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Macroeconomic Impact Analysis of the Business Provisions of the House GOP Blueprint for Tax Reform

Final Report
January 10, 2017

prepared by
Inforum

Final Report

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1. Executive Summary

On June 24, 2016, some House Republicans released a 35-page report on tax reform that would lower the corporate tax rate to 20 percent, provide full expensing for business investments, eliminate the deduction for net business interest expense, eliminate most tax preferences, and exempt active foreign business income under a 'territorial' system. The plan also includes border adjustments that would exempt export receipts and deny a deduction for import costs, following a destination-based approach to tax jurisdiction. Overall, the "Blueprint" is a type of destination-based business cash flow tax.[1]

This study uses a dynamic interindustry macroeconomic model called *Lift* that embodies the potential responses of the economy by sector to the assumed changes in the Blueprint.[2] The *Lift* model was designed as a tool for understanding dynamic effects of policy, technology and trade within the interdependent economy.

Lift is dynamic, so it is a long-term macroeconomic forecasting model. It includes most variables in the national accounts, in addition to financial, labor and demographic variables. Thus, in this sense, it is like other models such as that of IHS Global Insight, Macroeconomic Advisors, or Moody's Analytics.

Lift, however, is also an interindustry model, with detailed information on the relationships between industries, as well as the sales to consumers, investment, government and the rest of the world. More specifically, the general structure of *Lift* includes econometric equations for final demands, employment and value added, linked through an input-output (IO) framework at the core of the model. The IO structure is crucial to understanding how demand or price effects on one industry cascade to other related or dependent industries. Personal and disposable income are derived from value added projections which are consistent with production and demand.

It is this dual capability—dynamic *and* interindustry—that makes LIFT uniquely useful in answering policy questions where benefits and costs to different industries are important, or where the interaction of macroeconomic and industry behavior needs to be understood. In the past, the model has been used to explore impacts of tax policies, tariffs and free trade agreements, carbon taxes or cap and trade, infrastructure improvements, electrification of the vehicle fleet, port closures and other disruptions, immigration, defense impacts, health care projections, deficit reduction and many other questions.[3]

No legislation exists yet for the Blueprint, which makes modeling it a challenge. Other studies that have been done recently examine various aspects of the tax and revenue aspects of the plan based on what has been made known so far and making assumptions about other provisions.

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[1] For more detail on the Blueprint, see Appendix A. The Blueprint also would reform the taxation of individual wage and investment income. This focus of this study, however, is limited to the proposed changes in the taxation of business.

[2] This research was supported by Koch Industries. However, the author is fully responsible for the study design and findings. As discussed below, this analysis should be viewed in the light of its reliance on economic equivalence in the modeling approach.

[3] See Appendix C for an expanded description of the *Lift* model.

This study aims to address the lack of legislative specifics in a different way. In this study, we use *Lift* to model the business tax provisions of the House GOP Blueprint by first converting the Blueprint to what many academics and economists claim is economically the exact same thing. This simplified modeling approach relies on the **economic equivalence** between the business tax provisions of House GOP Blueprint and a plan that:

1. Repeals the corporate income tax and the individual income tax on business income earned by passthrough entities, i.e., sole proprietorships, partnerships, and S-corporations.
2. Adopts a destination-based subtraction method VAT with a wage deduction, taxable at a 20% rate for corporations and taxable at individual rates (with a cap at 25%) for passthrough entities. Losses would be carried forward with interest, but could not offset more than 90 percent of income before loss carryforward. The base of the subtraction method VAT would include net interest income; however, net interest expense would not be deductible. A research credit would be allowed as under present law.
3. Imposes a one-time tax on accumulated deferred foreign earnings at a rate of 8.75 percent to the extent held in cash and equivalents and 3.5 percent otherwise, payable over 8 years.

The simplified modelling approach further reduces the complexity of the analysis by:

1. Treating the 20% subtraction method VAT as equivalent to the combination of (1) a 25% retail sales tax on sales of goods and services to final consumers (including imports and excluding exports), (2) a 20% wage credit for employers, and (3) the current law research credit. The subtraction method VAT is imposed on the price inclusive of tax while a retail sales tax is imposed on the price exclusive of tax; consequently, a 20% tax inclusive tax rate is equivalent to a 25% (20%/(1-0.20)) tax exclusive rate.
2. Treating the individual tax rate applicable to the subtraction method VAT on non-corporate business as the same as for corporate business (i.e., 20%).
3. Assuming that companies with losses under the subtraction method VAT would be able to utilize them immediately.
4. Disregarding the one-time tax on accumulated deferred foreign earnings.

In this study, we develop a baseline for *Lift* that is consistent with the latest CBO Baseline Macroeconomic and Federal budget projections and two new scenarios[4]:

1. **Scenario A** - An alternative scenario that includes an economically equivalent version of the business provisions of the House GOP Blueprint with an immediate strengthening of the dollar in real terms, implemented through an immediate increase in wages.
2. **Scenario B** - An alternative scenario that includes an economically equivalent version of the business provisions of the House GOP Blueprint with a lagged strengthening of the dollar in real terms, implemented through a gradual increase in wages. This gradual adjustment could be explained by imperfect information, frictions, and delays in expectation formation, as well as fixed institutional arrangements.

[4] This analysis is performed using comparison of alternate scenarios of possible paths of the U.S. economy from 2017 to 2026, which is also the current projection horizon of the CBO.

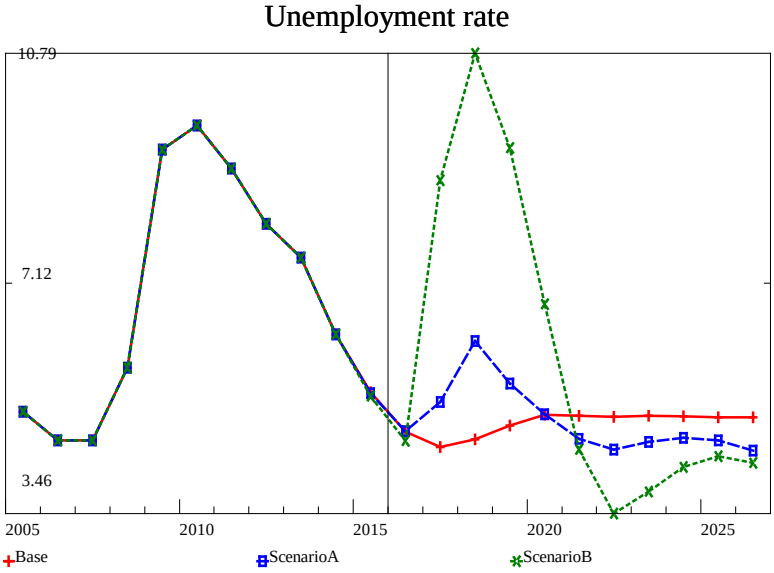
Our assumption that both prices and wages adjust equally to the imposition of the Blueprint (whether immediately or over time) is economically equivalent, in terms of real after-tax business cash flow, to the scenario in which prices and wages remain unchanged but the dollar appreciates instead of the domestic price level. Both types of adjustment have the effect of increasing the dollar price of domestic goods and services relative to imports and exports.[5]

1.1 Findings

This analysis, while simplified, has been useful in attempting to quantify the potential effects of the Blueprint on both macroeconomic responses and industry-by-industry behavior.

As for macroeconomic response, Scenario A creates a near-term increase in unemployment, returning to the CBO forecast in 2020 and then staying marginally below the forecast through 2026. Scenario B creates a dramatic spike in unemployment to levels above post financial crisis highs in 2010, falling significantly below the CBO forecast in 2022, and then rising to a level close to Scenario A as the analysis completes.

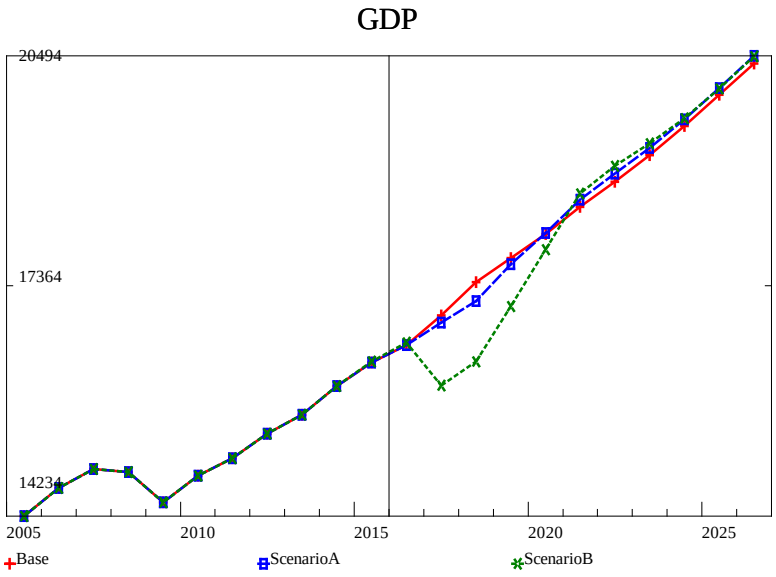
Unemployment rate



As for GDP, Scenario A hews fairly close to the CBO forecast which is built on the premise that the Blueprint is not in place. In Scenario B, there is a noticeable drop before returning to the CBO forecast in 2020.

[5] See, Alan J. Auerbach, Douglas Holtz-Eakin "The Role of Border Adjustments in International Taxation," American Action Forum, November 28, 2016, available at: https://www.americanactionforum.org/research/14344/; and
Alan J. Auerbach and Michael P. Devereux, "Consumption and Cash-Flow Taxes in an International Setting," Oxford University Centre for Business Taxation, May 14, 2014, available at: http://www.bi.edu/InstitutterFiles/Samfunns%C3%B8konomi/Papers/Spring%202014/Auerbach.pdf

GDP



Despite the adjustment in wages in Scenario A, there is a shock to employment in the initial year (2017). This is because personal and disposable income, adjusted for inflation, are lower than the base. There are other components of personal income, such as dividends, proprietors' income, rental and interest income, and government social benefits which are not fully adjusting to the sales-tax induced price increases. By the end of the scenario total jobs have increased relative to the base, partly due to increases in equipment and nonresidential structures investment.

If wages were to fully adjust, as in Scenario A, the shock from the price increase could be significantly reduced. A more gradual adjustment such as in Scenario B would lead to a larger shock to income, personal consumption and GDP. In either case, it is not clear how other components of personal income could be expected to adjust to the price increase. For example, several categories of social benefits may benefit from cost of living adjustments, but it is unlikely that components such as rental income, personal interest income or dividends would necessarily adjust.

The manner in which we implemented the tax increase led to the result that consumer prices increased, but domestic producer prices did not. Therefore, in the two scenarios that we explored, there was not a large impact on the prices of tradeable goods, which means that the impact on exports was relatively small. Changes in imports followed the general changes in demand, falling relative to the base when personal consumption fell, but being slightly larger by the end of the simulation.

As for industry-by-industry conclusions, most industries experience job contraction relative to the baseline scenario. Several of the hardest hit are in the healthcare space—hospitals, ambulatory health services, and nursing and residential care. In Scenario A, these sectors experience peak job losses in 2018 of 5-6%. In Scenario B, job losses in these sectors increase to 15-20% in 2018. In addition to healthcare, the accommodations sector also fares poorly under the tax with employment decreases of 15% in Scenario A and 20% in Scenario B. Employment changes for these sectors, in large part, can be

traced to decreased consumption of these services stemming from higher costs because of the modeled tax.

Although most industries experience job losses, employment in a handful of industries does increase. Support activities for mining experience significant job employment expansion (5% in Scenario A, 16% in Scenario B) due to increased investment in oil and gas drilling. Apparel and leather also experience job increases (9% in Scenario A, 15% in Scenario B). For this sector, while consumption decreases, output increases due to inventory build-ups.

In both of the alternative scenarios, the economy eventually recovers from the shock, and moves to return to the long-run growth path. The alternatives overshoot the base slightly, so that GDP is higher, and unemployment lower than the base by the end of the simulation. Additional stimulus from the increase in dividends is partly responsible for this, as well as the fact that equipment and non-residential investment have increased.

2. Macroeconomic Impacts

2.1 Estimation of Independent Effects

Each of the four elements in the simplified modeling approach described above was first run independently in the *Lift* model. First, the effect of only the repeal of the federal corporate income tax was implemented, next the imposition of the national retail sales tax, and so on. This step of analysis is not static, as the model was allowed to respond dynamically to the impacts. For example, by repealing the federal corporate income tax, the federal deficit goes up, financing requirements rise, interest rates rise, and this chokes back investment. However, in this first stage, the elements were not allowed to interact.

In the next step, the elements were combined, and the model was run to determine the impacts on GDP, the price level, the federal deficit, the unemployment rate and other macroeconomic variables. As described above, two alternate scenarios were run. The first, Scenario A, allows for immediate and full adjustment of nominal wages to the consumer price increase caused by the increase in sales taxes. The second scenario (B) assumes that wages adjust over a five year period.

Table 1 presents major aggregates of the model for selected years over the projection period 2017 to 2026. For each variable, the value in the CBO Baseline is shown in the first line, the second line represents the value of Scenario A, with immediate wage adjustment. The third line shows the value of Scenario B, with gradual wage adjustment. Table 2 presents the same information, but this time lines 2 and 3 for each variable are shown as differences from the baseline.

The top part of the tables summarizes the aggregate effects of each of the four policy elements. The line for the Federal corporate tax shows that according to the NIPA definition, there is still some corporate tax remaining, which is that paid by the Federal Reserve. The biggest increase is that of total indirect taxes, which represents the additional sales taxes levied on consumer goods and services. The wage credit line reflects the different assumed paths of wage adjustment.

The second section of the tables shows nominal GDP, selected components of real GDP in 2009 dollars, the federal budget deficit and the average federal personal income tax rate. Real GDP declines from the base in both alternate scenarios in 2017 and 2018, more drastically in Scenario B. This is driven primarily by the decline in real personal consumption expenditures. Investment, which actually is higher than the base in both scenarios in 2017, falls relative to the base in 2018, in response to lower output by industry.

The net effect of the various policy elements on the federal budget deficit is positive in both scenarios. By 2026, the budget deficit is lower by more than $500 billion. This is the net effect of a large increase in indirect (sales) taxes, combined with a reduction in corporate taxes, a wage credit (subsidy) and a reduction in the personal income tax rate. The personal income tax rate reduction we have calculated includes only the reduction on taxes on passthrough income discussed in Appendix section B.5. Note that we have not modeled the changes to the personal income tax schedule in the House Blueprint.

The third section of Table 2 shows the impact on prices. The personal consumption deflator increases in both alternative scenarios by .23 in 2017, and .27 by 2026, an average increase of between 20 and 21 percent. The GDP deflator also increases, due to the increase in Taxes on Production and Imports (TOPI) in the retail trade sectors, rising by .16 in 2017 and up to .19 by 2026 in Scenario A. The change in the deflator in Scenario B is similar, but slightly higher by 2021. The aggregate imports deflators remains unchanged, whereas the aggregate exports deflator changes slightly, due to small changes in the mix of exports.

The last section of the table shows the impacts on jobs and the aggregate unemployment rate. The shock to real income, personal consumption and GDP is reflected in reductions in output across many sectors. Jobs by industry are closely related to output movements, through the productivity and average hours worked equations. In both alternate scenarios, unemployment reaches its peak in 2018, increasing to 6.2 percent in Scenario A and to 10.8 percent in Scenario B.

Figures 2.1 to 2.6 show comparisons for selected variables between the base (red), Scenario A (blue) and Scenario B (green). Figure 2.1 shows the extent of the increase in the personal consumption deflator. The imposition of the sales tax occurs fully in 2017, with no transition period. Firms are provided the wage credit based on total labor compensation paid in each industry.

Figure 2.1. Personal Consumption Deflator

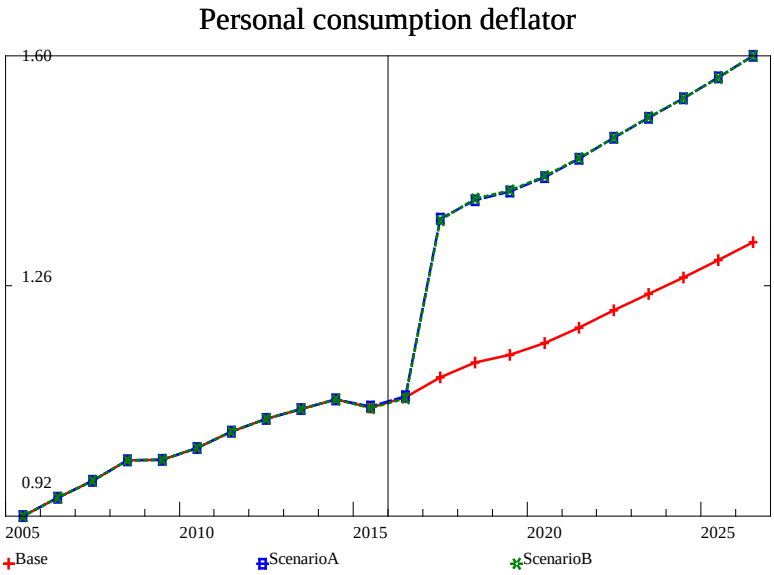
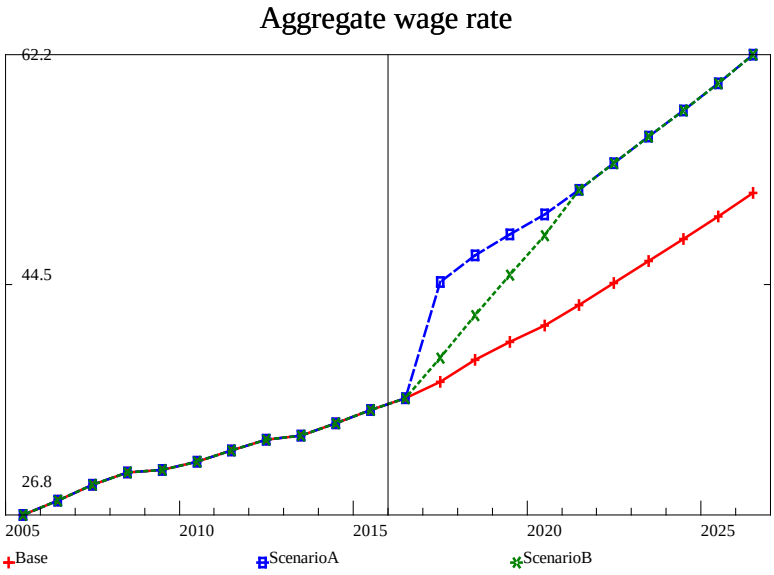


Figure 2.2 compares the path of the aggregate wage level in the base and the two alternate scenarios. In Scenario B, wages have adjusted to the amount of the personal consumption price increase by 2021.

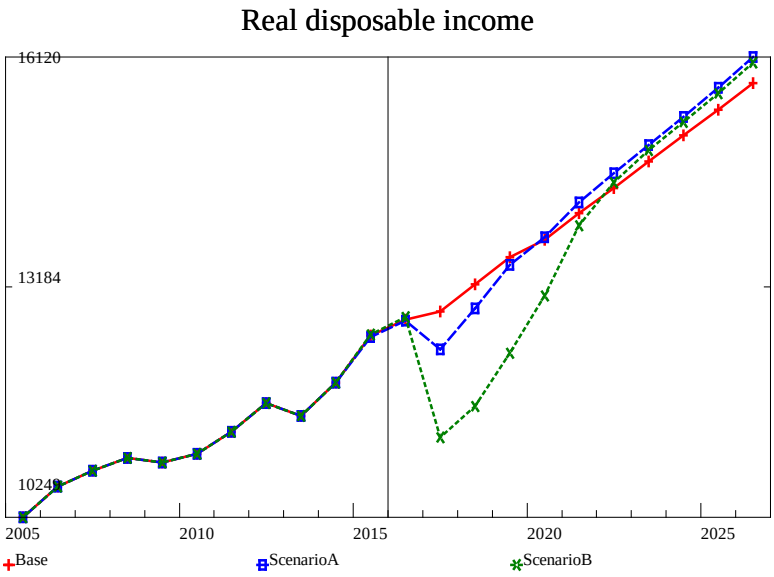
Figure 2.2. Aggregate private wage (total compensation/total hours)



Personal income is the sum of labor compensation, proprietors' income, dividends, rental income, interest income and government social benefits. Disposable income is personal

income less taxes. Real disposable income is deflated by the personal consumption expenditures deflator (Figure 1). Figure 2.3 shows the result of the combined assumptions on real disposable personal income. Note that the House Blueprint significantly increases business cash flow and the payout of dividends, and reduces the taxes on pass-through income.

Figure 2.3. Real disposable income



In Scenario A, wages have been adjusted to rise by the amount of the consumption price increase. However, other components of personal income, such as net interest, rental income and government social benefits have not been assumed to rise with the increase in price. Therefore, these components of personal income fall in real terms (after dividing by the increased consumption deflator). Overall, real personal income and real disposable income fall in 2017 and 2018 relative to Scenario A, but not nearly as much as the case (Scenario B) where wages adjust gradually.

Real personal consumption, roughly speaking is calculated as real disposable income less savings. We have assumed no changes in the average savings rate compared to the baseline, so the pattern of consumption is similar to that of real disposable income (figure 2.4).

Figure 2.4. Personal consumption expenditures

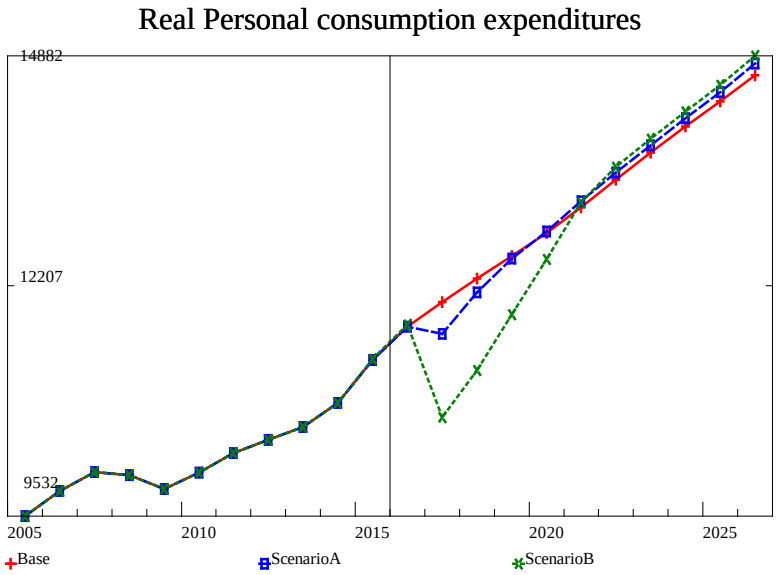


Figure 2.5 shows the resulting impacts on GDP. Personal consumption is a major part of GDP, but not all of it. Furthermore, several provisions of the Blueprint have stimulated investment activity for equipment and non-residential structures.

