Inland Empire
Economic Report 2019

Lowe Institute
of Political Economy
Claremont McKenna College

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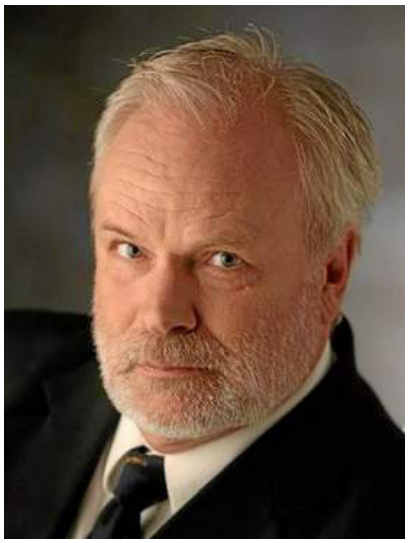
Lowe Institute of Political Economy and Public Policy
Robert Day School of Economics and Finance
Claremont McKenna College
500 E. Ninth Street
Claremont, CA 91711



MANFRED W. KEIL, PH. D.

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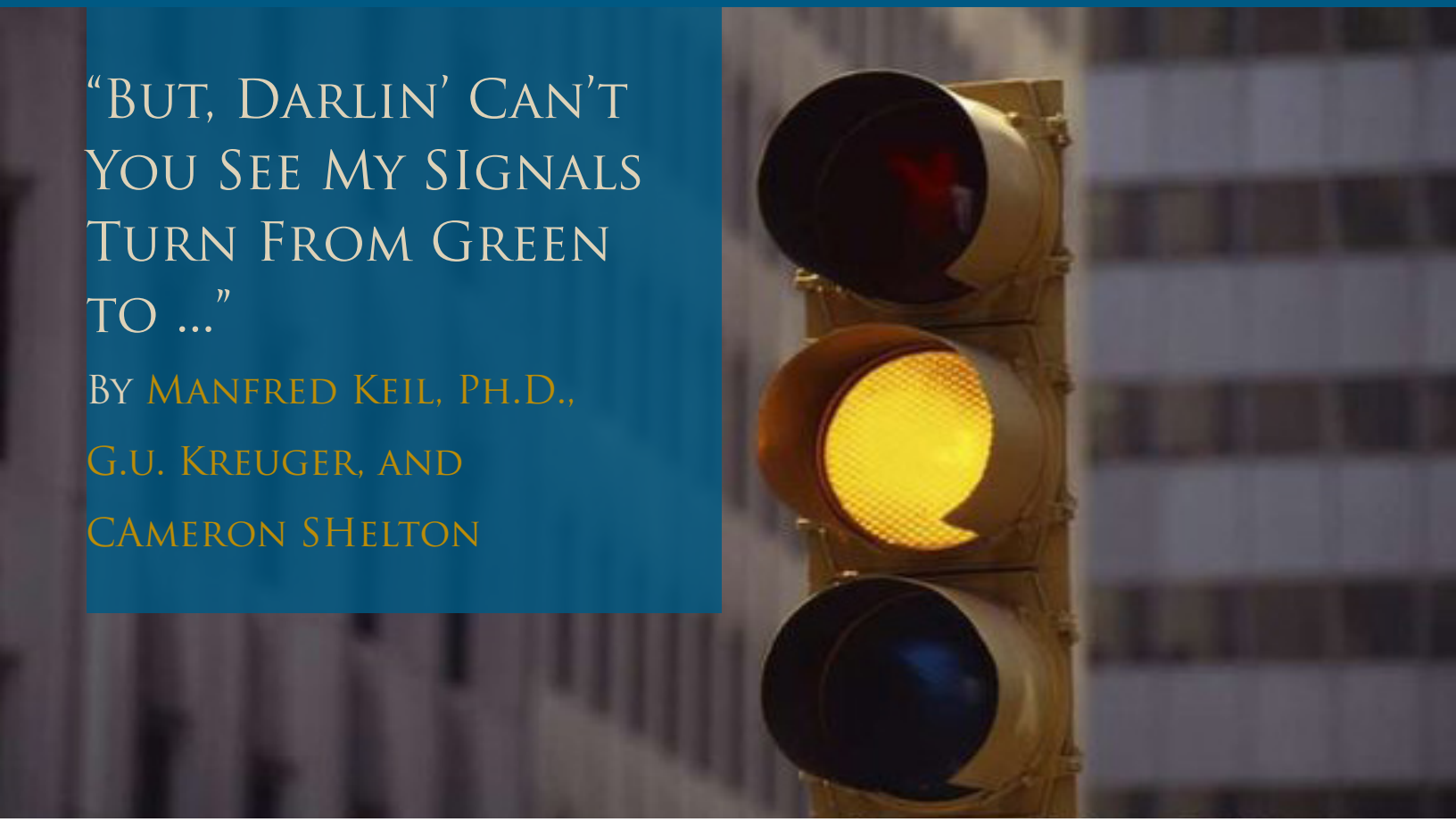
"But, Darlin' Can't You See My Signals Turn From Green to ..."

By Manfred Keil, Ph.D., G.U. Kreuger, and Cameron Shelton



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There is a lot of talk going around about the "Recession of 2020" or the "Recession of 2021." To make matters worse, (i) the volatility in the stock market starting in February 2018 but receiving more attention during the latter half of 2018, (ii) the decline in consumer confidence in three of the last four months (fall in October and November 2018, slight recovery in December, seriously turning south in January), (iii) the record breaking temporary government shutdown, and (iv) the Conference Board's Index of Leading Economic Indicators having fallen in October and December (two out of three months) seem to have moved up the starting date for the next recession to as early as 2019 in the mind of many analysts. An imminent economic downturn, which seemed somewhat implausible even last summer is now increasingly on people's minds.

The National Economy

Figure 1 shows the Google Trend graph for "Recession" over the last year: clearly there has been an uptick in the general public interest regarding the possibility of a recession in the near future. Interestingly enough, the highest number of searches were in Washington D.C.

Even the Federal Reserve has made it clear that it is more likely to see fewer increases in the federal funds rate in 2019 than signaled previously, ranging from zero to two following the statement after the January 2019 meeting. The minutes of the latest meeting indicate that the Federal Reserve looks at the economy as being "solid," rather than "strong," which is the wording they

Figure 1: "Recession," Google Trends, February 2014- February 2015 (5 Years)

used in December. Having taught university courses to many students, I typically classified an individual's performance as "solid" when I was not particularly impressed or happy with what the person had demonstrated in an exam. A notch below would be an upward of "most improved" from the previous evaluation. The Fed is clearly more concerned now than it was even a month ago.

Given the severity of the Great Recession of 2007-2009, and especially the devastating effect it had on some regional economies, we will spend some time talking about what type of data you should look at to judge the probability of an imminent recession.

Economists have done a notoriously poor job in forecasting recessions. Part of the problem is that the U.S. has only experienced a small number of these episodes during the post-World War II period when data became available at a higher frequency: there have only been eleven recessions in the U.S. since 1946. Statisticians refer to this as a small sample problem: trying to infer from a few observations what a much larger population looks like. It is as if you restricted yourself to look at a small number of people with a certain disease to figure out the underlying causes or forecast the next outbreak, where each one of the patients displays somewhat different symptoms, and where the severity of the illness varies across patients; beyond that, the recovery from the disease does not display a uniform pattern for most of the patients. To make matters worse, there is only a short period before the onset of the disease during which you can forecast with some confidence that the illness will actually occur with a high probability. Yet recessions are important economic events, especially if the subsequent upswing, or as we called it previously, the "Not So Great Recovery," is less than spectacular. Certain socio-economic sub-groups, such as some minority groups, younger people, etc. experience unemployment rates that are masked by the lower average. While aggregate unemployment rates reached 10% following the Great Recession; the unemployment rate for male teenage African Americans peaked at 49.5%. There are also important regional differences: the greater Detroit area had an unemployment rate of 17.2%, (the city of) Coachella and Adelanto in Victor Valley in the Inland Empire reached 22% peaks, and Imperial County in Southern California saw aggregate unemployment rates of 30%. Meanwhile, the unemployment rate for college graduates peaked at 5.3% and began to decline as soon as the economy started growing again.

Another reason for the poor track record of forecasters is that recessions are most often the result of a "shock" that hits the economy. Since these are typically unpredictable, there

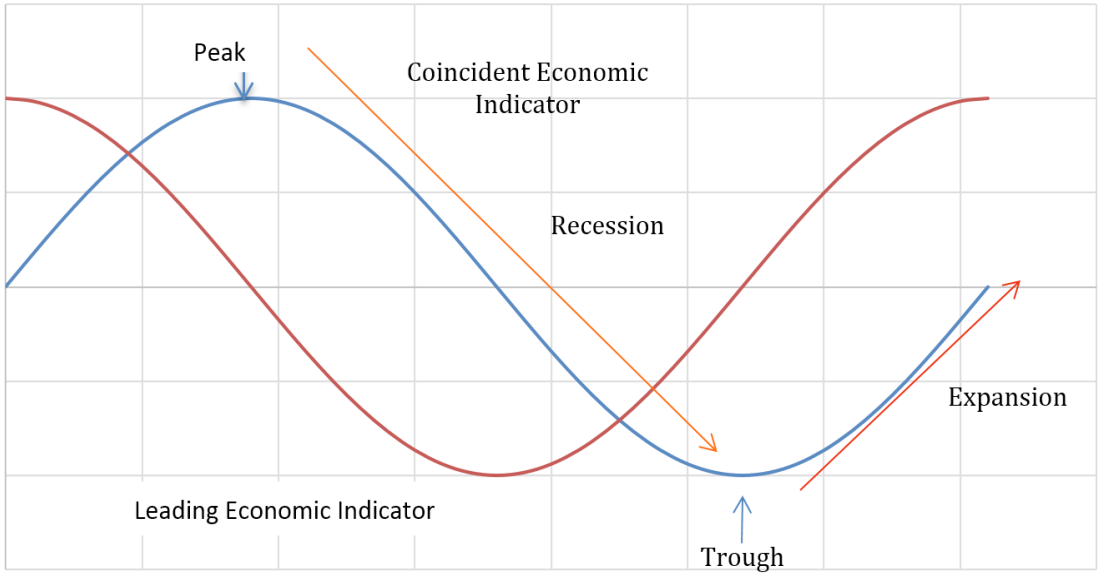
is little time to forecast economic downturns once they occur (think of predicting an earthquake or a tsunami). These shocks are typically the result of a monetary contraction, e.g. the Volcker recession (1981/2), oil price hikes (1973/5, 1980), or some sort of inventory problem such as a housing-mortgage crisis (2007/9). If we had to nominate candidates for a future shock, it might be another prolonged government shutdown, a lengthy trade dispute with China, a renewed debt crisis perhaps in Greece, Italy, Turkey, or Argentina, or a global economic slowdown originating in lesser developed countries with dollar denominated debt, etc. Anyone who can forecast these shocks is selling you snake oil.

What is a recession? The financial press often refers to these episodes as a decline of at least two consecutive quarters in real GDP. However, in the U.S., national recession episodes are determined by a dating committee of the National Bureau of Economic Research (NBER), which is located in Cambridge, MA between Harvard University and the Massachusetts Institute of Technology (MIT). The NBER does not recognize a recession in terms of two consecutive quarters of negative growth in real GDP. Instead, it defines "a recession [as] a significant decline in economic activity spread across the economy, lasting more than a few months, normally visible in real GDP, real income, employment, industrial production, and wholesale-retail sales.". Accordingly recessions are dated by month, not by quarter. For example, the Great Recession lasted from December 2007 to June 2009. If we used the often cited definition of two consecutive quarters of declining real GDP, then the Great Recession would not have started until July 2008 since there was a small positive economic growth during the second quarter of 2008, most likely as a result of the Bush tax rebates.

The task for economic forecasters is then to find early symptoms for the onset of a recession, preferably far enough in advance for policy countermeasures to be put in place to avoid the onset the decline in economic activity. This is the equivalent of the doctor administering medicine to prevent the outbreak of a disease. Let's call these symptoms "Leading Economic Indicators" (LEI) while the spread of the disease itself can be observed through a set of variables labeled "Coincident Economic Indicators" (CEI). Figure 2 displays the stylized relationship between the LEI and the CEI during a business cycle.

Of course real life only weakly resembles

Figure 2: Stylized Behavior of Leading Economic Indicators and Coincident Economics Indicators During the Business Cycle

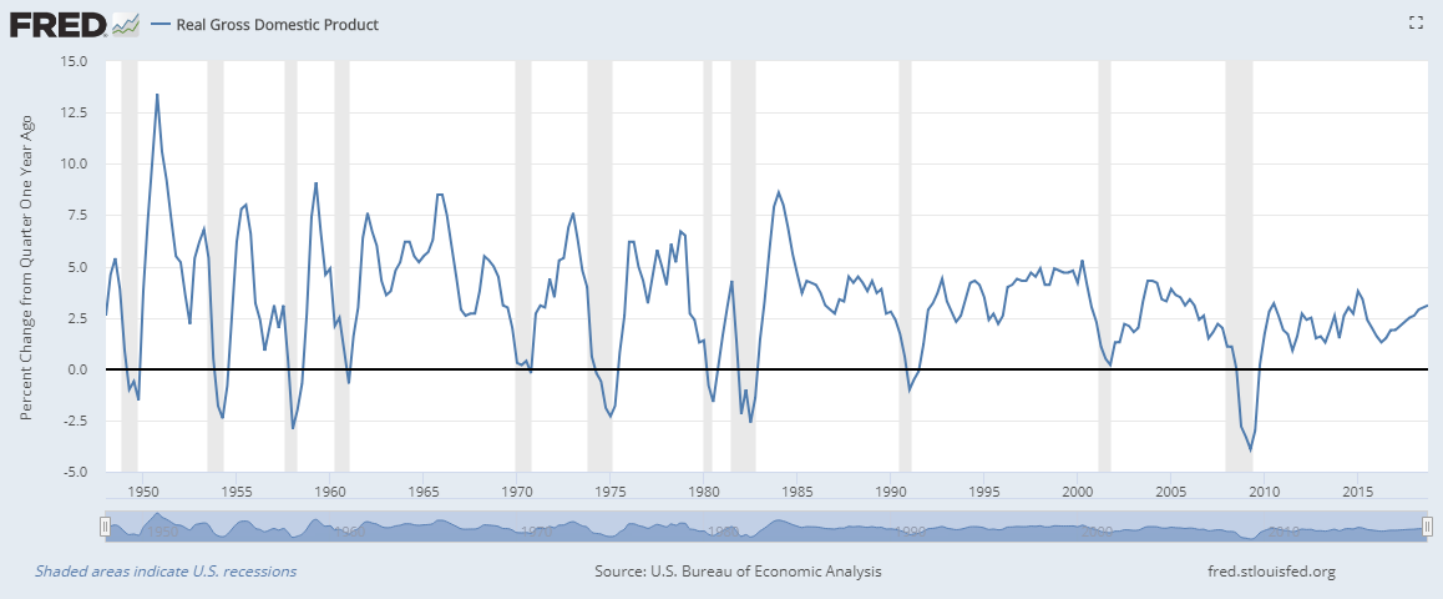


this idealized behavior. The length of the recession is typically much shorter than the expansion, there is an underlying upward growth trend in addition to the cyclical behavior, leading indicators do not turn with regularity ahead of the coincident indicators ("false positives"), there are semi-regular seasonal fluctuations (e.g. holiday shopping and employment), etc. In addition, even if the situation was as clear as depicted in Figure 2, there would be a time lag between the doctor (policy maker) being aware of the onset of a future disease and the time it takes for the doctor to administer the medicine (fiscal and monetary policy) in the hope of fixing the problem. This is referred to as the "inside lag," and it is shorter for monetary policy than for fiscal policy because the Federal Reserve acts more swiftly than Congress. After the medicine is injected (policy is switched to expansionary), assuming that it is available, it takes some time for the medicine to take effect on the patient. This period is referred to as the "outside lag," and it is shorter for fiscal policy than for monetary policy. What makes matters worse is that these lags are most likely not constant in different economic situations. Economists speak of "long and variable policy lags".

Perhaps there is a better metaphor for the business cycle using an aircraft carrier or oil tanker. Assume that the aircraft carrier is entering a fog bank and that there may be obstacles lying within the fog bank, such as icebergs. The captain will use the radar and other technical devices to plot the future path of the ship. Even after an iceberg is spotted, it takes a small lag before the rudder is turned (presumably not very long) but a much longer lag before the aircraft carrier moves from its previous path (the Titanic comes to mind, although the lookouts did not have the luxury of a radar). Sometimes it gets worse as when Captain Joseph Hazelwood of the Exxon Valdez oil tanker did not have radar and his vision may have been otherwise clouded. Still the officers acknowledged a problem ahead (the reef), but could not turn the tanker around in time. Similar to the Exxon Valdez, the U.S. economy has a wide turning radius.

Figure 3 shows what the business cycle, here represented by the growth rate of real GDP, looks like in real life for the post World War II period in the U.S. The shaded areas indicate recessions as defined by the NBER.

Figure 3: Real GDP Growth From A Year Ago, U.S.
1947 Q1 - 2018 Q4



In August 2018, Fortune Magazine ran a title story on the state of the U.S. economy, "The End is Near". Also on the front page of that issue: "The U.S. Economy Will Slow. The Bull Market Will End. Here's Why – And What You Should Do Now." In the article, the author and senior editor Geoff Colvin, makes a series of claims to support his vision of an imminent recession. A title story in The Economist a little later in the year, more concerned with the lack of policy tools available during the next recession, is also more cautious regarding the onset of the downturn. The cover of the magazine suggests that the U.S. economy has reached a peak but there may be a flat section on the top of the mountain before the decline begins. The Zeitgeist seems to be that the 12th post-World War II recession is nigh.

While a cynic might say that these are just clever marketing tools to increase the sale of a magazine issue, we will look at the claims made by these authors and others of a recession starting in the near future and provide fact checks. We hope that this will allow readers to make up their minds regarding the likelihood of a national downturn in the near future. Specifically we will address the following statements:

- The expansion is likely to end soon
- Economists are not good at forecasting recessions
- The flattening of the yield curve suggests a recession in the near future
- Low unemployment rates signal an imminent economic slowdown
- Stock market behavior is a reliable indicator of a future contraction
- The consumer sentiment (confidence) index should receive special attention when looking at future economic development
- The Index of Leading Economic Indicators should be used to forecast recessions
- Employment behavior at the periphery of certain Metropolitan Statistical Areas (MSAs) can be employed as an early detection device of a downturn in the near future.

Economic Expansions Die of Old Age

The current economic expansion started in July 2009 and has lasted 115 months so far. Figure 4 shows all U.S. expansions since December 1854. There has been one post-World War II upswing that has lasted longer, a 120 months period from March 1991 to March 2001. The economy will set a new U.S. post World War II record if the expansion continues beyond June 2019.

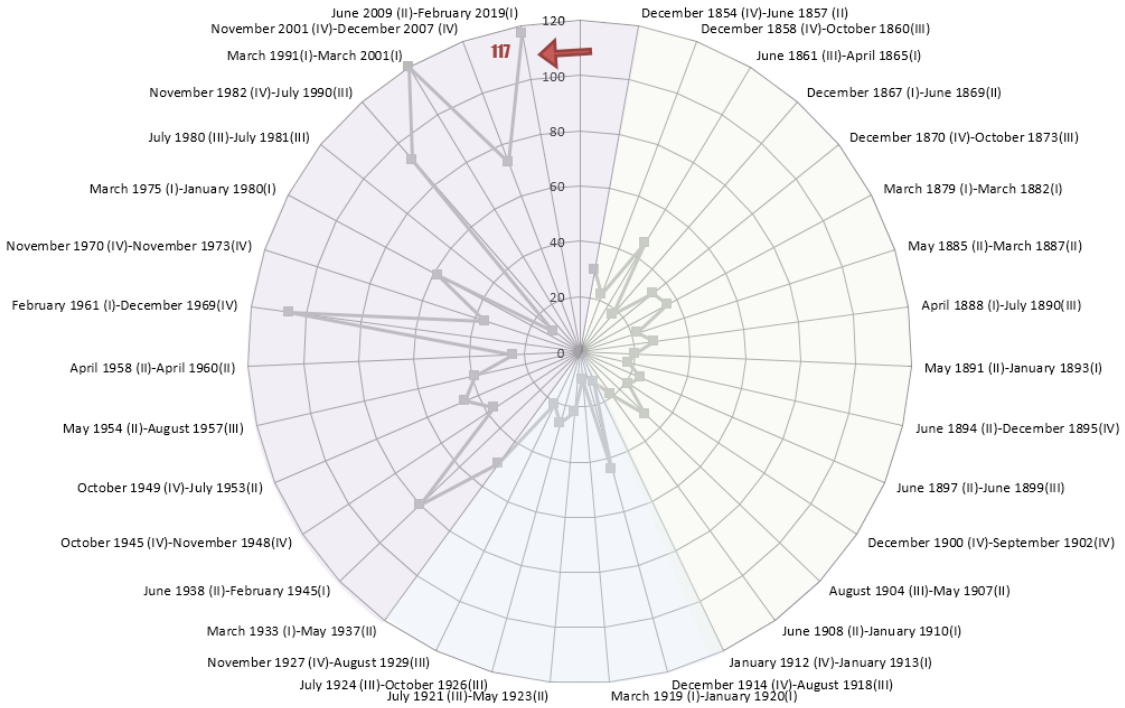
Colvin, in the Fortune Magazine article, makes the following statement regarding the length of the boom. "The current economic expansion is much nearer its end than its beginning." This is bound to be true: most likely, we will not see another 9 or 10 years of an uninterrupted boom in the national economy. Unfortunately this does not pin down the end date of the good times with any accuracy. But wait a minute: Australia just set a new record for the longest economic expansion among the Organization of Economic Cooperation and Development (OECD) countries (in essence, a rich country club) in 2017 at 104 quarters (not months) – 110 quarters by now. The country experienced its last recession in 1991, or 28 years ago. In all, the Australian

economy weathered the Asian Financial Crisis of 1997-8, the dot-com slump at the turn of the Millennium, and the Great Recession of 2007-9 without succumbing to recession.

Is there anything we can learn from the Australian expansion with regard to extending the current boom, or from similarly long episodes in Canada and the Netherlands? First of all, it has been pointed out by some that it is not clear that Australia avoided a downturn as measured by two consecutive quarters of real GDP decline during the Great Recession period. The Australian Bureau of Statistics (2010) shows that this is true only if GDP is measured from the expenditure side.

