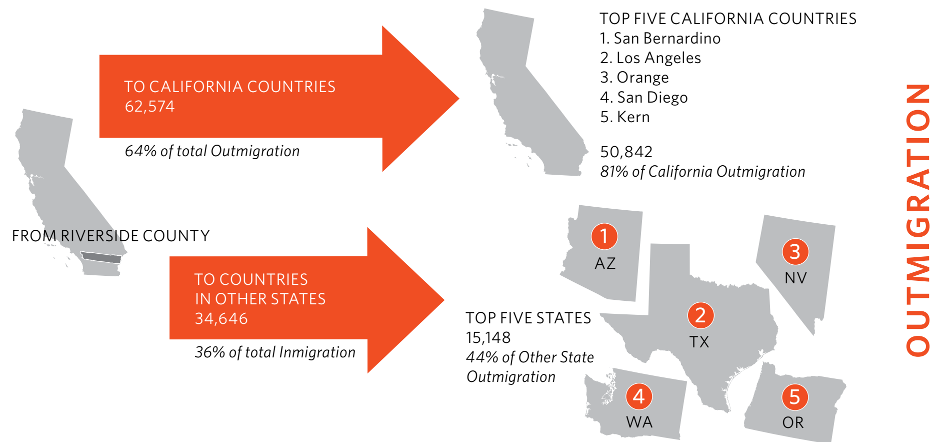
Where do residents of Riverside County move to if they leave the county? Three of the destinations are in Arizona, with Phoenix occupying first place. Only three of these locations are in California, two of them in Northern California. It would be interesting to look at the age structure of these out-migration flows. We speculate that those Riverside County residents migrating elsewhere are likely to be retirees, who are cashing in from selling their appreciated properties.

Figure 20 adds some numbers to the migration patterns. Roughly 5% of Riverside County residents move out and are replaced by just a few more within the sample period. The vast majority of the in-migration, almost 80%, come from other California counties. Furthermore, if we focus on those who out-migrate from California counties, the vast majority (close to 90%) previously resided in the Greater Los Angeles area (Los Angeles County, Orange County), San Bernardino County, San Diego County, and Kern County.

Figure 20 | In- and Out- Migration, Riverside County



NET MIGRATION IN = 17,944



Focusing on in-migration from other states, then the leading three states are from the West (Arizona, Nevada, Washington state), while two are further away in the East (Texas, Florida). Perhaps these two states simply stand out due to their population size.

Somewhat surprisingly, when we look at out-migration, we get a similar geographic pattern, although there is a higher percentage of residents who leave for locations in states outside of California. The Top 5 of out-migration within the state is identical to the Top 5 of in-migration (San Bernardino County, Greater Los Angeles, San Diego County, and Kern County). The top five states for out-migration are almost the same as for in-migration, with Oregon replacing Florida. However, the rank ordering is slightly different.

EMPLOYMENT

When describing total employment in the Coachella Valley, the first fact that stands out is the strong seasonal pattern. Figure 21 shows both the raw data and the "seasonally adjusted" series for employment in the area. (The seasonally adjusted series takes into consideration regularly occurring seasonal patterns and removes them with a statistical method called X-11 or X-12; don't worry about the details). For much of our analysis below, we will focus on the seasonally adjusted data - although we recognize that the seasonal pattern is extremely pronounced and hence of relevance for businesses and politicians, and it is changing over time.

Figure 21 | Employment Total Levels, Coachella Valley, Seasonally Adjusted and Unadjusted Data, Monthly Data, January 2001 - September 2017

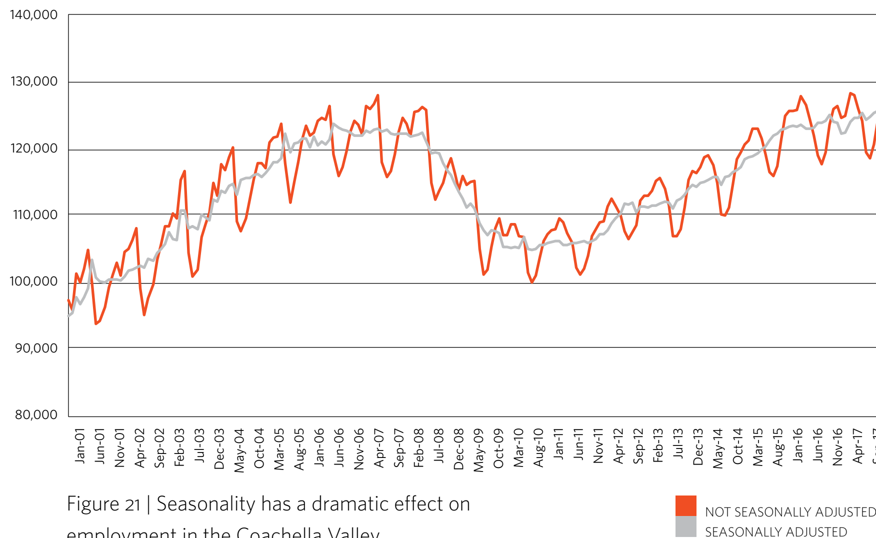


Figure 21 | Seasonality has a dramatic effect on employment in the Coachella Valley.

In one of our reports a few years back, we demonstrated that the seasonal patterns differed from the past as agriculture became less important for the Coachella Valley and Tourism gained in importance over time. Clearly those two industries do not have to follow the same seasonal patterns.

Whether we are in a recession or a boom, employment swings in the Coachella Valley are extreme. Rarely will you see seasonality have such a dramatic impact on employment, and these fluctuations are not easy to digest for businesses, policy makers, and workers. While you can plan for regular declines in businesses - think of dry cleaners or restaurants in a college town - you still have to shift around workers or lay them off temporarily. Since you cannot change the climate - well, at least not in the short run - then the only way to reduce seasonal fluctuation is to change the industrial composition in favor of sectors that are less affected by seasonal demand fluctuations. Government and Health and Education are less affected by seasonal fluctuations than Leisure and Hospitality and Agriculture.

To demonstrate the sheer numbers involved, let us look at the raw data from 2016 and 2017. Between November 2016 and April 2017, there were, on average, 126,000 people employed in the nine cities of the Coachella Valley. Between May and October of 2017, this number fell 3.2% to 121,000. To put this decline into perspective, if people did not stop looking for jobs during this period and simply declared themselves unemployed, then the unemployment rate would increase from 3.5% (say) to over 6.7%. Imagine we observed this for the country as a whole in such a short time span. Furthermore, this is an average with city-by-city variation; some cities in the Coachella Valley are even more heavily impacted by seasonal employment.

Figure 22 shows the seasonality in air traffic and hence in tourists landing in the Coachella Valley. It contains information other than the strong seasonal fluctuations. This is good news. Note the trend increase of arrivals in March since 2012. Clearly the warm weather is quite attractive to those of our neighbors from colder regions in the U.S., and don't forget snowbirds from The North (Canada). I recall a cruel Los Angeles weather forecaster mentioning that we invite people to visit us during snowstorms in the Midwest and along the East Coast, only to end the forecast with "Oh, I forget you can't. Your airports are closed." LAX traffic, on the other hand, is less affected by seasonality. For comparison, we can look at the differences between the two airports when they are the busiest, as well as when traffic is lightest. In 2018, PSP had, on average, 97,000 passengers arriving every month, with a low in the month of July (43,000 passengers) and the heaviest traffic in the month of March (173,000 passengers) - a stunning 300% increase in arriving passengers. LAX on the other hand was least busy in February (3.0M arriving passengers) and busiest in July (4.2M arriving passengers), which is "only" a 40% increase in arriving passengers (given the higher volume of LAX passengers, this is still quite stunning).

Figure 23 shows employment growth in the nine cities of the Coachella Valley from 2006 to 2017. Prior to the recession, the Coachella Valley experienced an employment growth rate of 2%. This is quite different from the rest of the Inland Empire, which experienced employment declines in 2007 already. We interpret that as a result of the Great Recession appearing to be quite mild at the national level until the middle of 2008. There is also a slight chance that the "seasonal adjustment" statistical procedure did not pick up the employment losses

Figure 22 | Passenger Traffic Arriving, Palm Springs (PSP) Airport, October 2002 - February 2019

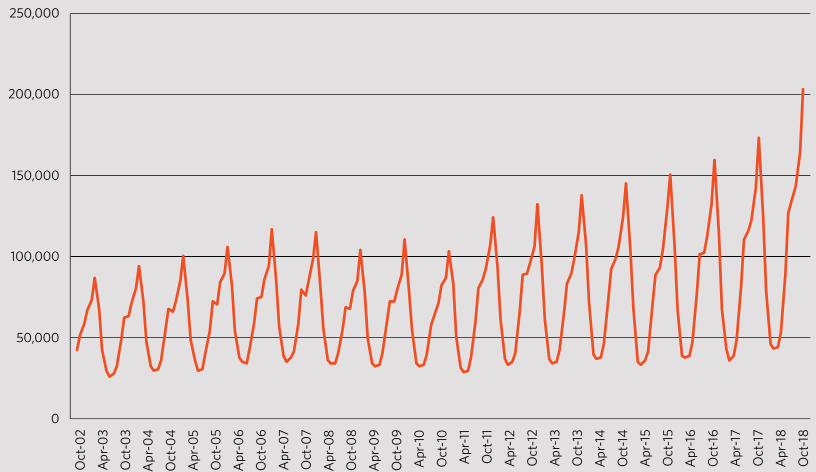


Figure 22 | You can clearly see the seasonal fluctuations before 2012 but note the trend increase of arrivals since then.

Figure 23 | Percent Change in Employment, Coachella Valley, 2006-2017

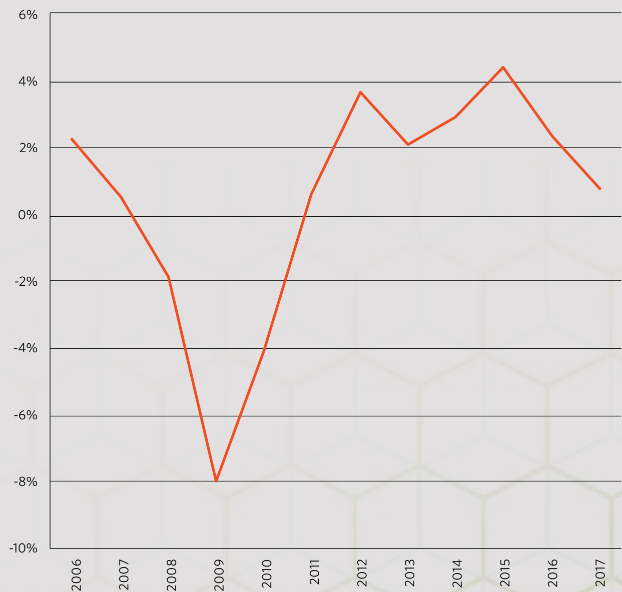


Figure 23 | In 2009, one of twelve employees lost their jobs. It took until 2011 for employment to start increasing by relatively small amounts.

around that time of the year, since the Coachella Valley always experiences large employment losses from June to August. 2009 was definitely not an easy year to survive in keeping your job in the Coachella Valley, or to keep your business open. One in twelve employees lost their jobs. It took until 2011 for employment to start increasing by relatively small amounts. However, in 2017, the employment of the Coachella Valley increased by an abysmal 0.6%. These aggregate numbers hide the fact that there is substantial variation between the nine cities when it comes to job growth, and we will talk about this further below. Finally, note that although jobs have been recovered since 2016, the population of the Coachella Valley has grown in the meantime. If we took that into account, then we would still have a gap with respect to previous peak employment.

Figure 24 is the same as Figure 8 above, but employment levels for the Coachella Valley have been added. The Coachella Valley took a long time ("The Lost Decade") to recover employment losses incurred during the Great Recession - but it is finally done. It also took much longer than for the Inland Empire as a whole, the state, and the nation.

We picked July 2007 as a starting point since employment peaked at that point in the Inland Empire. Initially, employment in the Coachella Valley did not fall by as much as in the Inland Empire. This was the result of the

Figure 24 | % Change in Employment Levels, U.S., CA, IE, CV, monthly data, seasonally adjusted
July 2007 - October 2017, Employment = 100 in July 2007
SOURCE: CA EDD, FEDERAL RESERVE ECONOMIC DATA

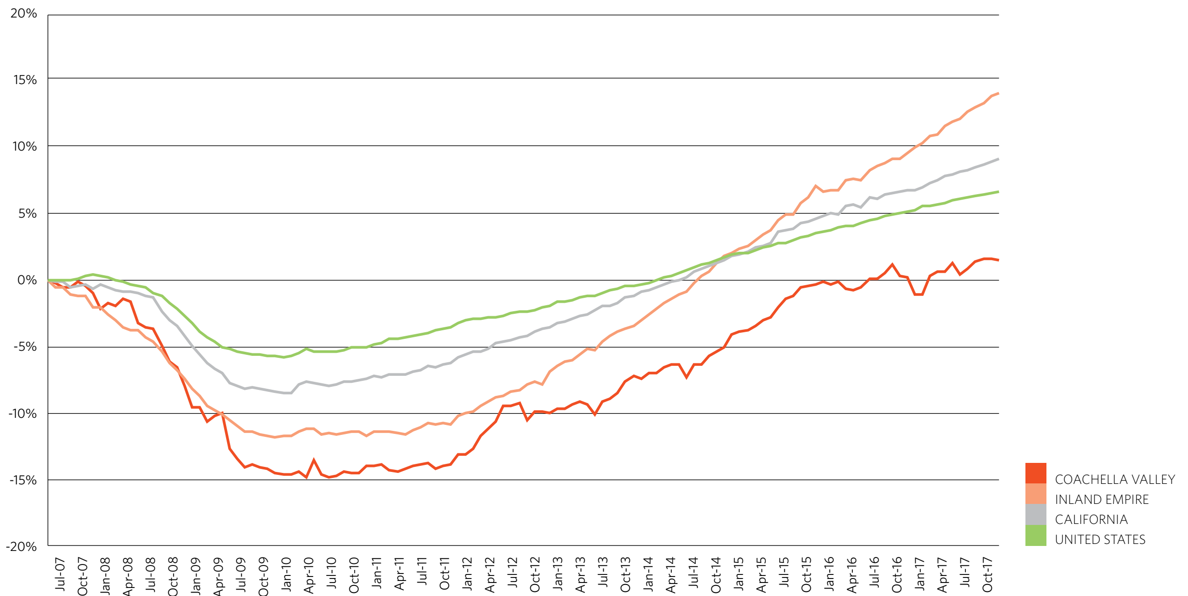


Figure 24 | At the trough, employment in the Coachella Valley was down by roughly 15%. Every 7th person lost his or her job.

national recession being mild initially (before the fall of Lehman Brothers). Starting early in the summer of 2008, however, tourism declined substantially and hotel bookings plus retail sales in the Coachella Valley went down quickly. Figure 24 indicates that at the trough, seasonally adjusted employment in the Coachella Valley was down by roughly 15%; basically every 7th person lost her or his job (actually mostly his, since this was a "mancession" with most job losses occurring in construction and manufacturing; but manufacturing plays only a minor role in the Coachella Valley). Coachella Valley employment continues to display lower growth rates when compared to the Inland Empire, California, and the nation.

