



# THE STATE OF THE REGION

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## THE INLAND EMPIRE 2023

by

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## WAITING FOR GODOT RECESSION: WHAT DOES THE MESSENGER TELL US?

To many of you, economic forecasting seems to be like something that comes out of a black box. Somehow, magically, those who predict the economic future make some statement that could affect you significantly, but you don't really understand where this is coming from. True, forecasts are based on mathematical models that are not trivial to understand, but you should not be in awe or puzzled. The task of forecasting a recession for the economy is very similar to that of predicting a volcano outbreak. Volcanologists install a variety of sensors at different areas around the volcano and then use a statistical model to judge whether or not an outbreak is imminent. If the forecast is successful, serious damage can be avoided (tourists and residents can be evacuated, lives can be saved). Note that you do not have to tell a causal story here, correlations are sufficient. There is no one who claims that the sensors "cause" the volcano outbreak. All that is required is that they ring an alarm bell in time before the eruption.

Economists do the same by looking at **precursors** or **leading economic indicators** that, after attaching weights to them, give you a likelihood of the economy turning south. Forecasting too many false positives (predicting volcano outbreaks which then do not materialize; "crying wolf" too often) will result in farmers and tourists not heeding the warning and simply staying behind despite warnings. In early March 2023, Ray Ferris, the Chief Economist of Credit Suisse (of all people, given the current problems Credit Suisse is facing - including a 73% drop (!) in its share price over the last year), coined the phrase "**Godot Recession**" in a Wall Street Journal article, alluding to the "Waiting for Godot" play by Samuel Beckett. Twice during the play, a young messenger boy appears towards

the end of the act and announces to Vladimir and Estragon, the two individuals waiting for Mr. Godot (God?) to appear, that he will not come today, but that he surely will be there tomorrow. Godot never arrives during the play. The somewhat clever claim here is that the 2022/2023 recession has been predicted by many and they revise their forecast repeatedly until they realize that it will never happen (we would be delighted if this was right).

Note that last year, during the State of the Region Conference 2022, we stressed that **we previously did NOT forecast a recession for 2022 or 2023**. This is in writing, and part of our posted and printed report.

The 2023 Economic **Report for the State of the Region** starts by looking at the possibility of the current expansion ending within the next 12 months, hence forecasting a recession. **We are predicting a national U.S. recession within a year with a fairly high probability**. Hence we do not agree with Ray Ferris's assessment and that of the few others you may have listened to. The current problems created by Silicon Valley Bank, Signature Bank and other lending institutions just amplifies the uncertainty regarding the national economy's future. In essence, the Fed has decided to put into place another Quantitative Easing (QE) by guaranteeing all deposits of the failed bank to be paid to the depositors, who should have been aware of the risks of depositing more than \$250,000 into these institutions. This resembles the "Too Big to Fail" episode of 2008. In all fairness, investors will not get reimbursed. Still, the old moral hazard story shows its ugly head again.

This is followed by a brief look at the California economy before we focus on the Inland Empire, a Metropolitan Statistical Area (MSA). MSAs are made up of one or two counties, here Riverside County and San Bernardino County. The area is the **12th largest MSA in the U.S. out of 384 MSAs** in the U.S.: in 2021, we passed San Francisco to become the second largest MSA in California, and about 12% of Californians reside here. Another feature that makes us stand out is the relatively large number of commuters: **over 35% of the labor force make the daily trip to the more coastal areas daily and back.**

The analysis of the Inland Empire will include more than just an evaluation of its most recent performance coupled with an outlook for the future. We will also address concerns generated by an environmental report sponsored by the Robert Redford Conservancy and others. The 80-page report was submitted to Governor Newsom together with a policy demand of a **warehouse building moratorium in our area** (to limit cancer and asthma health problems resulting from diesel trucks moving up to warehouses) and potentially even for the state. There are currently two bills that are under consideration in Sacramento which would seriously restrict the logistics sector in the

future (AB1000 by E. Reyes and AB627 by C. Jackson). We will also briefly address the expected effects that Artificial Intelligence will have on the logistics industry not only through automation and robotics over the next five years, but also from the recent introduction of **ChatGPT**. Finally we will point out our **vision for the Inland Empire in 2045**, which will depend on industrial and educational policies to attract more value-adding industries into our area. We are **urging decision makers to consider (industrial) policies that encourage a structural change for the region.**

As an alternative to reading our analysis, you can go straight to the end of the report, where we asked for a **500-word analysis of the current economic situation of the Inland Empire from ChatGPT**, a computer program that has become a national talking point from university academics to John Oliver on HBO.



## NATIONAL ECONOMY

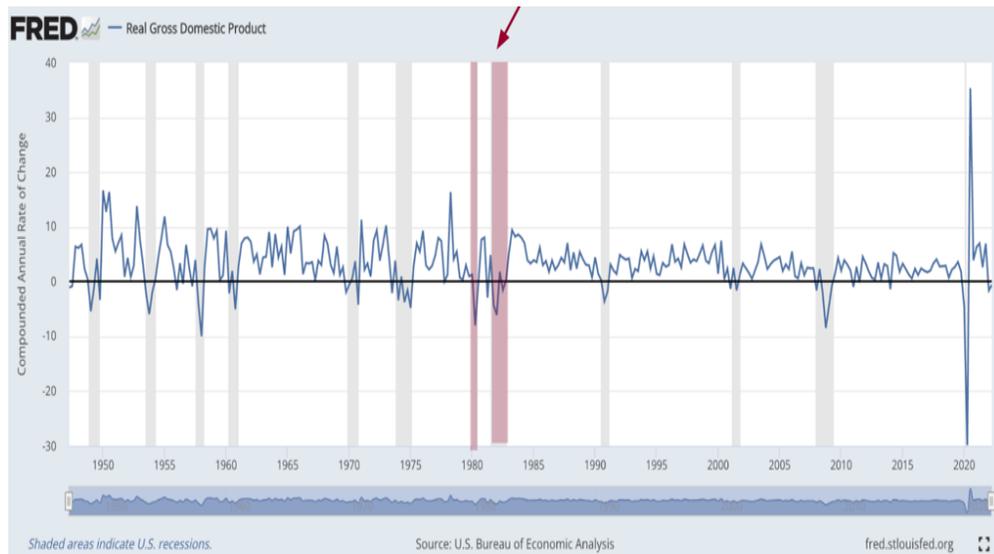
The central question of interest to you, the decision makers in the Inland Empire, is “**Will there be a recession within the next 12 months?**” A national recession would mean less demand for U.S. imports and hence fewer container traffic through the ports of Los Angeles and Long Beach, with their 40% share of all U.S. container imports. With fewer goods shipped through the Inland Empire warehouses, the transportation and warehouse sector will suffer. This, in turn, results in repercussions on household incomes and spending, triggering lower retail shipments, and thereby again affecting the region’s logistics industry.

Figure 1 shows quarterly real GDP growth (recessions shaded in gray). Negative growth, such as we saw during the first two quarters of 2022, does not necessarily indicate a recession. It is the dating committee of the National Bureau of Economic Research (NBER) that lists the peaks and troughs of business cycles. The committee

looks at a variety of variables, not just output/income growth, to determine the starting points (“trough”) and end points (“peak”) of expansions. During the Great Recession of 2008-2009, for example, the dating committee chose the peak of the previous expansion to be the fourth quarter of 2007, and hence the beginning of the recession to be in the first quarter of 2008, although the second quarter showed positive growth thanks to the Bush tax rebates.

Our best guess is that **we will see positive growth of slightly more than 2% for the first quarter of 2023.** This will be **followed by weaker growth in the second quarter, before the recession will start either in Quarter 4 (October to December 2023) or the first quarter of 2024.** If the downturn materializes, then the nation will experience a double dip recession similar to 1979 and 1981, although the first of these was caused by an oil price shock while the second, the so-called Volcker recession, resembled

FIGURE 1: REAL GDP GROWTH, U.S., 1947-2022, SAAR, QUARTERLY DATA



- two quarters of negative growth early in 2022
- fear of double dip recession
- downturn not likely before second half of 2023

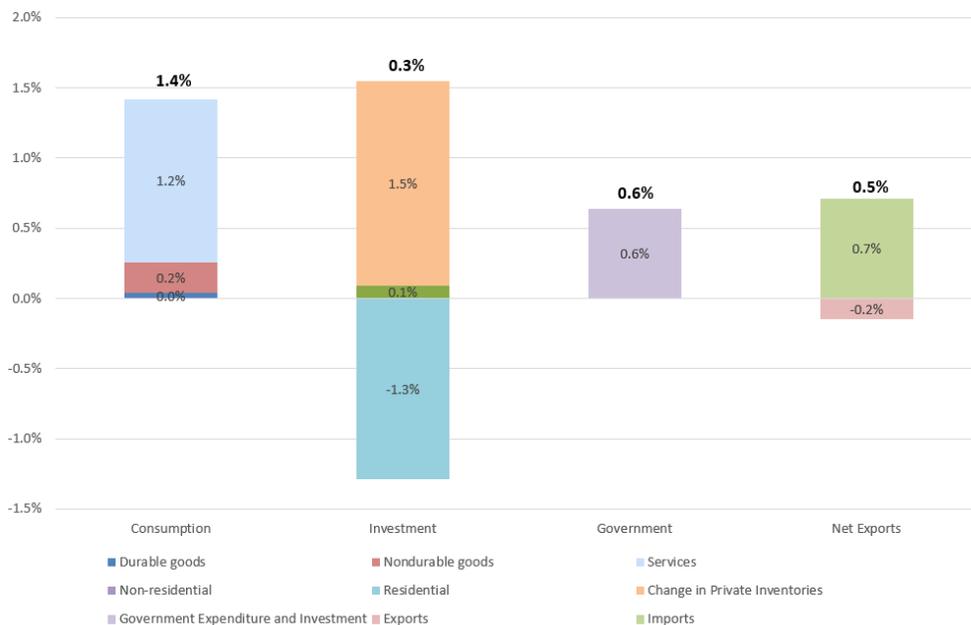
more the current situation, namely it was the result of a **monetary contraction orchestrated by the Federal Reserve Bank**. In both cases, the U.S. central bank raised interest rates dramatically to fight inflation.

