AMERICAN EXPERIMENT


# THE STATE OF MINNESOTA'S ECONOMY: 2020

## A focus on economic growth

JOHN PHELAN & MARTHA NJOLOMOLE • ECONOMISTS

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AMERICAN EXPERIMENT

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# The State of Minnesota's Economy: 2020

## A focus on economic growth

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# Executive Summary

- Minnesota typically scores well on levels of per capita income, which is what matters for economic welfare. In terms of per capita GDP, Minnesota ranks 15th out of the 50 states and the District of Columbia. Our state's per capita GDP — $68,050 in 2019 — is 4.2 percent higher than the figure for the United States, $65,298.
- Our state does less well when it comes to growth rate. Since 2000, per capita GDP in Minnesota has grown by 20.6 percent in real, inflation adjusted terms. This ranks us 22nd among the 50 states and the District of Columbia and is below the United States' growth rate over the same period, 25.0 percent. This cannot be explained by "convergence."
- The story is the same with Personal Income: an above average level but a below average growth rate. Furthermore, per capita wage and capital income growth in Minnesota ranked 29th and 39.5 percent of the increase in per capita Personal Income came from increased transfers, above the United States' share of 34.6 percent.
- It is a similar story when we look at Minnesota's Metropolitan Statistical Areas (MSAs). Between 2001 and 2019, GDP grew in the metropolitan portion of the U.S. by 42.5 percent, a rate which two of our MSAs beat — Mankato and Rochester — but which the other three lagged — Minneapolis-St. Paul, St. Cloud and Duluth. Compared to its peers across the United States, GDP in the Minneapolis-St. Paul MSA grew by 37.4 percent between 2001 and 2019, compared to 56.7 percent for its peers. Of those peers, the Twin Cities only outperformed St. Louis and Detroit.
- Per capita economic growth comes from three sources: an increase in the amount of labor provided by a given population (a higher employment rate/ratio or hours worked); growth of capital per worker (the tools those workers have to work with); and Total Factor Productivity (TFP), also known as Technology, which is the way inputs to the production process are transformed into output.
- There is little scope for Minnesota to generate much per capita income growth from increased labor inputs. At 67.8 percent, we already have the third highest employment rate in the United States. Among younger workers and black workers, however, employment is lower than in 2000.
- We need to make these workers more productive and here there is room for improvement. Minnesota's GDP per worker ranked 21st in 2019 and we rank 18th on GDP per hour worked. On both measures, again, our growth has lagged behind the national rate since 2000.
- The amount of capital each Minnesotan worker has to use, which leverages labor, is about the same as the United States' median average, so there is scope for improvement here.
- Minnesota can also boost per capita income growth by investing in human capital. In terms of education, we score well on measures such as National Assessment of Educational Progress (NAEP) scores, where we rank 4th. But if we control for socioeconomic factors, we fall to 33rd. Our state's ethnic minority students are also particularly badly served.
- We could also increase human capital by attracting and/or retaining highly skilled workers. However, using income as a proxy for productivity, we see that Minnesota has, on net, been losing more highly skilled workers: Between 2011 and 2018, Minnesota saw a net outflow of people above an income threshold of $50,000 annually.
- On one of the components of TFP, innovation, Minnesota scores well, ranking 6th in 2019 for patents per million of the population. But other states do a better job of implementing these.
- But on entrepreneurship we do less well. In 2020, new businesses accounted for 31.3 percent of businesses in Minnesota compared to 37.7 percent for the United States, ranking us 38th. ■

# Introduction

In our recent report "Closing Minnesota's Budget Deficit: Why we should make spending cuts and not raise taxes," we noted that, looking at the data for our state, it seems that the dollar amount of tax revenue available to the government is far more likely to be a function of the size of the state's economy than of the level of its tax rates. This means that if you want more money to fund government services, you should look to increase the state's Gross Domestic Product (GDP) rather than hike its tax rates.[1] This report looks at how we can foster that stronger economic growth in Minnesota.

This report looks at the period from 2000 to 2019, except where data availability requires us to use some other date. This gives us a good span of time to look at longer-term trends and changes in Minnesota's economy. It also means that our data cover two periods of economic downturn and recovery, as dated by the National Bureau of Economic Research.[2] In most cases, the most recent data in this report is from 2019. In early 2020, the COVID-19 pandemic hit Minnesota and the federal and state government took various steps to combat it, with significant economic impacts. This report reflects the economic situation in our state on the eve of the pandemic. ■

# Per capita income – Why it matters, where we are, where we've come from

## Why per capita income matters

What matters for economic welfare is per capita income. This is a general measure of welfare, telling us how much per person is available to be consumed, invested, or put to some other use.[3]

If we want to increase economic welfare, we should pursue policies that increase *per capita incomes.* A doubling of *total* GDP, if it is matched by a doubling of the population, will leave the average member of the population no better off. For example, China's GDP in 2017, $23.3 trillion, was 8.2 times larger than that of the United Kingdom, $2.9 trillion, but average living standards are much higher in the U.K. because China's population (1.4 billion) is 21 times larger than that of the U.K. (66 million), so China's GDP is divided among many more people. As a result, per capita incomes in the U.K. are, on average, 2.6 times higher than in China.[4]

## Per capita incomes in Minnesota

Minnesota typically scores well on levels of per capita income, but it does less well when it comes to rates of per capita income growth.

In terms of per capita GDP,[5] Minnesota ranks 15th out of the 50 states and the District of Columbia, as Figure 1 shows. Our state's per capita GDP — $68,050 in 2019 — is 4.2 percent higher than the figure for the United States, $65,298.

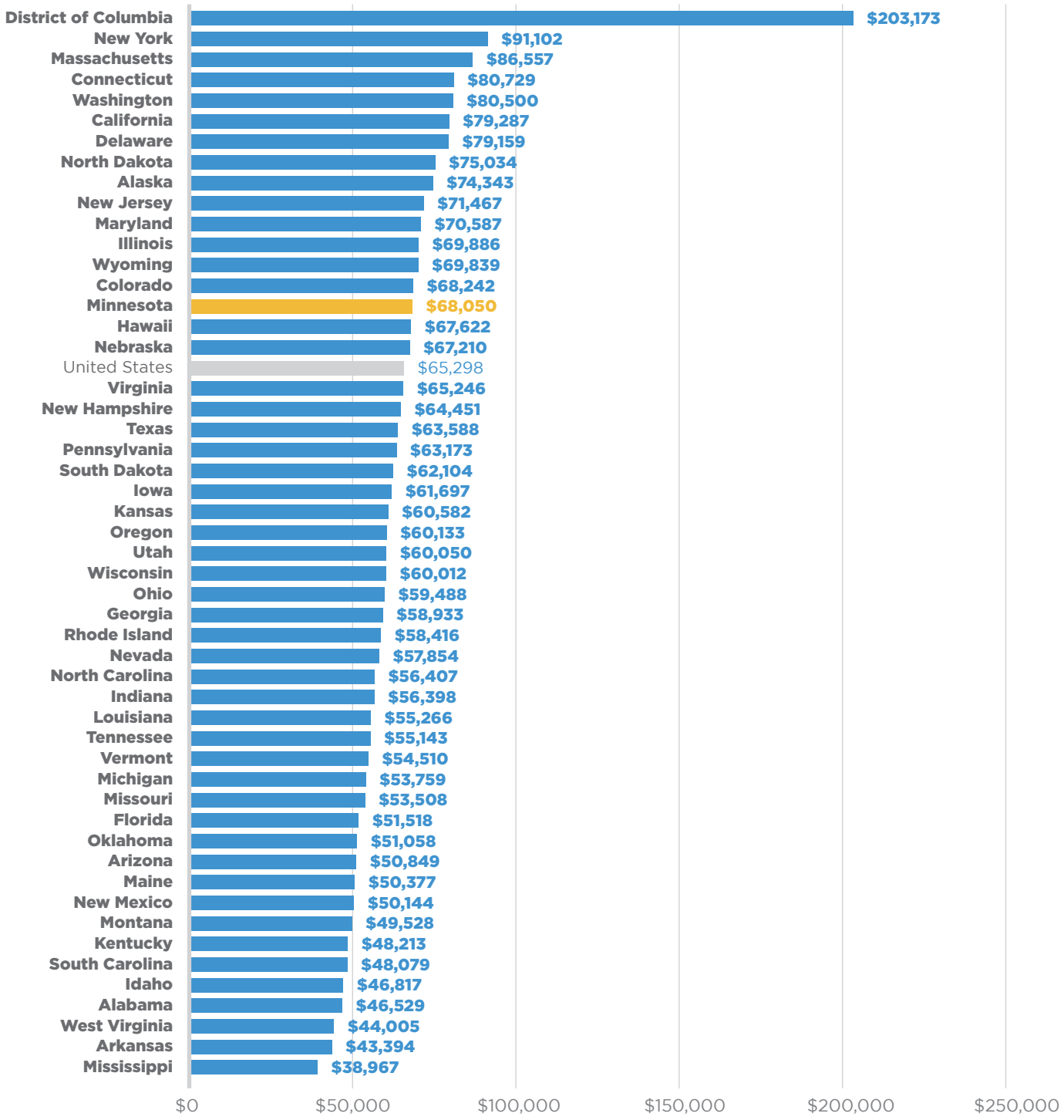
But while Minnesota's *level* of GDP is relatively impressive, its *rate of GDP growth* is less so. Figure 2 shows that, since 2000, per capita GDP in our state has grown by 20.6 percent in real, inflation adjusted terms. This ranks us 22nd among the 50 states and the District of Columbia and is below the United States' growth rate over the same period, 25.0 percent.

Figure 3 shows how Minnesota's per capita GDP has changed relative to that of the United States between 2000 and 2019. Changes in per capita GDP in our state matched those of the United States generally quite closely until 2014. Since then, a persistent and widening gap has opened up. Relatively speaking, on this vital measure of economic well-being, Minnesota is not performing as well as it used to.

It is a similar story when we look at Minnesota's Metropolitan Statistical Areas (MSAs).[6] Between 2001 and 2019, GDP grew in the metropolitan portion of the U.S. by 42.5 percent. As Figure 4 shows, of Minnesota's five MSAs, two beat this growth rate — Rochester (64.5 percent) and Mankato (47.0 percent) — but the other three underper-

# Per Capita Gross Domestic Product, 2019 (Current Dollars)

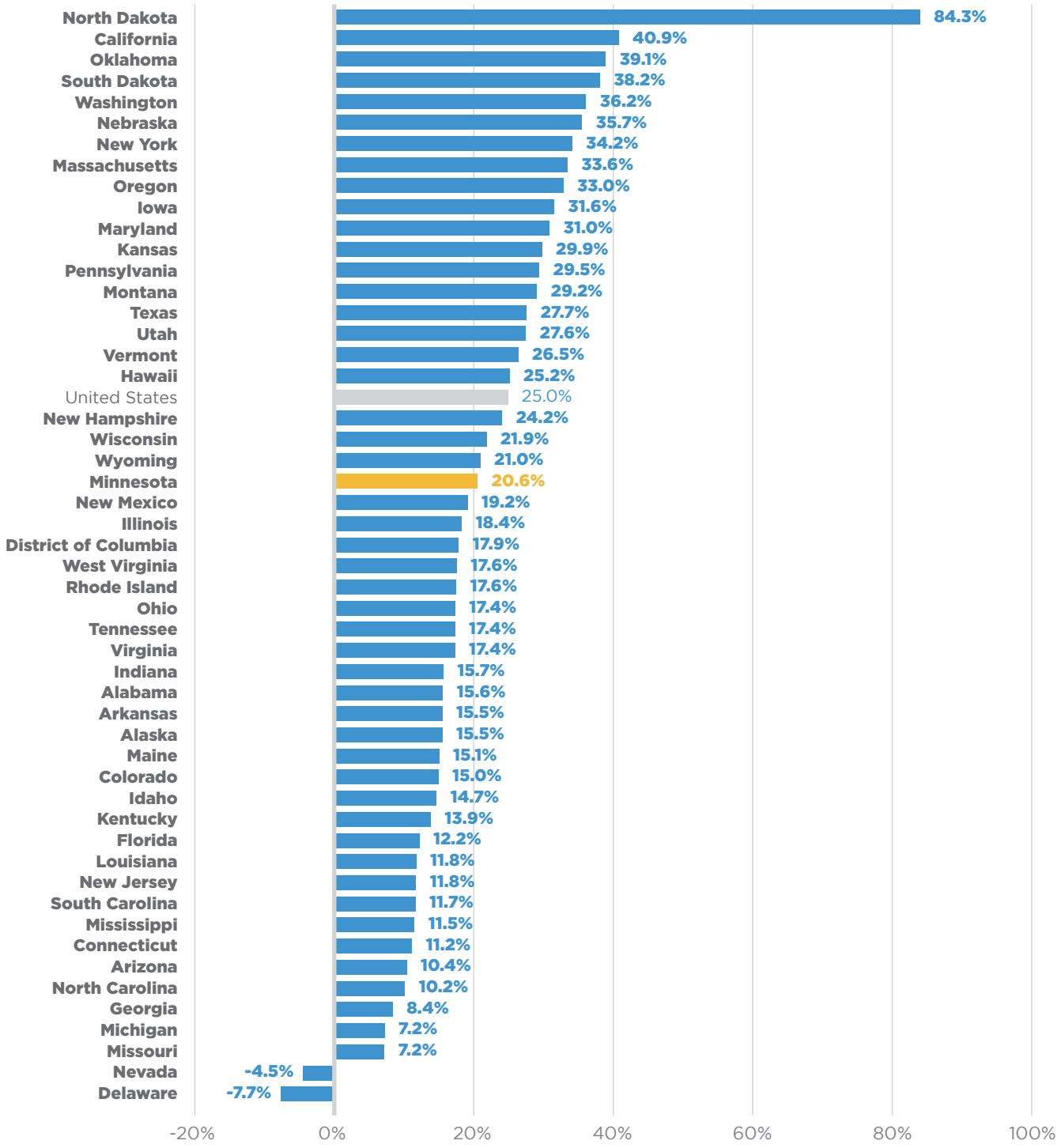
FIGURE 1




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

# Real Per Capita Gross Domestic Product Growth, 2000-2019

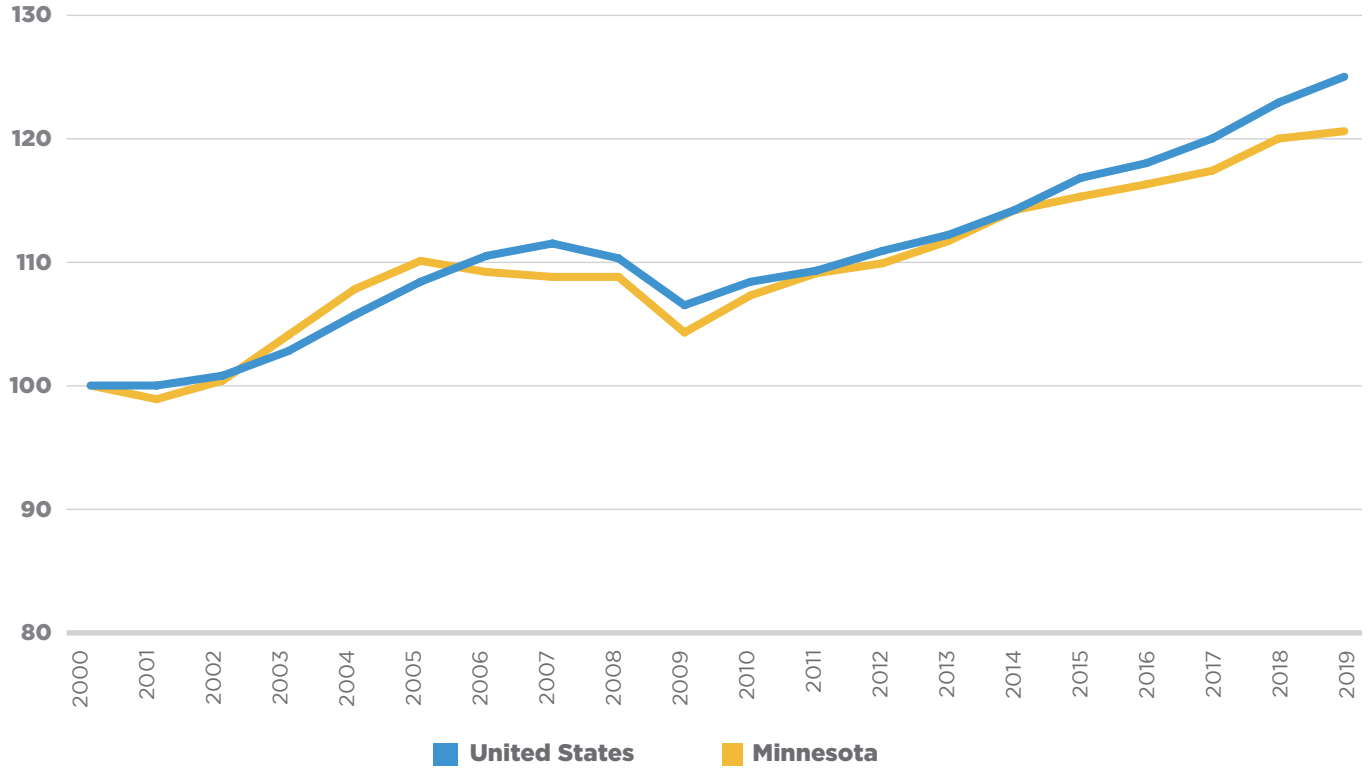
FIGURE 2




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

## Real Per Capita Gross Domestic Product Growth, 2000-2019 (2000=100)

FIGURE 3




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

formed – Minneapolis-St. Paul (37.4 percent), St. Cloud (34.9 percent), and Duluth (30.4 percent).

The state's economic hub, the Minneapolis-St. Paul MSA, has fared badly compared with its competitors elsewhere in the country. As Figure 5 shows, for the next six larger and next six smaller MSAs by GDP in 2001, the average growth rate from 2001 to 2019 was 56.7 percent, compared to just 37.4 percent for Minneapolis-St. Paul. Of its 2001 peer group, the Twin Cities only outperformed St. Louis and Detroit.