Similar to our analysis for the rest of the country, we are interested in showing how the employment composition has changed since the Great Recession. Although construction was the big loser, seeing employment returning to pre-recession levels does not necessarily imply that all construction jobs have been regained. That actually would be surprising, since we have mentioned above that average and cumulative housing starts have been quite low when compared to previous expansions.

Figure 25 indicates that our hypothesis regarding construction is confirmed by the data. (The reason why the title says "2005" is that different industries peaked at different times, the earliest starting in 2005.) Construction lost the largest amount of workers compared to the other sectors. Note that, again not surprisingly, Leisure and Hospitality also suffered severely. Tourists just stayed away during the Great Recession. However, while the Leisure and Hospitality sector has not only recovered fully but even added jobs, the same is not true for construction. The only other sector that shows

Figure 25 | Change in Employment by Industry, Relative to Peak Employment, Coachella Valley, Peak to Trough to Recovery, January 2005 - Q4 2017

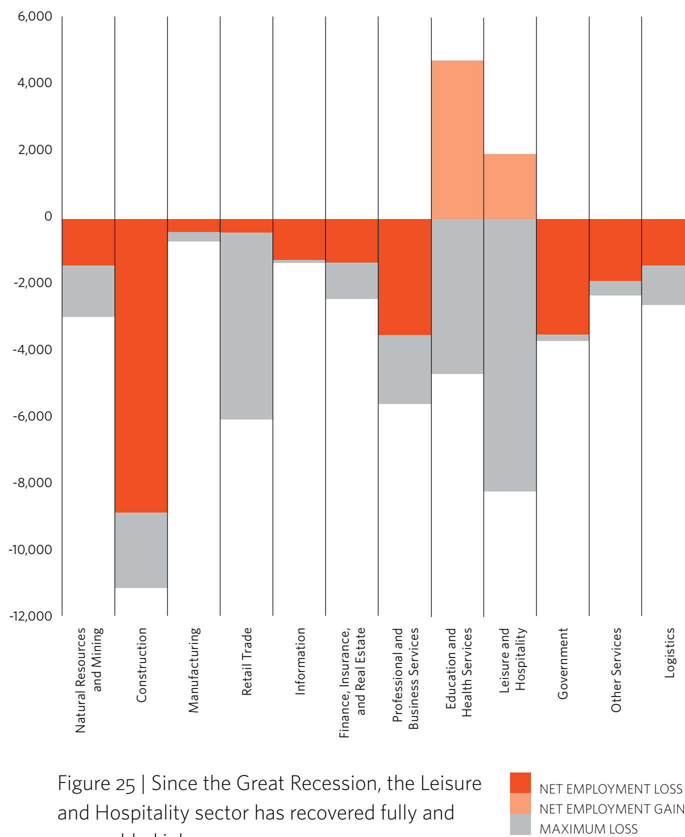


Figure 25 | Since the Great Recession, the Leisure and Hospitality sector has recovered fully and even added jobs.

substantial employment gains is Health and Education, centered on Health. Particularly disappointing is the behavior of the Professional and Business Services, since we know that this sector is responsible for the superior income performance for the state and nation.

Logistics, including Wholesale Trade, is a major engine for employment growth in the rest of the Inland Empire - not so much here in the Coachella Valley. Instead, Retail Trade (and Wholesale Trade) have basically returned to pre-recession levels, but have not gained beyond that. Retail added around 5600 of the 6000 jobs lost, while wholesale recovered around 700 (almost the entire amount that it lost).

Figure 26 scales the changes by looking at the percentage growth in employment by sector. The disadvantage in displaying percentage changes is that small sectors, such as Natural Resources and Mining, display large numbers, but that their effect on the Coachella Valley economy is negligent given the size of the sector.

As before, the sector that stands out is Construction. Around 70% of the jobs were lost peak-to-trough in this sector, and only 14% have been recovered. This leaves the Coachella Valley economy with a net loss of 56% of jobs in this sector.

Figure 26 | % Change in Employment by Industry, Relative to Peak Employment, Coachella Valley, Peak to Trough to Recovery, Q1 2005 - Q4 2017

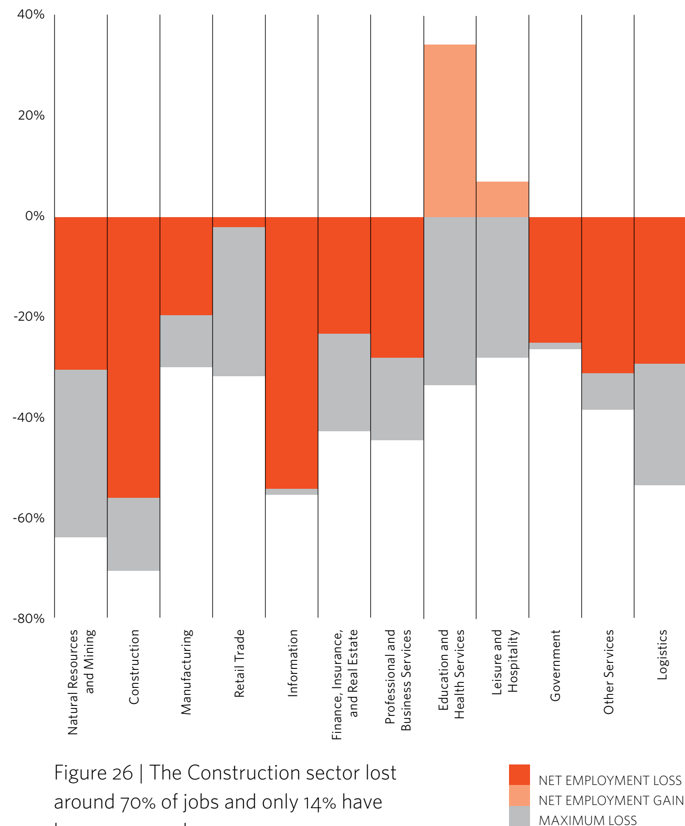


Figure 26 | The Construction sector lost around 70% of jobs and only 14% have been recovered.

Figure 27 | Change in Employment by City, Relative to Peak Employment, Coachella Valley, Peak to Trough to Recovery, January 2005 - December 2017

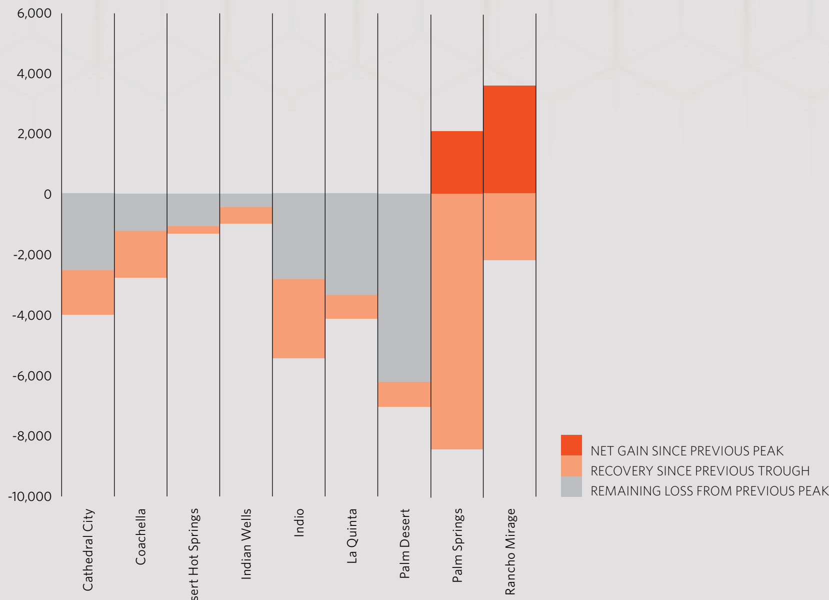


Figure 27 | Without considering the relative populations of these cities, Palm Desert, Indio, and Palm Springs were the hardest hit by the recession, in terms of jobs lost.

Figure 28 | % Change in Employment by City, Relative to Peak Employment, Coachella Valley, Peak to Trough to Recovery, January 2005 - December 2017

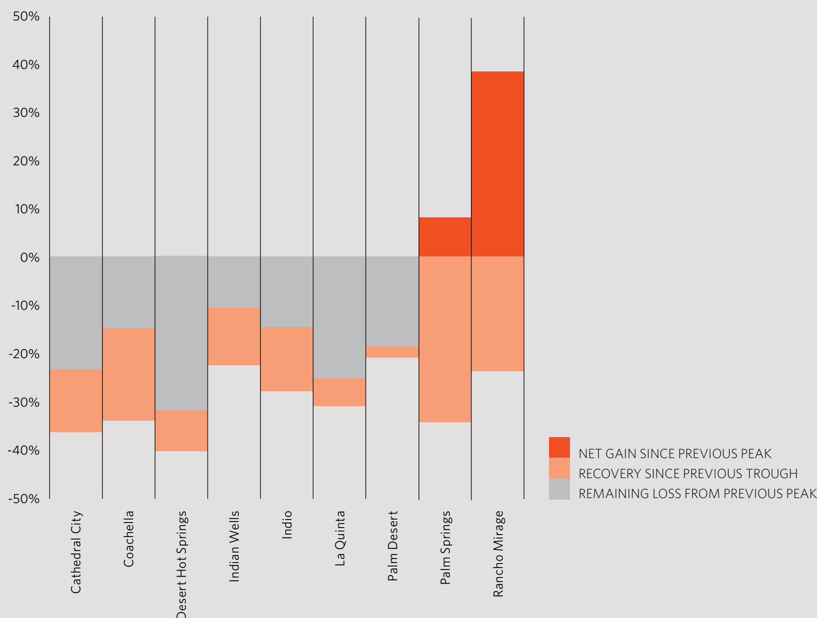


Figure 28 | Only Rancho Mirage and Indio have recovered the employment losses.

There is no reason to expect that the changes in sectoral employment are evenly distributed across the nine cities in the Coachella Valley, since each one has different characteristics. Figures 27 and 28 display the geographical changes in employment in numbers and in percent changes respectively.

Figure 27 could lead to the conclusion that Indio, Palm Desert, and Palm Springs were the hardest hit by the recession, which would be true from a pure analysis of jobs lost. However, the relatively large number of people living in these cities could result in misinterpretation of the severity of the impact.

We scale the effect of the changes by turning them into percent changes (see Figure 28). This results in a dramatically different graph. Rancho Mirage, Palm Springs, and Indio now appear to be impacted much less. Of course, and consistent with the previous figure, only Rancho Mirage and Indio have recovered the employment losses. Employment in these two cities has first risen to and then exceeded the previous peak. The same is not true for the other seven cities. Some of these have quite a way to go in terms of recovery.

As demonstrated in Table 3 above for the region, the state, and the nation, it is not trivial to figure out whether or not these sectoral shifts had a positive or negative overall effect. For example, employment may have returned to pre-recession levels, but the jobs created in the process were not "adding as much value" to the economy as those that were lost.

Consider the situation for the Coachella Valley. Although the average pay for an employee in the Education and Health Services Sector is slightly higher than the average pay in the Construction sector (a little more than $48,000 compared to roughly $45,500), note that the average salary in Health Services is affected by a highly skewed distribution: surgeons and doctors make a significant amount more than home healthcare workers. The vast majority of the jobs in health care do not require an M.D. after the name. Rather they are jobs such as nursing home attendants, which pay closer to minimum wages. We assume that the sector has boomed as a result of the latter. Certainly pay in Leisure and Entertainment is much lower ($31,500).

