



# Massachusetts Tax Revenue Forecasts for FY 2019 and FY 2020

The Beacon Hill Institute for Public Policy Research

165 Main Street, Medway, MA 021053

[www.beaconhill.org](http://www.beaconhill.org)

855-244-4550

[bhi@beaconhill.org](mailto:bhi@beaconhill.org)

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The Beacon Hill Institute is pleased to offer its revenue forecast for Fiscal Year (FY) 2019 and FY 2020 to the Executive Office of Administration and Finance and the Joint Ways and Means Committee.<sup>1</sup> We divide our report into three sections: (1) a summary of our latest forecast, (2) background information on the national and state economies and (3) an overview of the methodology used to provide our projections.©

## (1) Current Forecast

BHI predicts that tax revenues will be:

- **\$29.6 billion in FY 2019, 6.6% over FY 2018, and**
- **\$30.3 billion in FY 2020, 2.4% over FY 2019.**

The 6.6% increase for FY 2019 and the 2.4% increase in FY 2020 reflects projected growth of state personal income.<sup>2</sup> BHI projects state personal income to increase by 4.6% and 2.9% in calendar years 2019 and 2018, respectively.

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<sup>1</sup>Prepared by the staff of the Beacon Hill Institute, including Paul Bachman, William F. Burke, Frank Conte and David G. Tuerck.

<sup>2</sup> Based on BHI calculations.



## (2) Summary of National and State Economies

### (2a) The U.S. Economy

According to the Bureau of Economic Analysis's "second estimate," real GDP grew at an annual rate of 3.5% in the third quarter of 2018.<sup>3</sup> Personal consumption expenditures (which comprise 70% of the economy), private inventory investment, nonresidential fixed investment, state, and local government spending and federal government spending contributed to the third quarter increase. Exports and residential fixed investment, in addition to a rise in imports, negated some of the positive effects leading to a slowdown in third-quarter real GDP growth from 4.2% in quarter two. In contrast to a weak report in the first quarter, corporate profits increased by 3.0% (up from 1.2% in quarter one). The latest figure is a welcome sign, considering that growth has finally reached the 3.5% annual average of the 1990s and is above the postwar benchmark rate of 3.0%.<sup>4</sup>

The key manufacturing sector saw a small downturn, according to the Markit U.S. Manufacturing Purchasing Managers Index.<sup>4</sup> The Manufacturing PMI recorded 55.3, down from 55.7 in October, "thereby signaling the weakest improvement in operating conditions for three months. Weaker production growth and a slower rate of inventory accumulation contributed to the fall in the headline PMI during November." However, the report's authors noted: "Survey respondents noted that strong domestic demand and improving underlying economic conditions continued to support business activity expansion."

The National Retail Federation "expects holiday retail sales in November and December — excluding automobiles, gasoline, and restaurants — to increase between 4.3% and 4.8 % over 2017 for a total of \$717.45 billion to \$720.89 billion.<sup>5</sup> The forecast compares with an average annual increase of 3.9% over the past five years." The National Federation of Independent Business survey for November suggests that owners, supported by record levels of optimism, will continue to expand and invest in inventory.<sup>6</sup>

The equity markets saw historic gains in 2018 as a result of the tax code overhaul and deregulation under the Trump administration.<sup>7</sup> However, the markets have been plagued by uncertainty generated by the president's stance on tariffs, increasing inflation and the fear of the Federal Reserve hiking interest rates. After a long period of low volatility, the markets are entering a correction and are beginning to see higher levels of volatility.

*The Wall Street Journal* Economic Forecasting Survey for November 2018 predicts growth of 3.1%, 2.3% and 1.8% for 2018, 2019 and 2020 respectively.<sup>8</sup> The economists in the survey also predict that the unemployment rate for December 2018 will be 3.6%. The *Economist* poll of forecasters from August

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<sup>3</sup> Gross Domestic Product. (n.d.). Retrieved from <https://www.bea.gov/data/gdp/gross-domestic-product>

<sup>4</sup> OECD, Economic Outlook Annex Tables. (November 2018) <http://www.oecd.org/eco/outlook/united-states-economic-forecast-summary.htm> The 3.5% GDP benchmark is based on the years 1990-2001.