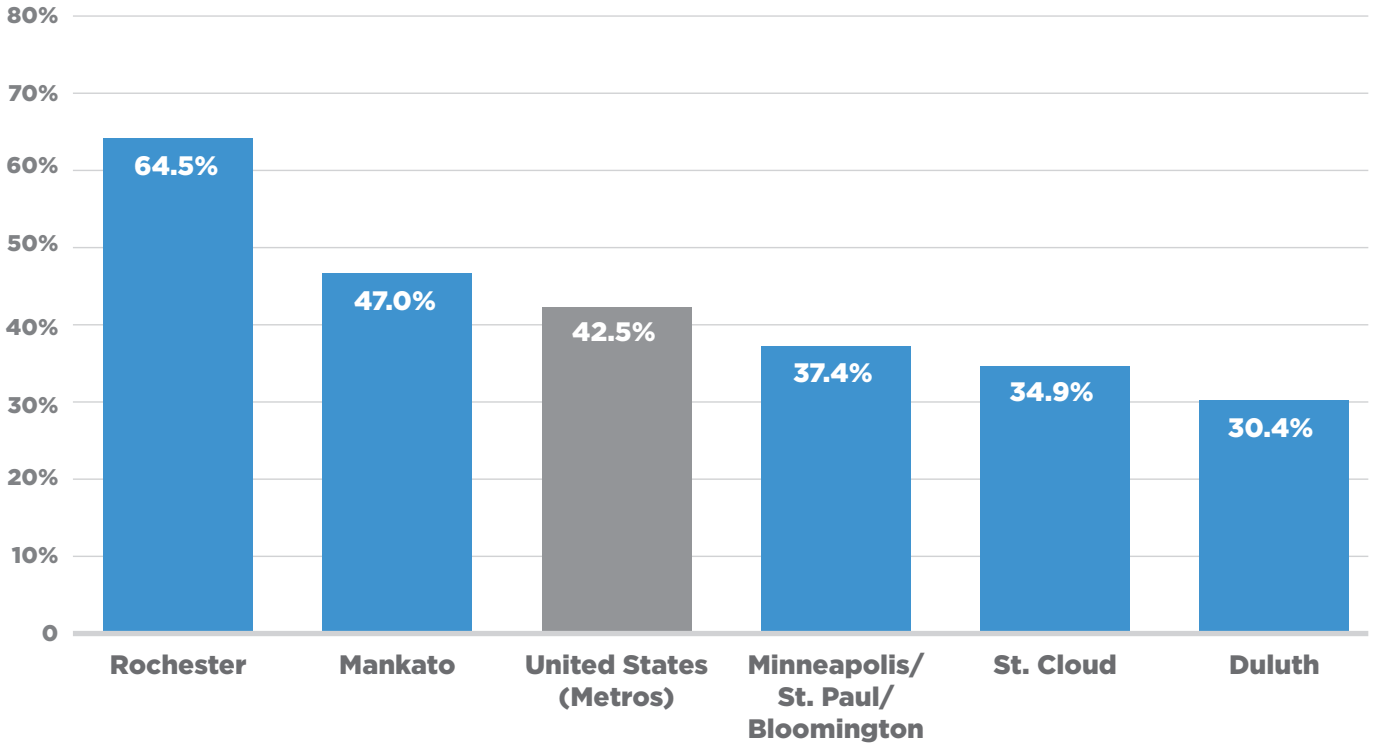
We see the same story when we look at Personal Income.[7] As Figure 6 shows, in 2019, Minnesota ranked 14th out of the 50 states and the District of Columbia, with a per capita Personal Income of $58,834, 4.1 percent above the level for the United States as a whole, $56,490.

But, again, while the *level* is impressive, the *rate of growth* is less so. As Figure 7 shows, over the period 2000 to 2019, Minnesota's per capita Personal Income increased by 22.1 percent in real, inflation adjusted terms. This ranked our state 30th out of the 50 states and the District of Columbia, and below growth for the United States, which was 24.1 percent.

The picture darkens further still for Minnesota when we look at how the components of Personal Income have changed over this period. Figure 8

## Real Gross Domestic Product Growth by Metropolitan Statistical Area, 2001-2019

FIGURE 4




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

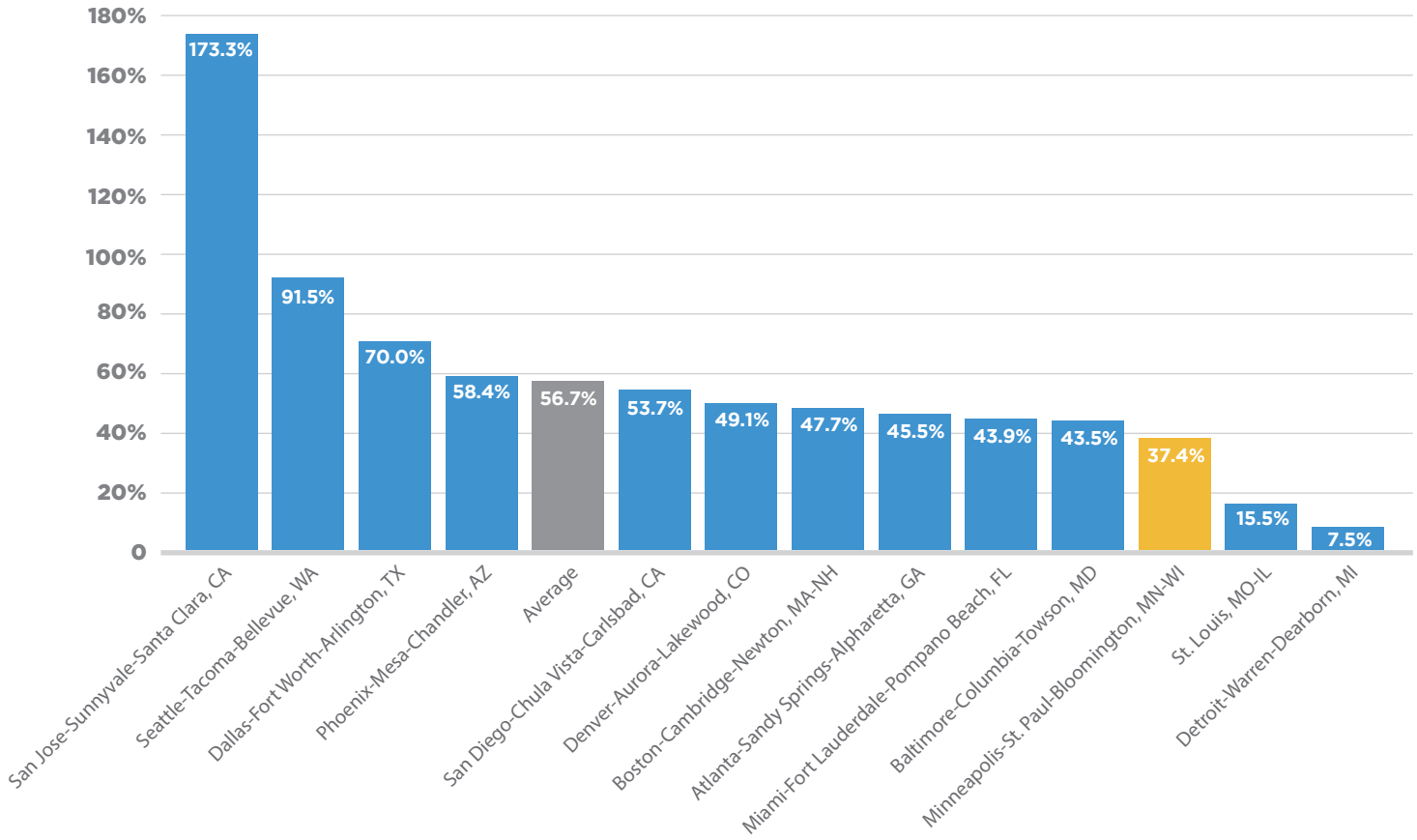
shows that, when we examine two of the three sources of Personal Income — "Net earnings by place of residence" (wages; labor income) and "Dividends, interest, and rent" (capital income) — per capita Personal Income in our state grew by only 15.0 percent between 2000 and 2019. This ranked Minnesota 29th out of the 50 states and the District of Columbia, and below the growth for the United States as a whole, 18.0 percent. It is a different story, however, for the third source, "Personal current transfer receipts" (transfer income[8]). This, as Figure 9 shows, rose by 81.8 percent in Minnesota from 2000 to 2019. This was above the growth for the United States generally — 66.4 percent — and ranked our state ninth out of the 50 states and the District of Columbia.

The results of Minnesota's below average increase in per capita labor and capital income and above average increase in transfer income is that a relatively large share of the total growth of per capita Personal Income in our state has come from expanded transfer payments. As Figure 10 shows, increases in transfer income accounted for 39.5 percent of the increase in per capita Personal Income in Minnesota between 2000 and 2019, compared to 34.6 percent for the United States as a whole.

Figure 11 shows how the growth rates of Minnesota's sources of Personal Income have changed

# Real Gross Domestic Product Growth by Metropolitan Statistical Area, 2001-2019

FIGURE 5

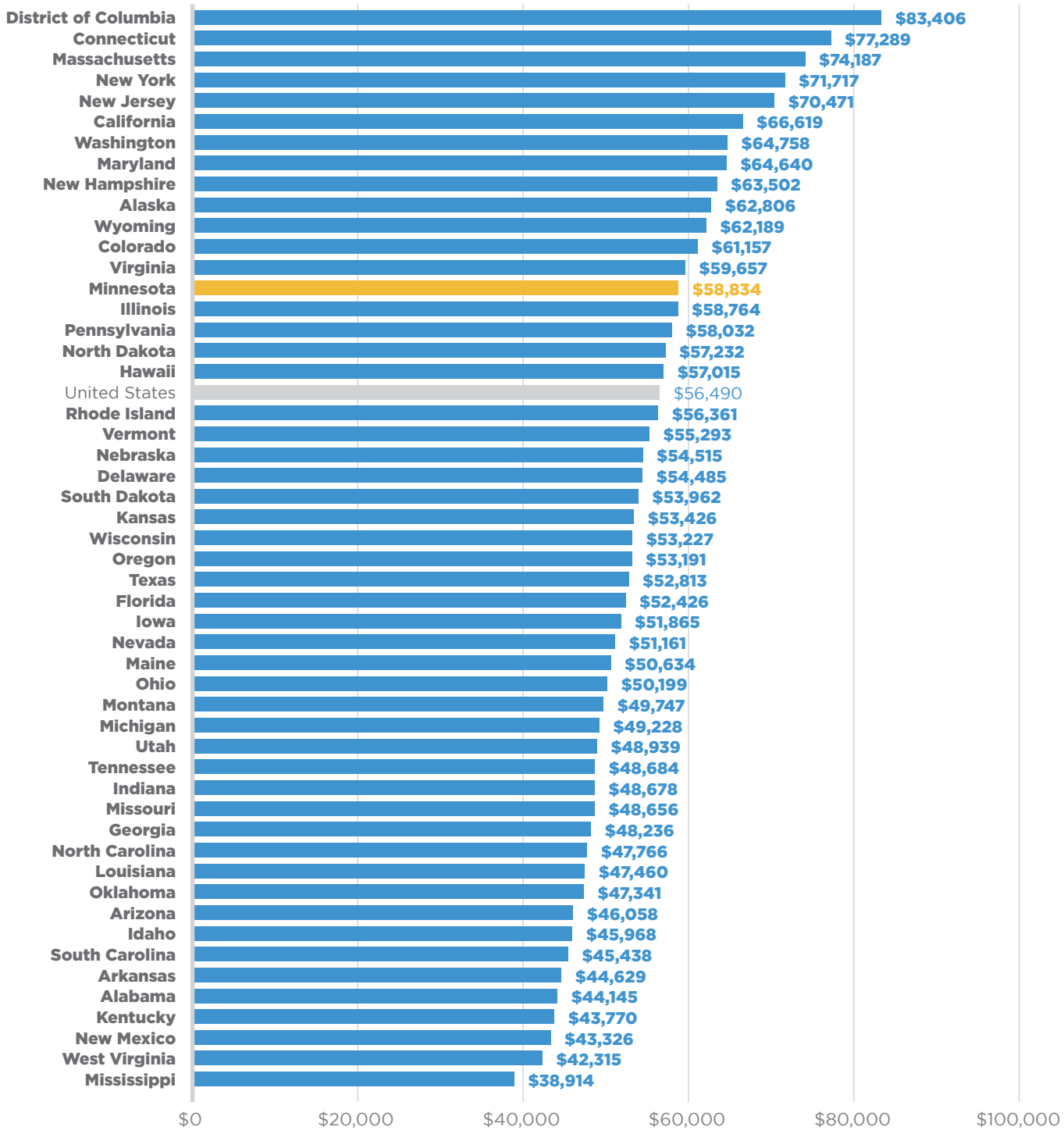



**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

over time relative to those of the United States generally. The changes for labor and capital income track quite closely over the whole period, but for transfer income our state opened a substantial lead over the United States at large during 2005-2007 and this has widened over time. Minnesota is over-reliant on increases in transfer payments for its Personal Income growth. ■