Figure 2.5. GDP

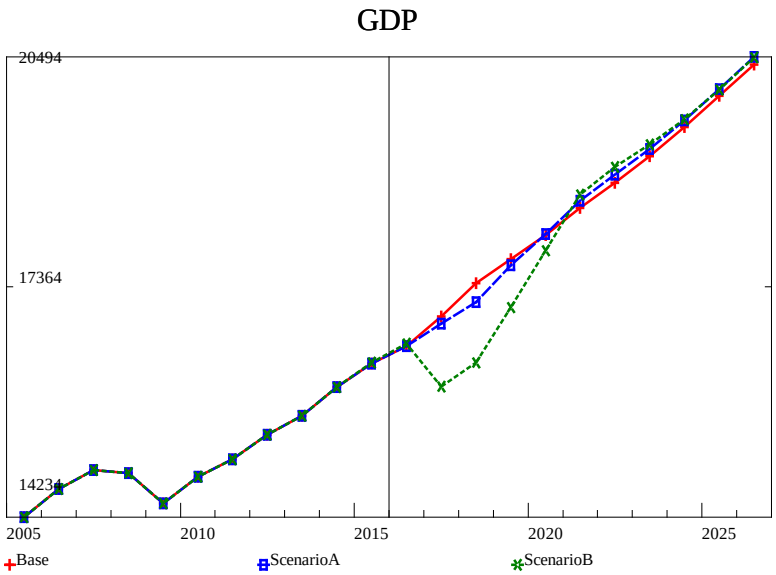
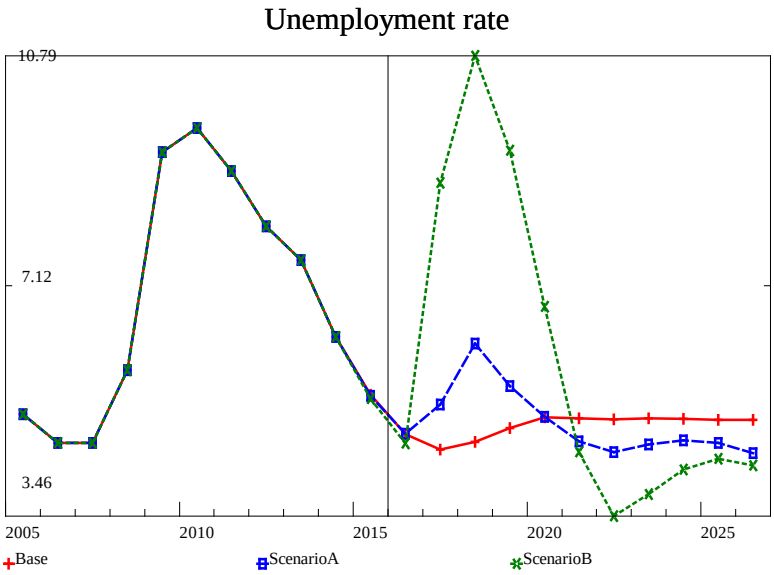


Figure 2.6. The unemployment rate



Finally, figure 2.6 shows the result for unemployment. Figures 2.3 through 2.6 indicate and economy that is stronger than the base case after 2020. This is partly due to the stimulus of investment and increased corporate cash flow (increased dividends). It is also a function of the model reacting to the previous period of below normal activity.

Table 1. Summary of Macroeconomic Impacts of House GOP Blueprint (Levels)
(Dollar amounts in billions)

Line 1: CBO Baseline
Line 2: Scenario A - Instantaneous Wage Adjustment
Line 3: Scenario B - Gradual Wage Adjustment

	2017	2018	2020	2023	2026
Policy Change (Billions of Dollars)					
Federal Corporate Tax	383	383	369	407	491
	76	72	74	79	94
	76	72	74	79	94
Total Indirect Tax	1,362	1,426	1,512	1,701	1,920
	4,179	4,363	4,670	5,304	5,988
	4,101	4,289	4,646	5,334	6,016
Wage Credit	0	0	0	0	0
	2,038	2,130	2,330	2,662	3,036
	1,692	1,825	2,211	2,685	3,041
R&D Credit	0	0	0	0	0
	12	12	13	13	13
	12	12	12	14	13
Federal Compensation	445	464	500	565	639
	537	560	603	683	771
	467	505	583	683	771
Macro Aggregates					
Gross Domestic Product (Billions of Dollars)	19,292	20,172	21,323	23,944	26,996
	21,960	22,809	24,462	27,615	31,166
	20,657	21,776	24,142	28,050	31,528
Real GDP (Billions of 2009$)	16,961	17,413	18,067	19,140	20,384
	16,865	17,159	18,080	19,238	20,494
	16,004	16,337	17,856	19,298	20,487
Real Exports (Billions of 2009$)	2,230	2,290	2,437	2,638	2,877
	2,229	2,285	2,429	2,626	2,860
	2,238	2,302	2,457	2,596	2,788

Table 1 (continued).

	2017	2018	2020	2023	2026
Real Imports (Billions of 2009$)	3,076	3,026	3,245	3,566	3,725
	2,998	2,982	3,243	3,577	3,738
	2,766	2,879	3,201	3,614	3,792
Real Personal Consumption (Billions of 2009$)	12,016	12,288	12,817	13,754	14,651
	11,647	12,128	12,839	13,834	14,787
	10,680	11,228	12,516	13,914	14,882
Gross Private Fixed Investment (Billions of 2009$)	2,889	2,944	3,162	3,402	3,635
	3,261	2,830	3,194	3,486	3,689
	3,278	2,792	3,238	3,542	3,678
Federal Budget Deficit (Billions of Dollars)	-786	-777	-952	-1,205	-1,506
	-618	-577	-670	-775	-993
	-553	-573	-691	-762	-985
Federal Personal Income Tax Rate (Percent)	13.0	13.3	13.8	14.0	14.5
	9.9	10.1	10.4	10.6	11.0
	9.9	10.1	10.4	10.6	11.0
Prices (= 1.0 in 2009)					
Personal Consumption Deflator	1.12	1.14	1.17	1.24	1.32
	1.35	1.38	1.42	1.50	1.60
	1.35	1.38	1.42	1.50	1.59
GDP Deflator	1.14	1.16	1.18	1.25	1.33
	1.30	1.33	1.35	1.43	1.52
	1.28	1.33	1.35	1.45	1.54
Exports Deflator	1.26	1.27	1.30	1.38	1.47
	1.26	1.27	1.30	1.39	1.48
	1.28	1.28	1.34	1.55	1.77
Imports Deflator	1.17	1.19	1.22	1.28	1.34
	1.17	1.19	1.22	1.27	1.34
	1.17	1.19	1.22	1.27	1.34
Total Employment (Thousands)	157,379	158,743	159,810	162,146	165,481
	156,234	156,219	159,804	162,824	166,370
	150,576	148,836	156,956	164,123	166,697
Unemployment Rate (Percent)	4.5	4.6	5.0	5.0	5.0
	5.2	6.2	5.0	4.6	4.5
	8.8	10.8	6.8	3.8	4.3

Table 2. Summary of Macroeconomic Impacts of House GOP Blueprint (Differences)
(Dollar amounts in billions)

Line 1: CBO Baseline
Line 2: Scenario A - Instantaneous Wage Adjustment
Line 3: Scenario B - Gradual Wage Adjustment
Lines 2 and 3 are shown as differences from the Baseline

	2017	2018	2020	2023	2026
Policy Change (Billions of Dollars)					
Federal Corporate Tax	383	383	369	407	491
	-307	-311	-295	-328	-397
	-307	-311	-295	-328	-397
Total Indirect Tax	1,362	1,426	1,512	1,701	1,920
	2,817	2,936	3,157	3,603	4,069
	2,739	2,863	3,133	3,633	4,096
Wage Credit	0	0	0	0	0
	2,038	2,130	2,330	2,662	3,036
	1,692	1,825	2,211	2,685	3,041
R&D Credit	0	0	0	0	0
	12	12	13	13	13
	12	12	12	14	13
Federal Compensation	445	464	500	565	639
	93	97	103	117	132
	22	41	84	117	132
Macro Aggregates					
Gross Domestic Product (Billions of Dollars)	19,292	20,172	21,323	23,944	26,996
	2,668	2,638	3,139	3,671	4,170
	1,365	1,604	2,819	4,106	4,533
Real GDP (Billions of 2009$)	16,961	17,413	18,067	19,140	20,384
	-96	-255	13	97	111
	-957	-1,076	-211	157	103
Real Exports (Billions of 2009$)	2,230	2,290	2,437	2,638	2,877
	-1	-5	-8	-12	-17
	8	11	20	-42	-89

Table 2 (continued).

	2017	2018	2020	2023	2026
Real Imports (Billions of 2009$)	3,076	3,026	3,245	3,566	3,725
	-77	-44	-2	11	13
	-310	-147	-44	48	68
Real Personal Consumption (Billions of 2009$)	12,016	12,288	12,817	13,754	14,651
	-369	-160	22	80	136
	-1,336	-1,061	-301	160	230
Gross Private Fixed Investment (Billions of 2009$)	2,889	2,944	3,162	3,402	3,635
	371	-114	31	84	54
	388	-152	76	140	43
Federal Budget Deficit (Billions of Dollars)	-786	-777	-952	-1,205	-1,506
	167	200	281	430	513
	233	204	261	443	520
Federal Personal Income Tax Rate (Percent)	13.0	13.3	13.8	14.0	14.5
	-3.2	-3.2	-3.4	-3.4	-3.6
	-3.2	-3.2	-3.4	-3.4	-3.6
Prices (= 1.0 in 2009)					
Personal Consumption Deflator	1.12	1.14	1.17	1.24	1.32
	0.23	0.24	0.24	0.26	0.27
	0.23	0.24	0.25	0.26	0.27
GDP Deflator	1.14	1.16	1.18	1.25	1.33
	0.16	0.17	0.17	0.18	0.19
	0.15	0.17	0.17	0.20	0.21
Exports Deflator	1.26	1.27	1.30	1.38	1.47
	0.00	0.00	0.00	0.01	0.01
	0.03	0.01	0.04	0.16	0.30
Imports Deflator	1.17	1.19	1.22	1.28	1.34
	0.00	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00	0.00
Total Employment (Thousands)	157,379	158,743	159,810	162,146	165,481
	-1,145	-2,524	-6	678	889
	-6,803	-9,907	-2,855	1,977	1,216
Unemployment Rate (Percent)	4.5	4.6	5.0	5.0	5.0
	0.7	1.6	0.0	-0.4	-0.5
	4.2	6.1	1.8	-1.2	-0.7

3. Industry Impacts

The impacts on industry output and employment in *Lift* are a combination of impacts stemming from differences in personal consumption, equipment investment, construction, government and trade. Each of these major final demand components has a different distribution of demand by industry. For example, personal consumption includes consumer goods and services, and a relatively high proportion of imports. Equipment investment drives demand for durable goods, particularly industrial equipment, transportation equipment, communication equipment and computers. Structures investment drives demand for construction materials, such as steel, lumber, gypsum, asphalt and concrete. Table 3 shows a comparison of output by industry[6] between the baseline and the Blueprint, Scenarios A and B. Table 4 shows the same variables, but the 2nd and 3rd lines are differences from the baseline. Tables 5 and 6 show the differences in employment by industry in the three scenarios.

Output figures are in millions of constant 2009 dollars. Employment is in thousands of jobs. In each table, the first line shows the level of the variable in the base case, the second line shows the level in the House Blueprint case Scenario A, with immediate wage adjustment, and the third line shows Scenario B, with gradual wage adjustment.

In Scenario B, with the gradual wage adjustment, the shock to output and employment is much larger, with the maximum employment reduction occurring in 2018. Table 7 shows the declines in output by industry in 2018 in this scenario, ranked with the largest declines at the top. The largest decrease in output is Hospitals (-185.2 million). The largest increase is in Mining support activities (+27 million).

Tables 8 to 13 show decompositions of the causes of output changes for 5 commodity sectors:

- Table 8. Hospitals – This is the sector with the largest decline in output relative to the baseline in 2018. The decomposition shows that the decline is due largely to a decline in personal consumption of hospitals, category 51.
- Table 9. Other ambulatory health care – This sector is one of 7 commodity sectors that correspond to industry 58, Ambulatory health care services, which had the second largest absolute decline relative to the baseline in 2018. The decline in sales from this sector is due partly to a decline in intermediate (business-to-business) sales to Hospitals, combined with a reduction in personal consumption of Other professional medical services, category 50.
- Table 10. Telecommunications – This commodity sector makes up a large part of the industry sector 42, Broadcasting, which had the third largest absolute decline relative to the base in 2018. Telecommunications has sales to intermediate (other business), personal consumption, and both equipment and structures investment, so the net result of its output change is the sum of these component effects. The largest component of the change, however, is in personal consumption.
- Table 11. Apparel and leather – This commodity actually showed a net increase in output in 2018 with respect to the baseline. Sales to personal consumption include Luggage, Clothing, Footwear, and total personal consumption declines

[6] Note that output by industry is actually calculated at the 121 commodity level in *Lift*. We have aggregated to the industry level in this table to make direct comparison with the employment table easier. See section C.7 for a list of the 71 *Lift* industries, and section C.8 for a list of the 121 commodities.

relative to the baseline. However, inventory change is higher, and imports lower than the baseline, resulting in net output being higher.

- Table 12. Support activities for mining – This commodity showed the largest increase in output relative to the baseline in 2018. The strong showing is due to the fact that nonresidential structures investment has been stimulated, and a large and volatile component of nonresidential structures is oil and gas drilling (Mining exploration, shafts and wells).
- Table 13. Accommodations – This commodity showed one of the largest percentage declines in output and employment. The reduction is mostly from personal consumption, where it has both a high price and income elasticity.

The personal consumption equations are a system of equations for 83 personal consumption categories, which react to changes in real income, own-price and relative prices of other goods and services. This are linked to the commodity sectors in *Lift* through a matrix called the personal consumption bridge. In the case of Apparel and leather for example, the commodity appears in 5 columns of the bridge matrix, shown in the decomposition table 11.

Table 14 shows the changes in employment by sector underlying the aggregate unemployment results for Scenario A. Results have been displayed for 2018, which is the year of peak decline in employment. Column 1 shows the level of employment in the base, column 2 shows the level in the alternate scenario, column 3 shows the difference, and column 4 shows the percent difference. The table is ranked by percentage difference. The largest percentage declines were in Accomodation, and in several health care sectors. The largest increases were in Mining support, Apparel and leather and housing services.

Note that the employment changes for any sector can be traced to the changes in output (production), which are in turn related to changes in the sources of demand, such as personal consumption, equipment and structures investment, and net trade. The relationship between employment and output is determined by the average hours worked per year per employee in each industry, and the labor productivity (output/hours worked). Due to different ratios of employment to output by industry, the industries with the largest output changes may not be the industries with the largest employment changes. Furthermore, both the average hours and the labor productivity functions also embody a cyclical response, so output and employment don't move exactly proportionately.

Table 15 is a similar table, this time for Scenario B. In general, the employment shock in Scenario B is larger, though in some sectors such as Textile mills (9), the change in 2018 in Scenario A is positive (+1.4 thousand), whereas it is negative in Scenario B (-5.4 thousand). This can be traced to a minor price substitution effect dominating for this sector in Scenario A, whereas the income effect dominates in Scenario B, and this is strongly negative.

Table 3. Output by Industry (Levels)

Units: Billions of 2009$

Line 1: CBO Baseline
Line 2: Scenario A - Instantaneous Wage Adjustment
Line 3: Scenario B - Gradual Wage Adjustment

	2017	2018	2020	2023	2026
1 Farms	291.8	296.2	300.5	301.9	306.1
	290.1	292.1	297.3	300.4	304.8
	288.3	285.7	289.7	298.7	304.0
2 Forest, fish, activities	49.9	51.5	52.0	50.9	50.4
	50.0	49.8	51.7	50.7	50.2
	48.8	49.3	52.5	50.6	49.0
3 Oil and gas extraction	238.0	243.3	243.8	252.1	266.4
	235.0	240.2	242.5	250.7	265.2
	222.2	235.4	244.4	253.2	267.4
4 Mining, except oil and gas	93.8	98.2	98.1	99.7	105.0
	97.3	95.1	98.4	99.9	105.3
	93.0	94.9	99.5	100.0	104.8
5 Mining support activities	111.7	116.7	122.5	131.4	141.6
	115.9	124.2	120.4	128.0	139.1
	121.6	143.7	119.9	117.6	134.1
6 Utilities	505.5	512.0	514.7	527.6	543.3
	501.8	504.5	513.4	527.5	543.5
	482.9	487.1	508.4	528.5	543.6
7 Construction	821.9	828.3	879.2	941.0	992.7
	909.1	806.3	891.7	964.4	1014.2
	891.0	768.7	890.0	986.9	1016.5
8 Food, bev, tobacco products	788.5	814.8	821.3	829.8	854.3
	781.8	798.6	813.3	824.7	848.8
	781.7	775.5	796.9	823.0	847.6
9 Textile mills	41.7	43.9	40.2	32.9	31.8
	39.4	45.5	40.7	33.1	32.0
	31.0	46.8	42.7	32.9	31.4
10 Apparel and leather products	34.7	39.7	41.6	43.1	50.1
	25.5	47.3	41.4	42.4	49.4
	5.9	58.4	45.3	42.5	49.5
11 Wood products	82.7	87.9	90.7	95.9	103.2
	89.4	80.4	91.7	96.9	104.6
	80.2	76.4	96.6	97.8	103.4
12 Paper products	176.6	187.7	192.3	198.7	212.1
	174.2	184.9	192.2	198.5	212.3
	164.4	180.6	193.0	197.6	210.7
13 Printing, related activities	64.0	64.6	64.7	65.2	66.1
	61.9	64.1	64.6	65.0	66.1
	56.4	62.0	64.0	64.2	65.0
14 Petroleum and coal products	534.7	545.1	540.8	542.2	559.5
	526.0	536.9	536.3	538.2	555.9
	503.8	526.0	541.9	546.8	563.3
15 Chemical products	678.3	732.1	762.1	797.3	871.9
	673.1	720.8	761.5	797.1	872.6
	637.7	698.7	754.2	783.2	855.0
16 Plastics and rubber products	198.6	210.2	208.6	208.1	217.9
	198.8	205.0	208.9	208.2	218.2
	182.7	201.3	211.7	206.2	213.6

Table 3. (continued)

	2017	2018	2020	2023	2026
17 Nonmetallic mineral products	105.1	110.8	113.0	116.1	123.5
	112.1	104.2	113.9	117.2	124.7
	103.9	100.8	116.8	118.5	124.1
18 Primary metals	203.0	231.0	218.6	210.8	232.3
	202.6	225.5	221.2	209.6	231.6
	183.4	237.0	232.3	206.1	227.5
19 Fabricated metal products	323.3	348.8	347.2	347.3	372.4
	326.8	337.6	347.1	344.9	369.1
	304.9	338.8	358.1	344.1	364.8
20 Machinery	328.1	363.3	376.7	378.3	412.7
	331.1	364.0	382.6	384.5	417.1
	325.6	374.3	396.5	380.4	411.9
21 Computer, elect products	301.5	322.0	312.6	289.1	310.7
	299.2	315.4	314.6	292.0	312.8
	289.6	318.1	318.1	292.3	311.4
22 Elect equip, appliances	103.2	111.9	108.4	102.6	107.0
	105.0	109.2	109.6	103.4	107.8
	98.6	111.1	114.6	102.5	105.7
23 Motor vehicles, parts	468.9	510.1	508.6	495.8	524.6
	454.0	514.2	512.1	496.7	523.0
	408.9	516.9	533.2	487.6	506.9
24 Other transportation equip	221.8	235.0	245.8	257.8	284.1
	220.8	226.7	246.5	258.1	285.4
	222.4	215.4	255.3	255.4	284.8
25 Furniture, related products	73.4	78.2	78.8	79.4	84.1
	74.4	75.3	79.8	80.8	85.7
	61.7	70.4	81.5	81.2	82.3
26 Miscellaneous manufacturing	162.6	175.7	183.8	199.1	223.5
	158.1	170.8	182.6	200.0	224.2
	146.9	159.0	167.5	189.5	210.8
27 Wholesale trade	1508.4	1560.3	1627.1	1728.3	1859.9
	1490.3	1536.6	1628.3	1734.3	1864.5
	1414.3	1497.4	1626.6	1735.8	1861.1
28 Motor vehicle and parts dealers	183.0	184.6	188.5	195.4	202.4
	172.3	181.7	186.2	193.3	200.2
	150.8	173.7	187.4	194.1	200.9
29 Food and beverage stores	182.9	186.2	190.0	195.7	202.0
	181.9	182.1	188.4	194.8	201.0
	182.7	175.5	184.0	195.2	201.4
30 General merchandise stores	220.1	225.0	233.4	247.2	260.2
	209.6	222.4	232.7	247.2	260.9
	185.1	207.4	230.5	248.7	262.4
31 Other retail	970.1	993.1	1036.3	1106.0	1170.1
	951.1	978.1	1037.3	1111.1	1177.5
	854.1	915.7	1031.6	1120.8	1182.5
32 Air transportation	186.2	190.5	198.1	214.5	230.2
	165.1	189.0	196.5	212.4	229.6
	118.5	171.5	200.1	214.2	231.2

Table 3. (continued)

	2017	2018	2020	2023	2026
33 Rail transportation	72.5	75.7	77.1	80.0	85.0
	72.3	74.3	77.1	80.0	85.1
	68.8	73.1	77.4	79.7	84.6
34 Water transportation	64.0	64.5	66.8	70.5	73.3
	59.8	62.8	65.5	69.3	72.2
	51.8	59.2	65.4	69.7	72.7
35 Truck transportation	308.8	317.9	327.1	343.1	363.7
	305.7	316.0	329.7	346.5	367.5
	280.8	307.3	330.9	347.0	367.2
36 Ground passenger transport	62.4	62.9	63.5	65.1	66.8
	60.6	61.3	62.8	64.6	66.5
	57.2	57.7	61.5	64.9	66.7
37 Pipeline transportation	27.8	28.3	28.6	29.3	30.6
	27.5	28.0	28.4	29.2	30.5
	26.5	27.2	28.4	29.4	30.6
38 Other transportation	216.2	221.3	230.6	246.2	263.7
	209.2	218.6	230.0	245.9	263.7
	189.9	209.4	230.5	246.6	263.6
39 Warehousing and storage	118.4	121.9	126.6	134.3	143.2
	116.1	120.3	126.6	134.6	143.7
	107.8	115.3	126.0	134.9	143.7
40 Publishing (incl software)	265.1	272.4	287.4	314.0	345.8
	258.4	274.7	289.0	316.2	347.2
	237.0	271.5	289.5	318.4	346.1
41 Movie and sound recording	183.8	189.6	199.5	213.7	228.3
	180.0	186.3	198.8	214.4	228.6
	169.9	175.1	194.9	216.3	228.7
42 Broadcasting	777.3	834.3	933.2	1071.3	1198.8
	753.0	808.2	924.9	1068.8	1197.9
	699.9	739.0	892.6	1076.4	1204.2
43 Information and data process	196.4	207.5	228.4	261.3	296.0
	191.1	203.7	226.7	259.9	295.0
	178.2	194.7	225.0	260.6	295.1
44 Banks, credit intermediation	557.7	570.1	598.7	641.8	681.6
	528.3	564.9	595.7	638.7	680.3
	454.2	533.3	598.4	641.9	682.0
45 Securities and investment	475.2	487.0	518.2	565.7	612.0
	440.1	479.4	510.6	557.0	604.8
	367.7	452.0	515.8	559.2	605.7
46 Insurance carriers	879.5	882.7	902.5	952.6	999.8
	863.6	856.2	890.5	943.6	991.6
	833.8	812.5	874.5	945.8	991.2
47 Funds, trusts, and other	154.1	156.1	164.9	176.1	183.0
	135.3	153.8	161.0	171.1	178.8
	98.8	142.8	165.1	172.4	180.0
48 Housing services	1776.0	1820.5	1878.3	2018.4	2154.5
	1933.5	1987.1	2092.6	2262.9	2418.6
	1819.8	1822.6	2014.5	2276.3	2434.9

Table 3. (continued)

