

GREAT AGAIN? TAX REFORM AND THE PROSPECTS FOR U.S. GROWTH

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We will make America strong again.
We will make America proud again.
We will make America safe again.
And we will make America great again.

Donald Trump

The slogans above were repeated like a mantra in Donald Trump's 2016 campaign appearances. These, and oft heard shouts of "Build the wall!" and "Lock her up!"² provided an easily recognizable brand to the campaign. But why did the phrase "make America great again" resonate so strongly with Trump voters? Wasn't the U.S. the world's largest economy, with the most powerful military, a good place to invest and do business, and a yardstick for productivity and efficiency? With an unemployment rate under 5 percent, a strong stock market, and an economic expansion entering its sixth year, wasn't America already great?

Despite the apparently strong macroeconomic reports, the economic situation was not good for many Americans. The low unemployment rate is consistent with two negative features of the U.S. labor market: 1) historically low labor force participation rates; and 2) several years of sub-par labor productivity growth. Many potential workers, especially males in their 40s to 60s, may be discouraged by lack of opportunity, and no longer in the labor force. Low productivity growth is one of the causes of slower growth of real wages. In fact, the growth of real median

¹ A border wall to keep out Mexicans and other Hispanic illegal immigrants.

² Referring to Secretary Clinton's inappropriate use of a private e-mail server for government business.

household income has been remarkably slow, compared to the growth of average real personal income, which includes the wealthy. GDP growth, while positive, has not been especially high. Average GDP growth since the end of the recession (2009) to 2016 has been just under 2.1 percent.

The U.S. has seen huge gains in globalization, and the size of the foreign-born population is at an all-time high. Not only do imports make up a larger share of domestic purchases, but there has been significant offshoring of formerly U.S. production activity. Many U.S. corporations now produce the majority of their output overseas. Perhaps due to perverse tax incentives, foreign earnings of U.S. owned firms are discouraged from being re-invested in the U.S. In cities and towns across the country, people see immigrants performing construction jobs, cleaning services, working in retail, driving taxis and working in fast food restaurants. It is not hard for unemployed Americans to conclude that foreigners have “stolen” their jobs, and that large multinational corporations have chosen to ship jobs overseas. There is a sense of economic malaise among many in the U.S. population.

In 2016, a group called Morning Consult conducted a survey of a sample that included both Democrats and Republicans, old people and young people. There was a clear demographic divide between Republicans and Democrats. When asked if life was better for people like them 50 years ago, 66 percent of Republicans answered yes. Among Trump voters, the share was 75 percent. Among Democrats, only 28 percent said it was better 50 years ago. The second most popular period for Republicans was the early 80s, in the first term of Ronald Reagan’s presidency (Sanger-Katz, 2016)³. Clearly the standard of living and quality of life measured by numerous indicators has improved since 1967. How can so many people believe that former times were better?

1. The setting: America in 2016

Americans that have lived through the 60s and the 80s know that a lot has changed. To better understand the perception of America in 2016, let’s do a direct comparison with economic and demographic descriptors of the U.S. about 50 years ago, in 1967.

Table 1 shows a sample of important economic and demographic facts about the U.S. in 1967 and in 2016. In 1967, real GDP had grown at an average annual rate of 5.1 percent in the previous 5 years. In 2016, the corresponding 5 year growth rate was only 2.1 percent. This slower

³ By the way, Ronald Reagan had the campaign slogan “Let’s make America great again” in 1980, but Trump claims to have been unaware of this!

growth can partly be explained by slower population and labor force growth, but also by a lengthy period of slow productivity growth after the Great Recession (Fig. 1). The U.S. economy had become much more open since 1967, but this openness is dominated by imports, which have grown from 4.6 percent of GDP to 14.7 percent by 2016. This has contributed to declining employment in goods-producing sectors, especially manufacturing. Employment in goods-producing sectors has fallen from 34.3 percent of total employment in 1967 to 11.5 percent in 2016. Many of the jobs that have been lost are traditionally male-dominated, and the male labor-force participation rate has declined significantly.

Table 1

The U.S. in 1967 and 2016

Economic and demographic facts	1967	2016
Average real GDP growth (last 5 years)	5.1 percent	2.1 percent
Average labor productivity growth (last 5 years)	3.0 percent	0.7 percent
Average population growth (last 5 years)	1.3 percent	0.7 percent
Imports to GDP (percent)	4.6 percent	14.7 percent
Share of employment in goods-producing industries	34.3 percent	11.5 percent
Federal debt per household (2016\$)	25.5 thousand	111.6 thousand
Health care spending per capita (2016\$)	\$1,428	\$10,448
Share of immigrants in the population	4.9 percent	13.7 percent
Gini Coefficient (measure of inequality)	0.36	0.46
Share of over 65 population	9.6 percent	14.9 percent
Labor force participation rate, men, 20–64	92.9 percent	82.7 percent

Inequality has gradually marched upward, with the Gini coefficient of 0.36 in 1967 rising to 0.46 in 2016⁴. Another reflection of this fact is that real median income has been growing much more slowly than average income. The burden of federal debt per household has increased from about \$25 thousand dollars in 1967 to \$112 thousand in 2016, in

⁴ The Gini coefficient is larger when the distribution of income is more unequal.

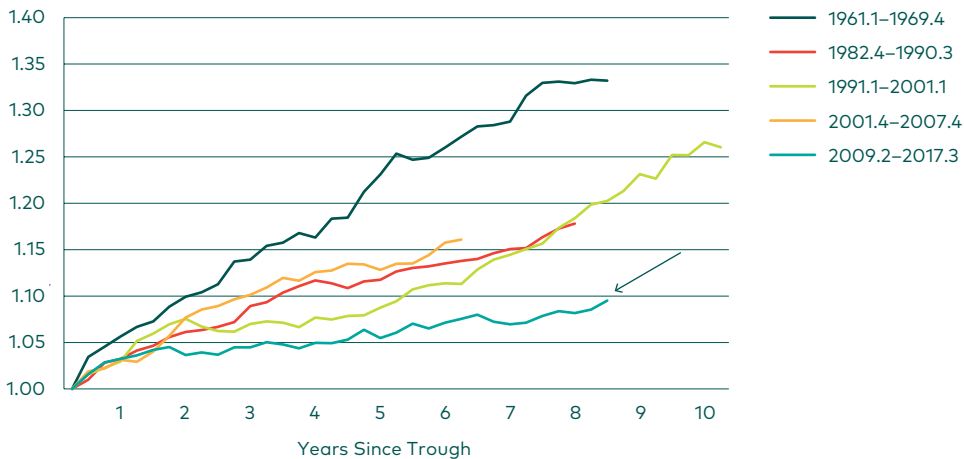


Fig. 1. Business sector productivity growth index in major postwar expansions.

real terms. The health care cost burden has increased even more in real (2016\$) terms, from \$1,482 per capita to \$10,448.

