Three Levers to Lift the Economy: SAVINGS INCENTIVES, DEFICIT REDUCTION, AND BASIC RESEARCH

By Matt Jensen

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Introduction

Economic growth is a mighty force behind improving standards of living. For much of the United States’ history, economic growth has also been reliably steady. So steady, in fact, that considerations of long-run growth effects receive little consideration in the policy process. Many policies treat the economy as if it was dependable and able to grow in spite of all abuses. It is easy to see the origin of this complacency about economic growth: the last century has seen remarkably steady growth rates in the United States of around 2%. Nevertheless, it is important to consider what policies could improve growth over the next century.

This paper proceeds in two parts. First, I will briefly review the importance of long-run growth, and then I will discuss a few policy levers that can influence long-run growth.

Why is Economic Growth Important?

Although it is one of the most important factors in improving well-being over time, long-run economic growth is often ignored in policy discussions. There are several reasons for this omission—the steadiness of past growth, a general focus on short-term problems, and a difficulty in understanding growth. However, long-run growth is an essential phenomenon that has large effects on health, well-being, and even government budgets. Understanding its importance can further discussion of how it can be promoted going forward.

Chart 1 shows America’s GDP per capita from 1790 through 2012 in constant dollars. The red line illustrates the years before 1870, while the blue line shows the years after. Note the rapid increase of the economy’s size from the early days of the United States to the present. In 1790, GDP per capita was a mere $1,107 dollars, whereas today it is $49,226, nearly 45 times higher.

This chart is not just useful for seeing changes in U.S. output, but for assessing differences in the rate of change over time; that is, the economic growth rate. The Y axis is plotted on a logarithmic scale, so a flat line represents steady growth—the greater the slope, the greater the growth. It is easy to see that the American economy grew faster after 1900 than it did before. Perhaps more interesting is that in the 20th century the rate of growth was remarkably steady. The black trend line is fitted to the period from 1870 to 2012, and there are few long-run deviations from the trend during this period. While there are certainly dips and peaks, most notably resulting from the Great Depression and World War II, the real growth rate hews very closely to 2%.
Although the growth rate has been fairly steady for over a hundred years, growth is not immune to policy. We must guard against complacency. However, policymakers and the general population seem more interested in other, short-term topics.

Chart 2 shows Google searches for the search term “unemployment” compared to searches for the term “gdp” in the United States. This chart from Google Trends displays the intensity of each search relative to the highest point on the chart, which is indexed to 100. The intensity of searches for GDP, on average, is 13% of the intensity of searches for unemployment. Although not displayed here, it is interesting to note that these trends are entirely reversed in China, where the intensity of searches for GDP are much higher than those for unemployment.²

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Part of the reason why growth might be ignored in the policy debate is that it can be difficult to internalize the importance that minor changes can have, particularly over the long-run.

A simple way to conceptualize the impact of growth is to remember the rule of 72: something growing at a rate of 1% per year will double every 72 years (with continuous compounding, 69 is a more accurate rule of thumb). At its 2% growth rate, the United States has been doubling its economy about once every 35 years. If the economy had grown only 1% slower from World War II until the present, America’s economy would be roughly half the size of what it is today.

The size of the economy, though it can be difficult to comprehend, has a real impact on quality of life. Growth means more consumption of better products or leisure.

These gains occur up and down the income distribution. In a June 2012 study, Kevin Hassett and Aparna Mathur narrowed in on a recent slice of economic history from 1987 to 2009 and examined the consumption patterns of low-income households (those with income less than $20,000 a year). In 1987, 17.7% of low-income households did not own color televisions. By 2009, only 2.1% did not. In 1990, 95.2% of low-income households did not own a computer; now the number has fallen to 52.3%. Even the ownership rate of air-conditioning has increased dramatically. In 1990, 44.1% of low-income households did not have air-conditioning, whereas in 2009 only 16.5% did not. Broad economic growth spurred on these improvements.

Another way to understand the importance of growth is to examine the relationship between

economic growth and health. In 1900, the average life expectancy in the United States was 46 years. Today, life expectancy has risen to about 79 years. The relationship between growth and life expectancy can be seen in chart 3, which shows life expectancy on the Y axis and GDP per capita on the x axis.

**CHART 3: GDP per capita and life expectancy across countries**

For many observers of the economy, the sustainability of the government’s fiscal health is one of the most pressing concerns. Here too, growth can help—or hurt—tremendously.