	2017	2018	2020	2023	2026
49 Other real estate	1049.1	1067.9	1105.9	1184.8	1260.5
	1088.4	1051.7	1108.1	1192.5	1269.3
	1064.5	1015.0	1101.9	1200.7	1269.6
50 Rental and leasing services	454.1	470.7	499.1	545.8	601.4
	443.5	462.3	494.9	542.0	597.7
	417.5	446.6	494.0	542.5	596.3
51 Legal services	287.6	290.9	297.5	313.0	329.1
	292.2	286.4	297.5	314.2	330.4
	280.2	274.3	295.8	315.8	329.9
52 Misc prof, sci and tech	1678.8	1713.3	1766.4	1837.0	1916.2
	1663.3	1686.4	1761.5	1842.0	1917.6
	1590.9	1620.6	1743.3	1853.7	1912.8
53 Computer systems services	454.5	459.0	459.9	454.5	445.3
	450.9	452.4	458.7	457.2	445.7
	433.2	432.8	451.1	463.8	444.4
54 Management of enterprises	605.5	636.1	668.9	719.1	787.7
	593.9	623.7	666.0	717.4	787.1
	557.1	599.0	661.7	717.0	784.0
55 Administrative and support	782.2	803.2	837.8	898.4	964.6
	781.4	798.7	844.9	909.3	978.3
	733.0	760.9	836.8	913.7	979.3
56 Waste management	104.4	106.6	109.6	115.2	121.4
	102.9	104.9	109.1	114.7	121.2
	96.9	101.1	108.5	115.1	121.2
57 Educational services	329.7	336.0	347.7	366.8	385.2
	327.5	326.5	349.0	371.7	390.8
	317.3	291.6	329.2	373.7	393.1
58 Ambulatory health services	986.4	1016.1	1081.0	1195.5	1322.6
	968.9	975.2	1065.6	1188.7	1327.7
	956.5	897.5	1012.4	1194.6	1335.6
59 Hospitals	984.9	1016.0	1087.1	1229.1	1368.8
	965.0	947.3	1061.0	1218.2	1377.4
	968.6	830.8	969.4	1227.9	1391.1
60 Nursing and residential care	286.7	297.1	321.5	365.8	412.1
	260.5	276.5	310.4	357.0	404.4
	223.5	232.9	291.0	361.3	409.8
61 Social assistance	176.9	181.4	190.8	204.6	218.6
	177.9	177.1	192.3	208.3	222.9
	176.1	161.0	181.4	209.4	224.3
62 Theatre, sports, museums	150.6	154.6	163.3	176.4	189.7
	148.1	149.3	161.7	176.2	189.5
	143.7	137.6	155.1	177.2	190.2
63 Amusements and recreation	202.0	205.9	216.6	233.7	250.2
	196.5	202.4	215.9	233.9	250.7
	184.2	189.7	211.2	234.9	251.8
64 Accommodation	153.8	155.4	162.9	172.6	179.1
	114.0	122.9	128.9	136.0	141.3
	93.7	113.2	129.0	137.3	142.1
65 Food, drinking establishments	735.2	750.2	769.5	802.5	837.3
	723.4	741.3	768.2	803.5	839.1
	692.4	710.5	757.3	806.1	841.3
66 Other services, except govt	821.4	832.9	859.8	905.8	951.6
	786.1	837.0	872.1	921.6	972.6
	670.7	775.6	866.5	927.7	978.5

Table 4. Output Changes by Industry (Differences)

Units: Billions of 2009$

Line 1: CBO Baseline
Line 2: Scenario A - Instantaneous Wage Adjustment
Line 3: Scenario B - Gradual Wage Adjustment
Lines 2 and 3 are differences from the Baseline

	2017	2018	2020	2023	2026
1 Farms	291.8	296.2	300.5	301.9	306.1
	-1.6	-4.1	-3.2	-1.5	-1.4
	-3.5	-10.5	-10.9	-3.2	-2.1
2 Forest, fish, activities	49.9	51.5	52.0	50.9	50.4
	0.2	-1.7	-0.3	-0.2	-0.2
	-1.0	-2.2	0.5	-0.3	-1.4
3 Oil and gas extraction	238.0	243.3	243.8	252.1	266.4
	-3.0	-3.1	-1.4	-1.4	-1.2
	-15.8	-7.8	0.6	1.1	1.0
4 Mining, except oil and gas	93.8	98.2	98.1	99.7	105.0
	3.5	-3.1	0.3	0.2	0.3
	-0.7	-3.3	1.4	0.3	-0.2
5 Mining support activities	111.7	116.7	122.5	131.4	141.6
	4.2	7.5	-2.0	-3.4	-2.5
	9.9	27.0	-2.6	-13.8	-7.5
6 Utilities	505.5	512.0	514.7	527.6	543.3
	-3.7	-7.5	-1.3	-0.1	0.2
	-22.6	-24.9	-6.3	1.0	0.2
7 Construction	821.9	828.3	879.2	941.0	992.7
	87.2	-22.1	12.5	23.4	21.5
	69.1	-59.7	10.8	46.0	23.8
8 Food, bev, tobacco products	788.5	814.8	821.3	829.8	854.3
	-6.7	-16.2	-8.0	-5.0	-5.5
	-6.8	-39.2	-24.5	-6.8	-6.7
9 Textile mills	41.7	43.9	40.2	32.9	31.8
	-2.3	1.6	0.5	0.2	0.2
	-10.7	3.0	2.5	0.0	-0.4
10 Apparel and leather products	34.7	39.7	41.6	43.1	50.1
	-9.2	7.6	-0.2	-0.7	-0.7
	-28.8	18.8	3.7	-0.6	-0.6
11 Wood products	82.7	87.9	90.7	95.9	103.2
	6.7	-7.5	1.0	1.1	1.4
	-2.5	-11.5	5.9	1.9	0.2
12 Paper products	176.6	187.7	192.3	198.7	212.1
	-2.4	-2.8	-0.1	-0.2	0.2
	-12.2	-7.1	0.7	-1.1	-1.4
13 Printing, related activities	64.0	64.6	64.7	65.2	66.1
	-2.1	-0.6	-0.1	-0.2	0.0
	-7.6	-2.6	-0.7	-1.0	-1.1
14 Petroleum and coal products	534.7	545.1	540.8	542.2	559.5
	-8.6	-8.2	-4.5	-4.0	-3.6
	-30.8	-19.1	1.1	4.6	3.8
15 Chemical products	678.3	732.1	762.1	797.3	871.9
	-5.3	-11.3	-0.5	-0.1	0.7
	-40.7	-33.4	-7.9	-14.1	-16.9
16 Plastics and rubber products	198.6	210.2	208.6	208.1	217.9
	0.3	-5.2	0.2	0.1	0.3
	-15.9	-8.9	3.1	-1.9	-4.3

Table 4. (continued)

	2017	2018	2020	2023	2026
17 Nonmetallic mineral products	105.1	110.8	113.0	116.1	123.5
	7.0	-6.6	0.9	1.1	1.2
	-1.1	-10.1	3.8	2.3	0.5
18 Primary metals	203.0	231.0	218.6	210.8	232.3
	-0.4	-5.6	2.6	-1.3	-0.7
	-19.6	6.0	13.6	-4.7	-4.8
19 Fabricated metal products	323.3	348.8	347.2	347.3	372.4
	3.6	-11.2	0.0	-2.4	-3.2
	-18.4	-10.0	10.9	-3.2	-7.5
20 Machinery	328.1	363.3	376.7	378.3	412.7
	3.0	0.7	5.9	6.2	4.4
	-2.5	11.0	19.8	2.0	-0.8
21 Computer, elect products	301.5	322.0	312.6	289.1	310.7
	-2.3	-6.6	2.1	2.9	2.1
	-11.9	-3.9	5.5	3.2	0.7
22 Elect equip, appliances	103.2	111.9	108.4	102.6	107.0
	1.8	-2.7	1.2	0.8	0.7
	-4.6	-0.8	6.2	-0.1	-1.3
23 Motor vehicles, parts	468.9	510.1	508.6	495.8	524.6
	-14.9	4.1	3.5	1.0	-1.6
	-60.0	6.8	24.7	-8.1	-17.6
24 Other transportation equip	221.8	235.0	245.8	257.8	284.1
	-1.0	-8.3	0.7	0.3	1.3
	0.6	-19.6	9.6	-2.5	0.7
25 Furniture, related products	73.4	78.2	78.8	79.4	84.1
	1.0	-2.8	1.0	1.5	1.6
	-11.8	-7.7	2.7	1.9	-1.9
26 Miscellaneous manufacturing	162.6	175.7	183.8	199.1	223.5
	-4.5	-4.9	-1.1	0.9	0.7
	-15.7	-16.8	-16.3	-9.6	-12.6
27 Wholesale trade	1508.4	1560.3	1627.1	1728.3	1859.9
	-18.0	-23.8	1.2	5.9	4.6
	-94.1	-63.0	-0.5	7.5	1.2
28 Motor vehicle and parts dealers	183.0	184.6	188.5	195.4	202.4
	-10.7	-2.9	-2.3	-2.1	-2.1
	-32.2	-10.9	-1.2	-1.3	-1.5
29 Food and beverage stores	182.9	186.2	190.0	195.7	202.0
	-1.0	-4.1	-1.7	-0.8	-1.0
	-0.2	-10.7	-6.1	-0.5	-0.7
30 General merchandise stores	220.1	225.0	233.4	247.2	260.2
	-10.6	-2.6	-0.7	0.0	0.6
	-35.0	-17.7	-2.9	1.5	2.2
31 Other retail	970.1	993.1	1036.3	1106.0	1170.1
	-19.0	-15.0	1.0	5.2	7.3
	-116.1	-77.4	-4.7	14.8	12.3
32 Air transportation	186.2	190.5	198.1	214.5	230.2
	-21.2	-1.5	-1.6	-2.1	-0.7
	-67.8	-19.0	2.0	-0.3	0.9

Table 4. (continued)

	2017	2018	2020	2023	2026
33 Rail transportation	72.5	75.7	77.1	80.0	85.0
	-0.1	-1.4	0.0	0.0	0.0
	-3.7	-2.5	0.3	-0.3	-0.5
34 Water transportation	64.0	64.5	66.8	70.5	73.3
	-4.2	-1.7	-1.3	-1.3	-1.1
	-12.3	-5.3	-1.3	-0.8	-0.6
35 Truck transportation	308.8	317.9	327.1	343.1	363.7
	-3.1	-1.9	2.6	3.4	3.8
	-28.0	-10.6	3.8	3.9	3.5
36 Ground passenger transport	62.4	62.9	63.5	65.1	66.8
	-1.8	-1.6	-0.7	-0.4	-0.3
	-5.2	-5.2	-2.0	-0.1	-0.1
37 Pipeline transportation	27.8	28.3	28.6	29.3	30.6
	-0.3	-0.4	-0.2	-0.1	-0.1
	-1.3	-1.1	-0.1	0.1	0.0
38 Other transportation	216.2	221.3	230.6	246.2	263.7
	-7.0	-2.7	-0.6	-0.3	0.0
	-26.3	-11.9	-0.1	0.3	0.0
39 Warehousing and storage	118.4	121.9	126.6	134.3	143.2
	-2.3	-1.6	0.0	0.3	0.5
	-10.6	-6.6	-0.6	0.7	0.4
40 Publishing (incl software)	265.1	272.4	287.4	314.0	345.8
	-6.7	2.4	1.6	2.1	1.4
	-28.1	-0.9	2.0	4.3	0.4
41 Movie and sound recording	183.8	189.6	199.5	213.7	228.3
	-3.9	-3.4	-0.7	0.7	0.4
	-13.9	-14.5	-4.6	2.5	0.4
42 Broadcasting	777.3	834.3	933.2	1071.3	1198.8
	-24.3	-26.1	-8.4	-2.5	-0.9
	-77.4	-95.3	-40.6	5.1	5.4
43 Information and data process	196.4	207.5	228.4	261.3	296.0
	-5.4	-3.8	-1.7	-1.4	-1.0
	-18.2	-12.8	-3.4	-0.6	-0.9
44 Banks, credit intermediation	557.7	570.1	598.7	641.8	681.6
	-29.4	-5.2	-2.9	-3.0	-1.2
	-103.4	-36.8	-0.3	0.2	0.5
45 Securities and investment	475.2	487.0	518.2	565.7	612.0
	-35.0	-7.7	-7.6	-8.8	-7.2
	-107.4	-35.0	-2.4	-6.5	-6.2
46 Insurance carriers	879.5	882.7	902.5	952.6	999.8
	-15.9	-26.5	-12.0	-8.9	-8.2
	-45.7	-70.2	-28.0	-6.8	-8.7
47 Funds, trusts, and other	154.1	156.1	164.9	176.1	183.0
	-18.8	-2.3	-3.9	-4.9	-4.2
	-55.4	-13.3	0.2	-3.6	-3.0
48 Housing services	1776.0	1820.5	1878.3	2018.4	2154.5
	157.6	166.5	214.3	244.5	264.1
	43.8	2.1	136.2	257.9	280.3

Table 4. (continued)

	2017	2018	2020	2023	2026
49 Other real estate	1049.1	1067.9	1105.9	1184.8	1260.5
	39.3	-16.2	2.3	7.7	8.9
	15.5	-52.8	-3.9	15.9	9.1
50 Rental and leasing services	454.1	470.7	499.1	545.8	601.4
	-10.6	-8.4	-4.2	-3.8	-3.7
	-36.6	-24.0	-5.1	-3.3	-5.2
51 Legal services	287.6	290.9	297.5	313.0	329.1
	4.6	-4.5	0.0	1.2	1.3
	-7.4	-16.6	-1.7	2.8	0.8
52 Misc prof, sci and tech	1678.8	1713.3	1766.4	1837.0	1916.2
	-15.5	-26.9	-4.9	5.0	1.4
	-87.9	-92.7	-23.1	16.7	-3.4
53 Computer systems services	454.5	459.0	459.9	454.5	445.3
	-3.6	-6.6	-1.2	2.7	0.3
	-21.3	-26.2	-8.8	9.3	-1.0
54 Management of enterprises	605.5	636.1	668.9	719.1	787.7
	-11.7	-12.5	-2.9	-1.7	-0.6
	-48.4	-37.1	-7.2	-2.1	-3.7
55 Administrative and support	782.2	803.2	837.8	898.4	964.6
	-0.8	-4.5	7.1	10.9	13.7
	-49.2	-42.3	-1.0	15.3	14.7
56 Waste management	104.4	106.6	109.6	115.2	121.4
	-1.5	-1.7	-0.5	-0.4	-0.3
	-7.5	-5.5	-1.0	-0.1	-0.2
57 Educational services	329.7	336.0	347.7	366.8	385.2
	-2.2	-9.5	1.3	4.9	5.5
	-12.4	-44.4	-18.5	6.8	7.9
58 Ambulatory health services	986.4	1016.1	1081.0	1195.5	1322.6
	-17.5	-41.0	-15.5	-6.8	5.1
	-29.9	-118.6	-68.7	-0.9	13.0
59 Hospitals	984.9	1016.0	1087.1	1229.1	1368.8
	-19.8	-68.7	-26.2	-10.9	8.6
	-16.3	-185.2	-117.7	-1.2	22.3
60 Nursing and residential care	286.7	297.1	321.5	365.8	412.1
	-26.2	-20.6	-11.1	-8.8	-7.7
	-63.2	-64.2	-30.5	-4.5	-2.3
61 Social assistance	176.9	181.4	190.8	204.6	218.6
	0.9	-4.3	1.5	3.7	4.3
	-0.8	-20.4	-9.4	4.8	5.7
62 Theatre, sports, museums	150.6	154.6	163.3	176.4	189.7
	-2.4	-5.3	-1.6	-0.2	-0.2
	-6.9	-17.1	-8.2	0.8	0.5
63 Amusements and recreation	202.0	205.9	216.6	233.7	250.2
	-5.5	-3.5	-0.7	0.2	0.5
	-17.9	-16.2	-5.4	1.2	1.6
64 Accommodation	153.8	155.4	162.9	172.6	179.1
	-39.8	-32.5	-34.0	-36.6	-37.8
	-60.1	-42.2	-33.9	-35.2	-36.9
65 Food, drinking establishments	735.2	750.2	769.5	802.5	837.3
	-11.8	-9.0	-1.3	1.1	1.9
	-42.9	-39.7	-12.2	3.6	4.1
66 Other services, except govt	821.4	832.9	859.8	905.8	951.6
	-35.3	4.2	12.3	15.8	21.0
	-150.8	-57.2	6.8	21.9	26.9

Table 5. Employment by Industry (Levels)
Thousands of Jobs

Line 1: CBO Baseline
Line 2: Scenario A - Instantaneous Wage Adjustment
Line 3: Scenario B - Gradual Wage Adjustment

	2017	2018	2020	2023	2026
1 Farms	1,345.3	1,346.0	1,321.7	1,229.2	1,197.3
	1,343.5	1,338.3	1,311.4	1,255.3	1,198.0
	1,331.3	1,295.0	1,276.0	1,246.0	1,194.5
2 Forestry, fishing, and related activities	650.6	645.0	665.0	654.4	663.0
	652.6	637.9	664.8	656.1	664.0
	646.8	639.7	669.3	668.1	649.5
3 Oil and gas extraction	220.1	233.9	248.3	277.4	313.7
	215.6	228.2	245.3	272.9	308.9
	209.3	220.8	245.1	273.7	310.8
4 Mining, except oil and gas	208.7	220.2	222.6	225.8	237.9
	213.5	220.8	224.0	227.6	239.7
	208.0	215.9	224.2	228.6	238.3
5 Mining support activities	383.2	397.6	415.9	464.5	523.7
	393.4	417.2	413.7	453.5	517.8
	406.1	463.1	429.6	428.3	499.3
6 Utilities	631.5	635.1	609.6	581.3	562.1
	632.6	634.5	608.1	584.1	565.2
	631.5	601.5	592.2	585.8	565.2
7 Construction	8,815.7	8,859.9	9,031.8	9,290.0	9,714.7
	9,401.8	8,807.4	9,138.3	9,561.9	9,948.0
	9,287.0	8,540.4	9,098.8	9,826.8	9,972.8
8 Food and beverage and tobacco products	1,605.8	1,601.3	1,575.2	1,510.8	1,495.4
	1,606.3	1,584.7	1,564.3	1,516.4	1,493.5
	1,605.7	1,551.8	1,529.2	1,512.4	1,491.0
9 Textile mills and textile product mills	198.7	193.9	168.8	131.1	112.8
	194.7	195.4	169.8	132.1	113.8
	177.5	188.6	171.7	131.7	112.3
10 Apparel and leather and allied products	192.7	188.3	172.0	147.0	142.5
	174.8	205.7	181.6	146.1	141.4
	123.7	216.7	211.4	163.7	141.9
11 Wood products	375.3	380.0	382.6	376.2	376.9
	392.7	373.4	392.0	380.5	383.4
	368.4	348.4	403.1	390.8	379.1
12 Paper products	355.8	364.3	356.4	340.3	335.7
	356.1	360.4	357.4	341.3	337.2
	354.9	349.5	357.4	340.2	334.6
13 Printing and related support activities	439.8	435.3	415.5	389.9	369.9
	433.3	428.2	414.1	390.2	370.8
	414.3	410.9	404.7	388.1	366.4
14 Petroleum and coal products	115.1	118.0	116.1	113.7	116.0
	114.6	116.6	117.2	113.4	115.7
	114.1	112.7	116.7	115.4	116.8
15 Chemical products	729.3	763.1	754.7	737.8	755.7
	727.3	754.9	757.0	741.0	760.0
	705.7	730.9	748.8	728.5	744.7
16 Plastics and rubber products	577.9	577.5	549.5	496.2	482.0
	579.3	575.2	558.2	495.9	479.1
	557.0	562.0	558.6	493.3	471.7

Table 5 (continued)

	2017	2018	2020	2023	2026
17 Nonmetallic mineral products	377.4	368.3	375.9	356.3	362.9
	384.0	378.8	381.3	362.6	366.3
	375.8	360.1	378.5	374.2	363.9
18 Primary metals	320.6	338.7	308.5	272.0	271.3
	320.7	335.2	311.8	272.1	271.0
	303.3	338.3	324.4	270.6	265.8
19 Fabricated metal products	1,252.0	1,303.0	1,276.5	1,193.2	1,207.2
	1,261.0	1,290.4	1,282.7	1,187.5	1,194.7
	1,228.1	1,257.1	1,301.9	1,195.1	1,179.4
20 Machinery	920.4	914.5	936.8	842.9	820.2
	927.6	920.6	935.8	862.5	831.5
	916.8	925.1	976.9	864.4	819.3
21 Computer and electronic products	854.4	851.0	800.7	674.7	653.3
	852.4	846.0	801.9	687.1	660.3
	837.5	845.1	796.3	687.0	657.5
22 Electrical equipment, appliances, and compone	319.0	333.8	317.6	281.9	275.3
	324.1	331.4	321.3	285.4	278.4
	307.6	330.0	333.8	283.3	272.0
23 Motor vehicles, bodies and trailers, and parts	651.9	645.4	598.4	517.6	474.6
	641.4	646.7	602.1	519.8	472.8
	604.2	637.1	613.2	516.6	458.2
24 Other transportation equipment	556.8	573.8	567.2	547.8	536.2
	555.6	558.2	573.8	551.3	540.6
	557.5	533.6	594.5	547.5	537.8
25 Furniture and related products	348.9	346.3	323.6	280.4	263.9
	352.3	343.6	329.5	284.3	264.6
	316.0	316.9	342.3	288.5	255.6
26 Miscellaneous manufacturing	513.5	522.8	503.0	459.4	453.9
	502.8	514.0	506.8	460.6	448.0
	473.0	488.4	476.9	471.0	449.5
27 Wholesale trade	5,801.0	5,863.6	5,792.0	5,653.2	5,580.9
	5,776.8	5,810.2	5,793.0	5,704.7	5,620.8
	5,631.8	5,559.2	5,739.7	5,718.2	5,609.2
28 Motor vehicle and parts dealers	2,221.0	2,202.7	2,239.2	2,270.7	2,287.3
	2,213.0	2,186.6	2,219.7	2,257.4	2,274.4
	2,197.1	2,153.1	2,213.5	2,245.7	2,282.0
29 Food and beverage stores	3,188.4	3,186.1	3,223.3	3,259.3	3,306.4
	3,175.0	3,143.2	3,205.8	3,259.7	3,306.2
	3,190.4	3,037.6	3,125.5	3,264.3	3,312.5
30 General merchandise stores	3,382.5	3,385.8	3,239.1	3,063.5	2,900.6
	3,350.3	3,268.5	3,240.4	3,077.5	2,922.0
	2,971.8	3,177.2	3,141.1	3,101.0	2,937.9
31 Other retail	8,222.8	8,123.4	7,871.9	7,555.8	7,189.3
	8,146.2	8,021.7	7,901.1	7,628.8	7,269.6
	7,458.0	7,559.2	7,753.6	7,711.9	7,300.4
32 Air transportation	475.6	464.3	447.0	433.2	416.7
	428.7	449.1	446.8	431.2	416.9
	313.7	417.8	438.5	431.9	419.4

Table 5 (continued)