Private fixed investment has also been growing more slowly since the end of the Great Recession, on track to be the lowest of all but one postwar expansion (Fig. 2).

Like many other OECD countries, the U.S. population has become older since 1967, with the share of the over 65 population growing from 9.6 percent to 14.9 percent. The population has also become more



Fig. 2. Total private fixed investment growth index in major postwar expansions.

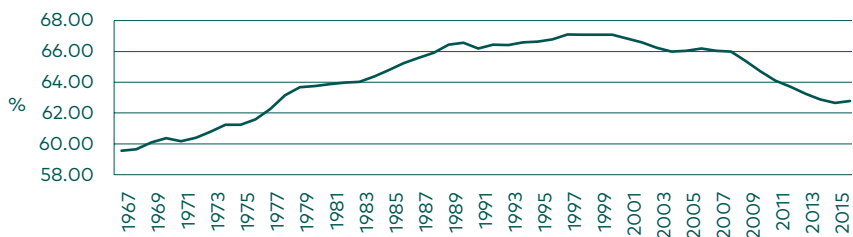


Fig. 3. U.S. Labor force participation, %.

diverse, with an increasing share of immigrants, rising from 4.9 percent in 1967 to 13.7 percent by 2016.

The overall labor force participation rate is actually slightly higher than in 1967, but has declined dramatically from its high point in 2000 (Fig. 3).

For a large segment of the population, namely white, native born, males, who worked in goods-producing industries, at about the median level of income, it is not hard to understand how they could look back longingly at a time such as 1967. For many, promises of change strike a chord. At the end of 2017, the possible change that would bring the economy “out of its doldrums” was tax reform.

2. Tax reform or tax cuts?

In 2016, before Donald Trump was elected, Republicans had already started to lay the groundwork for tax reform. Tax reform was primarily motivated by certain features of the existing tax system that were viewed as fundamentally flawed.

On the business side, the U.S. has one of the highest corporate tax rates in the world. This high corporate tax may be discouraging firms from locating in and earning profits in the U.S. A key tenet of the Republican tax reform was that this tax rate should be reduced, from a legislated rate of 35 percent down to as low as 20 percent. The taxation of profits earned abroad was also peculiar. Some countries work with a worldwide system, where profits are taxed immediately, wherever earned. Other countries use a territorial system, where profits earned in that country are taxed. The U.S. has a hybrid system, where profits are taxed when they return to the U.S. It is known that certain U.S. multinational firms have large pools of earnings sitting abroad that they hesitate to repatriate for this reason. It is argued that returning such funds to the U.S. would spur investment. Business taxation in the

U.S. also encourages debt finance, since interest payments are fully deductible. Depreciation schedules used to calculate profits are viewed as outdated, and favoring investment in certain classes of assets over others. Furthermore, the taxation of business profits has become riddled with special exceptions and favors for certain industries or types of activity, so that the taxation of business income is not a level playing field. Finally, individuals who receive their income from “pass-through” entities, such as partnerships, S-corporations and other proprietorships may pay taxes at the highest individual rate, and this is considered to be onerous for small businesses.

On the individual side, the marginal tax rates are complicated, with 7 different tax brackets. Unlike the VAT used in the EU and several other countries, which taxes consumption, the U.S. individual tax system primarily taxes income, and does not encourage saving. Furthermore, the individual tax system contains a labyrinth of special tax breaks, credits, phase-ins, phase-outs and “tax expenditures”⁵.

Any student of the U.S. economy and government is surely aware that the U.S. tax system does not raise enough revenue to cover expenditures, so that the Federal Government is continually going deeper into debt. Tax reform was initially viewed as a way to simplify the individual tax system, modify the business tax system to be more fair, and to provide positive incentives and promote investment. Several provisions were proposed to make the repatriation of capital abroad less painful. In June 2016, the House released *A Better Way*, also known as the “House Blueprint” (Ryan, 2016). Although somewhat vague, the plan seemed to go far to suggest reforms that would improve incentives and fairness for business, while simplifying and rationalizing the tax system for individuals. It was also sold as being revenue neutral, due in large part to a border tax adjustment, that was designed to stimulate exports, reduce imports and raise revenue all in one fell swoop. Under certain heroic assumptions⁶, the price effect of the tax would be neutral. However, if this assumption didn’t hold, certain industries would be severely disadvantaged by the tax, while others would greatly benefit⁷. House leaders ultimately were not able to keep the border tax. Without this, the plan was a big revenue loser, and furthermore benefited the wealthy at the expense of the middle class.

⁵ These are special provisions of the tax code such as exclusions, deductions, deferrals, credits, and tax rates that benefit specific activities or groups of taxpayers.

⁶ Including immediate and exact adjustment of the exchange rate by the percentage of the tax (20 percent).

⁷ One industry that would see its costs rise and profits squeezed was the retail trade industry. The lobbying group The National Retail Federation spent a lot of money fighting this component of the plan.

By the summer of 2017, new ideas had replaced the House Blueprint, but several of the core features of the plan remained popular. The corporate tax cut was still a centerpiece of the discussions, as was some kind of simplification of individual tax rates. A reduction in tax rates on pass-through income was considered highly desirable. Republicans were also keen to do away with the estate tax and the Alternative Minimum Tax (AMT)⁸. To stimulate investment, full expensing was proposed, which would reduce the cost of capital, at least in the short-term. Rules for repatriating foreign income would be modified to be more favorable.

