Will the Tech-Boom Falter if NASDAQ Enters a Long-Term Bear Market?

Jerry Nickelsburg
Director, UCLA Anderson Forecast
Adjunct Professor of Economics, UCLA Anderson School
December 2018

It has long been thought that the rapid growth in the California economy has been driven by the tech industry. There is ample evidence to support the notion, but there is also evidence that might question it. For one, there is no tech sector in the sense of being a well-defined industry classification. The standard classification of industrial and service sectors is the North American Industrial Classification System (NAICS) born after three years of statistical study in the late 1997.[1] Today something different might come out of such a study, but this is the classification that is currently in use. Thus bio-tech, entertainment-tech, green-tech and the like are buried within disparate sectoral categories depending on what the technology development is being used for.

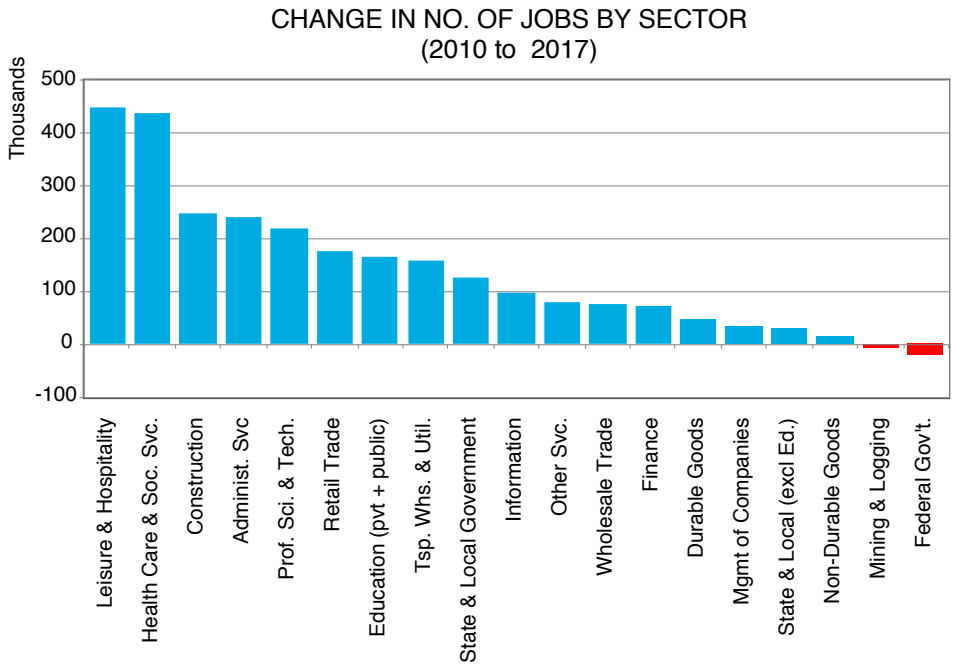
If one were to consider only the NAICS sectoral classifications, one would conclude that the growth in the California economy in this expansion was just a function of the health care and social services, and leisure and hospitality sectors. However, these are in large part derivative sectors; sectors whose demand depends on the growth of income. To be sure, part of leisure and hospitality is tourism from outside the state, and part of health care and social services is derived from an aging population and the passage of the Affordable Care Act. But is this really a recovery of Disneyland and geriatric care?

To answer that question, consider the following two sectors; information and technical, scientific and consulting services. These two sectors are heavily populated by what is commonly thought of as "the tech sector." Chart 2 is a plot of the growth rate of the combination of two sectors against the overall non-farm payroll job growth rate for the large MSA's in California. What is evident from this visual is that there is a high correlation between the two. The only region not quite in line with the others is Los Angeles, a region that prior to the last recession had a disproportionately large non-durable goods sector, a sector that has long been in decline. Therefore, it is important to ask the question, how long can the tech-boom continue?