# Per Capita Personal Income, 2019 (Current Dollars)

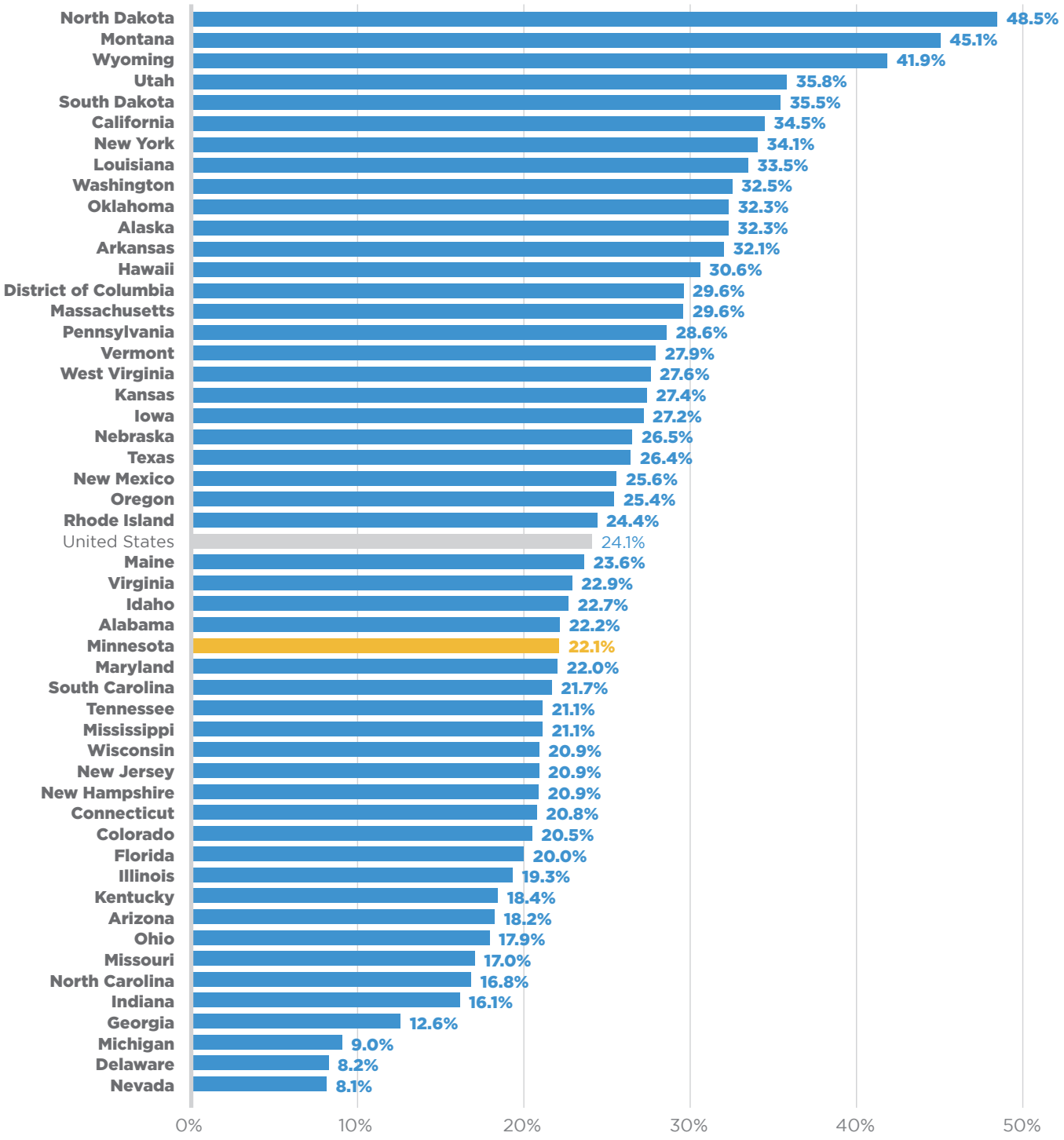
FIGURE 6




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

# Real Per Capita Personal Income Growth, 2000-2019

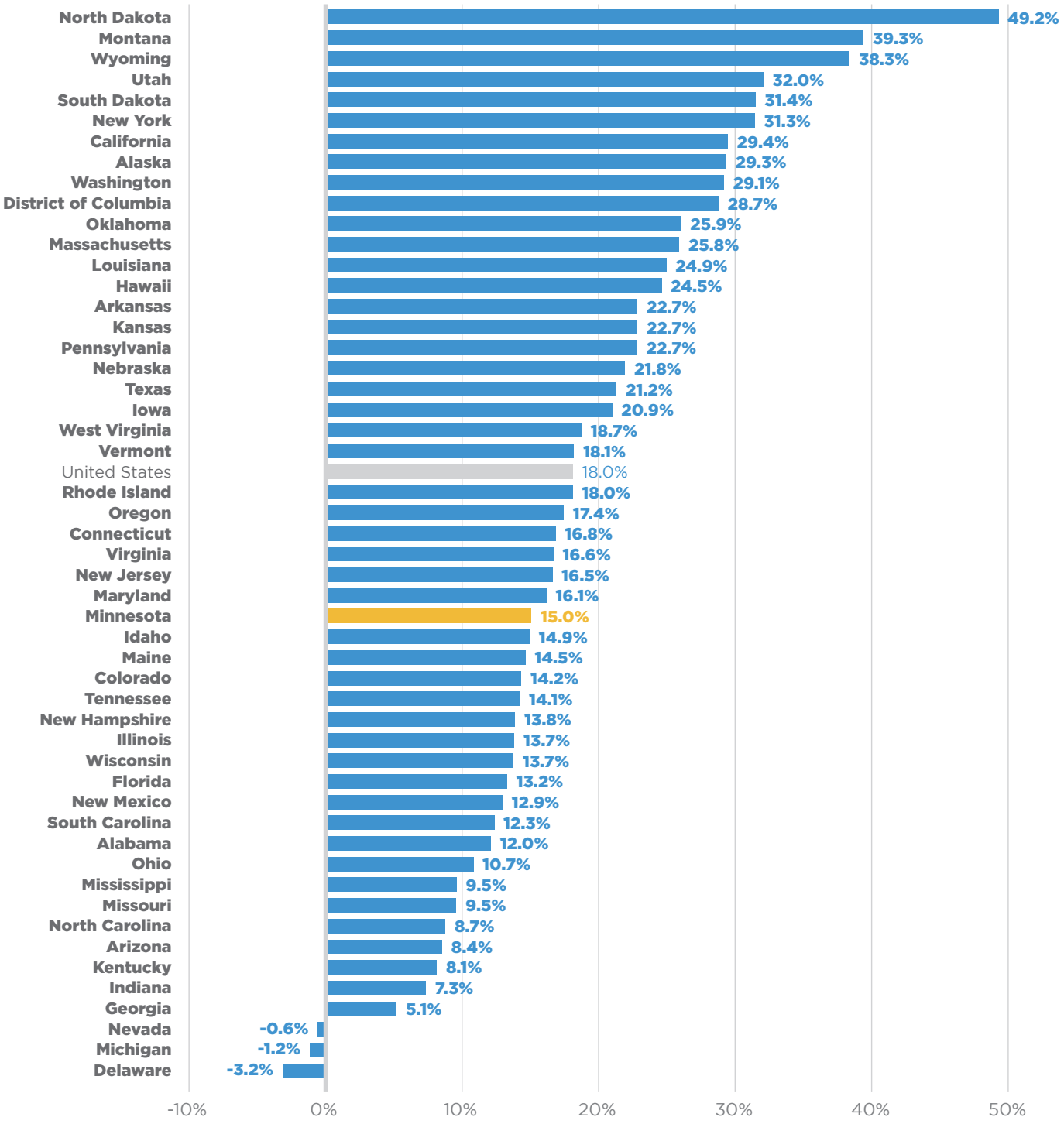
FIGURE 7




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

# Real Per Capita Labor and Capital Income Growth, 2000-2019

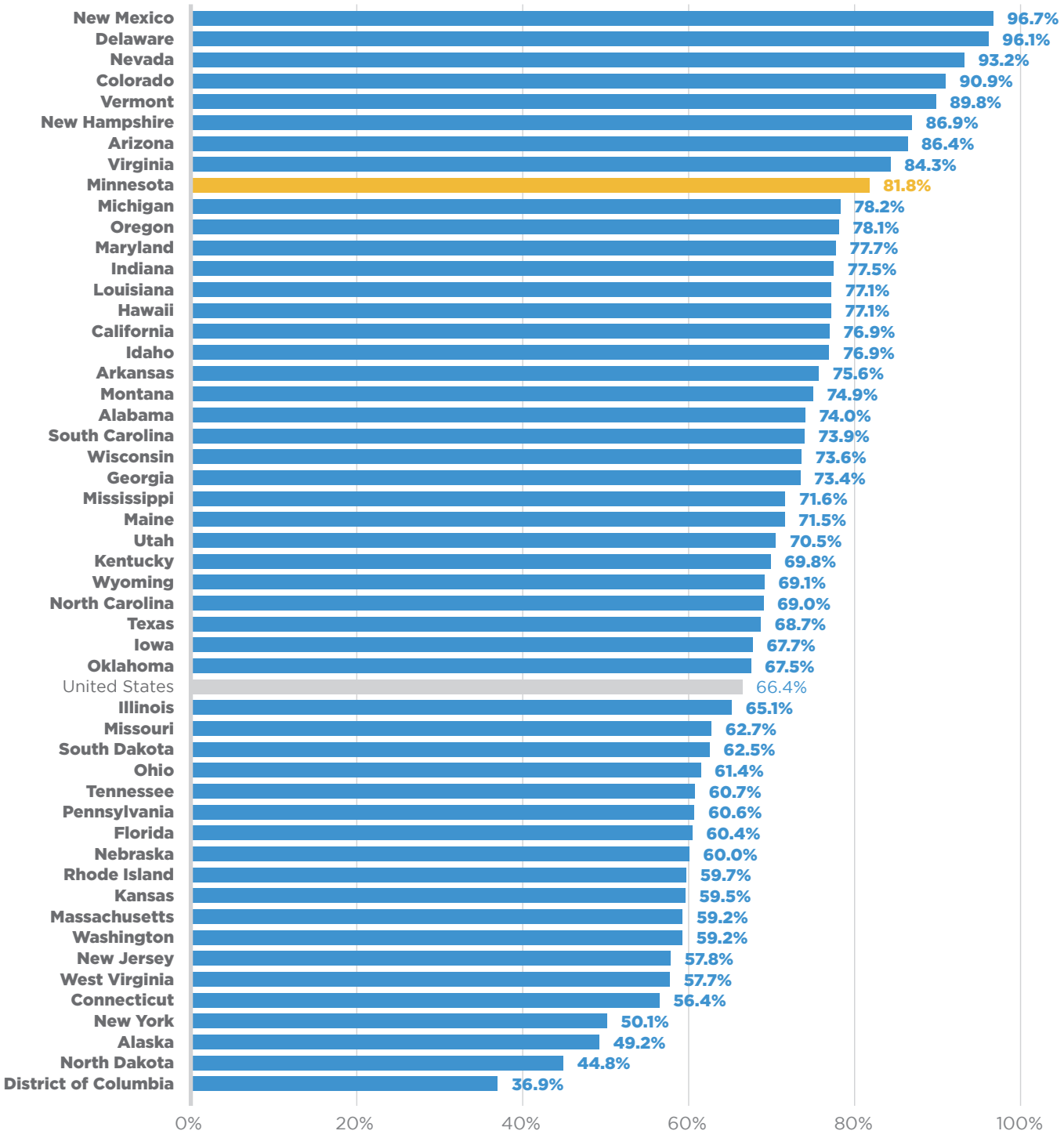
FIGURE 8




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

# Real per capita transfer income growth, 2000-2019

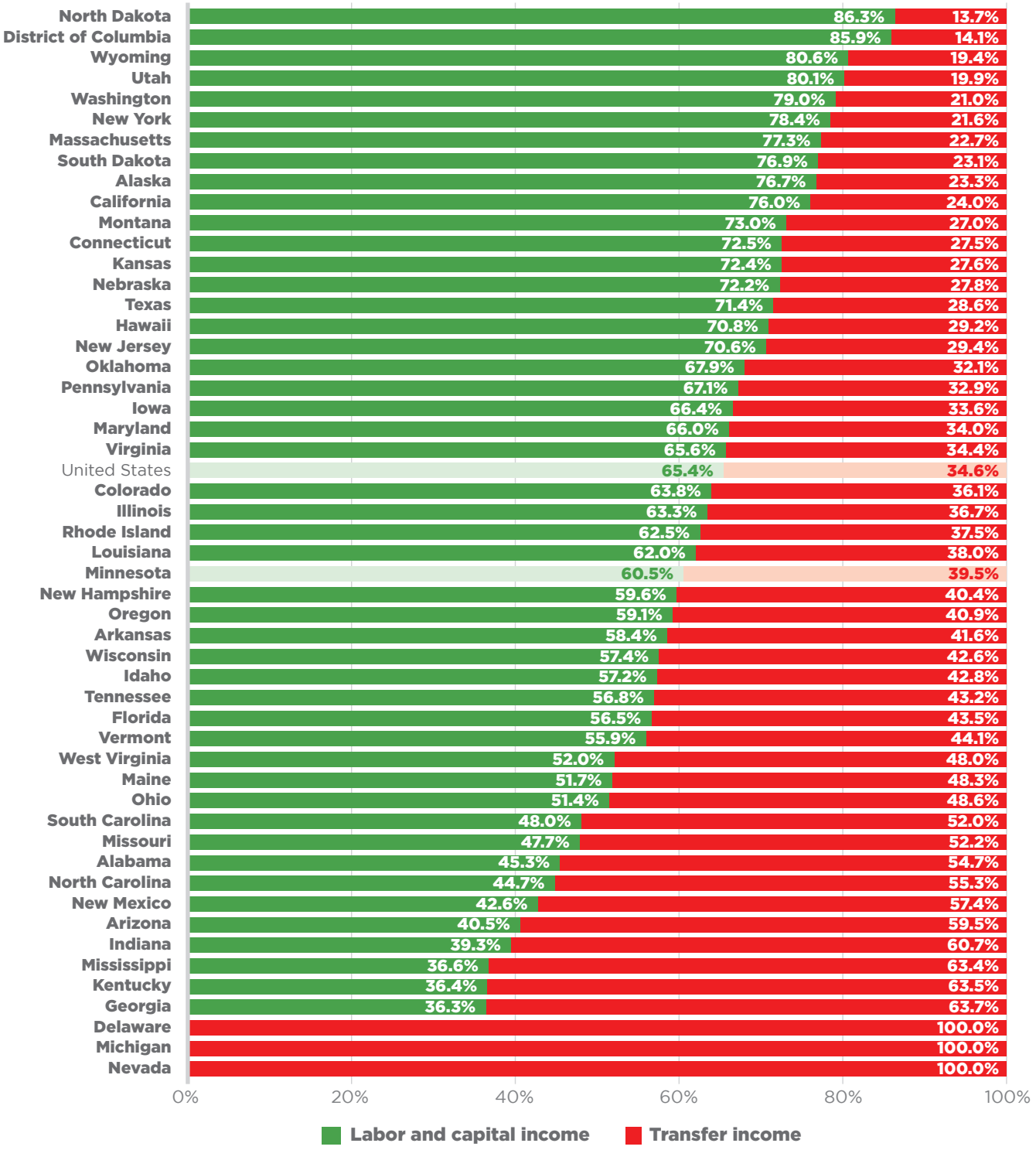
FIGURE 9




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

# Labor and capital and transfer income increases as share of all per capita Personal Income increases, 2000-2019

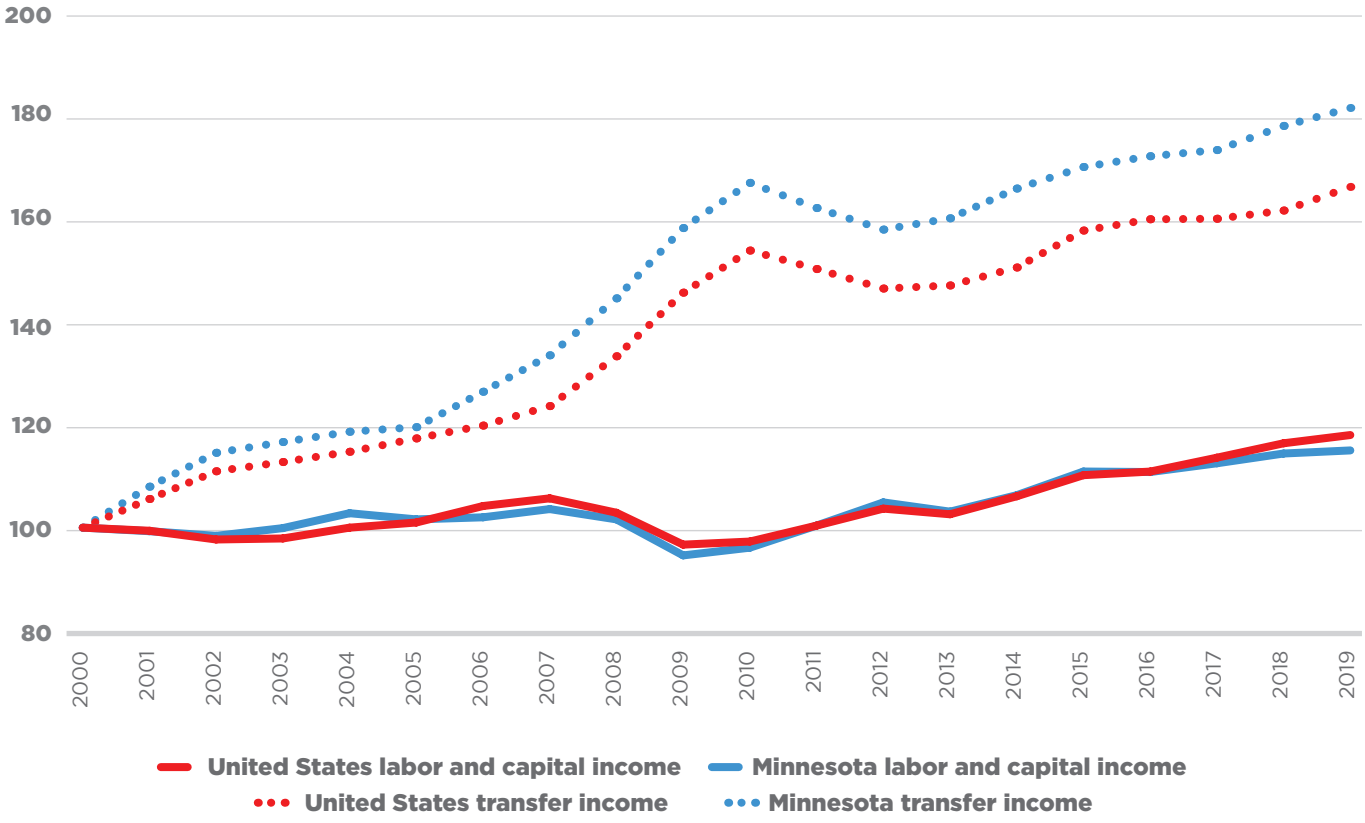
FIGURE 10




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

# Real per capita labor and capital and transfer income growth, 2000-2019 (2000=100)

FIGURE 11




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

## ISN'T THIS JUST CONVERGENCE?

It is sometimes argued that Minnesota's below average GDP growth is the result of an already high level of GDP.[9] The economic theory of convergence holds that, all else being equal, poorer economies' per capita incomes will tend to grow at faster rates than those in richer economies; they will catch up, in other words.

The evidence once supported this theory. During much of the 20th century, poorer states and regions in America caught up with richer ones at a rate of about 2 percent per year, a figure sometimes called the "iron law of convergence."[10] In 1930, for example, workers in Mississippi earned just 20 percent of the wages of workers in New York. By 1980, the proportion had increased to 65 percent. In 1991, the economist Olivier Blanchard wrote, "The convergence of income across regions in the United States is a robust fact." And, back then, it was.

More recent research casts doubt on this. While incomes across states converged at a rate of 1.8 percent per year from 1880 to 1980, there has been hardly any convergence at all since then. Specifically, "The convergence rate from 1990 to 2010 was less than half the historical norm, and in the period leading up to the Great Recession there was virtually no convergence at all."[11] Other recent research finds that convergence has declined in cities too. Between 1940 and 1980, poor cities caught up with rich ones at a rate of 1.4 percent a year. Since then, they have lagged behind.[12]

In other words, the "convergence" which some say explains Minnesota's slow rate of economic growth relative to the United States' average has not been happening over the period covered in our report. Our economic growth is lagging, and "convergence" does not explain it.

# The sources of per capita income growth

To understand what policies could increase Minnesota's per capita income growth, we need to understand what drives it. Then, we can investigate how our state has performed on these measures in the past and look at how it might be expected to do in the future.

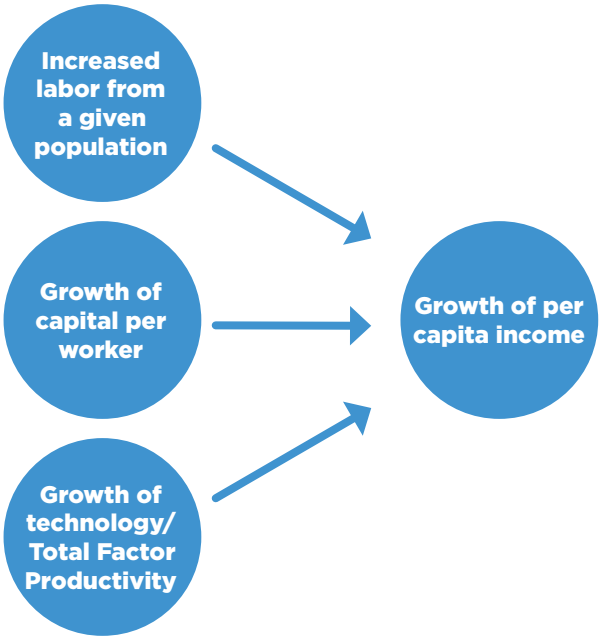
Per capita economic growth comes from three sources, illustrated in Figure 12. These are an increase in the amount of labor provided by a given population (a higher employment rate/ratio or hours worked); growth of capital per worker (the tools those workers have to work with); and Total Factor Productivity ("The effectiveness with which factors of production are converted into output"[13]), which is also known as Technology ("the way inputs to the production process are transformed into output"[14]).

## Increased labor

With a given population, we can generate more output if a higher share of it (the employment ratio) is employed and producing. Also, at the *intensive margin*, the workforce of a given population could produce more output by working more hours. Both would increase output per capita by increasing the numerator — GDP — but not the denominator — population.

## Sources of Per Capita Income Growth

FIGURE 12




When it comes to the share of Minnesotans employed, it would appear that there is little scope for improvement. Figure 13 shows the employment ratios for the 50 states and the District of

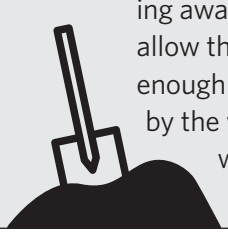
## DIGGING DITCHES
### A PARABLE OF ECONOMIC GROWTH

To visualize more clearly the contributions to per capita income growth of these three sources, imagine an economy whose only economic output is ditch digging.

If we have a population of one and this worker produces one ditch a year with their bare hands, then annual output is one ditch per capita. If we add a second worker, total output rises to two ditches but per capita output remains one ditch per capita: nobody is better off. If a third person enters but doesn't work, then total output remains at two ditches but per capita output falls to 0.67 ditches per capita: all three are worse off. If this third person begins to work, then per capita output rises back to one ditch annually.

We can make each worker more productive by giving him/her a shovel: increasing capital per worker. With this, each worker might dig 10 ditches a year. Total output would rise to 30 ditches, and per capita output would rise to 10 ditches per capita. Each shovel has increased output by nine ditches. But eventually this "capital deepening" runs into diminishing returns. Giving each worker a second shovel will double capital per worker, but the workers cannot use two shovels at once so this new capital will produce no extra ditches. The marginal product of introducing the first shovel was nine ditches: for the second it falls to zero.

We can generate more ditches per worker by increasing Technology, or TFP. In terms of innovation, we might, for example, invent an earth mover operated by one worker that can do the same work in a day as a hundred people equipped with shovels. In terms of entrepreneurship, we might have some workers digging while others are allocated to wheeling away the dirt. This specialization could allow those digging ditches to dig more than enough to cover the ones no longer being dug by the wheelers, especially if the wheelers were less good at digging.



Columbia. Minnesota ranked third in 2019 with 67.8 percent of its civilian noninstitutional population employed, well above the rate for the United States, 60.8 percent.

Even so, Minnesota's employment ratio is lower than it was in 2000, by 4.8 percentage points. This was the 18th steepest percentage point decline over that period among the 50 states and the District of Columbia, as Figure 14 shows. It was a steeper decline than that seen by the United States generally, 3.7 percentage points. Furthermore, this decline in the employment ratio was not uniform across all sectors of the labor force. As Figure 15 shows, Minnesota has seen an increase in the employment ratio of every age group over 55 and a decline in all groups below that except for women aged 25 to 34. In some categories, too, our state has seen employment ratios fall notably more than the United States generally. For Minnesotans aged 16 to 19, for example, the employment ratio has fallen by 19.5 percentage points compared to 14.8 percentage points for the United States. For black and African American Minnesotans, the employment ratio decline of 4.9 percentage points was more than double that of the United States as a whole, 2.2 percentage points.

