



PERC DATA POINTS

ISSUE 1, 2023



TEXAS A&M UNIVERSITY
Private Enterprise
Research Center

AN OVERVIEW OF THE ECONOMIC PERFORMANCE OF STATES IN THE U.S. FROM 2010 - 2022

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INTRODUCTION

“How is the economy performing?” Questions about economic performance are some of the most frequently asked questions posed to economists. A definitive answer oftentimes proves to be a complex task, as economic performance can be described from a variety of perspectives.

Here we focus our discussion of economic performance around real gross domestic product (RGDP). As one of the most referenced measures of economic performance, RGDP counts the output of final goods and services generated within a specified economic area. Still, discussions of RGDP are nuanced, as changes in RGDP can be described by either 1) changes in population or 2) changes in RGDP per capita, a measure related to productivity. In what follows we will discuss trends in both population and RGDP per capita in addition to RGDP itself.

We present information on trends in the performance of U.S. states over the recent 2010 - 2022 period, which followed the Global Financial Crisis and the Great Recession. This period also captures the emergence of the COVID pandemic, and thus we expect to see its effects as well. The primary goal of this paper is to examine which states had the highest or lowest levels of RGDP and growth in RGDP, and how the various state economies performed as a whole and on a per capita basis.

METHODOLOGY

Our analysis is divided into four sections. In the first section, we provide an overview of the year-by-year levels of RGDP, population, and per capita RGDP for all 50 U.S. states. Two years are compared, 2010 and 2022, which are the beginning and end of our period of analysis.

In the second section, we analyze trends in the growth rates of RGDP, population, and RGDP per capita from 2010 to 2022 for the entire U.S. and for the four largest states by population. Those states are California, Florida, New York, and Texas.

The third section provides an extension of this discussion by examining the annualized growth in all 50 U.S. states, with comparisons of their economic performance in relation to each other and to the nation as a whole.

To finish our discussion, the fourth section investigates the relationship between a state's relative RGDP per capita at the beginning of our observed period (2010) and its corresponding growth over subsequent years. This part of our analysis stems from the Solow Growth Model, which predicts that economies with lower levels of output per capita, lower levels of per capita RGDP, will grow faster than economies with higher levels of output per capita. That is, there is a tendency – not a requirement – for there to be convergence over time in the levels of RGDP per capita.

Utilizing data from the Federal Reserve Economic Database (FRED), the U.S. Census Bureau, and the U.S. Bureau of Economic Analysis, we obtain the RGDP, population, and per capita RGDP from 2010 to 2022. Measures of growth for the 2010 to 2022 period are presented as geometric average annual rates.

LEVELS OF RGDP, POPULATION, AND PER CAPITA RGDP IN THE U.S. AND ACROSS STATES

GDP varies across states, in part based on population size. U.S. RGDP, measured in 2012 dollars, was \$20,014 billion in 2022. California, the largest state by population, also had the highest RGDP at \$2,886 billion. Texas, the second largest state by population, had an RGDP of \$1,876 billion. New York, the fourth largest state by population, had an RGDP of \$1,563 billion. Meanwhile Florida, the third largest state by population, had an RGDP of \$1,071 billion.

Across the U.S., RGDP varied from California's highest to Vermont's lowest, at \$31 billion. But Vermont's population was 49th of the 50 states. With only 647,000 people in Vermont as compared to 39 million people in California, direct comparisons of RGDP in the two states is comparing apples to oranges, or perhaps apples to bushel baskets of apples.

Figure 1 graphs the level of RGDP in each state for 2010 and 2022. States vary widely in the levels of RGDP. Comparing the changes in RGDP between 2010 and 2022, it is also clear that the states vary in how much RGDP has grown over time.

FIGURE 1. STATE RGDP 2010 AND 2022
(100,000s OF 2012 DOLLARS)