In autumn, the new ideas were still being presented as “tax reform”, but more often as a “massive tax cut” especially as one that would help the middle class. Television viewers were subjected to dozens of advertisements paid for by corporate lobbyists, arguing that the time for tax reform was now, and promising healthy growth in jobs and income for the middle class if the tax reform was enacted. A version of the tax plan was passed in the House on November 16, and then the Senate went to work on their version. The “Tax Cut and Jobs Act” became reality by a narrow vote in the Senate in the early hours of Saturday morning, December 2. It was announced that day as a “momentous occasion for the Republican Party”.

3. An outline of the Senate tax plan

At the time we performed the analysis of the tax plan, the most recently passed bill was the Senate version. At this time it must still go back to the House for reconciliation, then back to the Senate, and then to President Trump’s desk. Table 2 summarizes the main components of the plan as it passed in the Senate.

Some of the components include the note “Sunset 12/31/25”. This means that the provision is set to expire at the end of 2025. Due to certain procedural rules that allow the Republicans to pass this bill without any Democrat participation, it can have a 10 year static revenue loss of no more than \$1.5 trillion. To reduce the projected revenue loss, some of the tax cuts on the individual side are not given during the last 2 years (2026–2027) of the 10 year period.

Under the individual income tax section of the table, the tax rates are the marginal rates for 7 brackets of income, which are different for single people and married couples. The individual AMT (Alternative Minimum Tax) is repealed, but will return in 2026. The current practice of

⁸ The AMT was designed to ensure that extremely wealthy citizens pay at least some minimum tax, no matter how many exclusions or exceptions they may be due.

itemizing deductions (for mortgage interest, medical expenses, property taxes, charitable contributions, etc.) is being shifted to a simpler standard deduction.

One item in Table 2, the reduction of the ACA shared responsibility payment to zero, deserves a few words. The ACA, also known colloquially as “Obama Care”, mandates that individuals obtain health insurance, or they must pay a fine. If they are judged too poor to afford

Table 2

Components of the Senate Tax Plan

Components	Description
Individual income tax	Tax rates: 10 %, 12 %, 22 %, 24 %, 32 %, 35 %, 38.5 % (Sunset 12/31/25).
	Individual AMT: Repealed (Sunset 12/31/25).
	Standard deduction: Increased to \$12,000 for Single, \$18,000 for head of household, and \$24,000 for married filing jointly (Sunset 12/31/25).
	Interest, dividends and capital gains: Taxed at current rates.
	Itemized deductions: Eliminated all itemized deductions (including SALT) other than mortgage interest and charitable (Sunset 12/31/25).
	Personal exemptions: Repealed (Sunset 12/31/25).
Corporate tax	Modification of child credit to \$2,000 not indexed (Sunset 12/31/25).
	Tax rate: Corporate tax rate 20 % effective 2019.
	Corporate AMT: Repealed.
Pass-through entities	Business tax preferences: Repealed.
	Tax rate: Deduct 17.4 % of qualified income (Sunset 12/31/25).
	Restrictions: If partnership or S-corporation, the percentage of total business income eligible is limited to 50 % of W-2 wages (Sunset 12/31/25).
Cost recovery provisions	Disallow active pass-through losses in excess of \$500,000 for joint filers, \$250,000 for all others (Sunset 12/31/25).
	Full and immediate expensing for 5 years then revert to accelerated depreciation (MACRS) in year 6.
Net interest deductibility	Limit deductions to 30 % of adjusted taxable income, carryforward of denied deduction.
Repatriation of foreign source income	U.S. businesses with international operations would be taxed on existing foreign profits at a tax rate of 10 %. If these repatriated earnings had been re-invested, the rate would be 5 %. Going forward, there would be a 50 % inclusion of foreign profits and a 12.5 % rate on U.S. income from overseas customers.
Affordable Care Act	Reduce ACA individual shared responsibility payment amount to zero.

Note: SALT (State and local taxes, which as of today, can be deducted on the Federal individual income tax return).

the health insurance, then the Federal government pays a subsidy to the insurance provider. The Republican tax plan is planning to reduce the revenue cost by repealing this mandated benefit and subsidy program, which is estimated to save a little over \$300 billion for the 10 year period 2018 to 2027.

4. Modeling the plan: microsimulation and macrosimulation

The analysis in this paper quantifies likely impacts of the personal and corporate income tax cuts outlined above, introducing the feedback effects of additional rounds of spending from consumption and investment, but also incorporating supply constraints, and other pushbacks that may be expected from the macroeconomic environment.

The *Lift* model is a highly detailed and internally consistent interindustry macroeconomic model, with about 1,400 macroeconomic variables, and over 10,000 industry and commodity level variables that are forecast for each year. However, for tax analysis, it can be helped immensely by coupling with a microsimulation tax model. Such a model contains a database of tax records for firms and households that preserve the inherent diversity and differences in size of taxable incomes, as well as special characteristics of the agents that are relevant to the analysis. This type of model can compute the average tax rate changes implicit in a certain proposed rate bracket, while also considering the removal of special deductions and credits, or the additions of other. For this exercise we teamed with Quantria Strategies, which has microsimulation models for both individual taxes and corporate taxes, including a calculator that can estimate the impacts of corporate tax changes on the user cost of capital.

Quantria has run simulations with their micro model on these provisions, to determine 3 types of inputs that can then be incorporated as assumptions to the *Lift* model. These are:

1. reduction of the average federal personal income tax in the model from the baseline, over a forecast interval of 2018 to 2025, with these provisions expiring in 2026 and 2027;
2. reductions in the corporate tax rate for the same period;
3. changes in the cost of capital by sector, and their effects on fixed investment.

This exercise is intended to aid in understanding the full dynamics of the economy in response to the Senate tax plan, and to quantify the changes in important economic variables, such as employment, GDP,

federal government revenue and expenditures, personal income and consumption and investment and trade.