When we look at hours worked, we might see more scope for per capita income growth. Figure 16 shows that for average weekly hours worked,

Minnesota tied for 38th in 2019 (with Idaho), with the average worker working 33.7 hours a week compared to 34.3 for the United States generally. This could reflect our state's higher than average share of part-time employment. As Figure 17 shows, 19.6 percent of Minnesota's workers are part time compared to an average for the United States of 17.1 percent.

## The limits of labor

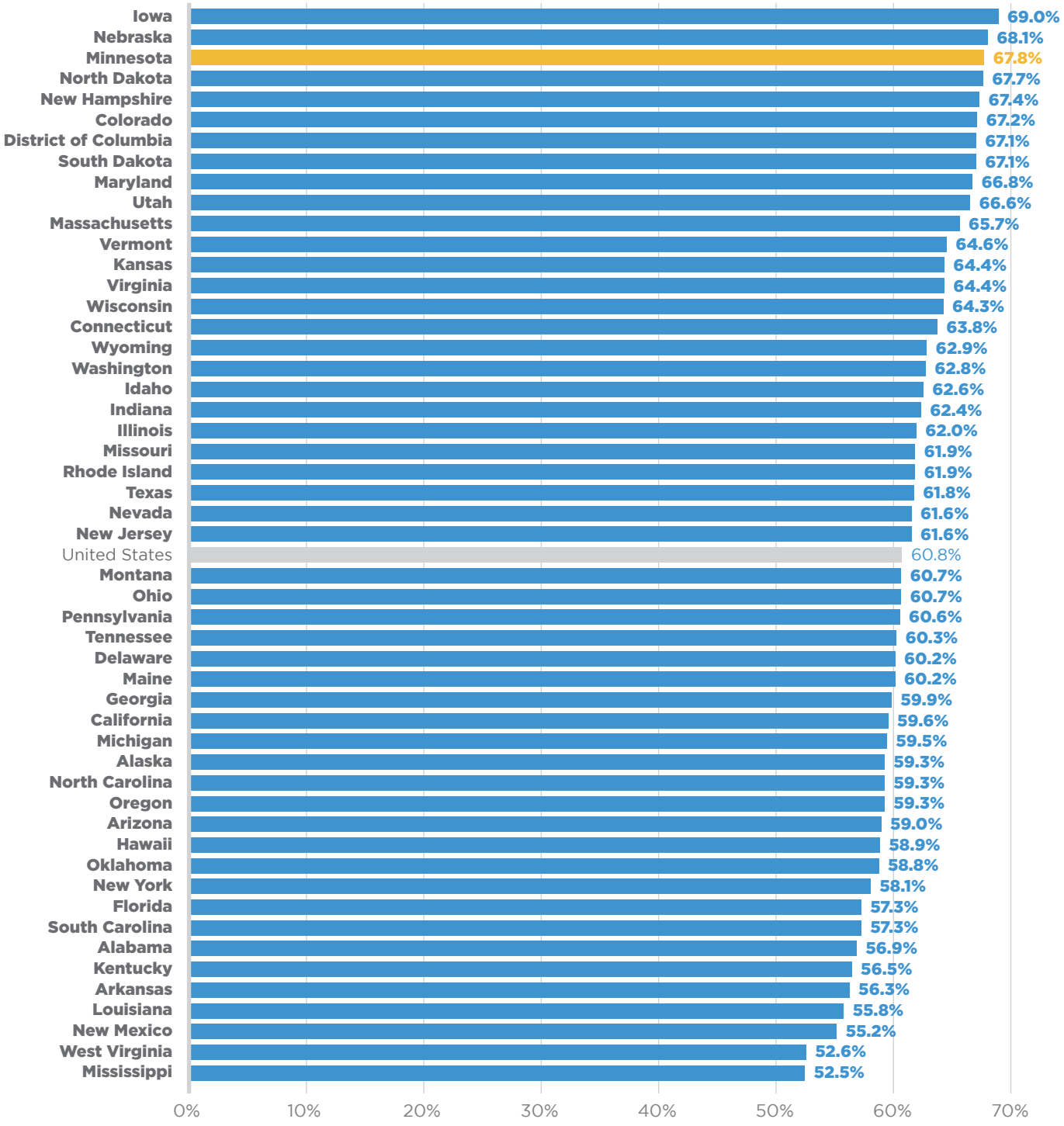
Increasing the amount of labor provided by a given population is not a strategy for sustained, long term, per capita income growth.

We might see a short term boost to per capita income growth if the employment ratio rises and a greater share of the population is producing output, but, clearly, this will run into an upper limit at some point. When everybody — or as near everybody who is likely to be — is employed, there is no more room for growth. This is a situation we are closer to in Minnesota than almost anywhere else, as Figure 13 shows.

We might also experience some short term boost to per capita income growth if each worker increases his/her working hours and spends longer producing output. But that, again, runs into an upper limit — there are only so many hours in the day, after all. There is also a normative consideration: economic growth is a means to an end — a more comfortable life — not an end in itself. In labor economics, working is generally considered a disutility[15] so if we only generated higher incomes by working longer hours, it isn't clear that we would be better off. ■

# Employment Ratios, 2019

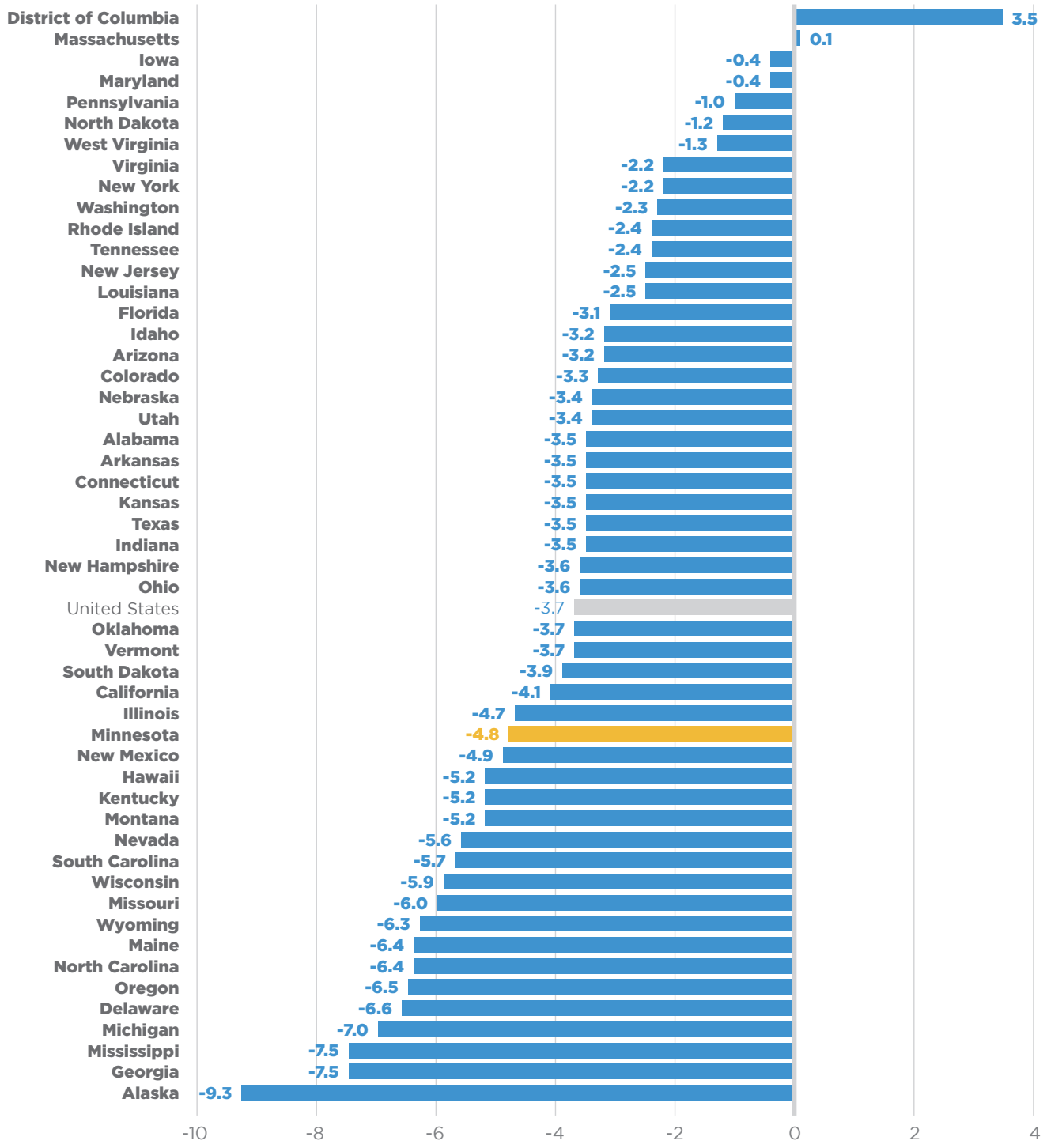
FIGURE 13




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

# Percentage Point Change in Employment Ratios, 2000-2019

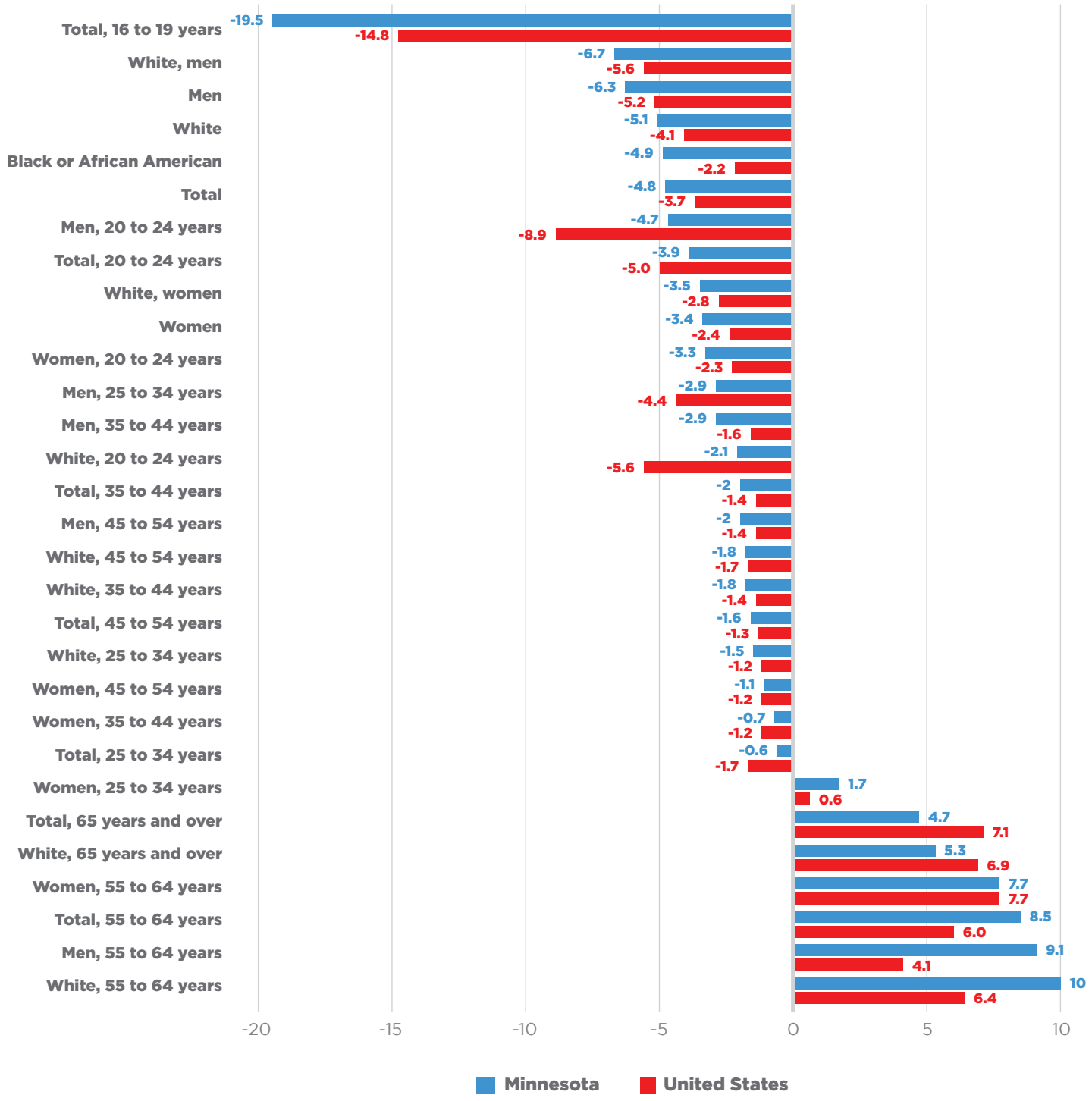
FIGURE 14




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

# Percentage Point Change in Employment Ratios, 2000-2019

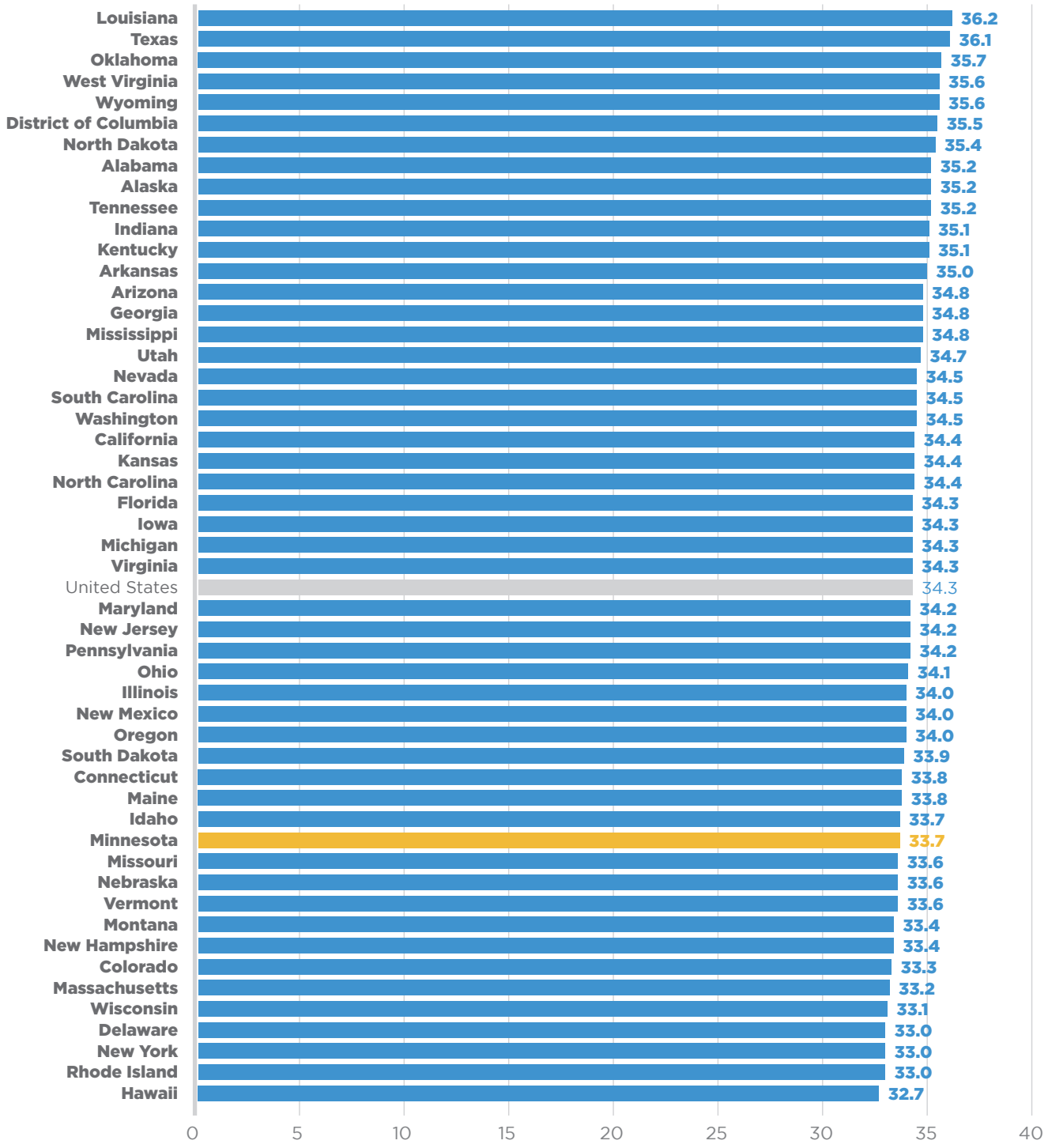
FIGURE 15




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

# Average Weekly Hours Worked of All Employees on Private Nonfarm Payrolls, 2019

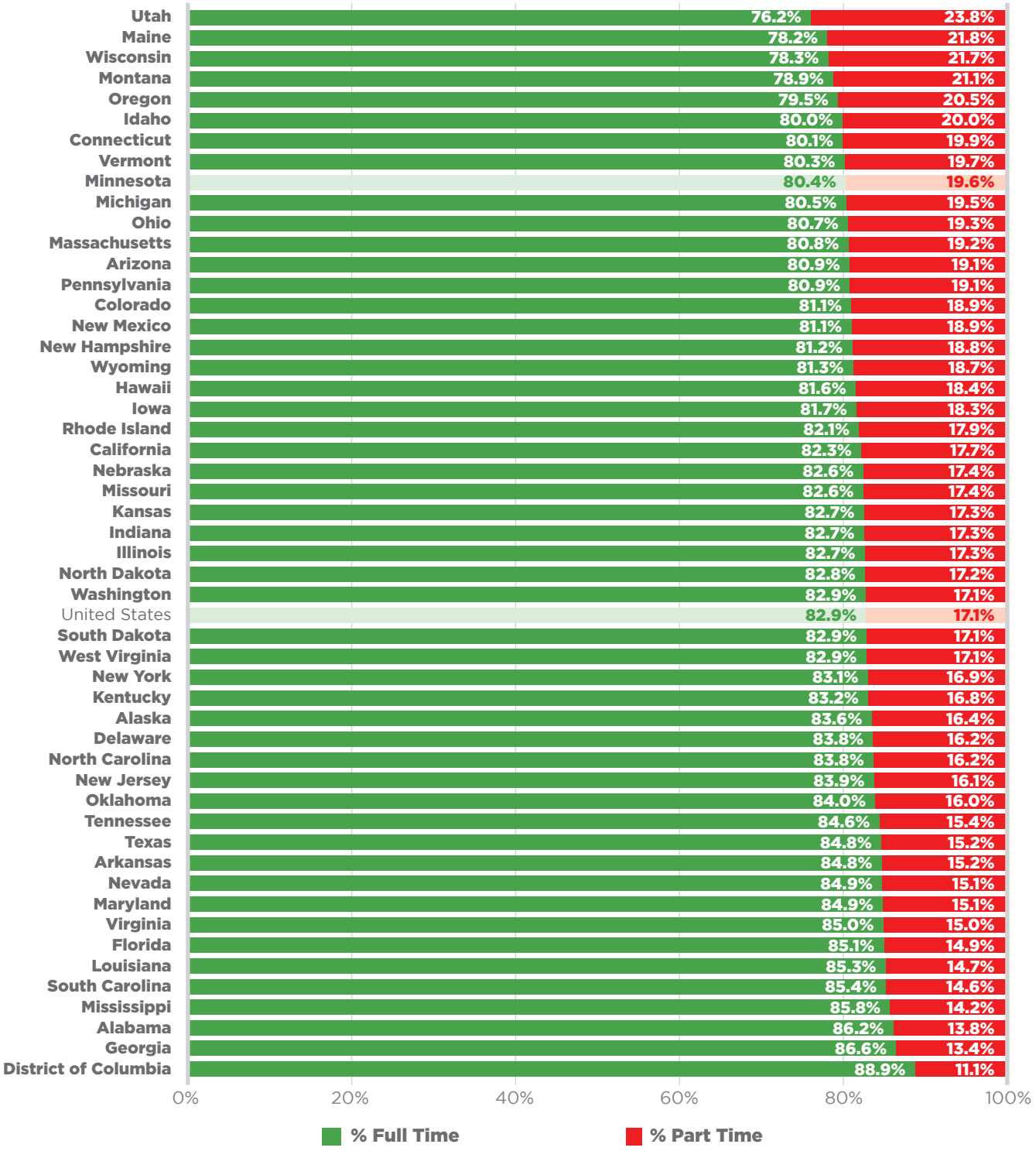
FIGURE 16




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

# Full-Time and Part-Time Unemployment as Share of Total Employment, 2019

FIGURE 17




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

# IS IMMIGRATION THE ANSWER?

Too often, people take the argument that an increased share of a given population in employment means higher per capita incomes and conflate it with the argument that a growing population and workforce means higher per capita incomes. The arguments are not the same. Whether a policy which increases the population, such as expanding immigration, leads to higher per capita incomes depends on two things.[16]

The first is whether the new arrivals have an employment ratio at least as high as that of the population already here. If they do not, they actually will lower the employment ratio, exacerbating the very problem the policy is intended to solve. There is good news for Minnesota here. In 2016, the employment ratio among Minnesota's foreign-born population was 68.6 percent, above that for native-born Minnesotans, 66.6 percent.