<sup>5</sup> NRF forecasts holiday sales will grow between 4.3% and 4.8 % | (November 2018) Retrieved from <https://nrf.com/media-center/press-releases/nrf-forecasts-holiday-sales-will-increase-between-43-and-48-percent>

<sup>6</sup> October 2018 Report: Small Business Optimism Index. (n.d.). Retrieved from <https://www.nfib.com/surveys/small-business-economic-trends/>

<sup>7</sup> Chang, S. (2018, August 22). Welcome to the longest bull market in Wall Street history. Retrieved from <https://www.marketwatch.com/story/the-stock-market-is-about-to-make-history-2018-08-14>

<sup>8</sup> *Wall Street Journal* Economic Forecasting Survey (November 2018) <https://www.wsj.com/graphics/econsurvey/>.



2018 predicts that U.S. GDP growth will be between 2.7% and 3.1% in 2018 and 1.6% and 3.3% in 2019.<sup>9</sup> The Federal Reserve Bank reports a median estimate of 3.1% for 2018, falling to 2.55% in 2019 and 2.95% in 2020.<sup>10</sup> In its long-term outlook, the OECD stated, “Growth is projected to slow in the coming two years as macroeconomic policy becomes less supportive. While employment growth slows, consumption growth remains solid, supported by wage growth picking up as the labor market tightens further. Strong business investment in 2019 and 2020 is underpinned by the recent tax reform and supportive financial conditions.”<sup>11</sup>

**Table 1**  
**Economic Forecasts for the United States, 2018 through 2020**

Calendar Year	WSJ Survey of Economists	Federal Reserve Bank (Median Range Sept. '18)	<i>The Economist poll</i>	OECD
2018	3.10%	3.10%	2.70%/3.10%	2.90%
2019	2.30%	2.55%	1.60%/3.30%	2.70%
2020	1.80%	1.95%	N/A	2.10%

The Bureau of Labor Statistics reported that the October 2018 unemployment rate remained unchanged at 3.7% with nonfarm payrolls increasing by 250,000 jobs, higher than the 12-month average of a 211,000 gain.<sup>12</sup> Professional and business services added 35,000 workers, health care added 36,000, and the construction sector added 30,000 (of which residential home builders contributed 14,000). The three month-average is now 218,000 new jobs per month.<sup>13</sup>

The Labor Force Participation rate increased to 62.9% in October (up from 62.7% in September). The employment-population ratio improved to 60.6%.<sup>14</sup> The number of persons employed part-time remained unchanged at 4.6 million in October. There were 506,000 discouraged workers in October, virtually unchanged from a year ago.<sup>15</sup> The number of persons considered long-term unemployed (unemployed for 27 weeks or more) was little changed at 1.4 million, though the portion of the long-term unemployed in the labor force is down to 22.5% of all the unemployed.<sup>16</sup> Average hourly earnings for all private nonfarm employees increased by 5 cents to \$27.30 for October. In total, over the year, earnings have risen by 3.1%. The average workweek rose to 34.5 hours.<sup>17</sup>

<sup>9</sup> *The Economist* poll of forecasters, August 2018 averages (August, 2018). <https://www.economist.com/economic-and-financial-indicators/2018/08/09/the-economist-poll-of-forecasters-august-averages>. See also <http://www.economist.com/indicators>.

<sup>10</sup> [https://www.federalreserve.gov/monetarypolicy/mpr\\_20160621\\_part3.htm](https://www.federalreserve.gov/monetarypolicy/mpr_20160621_part3.htm).