	2017	2018	2020	2023	2026
33 Rail transportation	173.9	169.4	158.8	142.2	131.9
	174.3	169.7	158.7	143.2	132.7
	173.6	161.6	156.7	142.0	131.8
34 Water transportation	79.2	79.0	77.9	77.1	74.5
	75.0	76.1	76.6	76.1	73.6
	65.3	72.9	74.7	76.8	74.1
35 Truck transportation	1,720.2	1,748.4	1,763.7	1,780.3	1,810.9
	1,716.3	1,741.6	1,777.7	1,807.9	1,838.0
	1,621.0	1,659.9	1,760.7	1,814.6	1,836.0
36 Ground passenger transport	747.6	699.9	683.7	663.9	658.1
	738.9	700.7	677.2	661.8	656.3
	721.7	684.6	650.1	665.1	658.8
37 Pipeline transportation	51.7	52.5	52.9	54.0	56.4
	51.7	52.1	52.7	54.1	56.5
	50.2	50.5	52.2	54.5	56.6
38 Other transportation	1,345.6	1,324.5	1,285.3	1,261.2	1,241.7
	1,316.7	1,301.2	1,299.3	1,255.5	1,234.2
	1,253.2	1,254.7	1,333.0	1,257.2	1,233.9
39 Warehousing and storage	743.5	752.6	736.2	708.2	684.0
	740.2	742.8	736.7	713.7	689.4
	706.6	704.8	722.6	717.2	689.1
40 Publishing (incl software)	928.5	931.3	930.0	938.0	950.5
	902.8	942.9	939.2	946.7	957.7
	821.8	937.4	944.0	952.0	955.0
41 Movie and sound recording	551.6	540.9	522.7	520.5	522.3
	547.4	531.3	528.6	521.3	518.8
	530.2	506.4	532.4	538.8	518.6
42 Broadcasting	1,119.7	1,137.4	1,138.6	1,108.3	1,050.7
	1,092.5	1,108.2	1,132.4	1,110.5	1,054.8
	1,026.1	1,019.8	1,091.5	1,117.9	1,059.8
43 Information and data process	286.4	267.7	233.0	190.7	155.4
	281.7	263.4	232.0	190.7	155.6
	281.7	249.9	228.6	191.5	155.6
44 Banks, credit intermediation	2,862.3	2,982.2	3,204.8	3,561.3	3,895.8
	2,758.1	2,874.9	3,199.8	3,558.1	3,901.8
	2,369.7	2,813.8	3,159.0	3,586.2	3,909.9
45 Securities and investment	877.3	861.8	829.5	790.9	746.1
	831.5	822.3	822.3	782.8	740.7
	696.0	808.9	814.1	789.6	741.7
46 Insurance carriers	2,549.1	2,473.0	2,300.4	2,148.1	2,005.0
	2,532.6	2,424.2	2,271.8	2,137.6	1,997.2
	2,488.8	2,324.2	2,207.9	2,144.1	1,995.9
47 Funds, trusts, and other	2.9	2.5	2.0	1.4	0.9
	2.6	2.4	1.9	1.3	0.9
	2.1	2.3	1.9	1.3	0.9
48 Housing services	299.8	303.6	303.2	311.0	316.0
	327.0	332.9	339.2	350.2	356.5
	307.8	305.3	326.5	352.3	358.9

Table 5 (continued)

	2017	2018	2020	2023	2026
49 Other real estate	1,660.6	1,653.9	1,608.4	1,545.8	1,467.7
	1,689.0	1,678.1	1,614.2	1,563.2	1,484.8
	1,674.8	1,628.9	1,587.7	1,576.9	1,485.6
50 Rental and leasing services	611.9	610.1	598.5	579.9	565.0
	605.9	600.5	597.0	576.5	560.9
	585.4	581.2	591.3	576.9	560.1
51 Legal services	1,432.1	1,445.2	1,463.6	1,532.0	1,601.6
	1,454.2	1,446.2	1,468.4	1,542.6	1,612.1
	1,411.2	1,374.7	1,458.9	1,552.2	1,609.7
52 Misc prof, sci and tech	6,452.7	6,536.9	6,608.8	6,666.7	6,726.1
	6,435.9	6,486.2	6,607.6	6,708.2	6,747.8
	6,272.3	6,238.2	6,494.2	6,756.6	6,733.1
53 Computer systems services	1,863.4	1,861.4	1,816.4	1,735.4	1,642.7
	1,853.1	1,844.1	1,818.4	1,753.3	1,652.1
	1,785.7	1,764.6	1,786.2	1,778.7	1,647.8
54 Management of enterprises	2,259.9	2,355.9	2,454.8	2,501.2	2,599.3
	2,258.8	2,320.2	2,452.9	2,502.5	2,593.2
	2,218.4	2,183.4	2,417.7	2,515.9	2,589.0
55 Administrative and support	9,396.0	9,454.0	9,418.0	9,449.4	9,474.1
	9,403.2	9,448.3	9,530.9	9,606.7	9,653.0
	8,892.8	8,984.1	9,413.3	9,656.2	9,662.2
56 Waste management	429.6	435.4	439.8	447.6	460.9
	426.8	429.3	438.1	445.4	458.7
	403.7	411.7	430.4	448.5	458.5
57 Educational services	3,720.8	3,835.8	3,959.8	4,148.3	4,332.6
	3,723.2	3,803.0	3,953.3	4,220.4	4,417.3
	3,682.6	3,448.4	3,629.2	4,224.9	4,442.9
58 Ambulatory health services	7,770.6	8,008.5	8,462.2	9,329.7	10,255.5
	7,522.0	7,555.0	8,453.4	9,321.3	10,427.8
	7,343.6	6,521.7	8,198.8	9,416.5	10,490.9
59 Hospitals	5,440.5	5,517.0	5,653.9	5,997.3	6,273.3
	5,357.0	5,206.9	5,526.4	5,970.1	6,330.8
	5,374.1	4,659.7	5,024.7	6,008.1	6,393.3
60 Nursing and residential care	4,459.4	4,608.7	4,929.7	5,519.6	6,095.4
	4,022.7	4,318.2	4,784.4	5,411.5	6,011.8
	3,402.1	3,631.3	4,510.9	5,478.0	6,092.4
61 Social assistance	4,586.8	4,644.9	4,733.1	5,080.2	5,525.1
	4,611.4	4,557.5	4,811.1	5,124.3	5,512.9
	4,560.9	4,164.0	4,667.6	5,411.0	5,565.2
62 Theatre, sports, museums	981.5	990.8	992.6	1,008.9	1,026.2
	981.5	976.7	987.2	1,013.0	1,026.0
	980.0	942.4	940.5	1,036.7	1,031.3
63 Amusements and recreation	1,761.8	1,787.6	1,830.3	1,925.7	2,003.9
	1,748.3	1,718.5	1,826.5	1,935.9	2,018.3
	1,699.9	1,687.2	1,758.4	1,943.2	2,026.5
64 Accommodation	1,962.4	1,953.7	1,976.3	2,009.7	1,999.6
	1,706.3	1,666.4	1,690.8	1,681.9	1,673.4
	1,551.3	1,554.1	1,685.1	1,689.5	1,671.7
65 Food, drinking establishments	11,074.6	11,251.7	11,367.7	11,648.6	11,936.0
	10,915.8	11,168.0	11,395.7	11,716.0	12,020.6
	10,443.6	10,703.9	11,234.0	11,752.8	12,052.5
66 Other services, except govt	9,519.2	9,632.3	9,878.8	10,352.5	10,796.5
	9,420.2	9,536.8	10,062.8	10,537.4	11,029.3
	9,098.0	8,997.9	9,902.8	10,627.1	11,097.2

Table 6. Employment by Industry (Differences)

Units: Thousands of Jobs

Line 1: CBO Baseline
Line 2: Scenario A - Instantaneous Wage Adjustment
Line 3: Scenario B - Gradual Wage Adjustment

	2017	2018	2020	2023	2026
1 Farms	1,345.3	1,346.0	1,321.7	1,229.2	1,197.3
	-1.8	-7.7	-10.3	26.1	0.7
	-14.0	-51.0	-45.7	16.8	-2.8
2 Forestry, fishing, and related activities	650.6	645.0	665.0	654.4	663.0
	2.0	-7.0	-0.2	1.8	1.0
	-3.8	-5.3	4.3	13.7	-13.5
3 Oil and gas extraction	220.1	233.9	248.3	277.4	313.7
	-4.4	-5.7	-3.0	-4.5	-4.8
	-10.8	-13.0	-3.2	-3.8	-2.9
4 Mining, except oil and gas	208.7	220.2	222.6	225.8	237.9
	4.8	0.7	1.5	1.8	1.7
	-0.7	-4.3	1.6	2.8	0.4
5 Mining support activities	383.2	397.6	415.9	464.5	523.7
	10.2	19.6	-2.2	-11.0	-5.9
	22.9	65.4	13.7	-36.2	-24.4
6 Utilities	631.5	635.1	609.6	581.3	562.1
	1.2	-0.7	-1.5	2.9	3.1
	0.0	-33.7	-17.4	4.6	3.0
7 Construction	8,815.7	8,859.9	9,031.8	9,290.0	9,714.7
	586.0	-52.5	106.5	272.0	233.3
	471.2	-319.5	67.0	536.9	258.1
8 Food and beverage and tobacco products	1,605.8	1,601.3	1,575.2	1,510.8	1,495.4
	0.4	-16.6	-10.9	5.6	-1.9
	-0.1	-49.6	-46.0	1.6	-4.4
9 Textile mills and textile product mills	198.7	193.9	168.8	131.1	112.8
	-4.1	1.4	1.0	1.0	1.0
	-21.3	-5.4	2.9	0.6	-0.5
10 Apparel and leather and allied products	192.7	188.3	172.0	147.0	142.5
	-17.9	17.5	9.6	-0.9	-1.2
	-68.9	28.4	39.4	16.7	-0.6
11 Wood products	375.3	380.0	382.6	376.2	376.9
	17.4	-6.6	9.4	4.4	6.6
	-7.0	-31.6	20.5	14.6	2.2
12 Paper products	355.8	364.3	356.4	340.3	335.7
	0.3	-4.0	1.1	1.0	1.6
	-0.9	-14.9	1.1	-0.2	-1.1
13 Printing and related support activities	439.8	435.3	415.5	389.9	369.9
	-6.5	-7.1	-1.4	0.4	0.9
	-25.5	-24.4	-10.8	-1.8	-3.5
14 Petroleum and coal products	115.1	118.0	116.1	113.7	116.0
	-0.5	-1.4	1.1	-0.2	-0.3
	-1.0	-5.3	0.7	1.7	0.8
15 Chemical products	729.3	763.1	754.7	737.8	755.7
	-2.0	-8.2	2.4	3.2	4.3
	-23.6	-32.2	-5.9	-9.3	-11.0
16 Plastics and rubber products	577.9	577.5	549.5	496.2	482.0
	1.3	-2.3	8.6	-0.3	-2.9
	-21.0	-15.5	9.0	-2.9	-10.3

Table 6 (continued)

	2017	2018	2020	2023	2026
17 Nonmetallic mineral products	377.4	368.3	375.9	356.3	362.9
	6.6	10.6	5.3	6.3	3.3
	-1.6	-8.2	2.6	17.9	1.0
18 Primary metals	320.6	338.7	308.5	272.0	271.3
	0.1	-3.6	3.3	0.1	-0.3
	-17.3	-0.4	15.9	-1.4	-5.5
19 Fabricated metal products	1,252.0	1,303.0	1,276.5	1,193.2	1,207.2
	9.0	-12.6	6.2	-5.7	-12.6
	-23.9	-45.9	25.3	1.9	-27.9
20 Machinery	920.4	914.5	936.8	842.9	820.2
	7.2	6.1	-0.9	19.6	11.3
	-3.7	10.6	40.2	21.5	-1.0
21 Computer and electronic products	854.4	851.0	800.7	674.7	653.3
	-2.0	-5.0	1.1	12.4	7.0
	-16.9	-5.9	-4.4	12.3	4.2
22 Electrical equipment, appliances, and compone	319.0	333.8	317.6	281.9	275.3
	5.0	-2.4	3.8	3.5	3.1
	-11.4	-3.8	16.2	1.4	-3.3
23 Motor vehicles, bodies and trailers, and parts	651.9	645.4	598.4	517.6	474.6
	-10.5	1.3	3.6	2.1	-1.8
	-47.7	-8.3	14.8	-1.0	-16.4
24 Other transportation equipment	556.8	573.8	567.2	547.8	536.2
	-1.2	-15.6	6.7	3.5	4.4
	0.7	-40.3	27.4	-0.3	1.6
25 Furniture and related products	348.9	346.3	323.6	280.4	263.9
	3.3	-2.7	5.9	3.9	0.7
	-32.9	-29.4	18.6	8.1	-8.3
26 Miscellaneous manufacturing	513.5	522.8	503.0	459.4	453.9
	-10.7	-8.8	3.8	1.2	-5.9
	-40.5	-34.3	-26.1	11.6	-4.4
27 Wholesale trade	5,801.0	5,863.6	5,792.0	5,653.2	5,580.9
	-24.2	-53.4	1.0	51.5	39.9
	-169.2	-304.4	-52.4	65.0	28.4
28 Motor vehicle and parts dealers	2,221.0	2,202.7	2,239.2	2,270.7	2,287.3
	-8.1	-16.0	-19.5	-13.3	-12.8
	-24.0	-49.5	-25.7	-25.0	-5.3
29 Food and beverage stores	3,188.4	3,186.1	3,223.3	3,259.3	3,306.4
	-13.4	-42.9	-17.5	0.4	-0.2
	2.0	-148.5	-97.8	4.9	6.1
30 General merchandise stores	3,382.5	3,385.8	3,239.1	3,063.5	2,900.6
	-32.3	-117.2	1.3	14.0	21.3
	-410.7	-208.6	-97.9	37.4	37.3
31 Other retail	8,222.8	8,123.4	7,871.9	7,555.8	7,189.3
	-76.6	-101.7	29.2	73.0	80.4
	-764.8	-564.2	-118.3	156.0	111.1
32 Air transportation	475.6	464.3	447.0	433.2	416.7
	-47.0	-15.2	-0.1	-1.9	0.2
	-161.9	-46.5	-8.4	-1.3	2.7

Table 6 (continued)

	2017	2018	2020	2023	2026
33 Rail transportation	173.9	169.4	158.8	142.2	131.9
	0.3	0.2	-0.1	1.0	0.7
	-0.3	-7.9	-2.1	-0.3	-0.2
34 Water transportation	79.2	79.0	77.9	77.1	74.5
	-4.2	-2.9	-1.3	-1.0	-0.8
	-13.9	-6.1	-3.2	-0.3	-0.3
35 Truck transportation	1,720.2	1,748.4	1,763.7	1,780.3	1,810.9
	-3.9	-6.8	14.0	27.6	27.1
	-99.2	-88.5	-3.0	34.2	25.1
36 Ground passenger transport	747.6	699.9	683.7	663.9	658.1
	-8.7	0.8	-6.6	-2.1	-1.8
	-25.9	-15.3	-33.7	1.2	0.7
37 Pipeline transportation	51.7	52.5	52.9	54.0	56.4
	-0.1	-0.3	-0.2	0.1	0.1
	-1.5	-2.0	-0.7	0.5	0.2
38 Other transportation	1,345.6	1,324.5	1,285.3	1,261.2	1,241.7
	-28.9	-23.3	13.9	-5.7	-7.5
	-92.4	-69.8	47.7	-4.0	-7.8
39 Warehousing and storage	743.5	752.6	736.2	708.2	684.0
	-3.2	-9.7	0.5	5.5	5.4
	-36.9	-47.8	-13.7	9.0	5.1
40 Publishing (incl software)	928.5	931.3	930.0	938.0	950.5
	-25.8	11.7	9.2	8.7	7.2
	-106.7	6.1	14.0	14.0	4.5
41 Movie and sound recording	551.6	540.9	522.7	520.5	522.3
	-4.1	-9.6	5.9	0.9	-3.5
	-21.3	-34.5	9.6	18.4	-3.7
42 Broadcasting	1,119.7	1,137.4	1,138.6	1,108.3	1,050.7
	-27.2	-29.2	-6.2	2.3	4.1
	-93.6	-117.6	-47.1	9.6	9.1
43 Information and data process	286.4	267.7	233.0	190.7	155.4
	-4.7	-4.4	-1.0	0.0	0.2
	-4.7	-17.8	-4.3	0.8	0.2
44 Banks, credit intermediation	2,862.3	2,982.2	3,204.8	3,561.3	3,895.8
	-104.2	-107.3	-5.0	-3.1	6.1
	-492.6	-168.4	-45.8	24.9	14.1
45 Securities and investment	877.3	861.8	829.5	790.9	746.1
	-45.8	-39.5	-7.2	-8.1	-5.4
	-181.2	-52.9	-15.4	-1.4	-4.4
46 Insurance carriers	2,549.1	2,473.0	2,300.4	2,148.1	2,005.0
	-16.5	-48.8	-28.6	-10.4	-7.8
	-60.3	-148.8	-92.5	-4.0	-9.1
47 Funds, trusts, and other	2.9	2.5	2.0	1.4	0.9
	-0.2	-0.1	0.0	0.0	0.0
	-0.8	-0.2	0.0	0.0	0.0
48 Housing services	299.8	303.6	303.2	311.0	316.0
	27.2	29.3	36.0	39.2	40.5
	8.0	1.7	23.3	41.3	42.9

Table 6 (continued)

	2017	2018	2020	2023	2026
49 Other real estate	1,660.6	1,653.9	1,608.4	1,545.8	1,467.7
	28.4	24.2	5.8	17.3	17.1
	14.2	-25.1	-20.8	31.0	18.0
50 Rental and leasing services	611.9	610.1	598.5	579.9	565.0
	-6.0	-9.6	-1.5	-3.3	-4.1
	-26.5	-28.9	-7.2	-3.0	-4.9
51 Legal services	1,432.1	1,445.2	1,463.6	1,532.0	1,601.6
	22.0	1.0	4.8	10.6	10.5
	-20.9	-70.5	-4.7	20.2	8.1
52 Misc prof, sci and tech	6,452.7	6,536.9	6,608.8	6,666.7	6,726.1
	-16.8	-50.7	-1.2	41.4	21.7
	-180.4	-298.7	-114.6	89.9	7.0
53 Computer systems services	1,863.4	1,861.4	1,816.4	1,735.4	1,642.7
	-10.3	-17.3	1.9	17.9	9.4
	-77.7	-96.8	-30.2	43.3	5.2
54 Management of enterprises	2,259.9	2,355.9	2,454.8	2,501.2	2,599.3
	-1.2	-35.7	-1.8	1.4	-6.1
	-41.6	-172.6	-37.0	14.7	-10.3
55 Administrative and support	9,396.0	9,454.0	9,418.0	9,449.4	9,474.1
	7.2	-5.7	112.9	157.4	178.9
	-503.1	-470.0	-4.7	206.9	188.1
56 Waste management	429.6	435.4	439.8	447.6	460.9
	-2.8	-6.1	-1.7	-2.2	-2.2
	-25.9	-23.7	-9.4	0.9	-2.4
57 Educational services	3,720.8	3,835.8	3,959.8	4,148.3	4,332.6
	2.4	-32.8	-6.5	72.1	84.7
	-38.2	-387.4	-330.6	76.6	110.2
58 Ambulatory health services	7,770.6	8,008.5	8,462.2	9,329.7	10,255.5
	-248.6	-453.5	-8.8	-8.4	172.3
	-427.1	-1,486.8	-263.4	86.8	235.3
59 Hospitals	5,440.5	5,517.0	5,653.9	5,997.3	6,273.3
	-83.5	-310.1	-127.5	-27.2	57.5
	-66.5	-857.3	-629.3	10.7	120.1
60 Nursing and residential care	4,459.4	4,608.7	4,929.7	5,519.6	6,095.4
	-436.6	-290.5	-145.3	-108.1	-83.7
	-1,057.2	-977.5	-418.8	-41.6	-3.0
61 Social assistance	4,586.8	4,644.9	4,733.1	5,080.2	5,525.1
	24.6	-87.5	78.0	44.1	-12.3
	-25.9	-480.9	-65.5	330.7	40.1
62 Theatre, sports, museums	981.5	990.8	992.6	1,008.9	1,026.2
	0.0	-14.0	-5.4	4.1	-0.2
	-1.5	-48.4	-52.1	27.8	5.0
63 Amusements and recreation	1,761.8	1,787.6	1,830.3	1,925.7	2,003.9
	-13.5	-69.1	-3.7	10.2	14.4
	-61.9	-100.4	-71.9	17.5	22.7
64 Accommodation	1,962.4	1,953.7	1,976.3	2,009.7	1,999.6
	-256.0	-287.3	-285.5	-327.7	-326.1
	-411.1	-399.6	-291.2	-320.2	-327.8
65 Food, drinking establishments	11,074.6	11,251.7	11,367.7	11,648.6	11,936.0
	-158.7	-83.8	28.0	67.4	84.6
	-630.9	-547.9	-133.7	104.3	116.5
66 Other services, except govt	9,519.2	9,632.3	9,878.8	10,352.5	10,796.5
	-99.0	-95.5	184.1	184.9	232.8
	-421.2	-634.4	24.1	274.6	300.7

Table 7. Ranking of Industries by Output Change in 2018, Scenario B
Units: Billions of 2009$

Industry	Change in Output, 2018
59 Hospitals	-185.2
58 Ambulatory health services	-118.6
42 Broadcasting	-95.3
52 Misc prof, sci and tech	-92.7
31 Other retail	-77.4
46 Insurance carriers	-70.2
60 Nursing and residential care	-64.2
27 Wholesale trade	-63.0
7 Construction	-59.7
66 Other services, except govt	-57.2
49 Other real estate	-52.8
57 Educational services	-44.4
55 Administrative and support	-42.3
64 Accommodation	-42.2
65 Food, drinking establishments	-39.7
8 Food, bev, tobacco products	-39.2
54 Management of enterprises	-37.1
44 Banks, credit intermediation	-36.8
45 Securities and investment	-35.0
15 Chemical products	-33.4
53 Computer systems services	-26.2
6 Utilities	-24.9
50 Rental and leasing services	-24.0
61 Social assistance	-20.4
24 Other transportation equip	-19.6
14 Petroleum and coal products	-19.1
32 Air transportation	-19.0
30 General merchandise stores	-17.7
62 Theatre, sports, museums	-17.1
26 Miscellaneous manufacturing	-16.8
51 Legal services	-16.6
63 Amusements and recreation	-16.2
41 Movie and sound recording	-14.5
47 Funds, trusts, and other	-13.3

Table 7. (continued)

Industry	Change in Output, 2018
43 Information and data process	-12.8
38 Other transportation	-11.9
11 Wood products	-11.5
28 Motor vehicle and parts dealers	-10.9
29 Food and beverage stores	-10.7
35 Truck transportation	-10.6
1 Farms	-10.5
17 Nonmetallic mineral products	-10.1
19 Fabricated metal products	-10.0
16 Plastics and rubber products	-8.9
3 Oil and gas extraction	-7.8
25 Furniture, related products	-7.7
12 Paper products	-7.1
39 Warehousing and storage	-6.6
56 Waste management	-5.5
34 Water transportation	-5.3
36 Ground passenger transport	-5.2
21 Computer, elect products	-3.9
4 Mining, except oil and gas	-3.3
13 Printing, related activities	-2.6
33 Rail transportation	-2.5
2 Forest, fish, activities	-2.2
37 Pipeline transportation	-1.1
40 Publishing (incl software)	-0.9
22 Elect equip, appliances	-0.8
48 Housing services	2.1
9 Textile mills	3.0
18 Primary metals	6.0
23 Motor vehicles, parts	6.8
20 Machinery	11.0
10 Apparel and leather products	18.8
5 Mining support activities	27.0

Table 8. Decomposition of Output Changes for Hospitals, Scenario B
Units: Millions of 2009$

Line 1: CBO Baseline
Line 2: Scenario B

Alternatives are shown in deviations from base values.

	2017	2018	2020	2023	2026
SUM: Intermediate	510	526	563	636	708
	(9)	(96)	(61)	(1)	12
51 Hospitals	1,004,565	1,036,518	1,109,025	1,253,338	1,395,594
	(14,494)	(188,823)	(119,829)	(234)	23,537
83 Final consumption expenditures of nonprofits	(17,639)	(18,329)	(19,648)	(21,714)	(24,006)
	(1,865)	3,102	1,736	(949)	(1,119)
SUM: Personal Consumption	986,927	1,018,189	1,089,376	1,231,624	1,371,588
	(16,360)	(185,721)	(118,093)	(1,183)	22,418
Discrepancy	-	-	-	-	-
	-	-	-	-	-
Output	984,855	1,015,994	1,087,128	1,229,109	1,368,844
	(16,296)	(185,199)	(117,727)	(1,225)	22,280

Table 9. Decomposition of Output Changes for Other ambulatory health, Scenario B
Units: Millions of 2009$

Line 1: CBO Baseline
Line 2: Scenario B

Alternatives are shown in deviations from base values.