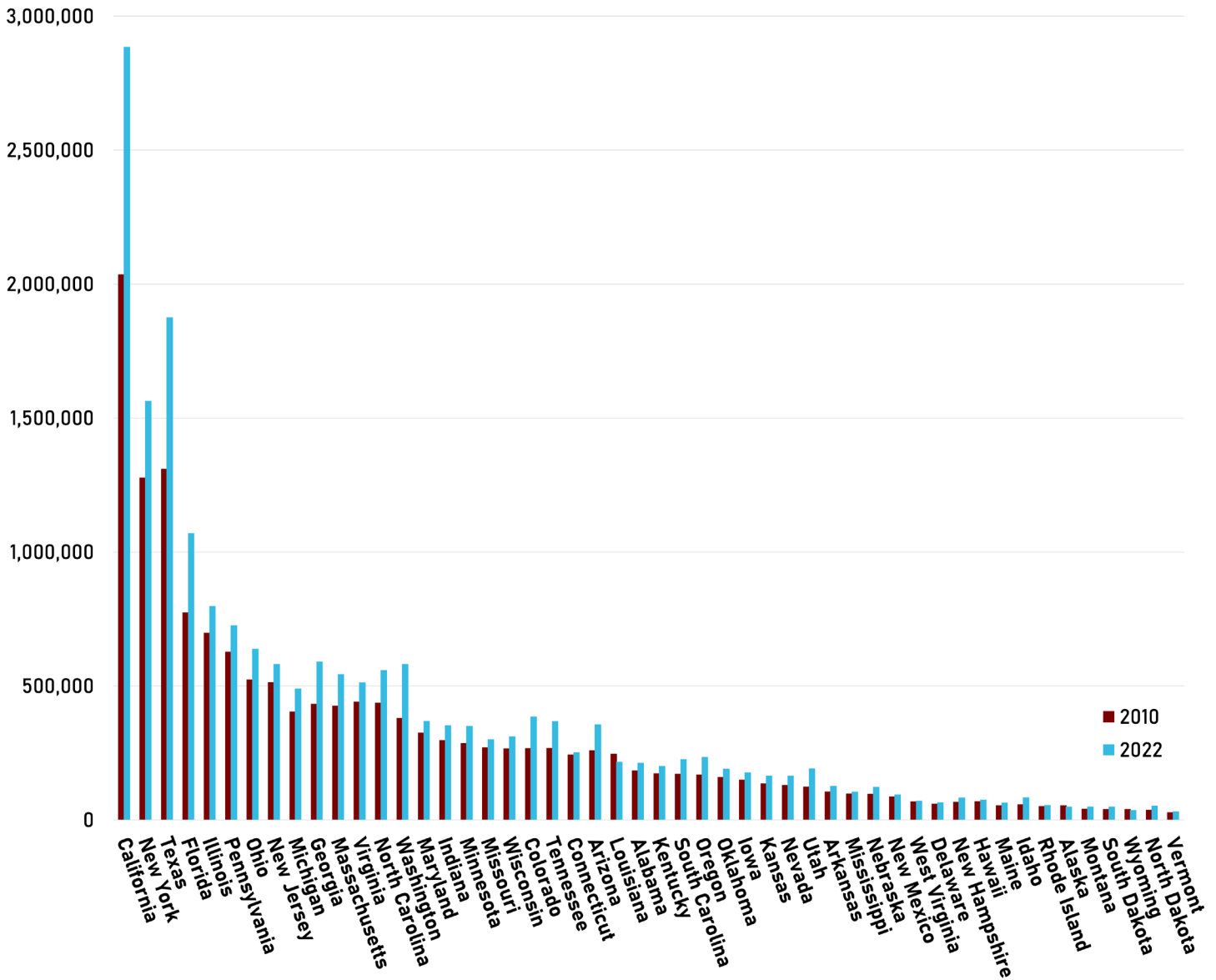
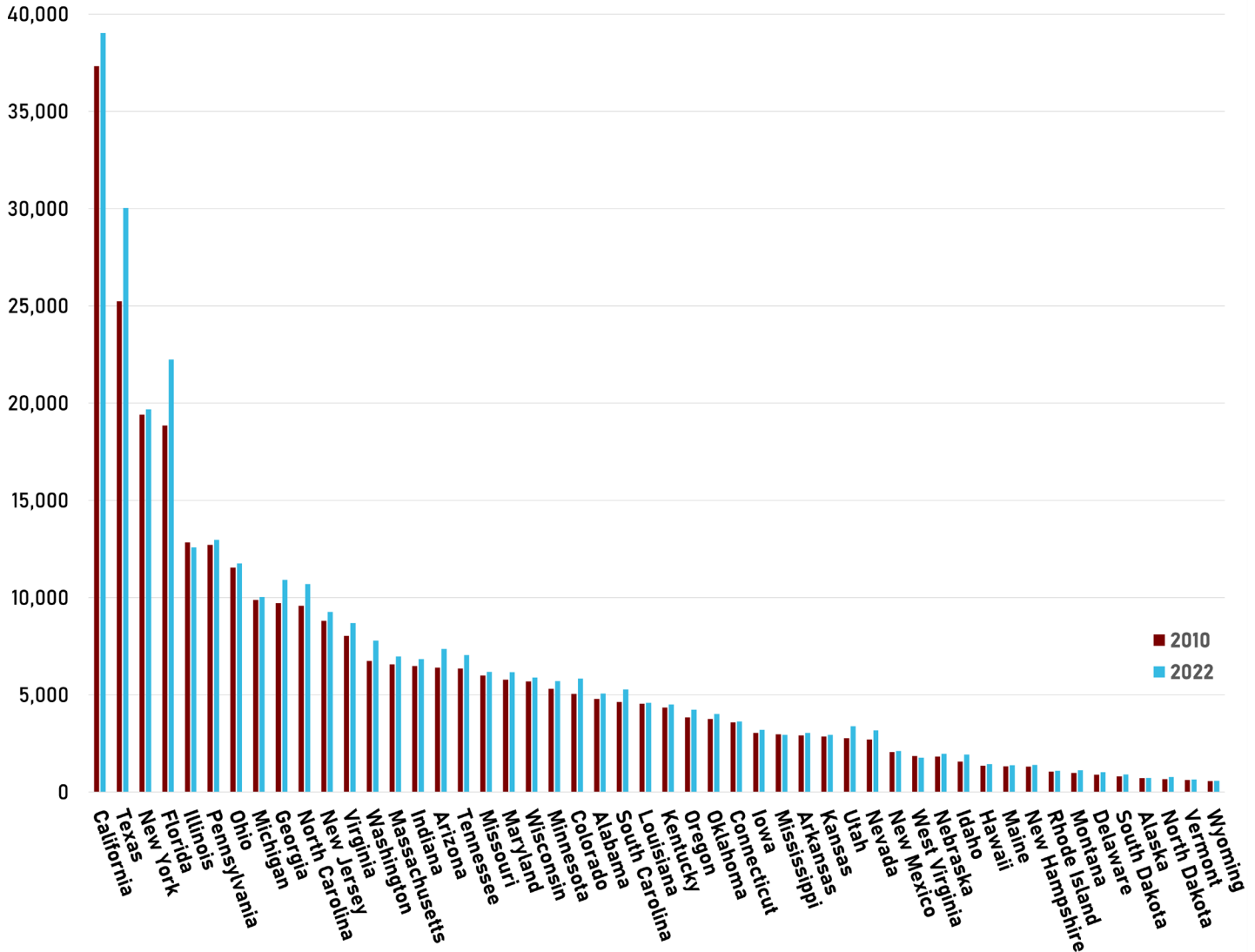


Figure 2 graphs state population in 2010 and 2022. Again, states vary widely in population, as noted above in comparing California with Vermont. In addition, states vary in population growth as well. The overall U.S. population increased 7.7% from 2010 to 2022. Texas increased 19.0%, and Florida 18.0%, both well above the national rate. Meanwhile, California grew 4.6%, and New York grew 1.4%, both exhibiting slower growth than the national rate. The fastest growing state was Idaho, which registered a 23.4% increase in population over this period. The slowest growing was West Virginia, which shrunk by 4.3% over this period. The number of residents in Mississippi and Illinois also shrunk over this period.

FIGURE 2. STATE POPULATION 2010 AND 2022
(1,000s)