Note that in general and across sectors, there is a significant level of income variation. The three lowest-paying sectors are Retail Trade, Leisure and Hospitality, and Other Services, all roughly averaging at $32,000 per year. Contrast this with

Figure 29 | Income per Worker, by Industry, Coachella Valley, 2017

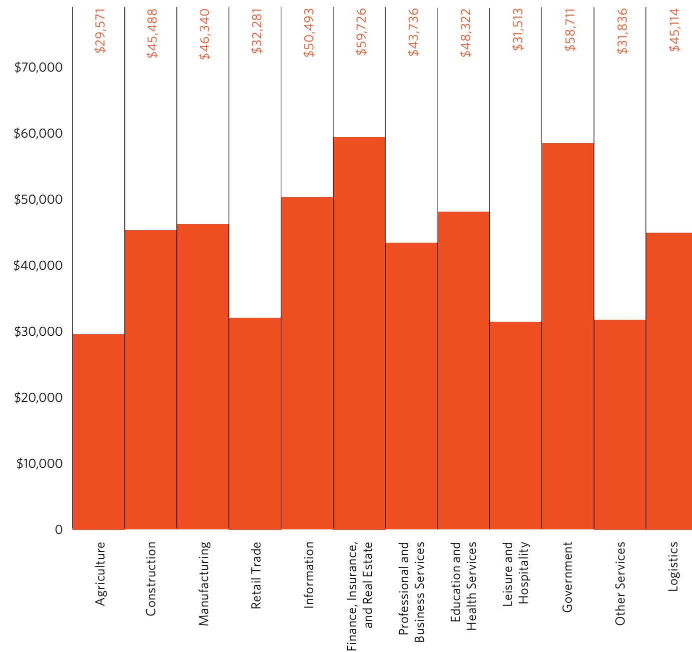


Figure 29 | Retail Trade and Leisure and Hospitality are among the lowest-paying sectors, but contributed substantially to job recovery in the Coachella Valley.

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When comparing the 2017 data to 2016, ten of the twelve sectors saw an increase in average pay, the exceptions being the Information sector and the Education and Health Services sector (though the losses incurred were relatively small).

You can think of the situation as that of trees burned in the fire of the recession having been replaced by new trees. You may reasonably conclude that the forest has healed. However, there is a key consideration that the naive observer has missed, namely the types of trees that have arisen from the ashes may not be the same as those that were burnt down. From its pre-recession peak to its trough, construction lost almost 11,000 jobs in the Coachella Valley. While those jobs in construction lost were a large percentage of all the trees felled in 2008, they were not a large percentage of the trees added back to the forest. As of 2017, employment in construction for the Coachella Valley is at 40% of its pre-recession peak, still a net loss of 10,000 jobs. So what were these new branches quickly propagating throughout the jobscape? Positions in Education and Health services as well as Leisure and Entertainment have filled the scars in the employment forest. However, a job as a valet attendant is not as value adding as a carpenter. The difference is not something as trivial as leaf shape or bark color. The divergence is about a $15,000 reduction in pay. So, we know that total employment in the Coachella Valley has more than recovered since 2008 but what is the moral of the story? The forest is important but so are the trees.

COMMUTING WITHIN THE COACHELLA VALLEY

What makes the local employment analysis more complicated is that the place of work does not necessarily have to be the place of residence. For example, a job lost in Palm Springs shows up in the establishment survey, but not in the unemployment rates if the worker lives elsewhere, such as Indio. As a result, it is possible for the unemployment rate of Indio to go up despite the fact that no one working in Indio has lost a job.

To get an idea regarding the commuting behavior within Coachella Valley, we looked at commuting patterns between the nine cities. This misses commutes from places elsewhere, e.g. Beaumont, Blythe, and Banning, or the commute of residents of the Coachella Valley to outside locations.

TABLE 6 | COMMUTING WITHIN COACHELLA VALLEY

LIVES/WORKS	INDIO	CATHEDRAL CITY	PALM DESERT	PALM SPRINGS	COACHELLA	LA QUINTA	DESERT HOT SPRINGS	RANCHO MIRAGE	INDIAN WELLS
INDIO	4,193	625	3,726	1,546	1,534	2,281	102	1,509	804
CATHEDRAL CITY	571	1,808	1,989	4,097	204	431	232	1,912	317
PALM DESERT	737	436	3,749	1,193	238	892	93	1,555	572
PALM SPRINGS	269	667	1,022	4,954	76	203	180	1,011	129
COACHELLA	1,958	270	1,548	477	1,770	1,099	45	513	336
LA QUINTA	1,087	254	1,933	827	438	1,788	44	879	484
DESERT HOT SPRINGS	275	489	766	1,555	90	154	809	479	82
RANCHO MIRAGE	139	229	619	569	49	137	32	744	85
INDIAN WELLS	60	28	221	80	18	93	1	109	90
INFLOW (HOW MANY PEOPLE FROM OUTSIDE THE CITY WORK IN THE CITY)	5,096	2,998	11,824	10,344	2,647	5,290	729	7,967	2,809
OUTFLOW (HOW MANY PEOPLE FROM WITHIN THE CITY WORK OUTSIDE THE CITY)	12,127	9,753	5,716	3,557	6,246	5,946	3,890	1,859	610
STATIC (HOW MANY PEOPLE FROM WITHIN THE CITY WORK WITHIN THE CITY)	4,193	1,808	3,749	4,954	1,770	1,788	809	744	90
% INFLOW (WHAT PERCENT OF A CITY'S WORKFORCE IS FROM ANOTHER CITY IN THE CV)	54.9	62.4	75.9	67.6	59.9	74.7	47.4	91.5	96.9
% OUTFLOW (WHAT PERCENT OF A CITY'S EMPLOYED POPULATION WORKS ELSEWHERE IN THE CV)	74.3	84.4	60.4	41.8	77.9	76.9	82.8	71.4	87.1
% STATIC (WHAT PERCENT OF A CITY'S EMPLOYED POPULATION LIVES AND WORKS IN THE SAME PLACE)	25.7	15.6	39.6	58.2	22.1	23.1	17.2	28.6	12.9

Table 6 might seem daunting and complicated at first, but we believe it can provide valuable insights for Coachella Valley city planners and transportation experts. Since this is based on census data and has not been updated, we are using the data from 2015 for further interpretations. This table presents where people live in rows and where they work in columns in 2015. For example, there are 1,989 people that live in Cathedral City but work in Palm Desert. The cities are sorted by their size of population in this table.

Some facts stand out from the table:

• Indio, as aforementioned, has the largest population among the nine cities. However, the people who live and work within its boundary only count for 25.7% of the labor force. This also indicates that people tend to find jobs elsewhere, and 75% of the workforce comes from outside the city.

• 58% of the labor force living in Palm Springs also work there. This percentage is the highest among the nine Coachella Valley cities.

• In Palm Desert, almost 40% of residents both live and work in the city. Palm Springs and Palm Desert have the largest number of inflows into the city.

• Cathedral City has a relatively low percentage of people who both live and work in the city, only 15.6%. We did not find this data surprising. Palm Springs and Cathedral City are close to each other, which means it must be easy for people to commute between the two.

• Indian Wells serves as an extreme. It holds the lowest rate of people who both live and work in the city, almost 13%. However, 96.9% of its workforce come from other places, based on the percentage of inflow.

• Rancho Mirage tells a similar story. Around 92% of its workforce comes from outside of the city, while 71% of its residents work elsewhere.

• Desert Hot Springs, Coachella and La Quinta have a relative medium percentage of residents who choose to work and live in the same city, 17.2%, 22.1% and 23.1% respectively.

Perhaps some visualization can help to understand these numbers. In Figure 30 we have left out the smaller commutes between communities to make it somewhat less demanding to read the graph.

Figure 30 | Commuting Patterns within the Coachella Valley

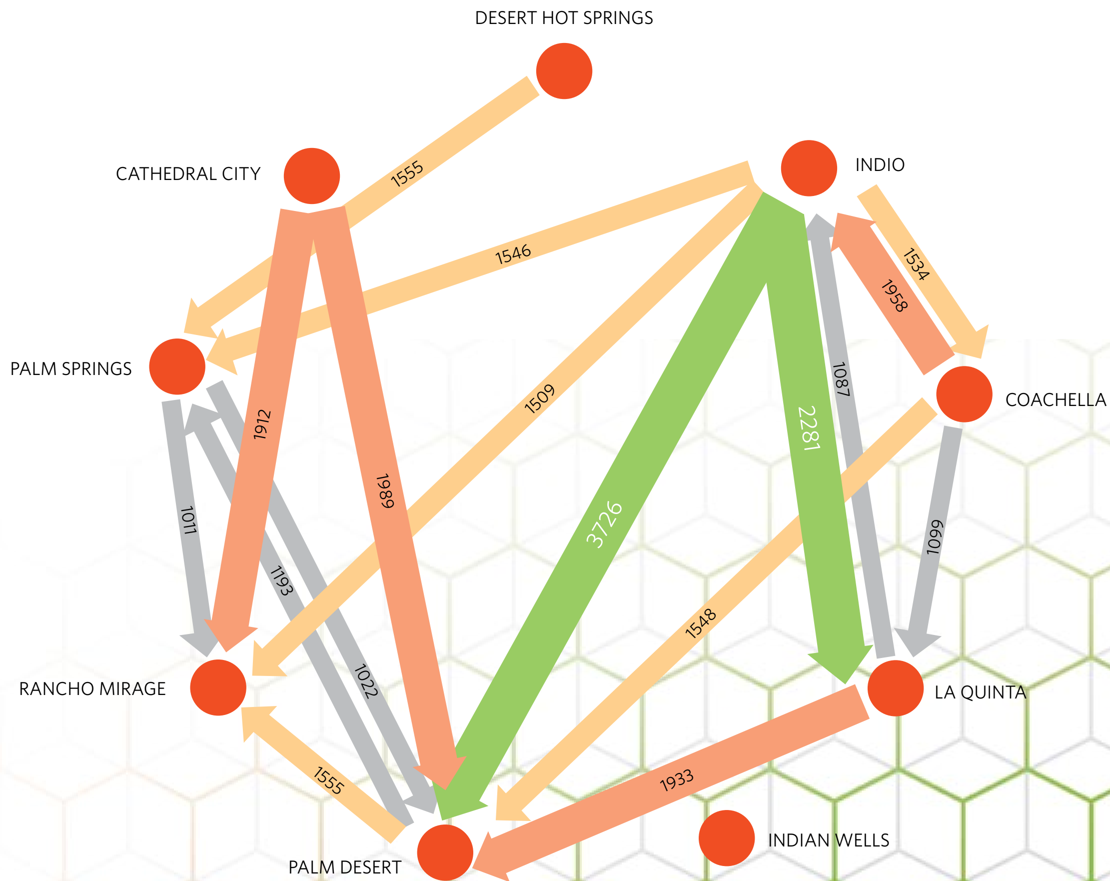


Figure 31 | Static Outflow Map

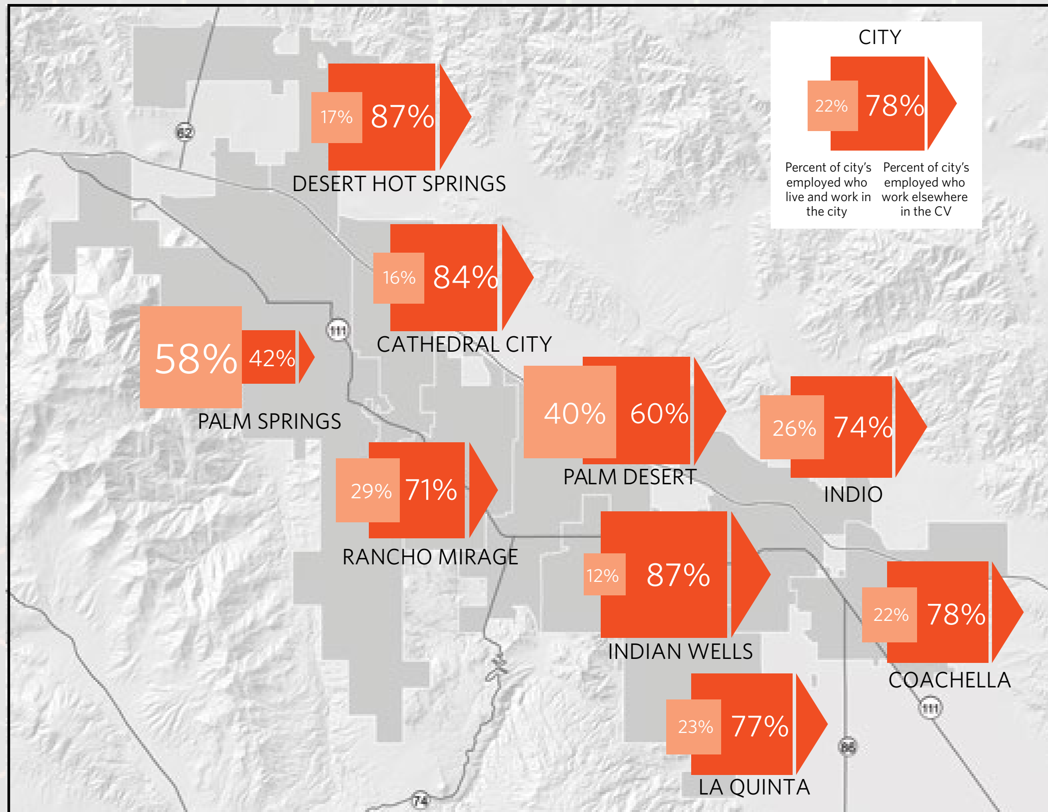


Figure 32 | Commuting within the Coachella Valley: Inflow Map

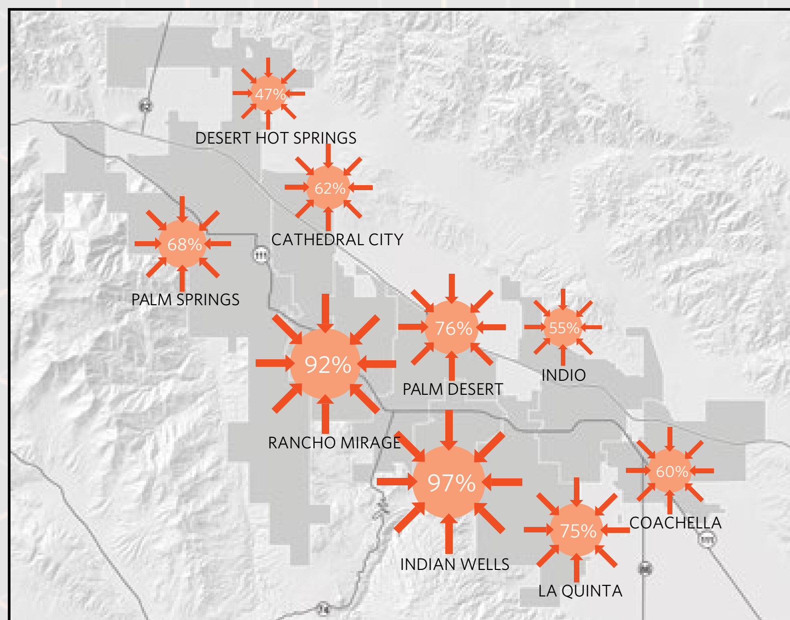


Figure 31 focuses on the percent of the specific city's employed (e.g. Palm Springs) who work in the city (here, Palm Springs) versus those who work elsewhere. Staying with Palm Springs as an example: 58% of the people who live in Palm Springs and who are employed, work in Palm Springs. The remainder work elsewhere. The larger the rectangles, the larger the percentage.