	2017	2018	2020	2023	2026
103 Hospitals	14,369	14,824	15,861	17,933	19,972
	(238)	(2,702)	(1,718)	(18)	325
SUM: Intermediate	14,935	15,406	16,480	18,613	20,714
	(272)	(2,773)	(1,752)	(14)	334
50 Other professional medical services	30,043	30,704	32,300	35,353	38,056
	(2,639)	(3,291)	(1,603)	(201)	335
83 Final consumption expenditures of nonprofits	3,115	3,237	3,470	3,834	4,239
	329	(548)	(307)	168	198
SUM: Personal Consumption	33,158	33,941	35,770	39,188	42,295
	(2,309)	(3,838)	(1,909)	(33)	532
Output	48,093	49,347	52,250	57,801	63,010
	(2,581)	(6,611)	(3,661)	(47)	867

Table 10. Decomposition of Output Changes for Telecommunications, Scenario B
Units: Millions of 2009$

Line 1: CBO Baseline
Line 2: Scenario B

Alternatives are shown in deviations from base values.

	2017	2018	2020	2023	2026
58 Wholesale trade	11,487	11,840	12,259	12,887	13,730
	(717)	(478)	(4)	56	9
75 Telecommunications	75,340	80,908	90,542	103,839	115,926
	(7,809)	(9,414)	(3,992)	355	503
83 Other real estate	19,881	20,164	20,733	21,983	23,154
	293	(998)	(74)	295	168
118 State and local general government	25,212	25,380	25,712	26,196	26,670
	-	-	-	-	-
SUM: Intermediate	**268,178**	**278,067**	**293,942**	**317,704**	**341,716**
	(20,216)	**(21,450)**	**(7,235)**	**745**	**602**
58 Cable and satellite TV, video rental	84,178	95,947	115,983	143,236	167,016
	(8,739)	(11,387)	(6,989)	(2,263)	(2,217)
71 Telecommunications services	201,052	216,340	241,693	273,414	297,336
	(33,841)	(18,133)	(3,757)	1,111	2,170
73 Internet access	108,230	120,663	142,855	175,366	205,425
	(10,092)	(34,125)	(18,983)	3,071	4,793
SUM: Personal Consumption	**393,460**	**432,950**	**500,531**	**592,017**	**669,777**
	(52,672)	**(63,646)**	**(29,729)**	**1,919**	**4,745**
SUM: Private Equipment	**8,333**	**9,004**	**10,930**	**11,642**	**12,534**
	174	**(1,824)**	**(428)**	**906**	**172**
SUM: Private Construction	**2,054**	**2,056**	**2,219**	**2,421**	**2,554**
	426	(265)	26	179	48
Exports	18,944	20,385	23,835	30,500	39,353
	158	232	495	(472)	(931)
Discrepancy	1,064	1,064	1,064	1,064	1,064
	-	-	-	-	-
Output	**695,771**	**747,194**	**836,161**	**958,961**	**1,070,586**
	(72,117)	**(86,938)**	**(36,865)**	**3,278**	**4,645**

Table 11. Decomposition of Output Changes for Apparel and leather, Scenario B
Units: Millions of 2009$

	2017	2018	2020	2023	2026
20 Apparel and leather	3,484	3,988	4,184	4,330	5,032
	(2,891)	1,885	370	(57)	(58)
23 Printing	488	490	486	483	484
	(58)	(20)	(5)	(7)	(8)
51 Motor vehicle parts	969	1,085	1,042	981	1,032
	(180)	53	63	(27)	(37)
58 Wholesale trade	949	977	1,010	1,058	1,125
	(59)	(39)	(0)	5	1
61 General merchandise stores	1,325	1,348	1,386	1,449	1,506
	(211)	(106)	(17)	9	13
112 Religious, grantmaking and other organizations	1,331	1,368	1,437	1,544	1,659
	55	(192)	(96)	52	60
118 State and local general government	1,913	1,924	1,946	1,977	2,008
	-	-	-	-	-
SUM: Intermediate	**13,858**	**14,688**	**15,074**	**15,501**	**16,708**
	(3,669)	**1,333**	**257**	**(23)**	**(39)**
17 Luggage and similar personal items	14,292	14,624	15,601	16,618	17,707
	(5,629)	(4,760)	(4,310)	(4,428)	(4,737)
25 Clothing, women's and children's	74,148	75,792	78,577	83,983	88,704
	(18,939)	(3,941)	1,799	998	1,454
26 Clothing, men's and boy's	46,919	47,588	48,652	51,133	52,935
	(17,012)	(307)	3,408	801	1,088
28 Footwear	27,289	27,833	28,722	30,288	31,689
	(5,114)	(1,336)	382	375	471
34 Pets, flowers seeds and plants	642	660	690	743	794
	(79)	(59)	(10)	16	19
SUM: Personal Consumption	**164,581**	**167,808**	**173,581**	**184,151**	**193,262**
	(46,890)	**(10,521)**	**1,229**	**(2,225)**	**(1,687)**
Inventory Change	1,862	674	683	812	1,057
	(16,262)	17,307	2,771	78	(18)
Exports	7,032	7,094	7,383	7,205	7,069
	(2,105)	(1,336)	(201)	(530)	(526)
Imports	(153,212)	(149,941)	(154,447)	(164,065)	(167,744)
	56,425	(5,334)	(3,148)	2,056	1,707
Discrepancy	(1,395)	(1,395)	(1,395)	(1,395)	(1,395)
	-	-	-	-	-
Output	34,671	39,679	41,633	43,085	50,068
	(28,764)	18,758	3,680	(566)	(582)

Table 12. Decomposition of Output Changes for Support Activities for Mining, Scenario B
Units: Millions of 2009$

Line 1: CBO Baseline
Line 2: Scenario B

Alternatives are shown in deviations from base values.

	2017	2018	2020	2023	2026
4 Crude oil extraction	5,374	5,545	5,600	5,811	6,204
	(418)	(166)	31	34	33
5 Natural gas extraction	1,406	1,401	1,375	1,406	1,441
	(50)	(54)	(10)	(0)	(2)
6 Coal mining	633	664	652	652	680
	(30)	(18)	7	(4)	(4)
8 Nonmetallic mineral mining	542	556	572	595	623
	47	(44)	1	15	4
9 Support activities for mining	1,586	1,657	1,739	1,866	2,010
	141	383	(37)	(196)	(107)
69 Transportation support, sightseeing, couriers	588	602	627	669	717
	(72)	(32)	(0)	1	(0)
SUM: Intermediate	**11,208**	**11,547**	**11,680**	**12,122**	**12,852**
	(445)	**46**	**6**	**(150)**	**(75)**
SUM: Private Equipment	**1,367**	**1,471**	**1,686**	**1,813**	**2,000**
	8	**205**	**127**	**(114)**	**83**
12 Mining exploration, shafts and wells	105,408	110,006	115,372	123,689	132,880
	10,359	26,696	(2,873)	(13,639)	(7,584)
SUM: Private Construction	**105,408**	**110,006**	**115,372**	**123,689**	**132,880**
	10,359	**26,696**	**(2,873)**	**(13,639)**	**(7,584)**
Exports	2,433	2,433	2,433	2,433	2,433
	-	-	-	-	-
Discrepancy	(8,010)	(8,010)	(8,010)	(8,010)	(8,010)
	-	-	-	-	-
Output	**111,694**	**116,724**	**122,474**	**131,431**	**141,587**
	9,947	**26,956**	**(2,593)**	**(13,838)**	**(7,507)**

Table 13. Decomposition of Output Changes for Accommodation, Scenario B

Units: Millions of 2009$

Line 1: CBO Baseline
Line 2: Scenario B

Alternatives are shown in deviations from base values.

	2017	2018	2020	2023	2026
77 Banks, credit cards and finance	2,536	2,523	2,516	2,513	2,503
	(134)	(23)	(12)	(12)	(4)
	(470)	(163)	(1)	1	2
83 Other real estate	2,081	2,062	2,028	2,024	2,019
	78	(31)	4	13	14
	31	(102)	(7)	27	15
93 Administrative and support services	2,578	2,576	2,552	2,550	2,567
	(3)	(14)	22	31	37
	(162)	(136)	(3)	43	39
118 State and local general government	1,990	1,957	1,896	1,818	1,754
	-	-	-	-	-
	-	-	-	-	-
SUM: Intermediate	**31,760**	**31,747**	**31,348**	**31,003**	**30,984**
	(484)	**(577)**	**(140)**	**(47)**	**(11)**
	(2,246)	**(1,948)**	**(463)**	**61**	**(30)**
57 Clubs, sports centers, parks, theatres and museums	6,024	6,116	6,463	6,982	7,464
	(267)	(354)	(206)	(168)	(172)
	(465)	(885)	(508)	(131)	(128)
65 Accommodations	109,610	111,039	118,407	127,537	133,315
	(39,317)	(32,121)	(34,198)	(36,960)	(38,257)
	(56,744)	(39,630)	(33,575)	(35,818)	(37,425)
78 Personal care and clothing services	2,948	2,996	3,106	3,300	3,454
	(264)	126	88	75	100
	(1,060)	(79)	211	102	127
SUM: Personal Consumption	**120,390**	**122,013**	**129,887**	**139,852**	**146,367**
	(39,419)	**(31,898)**	**(33,846)**	**(36,552)**	**(37,808)**
	(57,907)	**(40,210)**	**(33,427)**	**(35,340)**	**(36,898)**
SUM: Private Construction	364	360	392	432	455
	79	(26)	2	13	9
	74	(54)	(0)	33	5
Discrepancy	240	240	240	240	240
	-	-	-	-	-
	-	-	-	-	-
Output	**153,806**	**155,395**	**162,898**	**172,553**	**179,069**
	(39,823)	**(32,501)**	**(33,984)**	**(36,587)**	**(37,809)**
	(60,080)	**(42,213)**	**(33,891)**	**(35,245)**	**(36,920)**

Table 14. Employment Comparisons, 2018, Scenario A
Units: Thousands of Jobs, Ranked by Percentage Differences

		Scenario A		
	Base	Level	Difference	Percent Difference
64 Accommodation	1953.7	1666.4	-287.3	-14.71
60 Nursing and residential care	4608.7	4318.2	-290.5	-6.30
58 Ambulatory health services	8008.5	7555.0	-453.5	-5.66
59 Hospitals	5517.0	5206.9	-310.1	-5.62
45 Securities and investment	861.8	822.3	-39.5	-4.59
47 Funds, trusts, and other	2.5	2.4	-0.1	-3.92
63 Amusements and recreation	1787.6	1718.5	-69.1	-3.87
34 Water transportation	79.0	76.1	-2.9	-3.62
44 Banks, credit intermediation	2982.2	2874.9	-107.3	-3.60
30 General merchandise stores	3385.8	3268.5	-117.2	-3.46
32 Air transportation	464.3	449.1	-15.2	-3.26
24 Other transportation equip	573.8	558.2	-15.6	-2.71
42 Broadcasting	1137.4	1108.2	-29.2	-2.56
3 Oil and gas extraction	233.9	228.2	-5.7	-2.44
46 Insurance carriers	2473.0	2424.2	-48.8	-1.97
61 Social assistance	4644.9	4557.5	-87.5	-1.88
41 Movie and sound recording	540.9	531.3	-9.6	-1.78
38 Other transportation	1324.5	1301.2	-23.3	-1.76
11 Wood products	380.0	373.4	-6.6	-1.73
26 Miscellaneous manufacturing	522.8	514.0	-8.8	-1.67
13 Printing, related activities	435.3	428.2	-7.1	-1.63
43 Information and data process	267.7	263.4	-4.4	-1.62
50 Rental and leasing services	610.1	600.5	-9.6	-1.57
54 Management of enterprises	2355.9	2320.2	-35.7	-1.52
62 Theatre, sports, museums	990.8	976.7	-14.0	-1.42
56 Waste management	435.4	429.3	-6.1	-1.41
29 Food and beverage stores	3186.1	3143.2	-42.9	-1.35
39 Warehousing and storage	752.6	742.8	-9.7	-1.29
31 Other retail	8123.4	8021.7	-101.7	-1.25
14 Petroleum and coal products	118.0	116.6	-1.4	-1.19
2 Forest, fish, activities	645.0	637.9	-7.0	-1.09

Table 14. (continued)

		Scenario A		
	Base	Level	Difference	Percent Difference
12 Paper products	364.3	360.4	-4.0	-1.09
15 Chemical products	763.1	754.9	-8.2	-1.08
18 Primary metals	338.7	335.2	-3.6	-1.06
8 Food, bev, tobacco products	1601.3	1584.7	-16.6	-1.04
66 Other services, except govt	9632.3	9536.8	-95.5	-0.99
19 Fabricated metal products	1303.0	1290.4	-12.6	-0.97
53 Computer systems services	1861.4	1844.1	-17.3	-0.93
27 Wholesale trade	5863.6	5810.2	-53.4	-0.91
57 Educational services	3835.8	3803.0	-32.8	-0.86
25 Furniture, related products	346.3	343.6	-2.7	-0.79
52 Misc prof, sci and tech	6536.9	6486.2	-50.7	-0.78
65 Food, drinking establishments	11251.7	11168.0	-83.8	-0.74
28 Motor vehicle and parts dealers	2202.7	2186.6	-16.0	-0.73
22 Elect equip, appliances	333.8	331.4	-2.4	-0.72
37 Pipeline transportation	52.5	52.1	-0.3	-0.66
7 Construction	8859.9	8807.4	-52.5	-0.59
21 Computer, elect products	851.0	846.0	-5.0	-0.59
1 Farms	1346.0	1338.3	-7.7	-0.57
16 Plastics and rubber products	577.5	575.2	-2.3	-0.41
35 Truck transportation	1748.4	1741.6	-6.8	-0.39
6 Utilities	635.1	634.5	-0.7	-0.11
55 Administrative and support	9454.0	9448.3	-5.7	-0.06
51 Legal services	1445.2	1446.2	1.0	0.07
36 Ground passenger transport	699.9	700.7	0.8	0.11
33 Rail transportation	169.4	169.7	0.2	0.14
23 Motor vehicles, parts	645.4	646.7	1.3	0.20
4 Mining, except oil and gas	220.2	220.8	0.7	0.31
20 Machinery	914.5	920.6	6.1	0.67
9 Textile mills	193.9	195.4	1.4	0.74
40 Publishing (incl software)	931.3	942.9	11.7	1.25
49 Other real estate	1653.9	1678.1	24.2	1.46
17 Nonmetallic mineral products	368.3	378.8	10.6	2.87
5 Mining support activities	397.6	417.2	19.6	4.93
10 Apparel and leather products	188.3	205.7	17.5	9.28
48 Housing services	303.6	332.9	29.3	9.65

Table 15. Employment Comparisons, 2018, Scenario B
Units: Thousands of Jobs, Ranked by Percentage Differences

		Scenario B		
	Base	Level	Difference	Percent Difference
60 Nursing and residential care	4608.7	3631.3	-977.5	-21.21
64 Accommodation	1953.7	1554.1	-399.6	-20.46
58 Ambulatory health services	8008.5	6521.7	-1486.8	-18.57
59 Hospitals	5517.0	4659.7	-857.3	-15.54
61 Social assistance	4644.9	4164.0	-480.9	-10.35
42 Broadcasting	1137.4	1019.8	-117.6	-10.34
57 Educational services	3835.8	3448.4	-387.4	-10.10
32 Air transportation	464.3	417.8	-46.5	-10.01
25 Furniture, related products	346.3	316.9	-29.4	-8.49
11 Wood products	380.0	348.4	-31.6	-8.32
47 Funds, trusts, and other	2.5	2.3	-0.2	-7.77
34 Water transportation	79.0	72.9	-6.1	-7.72
54 Management of enterprises	2355.9	2183.4	-172.6	-7.32
24 Other transportation equip	573.8	533.6	-40.3	-7.02
31 Other retail	8123.4	7559.2	-564.2	-6.95
43 Information and data process	267.7	249.9	-17.8	-6.64
66 Other services, except govt	9632.3	8997.9	-634.4	-6.59
26 Miscellaneous manufacturing	522.8	488.4	-34.3	-6.57
41 Movie and sound recording	540.9	506.4	-34.5	-6.37
39 Warehousing and storage	752.6	704.8	-47.8	-6.35
30 General merchandise stores	3385.8	3177.2	-208.6	-6.16
45 Securities and investment	861.8	808.9	-52.9	-6.14
46 Insurance carriers	2473.0	2324.2	-148.8	-6.02
44 Banks, credit intermediation	2982.2	2813.8	-168.4	-5.65
63 Amusements and recreation	1787.6	1687.2	-100.4	-5.62
13 Printing, related activities	435.3	410.9	-24.4	-5.61
3 Oil and gas extraction	233.9	220.8	-13.0	-5.58
56 Waste management	435.4	411.7	-23.7	-5.44
6 Utilities	635.1	601.5	-33.7	-5.30
38 Other transportation	1324.5	1254.7	-69.8	-5.27
53 Computer systems services	1861.4	1764.6	-96.8	-5.20

Table 15. (continued)

	Base	Scenario B Level	Difference	Percent Difference
27 Wholesale trade	5863.6	5559.2	-304.4	-5.19
35 Truck transportation	1748.4	1659.9	-88.5	-5.06
55 Administrative and support	9454.0	8984.1	-470.0	-4.97
62 Theatre, sports, museums	990.8	942.4	-48.4	-4.88
51 Legal services	1445.2	1374.7	-70.5	-4.88
65 Food, drinking establishments	11251.7	10703.9	-547.9	-4.87
50 Rental and leasing services	610.1	581.2	-28.9	-4.73
33 Rail transportation	169.4	161.6	-7.9	-4.66
29 Food and beverage stores	3186.1	3037.6	-148.5	-4.66
52 Misc prof, sci and tech	6536.9	6238.2	-298.7	-4.57
14 Petroleum and coal products	118.0	112.7	-5.3	-4.47
15 Chemical products	763.1	730.9	-32.2	-4.22
12 Paper products	364.3	349.5	-14.9	-4.08
1 Farms	1346.0	1295.0	-51.0	-3.79
37 Pipeline transportation	52.5	50.5	-2.0	-3.79
7 Construction	8859.9	8540.4	-319.5	-3.61
19 Fabricated metal products	1303.0	1257.1	-45.9	-3.52
8 Food, bev, tobacco products	1601.3	1551.8	-49.6	-3.10
9 Textile mills	193.9	188.6	-5.4	-2.78
16 Plastics and rubber products	577.5	562.0	-15.5	-2.68
28 Motor vehicle and parts dealers	2202.7	2153.1	-49.5	-2.25
17 Nonmetallic mineral products	368.3	360.1	-8.2	-2.21
36 Ground passenger transport	699.9	684.6	-15.3	-2.19
4 Mining, except oil and gas	220.2	215.9	-4.3	-1.95
49 Other real estate	1653.9	1628.9	-25.1	-1.52
23 Motor vehicles, parts	645.4	637.1	-8.3	-1.29
22 Elect equip, appliances	333.8	330.0	-3.8	-1.13
2 Forest, fish, activities	645.0	639.7	-5.3	-0.82
21 Computer, elect products	851.0	845.1	-5.9	-0.70
18 Primary metals	338.7	338.3	-0.4	-0.12
48 Housing services	303.6	305.3	1.7	0.58
40 Publishing (incl software)	931.3	937.4	6.1	0.65
20 Machinery	914.5	925.1	10.6	1.16
10 Apparel and leather products	188.3	216.7	28.4	15.09
5 Mining support activities	397.6	463.1	65.4	16.45

Appendix A - Business Provisions of House GOP Blueprint

A.1 In General

Under the House Republican plan, the top US corporate income tax rate would be reduced from 35 percent to 20 percent. The corporate alternative minimum tax (AMT) would be repealed under the plan.

The plan moves towards a business cash flow tax by providing full expensing for business investment (in lieu of depreciation and amortization). Full expensing would apply for investments in both tangible property (such as equipment and buildings) and intangible assets (such as intellectual property), but would not apply to land.

The plan eliminates the current deduction for net business interest expense. Instead, businesses would be allowed to deduct interest expenses only against interest income. Taxpayers would be able to carry forward any disallowed net interest expense indefinitely for use as a deduction against future net interest income.

The Blueprint states that the plan generally would eliminate preferential business tax deductions and credits and specifically mentions eliminating the domestic production activities (Section 199) deduction.

The Blueprint is unclear on how inventory would be treated. The report states that the last-in, first-out (LIFO) method of inventory accounting will be retained and that the Ways and Means Committee will continue to evaluate options for a "more effective and efficient" treatment of inventory. However, retention of inventory accounting would represent a deviation from a cash-flow tax system. As such, for modeling purposes, we assume inventory accounting is repealed.

The plan would restrict the deduction for net operating losses ("NOLs") to 90 percent of net taxable income before NOL deduction in any given year, but would allow NOLs to be carried forward indefinitely and to be increased annually for the time value of money. NOL carrybacks would not be permitted.

A.2 Border Adjustment

The Blueprint would move the US tax system toward a destination-based tax by providing a border adjustment that exempts exports and taxes imports. In other words, receipts from exports of goods and services would be exempt from taxation but the cost of imports of goods and services would be nondeductible. For purposes of the border adjustment, it is assumed that foreign-source royalties and service income would be treated as exports under the plan.

A.3 International Taxation

The House GOP Blueprint would move the United States from its current "worldwide" system of taxation to a territorial tax system by allowing a 100-percent exemption for dividends received from foreign subsidiaries. No deduction or credit would be allowed for foreign taxes associated with exempt foreign dividends. The treatment of foreign branch income directly earned by US companies is not specified.

The plan would repeal Subpart F other than the foreign personal holding company income (FPHCI) rules, which would continue to play a role in preventing shifting of "truly passive income" to low-tax jurisdictions. The Blueprint notes that the destination-based approach to taxing cross-border income eliminates the tax incentive to move profits and jobs offshore so that the subpart F rules applicable to active business income are no longer necessary.

In addition to the territorial tax system, the Blueprint calls for a one-time transition tax on all deferred foreign earnings and profits of foreign subsidiaries of US corporations. In particular, under the plan, taxpayers would be deemed to repatriate accumulated not previously taxed foreign earnings. Accumulated foreign earnings would be subject to tax at an 8.75-percent rate to the extent held in cash or cash equivalents and at a 3.5-percent rate otherwise. Taxpayers would be able to pay the resulting tax liability ratably over an eight-year period.

A.4 Transition Rules

While the Blueprint does not specifically provide transition rules, the report states that the Ways and Means Committee will "craft clear rules to serve as an appropriate bridge from the current tax system to the new system."

Appendix B – Detail on the Modeling Plan

This Appendix discusses the plan for modeling the Blueprint.

B.1 Repeal of the Federal Corporate Income Tax

The *Lift* model includes detail on corporate profits for 66 private industries. NIPA data on corporate tax liabilities by industry are also included in the model. The rate of profits tax to NIPA profits has been calculated for each industry, and is held constant in the baseline for the period of the projection. Total domestic corporate profits tax liabilities were $553.8 billion in 2015, with $455.1 billion of federal, $60.3 billion of state and local, and $38.4 billion of corporate tax liabilities to rest of the world (ROW).

However, within this total figure of $455.1 billion, $110.4 billion are from the Federal Reserve, and though classified by the NIPA as 'corporate tax', they are in fact payments from the Federal Reserve into Federal receipts. These payments are not part of the federal corporate tax repeal.