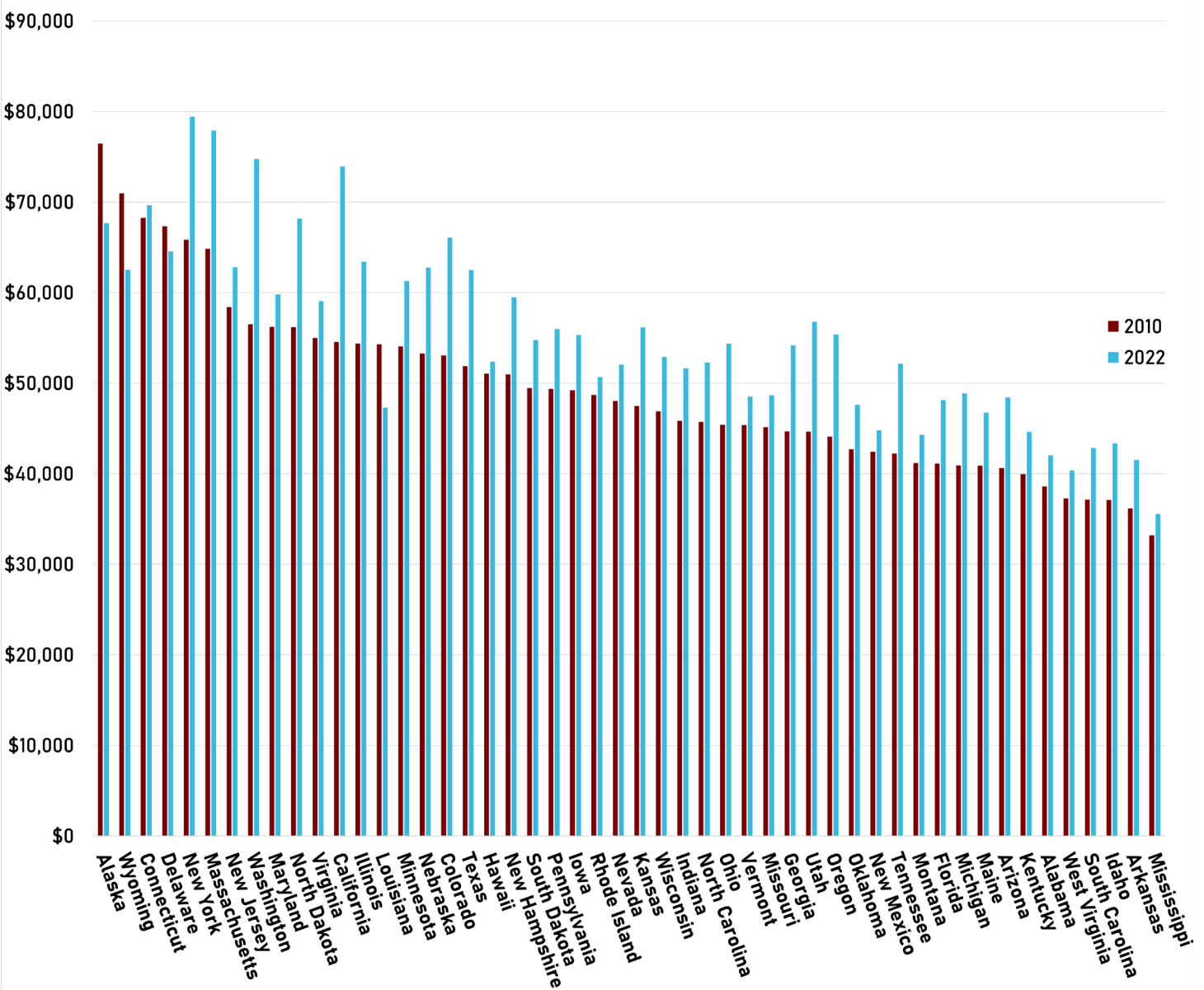
Finally, we consider RGDP per capita. State RGDP can be larger if a state has some combination of a larger population or a larger RGDP per capita. In many instances, it is more telling to compare RGDP per capita than it is to compare levels of total RGDP. For instance, China is approaching the U.S. in RGDP, but with three times as many people, China’s RGDP per capita is still far below the U.S. When discussing the well-being of individuals, high levels of RGDP per capita are usually more desirable than low levels of RGDP per capita. However, when discussing national power, including military power, there is an argument that the nation has access to total RGDP and so total RGDP is a better indicator of national power.

Nationwide, RGDP per capita in the U.S. was \$50,590 in 2010 and \$60,051 in 2022 (both figures in 2012 dollars). This was an increase of 18.7%. In 2022, RGDP per capita varied from \$79,434 in New York to \$35,556 in Mississippi. For the largest states, RGDP per capita in 2022 in New York was \$79,434 as reported above. It was \$73,935 in California, \$62,483 in Texas, and \$48,143 in Florida.

Per capita RGDP varies substantially across states, and the growth rate of per capita RGDP also varies substantially. Some states saw big increases in per capita RGDP between 2010 and 2022.

Some did not. Some even saw decreases. For instance, the first two states in the graph in Figure 3, Alaska and Wyoming, saw actual declines in RGDP per capita over this twelve-year period.
 Figure 3: State RGDP per Capita 2010 and 2022 (2012 dollars)

FIGURE 3. STATE RGDP PER CAPITA 2010 AND 2022 (2012 DOLLARS)



GROWTH TRENDS ACROSS THE 4 LARGEST STATES

To look at growth trends, we set 2010 as the base year and indexed the initial values of all states to 100 in that year. Then we graph the indexed values for the period 2010 - 2022. We did this for RGDP, population, and RGDP per capita. The change over time in these indexed values provides a relative comparison of growth in RGDP, in population, and in RGDP per capita over time.

RGDP Growth

We begin our discussion with Figure 4, which shows the indexed values of RGDP for our five series from 2010-2022. Figure 4 provides a visual representation of how RGDP has grown over time for the U.S. and for California, Texas, Florida and New York. Over this period, Texas,