Setting the record breaking issue aside – even with a recession in 2008, Australia's expansion would have lasted

Figure 4: Historical Duration of Economic Expansions, U.S. in Months



considerably longer than the current upswing in the U.S. – there are two other attributes that make Australia different from the U.S. First there is its immigration policy, which, while based on a point system, has encouraged foreigners to enter the country to the extent that 20% of the 25 million residents of Australia were not born in the country. This has resulted in a higher growth rate of the population and the labor force, and it is one explanatory factor for the long expansion: a one-percentage point difference in population growth may just have been sufficient to keep real GDP growth in positive territory when growth was less than one percent, even if measured on the expenditure side. Second, raw material exports may have been a savior. Asking an Australian colleague about the causes of the long expansion in Australia, he replied "Dig it up and sell it to the Chinese." This is not a sustainable strategy and one that is unavailable to most advanced countries. It seems to us that Australia is

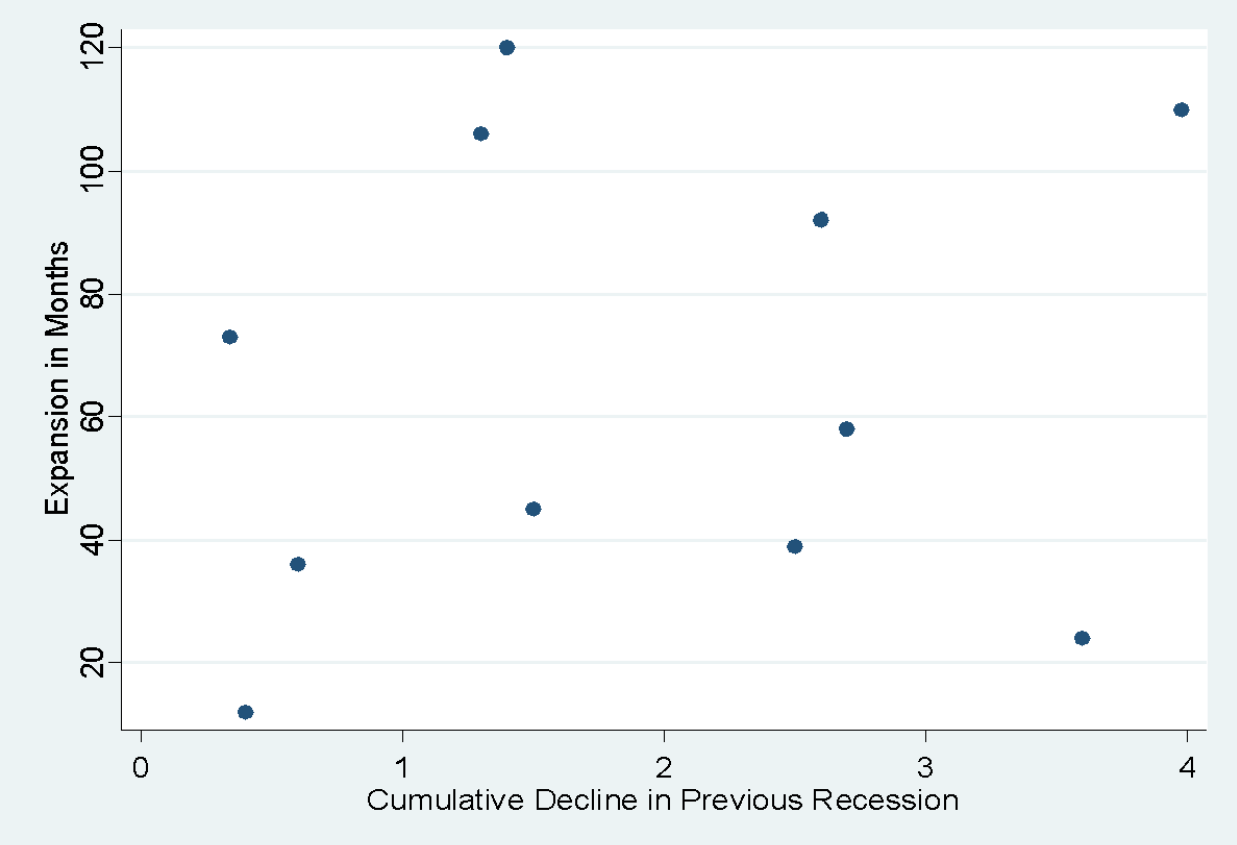
both riding its luck and sufficiently sui generis that it offers few macroeconomic lessons for others to draw upon.

It has been suggested that a recession from a financial crisis, rather than from a monetary contraction/oil price increase, may be more severe and result in a longer expansion. There is a resulting hypothesis that can be tested, namely that the length of the subsequent recovery is related to the severity of the recession prior to it. Figure 5 plots the relationship between cumulative percentage GDP decline for the previous post World-War II recessions, meaning by how much real GDP fell from peak to trough, and the subsequent length of the recovery.

As you can see, there is no simple relationship between the two variables. The observation in the northeast corner is the Great Recession and the Not So Great (weak) Recovery (see, e.g., Fernald et al., 2017). Sometimes a long expansion, such as the current one, follows a particularly severe recession; at other times a mild recession, such as the one experienced at the end of the Cold War, coincides with a very long expansion.

The bottom line, there is nothing in this graph for us to exploit in terms of predicting the end of the current expansion. Our title for the report is from a quote of former Federal Reserve Chairperson Janet Yellen, testifying on Capitol Hill on February 11, 2016: "There is always some chance of recession in any Year. But the evidence suggests that expansions don't die of old age."

Figure 5: Severity of Recession and Length of Subsequent Recovery, U.S. Post-WWII



Economists as forecasters of Recession

The senior editor of Fortune Magazine is particularly critical with economists as forecasters for economic downturns. "In addition to knowing which indicators are best at predicting recessions, we also know whom not to ask: economists. At least on this task, they're terrible." While this statement is harsh, it is mostly true. For example, surveying 47 professional forecasters at Goldman Sachs, Barclays, JP Morgan, Mitsubishi, etc. in August 2008 when we were already more than seven months into the recession and Bear Stearns had failed earlier that year, the median forecast for 2008:Q4 was (plus) 0.7%. The true figure turned out to be -8.5% . While the Lehman Brothers debacle did not occur until mid-September 2018, and the NBER, through its business cycle dating committee, did not declare the start of the recession until December 2008, when December 2007 was designated as the official beginning of the downturn, a forecast error of this magnitude is a remarkable failure. The consensus opinion in early to mid 2008 was that we were facing merely a minor banking problem perhaps producing a regional recession. Even Federal Reserve Chairman Ben Bernanke, in June 2018, is on record saying that the central bank of the U.S. was at that point more concerned about inflation than unemployment.

What do these professional economists tell us these days? According to a survey by the Wall Street Journal in May of 2018, almost 60% of the respondents (business, financial, and academic economists) saw the expansion ending in 2020. Over 80% believe it will end by 2021. In the latest survey by the Federal Reserve in February 2019, 10% of the professional economists surveyed actually thought that the recession will start later this year. We therefore find ourselves in a different situation from previous recessions: the vast majority of professional economists forecasts a significant slowdown within the next three, if not two years. If you want to convince others about an oncoming recession while suggesting that economists are notoriously doing a poor job forecasting recessions, then this is not the time to do so.

The Yield Curve As a Predictor of Recessions

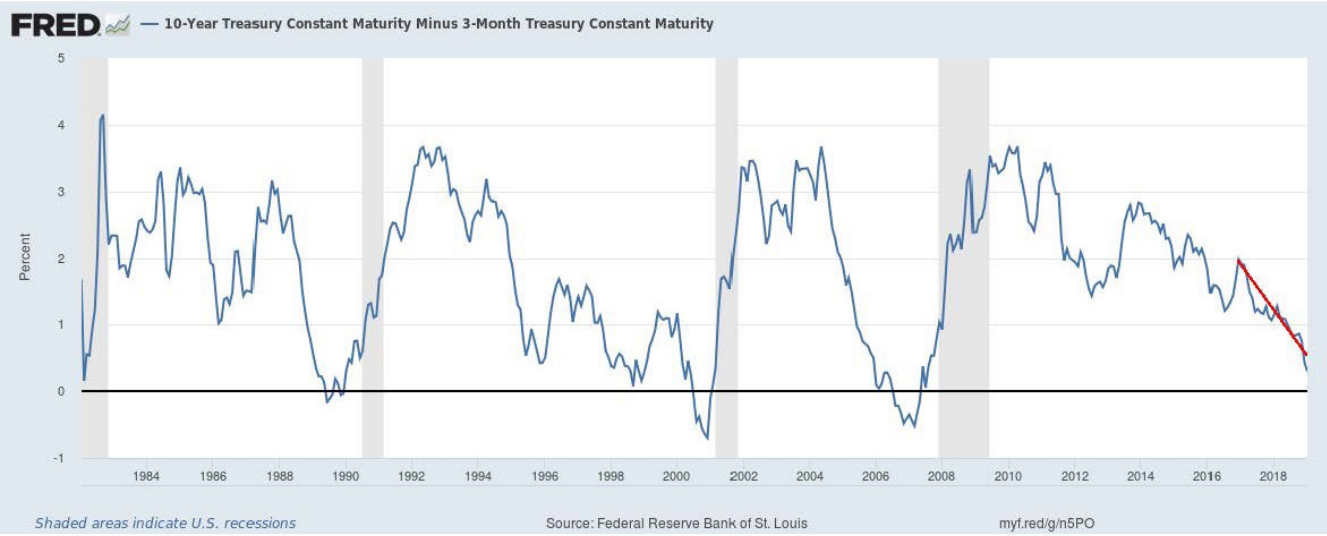
The bottom line so far is that there exists a fairly strong consensus between the popular press and both academic and business/finance economists that a recession is imminent. What crystal ball are these experts using? Fortune magazine claims that "when the yield on long-term (10-year) Treasury securities falls below the yield on short-term (3-month) Treasuries – an inversion of the yield curve – a recession is on the way.".

Long term rates are the average of expected future short term rates. To clarify: the 10-year yield is the average of the expected 3-month yield over the next ten years. The Fed will set the 3-month yield over the next ten years in response to the strength of the economy over this 10-year period. There are a variety of reasons why short term interest rates can end up higher than long term interest rates. The Federal Reserve could raise short-term rates now to tighten credit markets, even as markets believe they will keep short term rates low for most of the decade. Alternatively, there could be a general belief of an upcoming recession, which could lead markets to think the Fed will lower short-term rates in the near future, thus lowering today's long term interest rates.

Figure 6a shows both the long term (10-Year) and short term (3-Month) interest rate. The difference between the two is called the "yield curve" (Figure 6b) or interest rate spread. The popularity of the yield curve in forecasting recessions stems from the fact that since 1970, or for the last seven episodes of a downturn, an inversion has preceded each decline in economic activity. The average lag between the yield curve becoming inverted and the beginning of the subsequent collapse has been slightly over 10 months. However, this average hides a fairly large variation from a minimum of five months (June 1973) to a

Figure 6A: Short-Term and Long-Term Interest Rates, U.S.
1955 M1 - 2019 M2

Figure 6B: Yield Curve, U.S.
1982 M1 - 2019 M2



maximum of 16 months (August 2006).

While the yield curve has become consistently flatter since 2014, it is still not inverted. Using traditional tools for forecasting its future does not suggest that it will invert during the next two years. However, we can paint a worst-case scenario by fitting a (linear) trend (red) line through the recent decline (see the red line in Figure 6b). Assuming that a recent peak was reached in December 2016, we would forecast that the yield curve will turn negative in January 2020; changing the peak date to February 2018, the forecast for an inverted yield curve would be July 2020 - giving us a relatively narrow band of six months between 2020:M1 and 2020:M7 when the event would happen. If that were the case, and assuming that the average lag between the inversion and the onset of the recession follows historical patterns, we could forecast the start of the recession to be in 2020:Q4. However, recall that the lag between this inversion and the onset of a recession has varied between 5 and 16 months. Combining the range of forecasts for the inversion with a range of forecasts for the lag, this indicator forecasts a recession as early as June 2020 or as late as November 2021. That is a wide range.

Moreover, a simplistic linear projection presumes the Federal Reserve, which controls the short-term rate and can reduce it to restore the spread, will simply allow the spread to go negative. The Federal Reserve did let this happen in the past, but typically this was intentional: the central bank wanted to generate a monetary contraction to fight inflation (for example in the early '80s when monthly inflation rates in the U.S. had reached 15%). However, inflation does not pose a problem at this point, with price increases (measured through personal consumption expenditures, not the consumer price index) close to the target set by the central bank.

Last, but not least, we argue that the behavior of the term spread has become more complicated since the start of Quantitative Easing (QE). Until 2007, the Federal Reserve would directly influence the behavior of the yield curve through open market operations, basically working on the short term interest rate (literally the Federal Funds Rate, but the 3-Month Treasury Bill was most directly affected). Once the Fed started to buy long term bonds and even mortgage related assets, we would argue that there has been a structural shift, in that the Fed is now implicitly targeting the yield curve itself. Note that it is tempting to think that with the end of the Federal Reserve buying long-term bonds there will be a decrease in the demand for these, and that their price should fall as a result while the interest rate would then increase. Instead, note that the Federal Reserve declared recently (December) that it will stop shrinking its balance sheet at the order of $50 billion a month, and is considering even buying long-term bonds again. This should have an effect on expectations and prevent the long-term interest rate from falling further; indeed, it has remained fairly constant since the announcement. The bottom line is that we no longer believe that the yield curve is as good a predictor of future economic activity as it used to be.

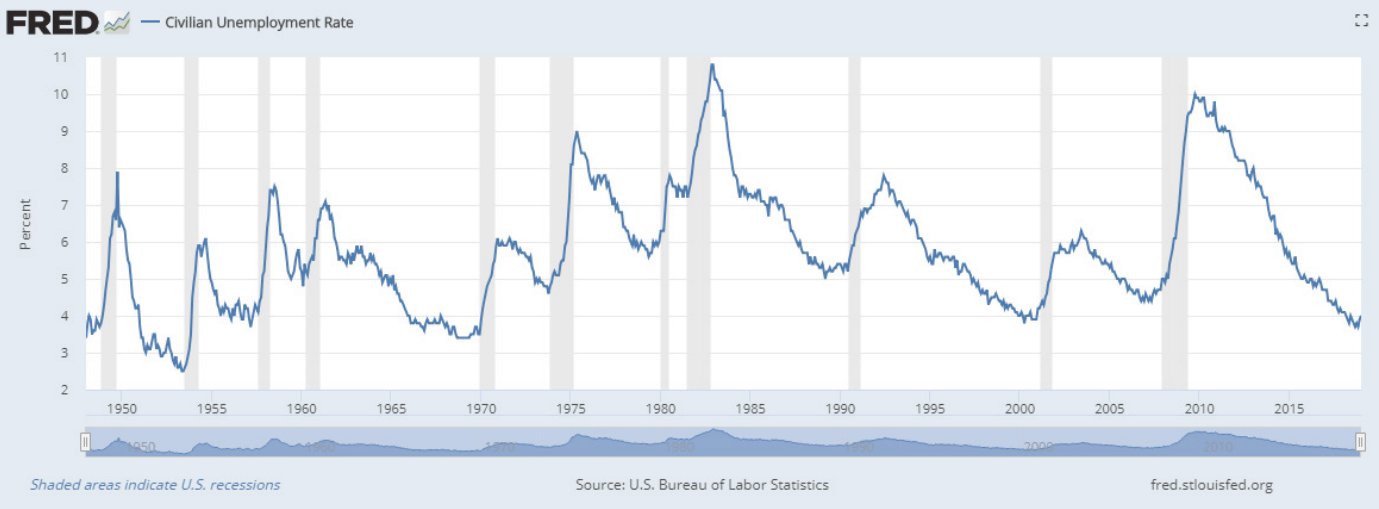
Low Unemployment Rates Signal an Economic Downturn

Golvin next uses a low unemployment rate as a possible predictor for a subsequent downturn: "Another highly reliable presage of downturns is … a trough in the unemployment rate… Super-low unemployment … means the expansion is pressing up against its limits." We are somewhat surprised by this argument since unemployment is typically considered a lagging economic indicator rather than a leading one; certainly this is true for a recovery at the end of recessions. Note, for example, that the U.S. unemployment rate peaked in October 2009, a full four months after the beginning of the last expansion. This has typically been the case in past recessions as well. Figure 7 shows the historical unemployment rate behavior with respect to post World War II recessions. What is the point below which unemployment cannot fall, signaling an imminent recession and subsequent rise? In the 1970s and 1980s, the nadir of unemployment was 5 or 6%. Unemployment dropped below 5% in May of 1997, but of course, unemployment continued to fall for another four years, reaching a low of 3.8% in April 2000.

We feel, therefore, that Golvin is right for the wrong reason: unemployment rates follow general economic developments, they are not leading them in the following sense: once the economy contracts (expands), the unemployment rate increases (decreases). It is true that the unemployment rate increases during every recession, which is another way of saying that it is "super-low" before a downturn, but the claim confuses signals. Umbrellas stay closed before the rain starts and they open once the water drops hit you. Carrying an umbrella, or even opening it, will not cause the rain to fall. But perhaps Golvin is not looking for causality here, just a predictor; and perhaps the unemployment rate is a lagging economic indicator in expansions but not for recessions, meaning that you open the umbrella before the rain starts but that you keep it up even after the last drop has fallen.

Looking at the relationship from an economic point of view, there is no reason why we cannot remain at full employment

Figure 7: U.S. Unemployment Rate, Seasonally Adjusted
1947 M1 - 2019 M1



for an extended period of time – a level of the unemployment rate economists call the "natural rate of unemployment" or the "non-accelerating inflation rate of unemployment (NAIRU)." For that matter, one of the targets of economic policy is to get the economy to that "full employment unemployment rate" and then to keep it there as long as we can. Looking at Figure 7, you can see that there were extended periods of low unemployment rates, or even small increases in unemployment, before the measure returned to lower rates again. Note that unemployment rates were at 4% or below for 52 months, or more than 4 years, and for 64 months below 5% before the 1970 downturn. The U.S. economy currently seems at the beginning of such a phase, with unemployment rates fluctuating between 3.7% and 4.0%. Increases in the unemployment rate have happened not because of a decrease in employment, but typically because of the labor force growing faster than employment. After comparing the predictive power of the unemployment rate with that of the interest rate spread, a commentator at the Federal Reserve remarked: "as with all recession signals, the wise economic analysts should examine many indicators rather than betting the farm on one or two." We fully agree.

Finally, there is no reason for the unemployment rate not to fall further. A well established relationship between unemployment and inflation suggests that if you are below the full employment unemployment rate, then wages and prices will start to increase. There is no evidence of accelerating wage or price inflation – instead it has been one of the major puzzles of the current expansion as to why wage and price inflation are absent at this stage. This does not deny the fact that wages and prices have increased slightly over the last year or so, with wages barely outpacing price increases. The current evidence suggests that wages will not accelerate as long as the unemployment rate remains in the range of 3.5% - 4%.

The proper sequencing of events is as follows. If unemployment rates fall below the natural rate, and wages and prices accelerate as a result, then the Federal Reserve would step on the brake by raising short-term interest rates aggressively, thereby inverting the yield curve with a resulting monetary contraction generating a recession coinciding with increasing unemployment rates. But so long as inflation remains quiescent, there is no reason for the Fed to take away the punchbowl.

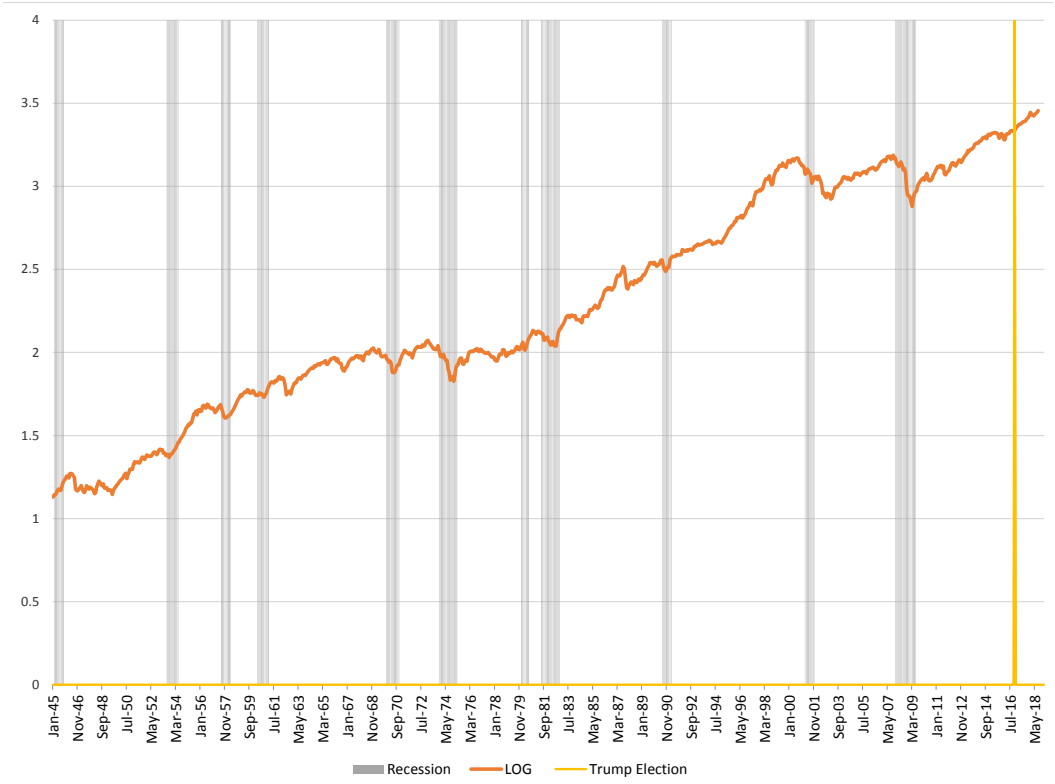
Stock Market Behavior As A Leading Economic Indicator

Another leading economic indicator for a recession is the stock market, and analysts have paid particular attention to it after the post-election 2016 market boom was interrupted in February 2018. Since then the stock market has exhibited relatively large, sometimes high frequency, swings (see Figure 8). However, despite the recent pessimistic outlook, as we write the Dow Jones Industrial Average is only about 800 points, or about 3%, below its all time peak.

One reason for the stock market's popularity in forecasting recessions stems from the fact that stock prices are forward looking in that they take into account future earnings of companies. Also, the stock market has forecasted every economic downturn after World War II. However, as remarked by Paul Samuelson, regarded by many as the father of modern economics, in 1966, bear markets had predicted 9 of the last 5 recessions. CNBC updated that statement to "stock markets have predicted 13 of the last 7 recessions."

Taking a longer term view rather than

Figure 8: S&P 500 index, U.S., Monthly Averages
1945 M8 - 2018 M2



Note: The yellow bar indicates the Presidential Election 2016.

focusing on the behavior since February 2018, the stock market recently experienced the longest expansionary period on record, a phase that started in March 2009. The financial sector defines an expansionary period in the stock market as a bull market that exceeds 20% growth and does not fall in the process by 20% or more. The recent dramatic declines from January 26 to February 9 of 2018, and October 3 to December 21 of 2018 saw the S&P 500 fall by 8.8% and 17.4% respectively. There is some debate whether or not the expansion actually is record breaking, but that is of little concern for our discussion here.

Given the behavior of the more general stock market index in Figure 8, it is actually not trivial to pick a measure of falling stock prices that would signal a downturn. After experimenting with different categorizations, we define a significant stock market decline for our purpose as negative growth for three or more consecutive quarters. Using this criterion, we find five false positives since 1959 (see Table 1). The recent declines were from 2018:Q1 to 2018:Q2, followed by an increase to 2018:Q3 and another decrease to 2019:Q4: stock prices fell two out of three quarters, not three quarters in a row. While this is a "close call," there seems to be another positive quarter on the way. Furthermore, a decline of two out of three quarters is not unusual for the index: the same pattern occurred from 2015:Q2 to 2016:Q1 (negative, positive, negative) with a subsequent prolonged increase. Note from the table that larger declines in stock prices do not seem to be related on whether there will be a subsequent recession.

Date	Decline In Stock Prices	Subsequent Recession
1959 Q4 - 1960 Q4	-4.2%	April 1960 - Feb 1961
1962 Q1 - 1962 Q3	-17.3%	None
1966 Q1 - 1966 Q4	-17.3%	None
1969 Q3 - 1970 Q3	-16.6%	Dec 1969 - Nov 1970
1973 Q2 - 1974 Q4	-35.4%	Nov 1973 - March 1975
1976 Q4 - 1978 Q1	-12.9%	None
1980 Q1 - 1980 Q2*	-1.7%	Jan 1980 - July 1980
1981 Q1 - 1982 Q3**	-13.5%	July 1981 - Nov 1982
1990 Q1 - 1990 Q4***	-5.7%	July 1990 - March 1991
2000 Q4 - 2001 Q4	-18.2%	March 2001 - Nov 2001
2002 Q2 - 2003 Q1	-19.5%	None
2007 Q2 - 2009 Q1****	-45.7%	Dec 2007 - June 2009
2011 Q2 - 2011 Q4	-7.1%	None

Notes:
*Only one quarter of falling prices.
**1981 Q2 saw .96% positive growth.
***1990 Q2 saw 4% positive growth.
****2007 Q4 had a .21% positive growth and 2008 Q2 had a 1.6% positive growth.