In this California report we examine one part of the question; that of the potential funding of the tech-boom. Of late, equity markets have been retreating (see Chart 3). The NASDAQ is 10% off of its high, and large tech stocks such as Apple, SNAP and Facebook have fallen in value. It is not a long-run bull market, not yet. But the short-term bull market may not be over with either, and what if it becomes that? Tech funding is closely related to the NASDAQ exchange in two ways. First, increases in the NASDAQ market values provide an exit for investors to roll over venture capital into new, innovative tech start-ups. Second, valuations of tech companies are going to depend on the prevailing NASDAQ price/earnings ratios, and these valuations are used in estimating the rate of return to investments. The lower is the NASDAQ composite index the lower will be the valuation and the more difficult it will be for start-ups to obtain ven-

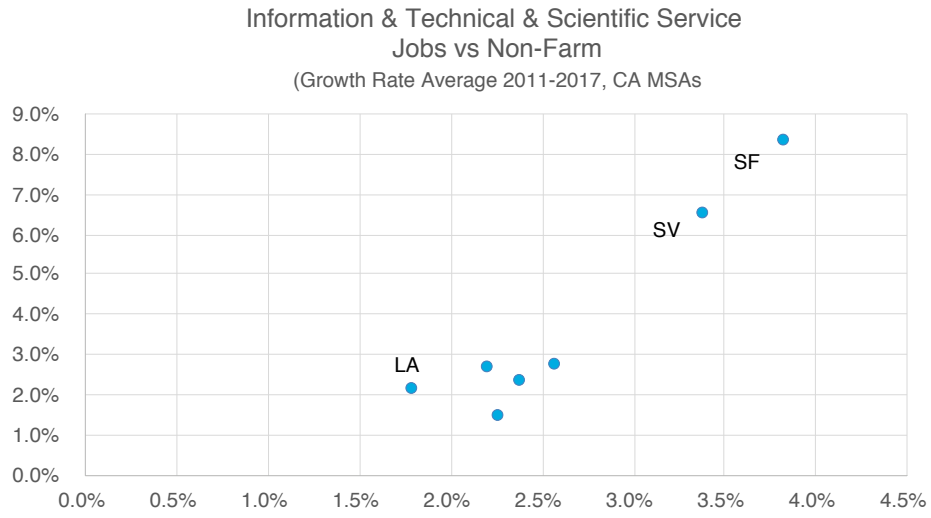
1. https://www.census.gov/eos/www/naics/

Chart 1



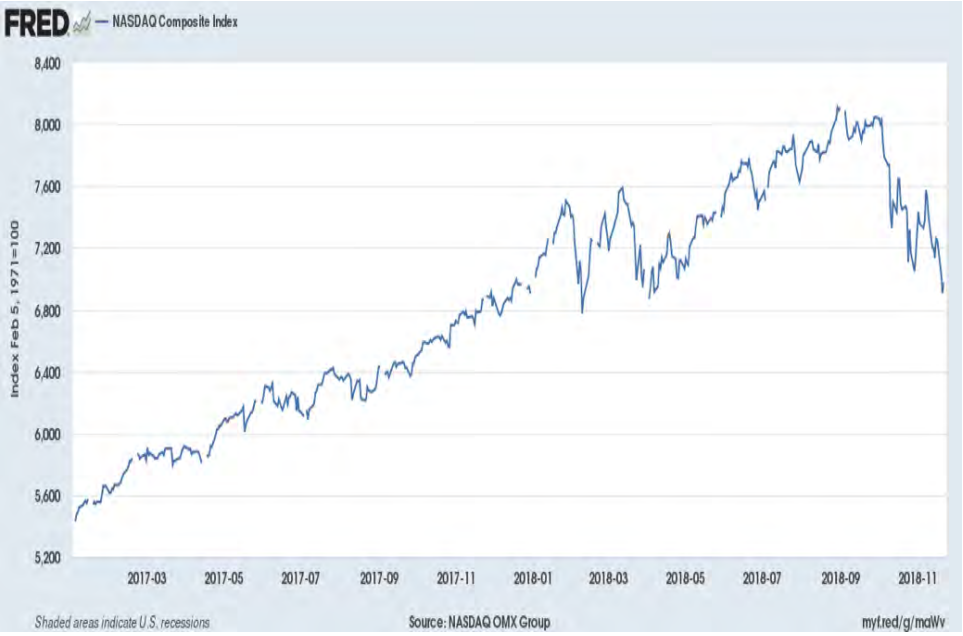
Source: EDD.ca.gov, UCLA Anderson Forecast

