Labor Productivity and Costs
https://www.bls.gov/lpc/faqs.htm

How is productivity defined?
Productivity is a measure of economic efficiency which shows how effectively economic inputs are converted into output.

Why is productivity measurement important?
Advances in productivity, that is the ability to produce more with the same or less input, are a significant source of increased potential national income. The U.S. economy has been able to produce more goods and services over time, not by requiring a proportional increase of labor time, but by making production more efficient.

How is productivity measured by BLS (*Bureau of Labor Statistics, US Department of Labor*)*?*
Productivity is measured by comparing the amount of goods and services produced with the inputs which were used in production. Labor productivity is the ratio of the output of goods and services to the labor hours devoted to the production of that output.

What is the most commonly used productivity measure?
Output per hour of all persons—labor productivity—is the most commonly used productivity measure. Labor is an easily-identified input to virtually every production process. In the U.S. nonfarm business sector, labor cost represents more than sixty percent of the value of output produced. Output per hour in the nonfarm business sector is the productivity statistic most often cited by the press.

Productivity and Growth
http://www.cengage.com/economics/tomlinson/transcripts/8561.pdf

... What is that allows a worker to produce a lot with a relatively small amount of time? The first thing that makes a big difference in productivity is the availability of good tools, what we call capital. The higher the capital labor ratio in an economy, the more workers are able to transform a given amount of time into a large quantity of output. So the higher the capital labor ratio, the higher the ratio of output per worker.

A second factor influencing productivity is natural resources. The more natural resources that are available to each worker, the easier it is to transform a given amount of time into a large amount of output. So the higher the ratio of natural resources to labor, the more productive the worker is, the more output produced per hour.

Another factor influencing the productivity of labor is human capital. The more skills the worker has, the more the worker is able to transform a small amount of time into a larger amount of output, doing it by smarts. The higher the ratio of human capital to labor, the more output per worker is likely to be produced.

Finally, there's the matter of technology. The better the overall level of know-how in the economy, the better the skill, the accumulated knowledge about how to transform inputs into output, the higher will be the productivity.

What's the Return on Education?
http://www.nytimes.com/2005/12/11/business/yourmoney/whats-the-return-on-education.html?_r=0

... Two Harvard economists, Lawrence F. Katz and Claudia Goldin, studied the effect of increases in educational attainment in the United States labor force from 1915 to 1999. They estimated that those gains directly resulted in at least 23 percent of the overall growth in productivity, or around 10 percent of growth in gross domestic product.

Better Schools, Better Economies:
What would happen to the GDP if states started investing more heavily in education?
https://www.theatlantic.com/business/archive/2015/12/fixing-public-schools-for-a-better-economy/419526/

... the economists Eric A. Hanushek of Stanford, and Ludger Woessmann and Jens Ruhose of the University of Munich ... argue that other measures, such as average years of schooling and educational attainment, are inadequate, largely because such assessments don't take into account the quality of schools and thus are blind to the actual quality of skills and competencies learned there.

Using data from other countries and from the National Assessment of Educational Progress, the authors built a model that predicts the economic effects of improving education. According to their model, if all students in the U.S. could be brought up to basic mastery as defined by NAEP, the U.S. GDP would increase by $32 trillion, or 14.6 percent. A more aggressive approach that brings all students up to the average test scores of the highest-achieving states could boost GDP by $76 trillion over the next several decades. The authors note that in 2010, spending on K-12 education by states and localities amounted to only about 4 percent of the total GDP, suggesting that the economic growth afforded by improvements in education would certainly outweigh the cost.

The Effects of Investing in Early Education on Economic Growth
https://www.brookings.edu/research/the-effects-of-investing-in-early-education-on-economic-growth/

... This policy brief analyzes the impact of a high-quality universal preschool policy on economic growth, concluding that such a policy could add $2 trillion to annual U.S. GDP by 2080. By 2080, a national program would cost the federal government approximately $59 billion, but generate enough additional growth in federal revenue to cover the costs of the program several times over.