Consumer Sentiment Index As A Leading Economic Indicator

A second forward looking variable is the consumer sentiment index (CSI) conducted by the University of Michigan. There is an alternative consumer confidence index available from the Conference Board, but we will focus on the more often cited index here. The idea here is that by asking "the Man-on-the-Street" where the economy is going, we will get a better prediction of consumer behavior, which makes up close to 70% of GDP, excluding residential investment. Being able to gauge future consumption behavior gets you a long way towards forecasting aggregate output.

Both the stock market index and the CSI are two of the ten components of the Index of Leading Economic Indicators. Figure 9 shows the behavior of the CSI. We added a red line for the Trump election date.

Similar to other time series, the index has shown relative volatility recently, falling for two consecutive months from October 2018 to November 2018, only to recover slightly in December 2018, before plunging in January 2019. Commentators at the University of Michigan suggest that the impact of the government shutdown had a significant effect on survey respondents and indeed, the February numbers show a modest recovery.

Taking a long run view, and similar to the Stock Market Index, there have been many false positives using the CSI. A famous example involves the 9/11 terrorist attacks, when the CSI fell off the cliff just a month before retails sales boomed. Economists, in general, prefer to extract information from people's behavior rather than what they are saying. Unless the "Man-on-the-Street" has better insights than what we can gain from his/her behavior, we should weigh this information less. Combining the information from the CSI with consumption behavior is probably more useful, especially if we believe in the "self-fulfilling hypothesis."

While national consumer sentiment has wobbled of late, local consumer sentiment remains robust despite the recent trade war with China and the resulting anxieties for the logistics industry. The Lowe Institute of Political Economy, with financial support from Cadence Capital and in partnership with Chapman University, generates consumer sentiment indices for the Inland Empire, Los

Figure 9a: Consumer Sentiment Index, U.S.
1979 M1 - 2018 M12, Monthly Data

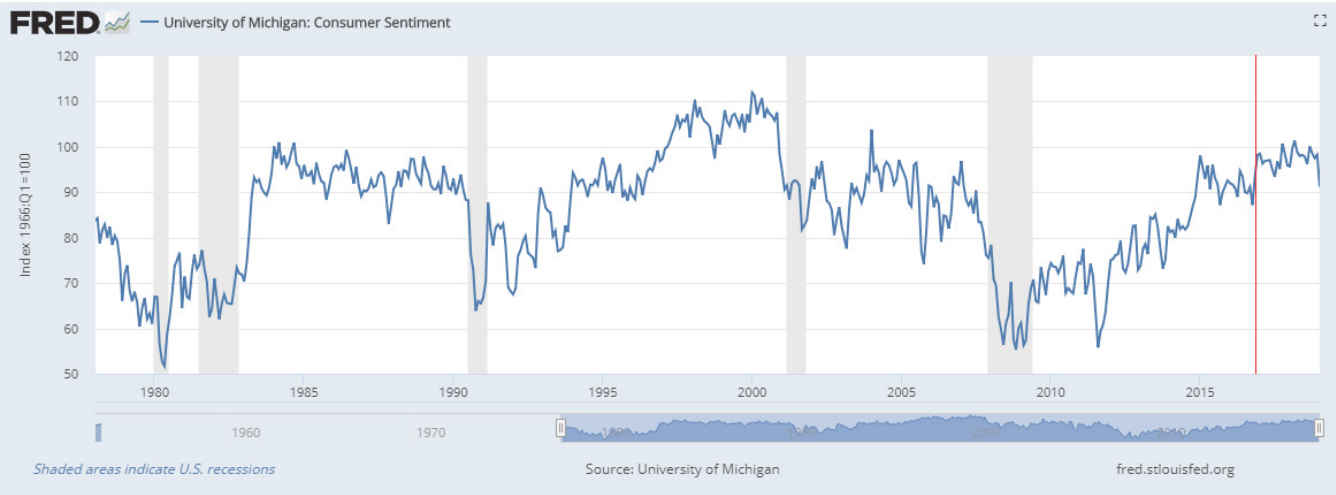
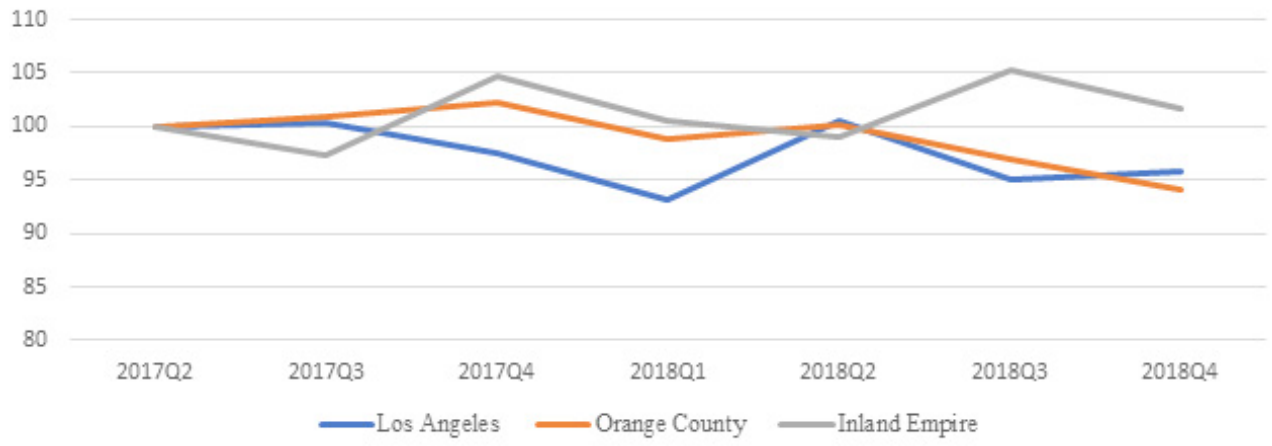


Figure 9b: Consumer Sentiment Index, LA Metro Area
2017 Q2 - 2018 Q4, Quarterly Data



Angeles County, and Orange County (see Figure 9b). The clear picture, when compared to national consumer sentiment, or even to earlier periods of local consumer sentiment, is one of stability and continued confidence.

Those familiar with the Lowe-Chapman Los Angeles County Consumer Sentiment Index may recall that there was a significant decline in late 2016 and early 2017. Closer analysis of responses has shown that consumer sentiment is largely dependent on the respondent's partisan political affiliation. Following the 2016 election, the animal spirits of Democrats collapsed as those of Republicans soared. Because Democrats greatly outnumber Republicans in LA county, LA county sentiment declined sharply even as sentiment remained robust for the country as a whole, over which party affiliation is nearly even. The Inland Empire on the other hand has a much more balanced political makeup. This is particularly evident when looking at how the population voted in the 2016 election. This suggests that going forward the Inland Empire is less likely to be susceptible to political shocks to sentiment. Moreover, the Inland Empire follows political news slightly less than Orange County or Los Angeles, further suggesting that its consumer sentiment is less responsive to political shocks. Inland Empire Consumer Sentiment is not currently a likely source of imminent danger.

Table 2a: Consumer Sentiment by Region and by Political Preference
(Based on 2017 Q2)

	Los Angeles	Orange County	Inland Empire
Democrat	86.2	76.6	83.8
Independent	107.9	99.2	98.7
Republican	132.5	121.6	122.9

Table 2b: 2016 Presidental Election Results By Region

	Los Angeles	Orange County	Inland Empire
Hillary Clinton	72%	51%	52%
Donald Trump	22%	42%	43%
Other	5%	7%	5%

Table 2c: Party Affiliation Within 2018 Q4 Sample

	Los Angeles	Orange County	Inland Empire
Democrat	51%	44%	45%
Independent	31%	28%	29%
Republican	18%	28%	25%

Table 2d: Responses to "How Closely Do you Follow the Political News?"

	Los Angeles	Orange County	Inland Empire
Very Freqeuntly	44%	45%	41%
From Time to Time	42%	42%	44%
Very Seldom	14%	13%	16%

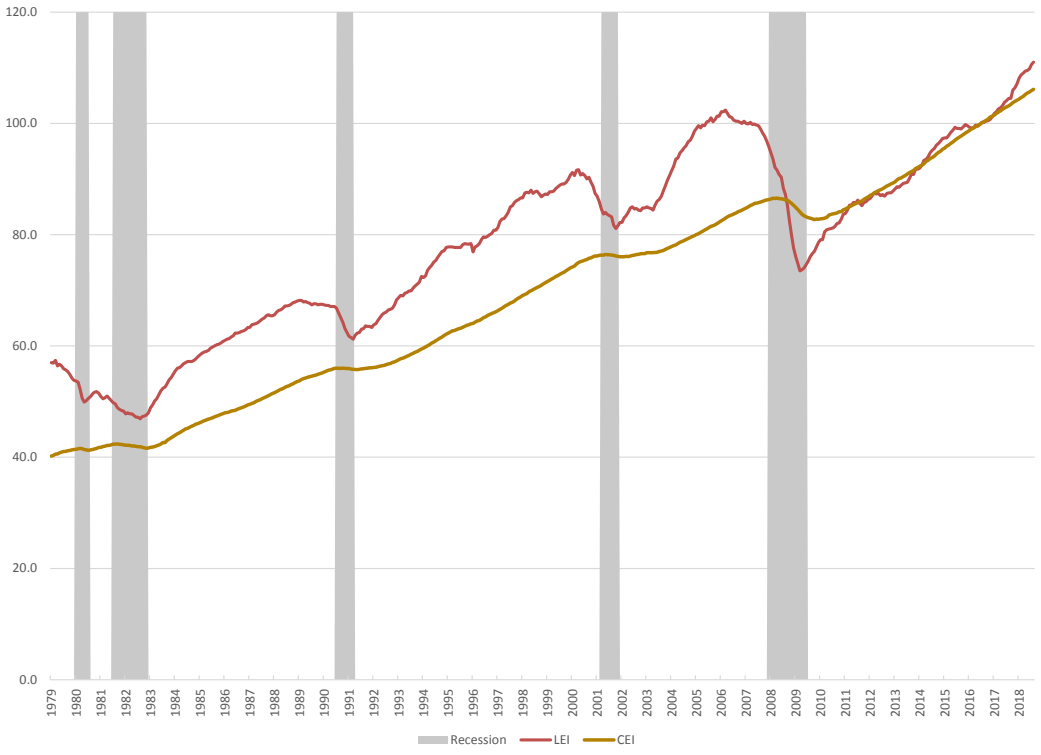
The Index of Leading Economic Indicators

Rather than looking at one indicator at a time, why not combine several of them into a single index? This is exactly what the Conference Board's LEI does. Originally developed at the NBER, the Conference Board eventually purchased the index in 1996. In essence, it is a weighted average ("composite index") of 10 underlying economic series:

- Stock Prices
- Interest rate spread (10-Year Treasury vs. Federal Funds Rate target)
- Average Consumer Expectations for business conditions
- Average weekly manufacturing hours
- Average weekly initial claims for unemployment insurance
- Manufacturers' new orders for consumer goods and materials
- New Orders Index (Institute for Supply Management)
- Manufacturers' new orders for nondefense capital goods excluding aircraft
- Building Permits
- Leading Credit Index

Taking an average of various series has the advantage that idiosyncratic strength or weakness in one indicator that is not broadly reflective will tend to be cancelled by an unrepresentative extreme at the other end. It takes a downturn in several series to

Figure 10: The Conference Board Leading Economic Index and Coincident Economic Index, U.S., 1998 M1 - 2018 M12



send a negative\signal before the LEI shows negative growth. We have already looked at the first three components in more detail above. Technically the index weighs the components depending on their variability (fewer fluctuations in a series result in a higher weight), and it is then adjusted to historical real GDP growth patterns. On the other hand, it is not clear why a series with lower variability should receive a higher weight. Figure 10 displays the Index of Leading Economic Indicators together with the Coincident Economic Indicators since 1990.

The LEI becomes a very good forecaster for future recessions if you focus on periods when it turned down for three months in a row. Most often, a recession then started within the next six months. Table 3 on the next page shows that there were only two false positives if you follow that rule since 1959, a superior record when compared to the forecasting ability of the stock market.

What is the most recent behavior of the LEI? The index fell slightly for the first time in October 2018, basically gained back the loss in November 2018, before declining again in December 2018. The bottom line is that the index fell two out of the last three months, but it did not fall three months in a row, which we would have taken as a strong signal for a recession within the next six months.

Table 3: Periods of 3-month Declines in the LEI and Subsequent Recession Data

Date	Decline In LEI	Subsequent Recession
July 1959 - October 1959	None	April 1960 - Feb 1961
April 1966 - July 1966	0.8%	None
April 1969 - July 1969	1.8%	Dec 1969 - Nov 1970
May 1973 - August 1973	1.8%	Nov 1973 - March 1975
May 1979 - August 1979	1.8%	Jan 1980 - July 1980
Nov 1980 - Feb 1981	2.5%	July 1981 - Nov 1982
June 1990 - Sept 1990	2.9%	July 1990 - March 1991
Sept 2000 - Dec 2000	3.2%	March 2001 - Nov 2001
March 2006 - June 2006	1.3%	None
May 2007 - August 2007	0.9%	Dec 2007 - June 2009

Employment Behavior of Periphery Versus Center

Metropolitan areas tend to spread from an urban center where the highest value productive activity takes place. Many workers commute from peripheral areas further away. Workers with longer commutes tend to be the first to be laid off. Thus employment fluctuations in certain geographical areas, call them peripheries, may serve as a leading economic indicator to adjacent areas, call these the center, if there is a substantial amount of commuting taking place. If we could identify such areas, then we could use employment behavior in the periphery to forecast economic activity in the center.

This general statement unfortunately is not only hard to define more precisely, but the applicability also depends on the type of shock that hits the national economy. In addition, housing that the commuters aspire to occupy in the center must be sufficiently more expensive than in the periphery. One implication is that education levels in the periphery are lower, on average, than in the center. What we want to rule out are pairs of geographic areas where housing is more desirable (on average) in the periphery relative to the center, or where residents prefer to live in the suburbs for cultural reasons. None of this ignores the fact that there is much commuting taking place within any MSA.

What we have in mind here is similar to a lake in the winter (recession) that freezes from the periphery before the center of the lake shows solid ice. The thawing (recovery) works in the reverse. Translating this into geographical areas, we are looking for "first in, last out" (FILO) examples. The Riverside-San Bernardino-Ontario MSA (the Inland Empire) seems to fit this description. 20% of its labor force commutes primarily into the Los Angeles-Long Beach-Santa Ana MSA (Greater Los Angeles) and to a lesser extent into the San Diego MSA. Housing prices, on average, are lower in the Inland Empire

Figure 11: Number of Employees, SA, CPS and CES, Inland Empire
July 2007- December 2018

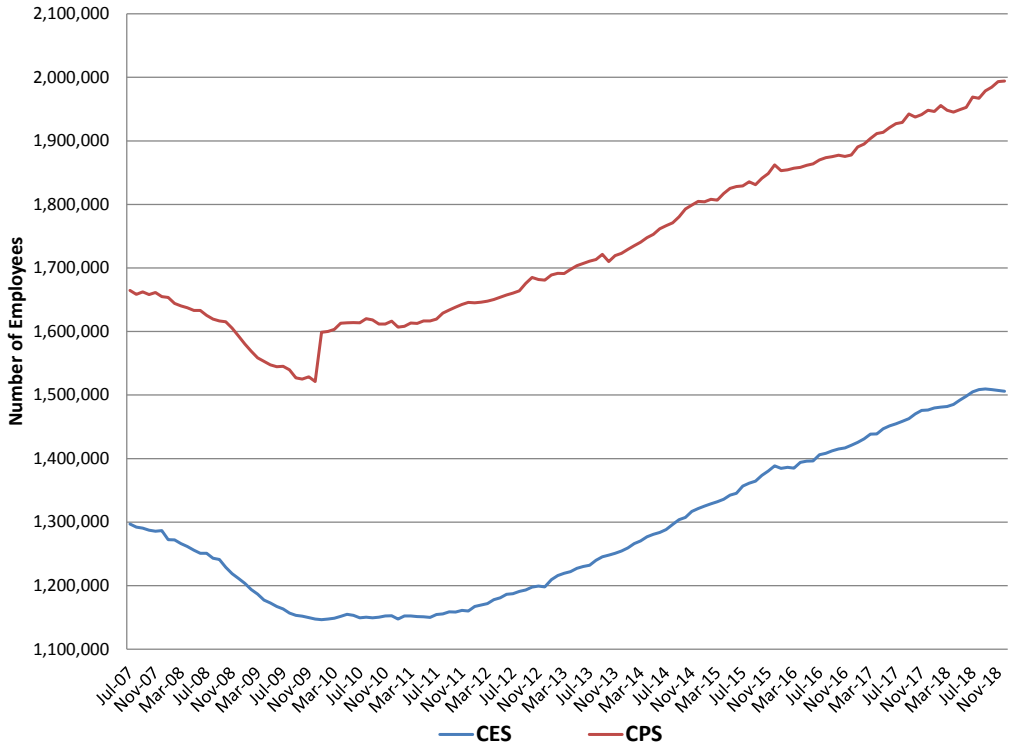
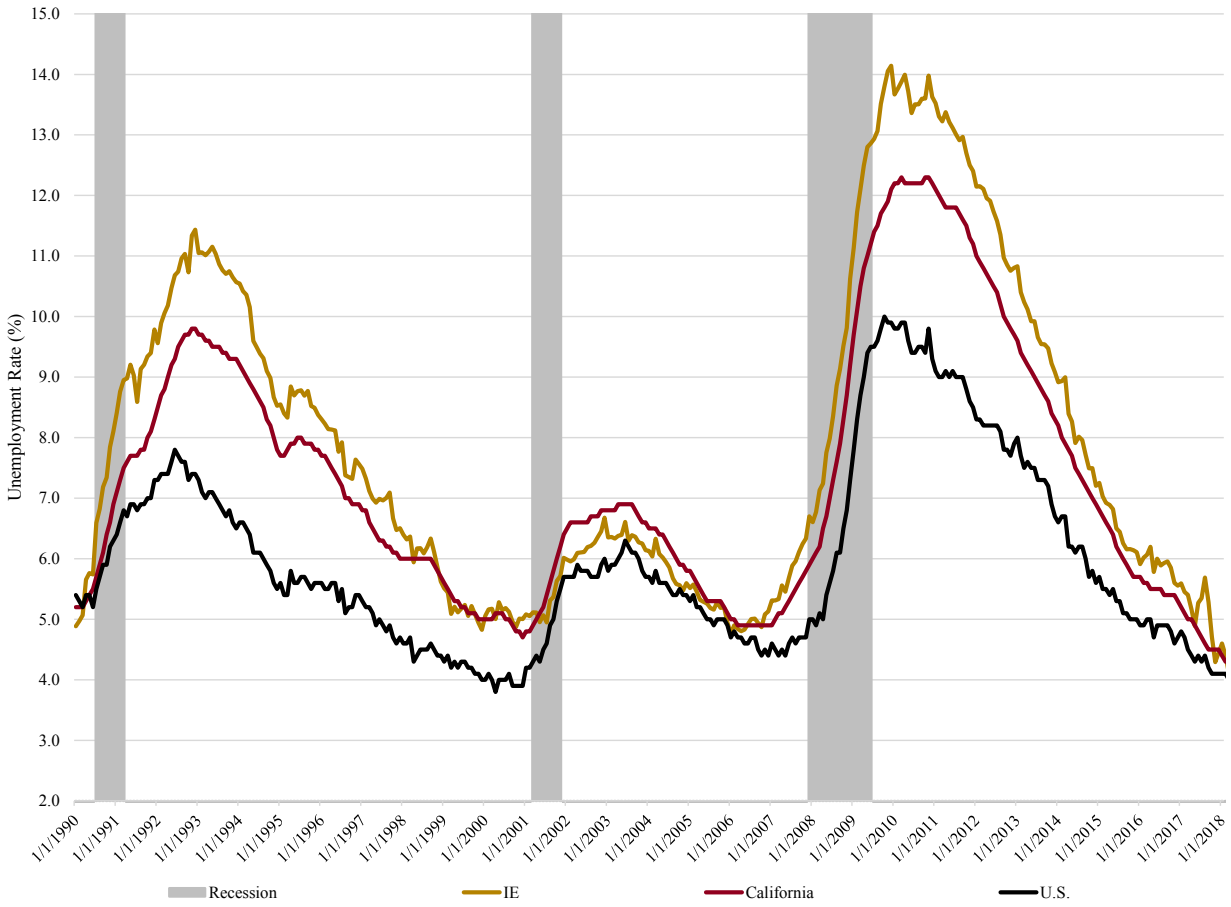


Figure 12: Unemployment Rate Inland empire, California, U.S.
1990 M1 - 2018 M12



compared to coastal areas, and education levels of the residents are also not as high as in the coastal areas. The Stockton-Lodi MSA also comes to mind where substantial commuting takes place to the Sacramento and San Francisco MSA. Because workers live in the periphery but work in the core, we would expect employment in the periphery to be substantially higher when measured by residency (CPS) than when measured by job location (CES). Figure 11 displays this in a dramatic way. The vertical difference between the lines are the net commuters who live in the Inland Empire but work elsewhere.

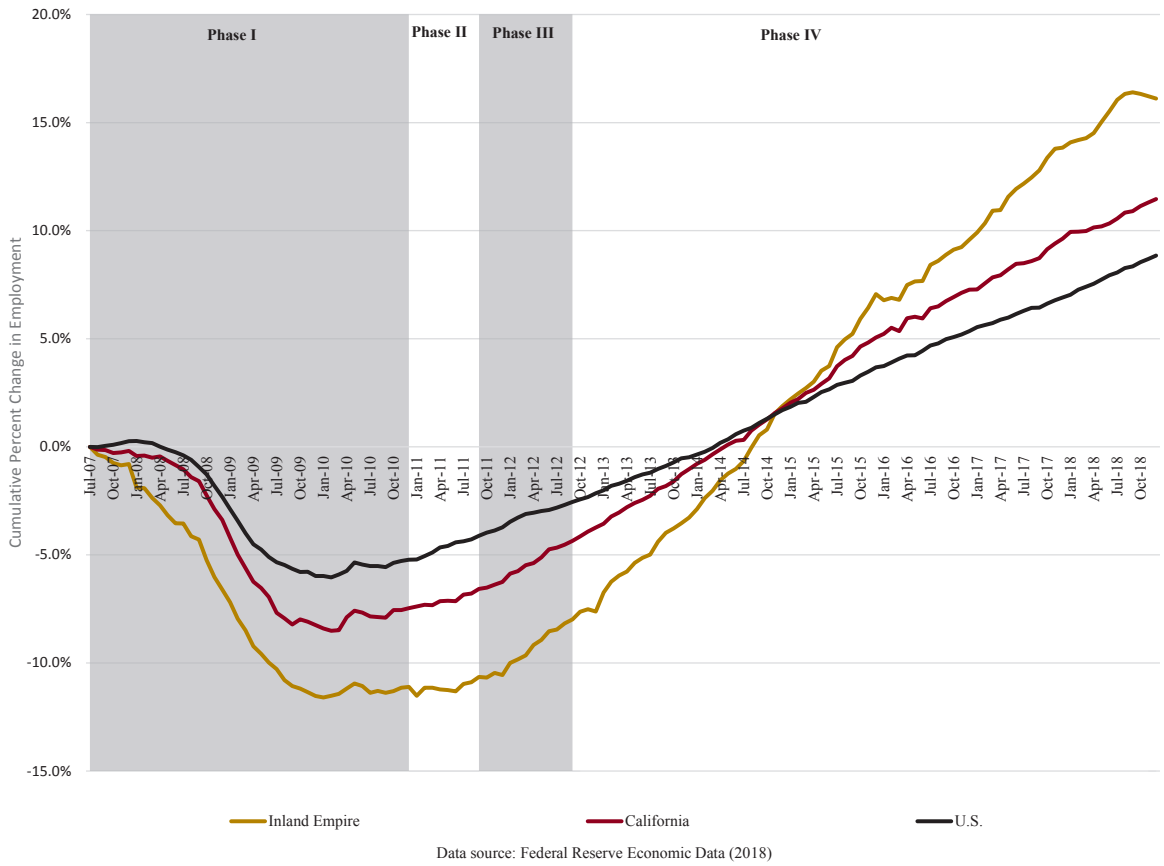
Let's make an example to clarify what we have in mind. Assume that there are three types of workers: worker A lives and works in the center; worker B lives in the periphery but works in the center (commutes); worker C lives and works in the periphery. It almost goes without saying that no one finds commuting desirable. Worker A has higher human capital than worker B, who has more years of education than worker C. While worker B would prefer to be employed closer to his/her residence, the jobs available in the periphery are not as well paying as in the center. Worker B therefore commutes every day. Worker A also works in the center but can afford the higher housing prices since he/she has, on average, a higher education level. Worker C cannot find employment in the center and therefore resides and works in the periphery.