Chart 2



Source: EDD.ca.gov, UCLA Anderson Forecast

Chart 3



Source: Federal Reserve Bank of St. Louis

ture capital funding. This California report proceeds with a review of current employment trends, and then follows with some analysis of the sensitivity of venture capital funding and tech employment to changes in the NASDAQ composite index. We conclude with an update to the forecast for 2019 and 2020.

Employment Retrospective

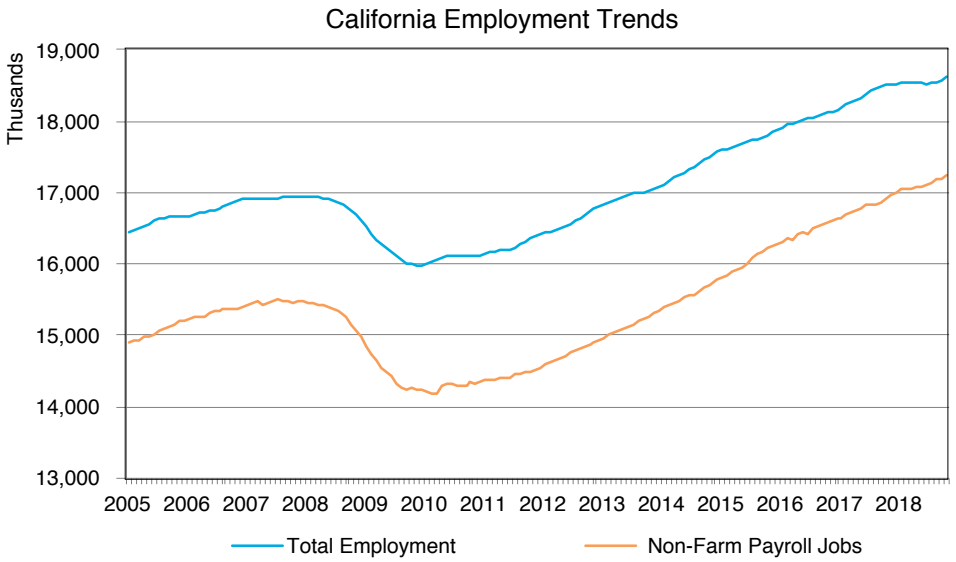
Three months ago we pointed out a divergence between the employment numbers the survey of households generated and the non-farm payroll jobs numbers the survey of establishments generated . The explanation lay in tight labor markets causing firms to convert 1099 contract workers who appear in the former survey but not the latter into payroll employees in order to retain them. That correction abated slightly in the subsequent three months, and California is once again experiencing increased total employment growth.

Non-Farm Payroll employment, which measures the number of jobs, increased to 17.24 million in October and that is 11.1 percent higher than the pre-recession peak. It is also 21.5 percent higher than employment at the depths of the recession. From October 2017 to October 2018 non-farm employment increased at a 1.8% rate, slightly higher than the previous twelve months.

Total employment, which measures the number of people employed and includes farm workers and non-farm non-payroll sole proprietors has dropped from a 2% growth rate to an October over October growth rate of only 0.6%. Thus far there is no discernable decrease in employment in agriculture from the nascent trade wars as farm jobs bounced back from an earlier temporary decline (Chart 4).