Let us say upfront that there have been 12 recessions for the post World War II period in the U.S. If history teaches us a lesson then perhaps we should listen, among others, to former U.S. Treasury Secretary and Harvard President Lawrence Summers, who has repeatedly stressed that there has not been a single episode where the unemployment rate was below 5% and the inflation rate above 4% which was not followed by a subsequent national recession.

Let's try to understand the **current economic situation** a bit better. The last four quarterly growth rates for real GDP in 2022 were -1.6% (Q1), -0.6% (Q2), +3.2% (Q3), +2.9% (Q4). The last two quarters suggest that the U.S. economy is doing well and generally healthy despite the two negative growth quarters earlier in the year.

The driving force behind the most recent 2.9% growth was household expenditures on services, but not on non-durables and durable goods. Out of the 2.9% overall growth, a total of 1.4% was generated this way. **Households are finally spending on dining out and traveling**, but less so on buying necessities and items that they consume services from over time (refrigerators, mobile phones, etc.). That has caused a **build up of business inventories**, or unsold goods, which is not healthy since businesses will adjust in the future unless they think that household purchases of durables will increase again. **Residential investment was abysmal, and investment in plant and equipment by firms was almost non-existent**. The final item that contributed significantly to growth in the fourth quarter was the reduction in imports, which counts as a positive in national income accounting but is not a strong sign of a healthy economy: if households cut back on imports, it means that they are not looking at a bright future. If you take out the inventory build-up and the reduction in imports, then the economy only grew at 0.7%, which is much weaker than the headline number indicates.

FIGURE 2: GDP GROWTH BY COMPONENT, 2022, QUARTER 4 (GDP GROWTH = +2.9%)



- household expenditures on services main driver
- dangerously high build up of inventories
- residential investment tanking

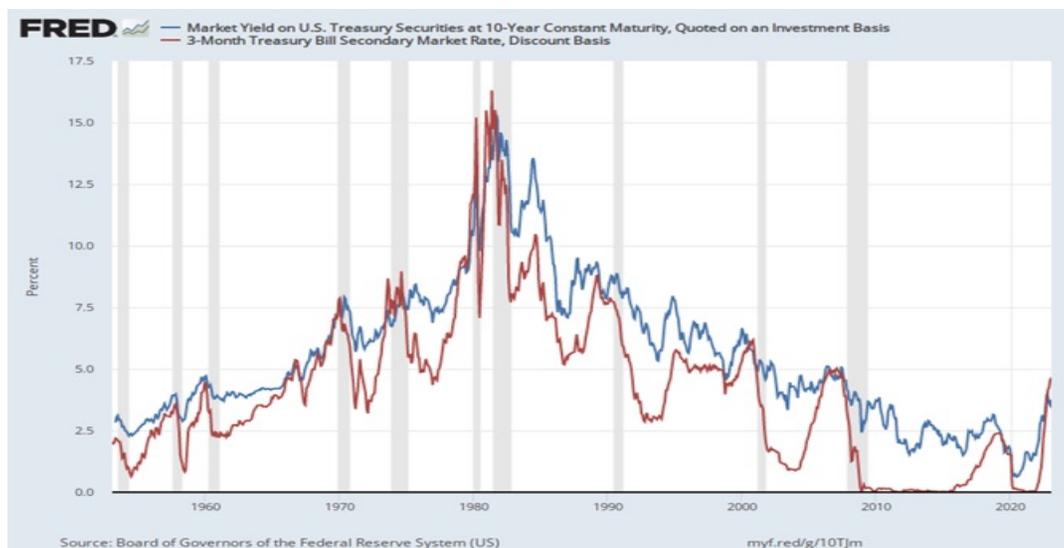
What are the sensors that are **ringing the alarm**? To convince you of our forecast, we want you to look with us at the behavior of the leading indicators we listen to most seriously. They are:

- the yield curve,
- housing starts,
- recent unemployment rates compared to the yearly average,
- change in consumer sentiment,
- change in the average workweek in manufacturing.

The first is the **yield curve**, or the difference between a long term interest rate and a short term interest rate (here the 10-Year Government Bond and the 3-Month Treasury Bill). When the short-term interest rate is higher than the long-term interest rate, the **yield curve becomes inverted**.

This is typically due to a monetary contraction initiated by the Federal Reserve, which has raised the Federal Funds Rate (FFR) eight times already and will continue to do so until the end of the year. Initially these increases were by 0.25 and 0.5 percentage points but during the four meetings from June to November 2022, the Fed raised the FFR by a dramatic 0.75 percentage points. More recently these increases have returned to the more standard 0.5 and 0.25 percentage points (25 basis points) hikes. The March 21-22 Meeting of the Federal Reserve will occur after the deadline to print this report - but an increase of the FFR was basically guaranteed as we are writing - and after the Silicon Valley Bank/Signature Bank event, it will be by 25 basis points for sure, and not by the previously possible 50 basis point hike. Look out for more to come for the rest of 2023 and **expect the FFR to end up north of 5.5%**.

FIGURE 3: 10-YEAR GOVERNMENT BOND AND THE 3-MONTH TREASURY BILL, 1953-2023.



- short-term interest rates rise above long-term interest rates, thereby inverting the yield curve, before recessions.
- there are no false positives
- currently the yield curve has been inverted since October 2022

Figure 3 shows that the yield curve has been inverted since October 2022 potentially signaling that we are headed into a recession in the near future. There are no false positives with this alarm: the yield curve inverts and a recession followed shortly after. The Coronavirus downturn of 2020 is an outlier in the sense that the yield curve inverted in March 2019; but to claim that we could have forecasted the COVID-19 downturn would be ludicrous. Still, there were serious signals

for the longest post-World War II expansion to end then and many Wall Street economists forecasted a downturn for 2020 unrelated to the virus.

The stock market is another alarm but we do not consider it for our forecasts since there have been too many false alarms in the past: as a famous economist, Paul Samuelson, once remarked, the stock market has predicted nine of the previous five recessions.

Other alarms: **Housing starts**, or better, the annual change in housing starts, receives a lot of weight in our forecast. The low point during the Coronavirus downturn was in April 2020 when less than 950,000 units were built, roughly 550,000 units below the long term average of 1.5 million units a month (annualized). Housing starts were back to that average by November

2020 and then grew beyond that level to 1.8 million by April 2022. The most recent number is 1.45 million in January 2023, a significant decline. Over the last 12 months, housing starts are down by over 300,000 units, even taking into account the uptick of 130,000 since December 2022. Prolonged declines of housing starts have been followed by recessions (see Figure 4).

FIGURE 4: YEAR-TO-YEAR CHANGES IN HOUSING STARTS, U.S., MONTHLY DATA, 1960-2022.

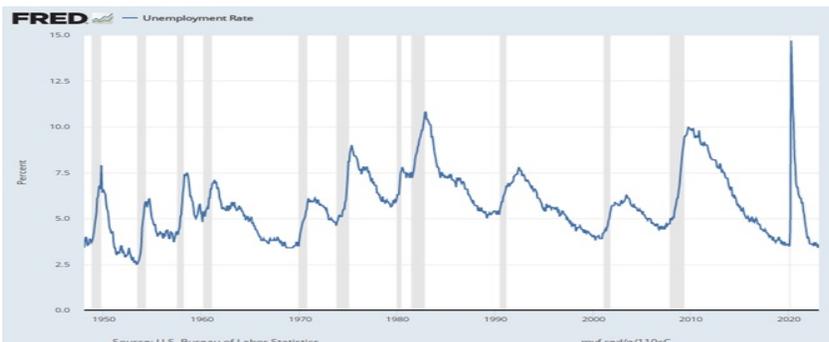


- housing starts have declined before every recession
- over the last 12 months, housing starts have seen a significant decline
- it is housing starts that contribute to GDP, not housing sales or prices

The national unemployment rate reached historically low levels, sitting at 3.4% for January 2023 before inching up to 3.6% in February 2023. But according to the so-called Sahm index, it is not the low level of the unemployment rate that matters, after all, **unemployment rates are always low before a recession**, but instead the recent behavior of the unemployment rate compared to the average for the previous year. That measure continues

to be slightly negative (-0.1 percentage points) meaning that the average unemployment rate over the last three months is still slightly below the yearly average: no recession alarm from this measure (yet). However, **if unemployment rates inch up by similar amounts over the next two months (March and April), then the measure turns positive and the alarm will ring.**

FIGURE 5: UNEMPLOYMENT RATE, U.S., MONTHLY DATA, SA, JAN 1948 - JAN 2023.