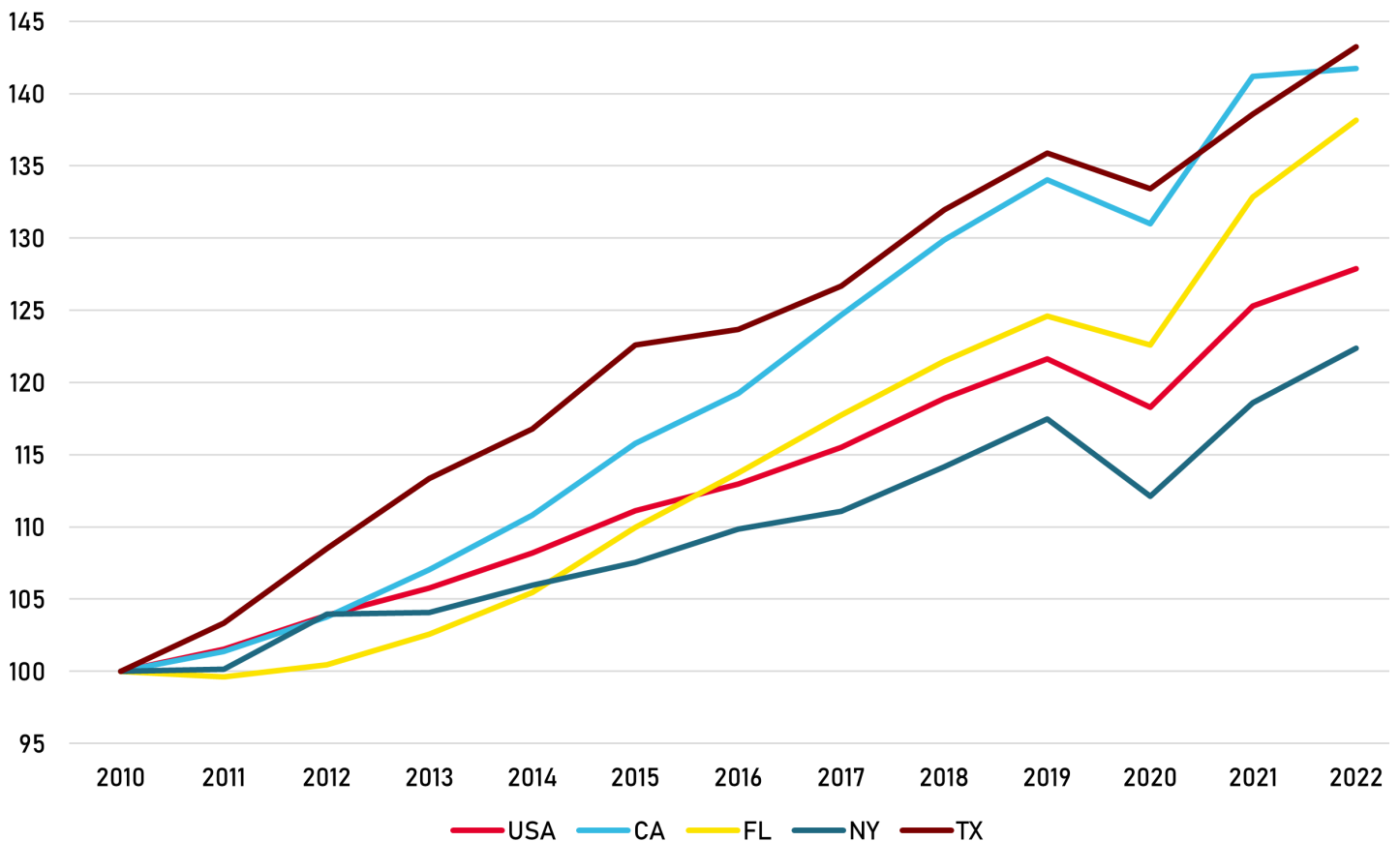
California and Florida have all exhibited faster RGDP growth than RGDP for the entire U.S. New York exhibited slower RGDP growth than nationwide. The impact of the COVID recession in 2020 is clear in all series, as well as the subsequent recovery.

In the graph, California and Texas have been above the U.S. in their indexed RGDP value for every year since 2010. Florida's indexed real GDP level was below the U.S. until 2016, at which time it rose above the national level and accelerated post-pandemic recession. New York lagged the national level and was consistently below the U.S. after 2012. Texas and California have grown roughly fifty percent more than has the entire U.S. over this period, with Florida not far behind.

After the COVID recession, Florida's RGDP grew the fastest, moving quickly toward the index values of Texas and California.

Over the entire period, the geometric average annual growth rates of each series are calculated as 2.07% for the U.S., 3.04% for Texas, 2.95% for California, 2.73% for Florida, and 1.70% for New York.

FIGURE 4. U.S., CA, FL, NY, TX RGDP GROWTH (2010 - 2022)



Population Growth

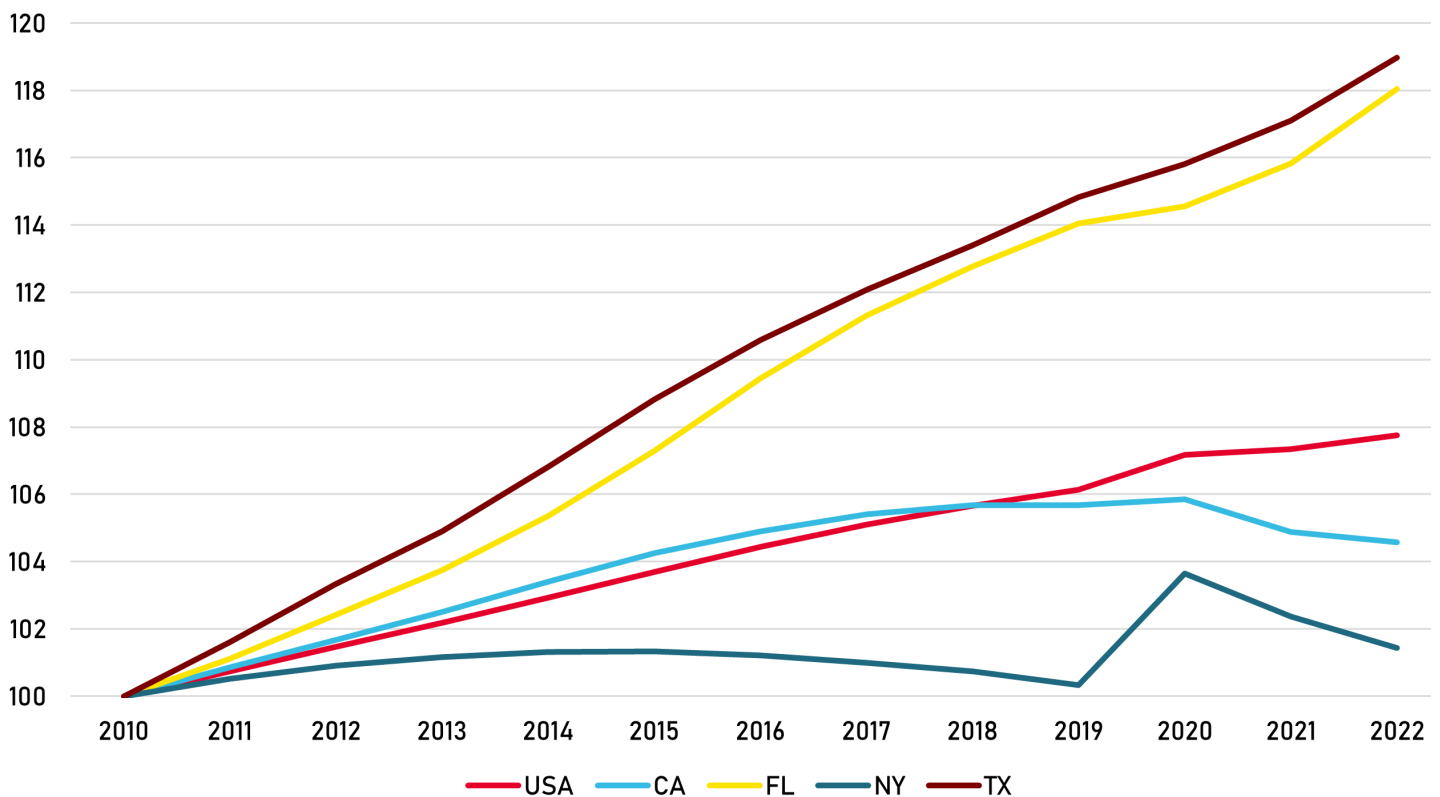
A state's total RGDP can grow because its population grows or because its RGDP per capita grows. First, we examine population. Figure 5 graphs index values of the population for the U.S. and for the four largest states by population from 2010 to 2022. Texas and Florida have grown the most over this period, Texas slightly more than Florida, and both have grown more than twice as much as the U.S.. California grew at the same rate as the national rate until 2019, but since then California's population has shrunk. New York's population grew very slowly until 2015,

experienced a decline in population until 2020, a spike in 2020, then another decline in population in the remaining two years.