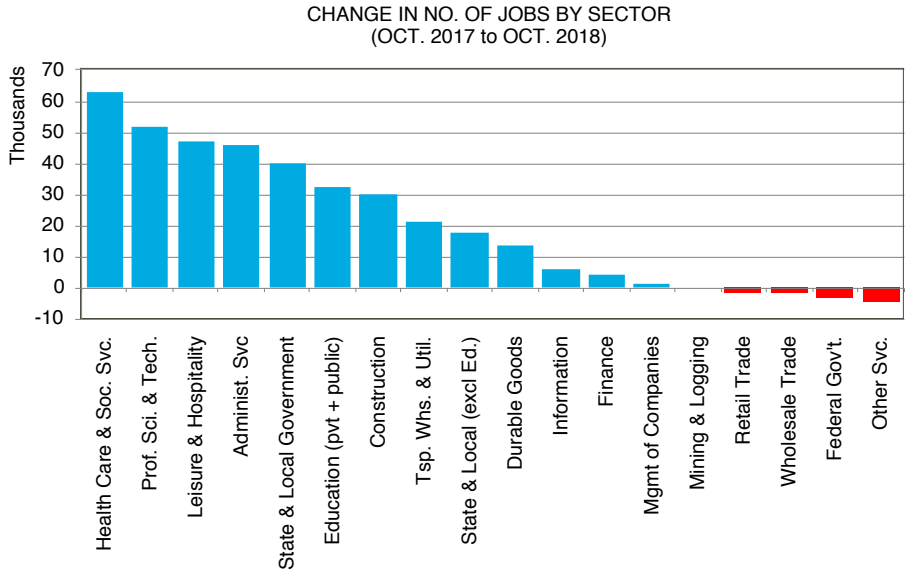
The growth in non-farm payroll jobs continues to be dominated by the health care, and leisure and hospitality sectors reflecting the demand of aging and retiring baby-boomer Californians (Chart 5). However, the spurt in payroll jobs in the past three months was driven by professional, technical and scientific services. This is one of the sectors that is heavily tech oriented. On a percentage basis (Chart 6) this sector is the fastest growing in the State. One of the risks to continued robust growth in the State is from a drying up of funding for this and other tech sectors and that is the subject of the analysis in the next section.