The final commuting graph (Figure 32) shows the percent of workers in the specific community, who come from elsewhere.

INCOME DISTRIBUTION

Having examined the employment and income by industry, Figure 33 looks at the income distribution for the Coachella Valley as a whole. The income distribution for the rest of Riverside County is also plotted for comparison. In the Coachella Valley, 52.8% of households earn less than the median U.S. household income ($57,650), compared to 42.7% of households in the rest of Riverside County. There is a much higher percentage of households earning less than $10,000 a year in the Coachella Valley than in the rest of Riverside County. The rest of Riverside County also has a significantly higher percentage of households with an annual income of more than $100,000. What is left out of these figures is wealth, in general. There are obviously quite a large number of affluent households in the Coachella Valley, but they do not have a paid salary/income.

Figure 34 compares the median, mean and average per capita household income of Coachella Valley, with that of Riverside County, California, and the U.S. The median household income in the Coachella Valley is lower than that in Riverside County; however, the mean household income in the Coachella Valley is higher. This suggests a positively skewed income distribution, meaning a long tail to the right. Even

Figure 33 | Income Distribution, 2017, Coachella Valley and Rest of Riverside County

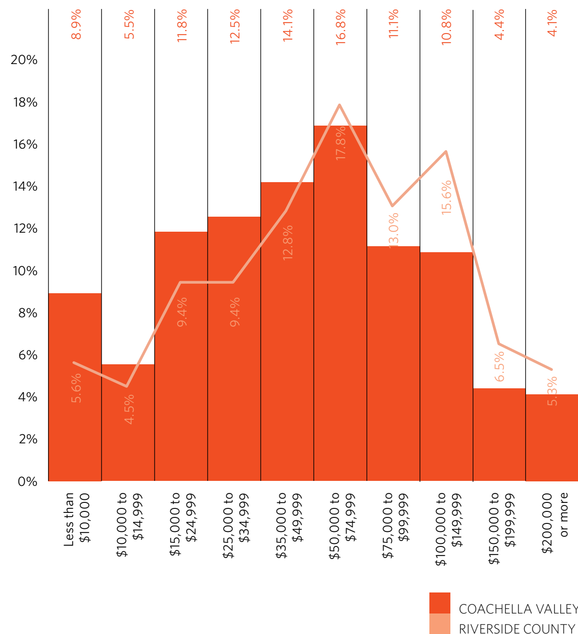


Figure 33 | There is a much higher percentage of households earning less than $10,000 a year in the Coachella Valley than in the rest of Riverside County.

though most households are in lower-income brackets, there are some households in very high-income brackets that pull up average income. However, both median and mean household income in Coachella Valley and Riverside County are lower than those in California. The average per capita income in the Coachella Valley is higher than in Riverside County. This may also be explained by the Coachella Valley's smaller average household size (2.7) as opposed to the average household size (3.4) for Riverside County.

UNEMPLOYMENT AND HUMAN CAPITAL

Figure 34 | Median, and Mean Household Income, Average Per Capita Income, CV, Riverside County, CA, U.S., 2017

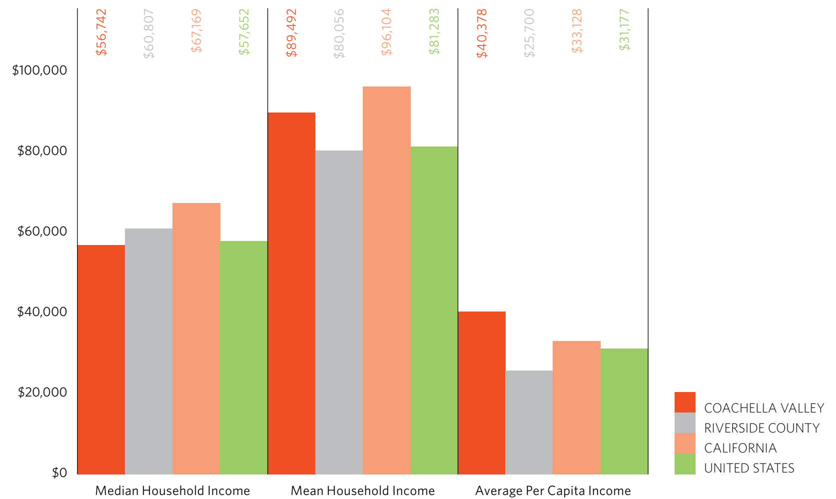


Figure 34 | The average per capita income in the Coachella Valley is higher than in Riverside County.

Let me tell you, it is much nicer to write about unemployment rates in the Coachella Valley and the Inland Empire now, rather than when we started to do so in 2010. At that time, unemployment rates in the city of Coachella and Adelanto were over 20%. What makes the analyses more difficult is that unemployment rate differences between municipalities are smaller and hence the distribution is much more compressed. In other words, almost everyone is doing well.

Table 7 shows the unemployment rates of cities in the Inland Empire with 25,000 or more residents, including seven cities in the Coachella Valley (Indian Wells and Rancho Mirage have fewer residents; however, we added them to the charts below.) The inclusion of other cities of the Inland Empire allows us to compare Coachella Valley's economics performance on this criterium with that of close-by cities and provides more insight for the explanation of the differences in unemployment rates by city.

The City of Coachella continues to be the municipality with the highest unemployment rate (10.4%) among the relevant cities in 2018. This has been the same over the years, whether we had high or low national unemployment rates. Second on the list is Adelanto, which is in Victor Valley (the High Desert). Both cities have unemployment rates that are significantly above the national unemployment rate, which currently is at a 50-year low of 3.5%. Even during the darkest days of the Great Recession, the U.S. unemployment rate had a peak at 10.1%. Note that San Bernardino County and Riverside County unemployment rates at the time were higher, of course, at 13.5% and 13.8% in 2010. Still Coachella has recovered significantly from its Great Depression type unemployment rates of 20.5% in 2010.

Most cities (seven of the nine) in the area have higher unemployment rates than the national average. Only Indian Wells and Rancho Mirage maintain a low(er) unemployment rate of 2.5 and 3.5. From 2017 to 2018, most cities saw a noticeable reduction in their

TABLE 7 | AVERAGE UNEMPLOYMENT RATE SEPTEMBER 2018 - AUGUST 2019, INLAND EMPIRE, CITIES OVER 25,000 POPULATION

CITY	UR
CHINO HILLS	2.7
RANCHO CUCAMONGA	3
MONTCLAIR	3.2
REDLANDS	3.2
UPLAND	3.2
CHINO	3.3
CORONA	3.3
TEMECULA	3.3
BEAUMONT	3.4
MURRIETA	3.4
YUCAIPA	3.4
NORCO	3.6
ONTARIO	3.6
FONTANA	3.7
RIVERSIDE	3.7
HIGHLAND	3.9
PALM SPRINGS	3.9
CATHEDRAL CITY	4.0
COLTON	4.1
LAKE ELSINORE	4.1
LA QUINTA	4.3
PALM DESERT	4.3
MORENO VALLEY	4.5
RIALTO	4.6
APPLE VALLEY	4.7
PERRIS	5.0
SAN BERNARDINO	5.0
BANNING	5.1
HESPERIA	5.3
SAN JACINTO	5.3
TWENTYNINE PALMS	5.3
INDIO	5.4
DESERT HOT SPRINGS	5.6
VICTORVILLE	5.6
HEMET	6.0
ADELANTO	8.1
COACHELLA	10.4

Figure 35 | shows unemployment rates in a map

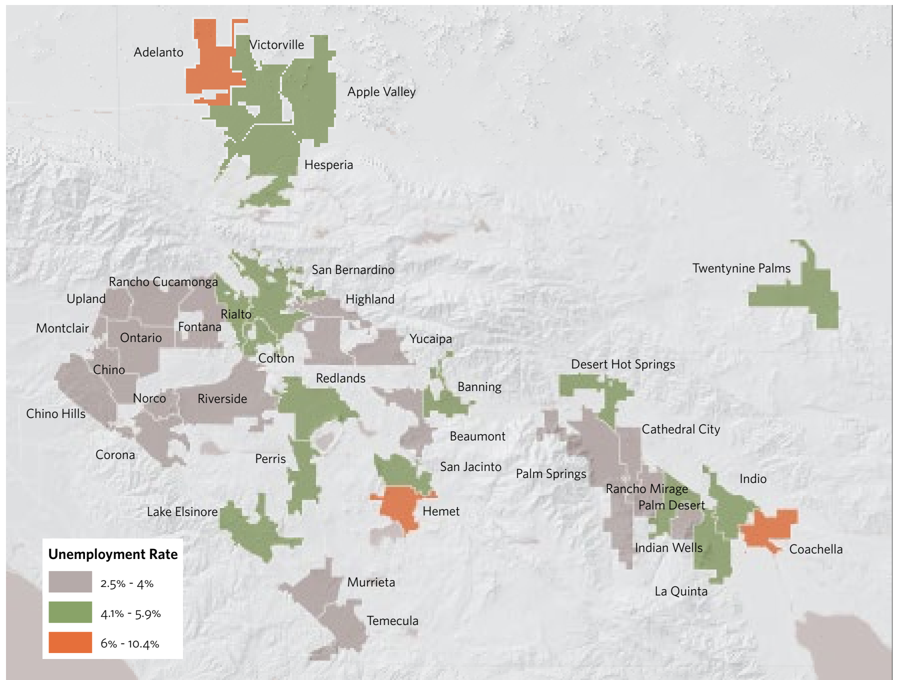


Figure 35 | Unemployment Rates, Inland Empire, Cities

unemployment rates, and this includes the City of Coachella (12.2% to 10.4%). San Bernardino County lowered its unemployment rate from 4.9% to 4.0%, while Riverside County's unemployment rate reduced from 5.2% to 4.4%.

Figure 35 shows the unemployment rate of cities in the Inland Empire in 2018. Although most areas see improvement in their unemployment rates, their rates are still significantly higher than the national or California average.

Figure 36 gives more insight into one explanation of the higher unemployment rate in certain cities. The chart indicates a positive relationship between unemployment rates and a city's distance from the Greater Los Angeles and San Diego county lines. Most cities we compare follow this trend as long as we stay within 50 miles, and the effect becomes weaker the further you move away. This excludes the cities of the Coachella Valley since they are more than 50 miles away from the county lines, thereby making commuting not an option for almost everyone. Clearly, distance from the MSAs is not an explanatory factor here.

Another candidate would be some measure of human capital, such as the high school graduation rate or a more general measure that takes into account years of education. Here we decided to go instead with something called the "Distressed Communities Index" (DCI), developed by the Economic Innovation Group. Figure 37 shows the relationship between the unemployment rate of the various cities and the DCI. The DCI takes into account high school graduation rates, but also contains additional variables.

Figure 36 | City Unemployment and Distance, Inland Empire

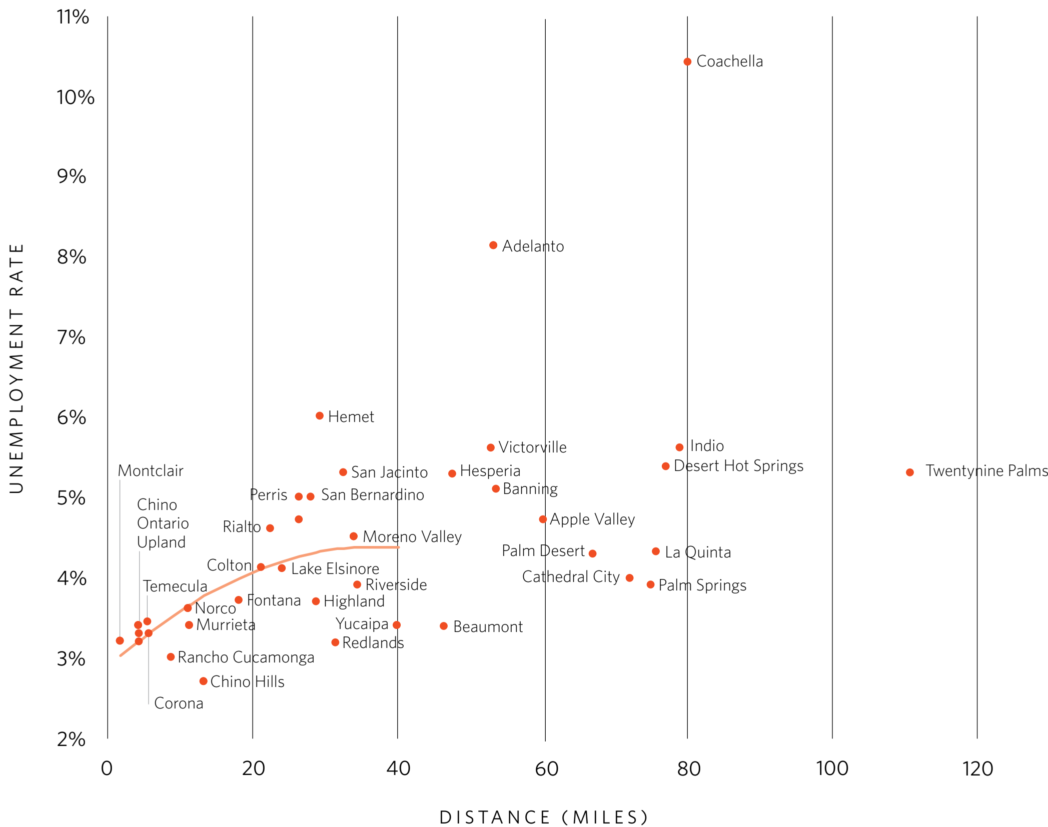
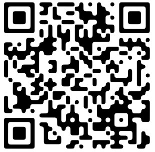


Figure 36 | This graph indicates a positive relationship between unemployment rates and a city's distance from the greater Los Angeles and San Diego county lines.

hey wait, what's this?

find out for yourself.