The Office of Management and Budget’s *Analytical Perspectives* shows an analysis (reproduced in Table 1) of what would happen to the federal budget if the economy were to grow 1% slower every year from 2014-2024. The results are disturbing. Over the 10-year period, government revenue would be nearly $3.5 trillion lower, spending would increase by $379 billion, and the deficit would increase by nearly $3.8 trillion.

Increased growth would have similarly large positive effects. Although it is hard to imagine increasing the growth rate by an entire percentage point on a permanent basis, this chart shows that even a tenth of a percent can net hundreds of billions of dollars in deficit reduction over 10 years.

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5 “FastStats Life Expectancy,” CDC/National Center for Health Statistics
6 WolframAlpha
TABLE 1: Budgetary impact of 1 percent lower real GDP growth sustained during 2014-2024, Billions of dollars

<table>
<thead>
<tr>
<th></th>
<th>Total of effects, 2014-2024 (in billions)</th>
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<tbody>
<tr>
<td>Receipts</td>
<td>$ (3,486)</td>
</tr>
<tr>
<td>Outlays</td>
<td>$ 379</td>
</tr>
<tr>
<td>Increase in deficit (+)</td>
<td>$ 3,865</td>
</tr>
</tbody>
</table>

How to Achieve Growth

Several giant shifts fueled economic growth in the latter part of the 20th century. Women joined the labor force en masse, for one thing. The IT revolution took place as well. International markets blossomed with globalization. And the United States enacted many pro-growth policies, including broad deregulation and sharp cuts to top marginal tax rates.

To the extent that the low hanging fruit have been gathered, sustaining growth in the 21st century will be more difficult and require more pro-growth action from policymakers. Nearly all policy choices affect growth in one way or another, so for the purpose of this paper some selection was required. Here I discuss three policy levers that might lift the economy: savings and investment incentives, debt and deficits, and federal research spending.

Savings and investment incentives in the tax code

One way to increase the growth of the economy is by spurring investment. This means spending on goods that are used to produce other goods. For example, the production of machines, equipment, and the buildings used to house them is all considered investment. The purchase of a new t-shirt, on the other hand, is not investment, but consumption.

Investment increases GDP in a simple way: if you invest a dollar in a silk-screening machine that produces t-shirts, GDP will rise by one dollar today. However, GDP will also be higher next year because your silk-screening machine is still making t-shirts. If you spend your dollar to buy a t-shirt, on the other hand, GDP will rise by one dollar today but not tomorrow. In this case, someone who delays their consumption of a shirt by first producing the shirt-making machine will increase the size of the economy more than someone who decides to purchase a shirt today. The person who delays consumption does not have to invest themselves; instead, they can save by lending to a firm or government that uses the funds to make investments.

7 http://www.whitehouse.gov/sites/default/files/omb/budget/fy2015/assets/econ_analyses.pdf Table 2-4
Ideally, the person who delays consumption would be rewarded because of their contribution to growth. Instead, income taxation does the opposite, rewarding those who consume today and penalizing those who delay their consumption. The tax code accomplishes this by taxing both capital income and labor income. Alan Viard provides an excellent description of how capital income taxation penalizes savers:

“Patient and Impatient [each] earns $100 of wages today. Impatient wishes to consume only today; Patient wishes to consume only at some point decades in the future. In a world with no taxes, Impatient goes to the mall and consumes $100 today. Patient lends her $100 of wages to a firm that buys a machine that yields a 100 percent rate of return (which is also the rate of return firms must pay savers) and therefore provides a $200 future payoff. The firm pays Patient back her $100 loan with $100 interest, allowing her to eventually consume $200.

What happens in a world with a 20 percent income tax? Impatient pays $20 of tax on his wages and consumes the remaining $80, which is 20 percent less than he consumed in the no-tax world. Patient also pays $20 of tax on her wages and lends the remaining $80 to the firm. On her $80 loan, she earns $80 of interest and is therefore repaid $160 by the firm. However, a $16 tax is imposed on the $80 of interest. Patient is left with $144, which is 28 percent less than the $200 she consumed in the no-tax world, compared to a 20 percent reduction for Impatient.”

A pure income tax on labor and capital income penalizes those who save and rewards those who consume today.