In the Tax Plan scenarios, the rate of federal corporate (non-Federal Reserve) income tax is set to zero starting in 2017, but state and local and ROW corporate taxes, and Federal Reserve are left intact.

B.2 Imposition of a 20 Percent Tax-Inclusive National Sales Tax

To perform this step, estimates of retail sales and retail sales taxes have been developed for the four retail industries in the *Lift* model, based on Census Bureau Annual Retail Trade Survey (ARTS) data:

Motor vehicle and parts dealers (NAICS 441)
Food and beverage stores (NAICS 445)
General merchandise stores (NAICS 452)
Other retail (all other NAICS 44 and 45)

Retail sales are related to retail output. Note that output for both wholesale and retail trade in the model is measured as the gross margin of the trade industry. We assume that the margin ratio of the industry is constant in the forecast period. Current law state and local retail sales taxes are then related to retail sales, assuming the average rates holding in the last historical period. In 2014, which is the last year of data in the ARTS, total retail sales are $4,636 billion and total retail sales taxes are $162.5 billion, which implies an average sales tax rate of about 3.5 percent. Of course, these totals include many commodities not currently subject to retail tax, such as food.

We next impose a 20 percent (tax-inclusive) national retail sales tax (which is equivalent to a 25 percent tax-exclusive rate on baseline retail sales). Therefore, under the Blueprint, there would be two kinds of retail sales taxes: baseline state and local retail sales tax, and a new national retail sales tax. As an example, if the baseline retail sales is equal to $1000 and if the average state and local retail sales tax rate is 8 percent, then the baseline state and local retail sales tax would be $80. The new national retail sales tax would be $250. So the impact of the national sale tax on TOPI (taxes on production and

imports) is an increase of $250. Of course, this assumes there is no change in retail sales under the Blueprint. However, if the tax plan dynamically expands the economy, then the level of retail sales under the Blueprint would be higher compared to the baseline line. As a result, the corresponding retail sales tax (both national and state and local) would be larger as well.

As this is modeled as a national retail sales tax, the additional revenues are specified to accrue to the Federal government. The tax increase is an increase in TOPI in the retail trade sectors. This has the effect of raising total value added in the retail sectors, and therefore the "price" of retail services. This price can be thought of as proportional to the amount of gross margin and commodity tax that a consumer must pay for the retail services of providing a certain bundle of goods and services. The result is that the average price of consumption rises. This is the deflator used to derive real disposable income, so real disposable income and total real consumption will fall, all else constant.

Sales taxes are also increased in other personal consumption categories not handled through retail trade. To implement these taxes, we first determine which industries are providing these goods and services, and then increase indirect taxes[7] in the Other retail row of the consumption bridge matrix enough to impose an increase of sales tax of 25% in each personal consumption category.[8]

Note that the imposition of the national sales tax affects the consumer prices only, not the producer prices, except in the retail sectors. However, the aggregate GDP deflator does rise, as TOPI is included in nominal GDP[9].

B.3 Implementation of a Wage Credit

The sales tax described above results in a rise in the personal consumption deflator. In both alternative scenarios, we assume that wage rates will adjust to the new price level, preserving the level of real wages. A 20 percent wage credit will be paid to firms, calculated simply as 20 percent of labor compensation. The wage credit will be paid by the Federal government to the business sector.

In the first alternative scenario (Scenario A), we assumed that wages would adjust immediately to the higher level of consumption prices. In the second alternative scenario (Scenario B), we assumed that they adjust gradually over a five-year period.

The wage credit is in effect a subsidy, that by itself would have the effect of reducing total industry value added and therefore the industry price. However, as labor compensation has increased as well, we have adjusted gross operating surplus so that total value added for each industry is unaffected. The cost of the wage credit is borne by the Federal government, as with a traditional subsidy.

[7] This is called "Taxes on Production and Imports (TOPI)" in the National Income and Product Accounts (NIPA).
[8] Several consumer categories, such as owner-occupied housing, did not have the tax imposed. Further details on the mechanics of implementing the sales tax are described in Appendix C.
[9] Viewed from the income side accounts, GDP can be formed as the sum of labor compensation, TOPI less subsidies, and gross operating surplus, which includes corporate profits, proprietors' income, depreciation, net interest and other categories.

B.4 Treatment of the R&D Tax Credit

Estimates of nominal research and development investment by industry are taken from the BEA *Fixed Assets* database, which includes investment by industry by type of asset, for equipment, structures and intellectual property. Data on the R&D tax credit taken by industry were obtained from tabulations from the IRS Statistics of Income (SOI) data. An equation for aggregate R&D investment was used to move the industry-level R&D. The tax credit rate was multiplied by this R&D figure by industry to estimate a projected R&D credit by industry. To implement the preservation of the current law R&D tax credit, it is also treated as a subsidy.

B.5 Removal of Passthrough Income Tax

Passthrough income includes income reported on IRS Schedules C, E and F. This is non-corporate income of partnerships, sole proprietorships and S-corporations. Although the NIPA provides historical estimates of proprietor income, they do not explicitly show the tax rate on this portion of personal income. In order to estimate the effect of the removal of this tax, we used the IRS Statistics of Income (SOI) data to derive the tax rates on passthrough and non-passthrough personal income. These rates were then adjusted to be consistent with the personal federal income tax from NIPA used used in the *Lift* model.

B.6 Combination of the Policy Elements

The Simplified Blueprint scenario was built up in steps, by adding each one of the policy elements in the *Lift* model. The federal corporate tax was removed first. The national sales tax was implemented next. This sales tax increase leads to an increase in the consumption deflator. We explored two alternative scenarios with different responses of wages. In both scenarios, the wage credit is calculated as 20 percent of total labor compensation. The wage credit is modeled as a subsidy to each industry, and profits are assumed to change so that there is a zero net effect on value added. The R&D credit was implemented next, and finally the removal of the passthrough income tax.

B.7 Estimated Effects on Investment

The estimated effects on investment have been derived using the cost of capital formula described in the Appendix section E.9. On average, the user cost of equipment capital falls by about 7.5 percent from the baseline. Assuming a unitary elasticity of capital with respect to user cost, the long-run optimal stock would also rise by 7.5 percent. We have modeled this by letting aggregate equipment investment rise by 7.5 percent relative to the baseline. The user cost of non-residential structures is estimated to fall by about 13.2 percent. With a unitary elasticity, the net investment portion of non-residential structures will rise by 13.2 percent.

Of course, dynamic interactions in the model result in total fixed investment being below the baseline at the start of the projection, and above the statically calculated increase by 2026, due to changes in personal income, personal consumption, government budget, and other influences.

Appendix C – The Lift *Model*[10]

C.1 Overview

As mentioned above, Input-Output (IO) relationships form the core of the *Lift* model. Output by commodity is determined using the IO identity, relating production to consumption, investment, government, exports and sales to other industries. Imports are not given to the IO calculation from outside, but are determined jointly with output. Prices and incomes are forced into consistency through the fundamental IO price identity, and the aggregate price level is determined as current price GDP divided by constant price GDP. As we describe below, the IO database underlying LIFT is unique, making full use of the data available from the Bureau of Economic Analysis.

Despite its industry basis, *Lift* is a full macroeconomic model, with more than 1000 macroeconomic variables ("macrovariables") determined either by econometric equation, exogenously or by identity. The econometric equations tend to be those where behavior is more naturally modeled in the aggregate, such as the personal savings rate, or the 3-month Treasury bill rate. A block of the model called "the accountant" relates the industry detail to the National Income and Product Accounts (NIPA), and implements the national accounts identities, which provide closure between the product and income side of GDP. Hundreds of identities are used to collect detailed results into aggregates. For example, total corporate profits are simply the total of corporate profits by industry. An equation for the effective corporate tax rate is used to determine total profits taxes, which is a source of revenue in the Federal government account. Equations for contribution rates for social insurance programs and equations for transfer payments out of these programs can be used to study the future solvency of the trust funds. Certain macrovariables provide important levers for studying effects of government policy. Examples are the monetary base and the personal tax rate. Others, such as potential GDP and the associated GDP gap provide a framework for perceiving tightness or slack in the economy.

Although many IO based models are computable general equilibrium (CGE) models, *Lift* is not. It allows for disequilibrium, but embodies tendencies to return to equilibrium over the medium- to long-run time frame. For example, a shock such as an oil price increase, a tax rate increase, or a sudden imposition of a large carbon tax will depress GDP and jobs for a few years, but the economy will eventually return to its long-run potential GDP growth path. The relationships in the model are for the most part estimated econometrically, on time series data. Optimizing, forward-looking behavior is not imposed on the model explicitly, but many of the equations in the model use economic concepts of optimization in their specification.

The software in which *Lift* runs was also developed by Inforum. The G7 program is used for developing large datasets, which can include matrices and vectors. G7 is integrated with a software framework called *Interdyme*, which is a set of C++ classes and code infrastructure which facilitate the development of models such as *Lift* that use matrices, vectors and macrovariables. In addition to *Lift*, Inforum has developed, or helped international partners develop, over 50 models using this framework. The framework

[10] An earlier version of the model is explained in more detail in the *Technical Documentation* (Meade, 2013).

makes it easy to extend *Lift* by quickly adding additional modules which explore some segment of the economy in more detail, such as the electric power sector, or light-duty vehicle transportation.

Development of *Lift* began in the early 1980s, and grew out of earlier Inforum work with IO models of the US and other countries. Since that time, the model has developed further both through graduate student dissertations and other development by students and researchers, and through work on projects with a large variety of clients and other users. Properties of the model have been examined both through historical simulation, forecasting, and scenario analysis. *Lift* continues to benefit from ongoing development, extensions, sharing ideas with clients and international partners, and internal discussion and seminars.

The next section provides a "tour" through the model's operation, providing a hands-on overview of the workings of the model. After this, some examples of applications of the model are reviewed in section 1.3. The LIFT database is described in section 1.4, as the understanding of the data is crucial to understanding the model. Finally, we conclude with an outlook for the future development of the model, and discuss other ways it can be extended.

C.2 A Tour Through Lift

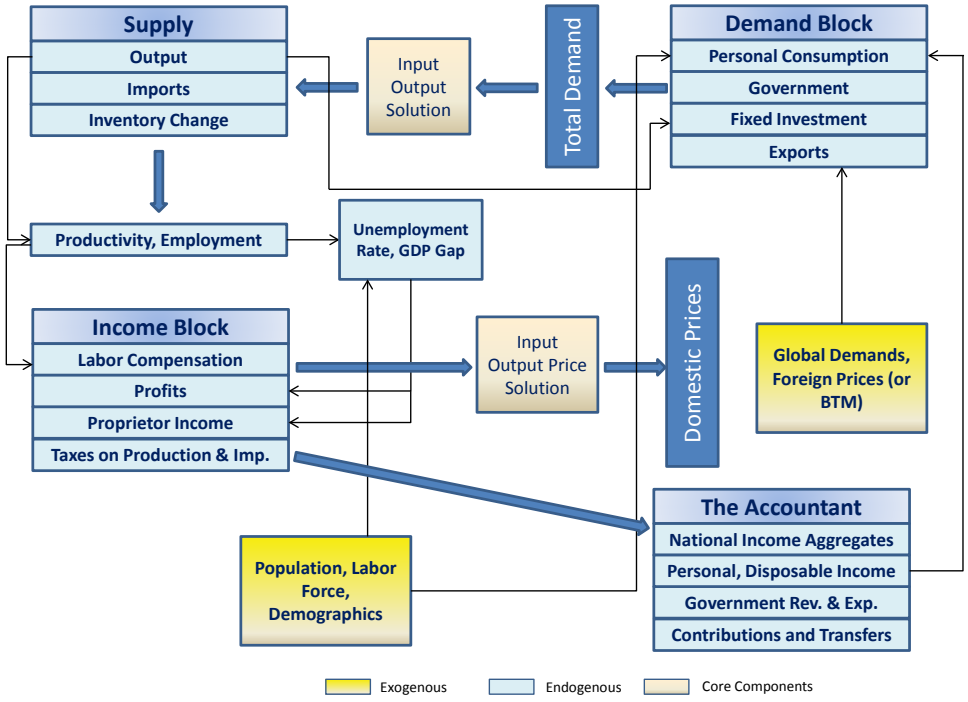
Before describing individual equations or parts of the model, it might be helpful to watch the entire model in operation. This should make the model less of a black box, and help to put the components of the model in perspective. Figure C.1 shows a summary diagram of the model.

For each year of the forecast, first guesses are made for several important endogenous variables, such as output and prices by industry, import shares, and many macrovariables. Fixes for exogenous variables are also done here.[11] Then the model loop begins. This loop will continue to run until outputs and other variables converge.

The model loop begins on the real side, where the expenditure components of GDP are calculated in constant prices. Before starting the expenditure calculations, estimates of final demand prices are made, based on the best current estimate of producer prices by product. Next, the savings function is called, to determine how much of real disposable income will result in total expenditures on consumption. From total expenditures, total population and an income distribution function, the distribution of per-capita expenditures for five income classes are calculated. The cross-section equations of consumption per age-weighted population are calculated next. Once this is done, relative consumption prices, age-weighted population and consumption per age-weighted population are combined in the PADS function to get consumption by category. PADS allows the classification of consumption goods into related expenditure groups. For example, consumption categories 19 to 23 are in the food group. PADS also allows for group, sub-group and individual commodity price parameters. Motor vehicles prices affect the demand for public transportation, since motor vehicles and public transport are substitutes within the Transportation group.

[11] Fixes, in the Interdyme modeling framework, are assumptions which can be imposed on either endogenous or exogenous variables.

Figure C.1 Summary Diagram of the *Lift* Model



After personal consumption, exports are calculated. If the model is run with the Inforum bilateral trade model (BTM), then exports are exogenous. However, if one wants to relax the dependence on BTM, then export equations are available which use information from BTM in the form of weighted foreign demands and foreign prices. The equipment investment equations are estimated by industry. A capital flow matrix converts investment by purchasing industry to investment by commodity. The construction equations are for 26 categories of private construction. Though each has a different form, common variables are interest rates, disposable income and sectoral output.

Federal and state and local consumption and investment expenditures are specified exogenously in real terms, but *Lift* allows for detailed control of these expenditures. For example, defense purchases of aircraft can be specified independently of missiles, ships or tanks. Capital consumption allowances of government are endogenous, based on depreciation of government capital stock, which is also calculated in the model.

At this point, all final demand expenditure categories except for imports and inventory change have been calculated. This means the model is ready to use the Seidel input-output solution to solve jointly for output, imports and inventory change. Note that the A-matrix[12] coefficients are specified to change over time, according to trends for each row. However, individual coefficients can be fixed, to model changes in price or technology.

The investment output loop is helpful in obtaining consistency between construction and equipment investment and output. Both of these categories of demand depend on

[12] The "A-matrix" is another term for the input-output direct coefficients matrix, which shows the share of each other commodity needed to make a unit of the given commodity's output.

output, but since they generate final demand, they also contribute to output. It's best to bring investment and output into agreement before moving on to calculate employment and prices.

Once the investment output loop has converged, the labor productivity equations can be calculated, which forecast the ratio of output to hours worked. Next the average hours equations are solved, which determine the average hours per employed person per year. Together, the productivity, average hours and output forecast generate employment by industry in the private sector. Adding in exogenous projections of government and domestic employment, we obtain total civilian employment, on the establishment basis, which is then adjusted to the household basis. Subtracting this employment from exogenous labor force projections yields unemployment, and then we calculate the unemployment rate. This is a pivotal variable in the model. Now the real side of the model is finished. For almost all of the equations in the real side, we needed information on relative prices (and the aggregate price level as well, to generate real disposable income). However, until the price side of the model has been run, these prices must only be guesses. Next the model turns to the important job of forecasting prices.

Prices are forecast as a markup over unit intermediate and labor costs. However, all components of value added are calculated first. Some are then scaled so that value added by commodity and prices are consistent. The first item of business is to get hourly labor compensation by industry, which we will call the "wage rate", although it also includes supplements. The "wage" equations relate the growth of the wage rate to growth in the ratio of M2 to GDP, expected inflation, and the growth in labor productivity. Multiplying the wage rate by the total hours worked per industry gives total labor compensation per industry. Next the total labor compensation is split into wages *per se*, and supplements such as employer contributions for social insurance and other labor income.

Labor compensation is the largest component of income, usually about 60% of GDP, and certainly has the largest effect on prices. However, it is also important to determine the components of capital income. Corporate profits are needed to be able to calculate corporate profits taxes, and retained earnings and capital consumption allowances are the large components of business savings, which is an important part of the savings-investment identity. Furthermore, dividends, proprietors' income, interest income and rental income all contribute to personal income.

The corporate profits equations relate the ratio of economic profits over labor compensation to a measure of aggregate tightness (the GDP gap), changes in industry output, and the prices of oil and agriculture as supply variables. Economic profits are defined as profits plus the inventory valuation adjustment plus the capital consumption adjustment. The proprietors' income equations take many forms, but typical right hand side variables are measures of tightness, the change in industry output, the change in GDP, and the change in the aggregate deflator. The two other large components of value added that have industry equations are corporate and non-corporate capital consumption allowances. The main explanatory variables are book value estimates of capital stock, which are formed by cumulating current price investment.

The equations for net interest, rental income, business transfer payments, inventory valuation adjustments, and government subsidies are aggregate equations, which are then shared out to industries, based on the share in the last year of data. Indirect

business taxes are determined by multiplying exogenous indirect tax rates by output by industry.

Before calculating prices, value added by component is summed to total value added by industry, and then passed through the product-industry bridge to obtain value added by product. This product-industry bridge is derived from the IO make matrix, which shows the distribution of the production of any given product across various industries. We assume that value added can be allocated by the same distribution, and so use this bridge to translate value added by industry into value added by commodity, and vice versa. Once value added at the product level has been obtained, commodity prices are calculated using the IO equation for prices that also takes account of the import composition of intermediate consumption.

Once the price-income loop has converged, the "Accountant" is run. This part of the model consists of numerous regression equations and identities that estimate economic aggregates that are part of the National Income and Product Accounts. For example, it is here that corporate profits by industry are aggregated to total corporate profits, and profits taxes and dividends are calculated. The Accountant is also responsible for calculating all the components of Federal and State & local expenditures and receipts. Finally, the Accountant ensures that the necessary national accounting identities hold. For example, for nominal net exports to rise, some component of savings (business, personal, government) must rise in tandem.

All loops iterate until convergence is reached. Once the model has converged for a given year, several housekeeping activities are performed, which include the updating of "buckets" which are used in the calculations of capital stocks and other types of stock variables.

Hopefully, this tour has given a good overall picture of how the *Lift* model works. Next we will turn to examine several of the most important pieces of the model.

C.3 Some Applications of Lift

For a sampling of some recent studies done using the model, please visit http://www.inforum.umd.edu/index.html.

C.4 The LIFT Model Database

As described above, *Lift* is an interindustry model in that most equations are estimated at an industry or commodity level, and the price and output solution by commodity uses the fundamental input-output identities. With a model of this type, a large part of the initial development and subsequent maintenance relates to the data. The database of LIFT consists not only of input-output matrices, and vectors of expenditures, value added and employment, but also numerous macroeconomic variables. Although we are extremely fortunate in having high quality data available from BEA, Inforum extends the BEA data by:

- Estimating detailed IO tables from the annual IO table controls

- Deflating the tables to constant dollars
- Reconciling value added by commodity and value added by industry.
- Incorporating employment and hours worked data that are consistent with the IO framework.

Listed below are some characteristics of the current model database.

- The input-output tables are based on the 2007 U.S. benchmark input-output study, updated using the time series of annual IO tables available from BEA, from 1997 to 2014.
- The model has 121 input-output commodity sectors, 83 personal consumption expenditure categories, and 71 industries. The industry classification is used for value added, investment, employment, hours and labor productivity.
- Defense spending is linked from 24 categories in the National Income and Product Accounts (NIPA) to the 121-sector level by a detailed defense bridge. Government construction is handled separately from private construction, or from other government spending.
- Nominal GDP is the same whether calculated as the sum of income or expenditure categories. This allows the four major balance identities to hold.
- All macrovariables have been updated to somewhere between 2014 and 2015. All NIPA data is updated through 2015.
- There are a total of almost 200 vectors and matrices whose history and forecast can be viewed in *G7*, or printed using the *Compare* program. All expenditure vectors are also calculated and stored in current prices, to make verification of the GDP identity easier.

C.5 Exogenous Variables

As described above, the *Lift* model is an interindustry macroeconomic model, in which final demands, value added, employment and other variables are determined by regression equations at the industry, commodity or category level. The macroeconomic aggregates in the model are generally formed by adding up detailed variables. The software used to implement the model, called *G7/Interdyme*, provides a flexible facility called 'fixes' for imposing assumptions. Some variables are purely exogenous, and must be fixed. These variables are usually specified in absolute terms, either in levels, growth rates or indexes. Other variables are determined endogenously, but may be fixed to a different value to implement a specific scenario, or to otherwise modify the behavior of the model. These fixes may be either multiplicative ("mul") or additive ("cta", which stands for "constant term adjustment"). A particular type of fix, called an 'equation fix', allows one to specify an equation for a variable in the fixes file. This may be to replace an existing model equation on the fly, or to make an otherwise exogenous variable endogenous, by specifying a rule for its calculation that relates it to other matrix, vector or macroeconomic variables. There are currently about 800 macroeconomic variables. There are upwards of 25,000 detailed sectoral variables calculated by the model.

The minimum requirement for generating a scenario with *Lift* is to specify values for all exogenous variables, using fixes. The process of running the model and using fixes is

described in more detail in the *Users Guide*.[13] Here is a list of most of the exogenous variables in *Lift*.

1. Population, by single year of age. (The model can also be run with a Demographic Projections Module, which takes fertility rates, mortality rates, and net immigration by age as exogenous).

2. Labor force participation rates for men and women, by the main 3 BLS age categories (16-19, 20-64, and 65+).

3. Exchange rates with major trading partners' currencies. An overall 'exchange rate scalar' is also used to move the average dollar rate up or down.

4. Federal defense, nondefense and state & local spending in real terms, by several categories of expenditure (defense is the most detailed). Note that two large components, compensation of employees and consumption of fixed capital, are determined endogenously.

5. Employment and hours worked for Federal defense, nondefense, state and local and federal and state and local government enterprises. Wage rates for these sectors are also exogenous.

6. Money supply (M2) and monetary base.

7. Demographic variables used in the personal consumption equations.

8. Average Federal Personal Income tax rate on adjusted personal income (may be determined in another model, or using an equation fix.)

9. Ratio of total state and local personal income taxes to federal personal income taxes.

10. Ratio of state and local other tax payments to personal income.

11. Legislated federal corporate tax rate. Effective corporate tax rates are endogenous, but also usually fixed. The same is true for state and local corporate tax rates.

12. Investment tax credit rate.

13. State and local contributions to S&L insurance funds.

14. Contribution rates to social insurance funds.

15. Social security payroll tax rate and other social security related variables.

16. Medicare rate of premiums paid to expenditures. Total medicare expenditures, part B and part D.

17. Direct relief transfers from Federal to state and local governments for medical care, mostly Medicaid.

[13] Meade (2016).

18. Federal current taxes and contributions from rest of world, dividends from rest of world.

19. Current surplus of government enterprises.

20. Dividends, interest, rents and royalties received by State and local governments.

21. NAIRU – Non-accelerating inflation rate of unemployment (usually taken from CBO).

22. Number of "multiple jobs holders" This is essentially the difference between the BLS payroll employment (sum of jobs by industry) and household employment, which are shown in parts A and B of the employment report. The household employment measure is used to calculate the unemployment rate.