The analysis is done using a scenario approach. This analysis starts with a baseline scenario developed for the INFORUM *Lift* model that is calibrated to be similar to the 2017 CBO 10 year baseline, from 2018 to 2027 (CBO, 2017). The baseline is modified to incorporate cuts in the personal income tax rates and the corporate tax rate. The tax cuts, which we implement in this study we assume to start in 2018, except for the corporate rate reduction which starts in 2019. We also model the impact of the cut in the corporate tax rate on the cost of capital and business investment.

We have made assumptions about changes in effective personal and corporate tax rates. These are different from the legislated rates (corporate) or a simplification of a complicated tax system (personal). Our approach has been to start with the proposed percentage reduction in the legislated rates, and then calculate the relevant percentage reduction in the effective tax rates.

Once these provisions were estimated, effective tax rates were calculated for individuals under both current law and the tax reform plan for different types of income, including: wages and salary, interest income, dividend income and the income of pass-through entities (i.e., sole proprietorships, partnerships and S-corporations). Table 3 below shows the assumptions provided by Quantria.

The *Lift* model generates components of personal income from several components of income for 66 private sector industries. Personal income is then used to derive the tax base for individual income taxes.

The model estimates personal income from several components of income by industry. For example, compensation of employees is

Table 3

Effective Tax Rates for Individuals, %

Effective tax rates	Current law	Tax reform
Wages & salaries	12.73	12.01
Interest income	22.27	20.69
Dividend income	17.44	16.80
Proprietors' income	15.10	13.38
Partnership income	29.40	26.02
S-corporations	31.60	28.92
Other proprietors' income	25.37	22.85

Table 4

Static Revenue Loss / Cash Flow Gain from Individual Tax Changes,
Billions of Dollars

	Baseline	Tax cut scenario	Revenue loss / DI gain
2018	1 735	1 636	-100
2019	1 834	1 730	-103
2020	1 925	1 818	-107
2021	2 016	1 905	-111
2022	2 106	1 991	-15
2023	2 201	2 081	-119
2024	2 305	2 181	-124
2025	2 423	2 293	-129
2026	2 538	2 404	-134
2027	2 652	2 513	-140
Total			-1 182

calculated in the model for 71 private and government industries, dividend income is based on corporate profits after tax for 66 private-sector industries. Proprietors' income (pass-through income) is calculated for the same 66 private industries. The model calculates personal income in the projection period by building it up from the pieces. Therefore, the dynamic response of personal income to a cut in personal federal income tax hinges on the response of wage and salary disbursements, proprietor's income, dividends, transfer payments, etc.

For this study, the components of Proprietors' income in the National Income and Product Accounts (NIPA) were further disaggregated into the components shown in Table 3. For each taxable income component, tax rates and tax liability can be computed. Total personal tax liability for each year is the sum of the tax liability components.

We will first present some static calculations of revenue loss, where the economy does not respond positively to tax cuts. These are useful as an unrealistic upper bound to the revenue cost, and are comparable to estimates from other static models used for tax policy analysis. These are also helpful for comparing with the full impacts including macroeconomic feedback ("dynamic scoring") within the *Lift* model. After this presentation, we turn to an examination of the dynamic analysis.

Although the *Lift* model does not contain detail on households by income level, filing status, types of income received or age, such information is available in the *Quantria* model, and is used to calculate aggregate personal income tax rates for several categories of personal income, which are then applied in the model.

Corporate income tax in the *Lift* model is based on NIPA data on corporate profits before and after taxes. Although the legislated corporate tax rate in the U.S. is 35 percent, the effective tax rate is lower, and differs by industry. The overall rate has averaged between 18 and 38 percent since 2000, for the most part staying between 20 and 25 percent. The CBO projects the rate to rise gradually and then flatten in the baseline.

In this analysis, we have reduced the legislated federal corporate from 35 % to 20 %. However, due to other provisions in the tax reform package we have modeled, the impact on the average rate is less than this, and the effective tax rate is different for each industry, based on calculations by *Quantria*.

The *Quantria* results provided effective corporate tax rates by industry, based on detailed calculations from the corporate microsimulation model. The statically calculated revenue loss is shown in Table 5.

Table 5
 Static Revenue Loss / Cash Flow Gain from Corporate Tax Cut, Billions of Dollars

	Baseline	Tax cut scenario	Corporate tax cut
2018	410	349	-61
2019	415	353	-61
2020	412	351	-61
2021	430	365	-65
2022	454	386	-68
2023	474	403	-71
2024	493	420	-74
2025	521	444	-78
2026	544	463	-81
2027	570	485	-85
Total			-704

We have modeled the repeal of the Individual ACA mandate recommended in the Senate tax plan. Using figures from Joint Committee for Taxation, we have assumed the following static revenue gain. We have made the change in *Lift* simply by reducing the portion of government social benefits classified as Refundable tax credits. While the program is actually quite complicated, and the effects are really a combination of reductions in both penalties and benefits, we believe the revenue impact of this assumption is quite accurate. The year-by-year static assumptions are shown in Table 6.

Table 6
Static Spending Reduction Estimates of ACA Mandate Repeal, Billions of Dollars

	Baseline	Tax cut scenario	ACA mandate reduction
2018	135	135	0
2019	138	131	7
2020	141	131	10
2021	145	116	29
2022	150	112	38
2023	155	114	41
2024	160	116	44
2025	166	119	47
2026	172	122	50
2027	178	125	53
Total			318

5. Dynamic scoring using *Lift*

The revenue estimates shown above are static estimates, much like those done by CBO and other tax analysts. These estimates are useful for estimating an upper bound on the revenue loss. However, in the presence of tax cuts, consumers have additional disposable income. Increases in disposable income can be expected to stimulate personal consumption expenditures and personal savings, thereby increasing demand for consumer goods and services. Reductions in the corporate tax rate will increase corporate tax flow and reduce the cost of capital investment. This should increase the level of investment in both equipment,

intellectual property and business structures, such as manufacturing plants and commercial office buildings. However, the dynamic analysis also imposes constraints. The model (and the economy) have difficulty operating above potential GDP, or tolerating low unemployment rates for extended periods of time. Potential GDP is a concept explaining the average trend real GDP that can be supported with the given labor force, labor productivity and hours worked, with a “full” employment rate. In this sense, to be above potential is to have an unemployment rate below full, and we leave the possibility open for the model to report a negative unemployment rate, even though this is impossible in the real economy. Obtaining a calculated negative unemployment rate is a sign that we are asking too much GDP to be generated for the given supply potential of the economy. This supply potential can be increased if labor force participation increases, or if labor productivity increases.