Next an economic shock hits the economy and especially sectors in the center.

Who is going to get laid off first? Worker B since he/she is more expandable relative to Worker A. Worker B then returns home and spends less money at Home Depot, Best Buy, Starbucks, Amazon, etc. As a result, worker C will get laid off - worker A is let go last. Going into a recession, we should therefore expect unemployment rates (employment) to go up faster (fall first) for residents in the periphery. Since the Current Population Survey (CPS) measures employment/unemployment by residency, we should see those patterns using it rather than the establishment (CES) survey. Figure 12 shows unemployment rates for the Inland Empire, California, and the U.S. since 1990 (data for the Inland Empire is only available since 1990). Note how unemployment rates rose first in the Inland Empire during the 1990/91 and 2007-2009 recessions. The pattern is broken for the dot-com recession; hence the type of shock matters. The slowdown around the turn of the millennium was centered in Northern California and only affected Southern California mildly and indirectly.

Figure 13 confirms the labor movement for the last recession where we have indexed employment for the three areas to 100 at the peak employment level for the Inland Empire which occurred in July 2007 (note that the national recession did not start until December of 2007). Here we plot employment growth as measured through the establishment survey. The FILO pattern is clearly visible. Note that we can divide the time series behavior into four phases: during Phase I, employment in the Inland Empire deteriorates dramatically and remains at a low level, even as California and the U.S. show small signs of recovery. During Phase II, California and the U.S.

Figure 13: Employment Changes Since July 2007, Inland Empire, California, U.S.



Data source: Federal Reserve Economic Data (2018)

show clearer signs of improvement, while the Inland Empire employment basically remains unchanged. It is only during Phase III that the recovery in the Inland Empire becomes established, before it becomes even stronger there during Phase IV, eventually passing the U.S. and California. Note that the employment growth has stalled recently, which could be seen as a warning signal. However, we saw in Figure 12 above that this decline is limited to the establishment survey, not the employment by residents.

Real GDP Growth Rate Forecast

If you believe that the inversion of the yield curve is a reliable predictor of an imminent recession, then the crucial question is when you expect the interest rate differential to become negative. There is a variety of methods that can be used to answer this question.

A less sophisticated way would be to use a simple deterministic trend starting in December 2016, when we can observe a distinct peak in the premium. Extrapolating, we would forecast negative values for the LHS variable by January 2020. Assuming that the past relationship between the difference in the two interest rates and the subsequent onset of a recession continues to hold, you would forecast the next recession to start in November 2020, with a range of June 2020 to May 2021. However, this method is somewhat subjective and the slope of the yield curve becomes steeper if you take the previous peak to be February 2018. In that case, the yield curve becomes steeper and you would forecast the difference to become negative in March 2019, with the most likely onset of the recession earlier, in January 2020, and a range of November 2019 to July 2021. This then is the period of doom predicted by the treasury markets. We suspect that many of the professional economists interviewed must have used this or similar simple forecast tools to predict a recession for 2020 (recall that 60% of the surveyed economists chose that date) with the additional economists added who believe that the yield curve will turn negative later, resulting in a 2021 recession.

The bottom line is that we do not see a recession for 2019 and 2020. Hence we do not agree with the 60% of surveyed professional economists. Even if the yield curve inverted later this spring, which we continue to find unlikely, then it will take on average 10 months for a recession to start, taking us into early 2020. We see a lower growth rate in real GDP for 2021, but would not dare to forecast two years into the future, even if we had predicted a negative growth rate for 2021, which, again we stress, we did not.

A Final Word on the National Economy

One way to read our analysis is to suggest that we are more optimistic about the economic outlook than most other analysts. However, recent developments in the stock market, the consumer sentiment index, the record-breaking government shutdown, the decline in retail sales, and finally the index of leading economic indicators just barely missing the crucial three-month decline threshold have also had the effect of making us reflect more carefully about the state of the business cycle in the United States. Housing data and automobile sales certainly look weaker now than only a short while ago, and there will

be a decline in the growth of government spending in 2019. If you couple that with a likely decline in the growth of investment, a reduction in inventory investment which is the result of a previous build-up in inventories in anticipation of tariffs, demographics that do not contribute to continued growth, and the potential chaos in D.C. over the next two years, then there are certainly scenarios under which the economy could turn south. We can add to that external effects such as Brexit, potential debt crisis in Turkey, Italy, and Argentina, plus debt problems in lesser developed countries due to the effect of an appreciating dollar on dollar denominated debt, and there are scenarios which would be conducive to an overall economic downturn, if not at least a significant slowdown to below a 1% growth over the next two years (we just barely missed the 3% growth mark for 2018). Once growth is at such low levels, then a minor shock can turn the record setting expansion into a recession. Putting it differently, when there are low real GDP growth rates, it is more likely that a negative shock can result in a recession. This is the same conclusion as reached by many forecasters. Shocks, on the other hand, cannot be predicted (otherwise they would not be called "shocks"). We are certainly not in the business of predicting these looking into a crystal ball.

The bottom line, will there be a recession in the next three years? The likelihood certainly has increased quite dramatically since last summer. We are not in a DEFCON 1 situation yet, and we continue to believe that the most likely scenario will be weakened growth that remains positive, but will be small. Also, while the economic news has been anything but soothing, we should put matters in perspective. Figure 1 above displayed the Google Trend for the word "Recession." The graph spiked in December 2018 and there appeared to be an upward trend in the data. Allowing the data to go further back (Figure 14), we can see that the frequency with which people google the word is small by comparison to the Great Recession.

Having said that, our advice is to look for the month-by-month development in, what we consider, two crucial markers: (i) employment development in the Inland Empire as measured by the CPS (not the CES), and (ii) the Index of Leading Economic Indicators. If these two change more dramatically in the near future, we will turn our low growth forecast into a recessionary one. We would suggest that you focus less on the yield curve as we no longer believe that it is a good predictor of future economic activity since the Federal Reserve has started to use different policy instruments such as Quantitative Easing.

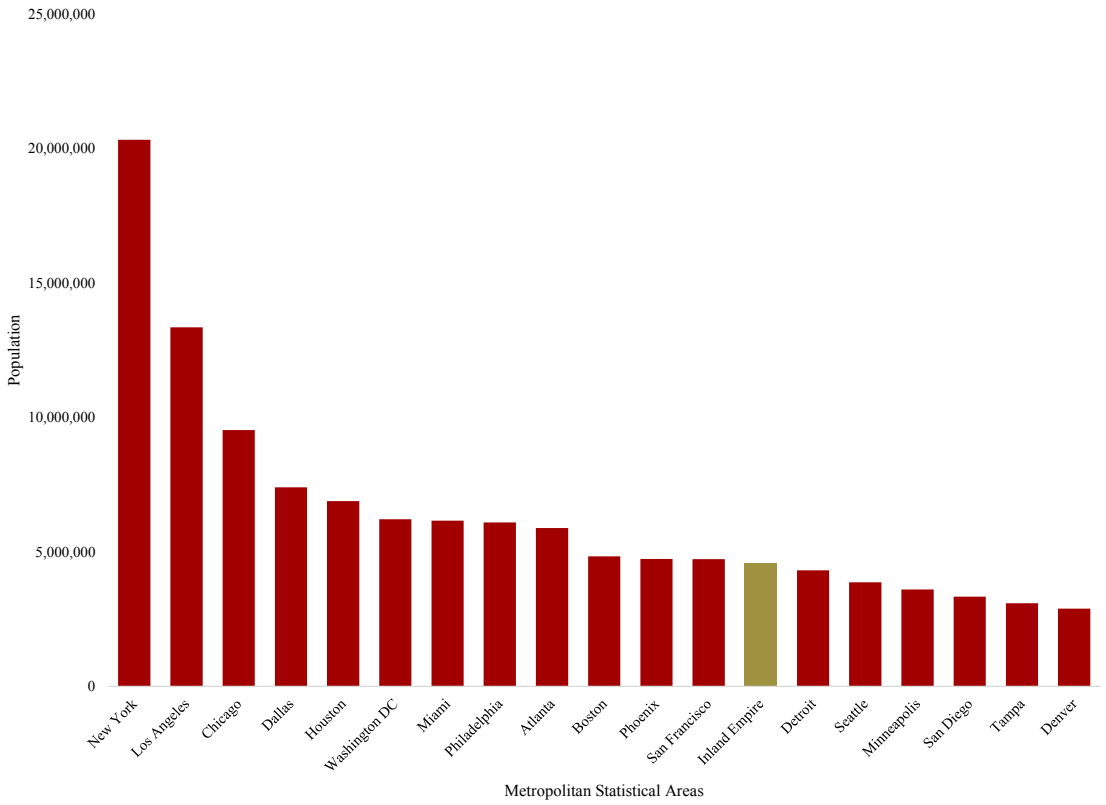
Figure 14: "Recession," Google Trends, 2001 M1 - 2019 M2

The Comparative Economic Performance of the Inland Empire

It is difficult to talk about the Inland Empire (Riverside-San Bernardino-Ontario Metropolitan Statistical Area (MSA), or Riverside and San Bernardino County) without being aware of the interconnectedness of some of its industries both to the Greater Los Angeles area (Los Angeles-Long Beach-Santa Ana MSA or Los Angeles and Orange County) and the national economy. The proximity of San Diego County on the I-15 going south is less important unless you live in South-East Riverside County corridor. Two major industries of the Inland Empire are heavily influenced by national economic developments: logistics, including wholesale trade, and leisure and hospitality, and especially the hotel sector. Hence it is very important to keep an eye on national economic developments, and that is indeed what the first part of this report stressed.

Output, Population, and Standard of Living

Figure 15: Population, Metropolitan Statistical Areas, 2018



What else do you have to know when you start to talk about the Inland Empire? Here are some facts that some of you may find obvious, while others may be surprised by the sheer numbers: the U.S. has 391 MSAs and ranking them by population, the Inland Empire is in 14th place with just under 4.6 Million people. Within California, it is the 3rd most populous MSA, ranked behind Greater Los Angeles and San Francisco-Oakland-Hayward (with slightly less than 150,000 more residents than the IE). In addition, the Inland Empire is placed higher in the order than the San Diego MSA (4th in California, 18th in the U.S.). Roughly 17% of all Californians live in the Inland Empire. Both Coachella Valley and Victor Valley have over 400,000 inhabitants. Housing affordability has played a major role in the net in-migration of people.

The point is, there are a lot of people living in the area. Figure 15 represents the relative populations of the 19 largest U.S. MSAs.

The second distinguishing and outstanding fact is that many of the residents commute to the Greater Los Angeles area (85% of commuters, and, to a lesser extent, 15%, to San Diego County). The total numbers are staggering: 20%, or every fifth person, of the labor force has to travel daily into the more coastal areas. This explains the traffic you experience on the I-10, I-210, the I-15, the CA-90, etc. When we have to attend a meeting at UCLA's Anderson Forecast at 9:30 in the morning, we have to leave Claremont at 6:30 to make it in time. Departing at 7:00 almost guarantees for you to be late (it also helps not having to drive by yourself…). Traffic is not only the middle name of Los Angeles, but also that of the Inland Empire. Table 4 presents some of the more staggering commuting times, such as going from Upland into Downtown L.A.: the two times 37 mile round trip on a Thursday can take a staggering 4½ hours.

Table 4: Commuting Times For Selective Routes, Inland Empire

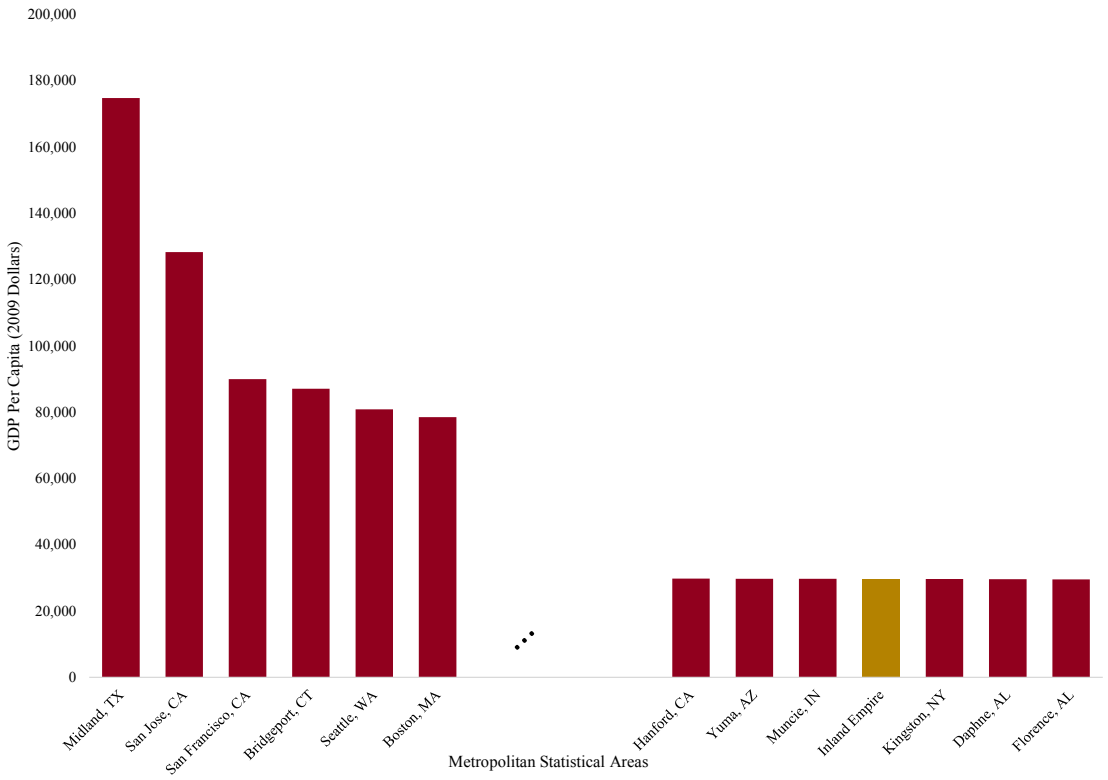
Start	End	Distance in Miles	7am Thursday	5pm Thursday	12pm Thursday
Moreno Valley	Anaheim	47	2:00	2:20	1:00
Victorville	Rancho Cucamonga	45	0:55	1:05	0:45
Upland	Downtown LA	38	2:10	2:20	1:00
Colton	Azusa	41	1:15	1:40	0:50
Riverside	Pasadena	55	2:20	2:30	1:15
Corona	Escondido	67	2:00	2:00	1:10

So far, these numbers have been massive and somewhat hard to comprehend given the magnitude. However, economies are not just measured by population, but also on how much output/income they produce/generate. You can think of China, which has the largest population in the world, and while the Chinese produce a lot (it is now the second largest economy), the "wealth of a nation" is really calculated by how much income the average person has available to her/himself. It is by that measure that China does not rank very high. Meaning as an average person, you would prefer to live in Singapore, Hong Kong, or Norway rather than in mainland China.

When we divide the total value of goods and services produced by the population, we get the so-called per capita GDP. Here quite a different picture emerges (see Figure 16). Midland, Texas, an MSA with a large mining (oil) sector and capital-intensive production ranks highest (Midland, Texas), followed by Silicon Valley (San Jose-Santa Clara-Sunnyvale). No surprises there. Other tech-heavy places such as San Francisco and Seattle move up into the top 5. The Inland Empire now ranks a stunning low of 342; its rank actually improved by four positions from a year ago. This is an amazing drop from the previous picture. The Inland Empire is surrounded by places many of you have not heard of before (Yuman (AZ), Munie (IN), Kingston (NY), and Daphne (AL)).

How is this possible? Are we doing that poorly compared to other locations in the U.S.? Well, not really. GDP measures the output produced within a geographic area, but it does not include the GDP produced by its residents elsewhere. Take a person, call him Persunfred Keil, who lives in Upland, which is in the Inland Empire, but works in Claremont, the neighboring community in Los Angeles County. Whatever Keil produces in terms of value is counted as output for Los Angeles, but not for the Inland Empire. For that matter if Keil retired and was replaced by someone who lived in La Verne, say, neither GDP nor per capita GDP in the Inland Empire

Figure 16: Per Capita GDP, MSAs, in 2009 Dollars



would change at all. The bottom line is that GDP does not specify where the employees that produce the goods and services come from. Residents from outside of the area will commute to the Greater Los Angeles area with higher pay and better opportunities and work, and the "goods and services" they produced will not be counted for the area they live in.

As mentioned previously, around 20% of the Inland Empire labor force commutes everyday to the coastal areas for work. Clearly the coastal counties can provide higher pay and more valuable jobs for certain employees from the Inland Empire since no one commutes for fun. The contribution that these employees provide to output are not fully counted towards the GDP of the Inland Empire. Hence Figure 16 not only deflates the accounting per capita GDP of the Inland Empire, but it also does not properly reflect the real spending power of the Inland Empire residents.

While we cannot provide detailed statistics on this, we could perform some back of the envelope calculations here. For example, we could attribute either 20% of the Greater Los Angeles GDP towards the Inland Empire, or reduce the population of the Inland Empire by 20% of the labor force, and also have their families taken out of the Inland Empire population figures. Neither calculation is perfect but it will show us how sensitive the numbers are depending on the commuters.

The answer is that if you take 20% of the Greater Los Angeles GDP and add it to the GDP produced by the Inland Empire, then it catapults the Inland Empire back into the Top 20 of MSAs in the U.S. - all the way to position 12. This would clearly overstate its importance. On the other hand, if we take commuters and their families out of the Inland Empire population, then it would improve its rank only to position 214 - an improvement from the low rank of 342 in Figure 16, but not as much as what we get when we using the GDP calculation. The true figure lies somewhere in between.

Based on this analysis, we can state the obvious: policy makers should try to create a business environment in the Inland Empire that would make it less attractive for 20% of its labor force to commute west (or south) - meaning they should implement policies that would create more value-added and high paying jobs for its residents. Not only would this raise the output produced in the Inland Empire, but it would allow residents to avoid some of these truly atrocious commuting times on the major freeways or long train rides.

Employment Trends

We already talked about the relative performance of the Inland Empire unemployment rate and and its level of employment since the beginning of the Great Recession (see Figures 12 and 13 above). The unemployment rates for the nation, the state, and the region all seem to indicate that we either have reached full employment or that we are very close to it. As a result, there is some concern how we can generate additional output growth over the next few years, since it will require either increases in employment and/or growth in labor productivity. Employment, of course, will grow with an increase in the population, but the relevant population (18 - 65-year olds) only grows at less than 1% currently.

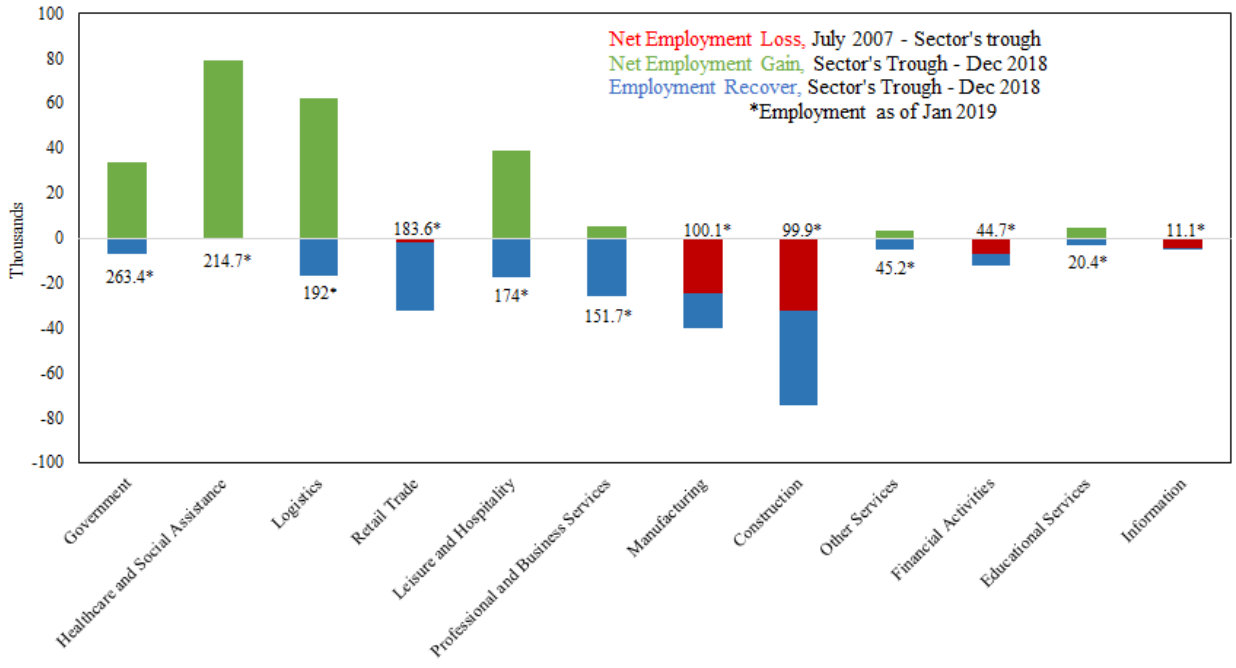
We are not going to display employment to population ratios for the U.S. and the Inland Empire here, but would like to point

out that we are very close to the pre-Great Recession peaks if we looked at 25 to 54-year olds (using 18 and above would be misleading due to demographic changes caused by the post World War II baby boomers, who have started to retire). However, there was a significant drop in the employment to population ratio from the 2000 peak, and we therefore still feel that there are workers out there who can be enticed to re-join the labor force.

Perhaps more interesting is an analysis of how the labor force composition has changed since the Great Recession, both for the Inland Empire and elsewhere. Figure 13 above showed that the nation, the state, and the region basically had recovered all jobs lost by late 2014. Nevermind the fact that this was one of the slowest recoveries for the post World War II period. However, this analysis does not imply that all jobs lost were recovered since there is always the possibility that certain sectors outperformed others. As a result, the quality of jobs may not be as good as it was prior to the Great Recession. Figure 17 looks at this possibility.