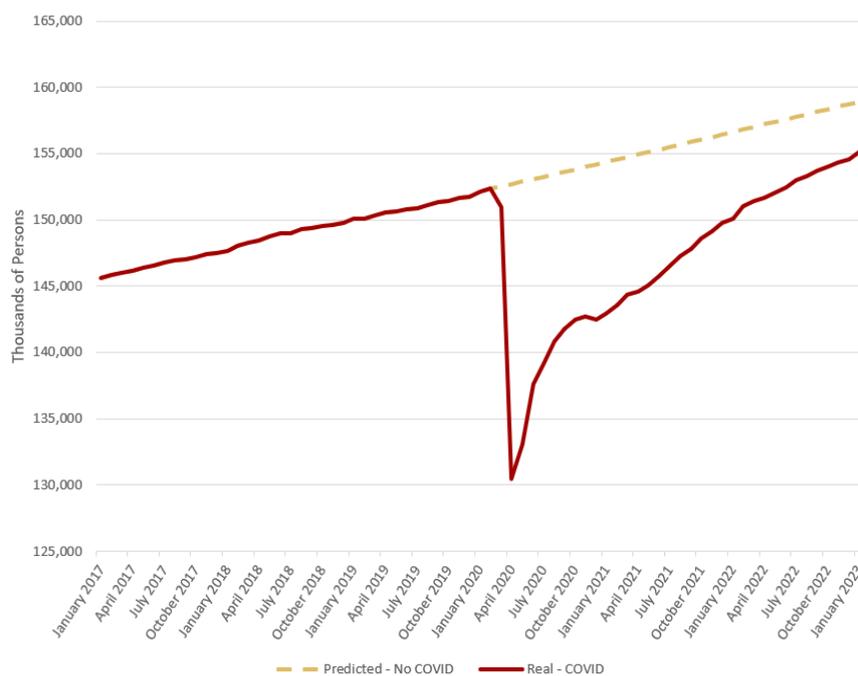


- unemployment rates reached a 70 year low
- unemployment rates tend to be at a lower level before a recession
- it is the average unemployment rate over the last 3 months compared to the average over the last 12 months that is a sensor

The labor market contains many puzzles currently. For example, why are there so many job openings for every unemployed worker (see Figure 7 below), and **why was hiring in January 2023 and even in February 2023 so strong**. Part of the reason is that to this day, we have not recovered

employment in terms of what we would have expected the level to be without the Coronavirus downturn. Some of our competitors have claimed that the COVID-19 recession was V-shaped. We let you be the judge of that given the following employment graph (Figure 6):

FIGURE 6: ACTUAL AND POTENTIAL EMPLOYMENT, U.S., 2017-2023.



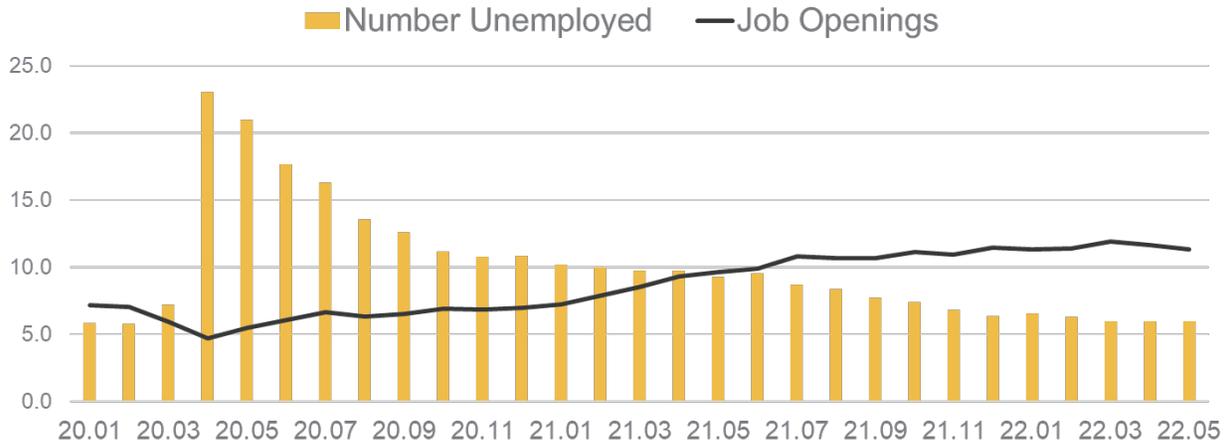
- employment did not recover from COVID-19 downturn until December 2022
- third slowest post World War II employment recovery out of 12 recessions
- continue to see employment below expected levels indicated by trend line (dotted line)

Sadly enough, the **employment recovery from the COVID-19 downturn was the third slowest one of the 12 post World War II recessions. Those forecasters who claim that this was the fastest recovery** are not looking at either employment nor GDP. Plain and clear, **they are misrepresenting the data**. It took the national economy until December 2022 to recover the jobs lost after February 2020. To this day, we are not that close to the employment level we would have expected to see by now (dotted line) had employment trends continued after February 2020. Including the exit of Baby Boomers from

the employment trend will lower the dotted line marginally but will still keep us below that level.

Clearly this is not what we would call a fast, or V-shaped, recovery. For that matter, in California, neither the labor force nor employment have reached pre-recession levels as of February 2020 if we use the household survey (Current Population Survey or CPS) rather than the establishment survey (Current Economic Statistics or CES). As a result, businesses are still “hungry” to hire new workers (see Figure 7).

FIGURE 7: JOB OPENINGS VERSUS NUMBER OF UNEMPLOYED PERSONS, IN MILLIONS, 2020-2022.

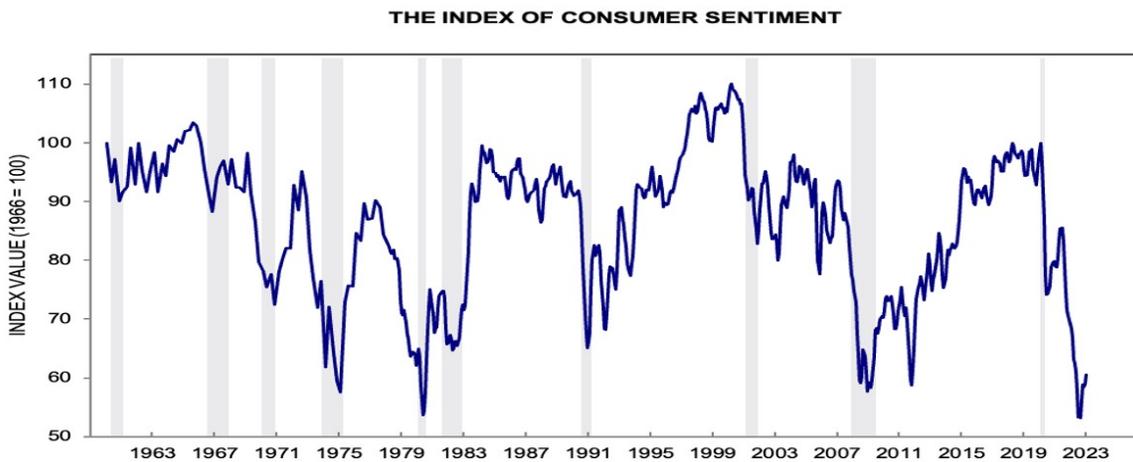


- there are roughly two job openings for every unemployed worker
- this is despite an extremely low unemployment rate of 3.4% in December 2022
- job openings persistently exceeded unemployed workers since May 2021

The last potential alarm we want to show you is the University of Michigan’s Index of Consumer Sentiment. In essence, the underlying survey asks people if they intend to purchase household durables in the near future (think of a mobile phone). Remarkably, as Figure 8 shows, the **Consumer Sentiment Index is at near record low historical levels,**

meaning we are looking at low consumer confidence not seen since 1979/1980. However, our alarm bell relies on recent changes in the consumer sentiment index and actually, **while still low, it has been improving.** Out of all our sensors, hard to believe as it is given its low level, this economic variable makes an upcoming recession slightly less likely.

FIGURE 8: CONSUMER SENTIMENT INDEX, UNIVERSITY OF MICHIGAN, 1960-2023

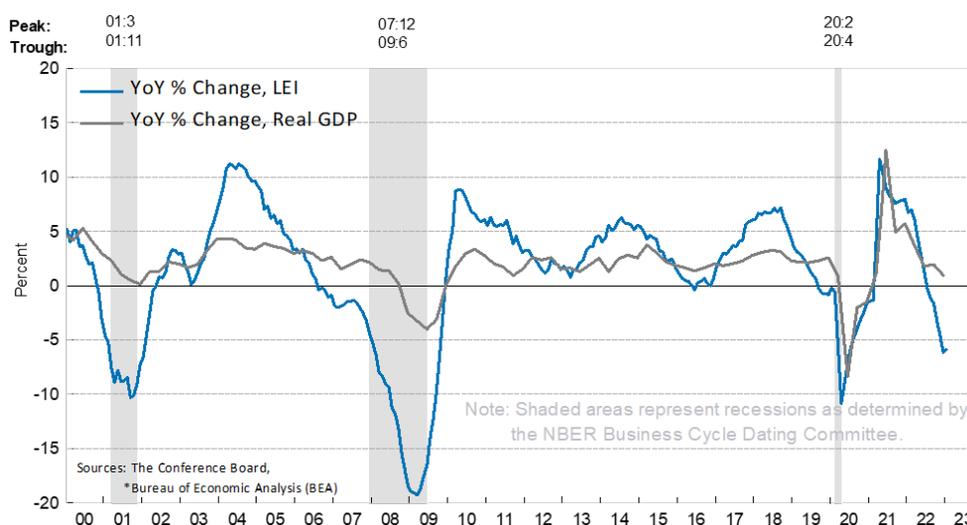


- extremely low consumer confidence after initial recovery from COVID-19
  - the recent low levels were last seen in the late ‘70s
- changes in consumer sentiment are a good indicator for an upcoming recession: they have become positive lately

At this point, we do not want to go through the remaining variables on our preferred list, such as the change in the average work week in manufacturing, a sector that is particularly sensitive to economic fluctuations. Instead we would like to point out that there are a large number of economists and organizations that forecast an upcoming recession. One particularly noteworthy entity is the **Conference Board**, basically an umbrella organization of U.S. businesses. The

Conference Board owns the **Index of Leading Economic Indicators**, a summary measure which contains some of the variables we looked at above, but also adds some additional variables, all of which are then combined into a single economic index. Figure 9 shows the recent behavior of the index of leading economic indicators, which does turn south before recessions and is **currently at a “recession” level**.