(New York's reported jump in population in 2020 is almost incredible, but that is what is officially reported. This jump is said to be due to an overcount in its population in the 2020 census. In any case, subsequent values in 2021 and 2022 strongly support the conclusion of a miscount in 2020.)¹

In terms of geometric average annual growth rates, the U.S. population grew 0.62% over this period. Texas grew 1.46% annually, Florida 1.39%, while California grew 0.37% and New York 0.12%.

FIGURE 5. U.S., CA, FL, NY, TX POPULATION GROWTH (2010 - 2022)



Per Capita RGDP Growth

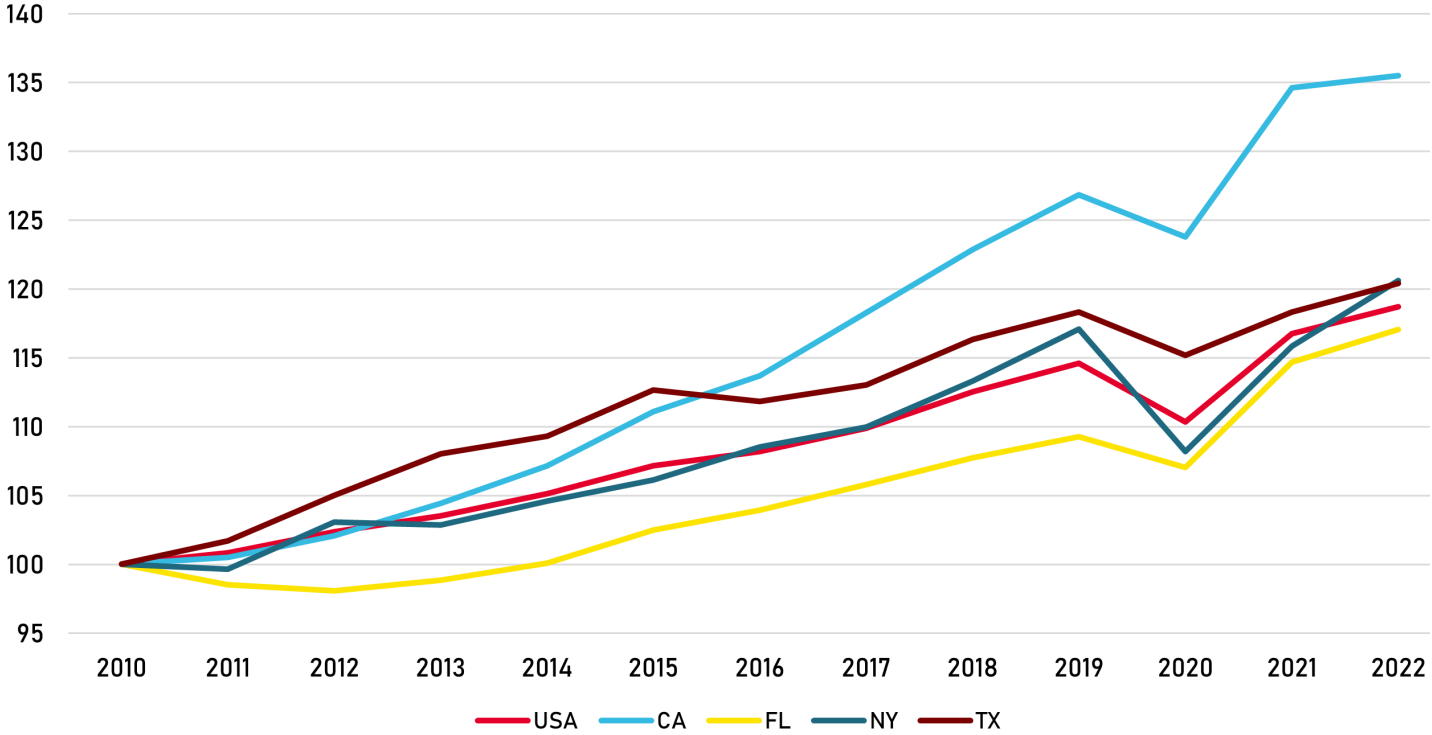
Figure 6 shows the index value of RGDP per capita over 2010-2022. Real GDP per capita can increase due to an increase in RGDP per hour worked or due to an increase in hours worked per person. RGDP per hour worked is a measure of labor productivity. Hours worked per person is a measure of labor utilization. Hence, RGDP per capita is a measure that summarizes the joint contribution of labor productivity and labor utilization within an economy.

We can see in Figure 6 that California was the leader over this entire period in terms of RGDP per capita. RGDP per capita in California grew more than twice as much as RGDP per capita in the U.S. as a whole. Meanwhile, RGDP per capita in the other states – Texas, Florida, and New York – grew much more in line with the national rate. Texas was higher than the national rate, and above California until 2016, while New York largely followed the U.S. Meanwhile, Florida lagged below the national rate, although it has been markedly catching up in the last few years.

¹ <https://www.pewresearch.org/short-reads/2022/06/08/key-facts-about-the-quality-of-the-2020-census/>

The large impact of the COVID pandemic in 2020 is apparent in Figure 6, with all series exhibiting a decline in RGDP per capita, followed by a recovery in subsequent years. U.S. RGDP per capita increased at a geometric average annual rate of 1.57% over our sample period. California’s annual rate was 2.80%. Texas grew annually at 1.70%, New York 1.72%, and Florida 1.44%. California’s rapid growth is due to its industry mix, including its tech sector. For the U.S., the Information industry had the fastest growth in inflation-adjusted value added over this period, followed by Professional and Business Services. Among California’s industries Professional and Business Services had the highest total real value added, and Information the third highest.