<sup>11</sup> OECD, Economic Outlook Annex Tables. (November 2018) <http://www.oecd.org/eco/outlook/united-states-economic-forecast-summary.htm>

<sup>12</sup> BLS. (November 2018) [from https://www.bls.gov/news.release/pdf/empsit.pdf](https://www.bls.gov/news.release/pdf/empsit.pdf)

<sup>13</sup> Employment Situation Summary. (2018, November 2). Retrieved from <https://www.bls.gov/news.release/empsit.nr0.htm>

<sup>14</sup> The Employment Situation Summary. (2018, November 2). Retrieved from <https://www.bls.gov/news.release/pdf/empsit.pdf>

<sup>15</sup> BLS US Employment Summary. (2018, November 2). Retrieved [from https://www.bls.gov/news.release/pdf/empsit.pdf](https://www.bls.gov/news.release/pdf/empsit.pdf)

<sup>16</sup> BLS The Labor Force Participation Rate. (November 2018). Retrieved from <https://www.bls.gov/cps/documentation.htm>.

<sup>17</sup> Ibid.



One welcoming sign is apparent as the tax revenue picture continues to improve. Revenue for all 50 state governments increased by 7.8% to \$304.8 billion in the second quarter, from \$282.6 billion in the same quarter of the previous year.<sup>18</sup> The second quarter recorded revenue increases in the individual income tax, the general sales and gross receipts tax, and the corporation net income tax, from the same quarter in 2017. On the other hand, local government revenue has increased due to growing prices, and that has led to higher revenues from property taxes.

The Beacon Hill Institute applied its BHI-DCGE model to the Tax Cuts and Jobs Act and found that the law would increase U.S. real GDP by 5.28% and create 3.032 million new private sector jobs by 2027.<sup>19</sup> The BHI-DCGE model also showed that the plan would lower combined federal, state and local tax revenues by \$3.901 trillion over the ten-year period 2018-27. However, state and local tax revenue would increase (See Table A2 in Appendix). The Act would provide a substantial boost to the private economy by increasing employment, and investment could be 7.81% higher by 2027. (See Table A3 in Appendix).

## **(2b) The Massachusetts Economy**

Massachusetts GDP grew by 1.6% in the first quarter of 2018, down from 2.6% in the last quarter of 2017, according to the Bureau of Economic Analysis. However, the BEA reported that Massachusetts GDP grew by 4.0% in the second quarter of 2018, the most recent data available. That number puts the state 17<sup>th</sup> in the nation. The New England leader, New Hampshire with 4.6%, ranked 8<sup>th</sup> nationally in second-quarter growth. The size of Massachusetts's economy, measured by nominal GDP, is more than \$569.3 billion.

The Massachusetts unemployment rate dropped to 3.5% in October 2018, according to the Executive Office of Labor and Workforce Development (LWD). The state's unemployment rate is slightly below the national rate of 3.7%. Massachusetts has added 64,400 jobs since October 2017, according to the BLS. The state's labor force participation rate increased to 68.0% (up .2% from the previous month). The latest figures show employment gains for education and health services, construction, information, professional, scientific and business services, trade, transportation, utilities, manufacturing, and other services. Government, leisure and hospitality, and finance activities lost jobs over the month. The state's labor force stands at 3.833 million, for an increase of 10,800.<sup>22</sup>

At the local level, the BLS found that the unemployment rate dropped to 2.8% for the Boston-Cambridge-Newton area in September 2018.<sup>23</sup> The city of Springfield saw an unemployment rate of 3.9% in September 2018 while the Worcester area saw a rate of 3.4%.<sup>24</sup> According to L&WD, "The Massachusetts unemployment rate continues to remain low at 3.5 % and has now held below 4 % for 30 consecutive months. With the Commonwealth's consistently low rate of unemployment, the economy continues to add jobs at a

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<sup>18</sup> Quarterly Summary of State and Local Government Tax Revenue for Second Quarter 2018. (2018, September 18). Retrieved from <https://www.census.gov/content/dam/Census/library/publications/2018/econ/g18-qtax2.pdf>

<sup>19</sup> Paul Bachman, Keshab Bhattarai, Frank Conte, Jonathan Haughton, and David G. Tuerck, "The Economic Effects of Trump 2.0: The Candidate's Updated Tax Proposal," (September 2016) [http://www.beaconhill.org/2016TaxPolicy/TeamBHIFinal-NCPA-BHI-PaperTrump2%20020160915\\_09%2019.pdf](http://www.beaconhill.org/2016TaxPolicy/TeamBHIFinal-NCPA-BHI-PaperTrump2%20020160915_09%2019.pdf).