FIGURE 9: REAL GDP, INDEX OF LEADING ECONOMIC INDICATORS, Y-T-Y GROWTH RATE, 2000-2023

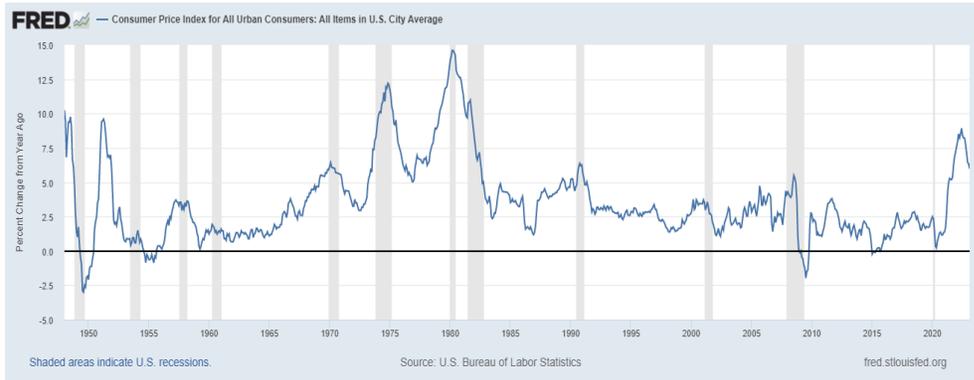


- index of leading economic indicators shows declining growth rates prior to recession
- currently shows strong negative growth
- index of leading economic indicators forecasts upcoming recession

Which leaves us with one more economic factor to talk about: the **main symptom of the current economic malaise: the inflation rate**. We do not have the space to go into details about differences on how to measure the inflation rate properly: is it the consumer price index, or shall we exclude volatile components such as energy and food from it, does the Federal Reserve focus on the personal consumption expenditures price index, or does it remove the least and most volatile components from it, etc. Too much detail. The

bottom line is, inflation is high (see Figure 10), and it has not been at these levels for the last 40 years. The Federal Reserve is determined to get back to its target inflation rate of 2% through **monetary tightening even at the cost of a recession** - all of this to re-establish credibility of the central bank as an inflation fighter. The Fed and its Chairman, Powell, of course hope/dream of a **“soft landing”** meaning the **elimination without a coinciding recession**. We have problems believing that the central bank can engineer this.

FIGURE 10: ANNUAL INFLATION RATE, CPI, YEAR-TO-YEAR, JUN 1947-JAN 2023

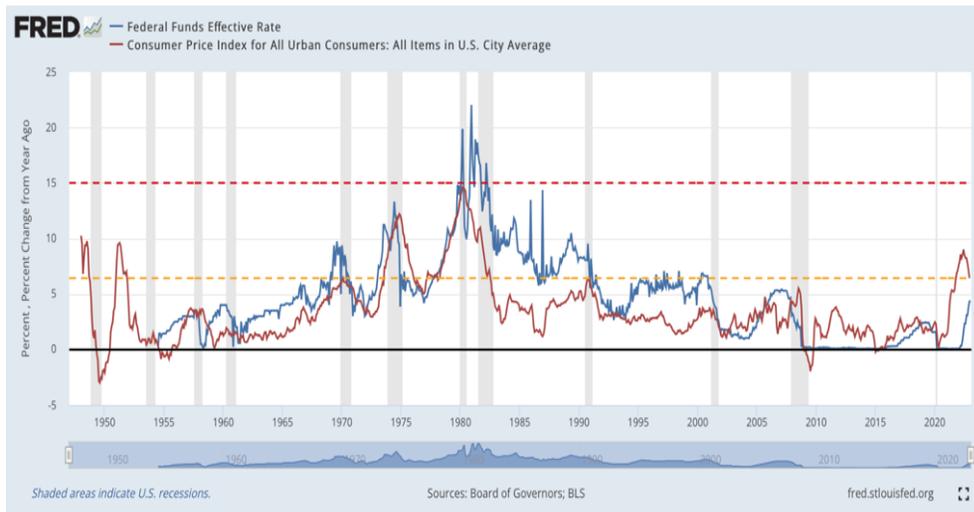


- inflation has decreased recently from its 8.9% peak in June 2022
- most recent observation is 6.0% for January 2023
- historically at highest level since double-dip recession of late '70s early '80s

Even though the Federal Reserve appears to have been aggressively fighting inflation through repeated increases in the Federal Funds Rate, **Chairman Powell is not half the inflation hawk that Paul Volcker was in the early '80s**. Figure 11 shows the inflation rate, which had reached 15% in monthly data back then, and the FFR, which, at

its peak, was above 20%. This resulted in a **huge increase in real interest rates** (nominal interest rates adjusted for inflationary expectations) and triggered the most severe post World War II recession at the time, with unemployment rates increasing to 10.8%.

FIGURE 11: INFLATION RATE, FEDERAL FUNDS RATE, YEAR-TO-YEAR, 1947-2023



- current inflation rate is considerably lower than the level seen before the Volcker recession of the early '80s
- Federal Funds Rate was raised significantly higher above the inflation rate back then
- inflation rate had not been a concern over the period of early '80s until last year

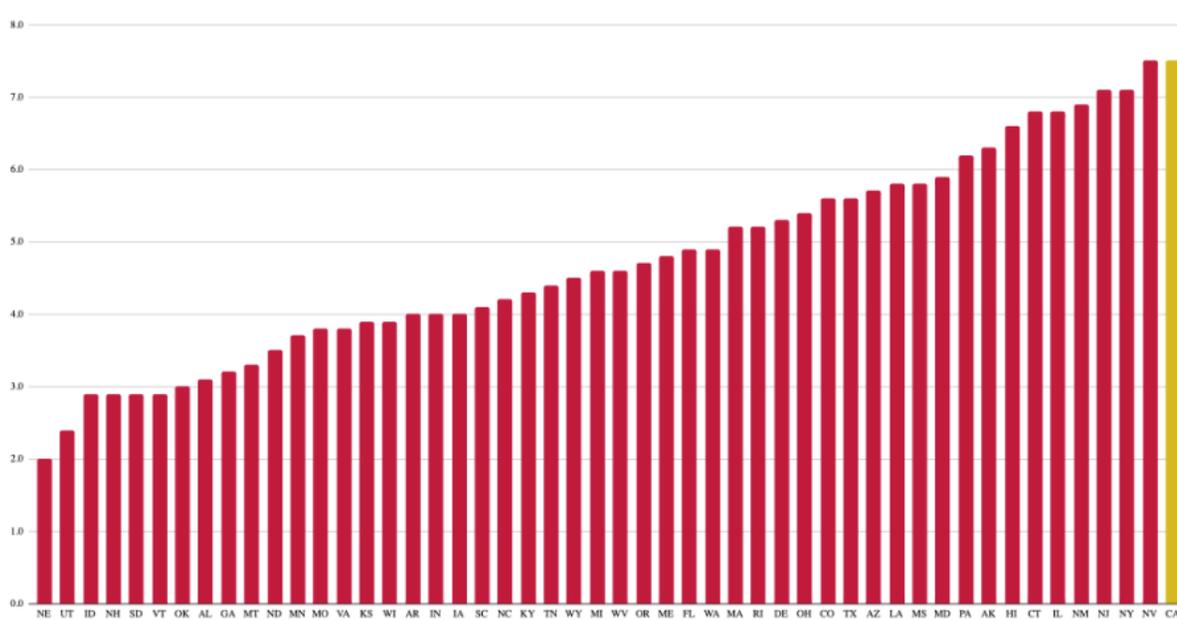
## CALIFORNIA ECONOMY

We will not spend much time talking about the state economy, since we want to focus as soon as possible on our region. The state has become more concerned about the **out-migration of people and firms** at this moment than its economy - although these are clearly related. Having lost a congressional seat for the first time in 170 years, coupled with the departure of Tesla (headquarters), Hewlett Packard, Oracle, etc. weighs heavily on

the mind of many - including ours. However, the current conference is not about the net migration of firms and people, instead it is about the state of the Inland Empire region.

Here are a few relevant observations regarding the state economy that are relevant for the Inland Empire.

FIGURE 12: UNEMPLOYMENT RATE, U.S. STATES, SEP 2021

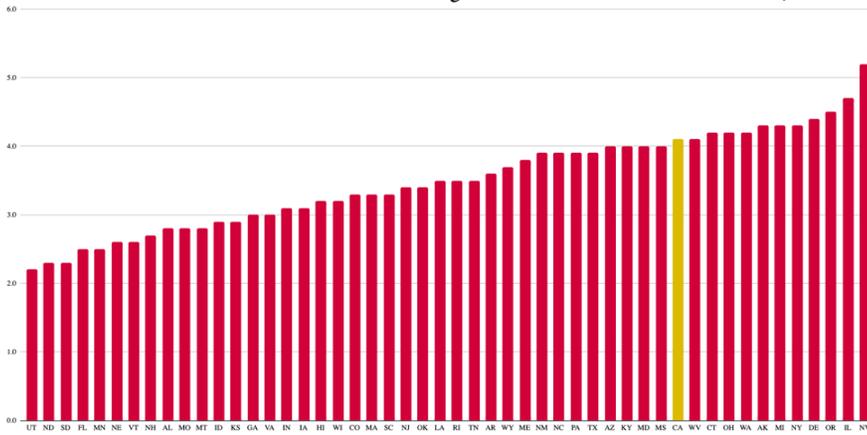


- following the Corona virus recession and initial recovery, California had the highest state unemployment rate
- even by mid-2021, it was still over 7%
- Nebraska had the lowest unemployment rate than at 2%

This bar graph shows state unemployment rates in September 2021. Back then, California had the highest unemployment rate in the country at around 7.5%. It seems likely that this can be at least partially attributed to the strict lockdown policy and other COVID-19 protection measures

put in place within the state. Illinois, New York, and New Jersey rank among the top 6 states with the highest unemployment, and each also had strong COVID-19 restrictions. It is evident that this was overall a time of elevated unemployment, with the national unemployment rate at 4.8%.