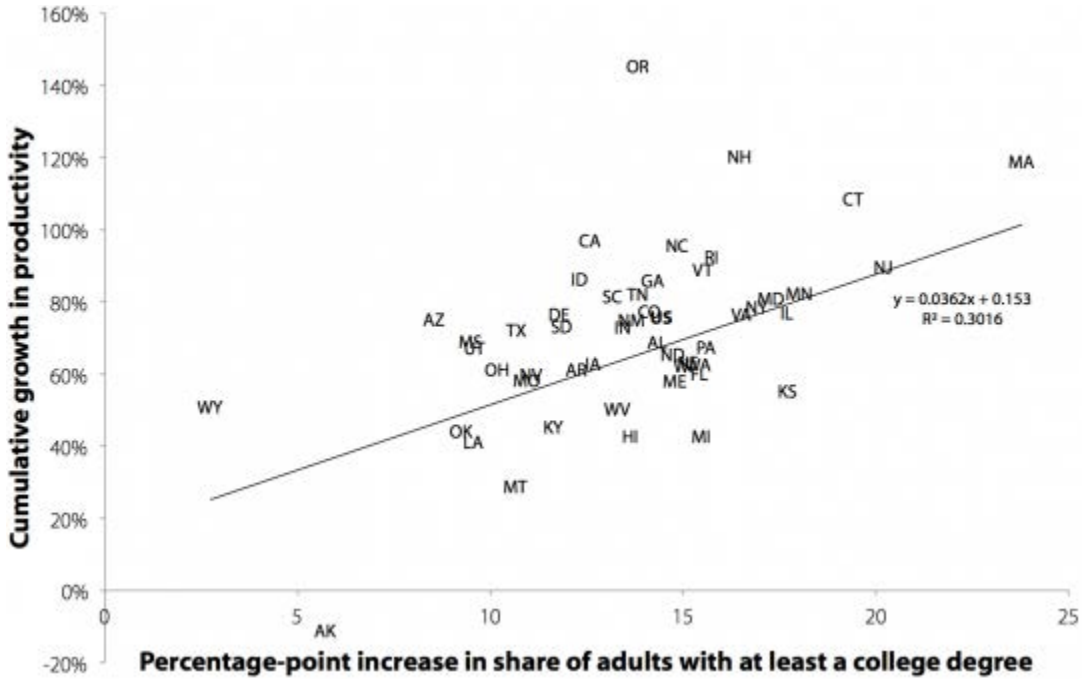
... Because most of these benefits are longer-term while the costs of mounting the programs are more immediate, the political system tends to be biased against making such investments.

However, any business that operated in this way would likely fail to succeed. A similarly dim prospect may be in store for a country that fails to take advantage of such solid investment opportunities.

A Well-Educated Workforce Is Key to State Prosperity
http://www.epi.org/publication/states-education-productivity-growth-foundations/

... Ultimately, the wealth of a society can increase only if the economy becomes more productive. A more productive economy can support both higher wages and higher profits, as well as shorter work weeks and a higher quality of life. So the question of how to increase productivity needs to be at the center of any debate about state economic development.

Figure: Productivity has grown more in states with greater growth in the educational attainment of their workforce.



... increasing productivity does not by itself guarantee that the resulting economic gains will be broadly shared. At the national level, productivity and wages grew hand in hand from the end of World War II until the early 1970s. But since then, wages have largely stagnated while productivity has continued to rise. From 1973 to 2011 productivity increased 80.4 percent while real median hourly compensation (wages and benefits) of production/nonsupervisory workers in the private sector grew just 10.1 percent.

Is Improving Schools All About Money?
https://www.nytimes.com/roomfordebate/2015/03/26/is-improving-schools-all-about-money

... A recent study of school funding reforms over the last 40 years or so shows just how much of a difference money can make: For low-income students who spent all 12 years of school in

districts that increased their spending by 20 percent as a result of court-ordered reforms, graduation rates rose by 23 percentage points and adult poverty rates fell by 20 percentage points. The students' family incomes were about 52 percent higher than they would have been without the greater education investment. The effects were large enough in many cases to entirely eliminate the gap in adult outcomes between those raised in poor families and those raised in non-poor families. - Darling-Hammond

... It is hard getting around the historic facts. Real per pupil spending has more than doubled in the past 40 years, but the mathematics and reading scores of 17-year-olds have barely budged. We must recognize that more of the same is unlikely to yield better results – and by implication reform through spending is not the way to improvement. - Hanushek

Returns to Investment in Education: A Further Update
http://siteresources.worldbank.org/INTDEBTDEPT/Resources/468980117095444778 8/3430000-1273248341332/20100426_16.pdf

Education and Economic Growth
http://educationnext.org/education-and-economic-growth/

Defining Productivity in Education: Issues and Illustrations
https://hanushek.stanford.edu/sites/default/files/publications/Hanushek%20Ettema.American%20Economist.pdf

The declining productivity of education
https://www.brookings.edu/blog/social-mobility-memos/2016/12/23/the-declining-productivity-of-education/

2016's Cities with the Most & Least Efficient Spending on Education
https://wallethub.com/edu/cities-with-the-most-least-efficient-spending-on-education/9390/#methodology