Figure 17 only appears to be complicated at first. Employment sectors for the Inland Empire are organized by employment size for starters, with the number of employees declining from left to right. For instance, there were approximately 263,400 workers employed in the Government sector in January 2019. Next we plotted employment losses from the peak employment prior to the onset of the recession to the subsequent trough, followed by the recovery to this day.

Figure 17: Employment Losses and Subsequent Gains, Inland Empire
2007 M7 - 2019 M1



Several facts stand out:

1. Manufacturing and Construction were the most severely affected sectors ("mancession"). Between the two industries, a massive number of jobs were lost. To this day, the Inland Empire has not seen a full recovery in these sectors. The construction seemed to have shown some improvement over the last few years, but the sector suffered a setback during the last half of 2018 as mortgage rates increased.
2. Healthcare and Social Assistance never lost any jobs throughout the recession. Indeed, that sector added the most number of employees. We see Obamacare as the primary driver of this expansion. Regardless of how you feel about this policy, total employment in the Inland Empire (and the state and nation as we will see later) would have been significantly less during the recovery.
3. Logistics experienced job losses initially. This is not surprising since the industry primarily depends on imports (40% of all U.S. imports come through the Ports of Los Angeles and Long Beach). U.S. income drives imports to a large extent and hence we saw a large decline in employment initially during the Great Recession. However, the numbers rebounded as soon as the national economy recovered and the U.S. economy showed further appetite for imports. Logistics is the most sensitive sector with regards to national trends in income and output. Note that logistics includes wholesale trade. Amazon has become the largest employer in the Inland Empire and their warehousing is contributing to the gain in jobs.
4. Leisure and Hospitality generated the third largest increase in employment. As households lost income during the recession both locally and in the rest of the state/nation, there was less disposable income to spend on hotel stays and restaurant visits. However, the industry recovered fairly quickly when the national/state economy turned up, and this sector has become a major force in employment generation for the Inland Empire.
5. Financial Activities (FIRE) is still below employment levels seen before the Great Recession. However, the sector is relatively unimportant in terms of total employment numbers in the Inland Empire.
6. Higher paying jobs, such as Professional and Business services, have barely recovered and shown some marginal growth.

The graph indicates that high paying jobs were replaced by lower paying jobs throughout the recession. Hence it is not surprising to see that while employment has exceeded pre-recession levels, GDP and per capita GDP for the Inland Empire have not: High value-added jobs have been replaced by low value-added employment. Take the Construction and Manufacturing sectors for example. We have identified significant decrease in relatively well paying jobs, e.g. carpenters, and these losses were only partially recovered by the increase in lower paying jobs in other sectors, such as home care worker in the Healthcare and Social Assistance sector or as parking valet attendance in the Leisure and Hospitality sector. This tells us that laid off employees previously working in higher paying sectors were only able to find new lesser paying jobs.

Figures 18 and 19 show the same change in sectoral composition, but now we focus on the state and the nation. There are significant differences here. Similar to the Inland Empire, California and the U.S. experienced the largest declines in Manufacturing and Construction; you could add to this the employment decline in Professional and Business Services. Similar

Figure 18: Employment Losses and Subsequent Gains, California
2007 M7 - 2019 M1

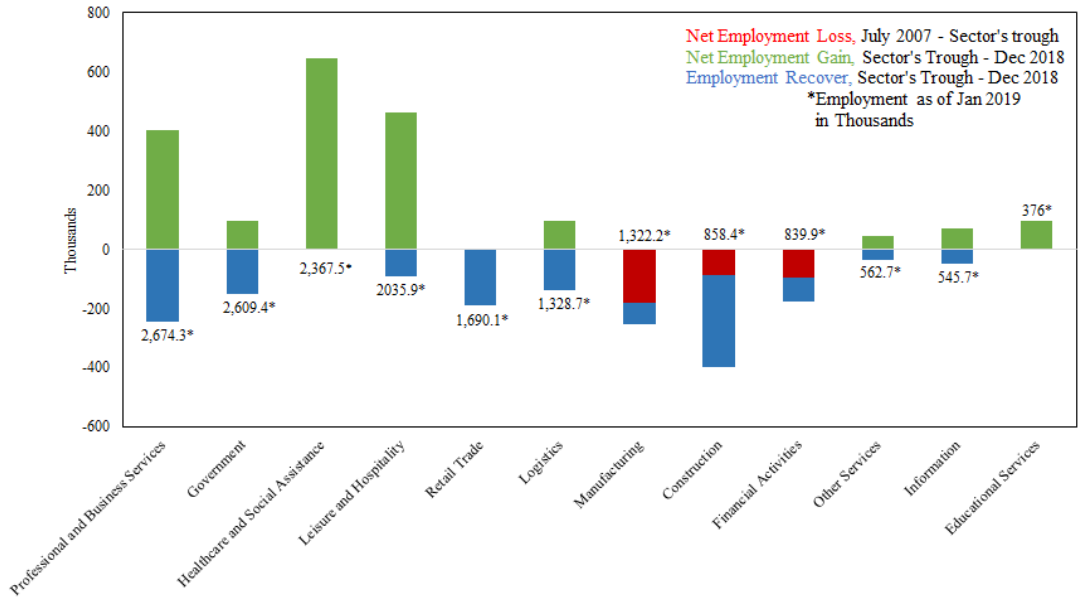
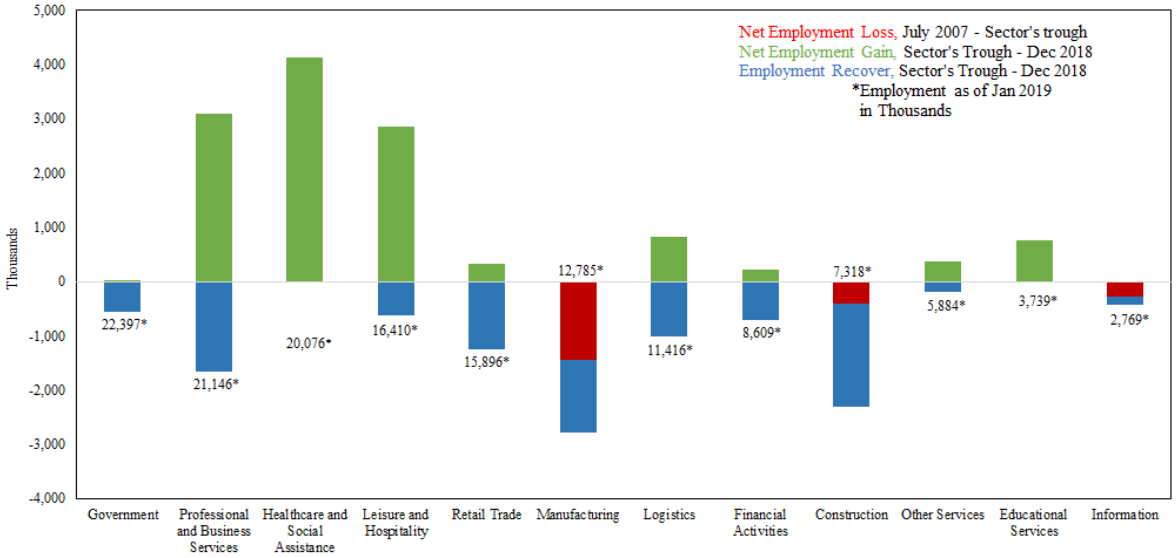


Figure 19: Employment Losses and Subsequent Gains, United States
2007 M7 - 2019 M1



to the Inland Empire, the recovery saw large gains in Healthcare and Social Assistance, and Leisure and Hospitality. But here comes the most significant difference: Professional and Business Services became a driving force during the recovery both for the state and for the nation. The percentage of job gains in Professional and Business Services in California and in the United States clearly outweighs the percentage of jobs lost initially in this sector. This is the missing component from the recovery in the Inland Empire. These are relatively high paying jobs in this sector, and as a result, GDP both in California and

in the U.S. grew faster in those areas when compared to the Inland Empire.

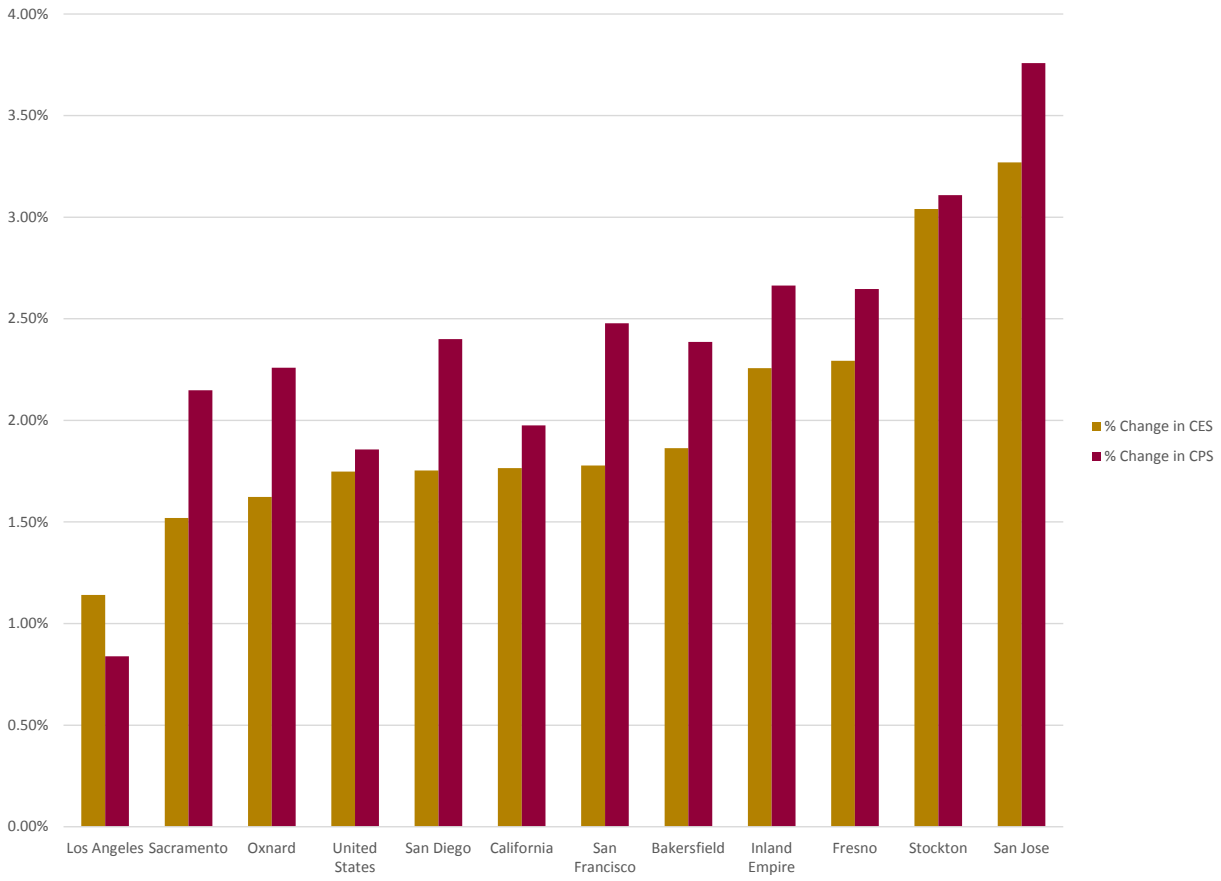
What has happened in the Inland Empire employment market more recently, that is over the last year? Remember the "FILO" classification: while the Inland Empire was one of the first MSAs to take a dive in 2007 (perhaps as early as mid-2006), it was also one of the last ones to recover. But jobs were fully recovered in late 2014. Subsequently employment growth in the Inland Empire has outpaced that of the state and the nation. What about the current situation? Are there any signs of an iceberg (recession) in the fog bank (looking into the future)?

Figure 20 looks at the employment changes of the ten largest MSAs in California, and adds employment growth for the state and the nation for comparison. Regardless of whether you use the establishment survey (CES) or the household survey (CPS), the Inland Empire still appears as one of the regions with a strong employment performance. Recall that the household based survey includes commuters. It is also interesting to see the Stockton-Lodi MSA in second place, since it comes closest to resembling the Inland Empire in Northern California. Almost 20% of its labor force commutes into the San Francisco MSA despite the relatively long distances - however, the Stockton-Lodi MSA is significantly smaller by comparison.

The take-away from Figure 20 is the Inland Empire has seen strong employment growth of roughly 2.5% when compared to a year ago. While it is no longer the top performer, as it was a year ago when employment grew by over 3%, it certainly has done better than both the state and the nation as a whole.

Economic development has of course

Figure 20: Percent Change in Employment, California, 10 Most Populous MSA
2017 M12 - 2018 M12



not been uniform across all sectors. Figure 21 shows the details. There are four sectors that generated almost all the employment growth over the year: Government, Logistics (including wholesale trade), Leisure and Hospitality, and Health (separated out from Health and Education). What is of concern here is the continued slow growth of business and professional services, and the renewed decline in construction. The latter was the strongest performing sector a year ago, and there was talk about finally returning to employment levels seen in the pre-Great Recession period. This hope clearly has not materialized and the development coincides with other concerns for this vital industry in the Inland Empire (more on this below). The continued small growth in Manufacturing is encouraging.

Instead of giving you a detailed month-by-month picture of sectoral employment changes since the start of the Great Recession, we will focus here on a few strategic sectors. To us, the most interesting sector to observe over the last year is construction.

Figure 21: Contribution to Total Employment Growth by Sector, Inland Empire
2017 M12 - 2018 M12

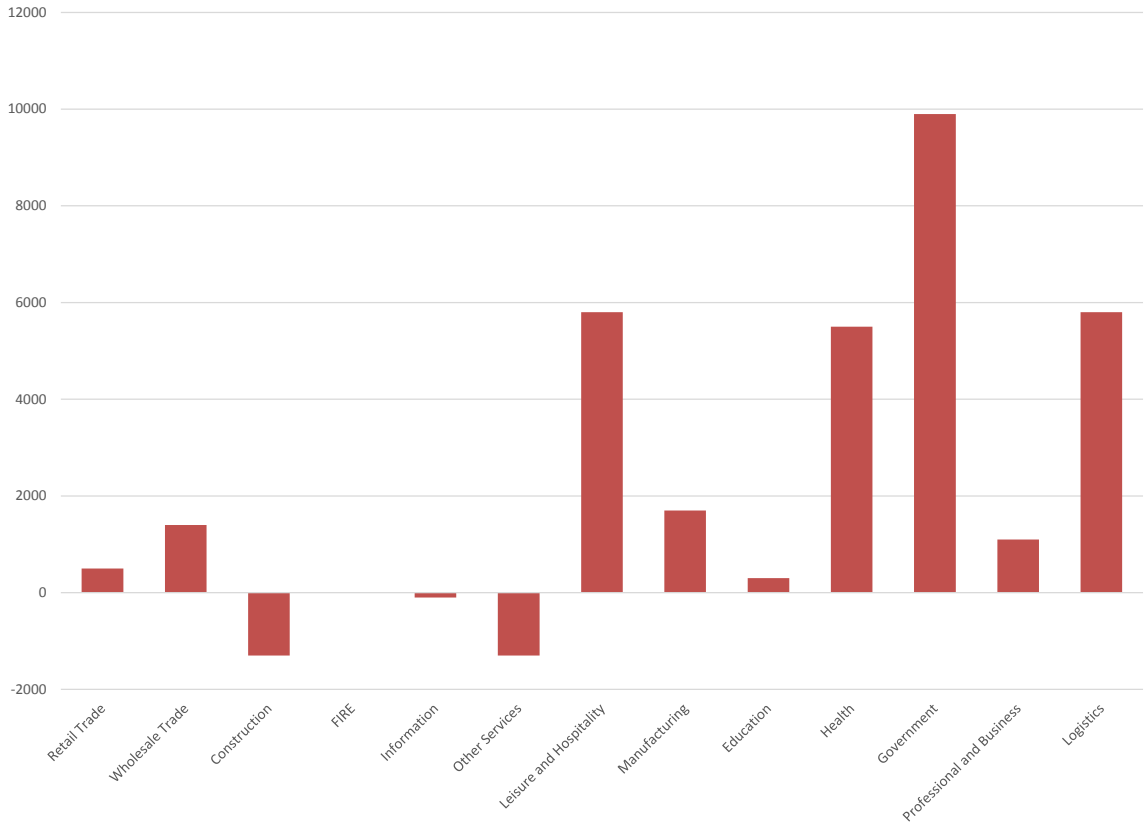
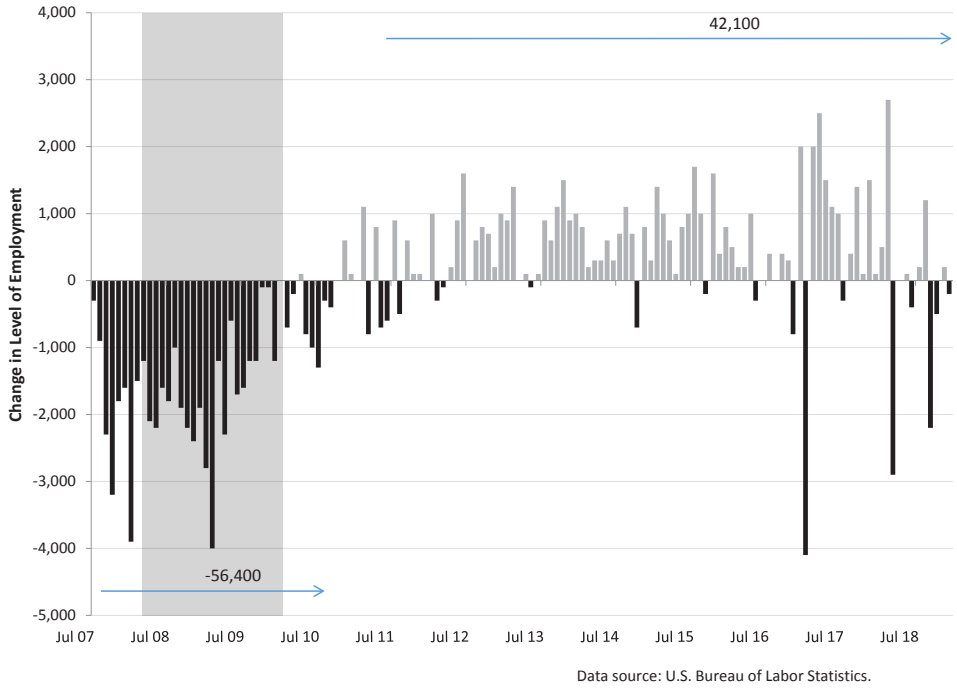


Figure 22 shows the by now most familiar past monthly employment patterns of the construction industry: the epic bloodletting throughout the Great Recession when the sector basically shed clase 60,000 jobs: not even manufacturing came close in magnitude to these kind of losses. This was followed by a steady and gradual recovery through 2016. With the exception of one month, 2017 saw an accelerated job growth in construction until mid 2018, when the job market in construction took a turn for the worse. This could be seen in Figure 21, but is more visible here. In the housing report, we will blame a decrease in demand on increases in mortgage rates during the second half of 2018.

As with the various other signals, this is not something to panic about, especially

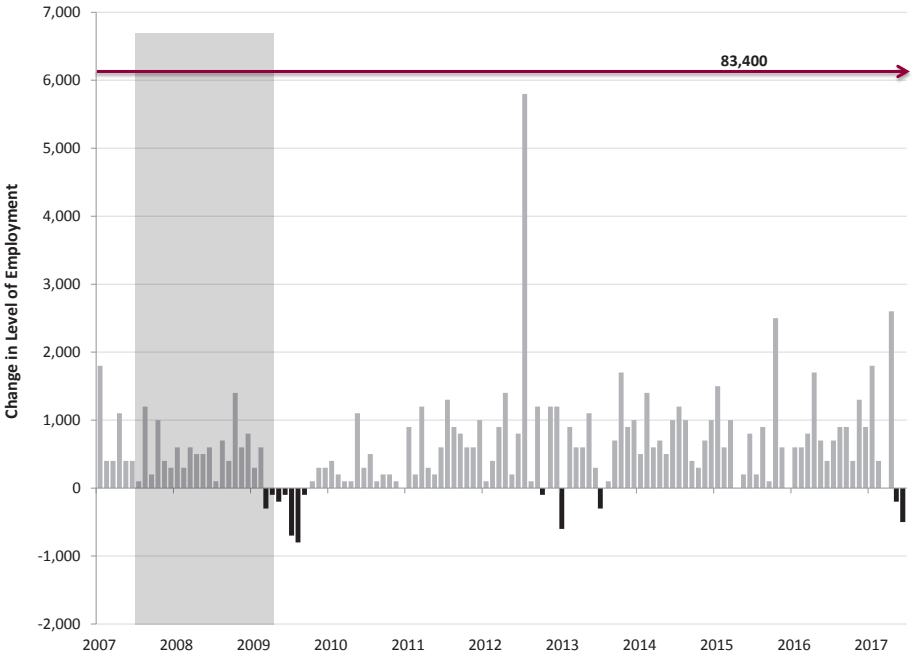
since other sectors, especially Health Care and Social Assistance (Figure 23), and Leisure and Hospitality (Figure 24), continue to grow at a healthy clip; but it is something to keep an eye on.

Figure 22: Construction Employment, Inland Empire
2007 M7 - 2018 M12



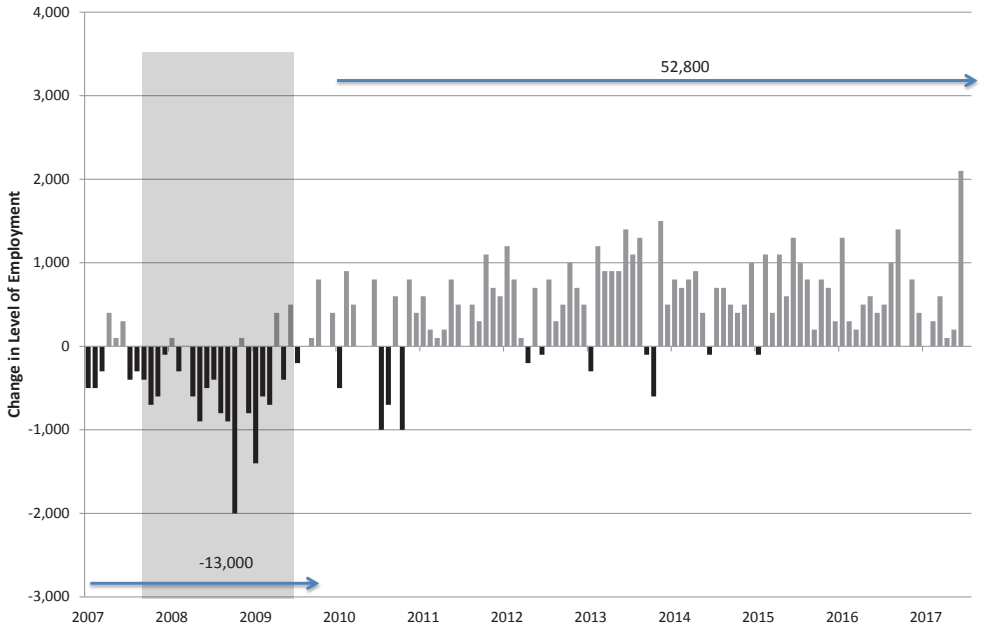
Data source: U.S. Bureau of Labor Statistics.

Figure 23: Health Care and Social Assistance Employment, Inland Empire
2007 M7 - 2018 M12



Data Source: Federal Reserve of Economic Data.