FIGURE 13: UNEMPLOYMENT RATE, U.S. STATES, SEP 2021



- following the Corona virus recession and initial recovery, California had the highest state unemployment rate
- even by mid-2021, it was still over 7%
  - Nebraska had the lowest unemployment rate than at 2%

This bar graph shows unemployment rates by state in December 2022. Compared to September 2021, California’s unemployment rate had declined by around 3.5%age points from 7.5% to just over

4%. It has the 12th highest unemployment rate and Texas is within reach. This also moved the state closer to the overall U.S. unemployment rate (3.5%).

TABLE 1: CA EMPLOYMENT BY INDUSTRY, FEB 2020 - JAN 2023 (REVISED)

	Feb-20	May-20	Jan-22	Dec-22	Jan-23	Change Feb-20	% Change Feb-20
Civilian Labor Force	19,536,400	18,606,500	19,048,800	19,222,800	19,317,100	-219,300	-1.1%
Civilian Employment	18,733,800	15,604,400	17,959,100	18,440,500	18,503,400	-230,400	-1.2%
Civilian Unemployment Rate	4.1%	16.1%	5.7%	4.1%	4.2%	0.1%	
Total Nonfarm	17,650,000	15,106,000	16,331,200	17,869,700	17,869,700	219,700	1.2%
Mining and Logging	22,600	19,100	19,400	20,100	20,200	-2,400	-10.6%
Construction	911,700	826,600	900,700	920,400	913,100	1,400	0.2%
Manufacturing	1,324,300	1,230,200	1,316,300	1,346,100	1,348,200	23,900	1.8%
Trade, Transportation & Utilities	3,050,900	2,652,000	3,097,700	3,123,900	3,143,800	92,900	3.0%
Information	582,700	509,400	595,500	607,200	602,200	19,500	3.3%
Financial Activities	837,300	838,300	844,700	849,200	847,000	9,700	1.2%
Professional & Business Services	2,735,000	2,500,300	2,821,100	2,909,700	2,919,200	184,200	6.7%
Educational & Health Services	2,874,700	2,616,700	2,871,700	3,012,300	3,023,300	148,600	5.2%
Leisure & Hospitality	2,057,600	1,109,000	1,840,700	1,990,000	2,010,800	-46,800	-2.3%
Other Services	593,500	408,900	548,500	575,600	577,400	-16,100	-2.7%
Government	2,621,800	2,433,300	1,510,600	2,515,200	2,561,200	-60,600	-2.3%

- both labor force and employment continue to be below February 2020 levels, according to household survey
- establishment survey shows employment above pre-Coronavirus recession
- significant sectors still showing large deficit are: leisure and hospitality, government

To complete the brief state analysis, we want to list California’s sectoral employment numbers between February 2020 and January 2023, i.e., before and after the worst parts of the COVID-19 pandemic. Note that overall civilian employment decreased by 1.2% (230,400 workers) during this period, which is consistent with an overall decline in California’s population. One of the hardest hit sectors was Leisure & Hospitality, decreasing by 2.3%, which makes sense considering that international tourism was severely impacted by the

pandemic and still has not recovered to 2019 levels (actually Mining & Lodging fell by more, but the sector is very small in terms of employment). The two sectors with the highest growth were Professional & Business Services, and Educational and Health Services, increasing by 6.7% and 5.2% respectively. The Logistics sector would have been the winner overall, if the 17.6% increase in Warehouse & Transportation had not been offset by an equally large decline in Whole Sales.

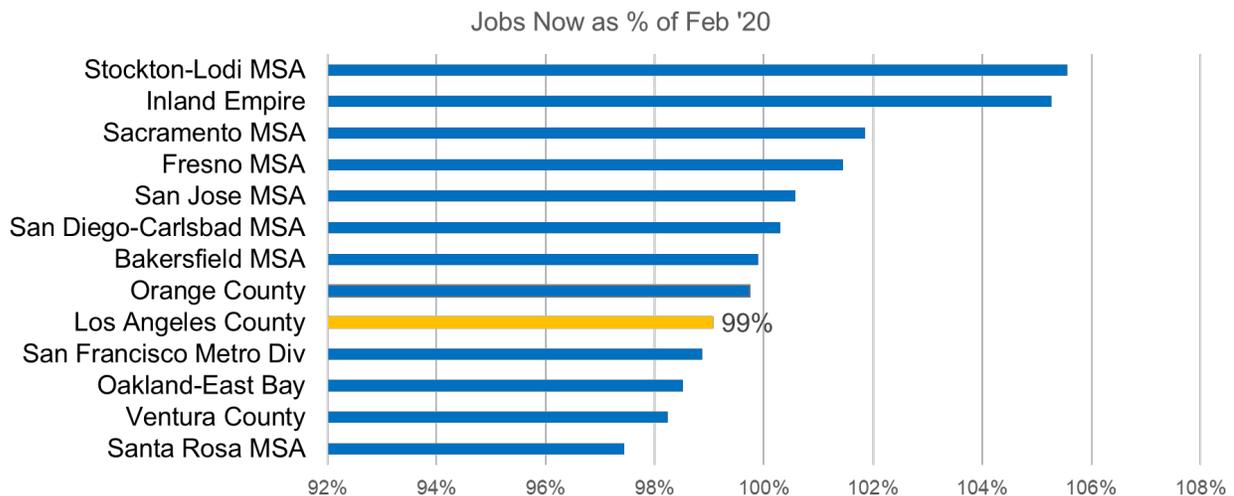
## THE INLAND EMPIRE ECONOMY

The Covid-19 Pandemic of 2020 saw our economy take one of its biggest negative shocks in its modern history. Social distancing made it nearly impossible to go to work, resulting in a significant decline in the labor force. Since then, work practices have slowly shifted to recover the loss. In Southern California, we have seen the labor force steadily increase in the Inland Empire, Orange County, and Los Angeles County. However, while the numbers have not reached pre-pandemic levels in Orange and Los Angeles Counties, they have recovered and are above pre-pandemic levels in the Inland Empire.

Besides the economic forecast for the Inland Empire economy, we want to address **deeper structural issues that are relevant for our region.**

Let's start with the positives. The **Inland Empire has been the economic miracle of the Coronavirus recovery** (see Figure 14). There is hardly any other region in California that has added more jobs than Riverside County and San Bernardino County. We have outperformed all other regions in Southern California; and, in addition, Silicon Valley and San Francisco.

FIGURE 14: JOBS NOW AS % OF FEB 2020



- Inland Empire created more jobs since the end of previous expansion with the exception of Stockton-Lodi
- our region outperformed other Southern California regions in terms of job creation
- even Silicon Valley (San Jose) did not show the same stellar job creation

Since February of 2020, the last month of the longest post World War II economic expansion, the Inland Empire has witnessed significant changes in its labor force. Employment, using the household survey, has increased by 1.1%, while it went up by almost 5% using the establishment survey. The two surveys will yield significantly different

results for the Inland Empire due to the effect of commuters, which are not captured by the establishment survey. This suggests that employment within the Inland Empire increased significantly more than when you take into account Inland Empire Residents who work in the Greater Los Angeles area.

From its peak in May 2020, the unemployment rate has decreased by a stunning 11.2%age points. The logistics industry, which consists of warehousing, transportation, and the wholesale industry, has seen a huge jump of 24.5% in employment. If you exclude the wholesale sector, the increase is even more impressive (36%). It is encouraging to see

that some other sectors have also performed well: Professional & Business services grew by 9.8% for example. The Information sector has seen significant losses. Leisure & Hospitality and Other Services, two of the most affected sectors, have basically completely recovered. Note that Government and, in particular Local Government, shed jobs.

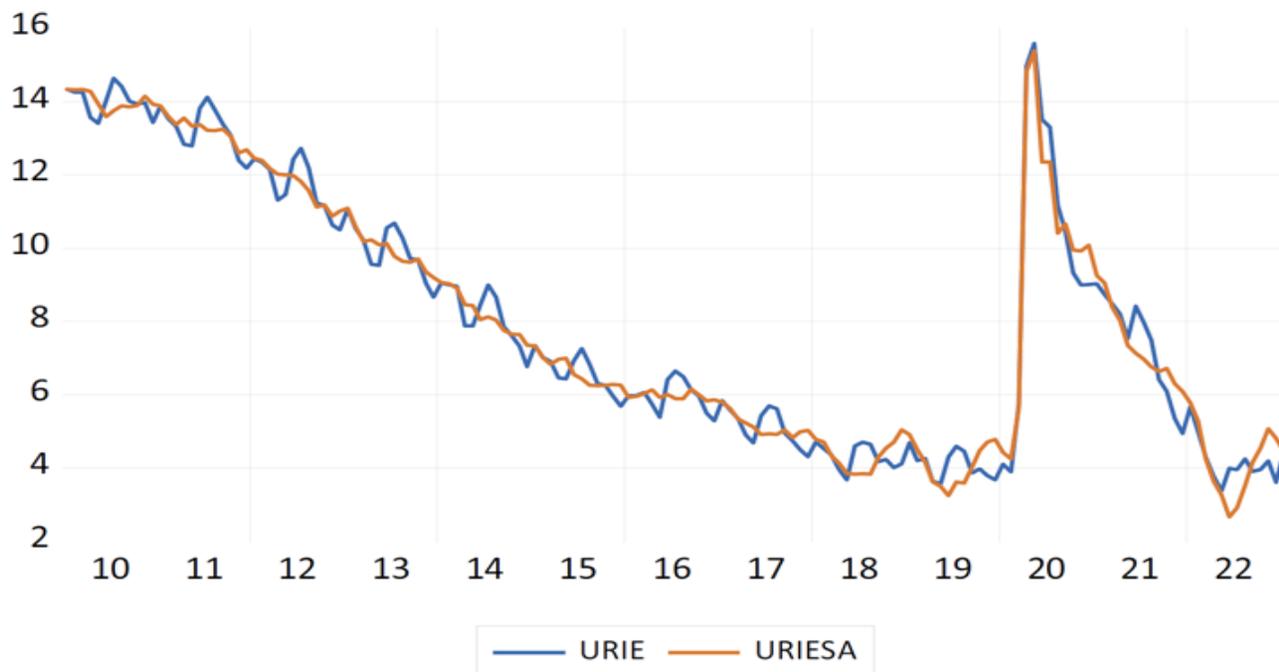
TABLE 2: EMPLOYMENT BY INDUSTRY, INLAND EMPIRE, FEB 2020 - JAN 2023