In the dynamic analysis, each change described above was implemented separately in a dynamic run of the *Lift* model. In the final results, all tax changes were applied together. This scenario incorporates the multiplier effects of consumption and investment, but also involves some “push back” from constraints in the labor market, and the effects on interest rates and prices.

The immediate effect of both personal and corporate tax cuts is stimulatory. Personal tax cuts result in higher disposable income. Disposable income is then divided into savings (modeled as determined by a flexible savings rate) and personal consumption. Unless consumers save all the additional personal disposable income, then personal consumption increases. Spending on personal consumption is divided into 83 categories of spending, which create demands for consumer goods industries directly, and for many other industries indirectly. The additional rounds of spending stimulate additional jobs and income, which allows for additional spending. This multiplier effect of a tax cut is well-known in the macroeconomic literature. Increases in investment occur in response to the better economy, but also in response to the reduction in the cost of capital. Investment in equipment and structures generates demand in the investment industries, which also create further jobs and income.

The majority of the tax cuts are projected to occur in 2018. The unemployment rate projected in the baseline for 2018 is 4.7 percent, and the baseline projection calls for an unemployment rate in the 4–5 percent range over the period 2018 to 2027. Additional consumer and investment spending is bumping into supply constraints, which can be understood as the level of production that the economy can produce without overheating (generating high inflation and interest rates). Some of the additional spending leaks out as imports. Both consumer and

investment goods are partially imported from abroad. Sectoral prices and the GDP price level rise, as do wages, in response to the additional demand. This affects U.S. competitiveness, which implies that a higher share of demand will be imported, and less will be exported, generating a deterioration in the trade balance. Higher prices also raise the cost of government purchases. This, combined with personal and corporate tax cuts, are associated with an increase in the federal deficit.

As mentioned above, the *Lift* model has been designed to allow lower rates of unemployment than are historically observed, but this is often viewed as a signal that some constraint has not been adequately accounted for. Conversely, it may be possible that a constraint may be alleviated. Currently, the U.S. economy is operating with a historically low labor force participation rate, and slow rates of labor productivity growth. Many economists agree that stronger demand pressures in the economy, and the associated higher wages will tempt many workers back into the labor force. In addition, the increase in investment will result in a higher capital stock, which should stimulate labor productivity. As an illustration of these effects, we have increased the labor force participation rate and the growth rate of labor productivity to model these effects.

In order to explore other possible features of a consistent and feasible tax reform trajectory, we have explored using several additional assumptions and mechanisms in the analysis.

1. The labor force participation rate has been adjusted to rise back closer to the historical norm than the standard CBO projection. However, after 2022 it declines again, due to demographic composition.
2. We have modeled an increase in average labor productivity across industries in response to additional capital investment.
3. We have adjusted the long-run interest rates downward slightly, to reduce the average interest rate paid on the Federal Debt. This reduces the deficit, but also reduces personal income growth from what it would have been otherwise.

6. A review of the scenario results

The next several figures summarize some key results from the scenarios. In each graph, the baseline is in red ('x') and the tax cut scenario is in blue (squares).

Figure 4 shows graphs of the personal and corporate tax liabilities, and the federal deficit, showing the difference between the CBO baseline and the tax cut scenario. The blue line (squares) incorporates the dynamic

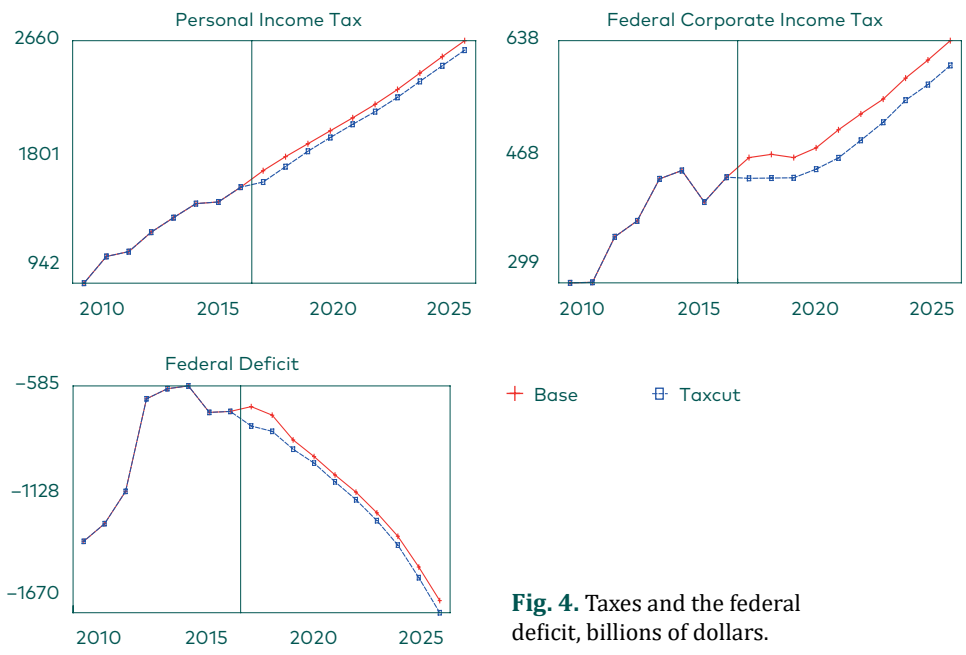


Fig. 4. Taxes and the federal deficit, billions of dollars.

response, in which the tax base is raised from the static scenario, due to increased output, wages and income. Statically calculated (using baseline income) 10 year tax revenue loss from personal taxes is estimated to be \$1,182 billion. The *Lift* model's incorporation of dynamic response yields a total personal tax revenue loss of \$534 billion, so that the dynamic