America’s tax code is not a pure income tax, but there are several aspects that increase the cost of investment by rewarding today’s consumers relative to those that wait. The individual side of the tax code includes levies on dividends, capital gains, and interest income. On the business side, the corporate income tax, capital-gains tax, and dividends tax conspire to increase the marginal effective tax rate on corporate equity-financed income. Moreover, in many cases the tax code exaggerates the amount of capital income taxation by not accounting for inflation. This is true with interest income, capital gains, and depreciation allowances. To complicate matters further, there are some offsetting incentives to encourage investment, including tax-deferred savings accounts, the deductibility of interest income at the firm level, various provisions that accelerate the depreciation of business investment, and various investment tax credits.

In 2005, the Congressional Budget Office (CBO) took these varying incentives into account and constructed a table of effective marginal tax rates on capital income by sector. The marginal effective tax rates reported by the CBO indicate that after-tax returns are lower than before-tax returns. As an example, in Viard’s Patient and Impatient scenario, above, the pre-tax return on savings is 100%. However, with taxes, Patient gets $144 dollars for delaying $80 of consumption, or an 80% return. The marginal effective tax rate in this example is 20%.

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TABLE 2: Marginal Effective Tax Rates

<table>
<thead>
<tr>
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<th>Percentage rate</th>
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<tr>
<td>Corporate, Equity</td>
<td>36.1%</td>
</tr>
<tr>
<td>Financed</td>
<td></td>
</tr>
<tr>
<td>Non-Corporate</td>
<td>20.6</td>
</tr>
<tr>
<td>Owner-occupied housing</td>
<td>-5.1</td>
</tr>
<tr>
<td>Corporate debt-financed</td>
<td>-6.4</td>
</tr>
<tr>
<td>Overall</td>
<td>13.8</td>
</tr>
</tbody>
</table>

Since the CBO conducted its analysis in 2005, effective marginal tax rates on capital income have increased further. These include two individual income tax rate hikes, the reintroduction of the Pease Provision and personal expenditure phase-out, an estate tax increase, a self-employment tax increase, and the introduction of the “Unearned Income Medicare Contribution”. All in all, marginal tax rates are likely much higher than they were in 2005, and growth will be slower as a result.

To speed up growth, policymakers should even the playing field for consumers and investors, rather than penalize those who delay their investment. This can be accomplished by reducing the taxes on capital income one-by-one. Likely this route is most feasible from a political standpoint, and if followed, tax reform packages should aim to chip away the various provisions that disincentive investment.

An alternative to one-off tax cuts for capital income would be a wholesale implementation of a consumption tax. Economists have estimated that a full move to consumption taxation could increase GDP in the long run by 2% to 9%. The higher end of this spectrum is less likely because it would require withholding transition relief for existing wealth. A newly-implemented consumption tax at a 25% rate would reduce the value of existing wealth by 20%, as it would now require $100 to purchase $80 dollars’ worth of goods and services. This levy would increase GDP but flout property rights and so should be avoided.

**Deficits**

Like tax disincentives, high public budget deficits reduce the level of private investment in the economy. Growing public debt will be a major detriment to future growth in the United States. This reality should be a focus in the debates over the main contributors to deficits: Social Security, Medicare, and Medicaid.

Chart 4 is taken from the CBO’s 2013 *Long-Term Budget Outlook* and displays the growth of federal debt held by the public as well as spending and revenues from 2000 to 2038 under the CBO extended budget outlook. Largely due to high deficits from the Great Recession, federal debt has...

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17 http://emlab.berkeley.edu/users/auerbach/ftp/taxreform/flatfinal.pdf
more than doubled from 34% of GDP in 2000 to 73% of GDP in 2013.

Although the level of debt is expected to dip over the next few years, deficits are still expected to grow steadily to 6.5% of GDP in 2038, causing debt to rise to 100% of GDP. Including the effect of inefficient economic policies, the federal debt is expected to rise to 108% of GDP in 2038.

This steady rise is due to an unsustainable fiscal path, driven by high spending on entitlements that swamp the dedicated trust funds.

CHART 4: Federal debt, spending, and revenues from 2000 to 2038 as a percent of GDP

While Keynesians argue that in the short run higher deficits spur growth by increasing aggregate demand, the consensus view of the long run is that deficits will slow growth. The mechanism through which debt decreases growth relates to investment. As the government increases its borrowing, it competes with private actors for debt financing. This leads to more of people’s savings being devoted to, for instance, purchasing Treasury bonds rather than financing new machines and factories. With fewer machines and factories, workers have less capital to work with, their productivity falls, and their wages fall with it. This elicits an additional negative response, which is that workers have less incentive to work. This effect is often referred to as “crowding out.”