FIGURE 6. U.S., CA, FL, NY, TX PER CAPITA RGDP GROWTH (2010 - 2022)



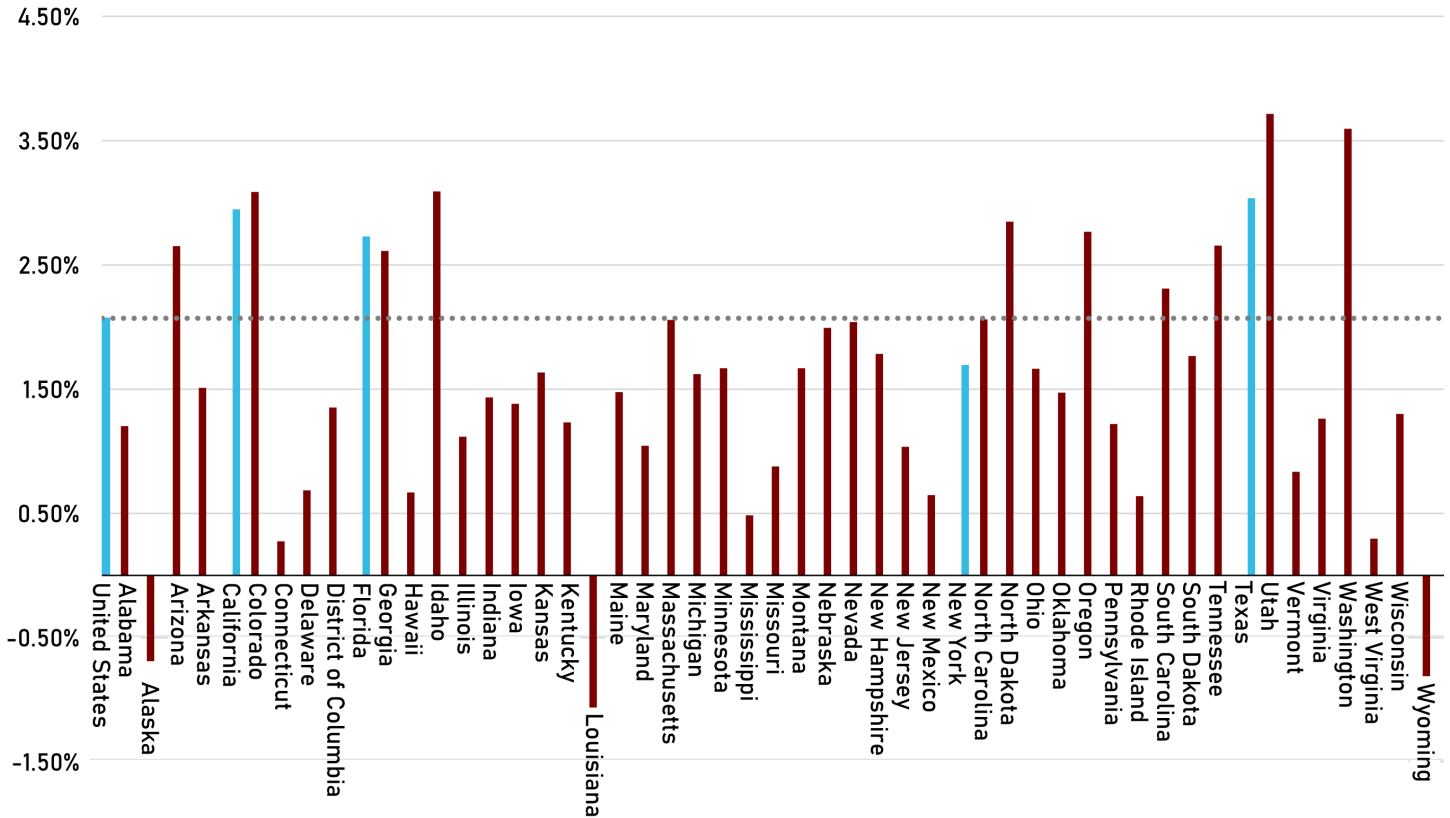
GROWTH ACROSS ALL STATES

Here, we expand our discussion to encompass all 50 states. To succinctly represent the growth of the states across the time period, we take interest in the annualized growth rate of the states across the time period. As stated in the previous section, the annualized growth rate is an average of the growth experienced by a state across a time period, so it may not reflect year-by-year trends. However, it provides a good overview of how each state performed over the time period. Annualized growth rates of RGDP, population, and per capita RGDP are also discussed.

RGDP Growth

Our discussion begins with the topic of annualized RGDP growth from 2010-2022. Figure 7 depicts annualized RGDP growth across the U.S. and all 50 states. The four largest states by population are represented by the blue bars. The dashed line represents the annualized RGDP growth of the U.S., which is also shown in the left-most blue bar.

FIGURE 7. STATE RGDP ANNUALIZED GROWTH (2010 - 2022)



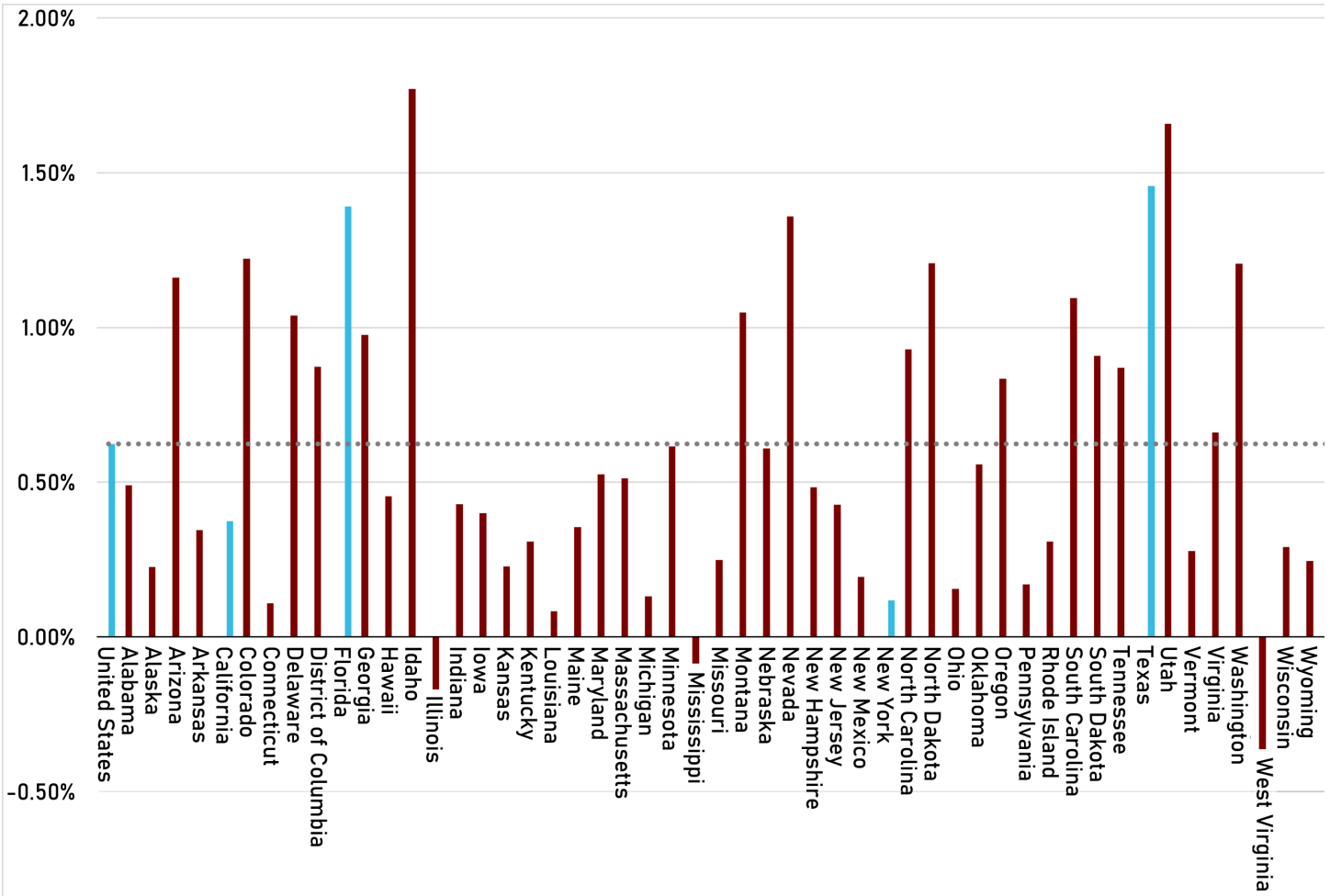
There are a few notable results in Figure 7. California, Colorado, Idaho, Texas, Utah, and Washington experienced very high annualized RGDP growth rates relative to the rest of the states. Connecticut, Mississippi, New Mexico, Rhode Island, Vermont, and West Virginia experience fairly low levels of annualized RGDP growth. There were three states – Alaska, Louisiana, and Wyoming – that had negative annualized RGDP growth rates over this time period.