Figure 24: Leisure and Hospitality Employment, Inland Empire, 2007 M7 - 2018 M12



Data source: Federal Reserve Economic Data

Employment, Take 2

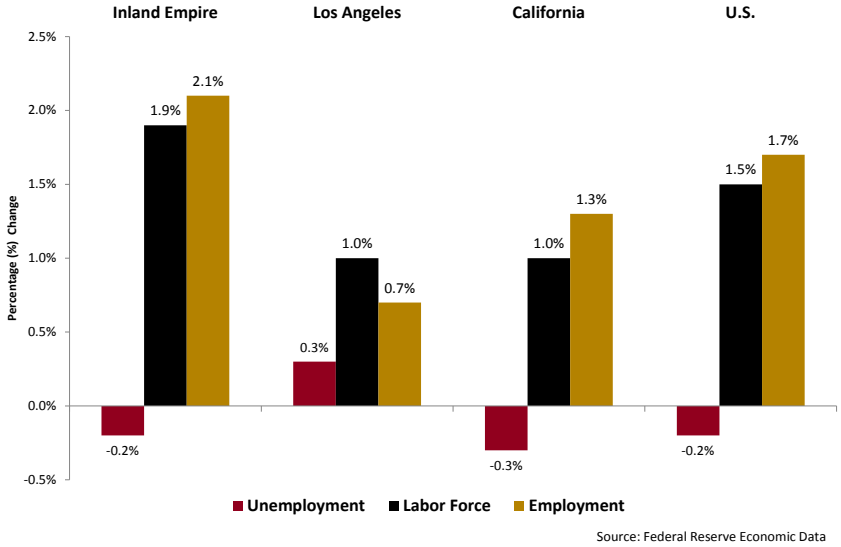
Having seen relatively strong employment growth over the last year, what are the implications for the unemployment rate? We can see the long run picture in Figure 12 above, but let's zoom in on the development over the last year. Figure 25 indicates that not much has changed in terms of the unemployment rate from a year ago in the four areas (Inland Empire, Greater Los Angeles, California, U.S.). This is not surprising since we have been at full employment for a year by now.

However, the unemployment rate will change either as as a result of changes either in employment or in the labor force. The employment part is intuitive. However, if there is an increase in discouraged workers, and therefore a decrease in the labor force (people give up looking for jobs), then then unemployment rate will shrink too. A healthy drop in the unemployment rate is the result of an increase in employment coinciding with an increase in the labor force. Looking at the change in the unemployment rate from this perspective, the Inland Empire has done better than all other regions considered in the graph.

Figure 26 repeats the analysis for all MSAs in California. The unemployment rate in the area will fall if the bubble-point is below the 45-degree line (meaning employment is growing faster than the labor force). We have drawn the bubbles in size according to the importance of the respective labor markets as measured by the size of their labor force (except for California as a whole and the U.S.). In general, the further to the north-east corner the bubble is located, the better performing the area. Once again, by this measure, the Inland Empire is doing well.

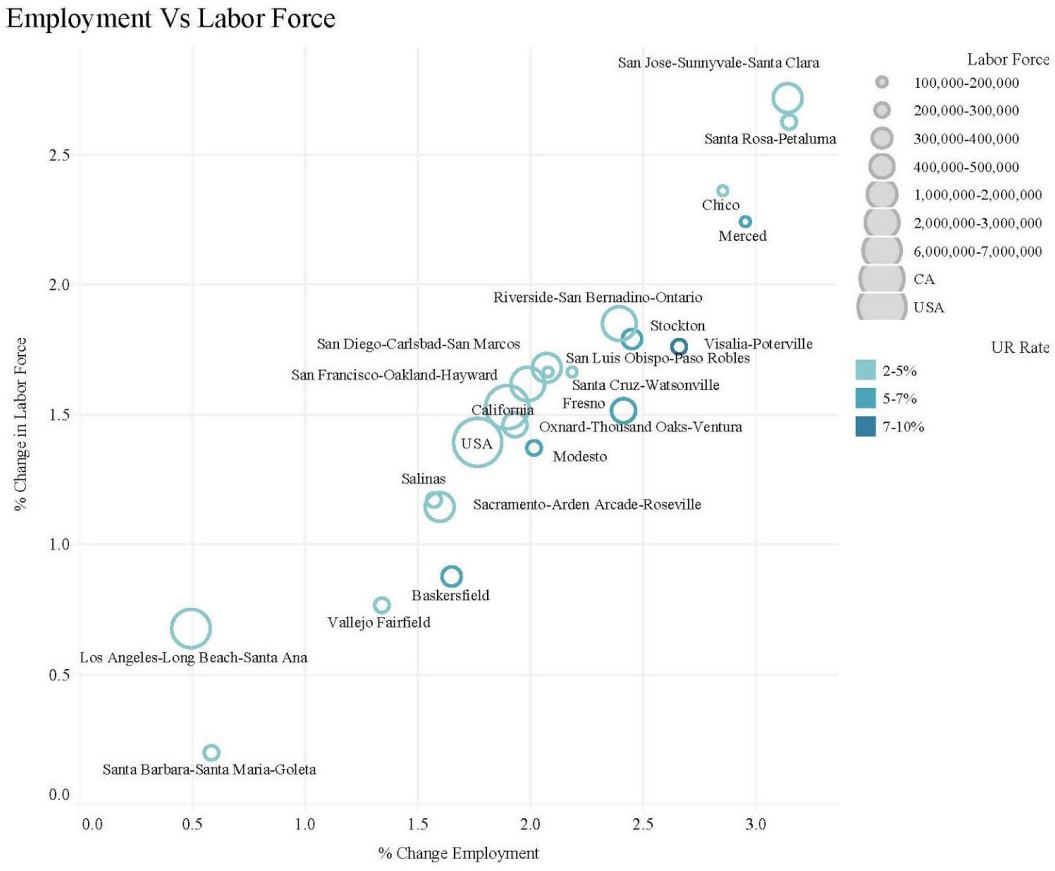
Figure 27 shows the relative performance of the Inland Empire from a different angle, namely by looking at all county unemployment rates. The Employment Development Department (EDD) provides a statewide map of county unemployment rates in five shades of blue. The darker the shade, the higher the unemployment rate. Imperial County has the

Figure 25: Percentage Chance in the Unemployment Rate and its Decomposition, Inland Empire, Greater Los Angeles, California, U.S., 2017 M12 - 2018 M12



Source: Federal Reserve Economic Data

Figure 26: Percentage Chance in the Unemployment Rate and its Decomposition, All MSAs in California, 2017 M10 - 2018 M10



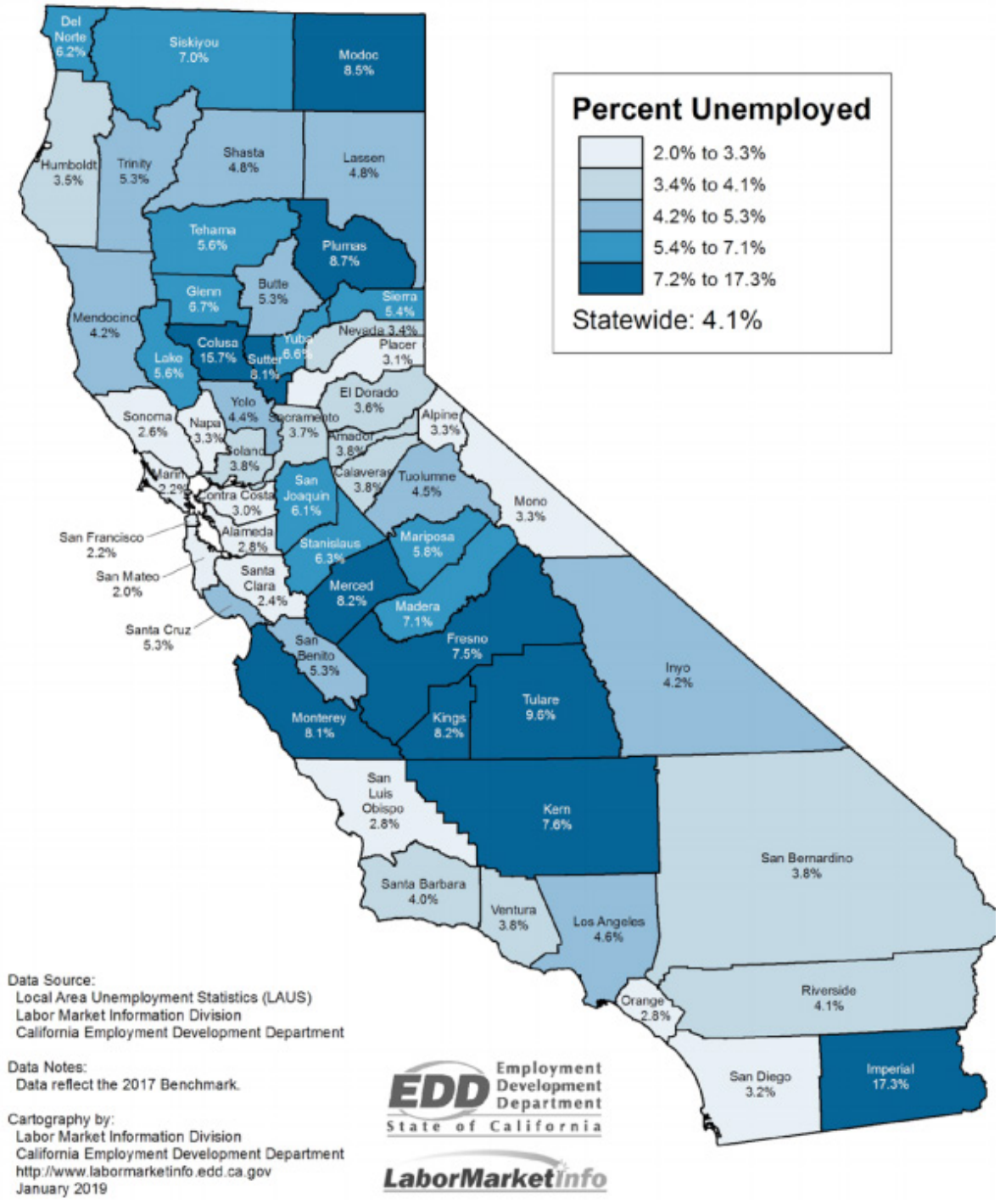
% Change Employment as an attribute vs. % Change in Labor Force as an attribute. Color shows details about UR Rate. Size shows details about Labor Force. The marks are labeled by MSA. The data is filtered on Change in Employment as an attribute, which keeps non-Null values only. The view is filtered on Labor Force, which excludes Null.

highest unemployment rate and it is actually the only county in the Southern part of the state that saw its unemployment rate increased from a year ago.

Both San Bernardino and Riverside County saw their unemployment rates drop from a year ago. With the exception of a few coastal countries, the Inland Empire continues to display one of the lowest unemployment rates across the state.

Finally, Table 5 lists the city unemployments rates in the Inland Empire with a population of

Figure 27: County Unemployment Rates, California
2018 M12



over 25,000. You note than many of the cities with the lowest unemployment rates, such as Redlands, Chino Hills, Upland, Temecula, and Rancho Cucamonga, are situated in the Western parts of the MSA, or in the south of Riverside County. However, there are others, such as La Quinta, Palm Desert, and Beaumont, that are quite some distance to the East of the Inland Empire.

Table 5: Unemployment Rates By City, Inland Empire, 2017

City Name	Abbreviation	Unemployment Rate
Adelanto	Adl	10.6%
Hemet	Hem	9.2%
Twentynine Palms	TwP	8.3%
Coachella	Coa	8.2%
Victorville	Vic	7.1%
Perris	Per	6.7%
Banning	Ban	6.6%
San Bernardino	SBD	6.4%
Rialto	Rlt	6.3%
Hesperia	Hes	6.2%
San Jacinto	SJa	6.2%
Lake Elsinore	Lel	6.0%
Jurupa Valley	JrV	5.9%
Apple Valley	Aplv	5.8%
Moreno Valley	MrV	5.7%
Wildomar	Wil	5.6%
Indio	Ind	5.5%
Desert Hot Springs	DHS	5.4%
Menifee	Mef	5.2%
Highland	Hgh	5.1%
Riverside	Riv	5.1%
Murrieta	Mur	5.0%
Palm Springs	Psp	5.0%
Cathedral City	Cat	4.5%
Fontana	Fon	4.5%
Eastvale City	EaC	4.4%
Colton	Col	4.3%
La Quinta	LaQ	4.3%
Montclair	Mcl	4.1%
Ontario	Ont	4.1%
Chino	Chi	4.0%
Yucaipa	Yuc	4.0%
Norco	Nor	3.9%

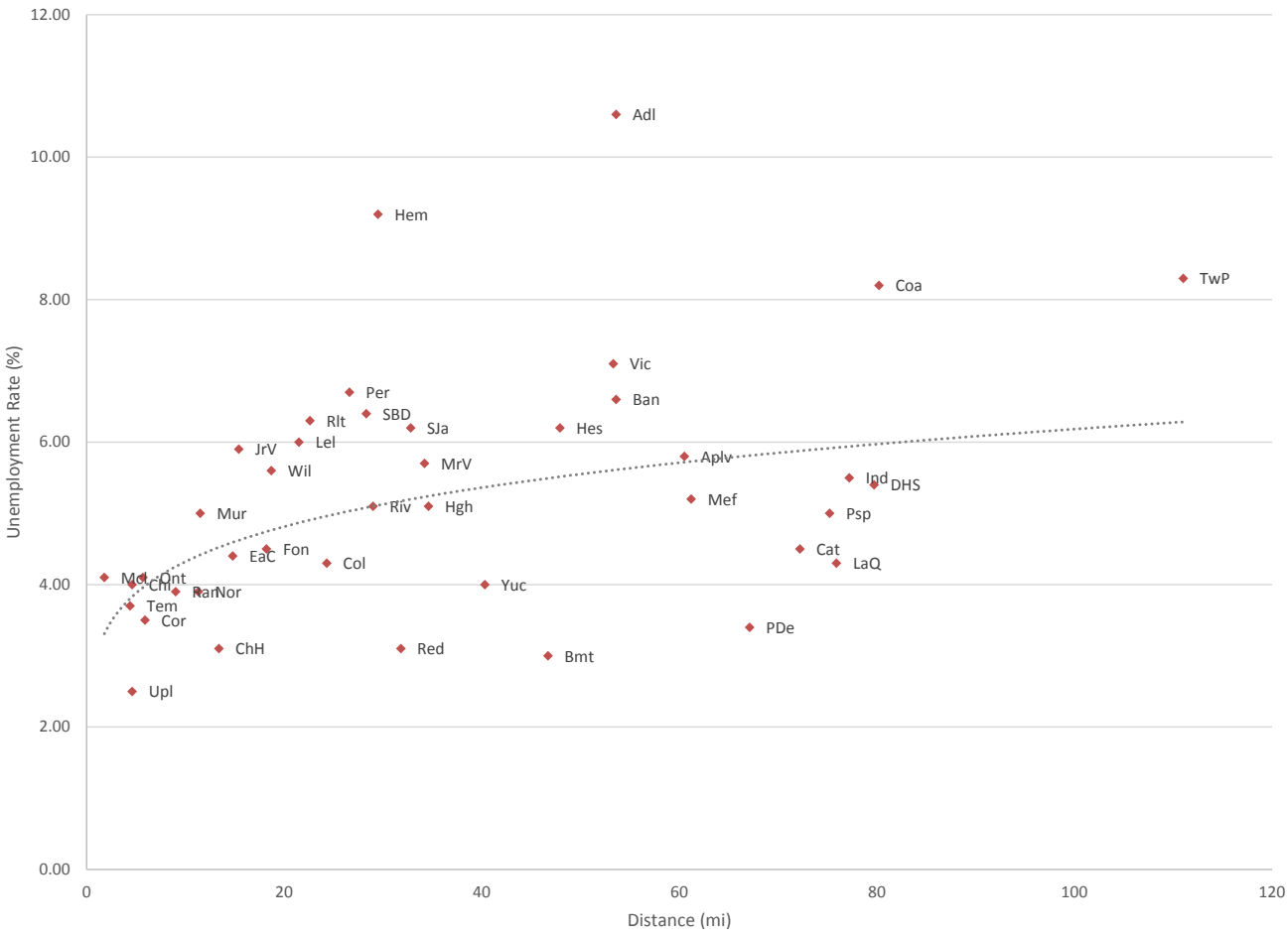
Table 5: (Continued)

City Name	Abbreviation	Unemployment Rate
Rancho Cucamonga	Ran	3.9%
Temecula	Tem	3.7%
Corona	Cor	3.5%
Palm Desert	PDe	3.4%
Chino Hills	ChH	3.1%
Redlands	Red	3.1%
Beaumont	Bmt	3.0%
Upland	Upl	2.5%

In analyzing city unemployment rate differences, we find that there are two major determinants: (i) distance to the nearest county line if that county is within reasonable driving range (not more than 50 miles away), and (ii) a measure of human capital, basically the high school graduation rate but also taking into account higher education levels of the residents.

Figure 28 shows the geographic relationship: Murrieta, for example, has a lower unemployment

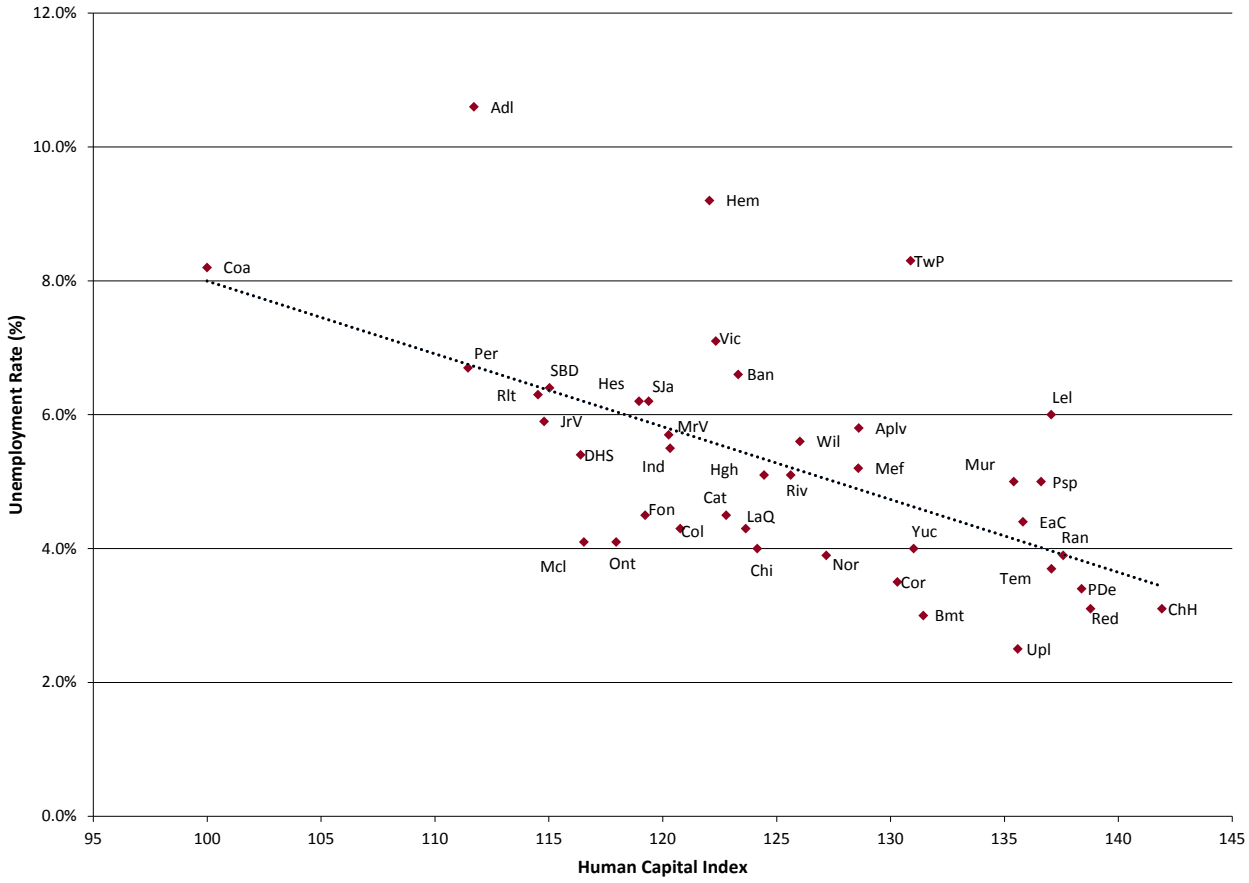
Figure 28: City Unemployment Rates, Distance to Greater Los Angeles or San Diego County Line, Inland Empire, 2017



rate than Moreno Valley because it is closer to the Los Angeles County line. Geography cannot be the only explanation since Redlands, for example, has a lower unemployment rate than Ontario. This is where the second factor comes into play, education levels.

Figure 29 shows that, controlling for the distance to the nearest county line, education levels play a major role when it comes to explaining unemployment rate differences between the major cities in the Inland Empire. For example, Chino Hills and Murrieta have significantly lower unemployment rates than Adelanto and the City of Coachella. In some ways, we are stating the obvious here: while cities cannot control their geography, they can certainly try to increase the level of education of the average resident, and by doing so, they will have a higher educated labor force which results in lower city unemployment rates.

Figure 29: City Unemployment Rates, Human Capital Index, Inland Empire, 2017

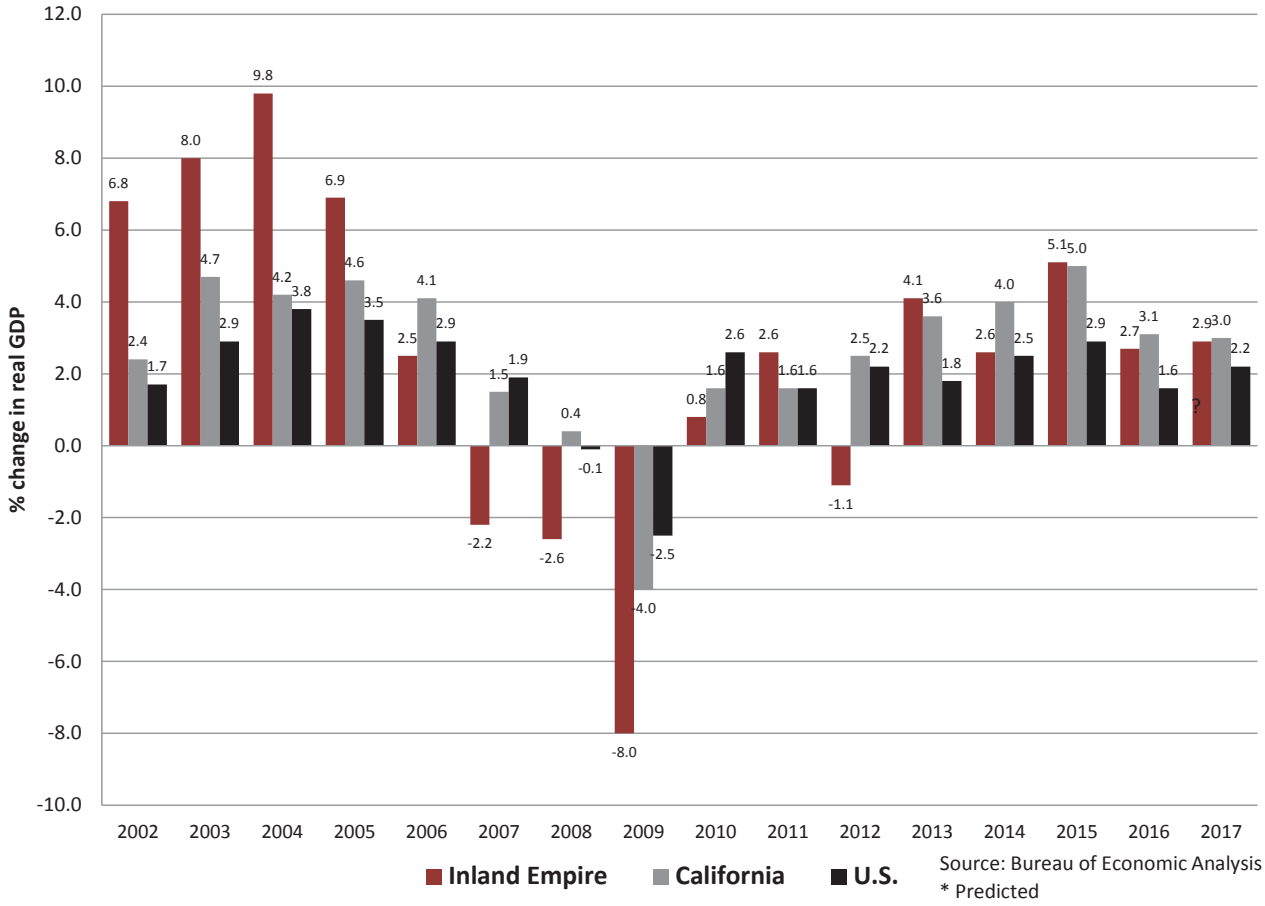


Output

There is often a difference between figures that generate headlines in the economics sections of newspapers and those that are the most comprehensive measures of economic performance but harder to understand. While unemployment rates make headlines, most economists prefer to study the real Gross Domestic Product (Real GDP). First, unemployment rates can be misleading when there are a large number of commuters, as is the case for the Inland Empire. More importantly, unemployment rates do not differentiate between the quality of jobs. Jobs in lower income sectors of the economy such as Leisure and Hospitality affect the unemployment rate in the same way as those in high paying Manufacturing or Construction sectors do. However, when people move from higher value-adding jobs to lower value-adding ones, the average value of goods and services produced in the region falls. This trend is exactly what we noted for the Inland Empire since 2006, at the peak of the previous business cycle.