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The trend line shows a positive relationship between the two variables. The DCI measures the economic well-being of communities. Here we only collected the data for the Inland Empire, but it is available for all communities across the United States. The measure takes into account high school graduation rates, housing vacancy rates, median income ratios, poverty rates, and changes in business establishment.

The lower a city's DCI is, the better it is performing economically. Palm Springs, Cathedral City, the city of Coachella, and Desert Hot Springs all have a DCI value that places them into a fairly low category. More specifically, they are in the second from the bottom quintile in comparison to other cities in the nation. Rancho Mirage, Palm Desert, and Indio are in the mid-tier DCI level. La Quinta performs above average, while Indian Wells is in the top (lowest) DCI class. In Figure 37, most cities with a high level of DCI also experience high unemployment rates. Still, there must be other factors in play for the city of Coachella and for Adelanto since both have significantly higher unemployment rates than in other cities with similar DCIs.

Figure 37 | Relationship between City Unemployment Rates and Distressed Communities Index

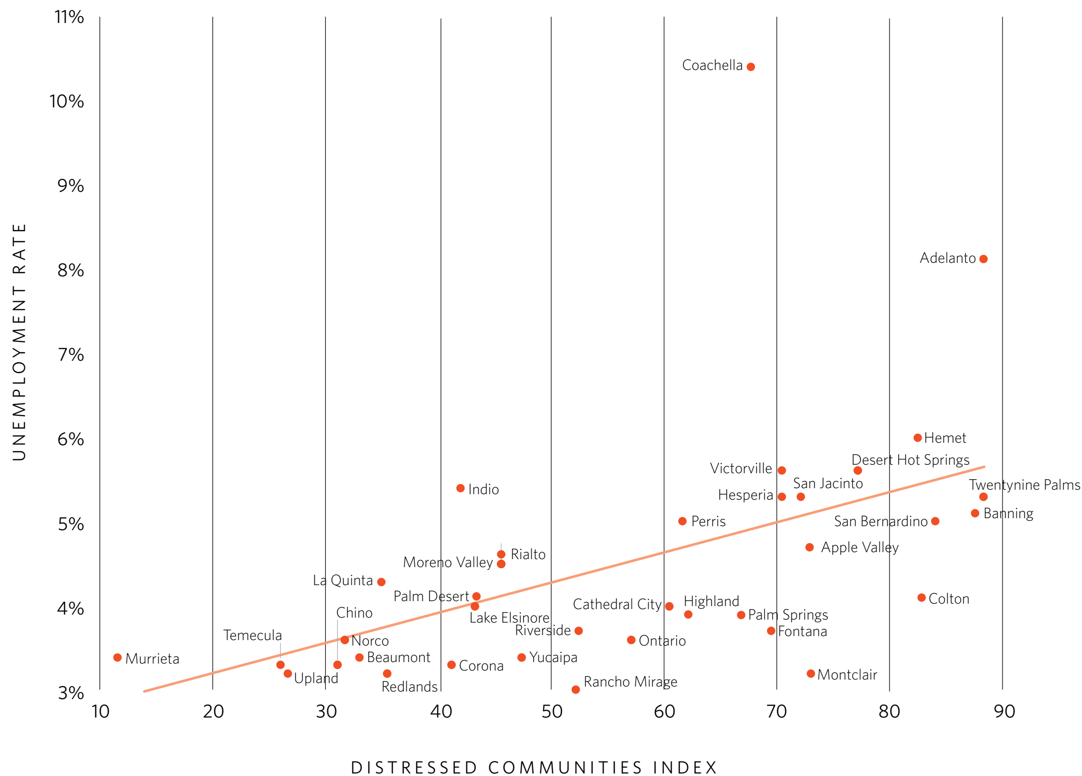


Figure 37 | The lower a city's DCI, the better it is performing economically. Most cities with a high level of DCI experience high unemployment rates.

PERFORMANCE OF SCHOOL DISTRICTS

Figure 38 displays the percentage of students who reach the College and Career Readiness benchmark established by the College Board on the 2016 revised SAT. This is only one measure of the school district performance, and does not control for the socio-economic composition of the student body. We have chosen to display the results for the Coachella Valley and nearby districts, together with the Riverside County and the California average. The benchmark is 530 for Reading and Writing and 480 for Math. Students who fail to meet the benchmark may need additional academic support. The average total score for the U.S. in 2018 was 1068 (536 in Reading and Writing, and 531 in Math).

Coachella Valley Unified, Palm Springs Unified, and Desert Sands Unified are not doing well by this measure, and when compared to the California average. Coachella Valley Unified is at the lowest value with only 17%. Desert Sands Unified, with a rate of 38%, outperforms the Riverside County average.

If you consider some of the driving variables, such as, percent of students who have English as a second language, poverty rates, and average income in the school district, then it becomes somewhat clearer why these districts

Figure 38 | College and Career Readiness Benchmark, % of students, Reading and Writing and Math in SAT, 2018

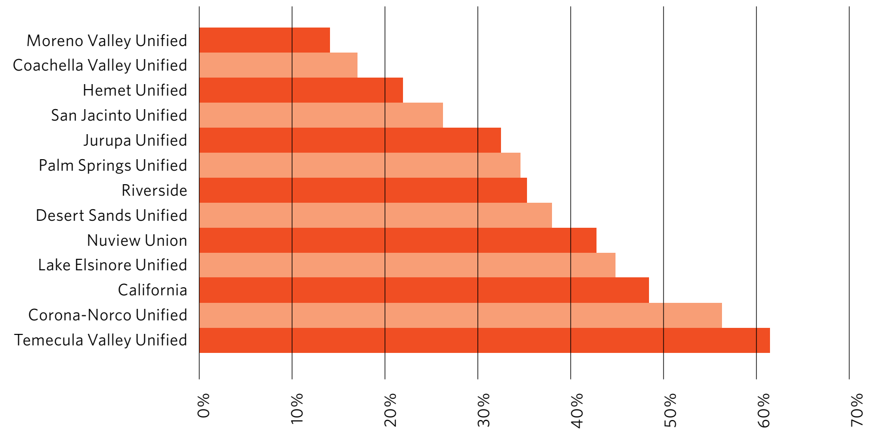


Figure 38 | Coachella Valley Unified, Palm Springs Unified, and Desert Sands Unified are doing worse than the California average. Desert Springs Unified outperforms the Riverside County average.

Figure 39 | ACT Average Scores, Coachella Valley School Districts and Selected Districts, Riverside County, 2018

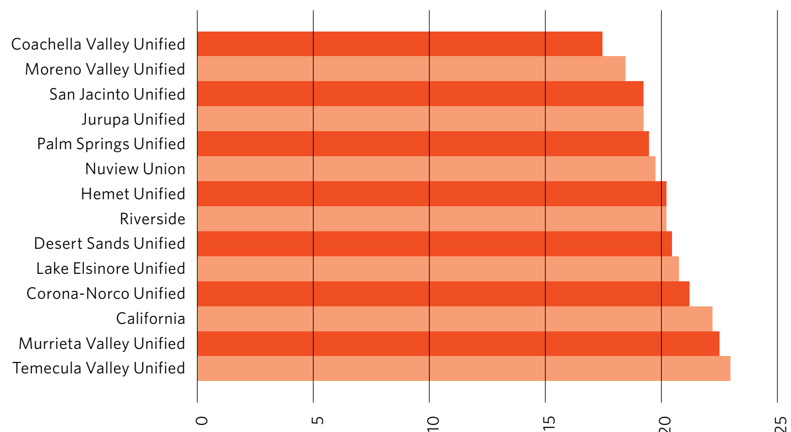


Figure 39 | Coachella Valley has the lowest average score, while Palm Springs and Desert Springs have scores that come closer to the California average.

Figure 40 | Automation Risks

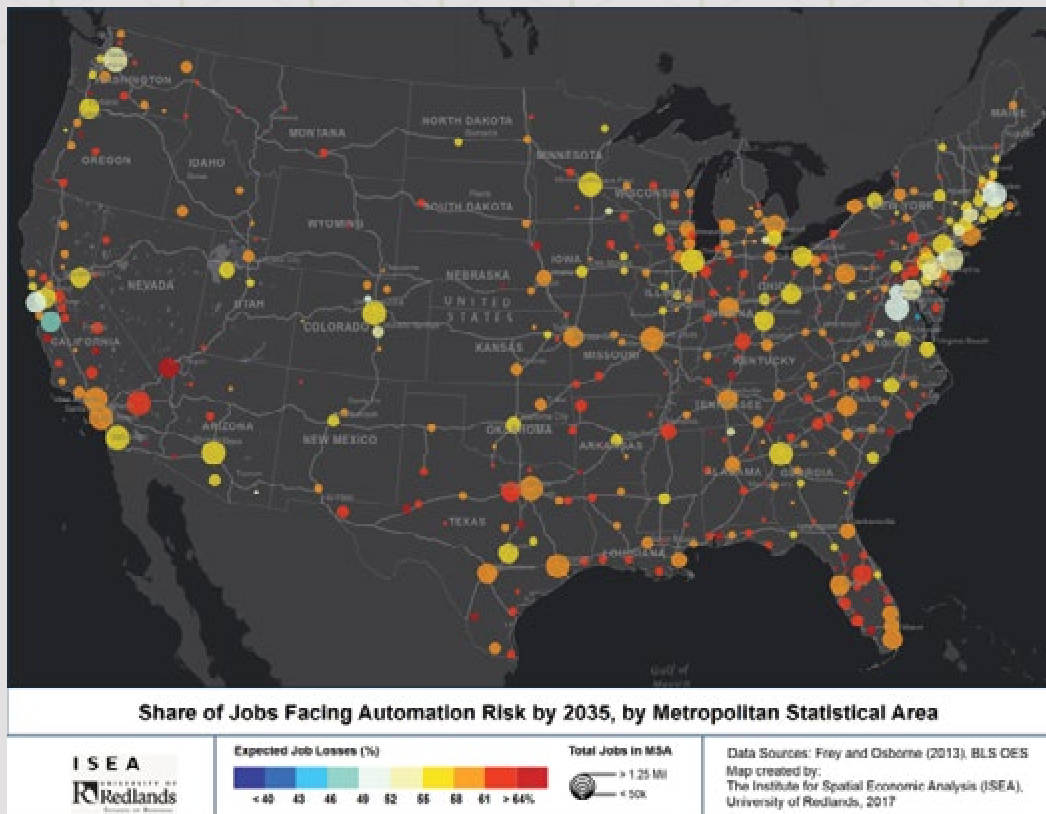


Figure 40 | For those of you who are interested in reading more about the threat of automation, go to The Atlantic, and read the following article: The Parts of America Most Susceptible to Automation, Alana Semuels.

are not performing well. Even if they had lower student teacher ratios, it would be hard to overcome these hurdles.In fact, Desert Sands with a rate of 38% has already outperformed Riverside County. Still, there is clearly room for major improvement.

Another measurement for academic performance is the ACT score. The maximum score on the ACT is 36, and students receive a scaled score for each of the four test sections (English, Math, Reading, and Science). The national average score of 2018 is almost 21. Figure 39 shows that Coachella Valley, with an average score of 17.5, ranks the lowest. Palm Springs and Desert Sands have scores that come closer to the state average.

AUTOMATION

A friend of mine, Prof. Moenius, is the Director of the Institute for Spatial Analysis at the University of Redlands. He and his colleagues estimated that almost all large American metropolitan areas are at risk of losing more than 55% of their current jobs to automation in the next couple of decades. In recent years, the primary focus on automation has been the Rust Belt. Offshoring has caused many factory jobs to be replaced, and capital-labor substitution has resulted in more machines having taken a bigger role in production processes. Only 13% of manufacturing job losses are due to trade, the rest is attributed to automation.

According to Prof. Moenius's estimates, the Inland Empire area may be one of the most vulnerable locations due to its large dependence on industries which will be most affected by the 4th Industrial Revolution (artificial intelligence, robotics). By 2025, 63% of jobs in Riverside County are predicted to be automatable. However, an important distinction must be made: it is not really jobs that are in danger, but actually

tasks. Jobs in the logistics industry are the biggest at risk of being replaced. In addition, areas with a high concentration of jobs in food preparation, office or administrative support, and/or sales will also be highly susceptible to automation. Not only are many parts of the Inland Empire at risk, but certain areas of the Coachella Valley are even more vulnerable. There is a high concentration of leisure and hospitality, and robots are already functioning as room service delivery in parts of Silicon Valley. The next stage will see robots clean the rooms. Hamburger flippers will be replaced by machines, etc. The Coachella Valley's emphasis on tourism could warrant substantial investments in robots to take over certain tasks. Historically, automation was infringing on middle-class jobs, such as manufacturing. Currently, automation is branching into the lower-income jobs. We will continue developing this section further in the future.

OPPORTUNITY ATLAS

This is another section that we did not include in previous reports. We think that you will find it fascinating and perhaps explore the topic or areas on your own.