Population Growth

Figure 8 depicts annualized population growth across the U.S. and all 50 states over 2010-2022. Once again, the four largest states by population are represented by the blue bars. The dashed lines represent the annualized population growth of the U.S.

There are several notable results in Figure 8. Idaho, Texas, and Utah experienced very high annualized population growth rates relative to the remaining states. Connecticut, Louisiana, Michigan, New Mexico, New York, Ohio, and Pennsylvania experienced fairly low levels of population growth. There were also a few states – Illinois, Mississippi, and West Virginia – with negative annualized population growth rates. One additional point worth noting is that California’s annualized population growth rate was relatively low, falling well below the national level.

FIGURE 8. STATE POPULATION ANNUAL GROWTH (2010 - 2022)

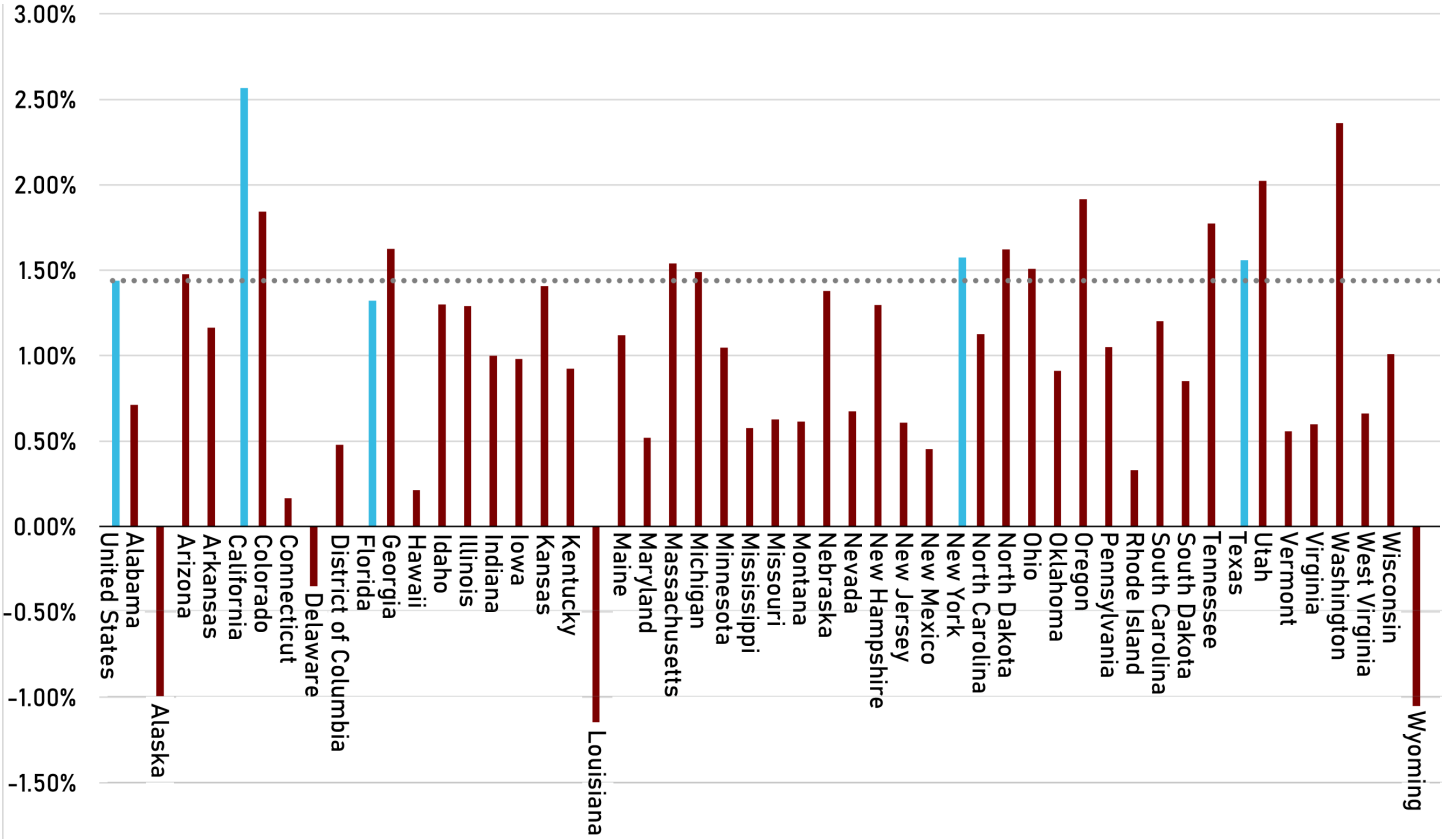


Per Capita RGDP Growth

Lastly, Figure 9 depicts the annualized population growth across the U.S. and all 50 states. Once again, the four largest states by population and the U.S. are represented by the blue bars. The dashed lines represent the annualized per capita RGDP growth of the U.S., at 1.44%.