The second is whether the new arrivals are at least as productive as the workers already resident. Considering GDP per capita, immigrant workers add to the denominator (population) as well as the numerator (GDP). If these workers increase the population by a greater percentage than they increase GDP, they will actually lower GDP per capita.

What matters is the skill level of the workers and here the picture is less positive for Minnesota. The 32.6 percent of immigrants aged 25 or older who have bachelor's degrees or higher is a figure similar to native-born Minnesotans' 35 percent. However, whereas 34 percent of native-born Minnesotans have attended some college or earned an associate degree, that figure is just 21.6 percent for foreign-born Minnesotans and falls to 15.5 percent for foreign-born non-citizens. While 30.8 percent of native-born Minnesotans have a high school diploma or less and just 4.9 percent are not high school graduates, for foreign-born Minnesotans these numbers are 45.8 percent and 27.1 percent, respectively. For foreign-born residents who are not citizens these figures rise to 52.7 percent and 34.4 percent.

This is reflected in the jobs Minnesota's immigrants do. Foreign-born workers are found more often in service occupations, which include health care support, protective service, food preparation and serving, building and grounds cleaning, and personal care occupations. These are lower-productivity jobs that generate relatively low levels of GDP, as Figure 22 shows.

Economics alone shouldn't drive immigration policy, but if the aim is to use immigration to generate per capita income growth, the preference should be for skilled workers.[17]

# Increasing output per worker

Sustained increases in per capita incomes come from increases in productivity: the amount of output a worker can produce with a given amount of labor. Indeed, as the economist Paul Krugman has written, "Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker."[18] The same applies to states.

Productivity is generally measured in one of two ways. First we can look at GDP produced per worker, and second we look at GDP produced per hour worked.

**Productivity is generally measured in one of two ways. First we can look at GDP produced per worker, and second we look at GDP produced per hour worked.**

Looking at GDP per worker, Minnesota has room for improvement. Figure 18 shows that, in 2019, our state's GDP per worker was $127,968, which was 6.2 percent lower than the level for the United States generally, $136,417. This ranked Minnesota 21st out of the 50 states and the District of Columbia. Minnesota is also a laggard when we look at GDP per hour worked. In 2019, our state lagged the United States average as Figure 19 shows. For the United States generally, $79.39 of GDP was generated for each hour worked, for Minnesota the figure was $75.95, 4.3 percent lower.

Productivity growth in Minnesota lagged the growth rate for the United States between 2000 and 2019. Figure 20 shows that GDP per worker increased by 25.1 percent for the United States compared to 21.8 percent for Minnesota. In per hour terms, as Figure 21 shows, GDP grew by 10.5 percent between 2008[19] and 2019, again below the rate for the United States, 13.9 percent.

Given the importance of productivity, it is worth looking at these numbers in more detail. Figure 22 shows the GDP associated with the average job in various industrial sectors for both Minnesota and the United States, as well as the percentage increase or decrease in jobs in those sectors between 2000 and 2019. The general pattern is a concerning one and is the same for both our state and the United States generally: The big gains in employment this century have come in sectors where each job generates relatively little GDP, such as Health Care and Social Assistance (GDP per job of $77,404 in

## HOW DO WE EXPLAIN THE DIFFERENCE BETWEEN PER CAPITA AND PER WORKER OUTCOMES?

On the face of it, the difference between Minnesota's impressive per capita income numbers seen in Figure 1 and Figure 6 and the relatively disappointing per worker income numbers seen in Figure 18 and Figure 19 might appear to be a puzzle. In fact, the answer is quite simple: Minnesota's above-average employment, seen in Figure 13, offsets its below-average worker productivity.

Per capita figures divide GDP by the population. Per worker figures divide it by the workforce. In both cases the numerator — total GDP — is the same, but the denominator — population or the workforce — is different. Because of Minnesota's high employment ratio, when workforce is the denominator the numerator is divided by a relatively greater number than when it is divided by the population. The numeric example shown in Table 1 illustrates this. State A has a lower employment ratio (50 percent) but higher productivity (2 units of GDP per worker). State B (corresponding to Minnesota) has a higher employment ratio (75 percent) but lower productivity (1.5 units of GDP per worker). As a result, State B has a higher level of GDP and GDP per capita, but a lower level of GDP per worker.

| Year | State A | State B |
|---|---|---|
| GDP | 100 | 110 |
| Labor Force | 50 | 75 |
| Population | 100 | 100 |
| | | |
| GDP per Capita | 1 | 1.1 |
| GDP per Worker | 2 | 1.5 |

Minnesota) and Educational Services ($57,061). A striking difference is in Mining & Logging, the best performing sector in Minnesota in terms of GDP per job ($569,139). For the United States, employment in this sector rose by 22.8 percent from 2000 to 2019, but in our state it actually fell, by 19.0 percent, over the same period.

## Increased capital per worker

We can increase the amount of output produced by a given amount of labor by giving it capital to use: increasing the amount of capital per worker.

Figure 24 shows that Minnesota's stock of capital per worker could be higher. In 2019, we ranked 26th out of the 50 states and the District of Columbia with $151,489 of capital per worker. This was 12.5 percent below the average for the United States, $173,122, but this average is being pulled up by some outliers: Wyoming, North Dakota and Alaska, which rely heavily on the capital intensive extractive industries. When we account for these by looking at the median, Minnesota looks better, with capital per worker almost exactly the same as the median average for the United States, $151,861.[20]

Minnesota has also performed well when it comes to the growth of its per worker capital stock. Figure 25 shows that, between 2000 and 2019, capital per worker grew by 29.8 percent in our state, above the growth for the United States of 26.5 percent.

## The limits of capital

But, as with labor, there are limits to usefully increasing capital per worker, too. The first unit might increase output significantly, but the second

## IS PRODUCTIVITY LOW BECAUSE OF HIGH PART-TIME EMPLOYMENT?

As Figure 17 shows, Minnesota has one of the highest shares of part-time employment in the United States. This could influence our state's labor productivity numbers.

On a per worker basis, all workers, whether part-time or full-time, count the same. But, if a greater share of them are working and producing only on part-time hours, then that will increase the denominator (employment) by more than the numerator (GDP). In this case, a higher share of part-time employment might drive below average-per-worker productivity numbers.

The evidence suggests that higher shares of part-time employment do not drive down per worker productivity numbers. Figure 23 shows that, in 2019, there was no relationship between the share of employment in a state that is part time and that state's GDP per worker. Per worker productivity seems to be independent of the relative share of employment that is part time, so other factors must account for Minnesota's relatively low level of productivity.

or third will increase it by less until, eventually, additional inputs yield a negative increment of output.

Thus, of our three sources of per capita income growth, two — increases in the amount of labor provided by a given population and in the stock of capital per worker — are subject to some upper limit at which further increases are either impossible, in the case of labor, or actually produce negative returns, in the case of capital. Sustained per capita income growth needs sources that are not subject to such constraints.

### Increased human capital

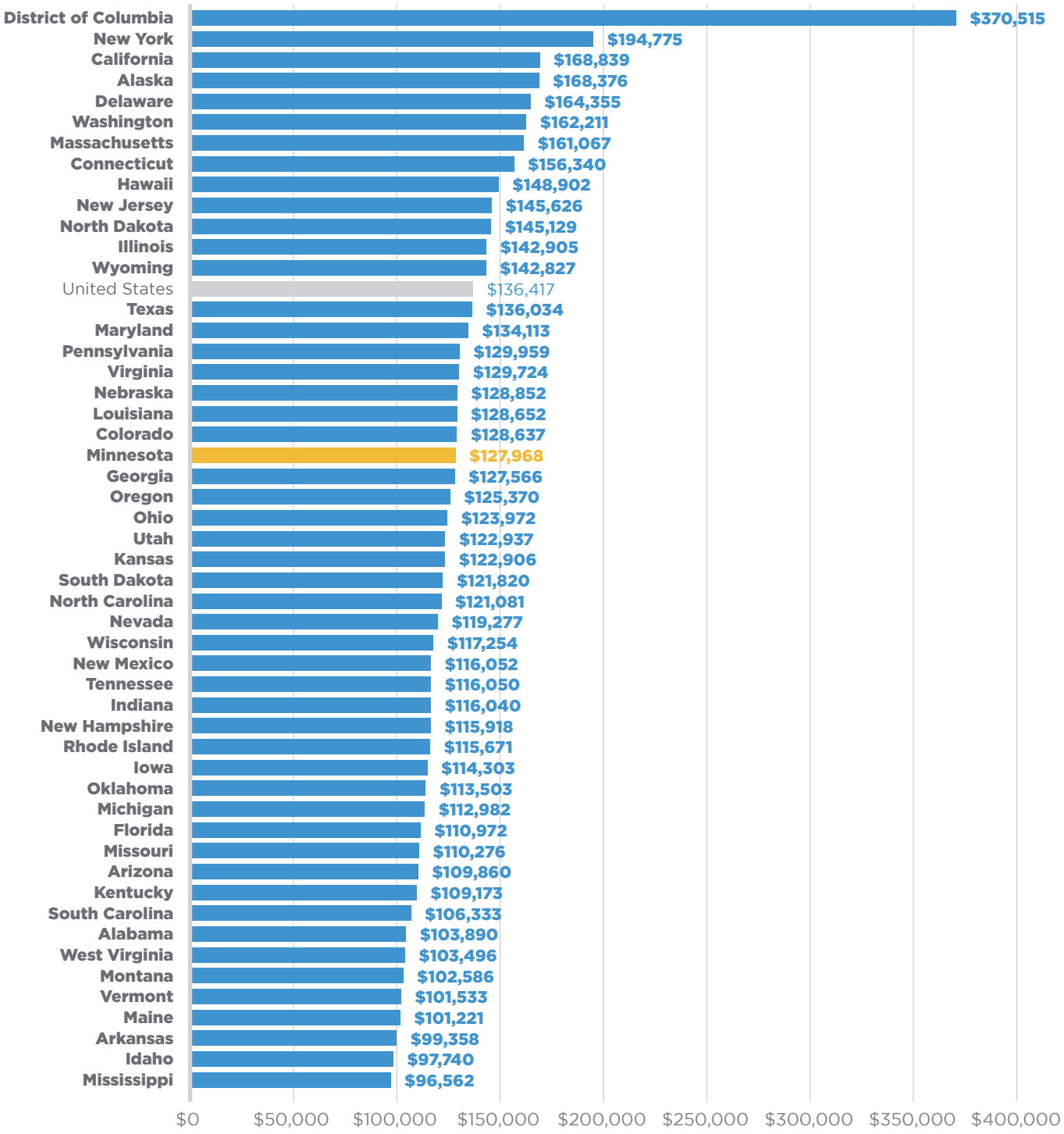
We can generate more output from a given input of labor at the intensive margin if that labor becomes more skilled. In this sense, investments in human capital are like investments in any other type of capital: They increase productive capacity at some future point.[21] There is no upper limit here, theoretically at least, because there is no upper limit to the amount of knowledge or skill each worker can possess.

Human capital is difficult to quantify. Some researchers use average years of schooling as proxy for "educational attainment" but this is a measure of an input — time in school — when "educational attainment" — skills acquired — is an output.[22] When attempts are made to augment these measures of the quantity of education with measures of its quality, Minnesota compares very favorably.[23] As Figure 26 shows, Minnesota ranks third in the United States for the aggregate per worker knowledge capital of its residents who were educated in the state.

But the measure of quality used here are test scores from the National Assessment of Educational Progress (NAEP), the use of which presents problems of its own. Students from different socioeconomic and ethnic backgrounds tend to perform differently on NAEP tests regardless of the state they are in which "often renders conventional state rankings as little more than a proxy for a jurisdiction's demography." A state, like Minnesota, that does well on such aggregated scores might be benefiting from its socioeconomic make up rather than any great achievement by its education

# Per Worker Gross Domestic Product, 2019 (Current Dollars)

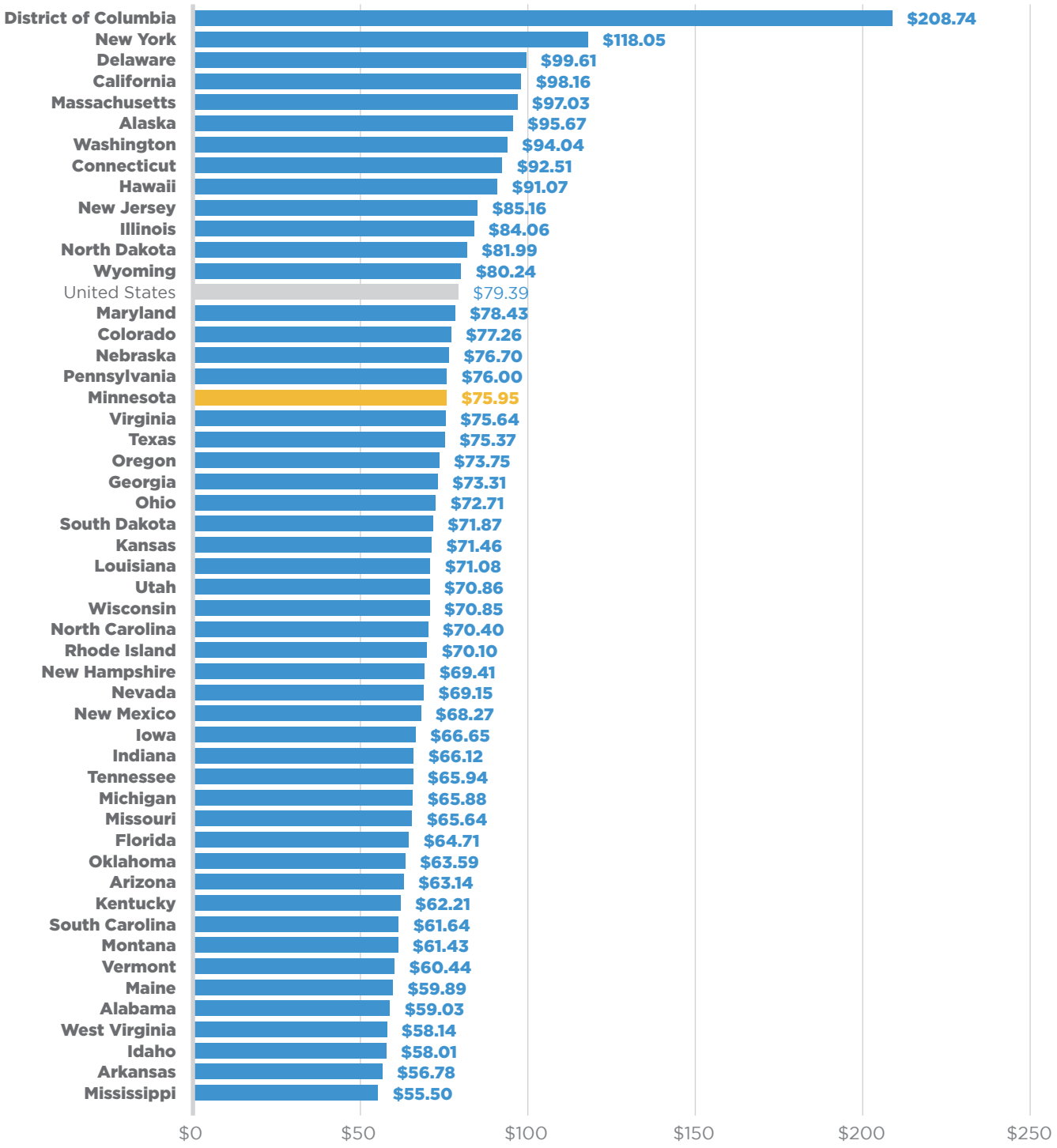
FIGURE 18




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS AND BUREAU OF LABOR STATISTICS