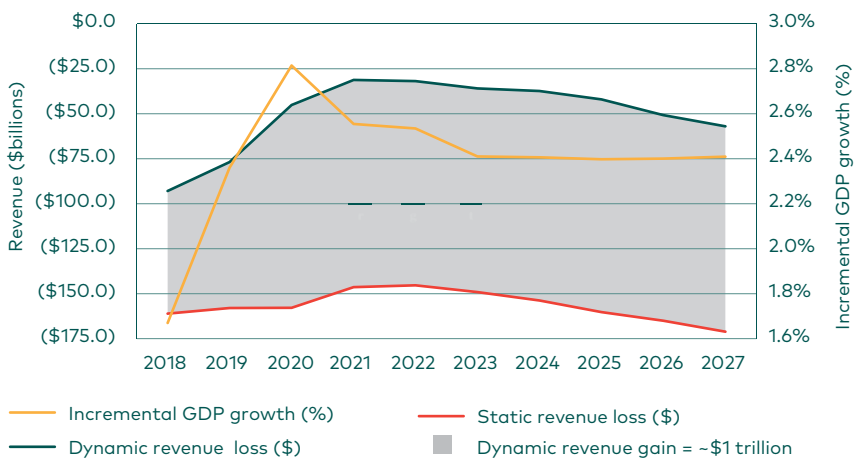


Fig. 5. Static and dynamic revenue loss.

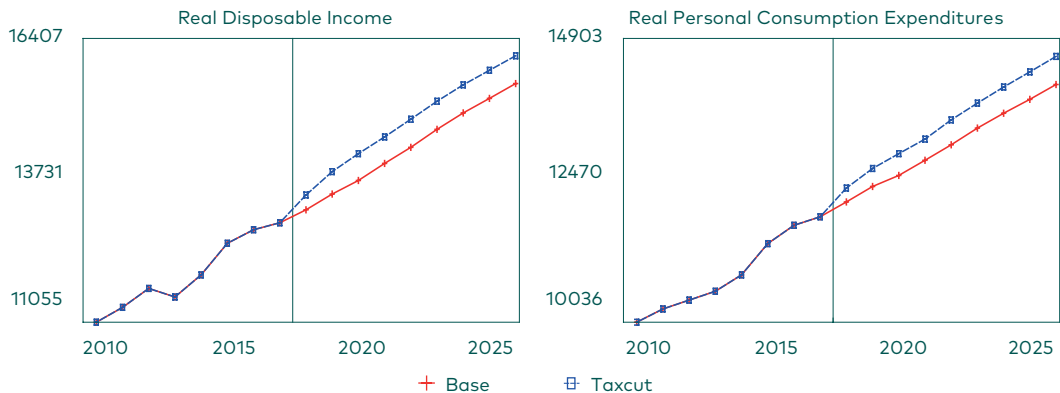


Fig. 6. Consumption and income, billions of dollars.

response gains back about 55 percent of the static revenue loss. Statically calculated (using baseline profits) corporate profits tax liabilities imply a revenue loss of \$704 billion. Dynamic calculations estimate a corporate tax revenue loss of \$512, gaining back about 27 % of the static revenue loss.

Figure 5 shows the combined dynamic revenue gain, which is the difference between the statically calculated revenue loss and the revenue loss calculated by the *Lift* model. The federal deficit is worse than in the baseline, reaching a value of \$1,670 billion by 2027, a difference of \$57 billion. Total 10 year revenue loss is estimated to be \$500 billion. The static calculations indicated a 10 year deficit increase of \$1,567 billion.

Figure 6 shows the impact of the combined tax reform on real disposable income. Real disposable income has increased both because of an increase in personal income (see Table 10) and through the fact that

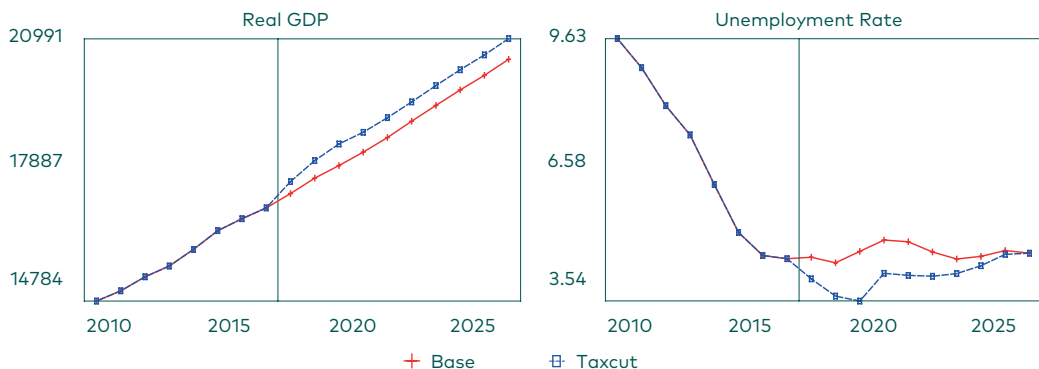


Fig. 7. Real GDP, billions of dollars, and unemployment rate, percent.

tax rates are lower. Personal consumption expenditures also increase in the tax cut scenario, generating increased demand for consumer goods and services, but also for additional imports.

Figure 7 shows that real GDP is higher by \$494 billion by 2027, due partly to increased Personal consumption, but also due to higher real investment spending.

The unemployment rate drops sharply in 2018 and 2019, due to increases in real GDP and jobs. We assume that labor force participation and average labor productivity growth return to historical norms, thus increasing the available supply of labor. Eventually, this results in an unemployment rate about equal to that in the baseline by 2027. This pattern results largely from the combination of the increased labor force and productivity we have assumed, combined with a retraction of the personal tax cuts.

The trade deficit is worse in the tax cut scenario, mainly due to an increase in imports, as both consumption and investment goods have a significant import content.