Chart 4



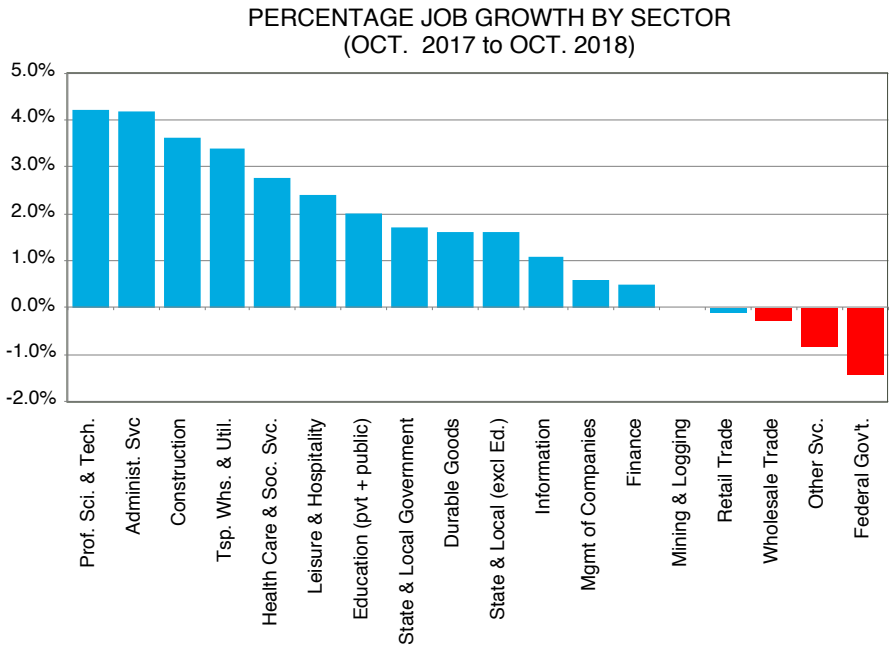
Source: www.edd.ca.gov

Chart 5



Source: EDD.ca.gov, UCLA Anderson Forecast

Chart 6



Source: EDD.ca.gov, UCLA Anderson Forecast

NASDAQ and Tech Employment

Venture capital investment in California soared through the late 1990s and into 2000. It came to a screeching halt when the dot-com bubble burst. In the decade that followed (Chart 7) investment adjusted for inflation was relatively flat. The recovery since the last recession (2008/2009) has seen a dramatic increase once again (150%). In the Bay Area tech employment growth, while still vastly higher than elsewhere, has abated of late, while real investment ought to increase in Los Angeles for the year. While venture capital is not the only source of funding for technological developments, R&D, and innovation—Alphabet funds internally for example—it is a driving force in the sector. Since the NASDAQ exchange is the equity arm of tech funding, we want to ascertain whether or not this might be considered an indicator of tech sector growth, and if so, whether it might provide signals of a slowdown in the sector in the future.

The analysis covers the period following the dot-com bubble—2001 to 2017. Both the dollar amount of venture capital and the NASDAQ composite index have an upward trend during this time. To keep the trend from distorting the analysis we focus on deviations from the trend. Since our hypothesis is that changes in the NASDAQ equity values create the conditions for growth in venture capital, we lag the NASDAQ data by one period prior to the venture capital data. Chart 8 plots those deviations (in logarithms). The correlation between the two series is .62 meaning that 62% of the variations in venture capital are captured by variations in the NASDAQ index.

The next step in ascertaining whether or not this relationship is important is to pick up the correlation between venture capital and payroll jobs in the tech sector.[2] Chart 9 plots the variation once again, but this time between venture capital funding in constant dollars and payroll jobs in the tech

2. *The tech sector is defined as the sum of the following NAICS sectors: software publishing; data processing, hosting and related service; telecommunications; other information services; specialized design services; computer systems design; management, scientific and technical consulting services; scientific research and development services; other professional, scientific and technical services. Note that the movie and broadcast sectors which are increasingly technology intensive are not included in this measure. It is expected that the tech part of these sectors would exhibit the same behavior, but data does not exist to verify that expectation.*

sector. The correlation between the two is .8 meaning that 80% of the variation in tech employment as defined herein is associated with variation in venture capital.

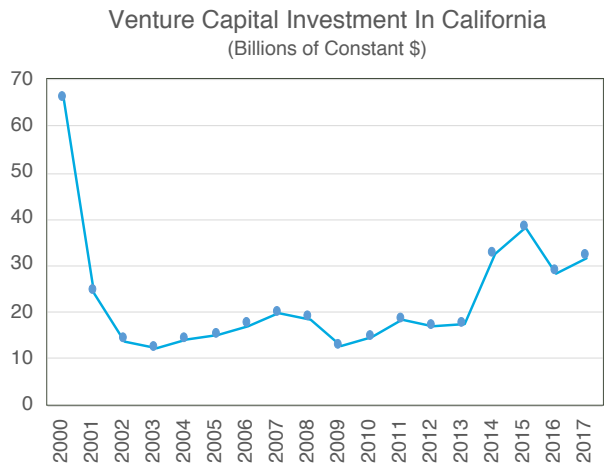
These two relationships are important because they trace a linkage between an important source of funding and valuation in the tech industry and employment in the industry. As seen in the opening section of this article, employment in the tech industry has been one of the keys to the growth in California, particularly in the Bay Area.