TITLE	Feb-20	May-20	Jan-22	Dec-22	Jan-23	Jan 22-Feb 20	% Change
Civilian Labor Force	2,123,800	2,025,600	2,165,300	2,200,200	2,160,000	36,200	1.7
Civilian Employment	2,041,000	1,709,900	2,042,500	2,120,600	2,064,100	23,100	1.1
Unemployment Rate	3.9%	15.6%	5.7%	3.6%	4.4%	0.5%	
Total Nonfarm	1,587,900	1,389,500	1,628,900	1,689,000	1,662,800	74,900	4.7
Mining and Logging	1,300	1,300	1,600	1,600	1,600	300	23.1
Construction	108,900	102,000	109,200	114,300	110,800	1,900	1.7
Manufacturing	100,900	93,500	97,800	98,100	98,200	-2,700	-2.7
Wholesale Trade	68,700	63,100	68,400	69,200	67,800	-900	-1.3
Retail Trade	177,000	148,000	178,700	187,700	182,200	5,200	2.9
Transp&Warehousing	152,900	154,800	207,800	214,900	208,000	55,100	36.0
Logistics	221,600	217,900	276,200	284,100	275,800	54,200	24.5
Information	11,300	8,800	10,100	10,300	10,100	-1,200	-10.6
Financial Activities	45,900	42,700	46,600	47,600	46,200	300	0.7
Prof&Bus Services	163,400	143,200	174,900	185,900	179,400	16,000	9.8
Educ&Health Services	259,600	239,000	260,900	273,300	271,700	12,100	4.7
Leisure & Hospitality	179,100	111,000	173,700	178,200	178,100	-1,000	-0.6
Other Services	48,100	34,700	45,600	49,200	47,800	-300	-0.6
Government	265,800	242,400	248,400	254,100	255,300	-10,500	-4.0
Local Government	212,500	189,200	199,800	206,400	206,700	-5,800	-2.7

The booming labor market is reflected in the relatively low **unemployment rate for the region**. The California labor department (Employment Development Department or EDD) does not release seasonally adjusted data for our region. That makes it somewhat tricky to separate business cycle concerns from simple seasonal fluctuations (you would not want to spend sleepless nights in the Coachella Valley if employment fell every June by 12% - it simply reflects an annual drop in employment due to the unbearably hot temperatures there in the summer). We have

removed recurring seasonal fluctuations from the Inland Empire unemployment rate time series, using standard statistical procedures (X-13). As a result, we are not worried about the recent 0.8% age point increase in the unemployment rate from December 2022 to January 2023. What does get our attention is the **increase in the seasonally adjusted unemployment rate since last summer** - this does turn on the alarm bells since, as we mentioned before, the Inland Empire has the **“First In - Last Out”** attribute in its labor market movements.

FIGURE 15 : UNEMPLOYMENT RATE, INLAND EMPIRE, SEASONALLY UNADJUSTED (URIE) AND SEASONALLY ADJUSTED RATE (URIESA), JAN 2010 - JAN 2023



**Housing** plays an important role in the Inland Empire economy. The low interest rate environment that prevailed for most of the last 20 years favored home buyers and builders alike. But interest rates have increased to their highest level in two decades as the Fed has fought to bring inflation down. This has had a chilling effect on home prices and home sales while creating new uncertainty for builders.

Table 3 shows that last year's peak season for the housing market was choked off before it got going by sharp increases in mortgage rates. The **median price** peaked in San Bernardino County at \$495,000 in April 2022, while Riverside County saw a peak at \$650,000 in May. The San Bernardino County median

has since slid by nearly \$30,000 compared to \$55,000 for the Riverside County median.

**Home sales** reached their high point in March 2022, but declined throughout the year and into 2023 as a result of higher mortgage rates. Home sales in February 2023 were 35% lower than a year ago in Riverside County and fell 42% in San Bernardino County.

The Fed's fight against inflation is not over, so **more rate hikes are expected in 2023**. The ultra-low rates that were characteristic of the last few years will not be returning soon. With high rates and limited supply, the housing market faces a difficult year ahead.

FIGURE 15 : UNEMPLOYMENT RATE, INLAND EMPIRE, SEASONALLY UNADJUSTED (URIE) AND SEASONALLY ADJUSTED RATE (URIESA), JAN 2010 - JAN 2023

Southern California	22.02	23.01	23.02	Price MTM% Chg	Price YTY% Chg	Sales YTY% Chg
Los Angeles	\$773,490	\$778,540	\$726,870	-7%	-6%	-33%
Orange	\$1,260,000	\$1,194,500	\$1,159,000	-3%	-8%	-26%
Riverside	\$605,030	\$585,000	\$595,000	2%	-2%	-35%
San Bernardino	\$450,000	\$446,900	\$466,500	4%	4%	-42%
San Diego	\$888,000	\$824,950	\$875,000	6%	-1%	-33%
Ventura	\$887,500	\$815,000	\$805,000	-1%	-9%	-33%

Source: California Association of Realtors, KE

- Riverside County home prices continue to be roughly 30% higher than San Bernardino County median prices
- Inland Empire housing prices remain more affordable when compared to coastal regions
- Year-to-Year sales are down by a third in Southern California

Similar to the rest of California, the Inland Empire has been sorely deficient in building new homes to meet the region's growing population. This **housing shortage** is therefore not just a chronic problem for the state, but for the region as well. The Inland Empire's regional housing needs are estimated to be closer to 300,000 units between now and the end of this decade. At 16,300 permitted housing, housing production rose nearly 5% from the previous year, but the region needs to expand production more dramatically. Unfortunately, the current high interest rate environment adds more uncertainty to an environment that is already rife with wildcards. Accordingly, an **increase in production in 2023 seems very unlikely.**

To simply rattle down further performance statistics for the Inland Empire at this point would be unproductive, meaning that in this section we want to go beyond what a recession would mean to the Inland Empire. Briefly, a **national recession** would cut back on the U.S. appetite for imports and thereby **reduce container shipments** with serious negative effects on the region's logistics sector. To make matters worse, employment in the Greater Los Angeles area would also decrease,

thereby affecting commuters from the Inland Empire directly. Since unemployment is measured by residency, we would observe increases in the Inland Empire unemployment rate first (think of a lake freezing from the periphery). Reduced spending by higher income commuters has secondary effects on the local economy, thereby lowering output and income of local firms and resulting in a further reduction of logistics employment as a result of fewer retail shipments.

The economic analysis that we have provided so far gives you a good summary picture of the current state of our area. However, there are some **big elephants in the room** that need to be addressed. They are:

- environmental concerns regarding warehousing,
- automation of the logistics industry,
- long-term outlook for the Inland Empire (Inland Empire in 2045)

We want to be brief here and simply stimulate discussions by policy and decision makers.

(i) **Environmental Concerns:** The Robert Redford Conservatory and 60 other environment groups have submitted a lengthy report to Governor Newsom asking for a

one to two year moratorium on building any further warehouses in the Inland Empire (see Exhibit 1).

## EXHIBIT 1: LETTER TO GOVERNOR NEWSOM BY 60 ENVIRONMENTAL GROUPS

January 24, 2023

Governor Gavin Newsom  
1021 O Street, Suite 9000  
Sacramento, CA 95814

CC:  
Attorney General Rob Bonta  
Office of the Attorney General  
1300 "I" Street  
Sacramento, CA 95814-2919

Superintendent Tony Thurmond  
California Department of Education  
1430 N Street, Suite 5602  
Sacramento, CA 95814-5901

RE: Over Sixty Organizations Urge Gov. Newsom to Declare a Public Health State of Emergency in the Inland Empire

**Location and space are essential components of a region's economic development.** The Inland Empire's proximity to the ports of Los Angeles and Long Beach gives us a **locational advantage** that resulted in the development of a transportation, warehousing, and logistics hub. The expansion of e-commerce and regional economic integration has fueled the sector's expansion. This hub has anchored the region's economic growth for the last fifteen years. Since December 2009, the end of the Great Recession, the broad industry category "Transportation and Warehousing" has generated one of every four new jobs in the Inland Empire, a total of over 145,000 jobs. Statewide, during the same period, these industries have created almost 386,000 jobs, or one of every ten new jobs in California. Altogether this sector accounts for almost \$1 billion dollars a month of total wages paid, or 15% of all wages in the region. In these industries, workers who traditionally have been excluded from well-paying jobs, those with no college education, have found relatively good-paying jobs.