23. Percentage of federal debt held by the public. Percent domestic share of federal interest payments.

24. Outstanding loans of state & local governments.

25. Rates of interest paid by federal and state and local governments on debt.

26. Federal grants-in-aid.

27. Interest receipts from trust funds.

28. Federal share of total taxes on production and imports (TOPI).

29. State and local transfer receipts from persons, business and rest of world.

30. State and local current transfers to rest of world.

31. Labor productivity growth is determined by equations which have a time trend and pro-cyclical component. These are usually adjusted to target potential GDP growth.

32. Interest rate equations are estimated for the 3-month T-bill rate, the 10-year rate, the AAA bond rate, and the average mortgage interest rate. In the recent environment of quantitative easing, these equations have either been overridden (3-month), or adjusted downward in the near term.

C.6 Development of the Lift *Model*

The *Lift* model is under continuous development. The current version is the 3rd major version developed with the Inforum *Interdyme* software, though earlier versions in FORTRAN preceded these.

C.7 Lift *Industries*

Sec #	Code	Description	2007 NAICS	IdLift 3 Commodities
1	111CA	Farms	111-12	1, 2
2	113FF	Forestry, fishing, and related activities	113-15	3
3	211	Oil and gas extraction	211	4, 5
4	212	Mining, except oil and gas	2121-3	6, 7, 8
5	213	Support activities for mining	2131	9
6	22	Utilities	2211-3	10-12
7	23	Construction	2301-3	13, 14
8	311FT	Food and beverage and tobacco products	311, 3121-2	15-18
9	313TT	Textile mills and textile product mills	313-4	19
10	315AL	Apparel and leather and allied products	315-6	20
11	321	Wood products	321	21
12	322	Paper products	322	22
13	323	Printing and related support activities	323	23
14	324	Petroleum and coal products	324	24
15	325	Chemical products	3251-6, 3259	25-27
16	326	Plastics and rubber products	3261-2	28, 29
17	327	Nonmetallic mineral products	327	30
18	331	Primary metals	3311-4, 33151-2	31, 32
19	332	Fabricated metal products	332	33
20	333	Machinery	3331-6, 3339	34-40
21	334	Computer and electronic products	3341-6	41-46
22	335	Electrical equipment, appliances, and components	3351-3, 3359	47-49
23	3361MV	Motor vehicles, bodies and trailers, and parts	3361-3	50, 51
24	3364OT	Other transportation equipment	3364-6, 3369	52-54
25	337	Furniture and related products	337	55
26	339	Miscellaneous manufacturing	3391, 3399	56, 57
27	42	Wholesale trade	42	58
28	441	Motor vehicle and parts dealers	441	59
29	445	Food and beverage stores	445	60
30	452	General merchandise stores	452	61
31	4A0	Other retail	442-4, 446-8, 451, 453-4	62
32	481	Air transportation	481	63
33	482	Rail transportation	482	64
34	483	Water transportation	483	65
35	484	Truck transportation	484	66
36	485	Transit and ground passenger transportation	484, S00201	67
37	486	Pipeline transportation	486	68
38	487OS	Other transportation and support activities	487-8, 492	69
39	493	Warehousing and storage	493	70
40	511	Publishing industries, except internet (includes software)	511	71, 72
41	512	Motion picture and sound recording industries	512	73
42	513	Broadcasting and telecommunications	5151-2, 517	74, 75
43	514	Data processing, internet publishing, and other information services	5,182,519	76
44	521CI	Federal Reserve banks, credit intermediation, and related activities	521-2	77
45	523	Securities, commodity contracts, and investments	5231-2, 5239	78-79
46	524	Insurance carriers and related activities	524	80
47	525	Funds, trusts, and other financial vehicles	525	81
48	HS	Housing services	n/a	82
49	ORE	Other real estate	531	83
50	532RL	Rental and leasing services and lessors of intangible assets	532-3	84, 85
51	5411	Legal services	5411	86
52	5412OP	Miscellaneous professional, scientific, and technical services	5412-4, 5416-9	87, 89-91
53	5415	Computer systems design and related services	5415	88
54	55	Management of companies and enterprises	55	92
55	561	Administrative and support services	561	93
56	562	Waste management and remediation services	562	94
57	61	Educational services	611	95
58	621	Ambulatory health care services	6211-6, 6219	96-102
59	622	Hospitals	622	103
60	623	Nursing and residential care facilities	623	104
61	624	Social assistance	624	105
62	711AS	Performing arts, spectator sports, museums, and related activities	711-2	106
63	713	Amusements, gambling, and recreation industries	713	107
64	721	Accommodation	721	108
65	722	Food services and drinking places	722	109
66	81	Other services, except government	8111-4, 812-4	110-113
67	GFGD	Federal general government defense	S00500	116
68	GFGN	Federal general government nondefense	S00600	117
69	GFE	Federal government enterprises	491, S00102	114
70	GSLG	State and local general government	S00700	118
71	GSLE	State and local government enterprises	S00203	115

C.8 Lift *Commodities*

Sec #	Description	2007 NAICS	BEA-74
1	Crop production	111	1
2	Animal production	112	1
3	Forestry, fishing and agriculture support activities	113, 114, 115	2
4	Crude oil extraction	211 pt.	3
5	Natural gas extraction	211 pt.	3
6	Coal mining	2121	4
7	Metal ore mining	2122	4
8	Nonmetallic mineral mining	2123	4
9	Support activities for mining	2131	5
10	Electric utilities	2211	6
11	Natural gas distribution	2212	6
12	Water, sewage and other systems	2213	6
13	New construction	2301, 2302	7
14	Maintenance and repair construction	2303	7
15	Dairy products, meat and seafood	3115, 3116, 3117	8
16	Other foods	3111, 3112, 3113, 3114, 3118, 3119	8
17	Beverages	3121	8
18	Tobacco	3122	8
19	Textiles and textile products	313, 314	9
20	Apparel and leather	315, 316	10
21	Wood products	321	11
22	Paper	322	12
23	Printing	323	13
24	Petroleum and coal products	324	14
25	Resin, synthetic rubber and fibers	3252	15
26	Pharmaceuticals	3254	15
27	Other chemicals	3251,3253,3255,3256,3259	15
28	Plastic products	3261	16
29	Rubber products	3262	16
30	Nonmetallic mineral products	327	17
31	Iron and steel	3311,3312,33151	18
32	Nonferrous metals	3313,3314,33152	18
33	Fabricated metal products	332	19
34	Agriculture, construction and mining machinery	3331	20
35	Industrial machinery	3332	20
36	Commercial and service industry machinery	3333	20
37	Ventilation, heating, air-conditioning and ventilation equipment	3334	20
38	Metalworking machinery	3335	20
39	Engine, turbine and power transmission equipment	3336	20
40	Other general purpose machinery	3339	20
41	Computers and peripheral equipment	3341	21
42	Communications and audio-video equipment	3342, 3343	21
43	Semiconductors and other electronic components	3344	21
44	Electromedical and electrotherapeutic apparatus	334510, 334517	21
45	Search, detection and navigation equipment	334511	21
46	Measuring and control instruments, and media	334512,3,4,5,6,8,9, 3346	21
47	Household appliances	3352	22
48	Electrical equipment	3353	22
49	Other electrical equipment and components	3351,3359	22
50	Motor vehicles	3361,3362	23
51	Motor vehicle parts	3363	23
52	Aerospace products and parts	3364	24
53	Ship and boat building	3366	24
54	Other transportation equipment	3365,3369	24
55	Furniture	337	25
56	Medical equipment and supplies, dental labs, ophthalmic goods	3391	26
57	Miscellaneous manufacturing	3399	26
58	Wholesale trade	42	27
59	Motor vehicle and parts dealers	441	28
60	Food and beverage stores	445	29

Sec #	Description	2007 NAICS	BEA-74
61	General merchandise stores	452	30
62	Other retail	442-4,446-8,451,453-4	31
63	Air transportation	481	32
64	Rail transportation	482	33
65	Water transportation	483	34
66	Truck transportation	484	35
67	Transit and ground passenger transportation	484, S00201	36
68	Pipeline transportation	486	37
69	Transportation support, sightseeing, couriers	487,488,492	38
70	Warehousing and storage	493	39
71	Publishing, except internet and software	511, exc. 5112	40
72	Software	5112	40
73	Motion picture and sound recording	512	41
74	Broadcasting: Cable, TV and radio	5151, 5152	42
75	Telecommunications	517	42
76	Information and data processing	5182,519	43
77	Banks, credit cards and finance	521,522	44
78	Securities and commodities brokers	5231-2	45
79	Other financial investment activities	5239	45
80	Insurance	524	46
81	Funds, trusts and other financial vehicles	525	47
82	Housing services	n/a	48
83	Other real estate	531	49
84	Rental and leasing of goods	532	50
85	Royalties	533	50
86	Legal services	5411	51
87	Architectural, engineering and related services	5413	52
88	Computer systems design and related services	5415	53
89	Scientific research and development services	5417	52
90	Advertising	5418	52
91	Other professional, scientific and technical services	5412, 5414, 5416, 5419	52
92	Management of companies and enterprices	55	54
93	Administrative and support services	561	55
94	Waste management and remediation	562	56
95	Educational services	611	57
96	Offices of physicians	6211	58
97	Offices of dentists	6212	58
98	Offices of other health practitioners	6213	58
99	Outpatient care centers	6214	58
100	Medical and diagnostic laboratories	6215	58
101	Home health care services	6216	58
102	Other ambulatory health care services	6219	58
103	Hospitals	622	59
104	Nursing and residential care facilities	623	60
105	Child care and social assistance	624	61
106	Performing arts, spectator sports and museums	711,712	62
107	Amusements, gambling and recreation	713	63
108	Accomodation	721	64
109	Food services and drinking places	722	65
110	Automotive repair and maintenance	8111	66
111	Other repair and maintenance, personal services	8112,-3,-4, 812	66
112	Religious, grantmaking and other organizations	813	66
113	Private households	814	66
114	Postal service and federal government enterprises	491, S00102	69
115	State and local government enterprises	S00203	71
116	Federal government defense	S00500	67
117	Federal government nondefense	S00600	68
118	State and local general government	S00700	70
119	Scrap, used and secondhand	S00401, S00402	72
120	Noncomparable imports	S00300	73
121	Rest of the world adjustment to final uses	S00600	74

C.9 Lift *Personal Consumption Categories*

#	PCE Category Title	Unpub09
1	New cars	6
2	New light trucks	9
3	Used cars and trucks	11,15
4	Tires, tubes, accessories and other parts	18
5	Furniture and furnishings	22
6	Household appliances	27
7	Glassware, tableware and utensils	30
8	Tools and equipment for house and garden	33
9	Video and audio equipment	38
10	Photographic equipment	45
11	Information processing equipment	46
12	Sporting equipment, supplies, guns, ammunition, musical instruments	50,59
13	Sports and recreational vehicles	51
14	Books	58, 67
15	Jewelry and watches	61
16	Therapeutic appliances, eyeglasses, contacts	64
17	Luggage and similar personal items	68
18	Telephone and fax equipment	69
19	Cereals and bakery products	74
20	Meat, poultry, eggs, dairy and seafood (off premise)	77,82,83
21	Fruits and vegetables (off premise)	88,91
22	Nonalcoholic beverages (off premise)	94
23	Other food products (off-premise)	87,92,93,101
24	Alcohol purchased for off-premise consumption	97
25	Clothing, women's and children's	104,106
26	Clothing, men's and boy's	105
27	Other clothing	108-109
28	Footwear	110
29	Motor vehicle fuels, lubricants, fluids	112
30	Fuel oil and other fuels	115
31	Pharmaceutical products	120
32	Other medical products	123
33	Games, toys, hobbies, photo supplies	125, 128
34	Pets, flowers seeds and plants	126-127
35	Household supplies	129
36	Personal care products	135
37	Tobacco	139
38	Magazines, newspapers and stationery	140
39	Net expenditures abroad by U.S. residents	145+146-147
40	Rental of tenant-occupied nonfarm housing, group housing	152, 160
41	Owner-occupied housing	156
42	Rental value of farm dwellings	159
43	Water supply and sanitation	162
44	Electricity	166
45	Gas	167

#	PCE Category Title	Unpub09
46	Physicians	170
47	Dentists	171
48	Home health care	173
49	Medical laboratories	174
50	Other professional medical services	175
51	Hospitals	179
52	Nursing Homes	183
53	Motor vehicle maintenance and repair	188
54	Motor vehicle renting and leasing, other services	189
55	Ground transportation	196
56	Air and water transportation	203, 204
57	Clubs, sports centers, parks, theatres and museums	206
58	Cable and satellite TV, video rental	215,219
59	Photographic services, photo and computer repair	216-218
60	Gambling	220
61	Other recreation services	224
62	Eating and drinking places	236-238
63	Alcohol in purchased meals	239
64	School lunches and food for employees	232,240
65	Accomodations	243
66	Financial services	247
67	Life insurance	265
68	Net household insurance	266
69	Net health insurance	269
70	Net motor vehicle and other tranportation insurance	273
71	Telecommunications services	276
72	Postal and delivery services	280
73	Internet access	283
74	Higher education	285
75	Nursery, elementary and secondary schools	288
76	Commercial and vocational schools	291
77	Professional and other services	292
78	Personal care and clothing services	301
79	Social services and religious activities	309
80	Household maintenance	321
81	Americans travel abroad	328
82	Foreigners spending in the US	= -332
83	Final consumption expenditures of nonprofits	336

Appendix D – Calibrating Lift *to the CBO*

The *Lift* model forecasts annually, and includes forecasts for 121 commodities, 71 industries, and 83 consumption categories. Most of the variables in the model are endogenous, but assumptions must be made about several exogenous variables in order to generate a forecast.

In order to calibrate *Lift* to another projection or forecast, some of the exogenous assumptions are changed, and endogenous variables can be modified, leaving as much of the model to operate endogenously as possible.

Here are the main steps used in the calibration to the CBO:

1. Adjust the population and labor force assumptions to agree. These are treated as exogenous, although the model does include a demographic projections module for projections of population by sex and single year of age, and labor force participation can be modeled for 4 age groups.

2. Adjust labor productivity by industry so that the aggregate productivity growth is close. Labor productivity equations have been estimated for 66 private industries based on time trends, capital stock, and cyclical factors. However, the aggregate growth of private sector labor productivity was modified to match that of the CBO.

3. Target the components of personal income, especially labor compensation, profits, proprietor's income, transfers less social insurance contributions. CBO makes this easier since they provide information on many of these elements. Note that these adjustments cannot be done as "hard" or override fixes, as that would prevent us from doing "deltas" in an alternative simulation. The model equations must be allowed to work, and then the results are adjusted with a multiplicative or add factor to hit the target. This needs to be done iteratively, as there is a lot of simultaneous interaction within the model. For example, labor compensation by industry is strongly related to hours worked, which is related to employment.

4. Estimate a personal federal income tax rate that gets us close to the personal income tax projection. This then enables us to estimate disposable income.

5. From disposable income, derive a target for personal consumption expenditures growth. Impose this exogenously, in which case the model calculates the implied savings rate.

6. Target the main components of real GDP growth, such as construction, equipment investment, IPP investment, government, exports and imports. Again, we use multiplication or add fixes rather than using hard controls. This requires iteration over achieving these targets as well.

7. Target the main components of value added to target the overall nominal GDP and the inflation rate.

8. Line up the various components of federal government revenues and expenditures to arrive at a federal deficit which is close to the control. Federal interest payments are highly sensitive to the amount of debt, and the interest rate paid on that debt, which is

related to T-bill rates. Calibrate the percentage of debt held publicly to estimate the gross federal debt.

9. At this point, if the real and nominal GDP and aggregate productivity and labor force are consistent, the unemployment rate should be close. Make small adjustments to the 'multiple job adjustment' (the difference between the sum of employment by industry and household employment) to achieve the target. In our case, these were quite minimal.

10. Fix the 3-month and 10-year interest rates exogenously.

At this point, the *Lift* model is fairly consistent with the CBO, and also shows the detailed industry and commodity structure underlying this CBO-consistent scenario. This information is crucial in estimating industry winners and losers from a given tax plan. For example, *Lift* includes data and equations on corporate profits by industry. Data are also available on corporate taxes, dividends and consumption of fixed capital, as well as other components of value added, such as labor compensation.

Appendix E – Additional Details

This section describes the development of data for variables important to this analysis, and provides underlying detail on how assumptions were derived and implemented.

E.1 Corporate Profits and Profits Taxes

The *Lift* model is based on National Income and Product Accounts (NIPA) and Input-Output (IO) accounts data produced by the Bureau of Economic Analysis (BEA). The vectors of value added by industry are derived from tables in Section 6 *Income and Employment by Industry*.[14] The featured measure of Corporate Profits is in Table 6.16 "Corporate profits with inventory valuation and capital consumption adjustments". This measure is also called "Profits from current production", to emphasize the fact that capital gains from inventories and physical plant and equipment capital are excluded.[15] The NIPA also shows "Profits before tax" in Table 6.17. This measure is closer to the IRS Statistics of Income (SOI) data and is also referred to as "book profits". It is derived from SOI profits data and adjusted to conform to BEA coverage and definitions. Table 6.18 is "Taxes on Corporate Income", and Table 6.19 is "Corporate Profits after Tax". The domestic total (line 1) of Table 6.18 corresponds to line 14 in the National Income table (1.12), and is divided into Federal, State and local, and rest of world corporate tax liabilities.

Prior to this analysis, although *Lift* included corporate profits for 66 private industries, the accounting for profits taxes was done at the aggregate level. The data from tables 6.17 to 6.18 have now been added to the model historical database. Effective profits tax rates by industry are calculated historically by dividing profits taxes by profits from current production. The rate is exogenous, and will continue at its last historical value unless modified. After calculating profits taxes by industry, they are scaled to agree to the macrovariable for aggregate profits taxes. The federal and state and local components of this aggregate are calculated using a rate variable, which has an equation, but can be fixed. In the scenarios where federal corporate profits taxes are repealed, the federal rate is set to zero, starting in 2017.

Within the total NIPA figure of $455.1 billion for corporate profits taxes, $110.4 billion are from the Federal Reserve, and though classified by the NIPA as 'corporate tax', they are in fact payments from the Federal Reserve into Federal receipts. These payments are not part of the federal corporate tax repeal.

In the Tax Plan scenarios, the rate of federal corporate (non Federal Reserve) income tax is set to zero starting in 2017, but state and local and ROW corporate taxes, and Federal Reserve are left intact.

Table E.1 shows the estimated corporate profits taxes by industry in 2017 in the base case, and in the case with Federal taxes repealed. The total reduction is about $305 billion in 2017.

[14] Interactive data for the NIPA can be accessed at http://www.bea.gov/iTable/index_nipa.cfm.
[15] See BEA (2016), chapter 13, for the BEA methodology and definitions of corporate profits.

Table E.1 Reductions in Corporate Tax by Industry: 2017

		2007 NAICS Definition	Base	HBPC1	Difference
1	Farms	111-12	1,644	402	(1,242)
2	Forestry, fishing, and related activities	113-15	373	91	(282)
3	Oil and gas extraction	211	2,504	675	(1,829)
4	Mining, except oil and gas	2121-3	1,417	353	(1,064)
5	Support activities for mining	2131	2,011	485	(1,526)
6	Utilities	2211-3	2,470	628	(1,841)
7	Construction	2301-3	7,069	3,448	(3,621)
8	Food and beverage and tobacco products	311, 3121-2	16,741	4,171	(12,570)
9	Textile mills and textile product mills	313-4	339	82	(258)
10	Apparel and leather and allied products	315-6	378	75	(303)
11	Wood products	321	201	56	(145)
12	Paper products	322	3,804	917	(2,886)
13	Printing and related support activities	323	544	127	(417)
14	Petroleum and coal products	324	15,929	3,875	(12,054)
15	Chemical products	3251-6, 3259	26,230	6,508	(19,721)
16	Plastics and rubber products	3261-2	1,508	361	(1,147)
17	Nonmetallic mineral products	327	417	137	(281)
18	Primary metals	3311-4, 33151-2	680	167	(513)
19	Fabricated metal products	332	3,755	927	(2,828)
20	Machinery	3331-6, 3339	9,410	2,541	(6,869)
21	Computer and electronic products	3341-6	22,262	5,770	(16,493)
22	Electrical equipment, appliances, and components	3351-3, 3359	2,592	637	(1,955)
23	Motor vehicles, bodies and trailers, and parts	3361-3	2,314	435	(1,879)
24	Other transportation equipment	3364-6, 3369	3,310	201	(3,110)
25	Furniture and related products	337	524	130	(394)
26	Miscellaneous manufacturing	3391, 3399	3,329	849	(2,480)
27	Wholesale trade	42	30,229	7,397	(22,832)
28	Motor vehicle and parts dealers	441	9,521	2,254	(7,267)
29	Food and beverage stores	445	7,418	1,810	(5,607)
30	General merchandise stores	452	5,988	1,482	(4,507)
31	Other retail	442-4, 446-8, 451, 453-4	19,528	5,029	(14,499)
32	Air transportation	481	850	208	(642)
33	Rail transportation	482	2,756	626	(2,130)
34	Water transportation	483	292	69	(223)
35	Truck transportation	484	1,808	434	(1,373)
36	Transit and ground passenger transportation	484, S00201	95	22	(73)
37	Pipeline transportation	486	387	85	(302)
38	Other transportation and support activities	487-8, 492	3,507	849	(2,658)
39	Warehousing and storage	493	833	204	(630)
40	Publishing industries, except internet (includes software	511	3,773	860	(2,912)
41	Motion picture and sound recording industries	512	9,282	2,256	(7,027)
42	Broadcasting and telecommunications	5151-2, 517	14,099	3,398	(10,700)
43	Data processing, internet publishing, and other informa	5182519	2,737	672	(2,066)
44	Federal Reserve banks, credit intermediation, and relate	521-2	88,095	75,676	(12,419)
45	Securities, commodity contracts, and investments	5231-2, 5239	48,741	10,476	(38,265)
46	Insurance carriers and related activities	524	42,706	10,977	(31,729)
47	Funds, trusts, and other financial vehicles	525	1,598	407	(1,191)
48	Housing services	n/a	-	-	-
49	Other real estate	531	2,495	580	(1,915)
50	Rental and leasing services and lessors of intangible ass	532-3	2,209	543	(1,666)
51	Legal services	5411	578	143	(434)
52	Miscellaneous professional, scientific, and technical ser	5412-4, 5416-9	16,739	3,874	(12,866)
53	Computer systems design and related services	5415	3,317	682	(2,635)
54	Management of companies and enterprises	55	-	-	-
55	Administrative and support services	561	836	190	(646)
56	Waste management and remediation services	562	1,316	346	(970)
57	Educational services	611	1,101	274	(827)
58	Ambulatory health care services	6211-6, 6219	5,130	1,578	(3,552)
59	Hospitals	622	538	133	(405)
60	Nursing and residential care facilities	623	506	149	(358)
61	Social assistance	624	4,960	1,288	(3,671)
62	Performing arts, spectator sports, museums, and relate	711-2	661	167	(494)
63	Amusements, gambling, and recreation industries	713	816	204	(612)
64	Accommodation	721	1,854	604	(1,250)
65	Food services and drinking places	722	5,746	1,428	(4,318)
66	Other services, except government	8111-4, 812-4	2,541	651	(1,890)
67	Federal general government defense	S00500	-	-	-
68	Federal general government nondefense	S00600	-	-	-
69	Federal government enterprises	491, S00102	-	-	-
70	State and local general government	S00700	-	-	-
71	State and local government enterprises	S00203	-	-	-
	Total		477,342	172,076	(305,266)

E.2 Dividends

Dividends in the NIPA are shown in table 6.20 "Net Corporate Dividend Payments by Industry", which were about $841 billion for Domestic industries in 2015. Like corporate taxes, dividend payments had previously been modeled only at the aggregate level. We have now incorporated the data from table 6.20 in the model, and estimated dividend equations by industry. These are based on a 3-year average of corporate profits less taxes.