Some of the harmful effect of crowding out is offset because foreign investors are attracted to higher interest rates in the United States and move capital here. Domestic personal saving will also rise somewhat in response to the higher interest rates. Even still, overall domestic investment will decline significantly. The CBO estimates that “when the deficit goes up by $1, private saving rises by 43 cents (so national saving falls by 57 cents), and foreign capital inflows rise by 24 cents, ultimately leaving a decline of 33 cents in investment.” This 33 cent fall in investments is a large price to pay for increased deficits, but the CBO estimates that the effect may be even larger.

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The CBO also conducted a useful experiment examining how gross national product (GNP) might react under two deficit reduction scenarios. GNP is a measure of output that excludes the earnings of nonresidents in the US and includes the earnings of residents abroad. They found that by reducing deficits by $4 trillion over ten years, GNP per capita could be 7% higher in 2038, which is a central estimate from a range of predicted outcomes. Reducing deficits by $2 trillion over ten years would increase GNP per capita by about 4% by 2038.15

This estimate is based on historical evidence where increased deficits were largely temporary, due to war or short economic slumps. The CBO rightly guesses that if, “participants in financial markets came to believe that policymakers intended to allow debt to continue to rise on an ongoing basis relative to the size of the economy, interest rates would probably increase by more than the historical relationship between debt and interest rates would suggest.”16 This would likely cause the decline in investments to be even larger.

Reducing debt would have other drastic benefits. Gorry and Jensen estimated that the debt burden causes large burdens on tax payers up and down the income distribution. They examined how much lower taxes could be if the nation were debt free, ceteris paribus. Assuming that the interest burden on the debt is paid for with higher taxes, divided according to existing distribution of taxes, they find that:

“Households earning $10,000 to $20,000-around the federal poverty line for an average-size household-could pay $33 less in taxes every year without the existing debt. Households earning $100,000 to $200,000 could pay $4,179 less, and households earning $200,000 to $500,000 could have a $10,472 lower burden.

Even after the recent fiscal cliff tax hikes, the country is expected to add another $3.8 trillion to the debt over the next ten years. If spending were reined in to head off that debt accumulation, households earning $100,000 to $200,000 could see their long-term tax burden lowered by $1,354 every year and those earning $200,000 to $500,000 could see savings of $3,392.”17

These numbers are reported in real dollars, and so these costs will be imposed on every generation of Americans. Reining in debt and deficits would cause the burden to be higher on the current generation, but it would help future Americans by reducing what they must pay for the interest burden and increasing the size of the economy.

Innovation

The final lever of growth that this paper will discuss is perhaps the most important—innovation. Innovation is the most profound creator of wealth and wellbeing known to mankind, for it allows resources to be combined in more effective ways.

Take, for instance, the stunning rise in the use of everyday sand in the 20th century. For thousands of

17 http://www.realclearmarkets.com/articles/2013/02/06/deficits_are_costly_even_if_youre_not_greece_100131.html; for more detail refer to a longer paper in tax notes: http://www.aei.org/files/2012/12/03/-gorry-jensen-a-simple-measure-of-the-distributional-burden-of-debt_094649102407.pdf.
years, sand covered the beaches of the world; it was useful, but not spectacularly so. Then came Jack
Kilby, Robert Noyce, and the integrated circuit. Today, the silica from quartz sand is in the brains of
our computers, smartphones, and robots.

The great American energy boom of the 2000s owes much thanks to sand as well, for sand is a main
ingredient in standard hydraulic fracturing procedures. Nothing has changed about sand, except for
humankind’s knowledge of how to use it.¹⁸

The shifting uses for something as simple as sand demonstrates one of the most optimistic ideas in
economics: invention is practically limitless. In 1998, Harvard University professor Martin Weitzman
wrote an optimistic paper titled, “Recombinant Growth,” which explored the possibilities of
innovation.¹⁹

Weitzman suggested that innovation follows a model akin to the hybridization of plants. Ideas,
Weitzman argued, can be crossbred with one another to find new ideas. Those new ideas can be
crossbred among themselves and also with the old ideas to generate even more new ideas, and on
and on. Through this process, a practically limitless set of ideas would be generated, both good and
bad. Weitzman concluded that “the ultimate limits to growth may lie not so much in our abilities to
generate new ideas, as in our abilities to process to fruition an ever-increasing abundance of
potentially fruitful ideas.”