**The development of this hub has not come without costs.** Pollution and traffic are at the forefront of our regional awareness. Some municipalities (Rialto, Colton) have imposed a moratorium on new warehouse construction. In addition, the State's Assembly is currently considering two bills that would impede further development of the region: **AB 627** would prohibit, by 2030, heavy-duty diesel trucks from circulating in the streets of San Bernardino and Riverside counties; and **AB 1000** would rule out the construction of warehouses larger than 100,000 square feet within a radius of 1,000 feet from a house, a residential development, or other sensitive receptors. **It is not our aim to discredit the health concerns that arise from the expansion of the logistics sector, but we must insist that any public measure should be grounded on a legitimate cost-benefit analysis.** This analysis should address how a moratorium will impact the thousands of jobs in the industry and the well-being of the workers' families.

(ii) **Automation:** Regardless of these environmental concerns, the **Inland Empire will be impacted by the fourth industrial revolution** (automation, robotics). While we feel that these developments would have happened sooner rather than later anyway, we strongly believe that the Coronavirus-downturn has accelerated the arrival.

Calculations on the **susceptibility of Inland Empire jobs to automation in 2016 identified the Inland Empire as the highest risk MSA in California and fourth in the nation:** about 63% of jobs at that point could have been technically automated within the next 20 years - but this was more than six years ago, employment in the Inland Empire is still tight, Covid-19 contributed to an increasing share in online sales with warehouses mushrooming in every corner of the region. Some have suggested that it was all just smoke and mirrors, overblown, and the risk of job losses is now a thing from the past.

Unfortunately, nothing could be farther from the truth, and people start to feel increasingly uncomfortable as **new Artificial Intelligence** software has crept into the lives of the many. This has taken place most notably in the form of a program called ChatGPT, capable of researching and writing entire texts in intelligent prose. Let us therefore briefly examine where we stood in 2016 and then some key developments since then, namely changes in the occupational structure largely driven by the warehouse boom, the effect of pandemics on the speed of technology adoption, and the development of new technologies and their costs.

In 2016, 75% or more of the jobs in the five largest occupational groups in the Inland Empire – (here listed in the order of size largest to smallest): office and administrative support jobs, logistics jobs, sales jobs,

hospitality jobs, and production jobs – were susceptible to automation. Interestingly, the total share of jobs in these occupations has not changed much. What has changed since then is that logistics jobs increased by roughly 80% and took the top spot, with now every sixth worker in the Inland Empire working in logistics, up from roughly every 9th worker - in just six years. At the same time, production jobs dropped to 9th place, but healthcare support occupations, which hold very low automatability, tripled in numbers, holding the previous balance of automatability in place. Nonetheless, these are **huge structural changes with possibly strong implications once automation arrives:** even if the current shortage of warehouse space remains (some doubt notwithstanding for the medium run), employment in warehouses post automation will set an even larger number of workers free relative to our predictions in 2016. As automation will not arrive in all industries at the same speed, high levels of concentration in some of these industries will increase the difficulty to manage adjustment processes in those industries, once they occur.

The pandemic did not only fuel the warehouse boom in the Inland Empire, it will, if history is any guide, **also accelerate the speed of technology adoption.** Data from past epidemics and pandemics as [analyzed by the IMF](#), suggest that robot adoption accelerates by 20% within four years after a pandemic ends relative to places without such health crises. Back-of-the-envelope calculations suggest that an *additional* 2.6% of the workforce—about 4 million workers—need to transition into new jobs during the next few years as compared to a scenario without a pandemic. Remarkably, a study by the consulting firm *McKinsey* obtained [similar results](#). For the Inland Empire, these effects are expected to be even more severe, as automation mostly affects less-skilled workers, which comprise a much larger share of workers in the Inland Empire than

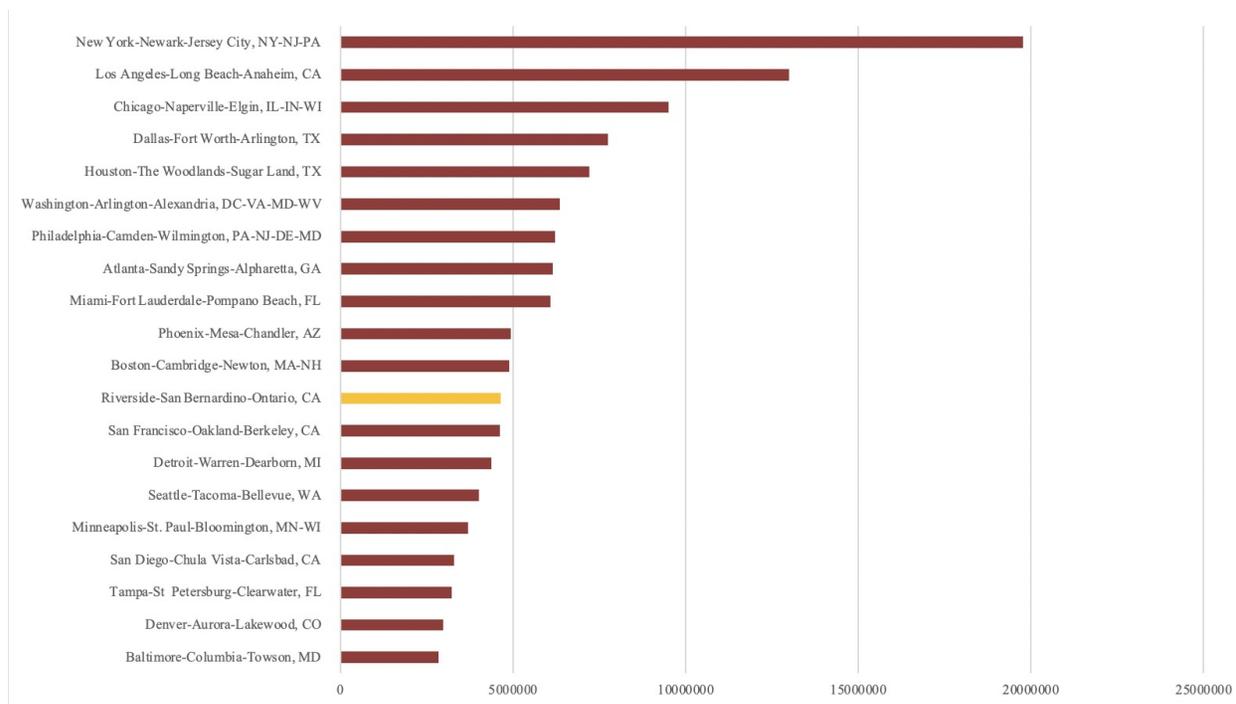
share of workers in the Inland Empire than at the national level; consequently the share of automatable jobs in the Inland Empire is about 35% higher than in the nation, leading to additional retraining needs for roughly 70,000 workers.

Lastly, robots have gotten cheaper and technology more capable. According to the [2022 AI Index Report](#) from Stanford University, **robotic arms dropped almost 50%** in price, AI investment grew roughly five-fold, publications per year on AI roughly doubled per year. Costs of AI systems dropped in half, and some performance measures show that its capabilities have increased up to ten-fold – all within just six years. Adoption costs are higher than just hardware and software

prices, but they constitute an important input. Large companies will continue their rapid adoption of technology, and with such wide-reaching performance and cost improvements, technology adoption becomes more likely every day.

Note that the Inland Empire has accumulated jobs that pay little, and do not produce much value added. These are at high risk of automation, contribute substantially to environmental pollution and consume vast amounts of space lost for more valuable production. Maybe the arrival of ChatGPT has finally sounded the alarm bells loud enough for decision makers to start preparing our workforce for an inconvenient truth: the fourth industrial revolution is here and is here to stay.

FIGURE 16: POPULATION OF TOP 20 MSAs, U.S., 2021



- the Inland Empire became the 12th largest MSA in 2021
- Riverside County and San Bernardino County are now second largest MSA in California
- next population up: Boston and Phoenix

(iii) **Inland Empire in 2045.** Finally we want to look ahead of where we see the Inland Empire going and what it might look like in about 20 years, or 2045. First the good news: in 2021, **the Inland Empire became the 12th largest MSA out of 384 in the U.S., passing San Francisco** - and thereby also being the second largest MSA in California. Our region is more populous than the San Diego-Carlsbad MSA as well. We are now right behind Boston-Cambridge-Newton and Phoenix-Mesa-Chandler.

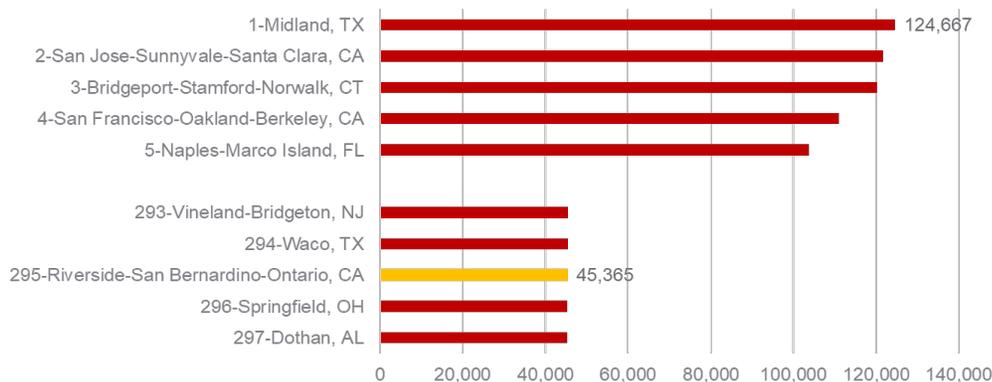
Time to bring out the Moet et Chandon or Cold Turkey?

Well, not so fast. Would you prefer to live, as the average person, in India/China or would you prefer to be a resident of Norway (the temperature notwithstanding) or South Korea/Spain? And if you said the obvious (the latter), how can we quantify what your preference is based on? The accepted/standard

measure of the “Wealth of a Nation” is per capita income or per capita GDP.