Notable in Figure 9 is how California and Washington experienced very high annualized per capita RGDP growth rates relative to the rest of the states at 2.57% and 2.36%, respectively. The states of Connecticut, Hawaii, and Rhode Island experienced fairly low levels of per capita RGDP growth. As mentioned above, there were also a few states with negative growth rates – Alaska (-1.02%), Delaware (-0.35%), Louisiana (-1.14%), and Wyoming (-1.05%). Aside from California, the remaining 3 largest states by population had relatively similar per capita RGDP growth that was near the national level, with Florida at 1.32%, New York at 1.58%, and Texas at 1.56%.

FIGURE 9. STATE PER CAPITA RGDP ANNUAL GROWTH (2010 - 2022)



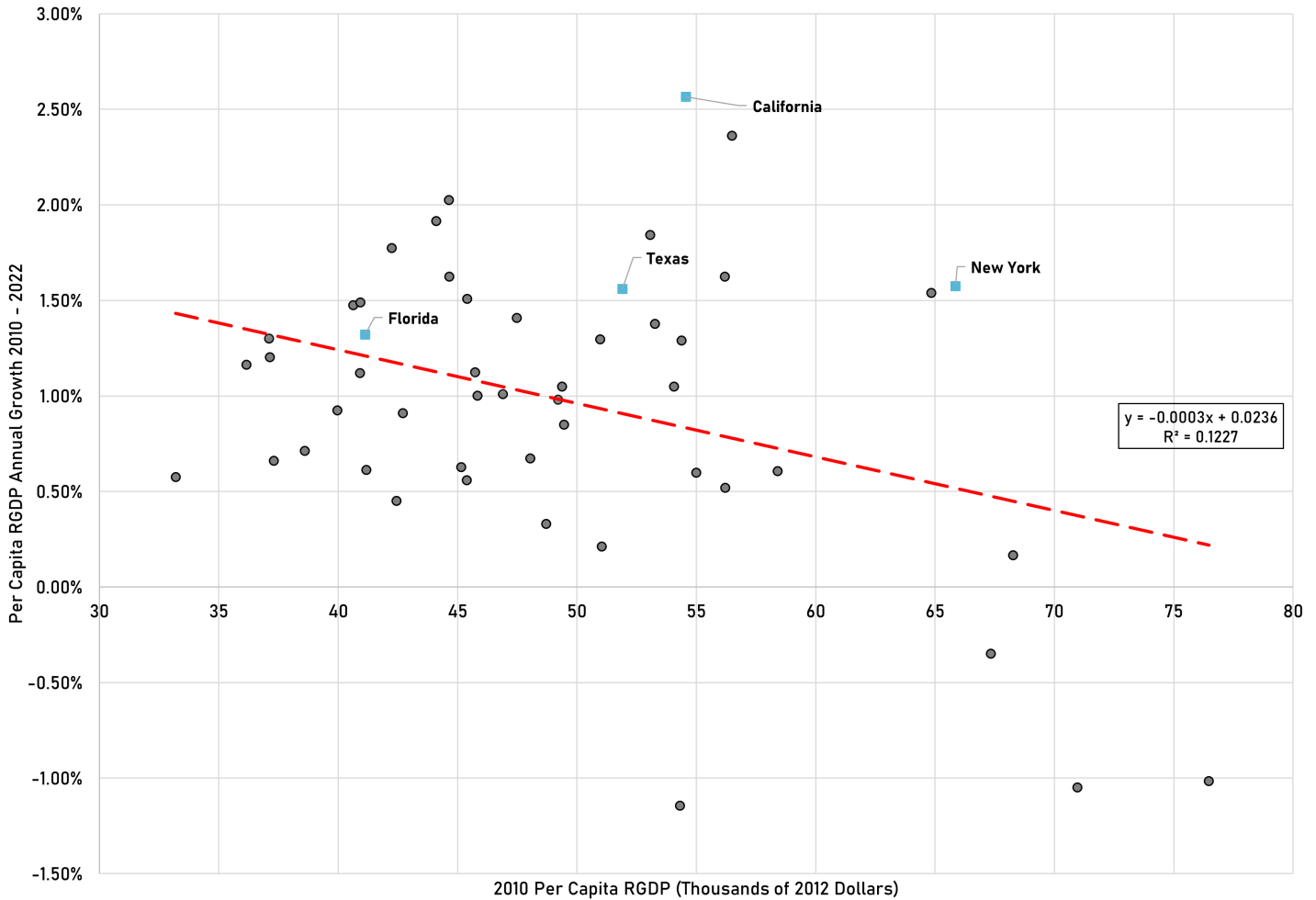
COMPARISONS OF GROWTH IN RICH vs POOR STATES

As stated previously in Section II, the Solow Growth Model predicts that poorer economies will grow faster than richer economies. An important consideration with this model is that this trend has largely been studied at the national-level, as such, trends may not necessarily hold at the state-level due to differences that exist in ease of migration and trade between states.

To study the differences in growth between rich and poor states, we observe the 2010 level of per capita RGDP and plot it against the annualized growth in per capita RGDP from 2010 to 2022. The results of this process are shown in Figure 10, with the points pertaining to the four largest states by population and the United States labeled and given green data points.

The regression line in Figure 10 clearly shows that there is a negative correlation between 2010 per capita RGDP and annualized per capita RGDP growth over 2010 to 2022. In other words, states who were better off in 2010 per capita RGDP were more likely to have a lower annualized growth rate of per capita RGDP over 2010 to 2022 compared to states that had lower 2010 per capita RGDP. This finding is consistent with the predictions of the Solow Growth Model. That said, this correlation is certainly not destiny, and there is a wide variety of experiences among the different states, no doubt due to industry mix, state policies, and other factors.

FIGURE 10. 2010 STATE PER CAPITA GDP vs PER CAPITA RGDP GROWTH



CONCLUSION

This paper illustrates the relative performance of states over 2010-2022 in terms of RGDP growth, population growth, and growth in per capita RGDP. Some states with high RGDP growth and high population growth, like Texas, also had moderate levels of per capita RGDP growth. Other states, such as California, had high RGDP growth but moderate population growth, and yet had very high per capita RGDP growth. When considering measures of economic growth, it is important to consider overall RGDP but also RGDP per capita, and these measures do not always tell the same story.

Additionally, we find that the levels of per capita RGDP play an important role in determining the growth of per capita RGDP in the following years. States with higher levels of RGDP per capita tend to grow more slowly than states with lower levels of RGDP per capita. This tendency toward convergence is a prediction of the Solow Growth Model.