<sup>22</sup> Labor and Workforce Development, "Massachusetts Unemployment and Job Estimates for October," (November 16, 2018) [http://lmi2.detma.org/Lmi/News\\_release\\_state.asp](http://lmi2.detma.org/Lmi/News_release_state.asp).

<sup>23</sup> BLS Economic Summary Boston-MA-NH Metro Area (November 7, 2018), [http://www.bls.gov/regions/new-england/summary/blssummary\\_boston.pdf](http://www.bls.gov/regions/new-england/summary/blssummary_boston.pdf).

<sup>24</sup> BLS [http://www.bls.gov/regions/new-england/summary/blssummary\\_boston.pdf](http://www.bls.gov/regions/new-england/summary/blssummary_boston.pdf).



healthy clip, and our labor force continues to grow to meet employment needs, with an additional 169,600 employed residents and 5,200 fewer unemployed over the last year.”<sup>22</sup>

According to its *September Employment Outlook Survey*, ManpowerGroup, the human resources consulting firm, found hiring sentiment to be strong and healthy for Massachusetts. “From July to September 21% of the companies interviewed plan to hire more employees, while 4% expect to reduce their payrolls. Another 71% expect to maintain their current workforce levels, and 1% are not certain of their hiring plans.”<sup>25</sup>

The Federal Reserve Bank’s October 2018 “Beige Book” reports a moderate to strong pace of growth in the New England district. The bank notes, that “most retailers, hoteliers, manufacturers, and IT firms saw year-over-year sales increases.” The Boston Fed noted that its contacts reported “moderately higher prices on average. Outlooks were cautiously optimistic.” Retailers, along with travel and tourism, reported “robust” sales increases.<sup>26</sup>

Massachusetts continues to rank atop the Beacon Hill Institute’s measure of competitiveness, with the state benefitting from abundant human capital, technology and a substantial ability to draw domestic and foreign investment. With its diverse industrial sectors, the state continues to be a leader in high tech, education, and finance. However, this latest edition shows that Massachusetts remained below the median in the Government and Fiscal Policy sub-index at number 33, due to the high state and local taxes and generous unemployment benefits. Year after year, the index shows consistently that the state has not made any progress in addressing infrastructure (i.e., travel time to work), energy and housing problems (rental costs). Still, the state’s strengths make it an attraction for global investment.<sup>27</sup>

In its October 2018 survey, the Suffolk University Political Research Center found that 69% of Massachusetts respondents think that the Bay State is heading in the right direction, up from 56.4% in June 2018.<sup>28</sup> Consistent with the June polling data, the sentiment in the October 2018 survey holds across all the geographic areas, party affiliations, age groups, both sexes, and races.

This trend may support consumer and business confidence in Massachusetts. Based on a survey of its 4,000 members, the Retailers Association of Massachusetts predicts a 3.8% gain in retail sales in the 2018 holiday season. RAM’s projected sales increase is higher than the 2017 holiday season increase of 3.0%. According to RAM, “The confidence level of consumers remains at 18-year high levels, and prices remain in check due to their unlimited purchasing options given the power of mobile commerce.”<sup>29</sup>

The burden of tariffs may prove to be a lost opportunity for Massachusetts. President Trump threatened to raise tariffs to 25% on over \$200 billion in Chinese goods in January 2019, with the further threat of