Calculating this measure for the Inland Empire and the other MSAs, our region sinks and sinks and sinks. We end in position 340 out of 384. How is that possible? It suggests that the goods and services we produce in our area (GDP) are not of high value. Note that GDP is calculated by evaluating the **goods and services produced within the area.** Perhaps this is not a fair characterization to the Inland Empire since 35% of our labor force generates GDP to the more coastal areas. That is a reasonable objection and as a result, we adjust the calculation to take into account the income that Inland Empire residents make while working in the Greater Los Angeles and San Diego area. This results in an upgrade in the rankings to .... 295 out of 384. What do we have to look ahead to? Waco, Texas and the Brazos River, and headquarters of the Dr. Pepper/Snapple’s group.

FIGURE 17: INCOME PER CAPITA



- the Inland Empire sinks all the way to 295 out of 384 MSA when measured by per capita income
- to put matters into perspective, Waco (Texas) is immediately ranked ahead of the area
- not surprisingly, Silicon Valley and San Francisco are in the top 5 - Midland (Texas) is oil producing

What if we wanted to **rise a bit more ambitiously**, say to the position of Phoenix by 2045? This is not unreasonable. It would require an additional annual 0.3 percentage point growth in our GDP plus assuming that Phoenix continues to grow at similar rates as in the past.

What is keeping us from doing so? The primary task is to **attract industries to our area that are more value adding**. If we could achieve that, then there would be **less of a need** for 35% of our **labor force to commute**, unless you assume that someone gets pleasure out of sitting in traffic for up to four hours a day (we cannot model insanity so we leave this to others). What prevents

these firms from settling in our area is the **lack of a highly educated labor force**: the percent of residents in the Inland Empire with a Bachelor Degree or higher is roughly 25%. It is over 10 percentage points lower than the same statistic for the Phoenix MSA. A primary target therefore has to be to **execute policies that raise the education levels** of the Inland Empire population. This is also where we have an additional concern regarding the logistics industry: if the area continues to be built up with warehouses and distribution centers, there will simply not be sufficient attractive space left for higher value adding firms to move into. Again, these considerations should be part of the cost-benefit analysis that we have suggested above.

# A CONVERSATION WITH AI ON THE ECONOMIC STATE OF THE INLAND EMPIRE: PART I

BY

MANFRED KEIL AND SASHA ROTHSTEIN<sup>2</sup>

It has only been three months since artificial intelligence firm OpenAI released ChatGPT, the chatbot so powerful it is already [replacing human workers](#). The AI has spurred mass panic at schools and universities over [new ways to cheat](#), and when added to Microsoft's Bing Search earlier this month, began [sending unhinged messages](#) to users. Regardless of whether you think ChatGPT is a harbinger of doom, there is no doubt, it is powerful. Need an original fifty-page term paper on Shakespeare in seconds? ChatGPT is your new best friend.

Naturally, we decided to test its knowledge of the Inland Empire economy. ChatGPT can write what experts are calling "[fluent BS](#)," allowing you, perhaps, to ace that literature class you are taking with 400 students. But can it replace economic analysts? To find out, we asked ChatGPT to "write a 500 word economic analysis of the current economic situation in the inland empire 2023." Here is its response in italics (and, of course, our comments below).

*"The Inland Empire region of Southern California has experienced significant economic growth in recent years. However, in 2023, the region is facing a number of economic challenges. This economic analysis will examine the current economic situation in the Inland Empire and*

*discuss the key factors driving the region's economic performance."*

A clean start, but not very original. Just like a high schooler to repeat our prompt back to us in the opening lines.

"The Inland Empire region consists of two counties: Riverside and San Bernardino. The region has a population of over 4 million people and is the 13th largest metropolitan area in the United States. The region has a diverse economy, with significant contributions from industries such as logistics, healthcare, manufacturing, and hospitality."

Actually, the Inland Empire has just become the 12th largest Metropolitan Statistical Area (MSA) in the U.S. (take that, SF!). Since that only happened last year, we are willing to give it a marginal pass. Other than that, it looks like our AI friend just scribbled down some random industries and called them significant. Manufacturing only generates 6.7% of employment in the Inland Empire; retail sales and professional & business services are both bigger employers than leisure & hospitality. Then there is the government sector, the second largest employer in the Inland Empire. Maybe ChatGPT thinks that the government's real contribution to output is negligible. Some of the readers may agree.

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<sup>2</sup> Keil: Chief Economist, Inland Empire Economic Partnership, Associate Director, Lowe Institute of Political Economy, Robert Day School of Economics and Finance, Claremont McKenna College. Rothstein: Harvey Mudd College, Senior Research Analyst, Lowe Institute of Political Economy.

Verdict: mostly wrong, with a couple correct statistics pulled straight from Wikipedia.

*“One of the key challenges facing the Inland Empire in 2023 is the labor market. The region has an unemployment rate of 7.4%, which is higher than the national average of 4.2%. The pandemic has had a significant impact on the labor market in the Inland Empire, with many businesses struggling to find workers. The hospitality industry, in particular, has been hit hard, with many hotels and restaurants struggling to fill open positions. This has led to wage inflation, with businesses offering higher wages to attract workers.”*

7.4% unemployment rate? Maybe one of ChatGPT’s programmers is named Rip Van Winkle and fell asleep in August 2021. The U.S. at 4.2%? In a parallel universe, maybe. The correct numbers are 3.6% for the Inland Empire and 3.4% for the nation. In the real economy you might struggle to find workers, but the AI is saying there’s a tight labor market at 7.4% unemployment—sorry, what?

The AI wraps up this section with a doozy of a claim that wage inflation is on the rise. Maybe it means nominal wages, because when you look at wage increases and inflation together, wage inflation is not our issue. The program suffers from money illusion and we personally find it hard to model insanity, but the AI programmers found a way.

Verdict: This paragraph? 100% fluent BS.

*“Another challenge facing the Inland Empire is housing affordability. The region has seen significant population growth in recent years, which has put pressure on the housing market. The median home price in the Inland Empire is \$450,000, which is significantly lower than neighboring Los Angeles County but*

*still high for many residents. This has led to a housing crisis, with many families struggling to afford rent or buy a home. The lack of affordable housing is also impacting the labor market, as workers are struggling to find housing close to their place of work.”*

Someone has been reading the LA Times letters to the editor section. Yes, housing affordability is a problem everywhere in California, but less so here in the Inland Empire. We pay for it in our two hour morning commutes from Upland to Downtown LA, though, adding another two hours coming back in the afternoon. Points given here for content and a fairly accurate median home price.

Verdict: A bit obvious to talk about California housing, but accurate overall.

*“Despite these challenges, the Inland Empire has seen significant economic growth in recent years. The logistics industry, in particular, has been a major driver of economic growth in the region. The Inland Empire is home to the largest distribution center in the world, which has attracted many businesses to the region. The region’s proximity to the ports of Los Angeles and Long Beach has also made it an attractive location for logistics companies.”*

All true. However, us humans would make sure to mention the environmental concerns around the Inland Empire’s logistics industry that has landed our region in international news headlines (see the NY Times and The Economist for more); plus, there is a major new development with Governor Newsom receiving a report by environmental groups asking for a two year moratorium on building warehouses in the region.

Verdict: Veracious verbiage, but missing major recent events that should be included.

*“In addition to logistics, the healthcare industry has also been a major contributor to the Inland Empire’s economy. The region is home to several large hospitals and medical centers, which employ thousands of people. The pandemic has also highlighted the importance of the healthcare industry, with many hospitals and medical centers seeing increased demand for their services.”*

We wish the health industry was as important for the Inland Empire as ChatGPT makes it sound. Government employs 7,200 more workers than the health industry, and even more if we exclude home care services from health care. More blatantly wrong is the claim that the health industry saw an increase in demand for their services during the pandemic. Instead, it suffered the second highest decline in employment (8% fall) during the early phases of COVID-19. Surprising? Yes, but people stayed away from medical facilities unless it was an emergency. Remember the number of dentist visits you made in 2020?

Verdict: We wish it were true, but this is entirely wrong.

*“Manufacturing is another important industry in the Inland Empire. The region has a long history of manufacturing, with industries such as aerospace, automotive, and electronics playing a significant role in the local economy. The pandemic has had a significant impact on the manufacturing industry, with many businesses struggling to find workers and dealing with supply chain disruptions. However, the industry has shown resilience, with many businesses adapting to the new economic environment.”*

Doubling down on manufacturing, huh? Maybe if President Biden’s reshoring plan works. As we said earlier, manufacturing generates less than 7% of private sector employment in the Inland Empire. As for the aerospace, automotive, and electronics firms that play a “significant” role—we’re going to need to see some receipts, ChatGPT.

Verdict: Totally wrong, and wipes out some benefit of the doubt we gave earlier.

*“In conclusion, the Inland Empire is facing significant economic challenges in 2023, including a tight labor market and housing affordability issues. However, the region has a diverse economy, with significant contributions from industries such as logistics, healthcare, and manufacturing. These industries have shown resilience in the face of the pandemic, and are likely to continue to drive economic growth in the Inland Empire in the years to come.”*

Most of what ChatGPT told us was trivial or false—wrong numbers, wrong interpretations, wrong industries (again, manufacturing?). At this point, it seems that ChatGPT is perhaps helpful for phrasing but still messes up factual statements. We hope that no one would pay for what the AI did get right, because important themes went totally omitted. Why not talk about the reason for 35% of the Inland Empire’s labor force commuting, or why we have the economic well-being (per capita GDP) of Waco, Texas! For now, it seems that ChatGPT could potentially be a helpful tool, but economists’ jobs require genuine creativity and they seem safe from artificial intelligence for now.

Final verdict: Failing grade. Time for GPT-4.