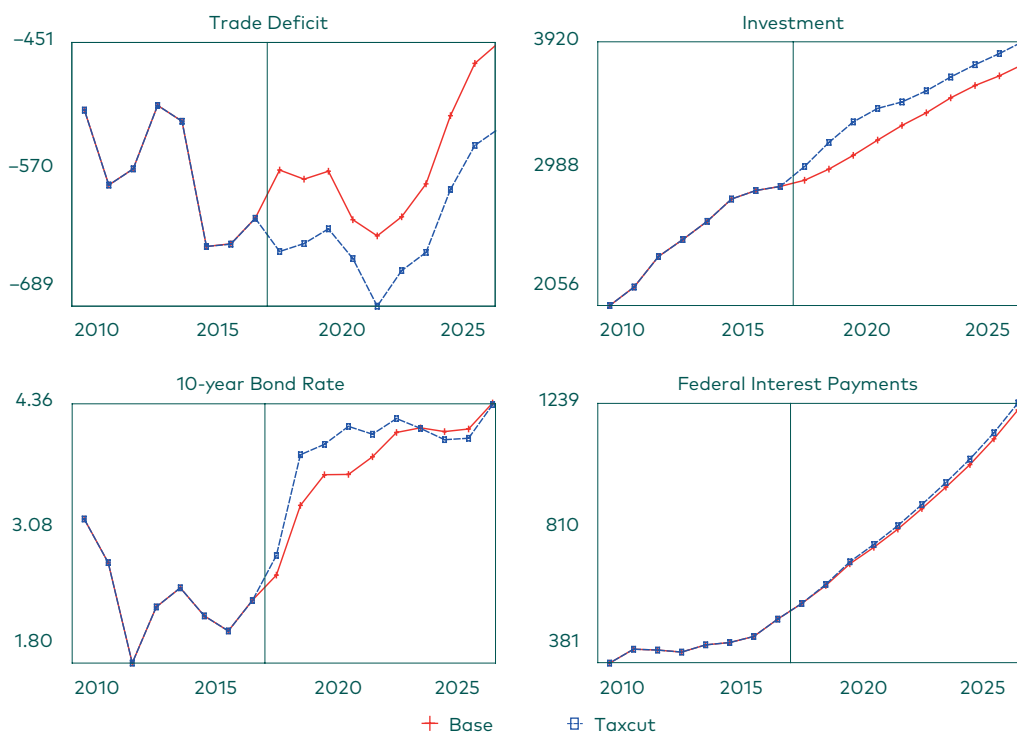


Fig. 8. Unemployment rate, trade deficit, investment, interest rate and interest payments.

Table 7

Macroeconomic Summary, Differences from Base

Titles of alternate runs Line 1: Baseline Line 2: Tax reform	Alternatives are shown in deviations from base values			
	2018	2020	2025	2027
Macro aggregates				
Gross Domestic Product (GDP)	20 386	21 677	26 327	28 505
	318	642	835	878
Real GDP	17 318	17 987	19 772	20 497
	289	506	474	494
Real exports	2 273	2 503	2 874	3 045
	10	21	-19	-26
Real imports	2 890	3 096	3 496	3 673
	76	82	98	113
Real personal consumption	12 096	12 553	13 858	14 404
	240	370	469	499
Gross private fixed investment	2 940	3 117	3 609	3 762
	98	236	149	158
Federal budget deficit	-685	-844	-1 305	-1 613
	-93	-45	-42	-57
Effective federal personal income tax rate	13.3	13.8	14.3	14.6
	-0.8	-0.8	-0.8	-0.8
Effective federal corporate tax rate	27.4	28.2	29.1	29.2
	-3.5	-3.6	-3.7	-3.7
Real disposable income	13 174	13 726	15 276	15 886
	280	507	526	521
Prices				
Personal consumption deflator	1.16	1.20	1.33	1.39
	0.00	0.00	0.01	0.00
GDP deflator	1.18	1.21	1.34	1.40
	0.00	0.00	0.01	0.01
Exports deflator	1.29	1.32	1.47	1.55
	0.00	0.00	0.03	0.03
Imports deflator	1.19	1.22	1.31	1.36
	0.00	0.00	0.00	0.00
Average wage	38.36	40.83	49.14	52.87
	0.04	0.49	1.16	1.32

Titles of alternate runs Line 1: Baseline Line 2: Tax reform	Alternatives are shown in deviations from base values			
	2018	2020	2025	2027
Employment				
Total household employment	154 329	155 746	159 766	161 012
	1 895	3 190	1 804	1 453
Unemployment rate	4.5	4.7	4.6	4.6
	-0.5	-1.1	-0.2	0.0
Taxes				
Federal personal income tax	1 738	1 929	2 431	2 660
	-80	-53	-59	-69
Federal corporate income tax	474	474	585	638
	-29	-28	-31	-35
Federal deficit	-685	-844	-1 305	-1 613
	-93	-45	-42	-57
Trade balance	-566	-568	-518	-451
	-73	-52	-66	-78

Investment increases significantly relative to the baseline, reaching its maximum difference in 2020, where it is \$236 billion higher than the baseline in real terms, a difference of about 7.6 %. Due to additional borrowing requirements from the government and business sectors, the 10 year bond rate also increases relative to the base. (Note that this rate also helps determine the average rate paid on the federal debt, and so affects the interest payments portion of government expenditures.)

7. Whither tax reform?

This analysis has demonstrated how the Senate Tax Plan could ripple through the economy. The exercise used the INFORUM *Lift* model, in combination with the Quantria Strategies' microsimulation models of the household and the business sector. The *Lift* model embodies a full interindustry economic core, so that it includes the multiplier effects of personal consumption and investment expenditures to the domestic industries that supply these expenditures. It also embodies the generation of additional jobs and income in these industries that generate further demand. However, *Lift* is also an aggregative, or macro model. Jobs by industry sum to total employment, and the aggregate unemployment rate is an aggregate comparison of total household