In 2018, economists from Harvard and Brown University teamed-up with the U.S. Census Bureau and researchers from Opportunity Insights to produce the so-called Opportunity Atlas. The resulting interactive map of the United States shows the economic prospects for children who grew up in each census tract. The Atlas ties de-identified IRS tax returns to Census Bureau data from individuals born in 1978, allowing for what is essentially a longitudinal study of how your neighborhood impacts future earning potential.

One of the most important insights from the project is that it matters where you grow up - the so-called neighborhood effects. While you would have expected that, what is amazing is that certain neighborhoods, which are very similar otherwise, produce very different outcomes. There are large disparities in prospects for upward economic mobility between regions of the United States, and within cities and communities themselves. While not all of the causal mechanisms are fully understood yet, factors such as school district, housing quality, and level of racial bias are all noted to be important determinants. But there are other variables that play a role in forming "social capital" within a community.

The Opportunity Atlas also provides an interesting picture of how many people have moved (or stayed) in the area they grew up in during the 1980s. Let me stress here that the map does not show how well people are doing today who live in the district where they grew up in 1978. Instead, the current residency plays no role, but can be used to look at migration patterns.

We have picked up certain areas within the Coachella Valley to demonstrate some of the interesting stories to you.

Generally, those who grew up in the Coachella Valley tended to stay in the same commuting zone as adults. As Figure 41 illustrates, La Quinta residents were least likely to stay within the same commuting zone, whereas those who grew up in the city of Coachella were most likely to stay. This picture of out-migration from the Coachella Valley changes slightly as the data are further disaggregated.

Children born into high income families were much more likely to leave than children born into low income families. For low income families, once again, those born in Coachella are most likely to remain in the same commuting zone (91.6%). On the other end of the spectrum, only 55% of children born into low income families in Palm Desert stayed in the same commuting zone as adults.

Figure 41 | Opportunity Atlas, % of Residents Staying in Same Commuting Zone, All Incomes, Races, Gender

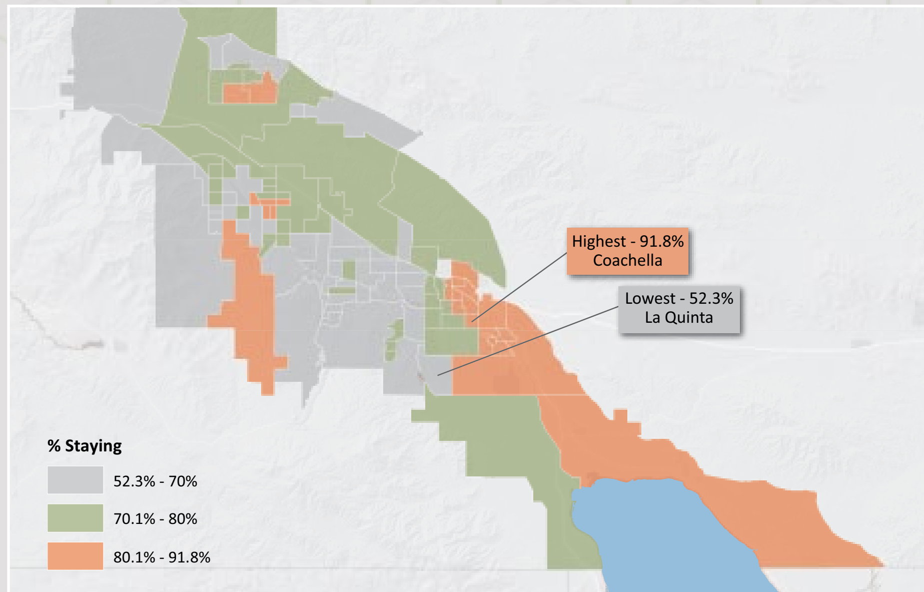


Figure 41 | Those who grew up in La Quinta were least likely to stay within the same commuting zone, whereas those who grew up in Coachella were most likely to stay.

Figure 42 | Opportunity Atlas, % of Residents Staying in Same Commuting Zone, Lowest Incomes, All Races and Gender

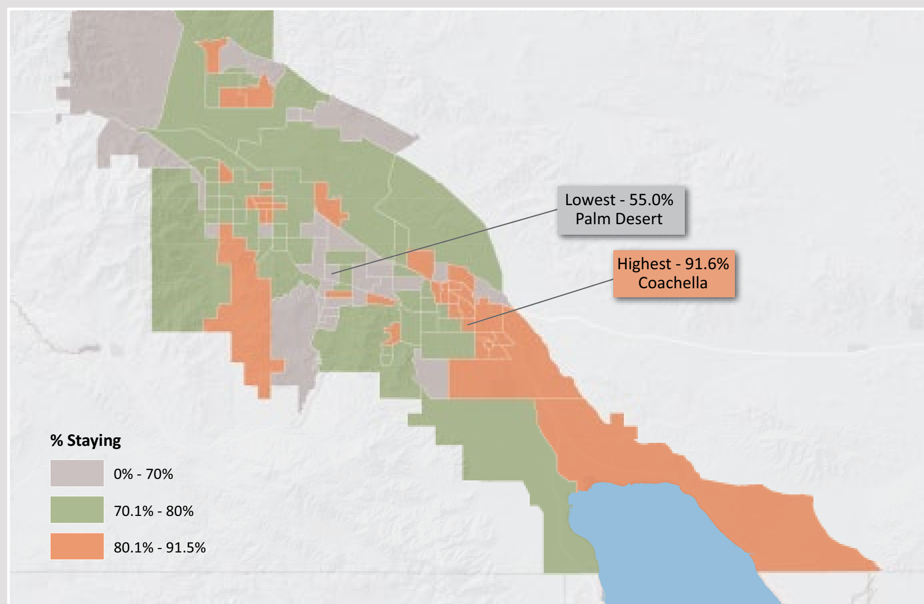
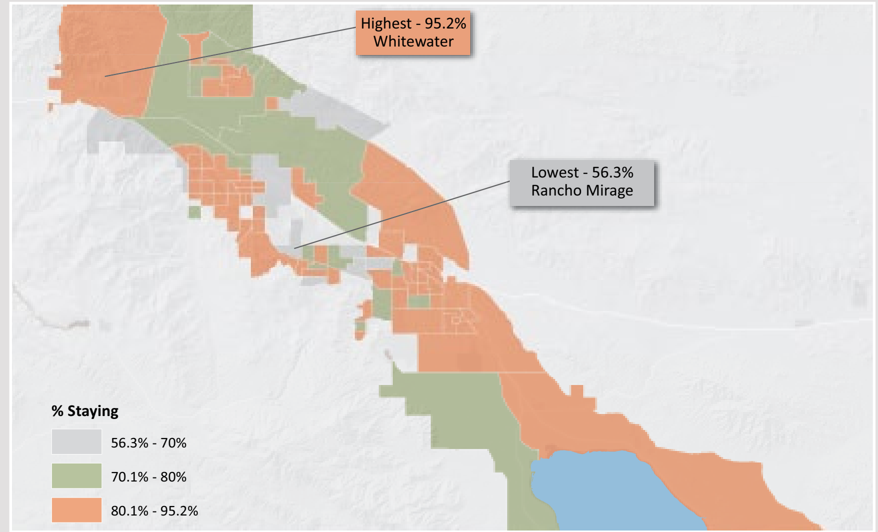


Figure 42 | Children born into low income families in Coachella are again most likely to remain in the same commuting zone (nearly 91.6%), whereas only 55% of children born into low income households in Palm Desert stayed.

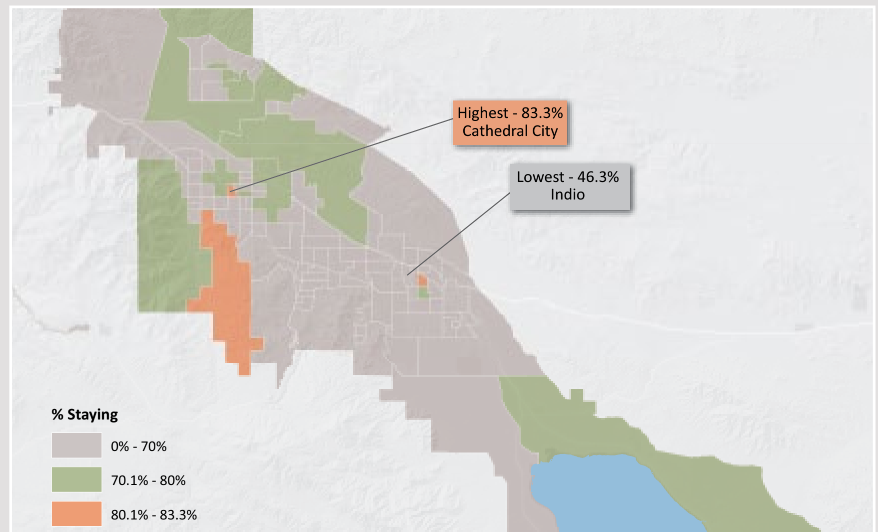
One of the largest differences in outmigration trends was between Hispanic and White residents in Coachella Valley. Overall, Hispanic children born in 1978 in the Coachella Valley were more likely to stay in the same commuting zone as adults than their white counterparts were. As seen in the two maps to the right, in the majority of tracts, over 80% of Hispanic children stayed in the same commuting zone as adults while over 80% of White children stayed in the same commuting zone in only 3 tracts. Furthermore, only 46.3% of White children who grew up in Indio stayed in the same commuting zone as an adult.

Finally, there are also differences in outmigration for females and males in the Coachella Valley. While there are not large geographic disparities between the two groups, overall, men born in 1978 tended to stay in the same commuting zone more often than women did.

Figure 43 | Opportunity Atlas, % of Residents Staying in Same Commuting Zone, Hispanics and Whites, All Incomes and Gender

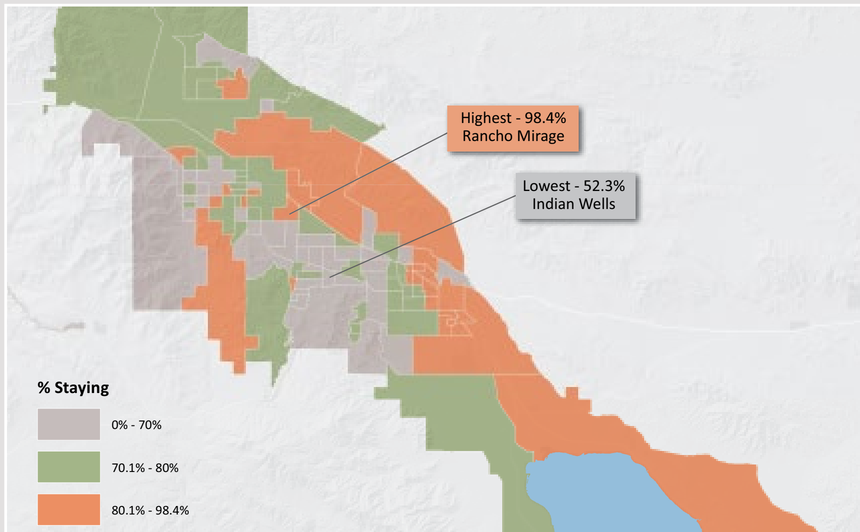


43a Hispanics

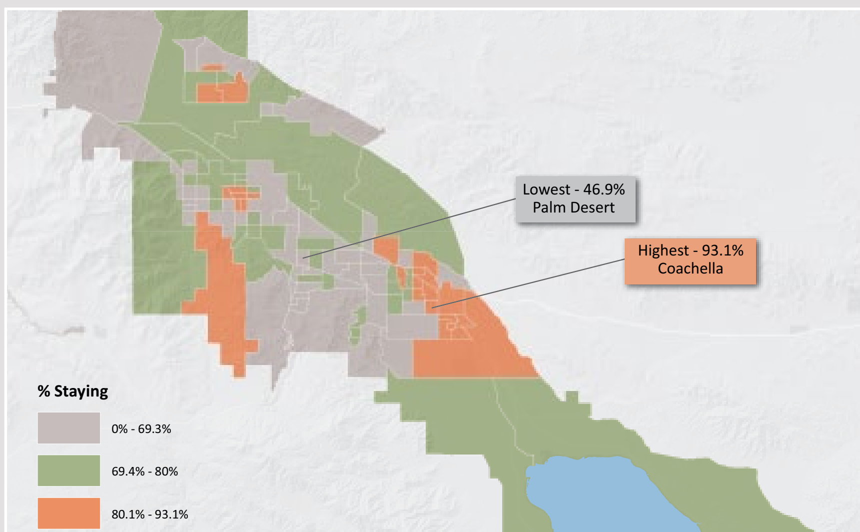


43b Whites

Figure 44 | Opportunity Atlas, % of Residents Staying in Same Commuting Zone, Females and Males, All incomes and Gender



44a Men



44b Women

HOUSING MARKET:

Small Signs of a Recovery and The Long Run View, by G.U. Krueger

In this section we will focus on Coachella Valley housing trends. Last year we observed that during the last 34 years, there has been a cyclical relationship between local housing and nationwide U.S. recessions. We concluded that the economic cycle in Coachella Valley corresponds with the nation's cycle and that it is partially dependent on outside economic influences. This makes it advisable to prepare for the possible arrival of the next national recession ("stress test"), when considering the upcoming trends in the Coachella Valley real estate market. This year, we will discuss why new housing construction has remained weak during the current housing recovery, despite the favorable demand conditions. For example, we will take a look at the so-called "extractions" by government from builders to pay for infrastructure and services, which make up a significant portion of the cost of building new housing in general and specifically in the Coachella Valley. A recent UC Berkeley study shows that quantifying the dollar amount of development fees puts a sharp focus on this issue with state politicians interested in housing reform. Finally, we will discuss how Coachella Valley housing affordability has fared lately.