A portion of the value from ideas is that they can be used by many people at the same time. The
knowledge to build a new widget often costs years and riches to develop, but building a second
widget often requires only a blueprint. What this means is that there are increasing returns to scale of
knowledge-laden products, and the increasing returns to scale mean contributions to growth.²⁰

The flipside of this coin is that it is difficult for an inventor to exclude others from using his ideas,
which weakens his incentive to invent. The patent system resolves this problem for innovation in a
way that is directly applicable to commercial use, typically in the form of applied research and
development (R&D). The temporary monopoly conferred by a patent, as President Lincoln once
said, adds “the fuel of interest to the fire of genius in the discovery of new and useful things.”²¹

The patent system is not as useful, however, for basic research that is more fundamental in nature.
Discoveries of how the world works are not patentable, nor should they be. Instead, they advance
the knowledge of all of mankind. This type of research is extremely important for advancing growth.
For instance, Louis Pasteur and other microbiologists in the 19th century questioned the
fundamental mechanism by which diseases are transferred. Their basic research led to the germ
theory of disease and set the stage for nearly all of the advances in medicine made during the 20th
and 21st centuries.

Unfortunately, there is little profit incentive for firms or individuals to invest in basic research.

¹⁸ Senator Jon Kyl explored these themes in a CIPPspeech
http://www.youtube.com/watch?v=SBT4qdOue9g#t=24
¹⁹ http://dash.harvard.edu/bitstream/handle/1/3708468/Weitzman_RecombinantGrowth.pdf?sequence=2
²¹ http://www.abrahamlincolnonline.org/lincoln/speeches/discoveries.htm
Beyond the fact that no property rights for basic research are conferred by government, firms are loath to invest in basic research because it is very difficult to know in what industry the research will pay off. In applied R&D, firms ensure that the research will be applicable to the firm’s area of business. But with basic research, even if a commercial application is derived, it is oftentimes difficult to predict in which field this application will be relevant. Further, a research finding that has applications in one field will have applications in many others. Economist Richard Nelson noted that “it is for this reason that firms which support research toward the basic-science end of the spectrum are firms that have fingers in many pies.”

In an NBER working paper, economists Akcigit, Hanley, and Serrano-Velarde tested Nelson’s hypothesis with data on French firms. Much as Nelson had predicted, they find that basic research intensity—as measured by the ratio of basic research spending to total firm investment in applied research—is significantly associated with the number of industries in which a firm operates. Each additional industry of operation, according to their results, increases a firm’s basic research intensity by 3% on average.

This trend plays out in the aggregate levels of research funding. In 2009, U.S. firms spent $197 billion on development and $34 billion on applied R&D. Shop floor innovation is not included in these numbers, but contributes to many practical advances. Basic research on the other hand, constituted only $16.5 billion (or about 6.6%) of industry research and development investment.

Since private firms will not adequately fund basic research, the gap is left to the government and philanthropists. While budget constraints are tight for the federal government, and increased deficits and debt will likely slow growth as discussed above, funding for basic research could come from shifting federal resources from applied research towards basic research.

Not only is applied research more likely to be funded by the private sector than basic research, but the private sector is likely to be better at funding it. Applied research, by definition, is meant to meet direct needs of society such as curing diseases, making consumer goods, and generating abundant energy. Industry is better suited to identifying which areas will benefit the most because industry has profit as a guide.

Government then should leave applied research to firms and focus its efforts on basic research. This would mean spending the bulk of the American government’s research budget on fundamental science. This research should be strategically directed towards areas that are likely to be useful, but it should encourage scientists to make advances in understanding rather than advances in implementation. Today, the U.S. government spends less than half of its non-defense research budget on basic research, and only a small fraction if defense spending on research is included. By enacting smarter innovation policy, government can help create the knowledge that drives innovation.

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22 [http://cstpr.colorado.edu/students/envs_5100/nelson_1959.pdf](http://cstpr.colorado.edu/students/envs_5100/nelson_1959.pdf)
23 [http://www.nber.org/papers/w19473](http://www.nber.org/papers/w19473)
24 National Science Foundation. 2012 Science and Engineering Indicators, Appendix Tables 4-9 and 4-10.
25 Ibid., Appendix Tables 4-8, 4-9, 4-10
26 National Science Foundation. Survey of Federal Funds for Research and Development.
Conclusion

Economic growth drives national wellbeing. It allows people to consume more and better products, services, and leisure. It alleviates and even cures many of the government’s budgetary woes.

This paper reviewed three areas where the bulk of economic theory indicates that current policy is shackling growth: savings disincentives in the tax code, high levels of federal deficits, and suboptimal research funding. Policymakers should strive to establish pro-growth policies in all areas of the economy.