The reduction in corporate taxes takes place immediately in 2017, with no transition. However, since the dividend equations are based on a moving average, the full effect is not seen until 2019.

E.3 Retail Sales

An important element of the analysis is the modeling of an increase in sales taxes of 20%. The *Lift* model and the BEA IO framework do not include retail sales, but do include retail output for the list of industries below.[16]

28. Motor vehicle and parts dealers (NAICS 441)
29. Food and beverage stores (NAICS 445)
30. General merchandise stores (NAICS 452)
31. Other retail (all other NAICS 44 and 45)

The Census Bureau *Annual Retail Trade Survey* (ARTS) provides historical annual data on retail sales by 12 3-digit NAICS industries, as well as detail for some 4- and 5-digit industries.[17] Data are currently available from 1992 through 2014. These data were aggregated to the 4 *Lift* industries above, and added to the historical model database. Forecasts of sales are now made by relating sales to retail output by industry. Retail output is determined in the model as the sum of all retail margins incurred on all transactions. These margins are concentrated in the personal consumption block of the model.

E.4 Retail Sales Taxes

Retail sales taxes are not shown explicitly on the transactions where they are incurred. In the U.S. IO framework, values are expressed in producers' prices, which means *inclusive* of commodity taxes such as sales taxes. Total commodity taxes according to industry of assignment are shown in the value added vector Taxes on Production and Imports (TOPI) in the *Lift* model. Retail sales taxes are included in TOPI for the 4 retail trade industries.

Retail sales taxes have been compiled and added to the historical database of the model for the 4 industries shown above. These data are also obtained from the ARTS,

[16] See BEA (2013), chapter 8, for an explanation of the treatment of retail margins and output in the IO framework.
[17] Accessed at https://www.census.gov/retail/index.html.

and are available from 2004 to 2014. Table E.2 shows retail sales, sales taxes, and implied average sales tax rates, for the 4 retail industries in *Lift* for selected historical years.

Table E.2 Retail Sales, Sales Taxes and Average Sales Tax Rates

	2005	2007	2010	2014
Retail Sales				
28. Motor vehicle and parts dealers (NAICS 441)	888,307	910,139	742,547	1,021,184
29. Food and beverage stores (NAICS 445)	508,484	547,837	580,787	669,902
30. General merchandise stores (NAICS 452)	528,385	578,582	603,776	666,873
31. Other retail (all other NAICS 44 and 45)	1,764,107	1,958,624	1,891,731	2,278,386
Total	3,689,283	3,995,182	3,818,841	4,636,345
Retail Sales Taxes				
28. Motor vehicle and parts dealers (NAICS 441)	29,006	29,494	25,480	32,820
29. Food and beverage stores (NAICS 445)	12,233	13,825	14,574	16,617
30. General merchandise stores (NAICS 452)	26,708	30,593	29,254	30,940
31. Other retail (all other NAICS 44 and 45)	68,041	72,538	69,381	82,143
Total	135,988	146,450	138,689	162,520
Average Retail Sales Tax Rates (percent)				
28. Motor vehicle and parts dealers (NAICS 441)	3.27	3.24	3.43	3.21
29. Food and beverage stores (NAICS 445)	2.41	2.52	2.51	2.48
30. General merchandise stores (NAICS 452)	5.05	5.29	4.85	4.64
31. Other retail (all other NAICS 44 and 45)	3.86	3.70	3.67	3.61
Total	3.69	3.67	3.63	3.51

E.5 Modeling a General National Sales Tax Increase in Lift

The sales tax increase is intended to be on all final personal consumption. It is an inclusive tax of 20%, which means that it is actually an additional tax of 25% over and above current commodity taxes on those consumer goods and services. This 25% is intended to be calculated on baseline sales before taxes.

Therefore, under this analysis there are two kinds of retail sales taxes: baseline state and local retail sales tax, and the new national sales tax. As an example, if the baseline sales equal to $1000 and if the average state and local retail sales tax rate is 8%, then the baseline state and local retail sales tax would be $80. The new national retail sales would be $250. So the impact on TOPI (taxes on production and imports) for that industry would be an increase of $250 and a total of $330. Of course, this assumes there is no change in retail sales under the Blueprint. However, if the Blueprint dynamically expands the economy, then the level of retail sales under the Blueprint would be higher compared to the baseline line. As a result, the corresponding retail sales tax (both national and state and local) would be larger as well.

As this is modeled as a national retail sales tax, the additional revenues are specified to accrue to the federal government. For personal consumption categories that are sold through retail trade, the tax increase is an increase in TOPI in the retail trade sectors. This has the effect of raising total value added in the retail sectors, and therefore the "price" of retail services. This price can be thought of as proportional to the amount of gross margin and commodity tax that a consumer must pay for the retail services of providing a certain bundle of goods and services.

For other consumption categories not sold through retail trade, we calculate the increases to TOPI by first specifying the additional tax necessary on each consumer category, and then inserting it into the Other retail (industry 31) row in the consumption bridge matrix. This bridge matrix translates consumption by category into consumption by commodity. Its function is to distribute margin to the transportation and trade industries, and also to either aggregate or disaggregate consumption categories to the respective producing sectors that provide them. The additional TOPI by industry is then added to the TOPI in Other retail that was in the baseline. Table E.3 shows the results of the calculation on the consumption price, for selected *Lift* consumption categories.

Table E.3 Tax Calculations for a Sample of Personal Consumption Categories

	Selected Personal Consumption Categories	Baseline Consumption Defaltor	Current Average Sales Tax Rate (%)	Additional Tax Rate	Increased Price Deflator, Inclusive of Additional Tax	Price Change
1	New cars	1.07	3.21	24.20	1.33	1.242
5	Furniture and furnishings	0.88	3.75	24.06	1.09	1.241
19	Cereals and bakery products	1.09	2.91	24.27	1.35	1.243
20	Meat, poultry, eggs, dairy and seafood (off premise)	1.22	2.91	24.27	1.52	1.243
21	Fruits and vegetables (off premise)	1.08	2.91	24.27	1.34	1.243
24	Alcohol purchased for off-premise consumption	1.05	2.83	24.29	1.30	1.243
25	Clothing, women's and children's	1.04	3.94	24.01	1.29	1.240
40	Rental of tenant-occupied nonfarm housing, group housing	1.17	0.00	25.00	1.47	1.250
41	Owner-occupied housing	1.15	0.00	0.00	1.15	1.000
44	Electricity	1.09	0.00	25.00	1.36	1.250
45	Gas	0.99	0.00	25.00	1.23	1.250
46	Physicians	1.12	0.00	25.00	1.40	1.250
51	Hospitals	1.16	0.00	25.00	1.45	1.250
54	Motor vehicle renting and leasing, other services	1.05	8.00	23.00	1.29	1.230
55	Ground transportation	1.29	5.00	23.75	1.59	1.238
56	Air and water transportation	1.17	7.50	23.13	1.44	1.231
62	Eating and drinking places	1.13	9.00	22.75	1.39	1.228
63	Alcohol in purchased meals	1.15	9.00	22.75	1.41	1.228
65	Accomodations	1.20	10.00	22.50	1.47	1.225
66	Financial services	1.35	0.00	25.00	1.68	1.250
67	Life insurance	1.09	0.00	25.00	1.36	1.250
	Total	**1.12**			**1.36**	**1.208**

The result is that the average price of consumption rises. This is the deflator used to derive real disposable income, so real disposable income and total real consumption will fall, all else constant. Table E.4 shows the estimated increase of total TOPI under the additional 20% (inclusive) national sales tax, and the increase in the personal consumption deflator, for selected years of the scenario.

Table E.4 Additional TOPI by Industry and Consumption Deflator with the 20% (Inclusive) National Sales Tax

	Total Indirect Tax			Personal Consumption Deflator		
	Base	HBP	Difference	Base	HBP	Ratio
2017	1,363	4,191	2,828	1.12	1.36	1.207
2020	1,514	4,663	3,149	1.17	1.42	1.206
2023	1,704	5,290	3,586	1.25	1.50	1.206
2026	1,922	5,968	4,046	1.32	1.60	1.206

E.6 Modeling the Wage Credit

The sales tax described above results in a rise in the personal consumption deflator. We assume that wage rates will adjust to the new price level—in one scenario over time, in the other immediately—preserving the level of real wages. A 20 percent wage credit will be paid to firms, calculated simply as 20 percent of labor compensation. The wage credit will be paid by the Federal government to the business sector.

This subsidy by itself would have the effect of reducing total industry value added and therefore the industry price. However, as labor compensation has increased as well, we have adjusted gross operating surplus so that total value added for each industry is unaffected. The cost of the wage credit is borne by the Federal government, as with a traditional subsidy[18].

Table E.5 shows the amount of wage credit estimated to be distributed to each industry for 2017, for Scenario A (immediate wage adjustment) and Scenario B (gradual wage adjustment.

E.7 Retaining the R&D Tax Credit

Estimates of nominal research and development investment by industry are taken from the BEA *Fixed Assets*[19] database, which includes investment by industry by type of asset, for equipment, structures and intellectual property. Data on the R&D tax credit taken by industry were obtained from tabulations from the IRS Statistics of Income (SOI) data. An equation for aggregate R&D investment was used to move the industry-level R&D. The tax credit rate was multiplied by this R&D figure by industry to estimate a projected R&D credit by industry. To implement the preservation of the R&D tax credit, it is also treated like a subsidy.

Table E.6 shows the amount of R&D tax credit estimated for each industry.

[18] We also assume that the wage of government employees and the military rises, which results in additional spending by Federal and State and local governments.

[19] These data can be obtained from http://www.bea.gov/iTable/index_FA.cfm and are also made available on the Inforum *EconData* site at http://www.inforum.umd.edu/econdata/econdata.html.

Table E.5 Calculated Wage Credit by Industry for 2017

	Industry	2007 NAICS Definition	Wage Credit (Millions) Scenario A	Scenario B
1	Farms	111-12	6,961	5,781
2	Forestry, fishing, and related activities	113-15	5,474	4,546
3	Oil and gas extraction	211	10,526	8,742
4	Mining, except oil and gas	2121-3	4,736	3,933
5	Support activities for mining	2131	10,323	8,573
6	Utilities	2211-3	24,347	20,221
7	Construction	2301-3	122,534	101,765
8	Food and beverage and tobacco products	311, 3121-2	22,686	18,841
9	Textile mills and textile product mills	313-4	2,468	2,050
10	Apparel and leather and allied products	315-6	2,102	1,746
11	Wood products	321	5,023	4,171
12	Paper products	322	7,396	6,143
13	Printing and related support activities	323	6,465	5,369
14	Petroleum and coal products	324	5,692	4,727
15	Chemical products	3251-6, 3259	23,941	19,883
16	Plastics and rubber products	3261-2	9,690	8,048
17	Nonmetallic mineral products	327	6,295	5,228
18	Primary metals	3311-4, 33151-2	6,715	5,577
19	Fabricated metal products	332	21,566	17,911
20	Machinery	3331-6, 3339	19,743	16,396
21	Computer and electronic products	3341-6	28,919	24,017
22	Electrical equipment, appliances, and components	3351-3, 3359	7,827	6,501
23	Motor vehicles, bodies and trailers, and parts	3361-3	12,121	10,067
24	Other transportation equipment	3364-6, 3369	15,810	13,130
25	Furniture and related products	337	4,649	3,861
26	Miscellaneous manufacturing	3391, 3399	11,017	9,149
27	Wholesale trade	42	130,586	108,453
28	Motor vehicle and parts dealers	441	31,575	26,223
29	Food and beverage stores	445	23,175	19,247
30	General merchandise stores	452	24,394	20,260
31	Other retail	442-4, 446-8, 451, 453-4	74,482	61,858
32	Air transportation	481	12,829	10,655
33	Rail transportation	482	4,987	4,142
34	Water transportation	483	1,978	1,643
35	Truck transportation	484	23,463	19,486
36	Transit and ground passenger transportation	484, S00201	5,991	4,976
37	Pipeline transportation	486	2,191	1,819
38	Other transportation and support activities	487-8, 492	20,051	16,653
39	Warehousing and storage	493	10,434	8,666
40	Publishing industries, except internet (includes software	511	30,892	25,656
41	Motion picture and sound recording industries	512	10,746	8,925
42	Broadcasting and telecommunications	5151-2, 517	29,461	24,467
43	Data processing, internet publishing, and other informa	5182519	8,773	7,286
44	Federal Reserve banks, credit intermediation, and relate	521-2	63,676	52,883
45	Securities, commodity contracts, and investments	5231-2, 5239	53,059	44,066
46	Insurance carriers and related activities	524	62,719	52,089
47	Funds, trusts, and other financial vehicles	525	233	194
48	Housing services	n/a	4,555	3,783
49	Other real estate	531	20,885	17,345
50	Rental and leasing services and lessors of intangible ass	532-3	8,588	7,132
51	Legal services	5411	37,118	30,827
52	Miscellaneous professional, scientific, and technical ser	5412-4, 5416-9	139,060	115,490
53	Computer systems design and related services	5415	50,574	42,002
54	Management of companies and enterprises	55	85,206	70,764
55	Administrative and support services	561	93,839	77,934
56	Waste management and remediation services	562	6,947	5,770
57	Educational services	611	46,250	38,411
58	Ambulatory health care services	6211-6, 6219	131,547	109,251
59	Hospitals	622	109,945	91,310
60	Nursing and residential care facilities	623	48,296	40,110
61	Social assistance	624	29,837	24,780
62	Performing arts, spectator sports, museums, and relate	711-2	14,279	11,859
63	Amusements, gambling, and recreation industries	713	13,376	11,109
64	Accommodation	721	20,824	17,294
65	Food services and drinking places	722	59,194	49,161
66	Other services, except government	8111-4, 812-4	86,504	71,842
67	Federal general government defense	S00500	-	
68	Federal general government nondefense	S00600	-	
69	Federal government enterprises	491, S00102	-	
70	State and local general government	S00700	-	
71	State and local government enterprises	S00203	-	
	Total		**2,037,547**	**1,692,199**

Table E.6 R&D Tax Credit by Industry in 2017

		2007 NAICS Definition	R&D Credit
1	Farms	111-12	7
2	Forestry, fishing, and related activities	113-15	2
3	Oil and gas extraction	211	64
4	Mining, except oil and gas	2121-3	7
5	Support activities for mining	2131	31
6	Utilities	2211-3	66
7	Construction	2301-3	31
8	Food and beverage and tobacco products	311, 3121-2	143
9	Textile mills and textile product mills	313-4	11
10	Apparel and leather and allied products	315-6	9
11	Wood products	321	16
12	Paper products	322	26
13	Printing and related support activities	323	9
14	Petroleum and coal products	324	31
15	Chemical products	3251-6, 3259	2,036
16	Plastics and rubber products	3261-2	122
17	Nonmetallic mineral products	327	46
18	Primary metals	3311-4, 33151-2	26
19	Fabricated metal products	332	64
20	Machinery	3331-6, 3339	498
21	Computer and electronic products	3341-6	2,277
22	Electrical equipment, appliances, and components	3351-3, 3359	108
23	Motor vehicles, bodies and trailers, and parts	3361-3	974
24	Other transportation equipment	3364-6, 3369	500
25	Furniture and related products	337	12
26	Miscellaneous manufacturing	3391, 3399	408
27	Wholesale trade	42	760
28	Motor vehicle and parts dealers	441	7
29	Food and beverage stores	445	-
30	General merchandise stores	452	-
31	Other retail	442-4, 446-8, 451, 453-4	-
32	Air transportation	481	6
33	Rail transportation	482	4
34	Water transportation	483	0
35	Truck transportation	484	2
36	Transit and ground passenger transportation	484, S00201	0
37	Pipeline transportation	486	0
38	Other transportation and support activities	487-8, 492	12
39	Warehousing and storage	493	0
40	Publishing industries, except internet (includes software	511	1,016
41	Motion picture and sound recording industries	512	25
42	Broadcasting and telecommunications	5151-2, 517	233
43	Data processing, internet publishing, and other informa	5182519	821
44	Federal Reserve banks, credit intermediation, and relate	521-2	74
45	Securities, commodity contracts, and investments	5231-2, 5239	32
46	Insurance carriers and related activities	524	149
47	Funds, trusts, and other financial vehicles	525	0
48	Housing services	n/a	-
49	Other real estate	531	1
50	Rental and leasing services and lessors of intangible ass	532-3	30
51	Legal services	5411	-
52	Miscellaneous professional, scientific, and technical ser	5412-4, 5416-9	1,128
53	Computer systems design and related services	5415	146
54	Management of companies and enterprises	55	8
55	Administrative and support services	561	-
56	Waste management and remediation services	562	17
57	Educational services	611	3
58	Ambulatory health care services	6211-6, 6219	6
59	Hospitals	622	12
60	Nursing and residential care facilities	623	1
61	Social assistance	624	9
62	Performing arts, spectator sports, museums, and relate	711-2	1
63	Amusements, gambling, and recreation industries	713	1
64	Accommodation	721	1
65	Food services and drinking places	722	5
66	Other services, except government	8111-4, 812-4	2
67	Federal general government defense	S00500	-
68	Federal general government nondefense	S00600	-
69	Federal government enterprises	491, S00102	-
70	State and local general government	S00700	-
71	State and local government enterprises	S00203	-
	Total		**12,035**

E.8 Removal of Tax on Passthrough Income

Passthrough income includes income reported on IRS Schedules C, E and F. This is non-corporate income of partnerships, sole proprietorships and some S-corporations. Although the NIPA provide historical estimates of proprietor income, they do not explicitly show the tax rate on this portion of personal income. In order to estimate the effect of the removal of this tax, we used SOI data to derive the tax rates on passthrough and non-passthrough personal income. These rates were then adjusted to be consistent with the personal federal income tax from NIPA used used in the *Lift* model.

Personal income can be calculated according to the following table, which shows values and growth rates from the NIPA for recent years:

Table E.7 Personal Income Components

	2005	2010	2012	2013	2014	2015	00-05	05-10	10-15
Compensation of employees	7,087	7,961	8,610	8,840	9,249	9,655	3.8	2.3	3.9
Wage and salary disbursements	5,692	6,378	6,930	7,114	7,478	7,824	3.3	2.3	4.1
Supplements	1,395	1,584	1,680	1,725	1,771	1,831	6.1	2.5	2.9
Proprietors income w. IVA&CCADJ	979	1,033	1,241	1,285	1,347	1,388	5.1	1.1	5.9
Rental income of prsns w. CCADJ	238	403	525	563	611	657	4.8	10.5	9.8
Dividends	578	545	835	789	816	868	8.2	-1.2	9.3
Personal interest income	1,088	1,195	1,289	1,271	1,302	1,312	0.3	1.9	1.9
Transfer payments to persons	1,517	2,325	2,366	2,427	2,529	2,663	6.7	8.5	2.7
Federal	1,084	1,758	1,784	1,823	1,877	1,960	6.8	9.7	2.2
State and local	407	524	540	562	610	660	8.1	5.1	4.6
Business current transfer payments	26	43	43	41	42	43	-10.0	10.3	0.1
Less: Contributions for social insurance	873	984	952	1,107	1,159	1,203	4.3	2.4	4.0
Personal income	**10,614**	**12,477**	**13,915**	**14,068**	**14,694**	**15,340**	**4.1**	**3.2**	**4.1**

To get at a measure of personal income for the tax base that behaves more like adjusted gross income, *Lift* removes non-retirement social benefits, other labor income, half of net interest income and rental income, and adds back in employee and self-employed contributions for social insurance. The federal personal income tax rate normally used in *Lift* is the rate of total federal personal income tax divided by adjusted personal income.

Table E.8 Estimated Tax Rates on Passthrough and Non-Passthrough Income

	Passthrough	Non-Passthrough
2000	29.6	12.7
2005	22.9	9.8
2010	20.9	9.0
2015	26.1	11.2
2016	25.6	11.0
2017	26.2	11.2
2018	26.8	11.5
2019	27.2	11.7
2020	27.7	11.9
2026	29.1	12.5

We used the SOI data to establish that the average tax rate on pass-through income in 2017 was 28 percent, and the rate on non-passthrough income was 13%. Starting with these values, we scaled the rates over the history and projection period to match the

total rate in either NIPA or CBO. Table E.8 shows implicitly derived tax rates on passthrough and non-passthrough income for selected historical and projection years.

In the House Blueprint Cases, we set the rate on non-passthrough income to zero, starting in 2017.

E.9 Investment Impacts

The *Lift* model contains equipment investment for 66 private industries, in both current and constant prices. The historical data are derived from the BEA *Fixed Asset* data and the NIPA. The model also contains a capital flow matrix or bridge that translates investment spending by industry to the commodities that make up that investment. This matrix is used periodically to determine an average service life of equipment capital by industry that is used to determine the industry-specific depreciation rate.

Although the biggest determinants of equipment investment are output and the need for replacement investment, there is also an opportunity for the user cost of capital to affect net investment.

The user cost of capital we have used can be specified:

$$UCC_{it} = p_{it}(r_t + \delta)\frac{1-TZ-C}{1-T}$$

where:

UCC is the user cost of capital
p is the industry specific average equipment price deflator
r is the opportunity cost of funds, where 5% would be .05
δ is the average depreciation rate
T is the corporate tax rate
Z is the net present value of depreciation

Table E.9 Sample User Cost Calculations

	Baseline						Blueprint		
	P	r	delta	T	Z	UCC23	r	UCC23	Logarithmic Percent Change
2017	1.09	5.00	0.15	0.35	0.92	0.230	3.25	0.206	-10.81
2018	1.10	5.00	0.15	0.35	0.92	0.231	3.25	0.208	-10.84
2019	1.10	5.00	0.15	0.35	0.92	0.231	3.25	0.207	-10.85
2020	1.11	5.00	0.15	0.35	0.92	0.235	3.25	0.210	-10.86
2021	1.13	5.00	0.15	0.35	0.92	0.238	3.25	0.214	-10.86
2022	1.16	5.00	0.15	0.35	0.92	0.243	3.25	0.218	-10.84
2023	1.18	5.00	0.15	0.35	0.92	0.248	3.25	0.222	-10.82
2024	1.19	5.00	0.15	0.35	0.92	0.251	3.25	0.225	-10.80
2025	1.21	5.00	0.15	0.35	0.92	0.254	3.25	0.228	-10.79
2026	1.23	5.00	0.15	0.35	0.92	0.258	3.25	0.232	-10.78

In recent years there has been no investment tax credit. If we remove the corporate tax, the ratio on the right simplifies to 1.0. With the removal of the corporate tax, the equivalent value of *r* could fall to *r(1-T).* Table E.9 shows the value of the user cost for the Motor vehicles industry (23) in the baseline and in the alternative scenarios. In this industry, the average decline in user cost of capital from the base is just under 11%.

Table E.10 shows an average of user cost for the entire U.S. weighted by the current period capital stocks in each industry. If we assume that the aggregate investment elasticity with respect to user cost is -1.0, then net investment would be expected to increase by an average of about 7.5% from the baseline.

Table E.10 Aggregate User Cost

Aggregate U.S. User Cost Calculation			
	Base	HBP	Logarithmic Percent Change
2017	0.239	0.222	-7.61
2018	0.240	0.223	-7.65
2019	0.240	0.222	-7.64
2020	0.242	0.225	-7.61
2021	0.245	0.227	-7.61
2022	0.249	0.231	-7.55
2023	0.252	0.234	-7.50
2024	0.255	0.236	-7.45
2025	0.258	0.239	-7.43
2026	0.261	0.243	-7.39

Changes were estimated for non-residential structures in a similar manner. The average percent change in the user cost due to the House Blueprint was estimated to be -13.2 percent. The aggregate net investment elasticity was assumed to be -1.0.

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