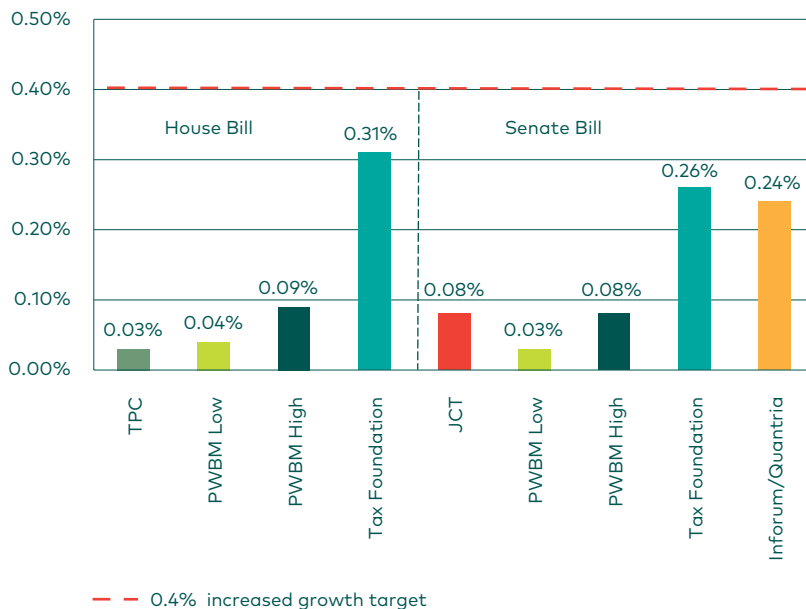


Fig. 9. Estimated impact of versions of the Tax Cuts and Jobs Act on annual GDP growth, %.

employment and the projected labor force. At some point, additional stimulus cannot permanently push the economy to a level of employment much below what is considered “full employment” (between 4 and 5.5 percent). We have modeled how increases in labor force participation and labor productivity may be brought about due to economic stimulus and increased investment, enabling higher potential GDP than would otherwise be available. We have made all assumptions explicit and the model incorporates the effects of these assumptions and their interactions in a fully consistent way.

Figure 9 compares increases in average annual real GDP growth in several studies that have been done on the Tax Cut and Jobs Act. The INFORUM / Quantria analysis is on the high side, though not the highest. Our study can be viewed as an exploration of the impacts of a strong labor force participation and labor productivity response to the increased demand, and the increased investment coming from the reductions in the cost of capital.

We have also assumed that the long term interest rates would not go up very much in response to the increase in the federal debt. Without these assumptions, our annual GDP growth increase would still be positive, but closer to 0.15 % per year.

Conclusions

In summary, here are a few of the key findings from the scenarios.

Individual taxes

- We have used information from Quantria on changes in tax rates on several sources of personal income. This results in a reduction in the average effective personal federal income rate from 13.8 % to 13.0 % by 2020, from 14.3 % to 13.5 % by 2025, and from 14.6 % to 13.8 % by 2027.
- We find that the reduction in the personal federal income tax rate raises real personal disposable income and personal consumption. Real personal disposable income per household is \$3,883 higher in 2020 and \$3,598 higher in 2027.
- Real personal consumption is \$370 billion higher than the baseline in 2020 and \$499 billion higher in 2027. On a household basis, these real personal consumption increases amount to \$2,830 and \$3,452, respectively.
- Statically calculated (using baseline income) 10 year tax revenue loss from personal taxes is estimated to be \$1,182 billion.
- The *Lift* model's incorporation of dynamic response yields a total personal tax revenue loss of \$534 billion, so that the dynamic response gains back about 55 percent of the static revenue loss through the personal tax side.
- We treated modifications to the Affordable Care Act (ACA) that were part of the Senate Tax Plan as reductions in government-provided social benefits.

Corporate / business

- Using detailed analysis on effective corporate tax rate by industry from Quantria, we obtain a reduction in the economy-wide average effective corporate income tax rate from 18.7 % to 16.8 % by 2027.⁹
- We find that fixed investment is stimulated both through increased economic activity (demand effect) and a reduction in the cost of capital (price effect). Total investment is higher by \$236 billion in 2020 and \$158 billion by 2027.

⁹ These effective tax rates exclude the following sectors due to certain unresolvable data anomalies that arise from bridging two different data sets: Utilities, Other Real Estate, Federal Reserve Banks, Oil & Gas Extraction, Mining, and Mining Support Activities.

- Statically calculated (using baseline income) 10 year tax revenue loss from corporate taxes (baseline profits) is estimated to be \$704 billion.
- Dynamic calculations estimate a corporate tax revenue loss of \$512, gaining back about 27 % of the static revenue loss.

Macroeconomic

- We find that real GDP increases by \$506 billion in 2020 and by \$494 billion by 2027.
- We assume an increase in total labor force participation in response to stronger economic growth. By 2027, the labor force participation rate is 61.5 %, compared with 60.95 % in the baseline. In 2027, this represents about 1.5 million additional people in the labor force.
- We assume that average labor productivity increases in response to stronger investment. In 2027, productivity is 6 % higher than in the baseline.
- We find that total household employment increases by 3.2 million jobs by 2020, and by 1.5 million jobs in 2027.
- We find that the federal deficit increases by \$45 billion by 2020, and by \$57 billion by 2027.
- The total 10 year federal deficit is higher by \$500 billion. The static calculations indicated a 10 year deficit increase of \$1,567 billion.

Congress is now working to reconcile the two versions of the plan, vote on the reconciled version, and submit this bill to President Trump by Christmas. Although the final bill will certainly be different from the Senate version analyzed in this study, the main features of it will be similar. In addition to the macroeconomic impacts described above, there will certainly be distributional impacts. It is clear that the bulk of the tax cuts are coming from the reduction in the corporate tax rate, and reductions to the marginal tax rates paid by the highest income bracket. Other features, such as the repeal of the Alternative Minimum Tax and the estate tax, are primarily benefitting the wealthiest taxpayers.

Whether the tax reform will contribute to a feeling of “Great Again” for the average Trump voter remains to be seen. If we do see corporate cash return to be invested in the U.S.; if there is a revival of domestic manufacturing and construction activity; if discouraged older male workers are drawn back into the labor force; if labor productivity growth increases; if depressed areas of the country experience job and median income growth again, perhaps the voters' hopes will be

partially fulfilled. However, many of the changes in the U.S. economy and demographics described in the first section will still be with us, and the federal debt per household will be worse due to the tax cuts. Economic scientists will be watching this experiment with a critical eye.

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