Figure 45 | Home Sales, Existing and New, Annual Levels, Coachella Valley, Quarterly Data, Q1 1984 - Q4 2019 (Estimated)

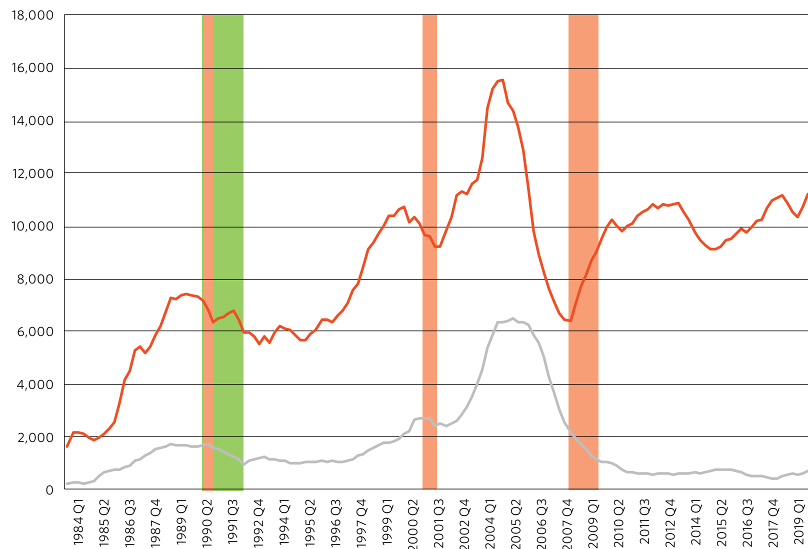


Figure 45 | There was a small recovery for new and existing homes this year, following a relatively sharp drop of sales during the second half of 2018.

Sources: DQNews, FRED, Kruegereconomics (The data is converted to annual levels to reduce volatility)

Looking at the Coachella Valley housing market volume for new and existing homes over the last 24 years, there are several facts that stand out immediately. First the good news: there seems to have been a small recovery for new and existing homes which occurred this year (see Figure 45; shaded areas correspond to U.S. recessions). While the recovery appears small, it follows a relatively sharp drop of sales during the second half of 2018. The decline was triggered following the increases in the Federal Funds Rate by basically 50 basis points during the second half of last year, which threw the nation's new and existing housing sales into a mini demand-led crisis. Since the beginning of this year, the Fed started to ease its monetary policy stance again and interest rates on 30-year mortgages declined by roughly 130 basis points. Real estate observers had hoped for a more significant response from the housing market following the lower mortgage rates. Although this did not happen, at least we were spared a more severe housing sales decline as a result. Regardless, the higher and then lower interest rates served as a reminder of the risks associated with higher mortgage rates.

Figure 46 | Prices, New and Existing Homes, Quarterly Data Annualized, Coachella Valley, Q1 1984 - Q4 2019 (Estimated)

Figure 46 | Prices in new homes saw a significant increase over the last year, and there is a gap of nearly 61% between new and existing home pricees.

Sources: DQNews, FRED, Kruegereconomics

EXISTING HOME SALES
NEW HOME SALES
US RECESSION
CALIFORNIA RECESSION

Second, the current recovery in sales is essentially driven by the existing home sales market. Sales in new homes have basically been flat since 2010, with some very minor variations. This is quite stunning and has occurred at the national and state level as well. While we did not expect new sales to pick up in 2010 and 2011 when bank-owned sales from foreclosures redirected demand from new home sales to existing home sales, time has moved on by nine years and there is still no visible improvement. We speculate that the price of new homes has kept these properties out of reach for most potential customers in the Coachella Valley who – with the exception of the very rich – cannot afford them.

Different from the sales volume, prices of new homes actually saw a significant increase since our last report. This is puzzling at first, but one possibility is that builders moved into the more affluent sections of the housing market, and that the demand side in this segment of the market could be served with expensive and hence more profitable houses. Over time, this has resulted in a gap of nearly 61% between new and existing home prices. This is not a sustainable level for a broad-based new housing market.

Figure 47 | Housing Permits, Coachella Valley and Riverside County, Annual Data, 1980-2019

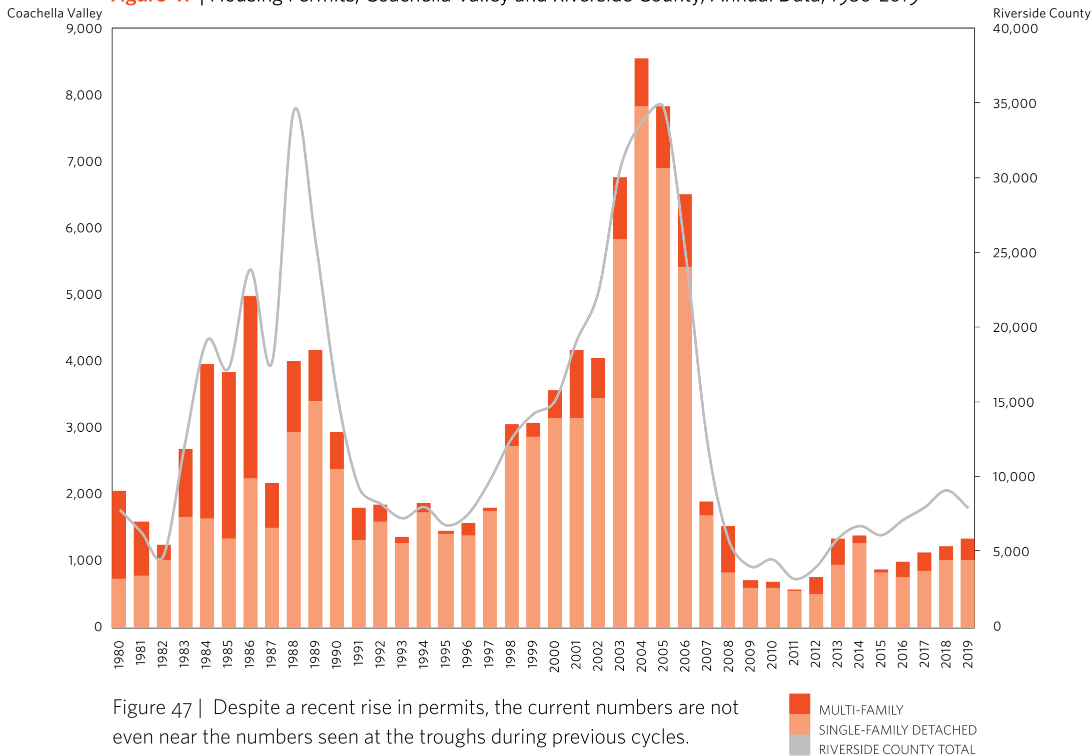


Figure 47 | Despite a recent rise in permits, the current numbers are not even near the numbers seen at the troughs during previous cycles.

Sources: US Census, Kruegereconomics

Builders often claim that impact fees by local governments are to blame. To analyze the validity of this argument, we start by looking at single-family and multi-family housing permits in both Riverside County and the Coachella Valley (Figure 47). Housing permits serve as a proxy for quantity of houses supplied.

Figure 47 highlights the fact that housing permits in the Coachella Valley were very much in sync with that of Riverside County prior to 2010. Since then, and especially since 2015, the supply response in the Coachella Valley never regained the vitality it showed previously. Ten years into the recovery from the Great Recession, and despite a recent rise in permits (roughly 1,200 units in 2019), the current numbers do not even come close to the numbers seen at the trough during previous cycles. This is not just a local phenomenon. Similar weak supply numbers can be seen in the Inland Empire as a whole, the state, and the nation. To this date, we have not reached 10 million new housing starts in the U.S., despite the record-setting economic expansion. Previous booms easily passed 10 million units and were shorter.

Digging further into the claim of a potential supply side problem, Figure 48 shows the development fees, which were provided by the Desert Valleys Builders Association. These fees represent levies imposed by cities on local builders; these fees are meant to pay for services and infrastructure costs

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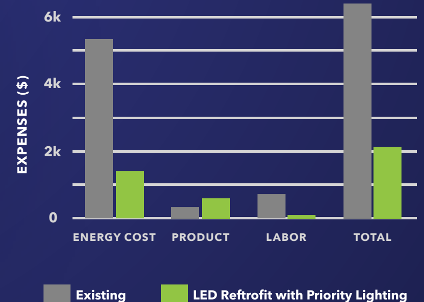

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associated with new housing. Listing these fees for 2017 hopefully sheds some light on how these levies can push up the cost of housing in general, and hence pricing. These fees represent a significant portion of the total cost of building new homes.

Take Rancho Mirage, for example. Relative to home prices, the fees represent only 3.8% in this upscale community. However, the fraction rises to 11.7% in Palm Desert, 13.7% in Indio, and 16.9% in Desert Hot Springs, which are significant components of overall costs. Communities in the high-end of the price range generally look less impacted by development fees than in communities which build for the middle-class market.

To make matters worse, the data shown in Figure 48 probably understates the true magnitude of the total fees. You have to keep in mind that the fees listed here are just at the builder stage. These numbers do not include additional payments imposed at the land development stage. The largest fees by far the builders face are "impact fees," which include developer fees, school developer fees, water and wastewater development fees, habitat conservation fees, and other fees to offset the impact of development in certain capital facilities. All in all, the impact fees depicted in the figure appear to be realistic. They are consistent with the roughly $44,000 shown for the City of LA, according to a 2018 study by UC Berkeley.

Not covered in the numbers shown are other fees such as project-specific fees and other payments levied by a city to ensure the approval of the city through "development agreements". These occur at the land development stage, at the point of reaching the so-called "development agreement" discussion. This involves negotiations with planning commissioners, city council members, or even political campaigns. Negotiations often center on design changes, agreements to lease housing and commercial units below market price, additional amenities, labor (union) agreements, and other payments above the codified "official fees" – all in exchange for city planning approval. Clearly this un-codified process adds enormously to the costs and risks of the whole process.

The message we are trying to get across is that "development agreements" are likely to push up development costs. While it is relatively easy to quantify

Figure 48 | Impact Fees Per Unit Per Builder, 35-Unit Subdivision, 2017

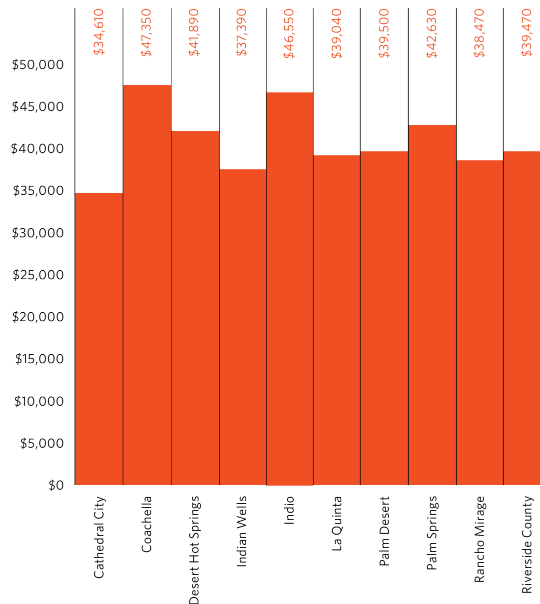

Figure 48 | The fees listed here are reported during the builder stage and understate total costs since it does not consider costs incurred from impact fees and development agreements in the land development stage.

Sources: Desert Valley Builders Association, Kruegereconomics

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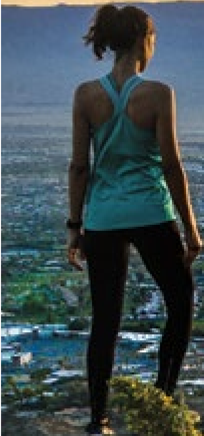

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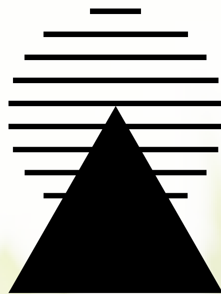

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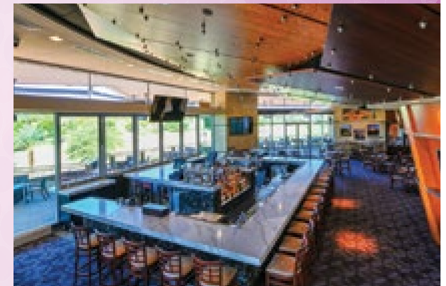

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Figure 49 | Housing Sales, Annual Data, Coachella Valley, 2011-2019

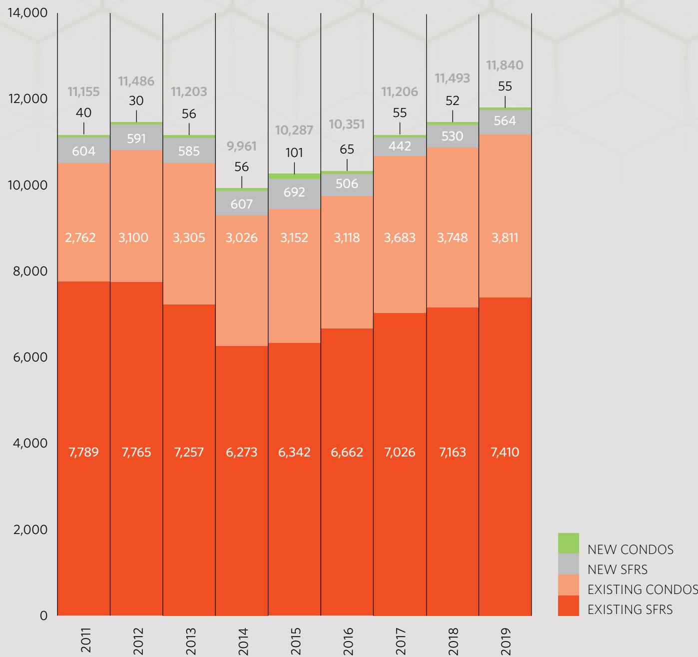

Figure 49 | Total Coachella Valley home sales are forecasted to grow by 3.0% in 2019, partially driven by low mortgage rates.