Thus far in 2018 the NASDAQ index growth rate has not changed by much. The last two months (October and September, 2018) have seen negative growth, but the NASDAQ is not down relative to its December 2017 average (Chart 10). The lack of growth is consistent with a relatively constant growth rate in San Francisco and Silicon Valley employment through October 2018 (the lower two lines in Chart 10).

The NASDAQ is clearly not the only factor affecting Bay Area employment. In fact, there was a surge in venture funding in the 2nd and 3rd quarters of this year, however it was primarily focused on roll-over and expansion funding for late-stage company financing.[3] Importantly, a housing shortage in the Bay Area and continued full employment are contributory and possibly dominant factors.

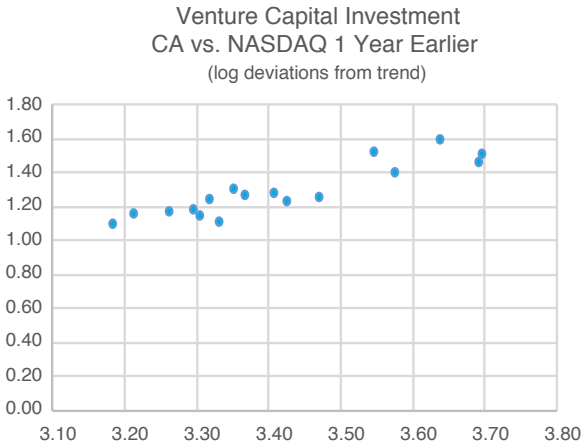
However, venture capital and other start-up funding is one factor, and given that it has the greatest potential for dramatic swings, one that is important to follow. Were we to enter a long-term bear market in 2019, this would be cause

Chart 7



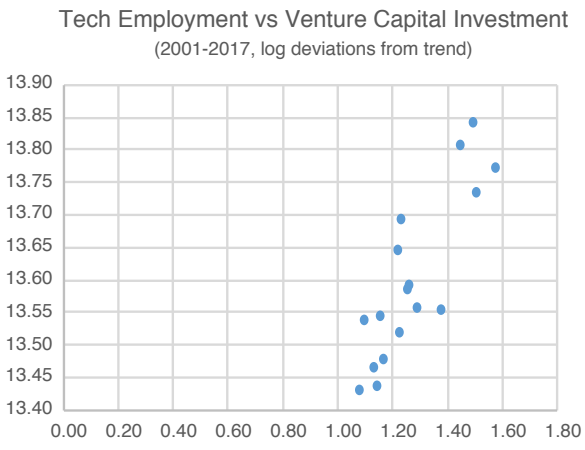
Source: Price Waterhouse Coopers and SiliconValleyIndicators.org

Chart 8



Sources: Price Waterhouse Coopers, SiliconValleyIndicators.org, Federal Reserve Bank of St. Louis & UCL A Anderson Forecast