Figure 30 shows the growth rates of inflation adjusted ("real") GDP for the Inland Empire, California, and the U.S. since 2001, when this type of measure first became available by MSA. Note that GDP only measures goods and services produced within the Inland Empire, but not the output produced by its commuters elsewhere.

Figure 30: Real GDP Growth Rates, U.S., California, and Inland Empire, 2002- 2017

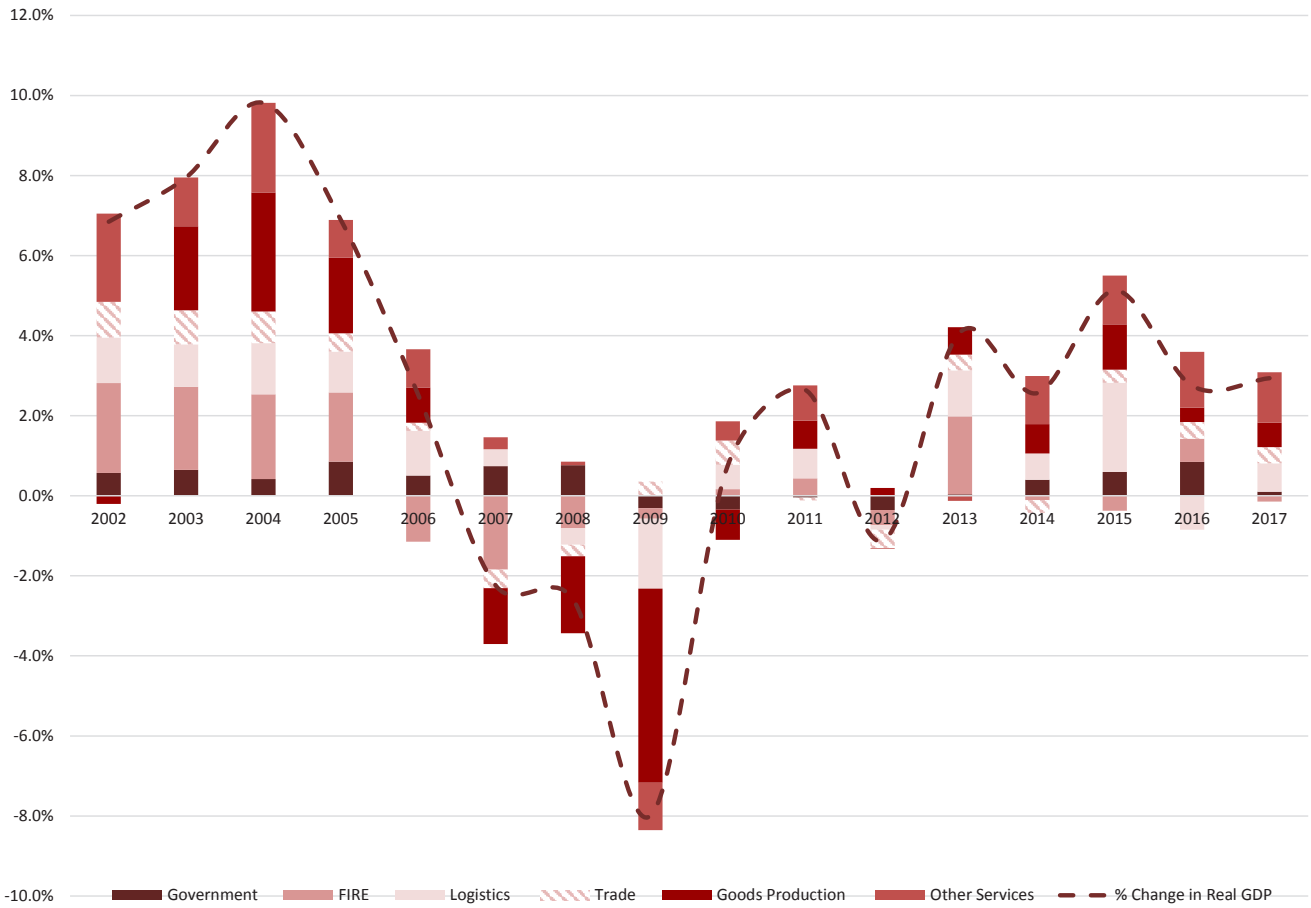


You can clearly see that between 2002 and 2005, economic performance of the Inland Empire far outstripped that of the state and the U.S. However, the Great Recession hit the Inland Empire earlier and harder than California and the U.S. The Inland Empire staggered from a body blow to its booming industries, primarily construction. Real GDP fell for three consecutive years from 2007 to 2009. Since the recession, the Inland Empire has grown erratically, especially between 2010 and 2014. More recently, the Inland Empire has performed better than the U.S. but growth rates have somewhat tended to mirror that of California. Data for 2018 will not be available until fall 2019 but our forecast indicates that economic growth in the Inland Empire will continue on its current trend.

We can see a shift in what industries are important to the Inland Empire by studying Figure 31. During the earlier parts of the century, GDP was driven by the high paying sectors of manufacturing and construction, along with retail and wholesale trade. During the Great Recession, jobs in construction and manufacturing evaporated from the Inland Empire, which led to most of the collapse in its economic performance. During the recovery, Goods Production remained fairly weak, growing significantly only in 2014 and 2015. Instead, the engines of growth post 2010 were Logistics and other services, here including Leisure and Hospitality, and Health. In 2016, there was a boost in growth from the government sector, but this has evaporated in 2017 data.

Sadly, Figures 30 and 31 provide an overly optimistic view of economic growth in the region, unrelated to commuting. The population of the

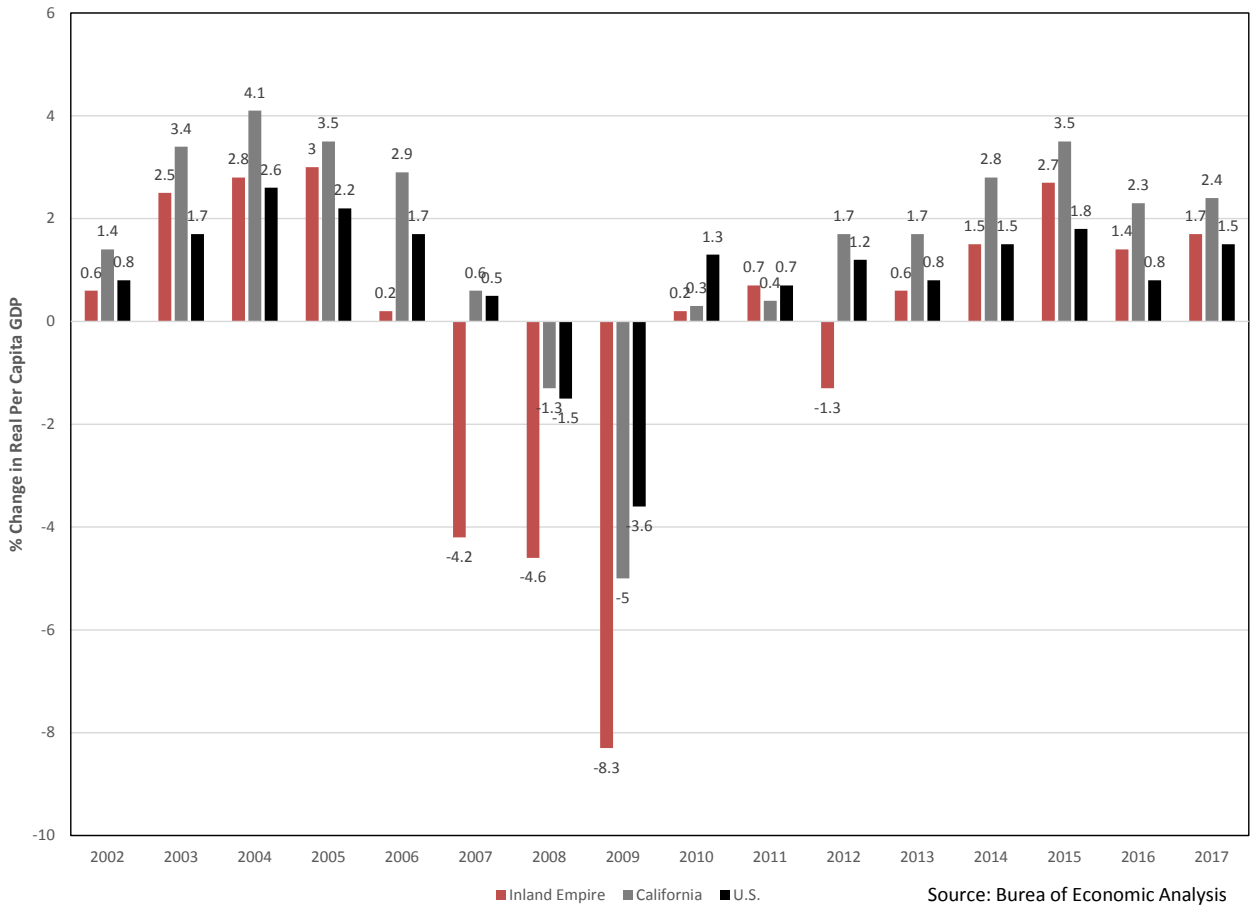
Figure 31: GDP Contribution by Industry, Inland Empire, 2002 - 2017



Inland Empire was expanding rapidly in the early 2000s. As the size of a population rises, its real GDP rises as well as more people tend to produce more goods and services. GDPs per capita, or per person, is a superior indicator of prosperity. In order to properly understand the actual economic performance of the Inland Empire, we must control for changes in population. The U.S. population grows by approximately 1% every year but this is not true for California and the Inland Empire, for which population growth rates can vary significantly. Figure 32 shows the performance of the three regions using real GDP per capita figures. For the Inland Empire, per capita growth in the early 2000s remains high but less remarkable than in the previous figure, while the numbers for the Great Recession indicate an alarming decline. 2006 registers almost no growth for the area, even though the rest of the country was still booming. We know that that employment in the Inland Empire peaked in the summer of 2007 but that employment in construction had peaked a year earlier. The Lowe Institute Dating Committee has determined that the local economy had gone into a recession as early as the fall of 2006.

Given the low growth rates in the recovery years since 2009, it is important to ask whether the Inland Empire has reached its pre-recession levels of prosperity or whether the recession set the region back over a decade. Per capita growth in the Inland Empire only surpassed that of the U.S. in three of the last eight years. Figure 33 answers this question. For the national and state economy, the answer is a very clear yes. The U.S. economy surpassed its 2007

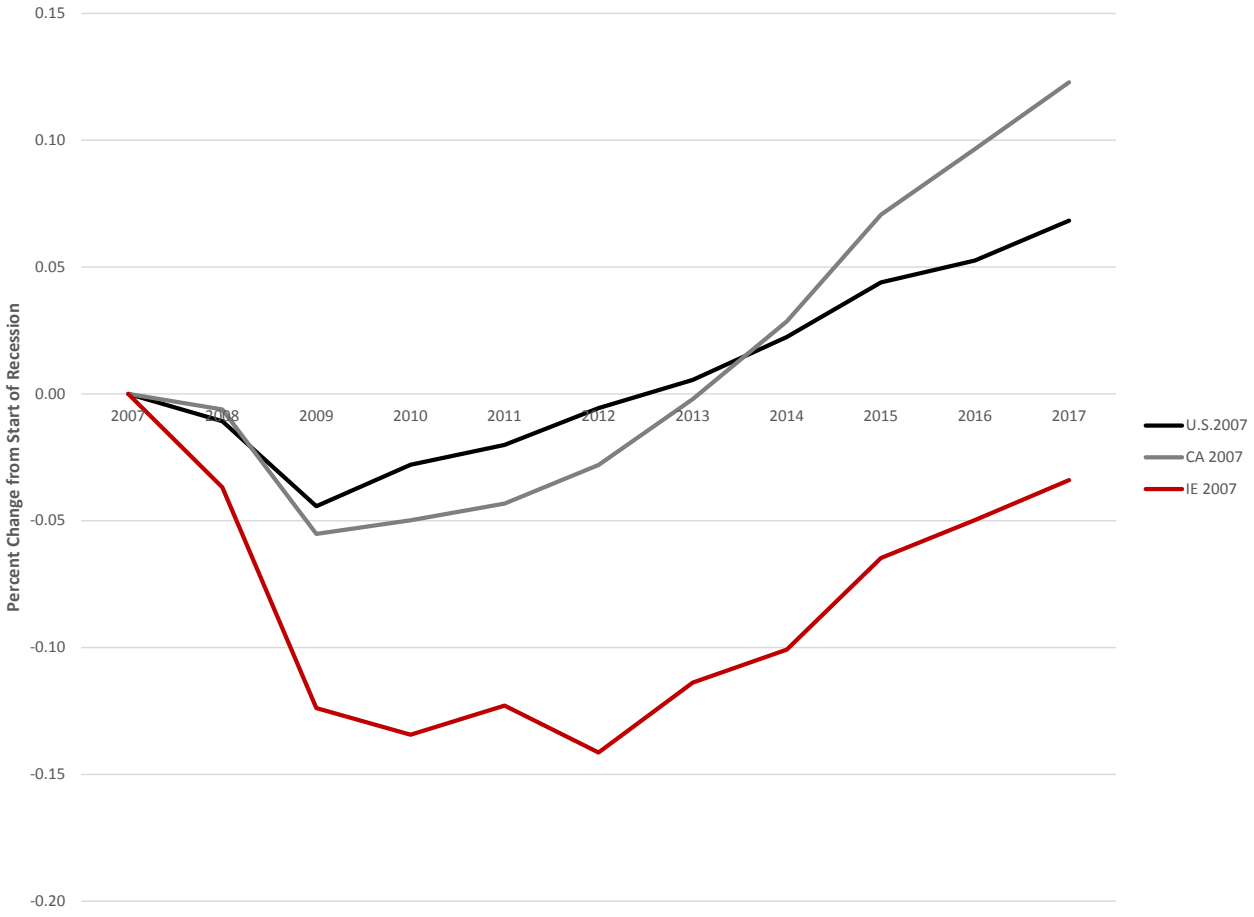
Figure 32: Per Capital Real GDP Growth Rates, U.S., California, Inland Empire, 2002 - 2017



Source: Burea of Economic Analysis

peak in late 2012 and California followed in 2013, and both did so before employment recovered in late 2014. The Inland Empire, however, remains below its pre-recession peak by over 3%. Despite seeing constant growth since 2012, the economy of the Inland Empire is expected to shrink this number to 1% by the end of 2018 and show an improvement only in 2019. The region suffered more than a lost decade, unlike the state and the nation.

Figure 33: Percentage Change in Per Capita Real GDP Since 2007, U.S., California, and Inland Empire



Housing Report

We complete our economic outlook with a report on housing in the Inland Empire

2018 Inland Housing Dynamic Dampens Recovery

In 2017, the Inland Empire housing market showed encouraging signals of emerging from its slumber. Unfortunately this trend did not continue into 2018, when there was at least a temporary setback. Specifically we see a slowdown in the pace of the transaction volume and also in general overall economic activity (as pointed out in the economic analysis of this report). We expect this phenomenon of a restrained housing recovery to continue over the next two years.

One fundamental problem is the rising cost of construction. Land prices for new home projects are relatively high. Add to this certain entitlement difficulties, high impact fees, and higher labor and other input costs, and this combination compels builders to move into higher price echelons, where there is less demand due to a lower percentage of households in higher income/wealth categories. Several builders have indicated to us that the new housing supply curve is non-existent below the $350,000 price point in the Inland Empire.

This situation is similar to the housing shortages in coastal Southern California counties. One way to measure the evolution of the housing market is to compare the change in the housing stock with the change in employment. If an area adds significantly more jobs than it does houses, then housing demand is likely outstripping housing supply. Many households include more than one worker, so a ratio between 1.2 and 1.5 new jobs per new house is considered "normal," without placing additional stress on the housing market. For 2018, the ratio of employment growth to housing growth in the Inland Empire stood at 3.4, a strong indication that supply is falling behind demand. Yet, inventories of existing homes, measured in months of housing supply, became less tight in January 2019 as sales declined last year. We see this primarily as a result of higher mortgage rates. At the same time, listings rose. Consequently, increases in home prices slowed last year. Current sales volume in the new housing market appears rather unimpressive, especially when you consider historical patterns. In 2018, both new ownership home sales and total housing permit activity were either well below or barely above the level experienced even in previous housing troughs since 1968.

For 2019, we forecast an increase in Inland Empire housing permits of almost 7% to 14,500 units from 13,600 in 2018. We see this growth resulting from a small shift towards multifamily housing permits, which will rise by 11%. At the same time, we predict that single-family permits will go up by slightly more than 5%.

Our forecasted increase in new housing permits and construction will result in an increase in employment in the construction industry. By 2018, jobs in this sector already reached levels higher than in 2008, although they continue to be 20.5% below the record level set in 2006. It is doubtful that employment in construction will re-attain the previous cycle peak levels during the next few years, even though the crash is over ten years past.

Here are some highlights of recent trends, which we believe support our forecast of a moderate housing construction improvement, and a mild shift towards multifamily permits and apartment buildings.

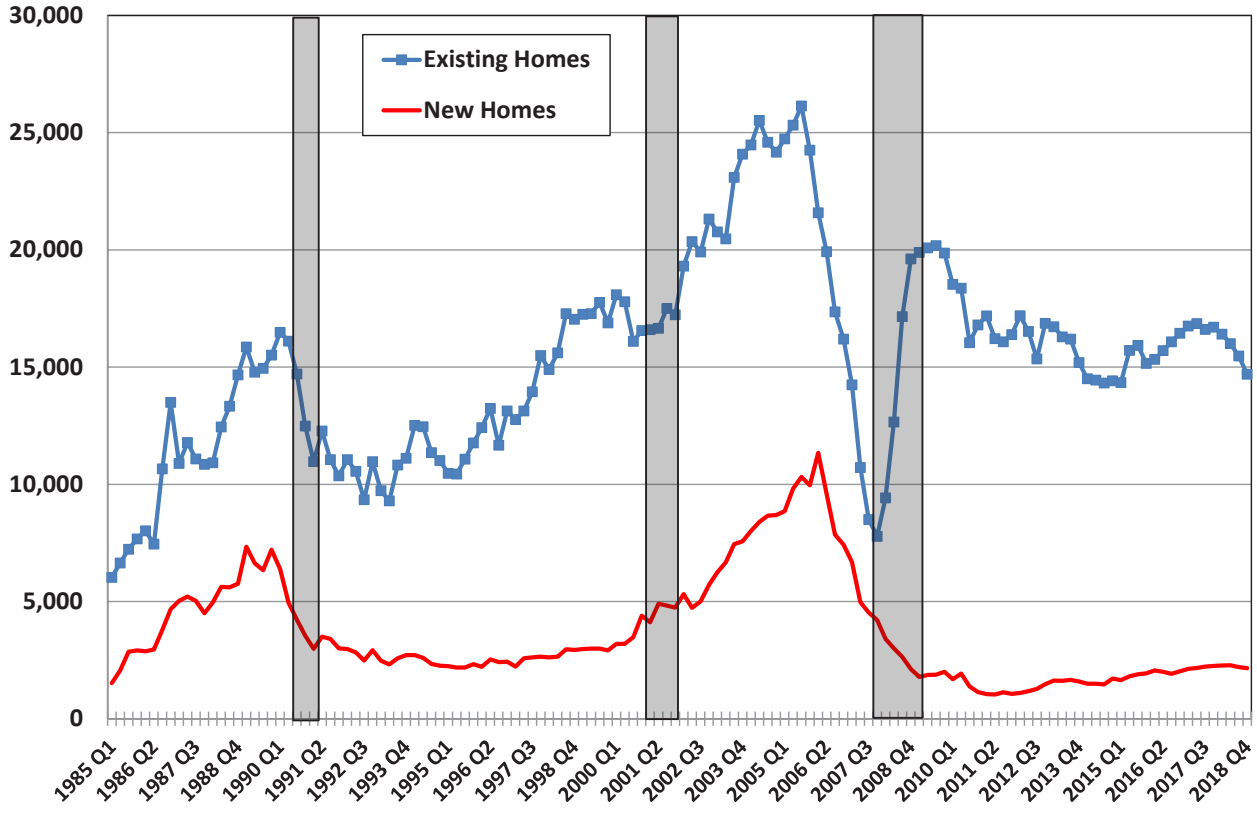
New and Existing Home Sales

In 2018, new home sales in the Inland Empire rose by just 1.6% from 2017, to 8,900 units. Part of the explanation for the somewhat disappointing result lies in the 43 basis point increase of 30-year mortgage rates during a relatively short time period from August 23, 2018 to November 5, 2018. This resulted in a 5.2% drop in new home sales in the area during the final two quarters of 2018, reversing most of the gains of the first two quarters of 2018. Sales in existing homes actually declined in 2018 by 6.5% to 62,500 units.

One way to understand our current recovery from the Great Recession of 2008-9 is to place it in comparison with the previous recovery from the aerospace recession of the late 1980s and early 1990s. For the Inland Empire, the economic downturn experienced at that time was as painful and had long-lasting effects similar to those felt in the aftermath of the Great Recession. At present, the level of new home sales during the current recovery is still well below levels that witnessed in the recovery from the Southern California aerospace collapse. We believe, however, that a recent decline of 59 basis points in mortgage rates since last November is likely to give the Inland Empire housing market a mini-boost during the 2019 Spring home buying season.