# Per Hour Gross Domestic Product, 2019 (Current Dollars)

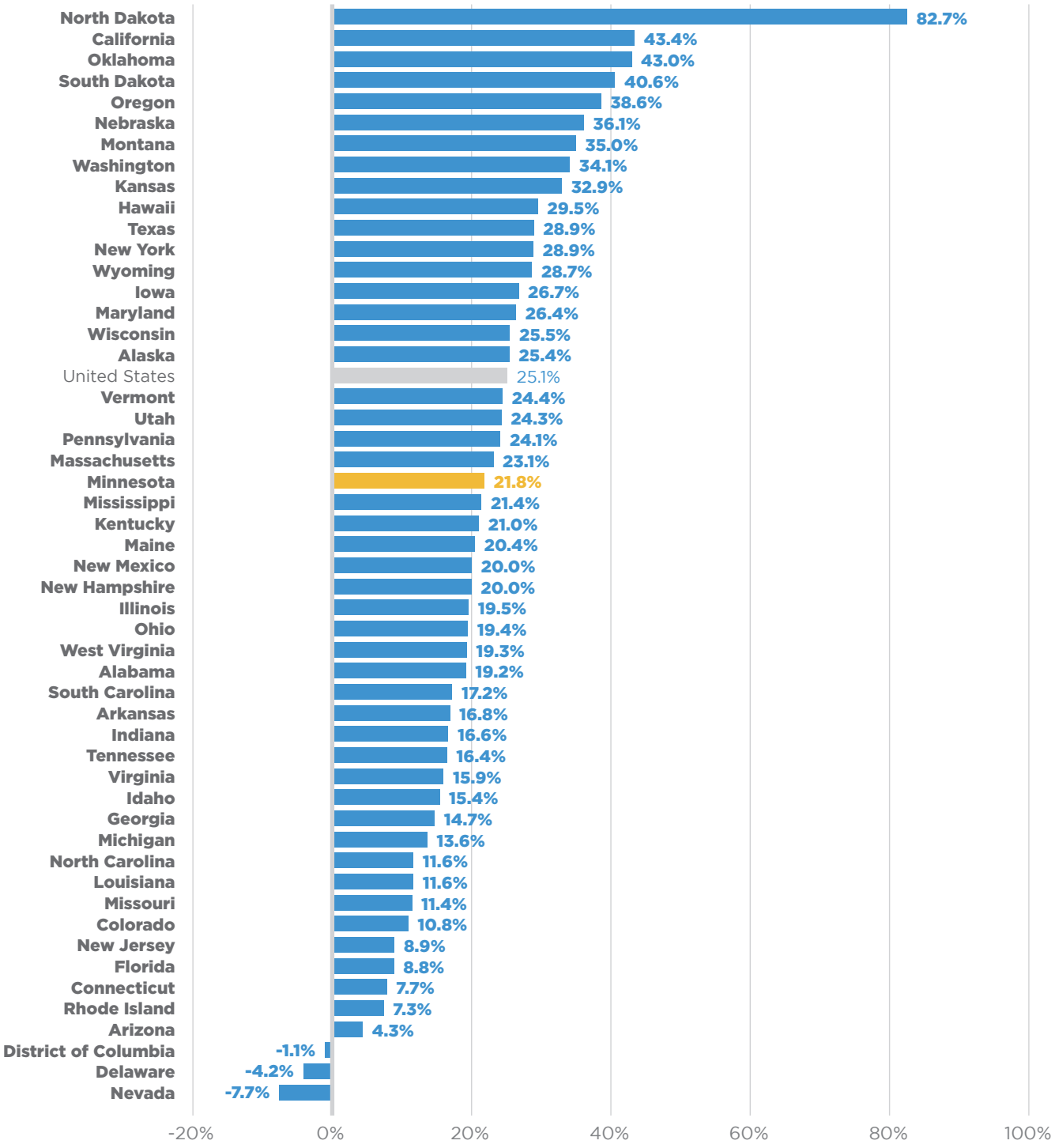
FIGURE 19




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS AND BUREAU OF LABOR STATISTICS

# Real Per Worker Gross Domestic Product Growth, 2000-2019

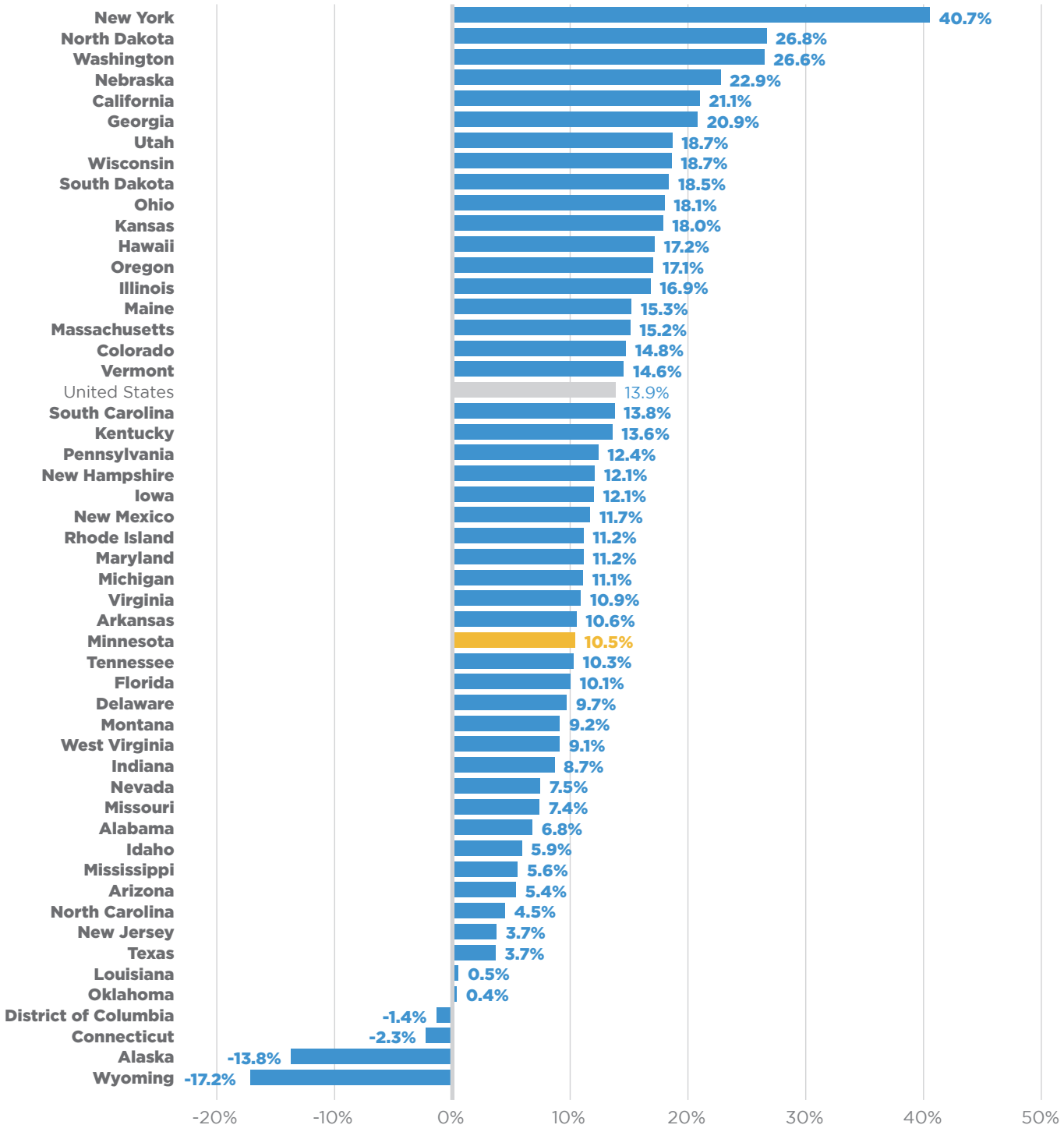
FIGURE 20




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS AND BUREAU OF LABOR STATISTICS

# Real Per Hour Gross Domestic Product growth, 2008-2019

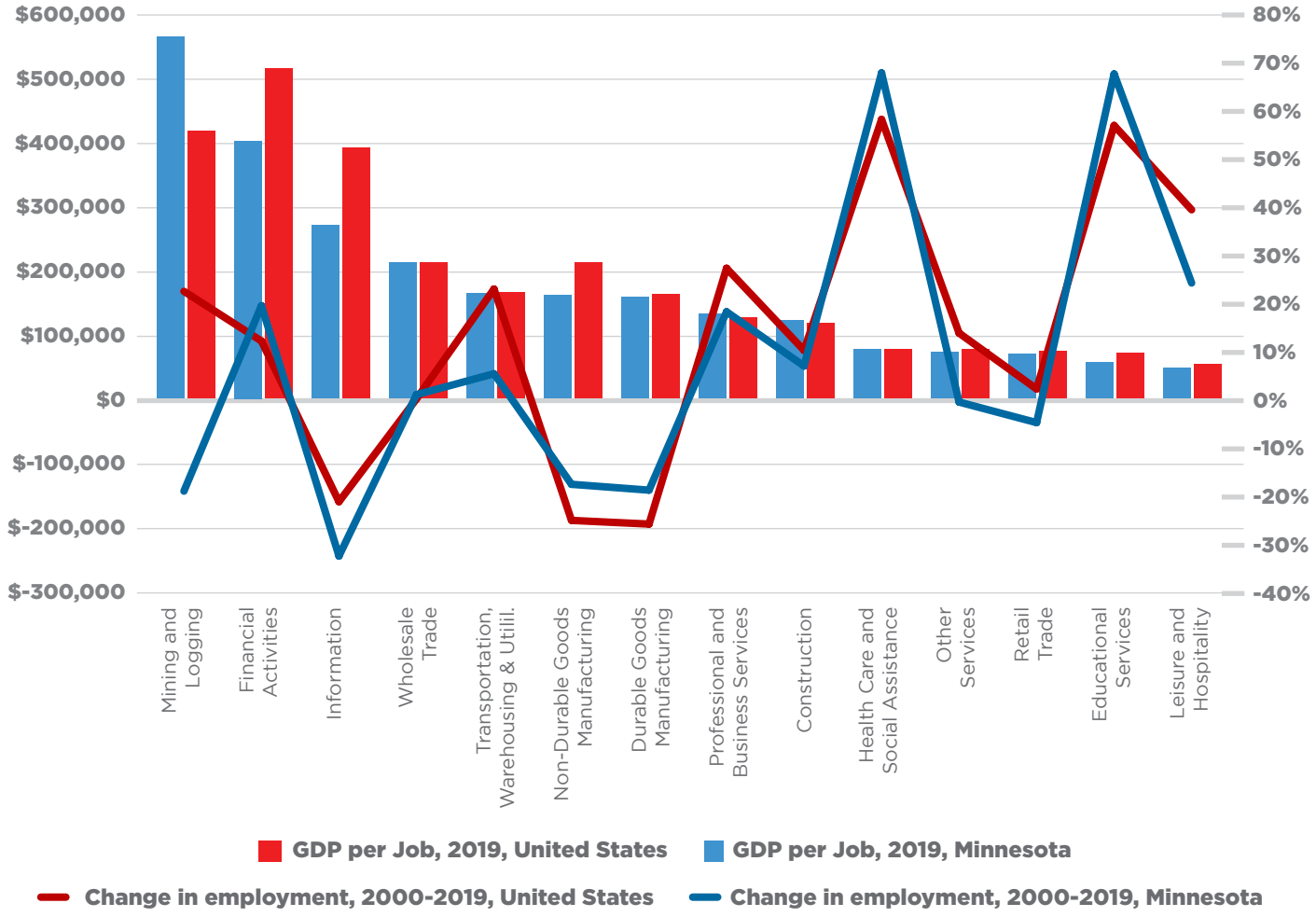
FIGURE 21




**SOURCE:** BUREAU OF ECONOMIC ANALYSIS AND BUREAU OF LABOR STATISTICS

# Minnesota's GDP Per Worker, 2019, and Job Growth by Sector, 2000-2019

FIGURE 22



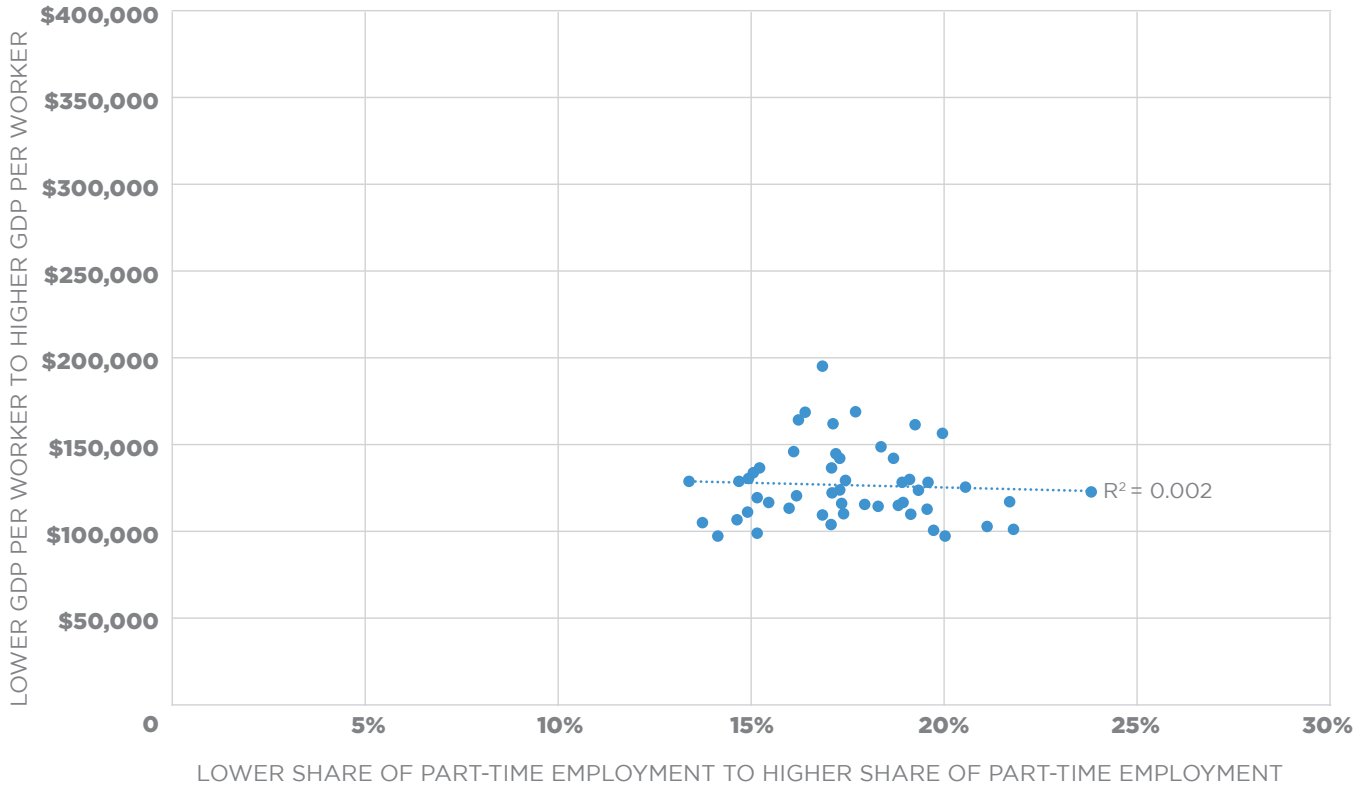

**SOURCE:** BUREAU OF ECONOMIC ANALYSIS

system. Indeed, when we disaggregate the data to take these factors into account, Minnesota slumps from 4th to 33rd in the United States.[24]

Digging deeper into the numbers gives more cause for concern. In Texas — a state that serves similar student demographics as Minnesota — black, Hispanic and Asian/Pacific Islander students outperformed Minnesota's black, Hispanic, and Asian/Pacific Islander students on each 2019 NAEP subject test for each grade level. In Mississippi, black and Hispanic students in both fourth- and eighth-grade math and reading outperformed Minnesota black and Hispanic students. Both states spend significantly less per pupil than Minnesota. Equally important, Mississippi's NAEP test scores for fourth- and eighth-grade black students have been scaling up over the years, compared to Minnesota's declining scores and inconsistent growth among fourth- and eighth-grade black students. And, when NAEP results are income

## Relationship Between Part-Time Share of Employment and GDP Per Worker, 2019

FIGURE 23




**SOURCE:** BUREAU OF LABOR STATISTICS, BUREAU OF ECONOMIC ANALYSIS, AND CENTER OF THE AMERICAN EXPERIMENT

adjusted (with controls for free and reduced-price lunch eligibility), our state's fourth graders' reading scores ranked 28th in the United States. Among low-income students in Mississippi — who make up 75 percent of the student body compared to Minnesota's 37 percent — fourth graders' reading scores ranked 2nd.[25]

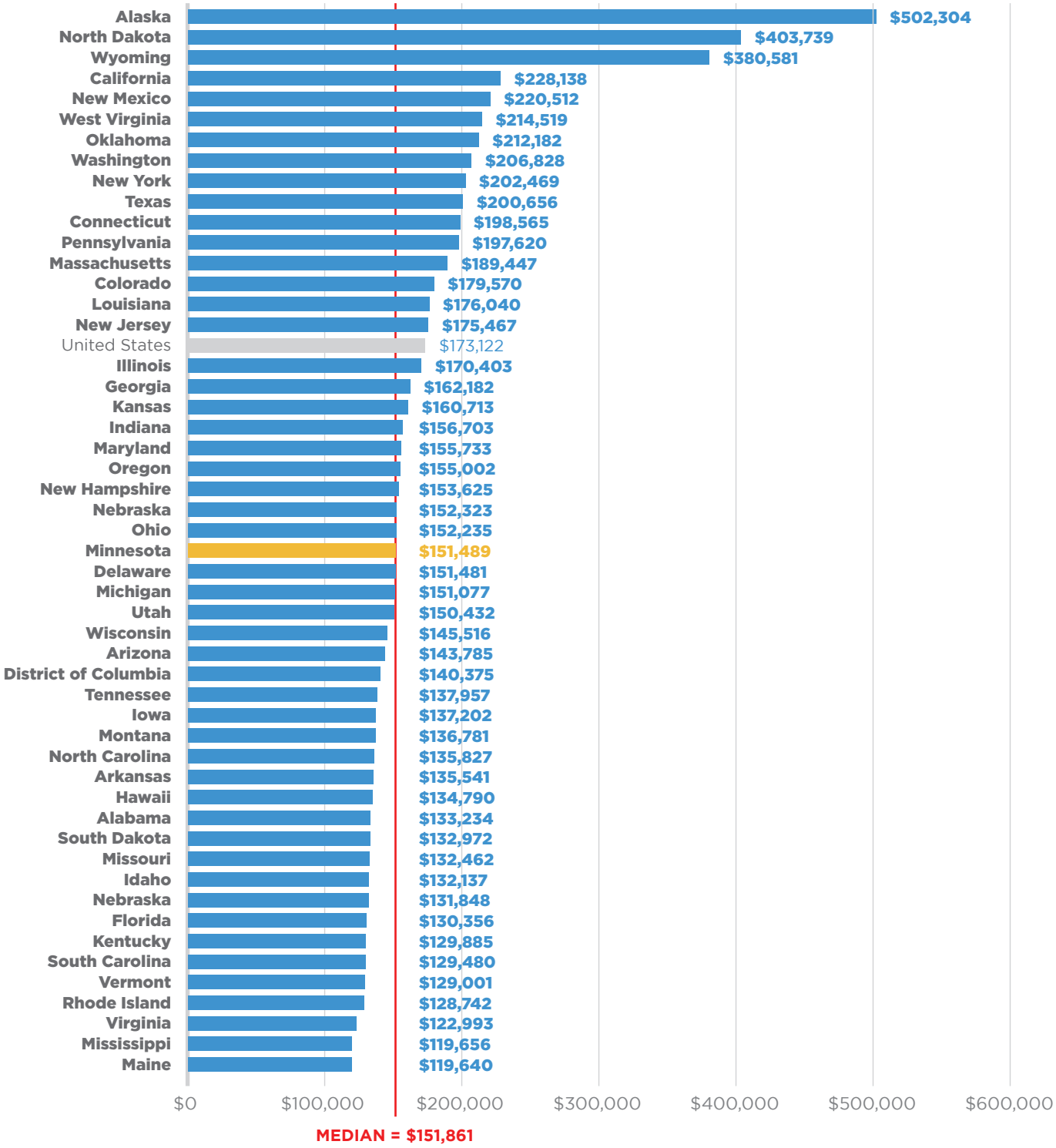
Another way Minnesota could improve its stock of human capital and productivity is by attracting highly skilled workers to the state or holding on to those it already has. Sadly, Minnesota has performed poorly on this front. Using income as a proxy for productivity, which is standard in economics, Figure 27 shows that Minnesota attracts lower-income residents and loses higher-income ones. Furthermore, these losses are not limited to the so-called "rich" who might be fleeing the state's high top rate of tax. Between 2011 and 2018, Minnesota saw a net outflow of people above a threshold of $50,000 in income annually.