Sources: DQNews, Kruegereconomics

Figure 50 | Existing Home Sales, % Change from a Year Ago, Coachella Valley Cities, 2018-2019

Figure 50 | Every city except the city of Coachella and Indian Wells saw positive growth in single-family attached and detached home sales for 2019.

Sources: DQNews, Kruegereconomics

builder fees, "development agreements" are very opaque and hard to translate into dollars and cents. In general, the Mitigation Fee Act, which codifies the fees, is currently under reform by the State, and Governor Newsom could insist on more information transparency. The Mitigation Fee Act has come under scrutiny, as a result of its suspected connection with the housing affordability crisis in California. The bottom line is that it is difficult to obtain accurate numbers.

RECENT SHORT TERM SALES AND PRICE TRENDS

Looking at recent sales trends, there is good news for the Coachella Valley housing market. Overall, annual existing and new home sales are estimated to reach close to 11,800 sales in 2019, which represents a 10-year record, according to Figure 49. We forecast that total Coachella Valley home sales will grow by 3.0% in 2019 partially driven by mortgage rates remaining low for the remainder of the year.

Figure 50 shows the expected sales of existing homes for the Coachella Valley cities in 2018-2019. Some of the 2019 numbers were forecasted. Every city in the Coachella Valley, with the exception of the cities of Coachella and Indian Wells saw positive growth in single-family attached and detached home sales for 2019. More affordable detached homes in Desert Hot Springs (5.4%) and upscale Indian Wells (6.2%) lead the

way, with Cathedral City in between. Note that the various resort towns are shown to do quite well in 2019.

Figure 51 plots the percentage change of existing home prices for both attached and detached single-family units from 2017 to 2019. It shows that there will be very good news for Coachella Valley home prices in the near future. Every Coachella Valley city, except for the City of Coachella, will experience solid annual price increases in both the attached and detached home markets during 2019. Note also that the resorts, which include Palm Springs, are likely to outperform the North Valley for existing detached homes. Palm Springs will actually be the driving force here.

Overall, the existing housing market is showing some strength, because home prices are so much more affordable which is encouraging. New home sales continue to pick up, partially because they are benefiting from lower mortgage rates in 2019.

HOUSING AFFORDABILITY:
A Social Problem and a Cyclical Risk

The Coachella Valley housing market is currently stable and even growing. But the Southern California housing affordability crisis has arrived in the Coachella Valley, which could have cyclical implications. The data in Figure 52 depicts the percentage of households that can afford to purchase the median price of existing and new homes given mortgage rates, the local income distribution and standard underwriting assumptions.

One of the facts that stands out is the low numbers in Figure 52 – this is true for both new and existing homes: less than a third of its households can afford to purchase a home at the expected 2019 existing median home price. This number increases slightly for 2019 thanks to lower mortgage rates. Furthermore, new homes in the Coachella Valley are less affordable than existing homes. Only roughly every seventh person (15%) can afford them. Across all cities, housing affordability for existing homes ranges 24.5% to 40.1%. For new homes, the range is 9.9% in Palm Springs and 29.3% in Palm Desert. Again, affordability increased in some markets for new homes due to lower mortgage rates (Palm Springs and Palm Desert). Should mortgage rates increase

Figure 51 | Median Prices of Existing Homes: % Change, 2018 to 2019, Coachella Valley Cities

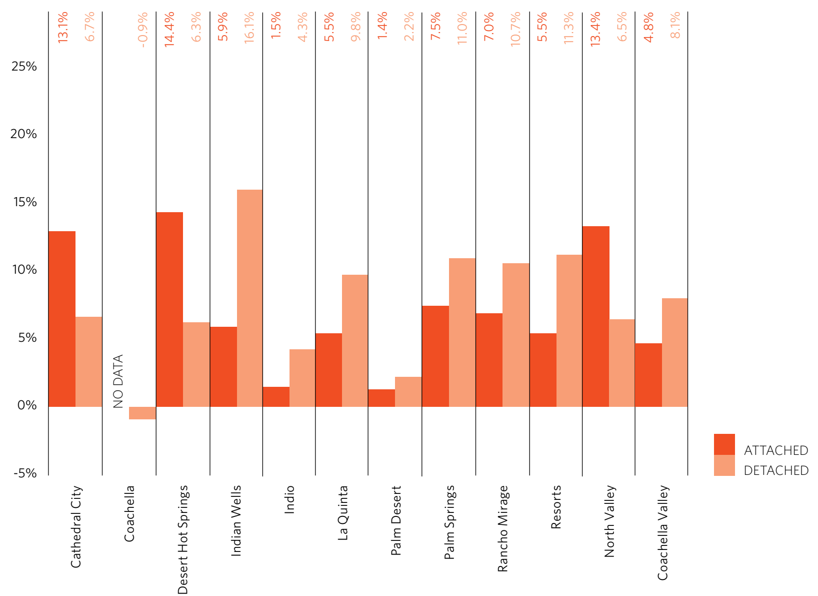

Figure 51 | Every Coachella Valley city but the city of Coachella will experience solid annual home price increases during 2019.

Sources: DQNews, Kruegereconomics

eventually, then low affordability would get worse.

There is another measure of affordability, the so-called median cost burden for all ownership and rental households. Figure 53 shows that in 2017, both rental and mortgage costs as a percent of median income in the Coachella Valley came close to or even exceeded the critical benchmark of 33%. Such a level is considered a reasonable cost burden for a household. The median mortgage cost as a percent of household income in the Coachella Valley was less than 30% in 2017, while median rental costs as a percent of income was 35%.

Together, the various affordability measures suggest a deeper problem that exists for many employees in the Coachella Valley: they simply cannot afford decent housing. It might become increasingly difficult to live and work year-round in the Coachella Valley.
In summary, we are forecasting a mini-recovery in 2019, which could well last through 2020. New home sales have been weak during the current recovery. During this time, median new home prices have exceeded median existing home prices by a stunning 68%. Builders seem to have focused on the upscale market, while neglecting mid-level homes. This pushed up prices for new homes led by the supply side.

Figure 52 | % of Households That Can Afford Median Prices, Existing and New Homes, Coachella Valley, 2018-2019

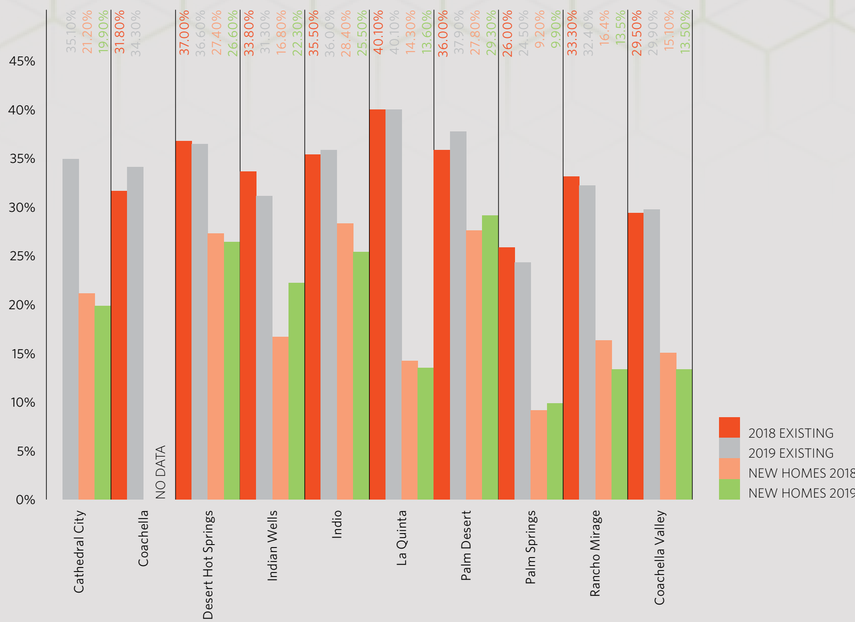

Figure 52 | New homes in the Coachella Valley are less affordable than existing home prices. Should mortgage rates increase, low affordability would get worse.

Sources: DQNews, Zillow, FreddieMac, Kruegereconomics

Figure 53 | Mortgage and Housing Costs, % of Income, Coachella Valley, 2017

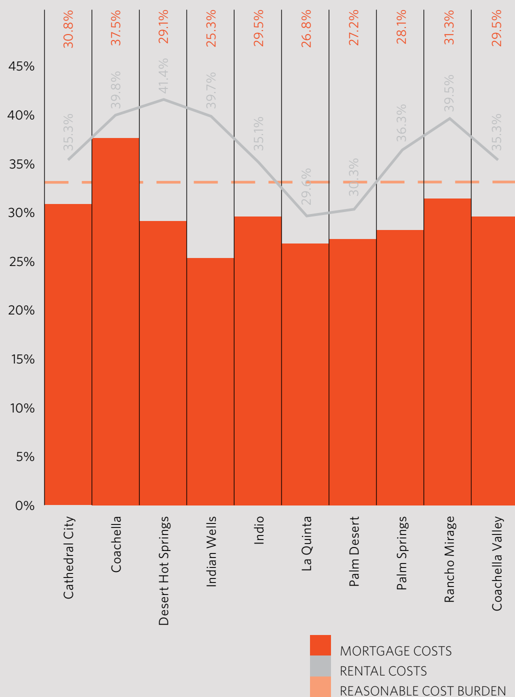

Figure 53 | The median mortgage cost as a percentage of household income was less than 30%, while median rental costs as a percent of income was 35%.

Sources: ACS, Kruegereconomics

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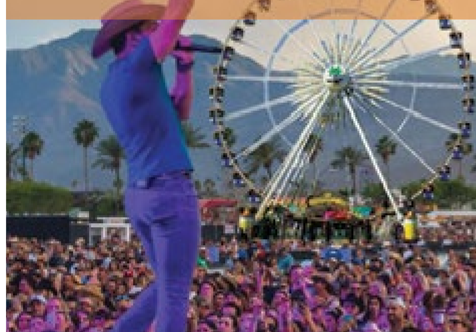

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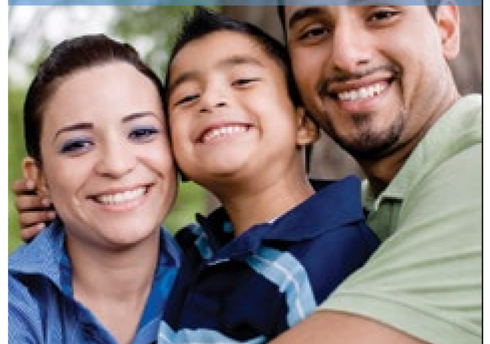

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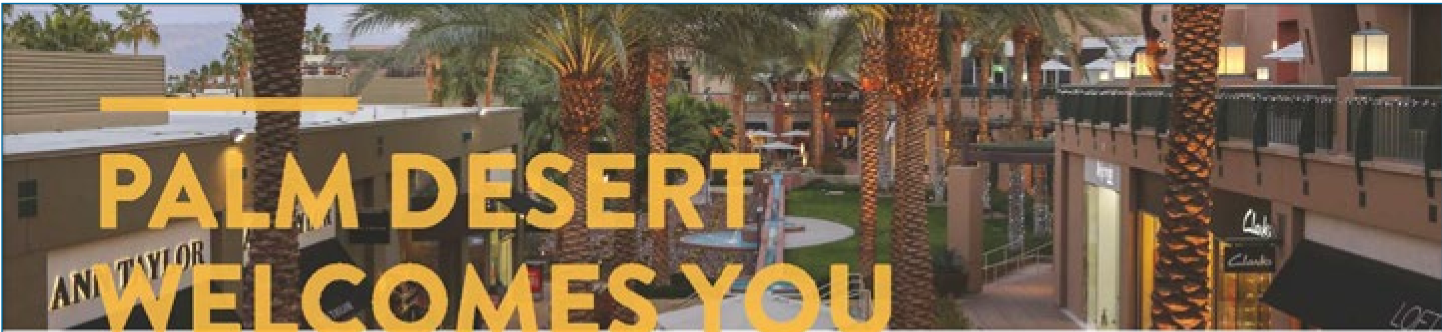

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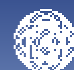

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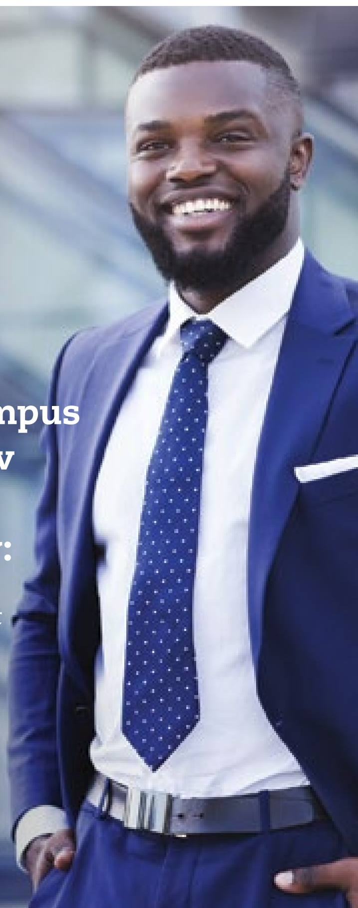

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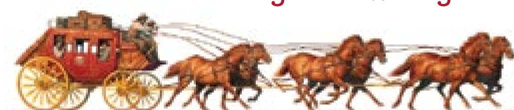

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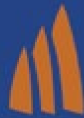

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We serve as the voice of the home building industry in Riverside County. Our Association is committed to preserving a legal and regulatory environment that is conducive to meeting the current and future housing needs. Together, through representing home builders and affiliated trades we help build communities for families to realize the American Dream of home ownership.

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