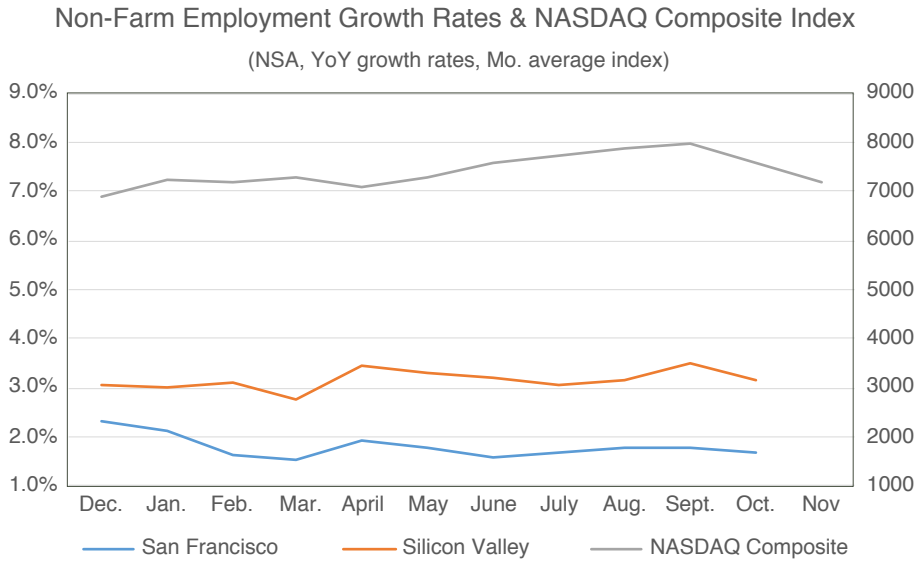
Chart 9



Sources: Price Waterhouse Coopers, SiliconValleyIndicators.org, EDD.ca.gov & UCLA Anderson Forecast

3. *https://www.pwc.com/us/en/moneytree-report/moneytree-report-q3-2018.pdf*

Chart 10



Sources: Federal Reserve Bank of St. Louis, EDD.ca.gov & UCLA Anderson Forecast

for concern and it clearly represents a negative risk to the forecast. At present we do not expect that, however we have built into our forecast a slowing of growth consistent with the current NASDAQ indicators beginning to end their multi-year run-up in valuations.

The Forecast (with William Yu)

Our current forecast for 2019 and 2020 is not much changed from the September forecast as the economy has been evolving much as expected to this point. The expectation is for slowing growth, consistent with the US economy, through the forecast horizon. In part this is due to running out of workers. Though we expect positive net migration as well as natural population growth, it will not be enough to stem the trend of slowing job growth. Nevertheless, 2019 ought to see faster job growth in California than in the US as a whole.

The elevated risk we have discussed over the past year still exists. The risk to NAFTA has only partially abated. The modifications in the agreement with Mexico and Canada will have little effect on the US and on CA since the new agreement focuses on the auto industry (it will increase auto parts manufacturing in Mexico due to the North American content rules) and the dairy industry (a very small sector in California's $2.5T economy). Of significance to California is the establishment of modern IP rules including domestic content calculations that recognize the role of software in modern autos and trucks.

Though the agreement has been signed by the executive branch of each of the three countries, it still has to be approved by the respective legislative branches. With a new congress in the US and the election in Mexico bringing AMLO to the presidency, this is not guaranteed. If the new agreement is not approved by the US Congress, the potential still exists for the Trump administration to follow through on threats to end NAFTA altogether. Therefore, this remains a forecast risk

The risk with a trade war with China is much greater and were that to come to pass, the logistics industry—one of the fastest growing sectors in California over the last year—will be very real. The signals at the moment are quite mixed. On the one hand President Trump has vowed to increase tariffs on Chinese goods to 25% and on the other there seems to be a willingness to postpone the imposition of tariffs in hopes of obtaining a modest deal in the coming months. Our forecast is consistent with the latter. Nevertheless, this is a risk that we will keep an eye out for as it has the potential to derail the forecast.

We expect California's average unemployment rate to rise slightly to an average of 4.5% in 2020, an average consistent with full employment. While the overall forecast is not much different from that released in September 2018, some economic activity has been pulled forward into 2019 due to fiscal incentives. This results in a weaker 2020 than was implied by our previous forecast but not a significant change

Our forecast for 2019 and 2020 total employment growth is 1.4% and 0.7% respectively. Payroll jobs are expected to grow at a 1.5% and 0.9% rate respectively. Real personal income growth is forecast to be 3.7% and 4% 2019 and 2020 respectively. The continued growth in real personal income in 2020 is reflective of the changing mix of employment in California and tight labor markets in high wage occupations. Homebuilding will accelerate to about 140,000 units per year by the end of the forecast horizon 2020 in spite of higher interest rates. This will be a response to easing zoning and regulatory requirements for developers and a continued strong demand for housing in the State.