## Technology/Total Factor Productivity

If we have diminishing returns to the amount of labor and capital that we use to produce output, how have we witnessed mostly sustained economic growth in some parts of the world over the last two centuries? The answer is that per capita eco-

# Capital Per Worker, 2019 (Current Dollars)

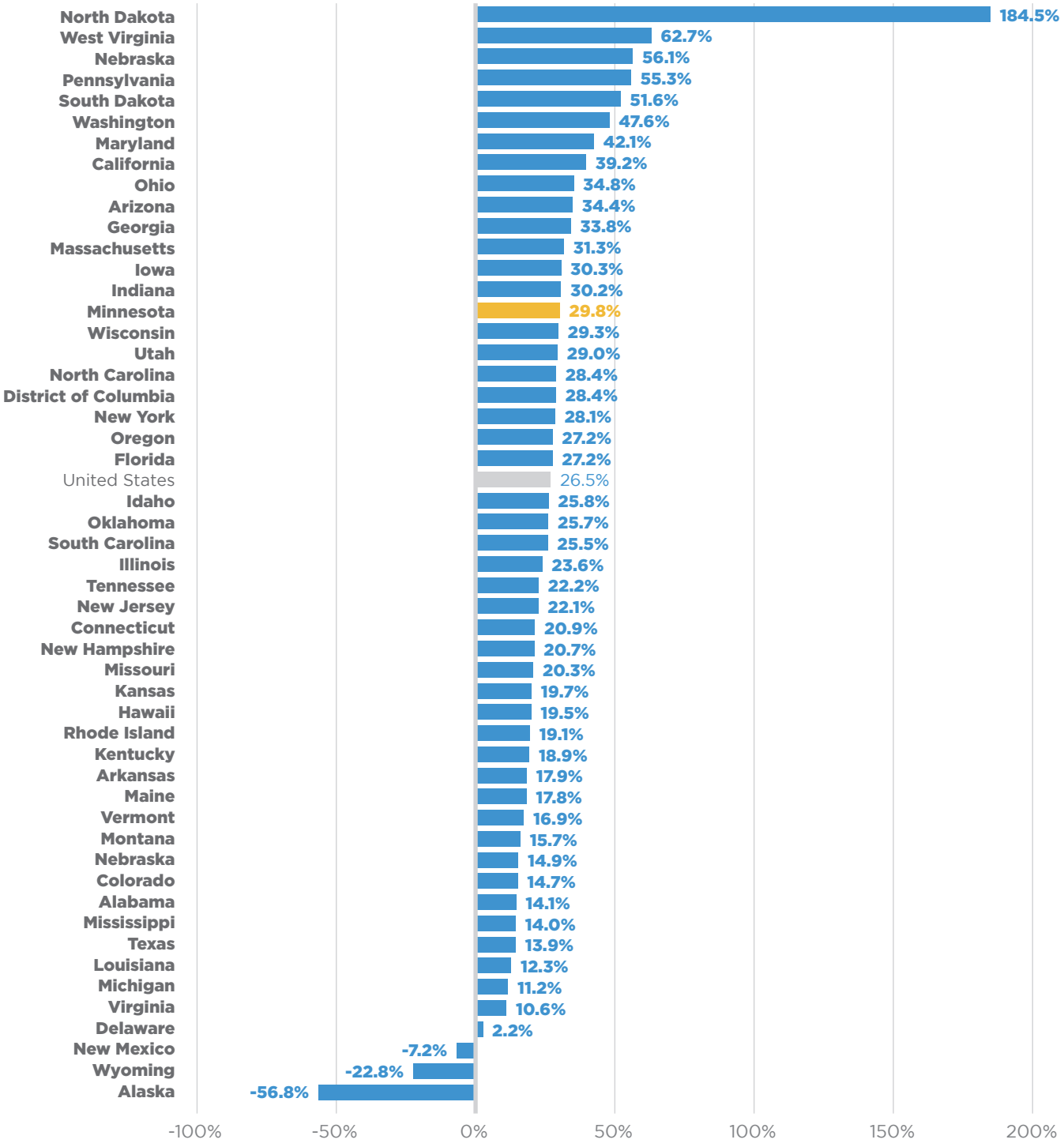
FIGURE 24




**SOURCE:** BUREAU OF LABOR STATISTICS, BUREAU OF ECONOMIC ANALYSIS, AND EL-SHAGI AND YAMARIK

# Real Capital Per Worker Growth, 2000-2019

FIGURE 25




**SOURCE:** BUREAU OF LABOR STATISTICS, BUREAU OF ECONOMIC ANALYSIS, AND EL-SHAGI AND YAMARIK

nomic growth is not driven by ever larger inputs of labor, capital, or natural resources, but by new ideas. While we might one day run out of an input like oil, and some conclude from this that there are limits to growth, there is no reason to think that we will run out of ideas, which are the true source of that growth. Human ingenuity is, as the economist Julian Simon called it, "The Ultimate Resource."[26]

This source of growth is called Technology or Total Factor Productivity (TFP). An example would be the use of tin throughout history. Between 3,000BC and 600BC, tin was alloyed with copper to produce bronze, which gave that age its name. Bronze was used extensively in weapons, armor, and household items like plates and cups. Nowadays, tin is mixed with indium to produce a solid solution that is both transparent and electrically conductive. This is used for the touchscreen on smart phones. As economists Charles I. Jones and Dietrich Vollrath explain: "The different ideas regarding tin allow us to use the same bundle of inputs to produce output that generates higher levels of utility."[27]

These ideas don't just take the shape of new inventions, they may also be the creation of new processes. Jones and Vollrath note that Sam Walton's innovative approach to retailing was no less an idea than inventing something like the smartphone. So, too, are the "assembly lines and mass production techniques that allowed Henry Ford's company to turn out a Model T every 24 seconds."[28]

"Ideas" are hard to capture in quantitative data. Data on the share of a state's income that is spent on Research & Development are readily available, but that measures an input and it is outputs — the products of that R&D — which matter for economic growth. Data on patents are also readily available and can be used as a measure of the output of new ideas. But this, too, has drawbacks. As Jones and Vollrath note:

> *Many ideas are neither patented nor produced using resources that are officially labeled as R&D. The Wal-Mart operation manual [is a] good [example]. In addition, a simple count of the number of patents granted in any particular year does not convey the economic value of the patents. Among the thousands of patents awarded every year, only one may be for the transistor or the laser.*[29]

With this in mind, these ideas broadly fall into two categories: innovation and entrepreneurship.

On some measures, Minnesota is one of the most innovative states in America. Figure 28 shows that, in 2019, our state generated 874 patents per million of the population, ranking us 6th — little changed from 2nd in 2000 — and well above the average of 567.

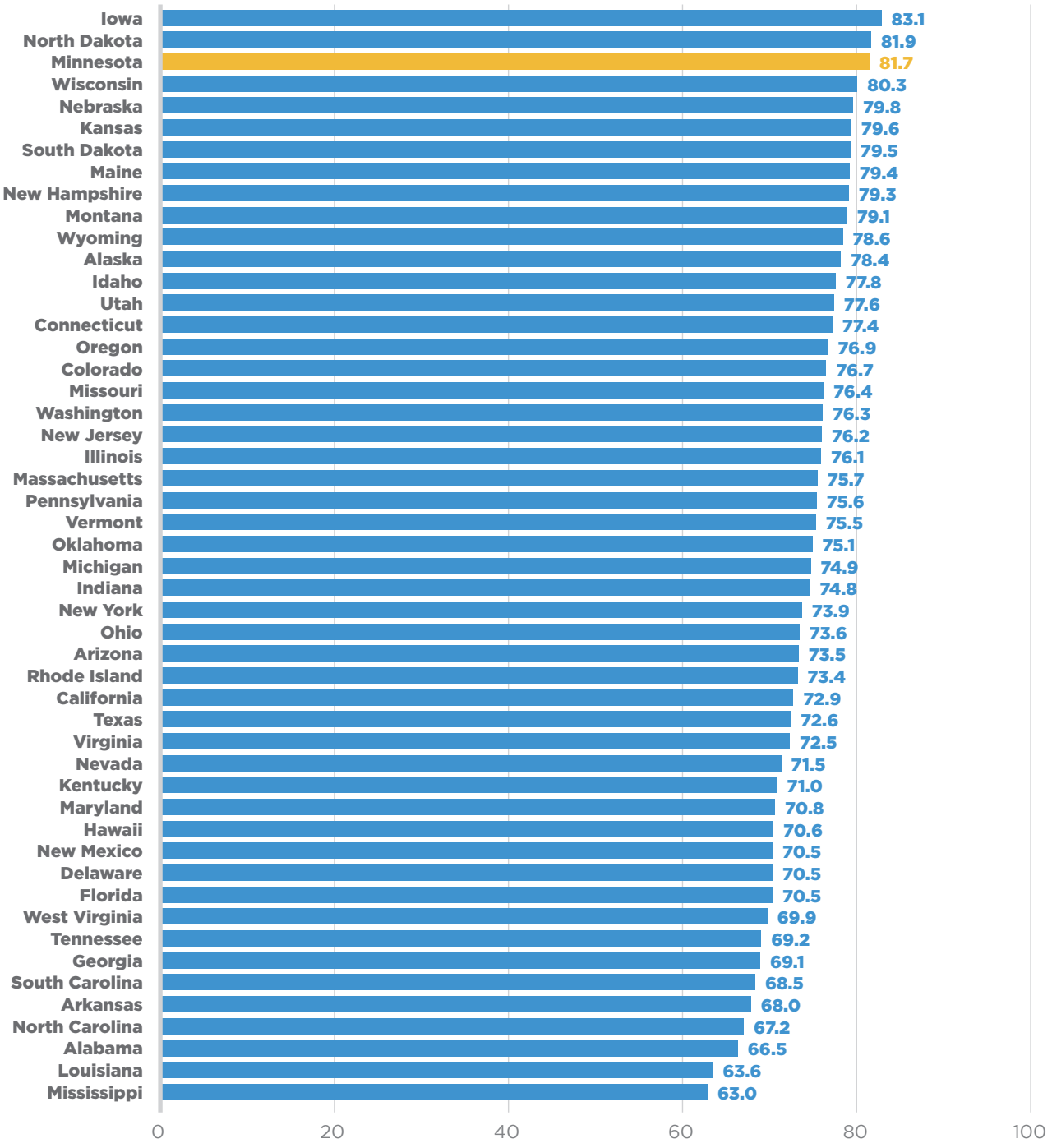
**Another way Minnesota could improve its stock of human capital and productivity is by attracting highly skilled workers to the state or holding on to those it already has.**

But ideas move more easily than either goods or capital, especially in a jurisdiction like the United States where there are no barriers to commerce between the states. As a result, an idea generated in one place can be exploited in another. But Minnesota's middling per capita GDP growth, seen in Figure 2, and below-average productivity performance, seen in Figures 18 and 19, suggest our state is good at generating new ideas, but other states are better at applying them and reaping the benefits.

This is closely related to entrepreneurship and Minnesota fares relatively poorly here. Figure 29 shows that, in 2020, New and Young Businesses — those which are five years old or less — accounted for just 31.3 percent of all businesses in our state. For the United States generally, the figure was 37.7 percent and Minnesota ranked 38th. This is lower than in 2000, as Figure 30 shows. Between 2000 and 2020, the share of Minnesota businesses which were New and Young Businesses fell by 4.6 percent. As we have seen throughout this report, this move was in the same direction as the national trend but was more pronounced here. ■