Figure H1 shows that in two of the last three recessions, home sales in the Inland Empire were a clear leading economic indicator of a subsequent recession. We would argue that the recession at the turn of the millennium was not really a Southern California recession, since its effects were centered on and largely confined to industries concentrated in the north of the state. Clearly home sales turned south for the aerospace recession of the

Figure H1: Inland Empire Seasonally Adjusted Home Sales
1985 - 2018



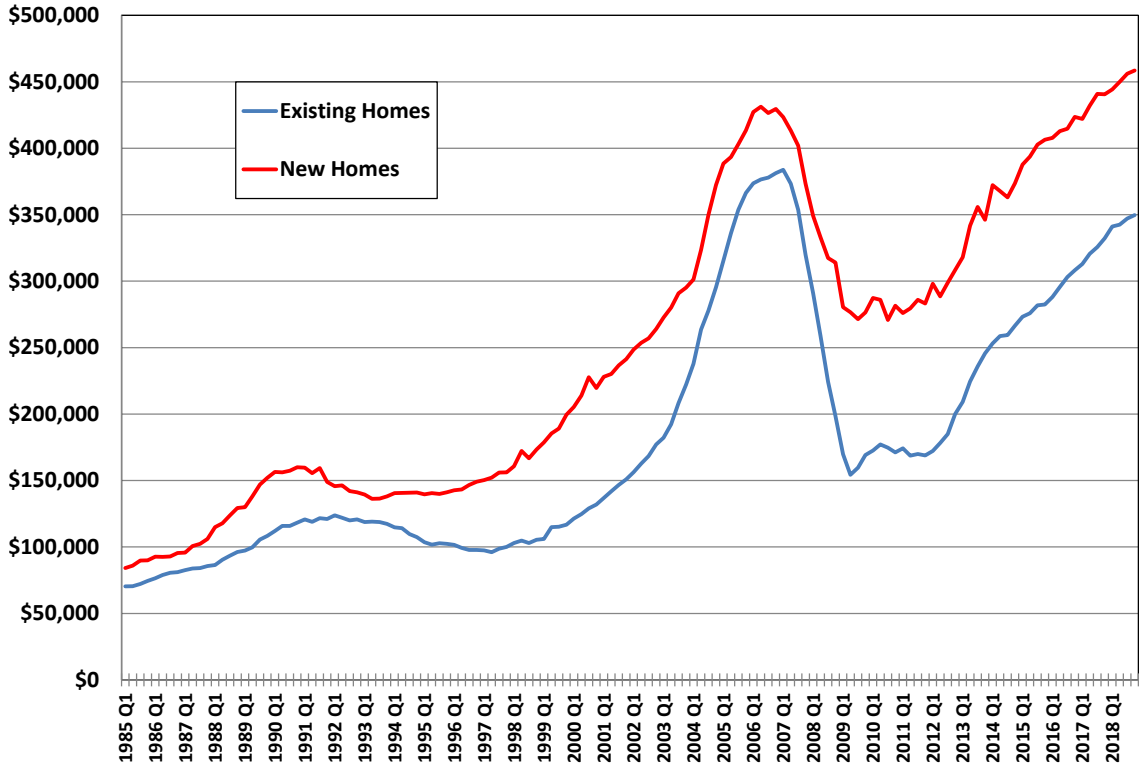
Sources: DQNews

early 1990s, and just before the Great Recession of 2007. Of course many of us remember the sales decline as a preamble of the subsequent foreclosure crisis, which eroded the balance sheets of many households and damaged consumer confidence and decreased consumption expenditures. The decline in new home sales also led to a collapse of the local housing industry, which had great repercussions for other industries including the finance (FIRE) sectors and business and professional services.

One of the big puzzles of the weak recovery has been the low volume recovery in new home sales following the 2011 trough. Its market share in 2018:Q4 remains at an unimpressive level of 12.5%, which is sharply below previous peaks of 30% or more. It is also below the post 1985 historical average of 19%. By analyzing recent home price data and housing affordability trends we may be able to give at least a partial answer to why turnover remains low.

Median Home Price Trends and Housing Affordability

Figure H2: Inland Empire Seasonally Adjusted Home Prices
1985 Q1 - 2018 Q4



Sources: DQNews

In contrast to the picture we painted for sales volumes, median home prices in the Inland Empire have been strong through 2018. Figure H2 shows that these have increased by an average of 9.0% for existing homes and 6.6% for new homes annually since the trough in 2009/2010. Nonetheless, annual home prices increases did slow in 2018. In the existing housing market the median home price rose only 6.9% in 2018 to $345,000, while new home prices were up only 4.2% from the year before to $459,000.

Figure H2 clearly shows the significant price gap between new and existing homes by the end of 2018. This gap stood at $109,000 in 2018:Q4, and

it has consistently remained in the range between $110,000 and $120,000 since 2009. Figure H2 also shows that new home prices tend to decline by less during down cycles when compared to existing homes prices. They also appear to recover earlier and faster, at least initially. Furthermore, by the end of 2018, the median new home price was 6.3% higher than it was during the housing bubble peak, while existing homes were still about 8.9% below that level.

One interesting question to pursue is how the home price gap affects housing affordability. This is shown in Table H1, which lists housing affordability for Inland Empire rentals, new, and existing homes. One conclusion from these numbers is that the housing affordability crisis has arrived in the Inland Empire. As part of our affordability calculations, we calculated the minimum annual income required for the median Inland Empire rent, median existing home price, and median new home price. In the case of purchasing, standard underwriting criteria are used such as a 20% down payment, prevailing mortgage interest rates, taxes and insurance, and a standard income ratio. This minimum income is then compared with the income distribution of the Inland Empire to arrive at the percentage of households that can afford to rent or buy. The results are shown in the last three lines of the table.

Our calculations indicate that all housing categories experienced a decline in their affordability between 2011 and 2018. In addition, our numbers show that only 27.5% of Inland Empire households could afford the median new home price in 2018. This number is significantly below the affordability rate of 39.8% for existing homes and 45.8% for rental dwellings in 2018.

Recall that the unaffordably high price of new homes is being driven by increases in builder's costs and the resulting lack of profit in building housing below $350,000. In this context, the best we can hope for are small volume increases for new and existing home transactions coinciding with moderate price increases for the near future. To some degree any volume increases will depend on lower mortgage rates and increased affordability migrations of higher income households from Southern California coastal areas into the Inland Empire. Currently, there is no evidence that would suggest a repeat of the big migration waves that hit the Inland Empire during previous recoveries (more on this below).

Table H1: Housing Affordability, Inland Empire, 2011, 2017, 2018
Income Distribution Based

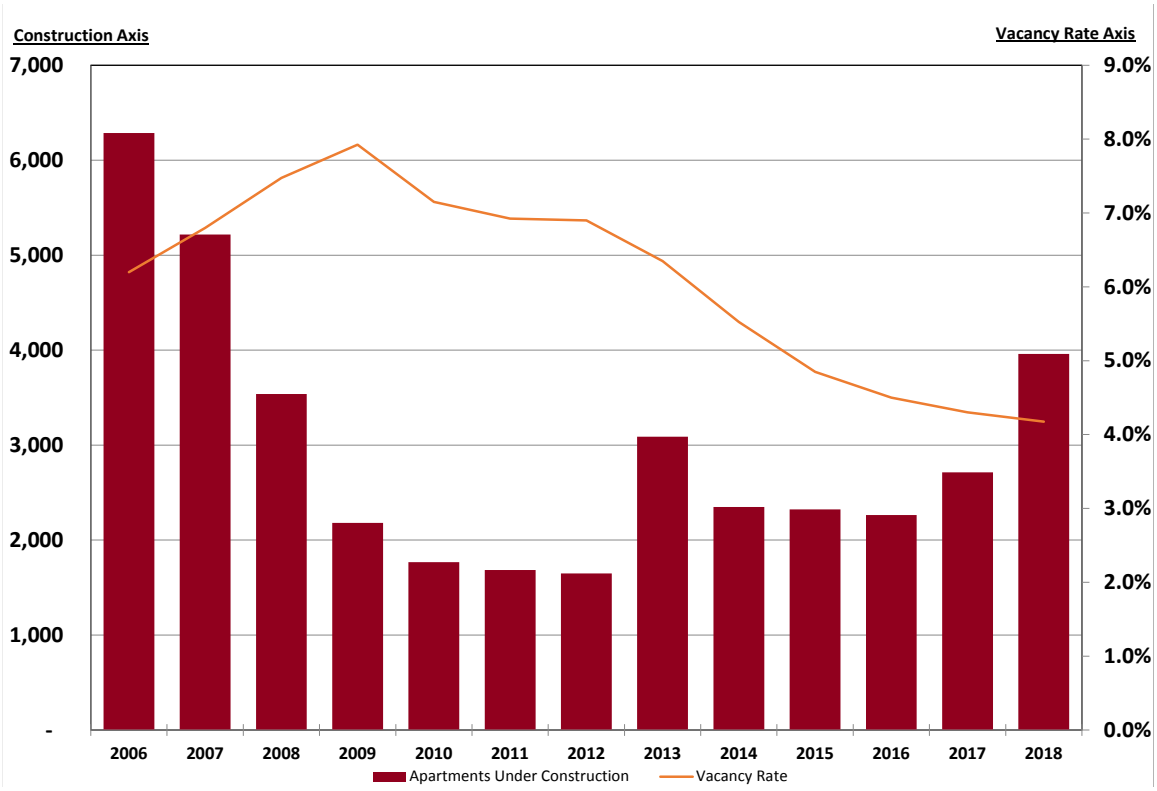
Home Type	2011	2017	2018	Change/%Change
Annual Zillow Rent (All homes)	$18,768	$21,636	$22,766	32.3%
Existing Home Price	$170,440	$322,849	$349,772	105.2%
New Home Price	$281,160	$443,989	$458,503	63.1%
Rent Minimum Income Required	$56,867	$65,570	$68,982	21.3%
Existing Home Minimum Income Required	$37,870	$68,757	$78,287	106.7%
New Home Minimum Income Required	$62,472	$92,426	$102,673	64.3%
Affordability Zillow Rent (All Home)	50.9%	48.3%	45.8%	-10.1%
Affordability Existing Home Price	67.1%	46.0%	39.8%	-40.7%
Affordability New Home Price	46.7%	32.5%	27.5%	-41.1%

Sources: Zilow, DQNews, Freddie Mac, ACS Income Distribution

Apartment Market

In contrast to the region's ownership housing market, the Inland Empire apartment market showed some strength in 2018. Figure H3 indicates that apartments under construction in the area exhibited a sharp increase of 46% in 2018 to almost 4,000 units. Construction activity in the apartment sector was the highest since 2007. At the same time, apartment vacancy rates continued to drop from 4.3% in 2017 to under 4.2% in 2018, showing that the market is easily absorbing these new units.. In addition, effective rent growth was 4.3% in 2018, a slight decline from the 5.5% increase observed in 2017. We see this development, namely the moderation in rent growth coupled with the increased supply, as a sign that apartments will continue to be a relatively more affordable alternative in the near future.

Figure H3: Inland Empire Apartments Under Construction vs. Vacancy Rate



Sources: CBRE, Costar

Housing Permits and Their Composition

Total housing permits declined 2.7% in 2018 to 13,600 units. Coming on the heels of a 39% increase in 2017, one could either be mildly disappointed that the increase was not replicated or mildly upbeat that most of last year's increase was sustained. This decline of housing permits

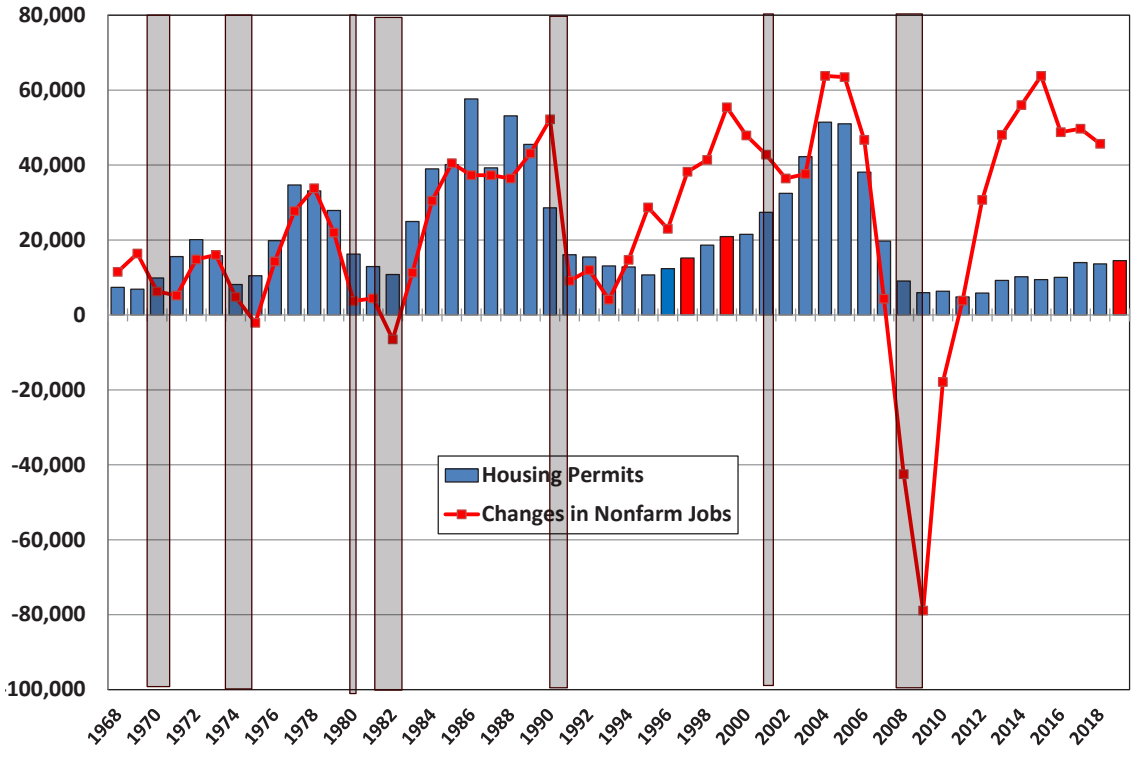
was led by a 13% drop in multi- family home permits, which fell to just below 3,200 units. The numerically larger, single-family homes category rose by 3.5%.

The tepid permit data seems to coincide with the affordability struggles experienced by households in the Inland Empire where low housing affordability has been exasperated by rising mortgage rates. We expect a small increase of permit activity for 2019 as mortgage rates have dropped recently. We assume that this will result in increased demand for new home purchases.

Figure H4 shows housing permits in the Inland Empire since 1968. The figure also indicates that the current level of permits is relatively low, despite eight years of employment gains, which have accelerated during the last five years.

As with all analysis, the reader is mostly interested in where we go from here. Perhaps there are lessons to be learned from the past. Specifically, we see a parallel between permit activity during the post-aerospace economic recovery in 1994 and the current housing permit situation. In 1994, we witnessed accelerating job gains without any signs of an appreciable housing improvement until 1997. This is similar to what we observe during the current cycle until 2016. Further improvements in housing permits occurred during the two years after 1997, and by 1999, Inland Empire housing permits had reached almost 22,000 units. A repeat of this situation is the optimistic scenario. However, our economic report forecasts a slowing U.S. and Inland Empire economy for 2019-2021. Such a slowdown would counteract a more solid permit recovery relative to what we have experienced so far. Nonetheless, we assume in our housing outlook that the mini-boom in apartment construction will continue at least through 2019.

Figure H4: Inland Empire Total Housing Permits and Nonfarm Job Changes

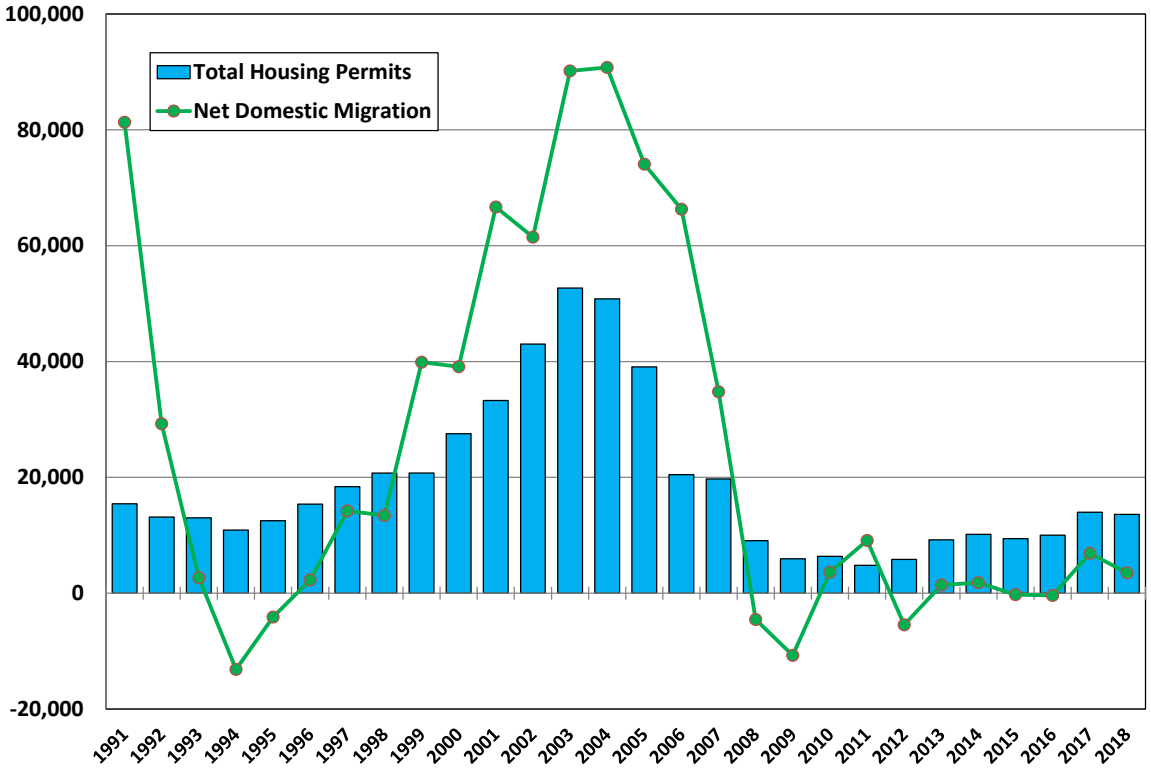


Sources: U.S. Census, EDD

The Importance of Net Domestic Migration

Historically speaking, the mechanism that elevated housing permits and housing demand in the Inland Empire was sharp increases in net domestic migration (in-migration minus out-migration). Figure H5 shows that spikes in this time series traditionally coincided with sharp increases in housing permits. On the other hand, weak or negative net domestic migration results in a decline in permits. Unsurprisingly, affordability from coastal regions drives net domestic migration into the Inland Empire. As housing becomes less affordable in the Greater Los Angeles area and San Diego County, middle-income households are forced to relocate into the Inland Empire. In our report, we refer to these as "B-workers" (A-workers work and reside in the coastal areas, C-workers do not only live in the Inland Empire but also work here). B-workers typically have higher human capital (education, experience) and hence are often higher income households than those that reside and work here. Different from previous cycles, net domestic migration has not been a major driving force for the Inland Empire. However, the expected slowdown in nationwide economic growth may also slow net domestic migration.

Figure H5: Inland Empire Net Domestic Migration and Total Housing Permits



Sources: DOF, U.S. Census

Final Thoughts on Affordability and the Economic Cycle

We have seen that low housing affordability may be a major impediment for a solid housing recovery in the Inland Empire. This is driven in large part by the sluggish supply response of new housing construction, which differs from previous supply recoveries in the area. We believe this sluggish response derives in large part from high building costs leaving builders unable to build and sell at prices that are affordable to the majority of the region's inhabitants. There are implications from this observation as we move forward.

In essence, the economic report presented above contained a serious warning signal, similar to a street light turning from green to yellow. A fair reading of the report is that we are entering a period of heightened cyclical risks in the U.S., and also in the Inland Empire. Low housing affordability does not cause, by itself, a downturn in the housing market. However, couple this with a negative economic shock and the economy could tip into a recession by 2020/2021, as forecasted by many professional analysts. Should such an event happen while economic growth weakens within the next year or two, then this will have a major impact on home prices, home sales, and housing construction in the Inland Empire. At this point, we do not forecast such an event, but in general, we need to keep a more carefully watch the economy than we had to for the last few years, when the national expansion was still relatively strong.

Governor Newsom continues to push for higher housing production and seems to be willing to question barriers to large-scale housing expansion, such as the California Environmental Quality Act, and the exclusive local control over local development decisions. A recent study by our friends at Beacon Economics and Next 10 highlighted, for example, that 31 cities in Southern California from Huntington Beach to Loma Linda ignore housing reporting rules. Furthermore, as far as meeting goal completion percentages within the "Regional Housing Needs Assessment" is concerned, even Riverside County and the San Bernardino County received a C-grade, according to the Beacon report. In general, many communities in Southern California fail to provide adequate housing to the lower to moderate income category households. This supports our contention that housing affordability for lower and middle income households has now become a primary policy concern for the Inland Empire. Changes to zoning and building regulations would affect Inland Empire construction directly, but would also affect demand for Inland Empire Housing via its impact on the supply of housing in Orange and Los Angeles counties.

Given the importance of this emerging debate, therefore, we feel that all real estate stakeholders in the Inland Empire should prepare to participate in the housing affordability conversation. This is a unique opportunity to address housing affordability problems that have now affected the Inland Empire as well. We feel that this is particularly important since there seems to be some bias against suburban housing development in current policy considerations.

Table 6: General Economic Conditions, Fall 2016 and Now

	2016 Q4	March 2017	March 2018
President	Obama	Trump	Trump
Stock Market (Dow Jones)	17,930 (early Nov)	24,946 (March 16)	25,673.46 (March 6)

Table 6: (Continued)

	2016 Q4	March 2017	March 2018
Consumer Sentiment	87.2	99.7	91.2
Annual U.S. GDP Growth	1.5%	2.3%	2.9%
UR_{US}	4.8 (October)	4.1 (February)	4.0 (January)
UR_{CA}	5.3	4.4	4.2 (December)
UR_{IE}	5.8	4.3	4.2 (December)
Inflation	1.6	2.1	1.5
Oil Prices (West Tex Int)	$46.83	$62.49	$56.60
$CAD/$US	1.31	1.30	1.32
Federal Funds Rate	0.25 - 0.50	1.25 - 1.50	2.25 - 2.50
Housing Starts U.S.	1,328	1,326	1,078
Baseball/Soccer	Dodgers on Vacation	Dodgers Win World Series Germany Wins World Cup	no money left for betting after heavy losses last year
Weather	$16.1 Billion in Damages	Not another 186.8 billion in damages	coldest February on record in SoCal; more rain

Table 7: GDP Growth and Unemployment Rate Forecase, U.S., California, and IE

	2018	2019	2020
United States GDP	2.9	2.2	1.7
California GDP	3.2	2.6	2.0
Inland Empire GDP	3.8	2.8	2.3
United States UR	3.9 (end of year)	4.1	4.3
California UR	4.2 (end of year)	4.4	4.5
Inland Empire UR	4.2 (end of year)	4.5	4.7

Ackowledgement

Claremont McKenna College
Lowe Institute of Political Economy
Research Assistants

*Ryan Chakmak '19
*Richy Chen '20
*Celeste Terni '19
Maxine Baghdadi '21
Mackenzie Bradford '19
Eamon Gallagher '19
Bach Hoang '19
Gage Hornung '21
Amanda Huang '21
Andrew Kim '21
Leo Kitchell '21
Yao Li '20
Aaryaman Sheoran '20
Joshua Tatum '21
Xinran Xing '21
Xinyi Zhang '21

Note: * = Lowe Institute Student Manager

LOWE INSTITUTE
OF POLITICAL ECONOMY
CLAREMONT MCKENNA COLLEGE

500 E. Ninth Street
Bauer Center, Third Floor
Claremont, CA 91711-6420

909.621.8012 (t)
909.607.8008 (f)

Email: lowe@cmc.edu
www.inlandempirevision.org