# Aggregate Knowledge Capital Per Local Worker, 2007

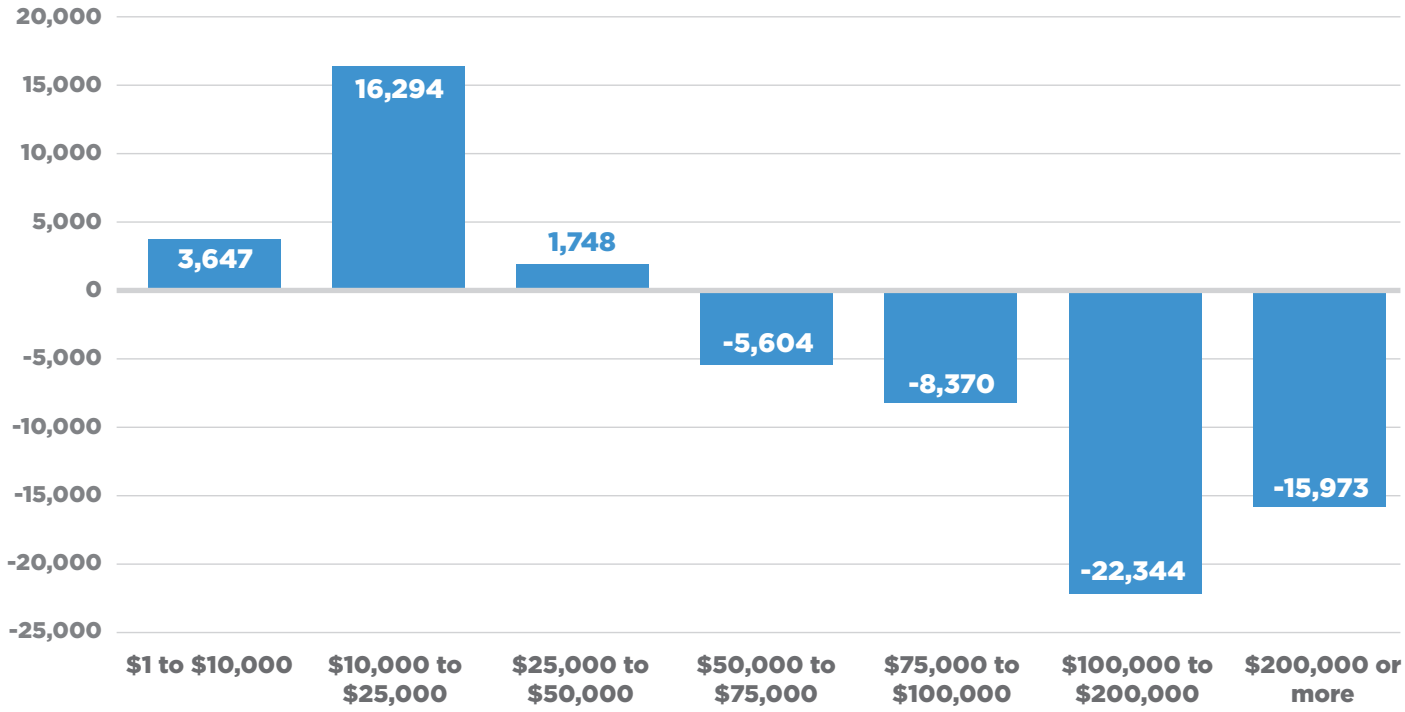
FIGURE 26




**SOURCE:** HANUSHEK, RUHOSE, AND WOESSMANN

# Net Flow of Taxpayers and Dependents to Minnesota by Income of Primary Taxpayer, 2011-2018

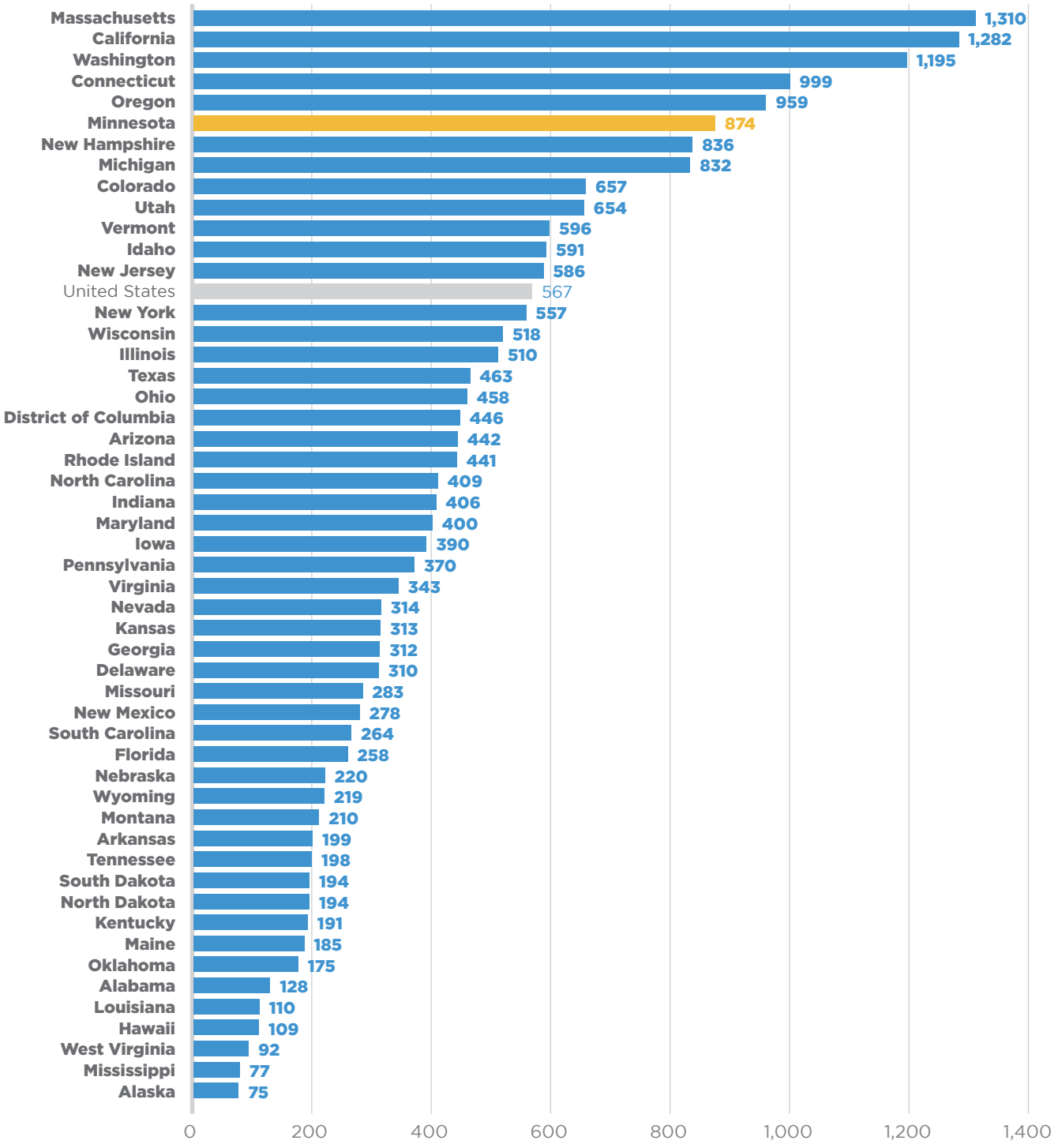
FIGURE 27




**SOURCE:** INTERNAL REVENUE SERVICE

# Patents Per Million of the Population, 2019

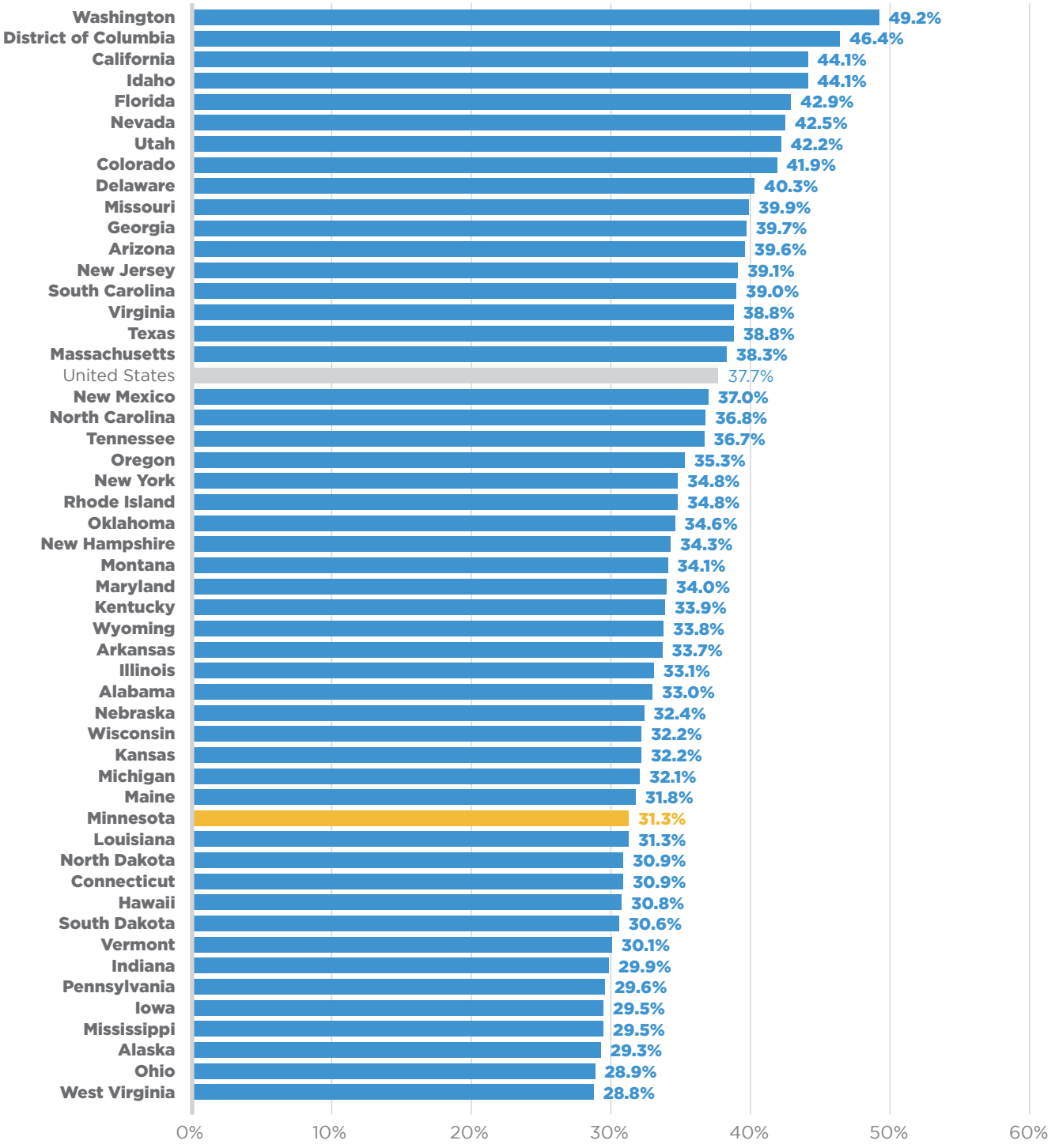
FIGURE 28




**SOURCE:** UNITED STATES PATENT AND TRADEMARK OFFICE

# New and Young Businesses as a share of all businesses, 2020

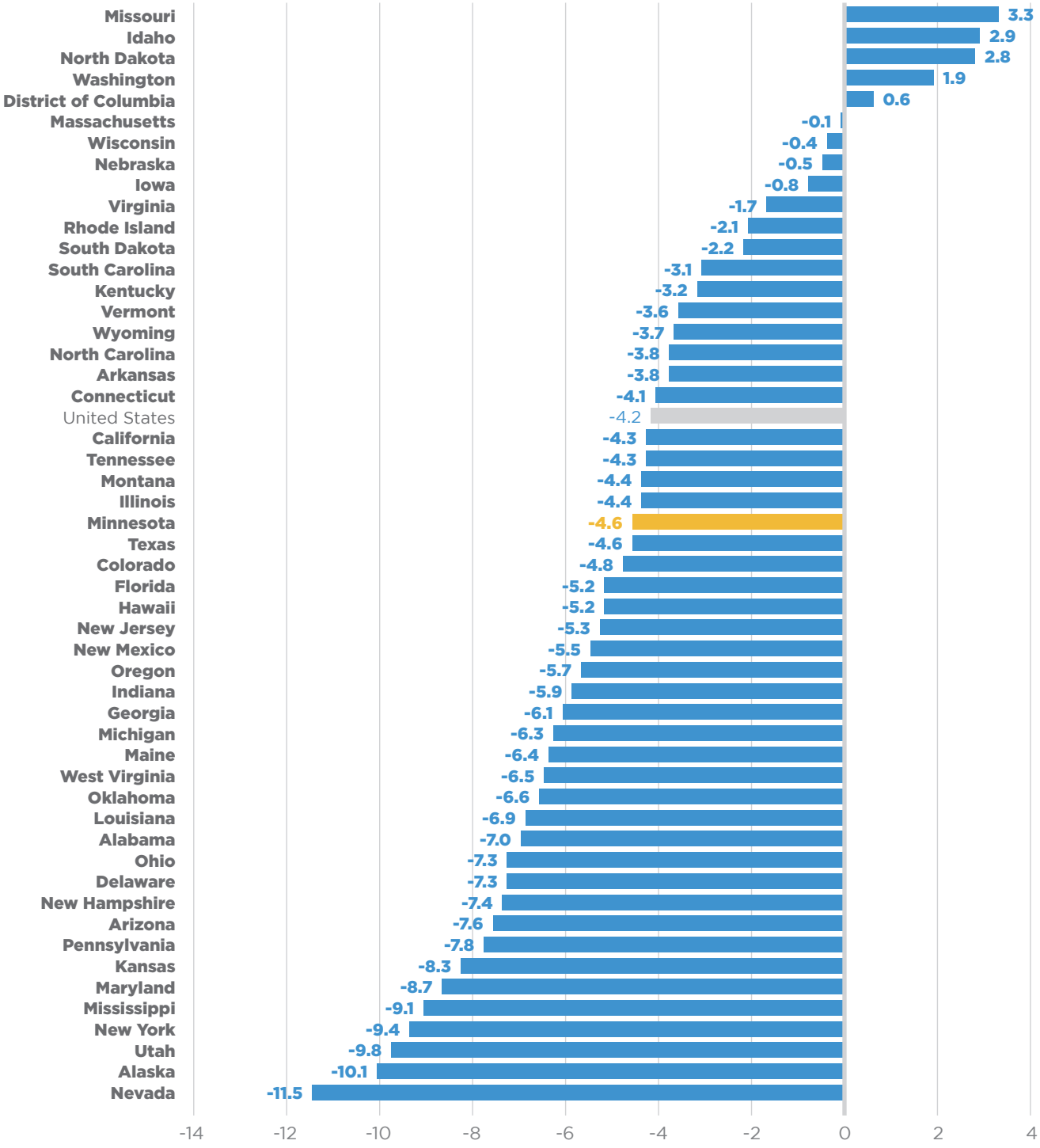
FIGURE 29




**SOURCE:** BUREAU OF LABOR STATISTICS

# Percentage Point Change in New and Young Businesses as a Share of All Businesses, 2000-2020

FIGURE 30




**SOURCE:** BUREAU OF LABOR STATISTICS

# Conclusion

Minnesotans typically have high incomes relative to residents of other states, but much of this is a legacy of growth in the past. In more recent years, our state's per capita income growth has both lagged that of the United States generally and been overly reliant on increases in transfer income. This is not sustainable.

The main problem underlying Minnesota's below average growth is its blow average level of and growth of labor productivity. Solving this is the key economic issue facing our state and the United States generally.

The policy tools available to state government generally fall into one of two categories: regulatory and fiscal policy. Regulatory policy is law, such as a legally mandated minimum wage rate. Fiscal policy covers taxing and spending.

## Regulation

Tax rates and, to a slightly lesser extent, their actual burdens, are, by their nature, relatively easy to quantify. But how do we quantify a regulatory burden? A great deal of work has been done to quantify the burden of federal regulations but much less work has been done on calculating the burden of state regulations. Economists at the Mercatus Center at George Mason University lead the field here. They:

> *...gathered and analyzed the regulations of 46 states plus the District of Columbia. (Unfortunately, the regulatory codes of Arkansas, Hawaii, New Jersey, and Vermont were not able to be analyzed owing to data limitations.) Mercatus researchers then used text analysis and machine learning algorithms to quantify how many words and regulatory restrictions each state's regulations contain as well as to estimate which sectors and industries of the economy those regulations are likely to affect. As in all RegData datasets, regulatory restrictions are a metric designed to act as a proxy for the number of prohibitions and obligations contained in regulatory text, as indicated by the number of occurrences of the words and phrases "shall," "must," "may not," "required," and "prohibited" in each state's regulations.*[30]

While this attempt is to be applauded and will hopefully be refined over time, there are two problems with it at present.

First, how tightly drafted are the regulations? It might be less burdensome to have 10 precisely worded regulations containing words like "shall," "must," "may not," "required," and "prohibited" than one loosely worded one. In the former case, individuals know exactly what the situation is. In the latter, there will be substantial uncertainty. For a business, the former situation will usually be preferable to the latter.

Second, the regulatory burden is only partly a function of the wording of regulations. It is also partly a function of how those regulations are enforced. In 2007, for example, the Supreme Court ruled that the Environmental Protection Agency (EPA) was required to regulate greenhouse gases but, citing the so-called "Chevron deference," the Bush administration ignored this ruling. Then, when the Obama administration took office, the EPA issued new rules to comply with the decision. The regulatory burden was markedly different because of their enhanced enforcement, not because any wording had changed.

## Policies to support employment growth

Given Minnesota's already high level of employment and the limits that exist to adding labor inputs, the scope for the state to generate per

capita income growth from more labor is limited. There are, however, sections of the population where employment could reasonably be higher, specifically among younger and black/African American Minnesotans, whose employment ratios are lower than they were in 2000. In our 2019 report "Minnesota's Workforce to 2050," we outlined six policy measures that would help:

» Keep taxes on capital intensive manufacturers low.

» Assist reskilling with support for lifelong learning.

» Restrict the eligibility for disability benefits to those genuinely in need.

» At least freeze minimum wages at current levels.

» Pass a "Clean Slate" bill like those in Pennsylvania and Utah and repeal our "Ban the Box" law.

» Halt the growth in occupational licensing coverage in Minnesota and enact a mutual recognition law such as that passed in Arizona.[31]

**The main problem underlying Minnesota's below average growth is its blow average level of and growth of labor productivity.**

## Policies to increase capital investment

Our state's workers are equipped with about the average amount of capital per worker so there is scope for growth here, although, once again, only up to a limit. There is, at present, little research on what drives capital investment at the state level. What we can say is that Minnesota's manufacturing employment held up relatively well in the face of the "China Shock," which could have been helped by the state's uncharacteristically low tax rates on capital intensive manufacturers — we rank 2nd lowest in the United States.[32] Given headwinds for businesses in the state, this might also help account for Minnesota's levels of capital per worker.

» Minnesota's low tax rates on capital intensive manufacturers should be maintained and taken as a lesson on how state fiscal policy can support economic growth.

## Policies to improve our human capital

Human capital is not subject to the limits that the quantity of labor provided and capital per worker are. This offers us scope for sustained per capita economic growth.

We can improve our human capital with more effective education, particularly among our minority students. More spending, however, should not be part of the equation. Research shows that in Minnesota, between 1970 and 2011, SAT scores adjusted for participation and demographics showed no noticeable increase while, over the same period, inflation adjusted per pupil spending increased by 80 percent.[33] Instead, as we noted in our 2020 report "Allergic to Accountability: Minnesota's public schools have little to show for decades of increased spending," we should:

» Expand the school choice continuum.

» Restore discipline in classrooms.

» Learn from other states.

We can also identify and enact policies that will help to attract and/or retain highly skilled workers. Minnesotans are some of the most highly taxed citizens in the United States and there is evidence that such high rates are a driving factor in population flows.[34]

» Minnesota's personal income tax rates need to be reduced across the board.

## Policies to increase innovation and entrepreneurship

Finally, we need to foster a more entrepreneurial climate in Minnesota so that it is a more attractive place to start businesses and nurture them to maturity.

Once again, Minnesota's corporate income tax rates are some of the highest in the United States. Research has found that corporate income taxes have a large negative effect on aggregate investment and entrepreneurial activity,[35] are a major influence on foreign investment decisions,[36] reduce entrepreneurship,[37] significantly influence firm and household location,[38] and may also uniquely harm entrants over incumbent firms.[39]

» Minnesota needs to cut its corporate income tax rate. ■

# Endnotes

**1** Martha Njolomole and John Phelan, "Closing Minnesota's Budget Deficit: Why we should make spending cuts and not raise taxes," Center of the American Experiment, Minneapolis, 2020.

**2** U.S. Business Cycle Expansions and Contractions, available at http://www.nber.org/cycles.html (accessed September 24, 2020).

**3** Charles I. Jones & Dietrich Vollrath, *Introduction to Economic Growth* (Norton, New York), 2013, p. 6.

**4** GDP, PPP (current international $) https://databank.worldbank.org/data/source/world-development-indicators#

**5** GDP is the most commonly used measure of economic performance. It measures the total market value of goods and services produced within an economy in a given period.

**6** A Metropolitan Statistical Area (MSA) is a geographical region with a relatively high population density at its core and close economic ties throughout the area.

**7** Personal Income measures how much money is received by people in an economy from their economic activity. It includes wages, benefits, proprietor income, dividends, interest, rent, and transfer payments like Social Security and veteran's benefits.

**8** "Consists of income payments to persons for which no current services are performed and net insurance settlements. It is the sum of government social benefits and net current transfer receipts from business." https://www.bea.gov/help/glossary?title_1=All&title=&page=5 (accessed February 15, 2021).

**9** Louis D. Johnston, "That Center of the American Experiment Report on the Minnesota Economy? It's Politics, not Economics," *MinnPost*, August 23, 2016.

**10** Robert Barro and Xavier Sala-i-Martin, "Economic Growth and Convergence Across the United States," National Bureau of Economic Research working paper, No. 3419, 1990.

**11** Peter Ganong and Daniel Shoag, "Why Has Regional Income Convergence in the U.S. Declined?" National Bureau of Economic Research working paper, No. 23609, 2017.

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**15** George J. Borjas, *Labor Economics* (McGraw Hill Education, New York), 2020, pp.19-75.

**16** Steve Hine and Cameron Macht, "Immigrants and the Economy," Minnesota Economic Trends, December 2017, pp. 2-7.

**17** It has been argued that more people means more productivity enhancing ideas so that population growth can increase per capita incomes. However, this is an argument for having more children, not for moving around the adults that there are via immigration. See Michael Kremer, "Population Growth and Technological Change: One Million B.C. to 1990," *Quarterly Journal of Economics*, 1993, 108(3): 681-716.

**18** Paul Krugman, *The Age of Diminishing Expectations* (MIT Press, Cambridge), 1994, p. 9.

**19** The first year for which there is data.

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**22** See Roberto Cardarelli and Lusine Lusinyan, "U.S. Total Factor Productivity Slowdown: Evidence from the U.S. States," IMF working paper 15/116, 2015.

**23** Eric A. Hanushek, Jens Ruhose, and Ludger Woessmann, "Knowledge Capital and Aggregate Income Differences: Development Accounting for US States," *American Economic Journal*: Macroeconomics, Vol. 9, No. 4, 2017, pp. 184-224.

**24** Stan J. Liebowitz and Matthew L. Kelly, "Fixing the Bias in Current State K–12 Education Rankings," Cato Institute Policy Analysis, No. 854, November 2018.

**25** Catrin Wigfall, "Allergic to Accountability: Minnesota's public schools have little to show for decades of increased spending," Center of the American Experiment, Minneapolis, 2020.

**26** Julian Simon, *The Ultimate Resource* (Princeton University Press, Princeton), 1998.

**27** Charles I. Jones & Dietrich Vollrath, *Introduction to Economic Growth* (Norton, New York), 2013. p. 80.

**28** Ibid, p. 81.

**29** Ibid, p. 92.

**30** James Broughel, Michael Kotrous, Patrick McLaughlin, "Quantifying Regulation in US States," Mercatus Center. https://www.mercatus.org/publications/regulation/quantifying-regulation-us-states (accessed Feb. 10, 2021).

**31** John Phelan, "Minnesota's Workforce to 2050," Center of the American Experiment, Minneapolis, 2018.

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