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<sup>25</sup> ManpowerGroup Employment Outlook Survey United States Q4 2018. (n.d.). Retrieved from <https://www.manpowergroup.us/meos/2018/Q4-docs/meos-report.pdf>

<sup>26</sup> The Beige Book, Summary of Commentary on Current Economic Conditions By Federal Reserve District. (2018, October 24). Retrieved from [https://www.federalreserve.gov/monetarypolicy/files/BeigeBook\\_20181024.pdf](https://www.federalreserve.gov/monetarypolicy/files/BeigeBook_20181024.pdf)

<sup>27</sup> Institute releases 17th Annual State Competitiveness Report. (n.d.). Retrieved from <http://beaconhill.org/wp-content/uploads/2018/11/17thEditionBHISateCompetitivenessReport181120.pdf>

<sup>28</sup> Suffolk University Political Research Center, SUPRC-Boston Globe (October 29, 2018) Retrieved from [https://www.suffolk.edu/documents/SUPRC/10\\_29\\_2018\\_marginals.pdf](https://www.suffolk.edu/documents/SUPRC/10_29_2018_marginals.pdf)

<sup>29</sup> Retailers Association of Massachusetts predicts local holiday sales increases of 3.8%. (2018, November 15). Retrieved from [https://ram.memberclicks.net/assets/docs/2018\\_holiday\\_press\\_release.pdf](https://ram.memberclicks.net/assets/docs/2018_holiday_press_release.pdf)



more to come if a trade deal cannot be agreed upon.<sup>30</sup> Over this past weekend, the United States and China agreed to a 90-day moratorium on new tariffs. China remains a major trading partner; Massachusetts imported over \$4.5 billion of goods and services in 2017. Massachusetts exports over \$2.3 billion in goods and services to China. Higher tariffs of the kind planned by President Trump will most certainly fall disproportionately on low-income consumers.<sup>32</sup> Widespread changes in trade agreements are sure to impinge upon the Massachusetts economy, which relies on expanding markets.<sup>31</sup>

### (3) Methodology

**Table 2**  
**Economic Forecasts for Massachusetts, 2019 through 2020**

Massachusetts (calendar year-end)1*	Actual 2015	Actual 2016	Actual 2017	Forecast 2018	Forecast 2019	Forecast 2020
Real Gross State Product	469	478	490	508	522	535
% change p.a.	3.5	1.9	2.5	3.6	2.8	2.5
Personal income (\$ billion)	432	445	464	485.5	508	523
% change p.a.	6.7	3.0	4.3	4.6	4.6	2.9
Employment ('000)	3,416	3,471	3,521	3,698	3,755	3,810
% change p.a.	1.6	1.6	1.4	5.0	1.5	1.5
Unemployment rate, %	4.8	3.9	3.7	3.5	3.5	3.3
<b>BHI forecast, MA taxes, (fiscal year)</b>	<b>Actual</b>	<b>Actual</b>	<b>Actual</b>	<b>Actual</b>	<b>Forecast</b>	<b>Forecast</b>
Personal income tax (\$ million)	14,375	14,388	14,684	16,240	16,909	17,516
% change p.a.	8.9	0.1	2.1	10.6	4.1	3.6
Sales Tax	5774.5	6047.0	6211.1	6453.8	6,705	6,991
% change p.a.	5.1	4.7	2.7	3.9	3.9	4.3
Corporation Excise	2054.9	2158.7	2196.7	2392.2	2,779	2,751
% change p.a.	0.3	5.1	1.8	8.9	16.2	(1.0)
Business Excises	365	377	358	380	426	407
% change p.a.	(20.9)	3.3	(5.0)	6.3	11.9	(4.4)
Motor Fuels	756	766	769	769	788	797
% change p.a.	3.2	1.3	0.5	(0.0)	2.4	1.2
<b>Total Taxes</b>	<b>24,717</b>	<b>25,267</b>	<b>25,662</b>	<b>27,787</b>	<b>29,608</b>	<b>30,327</b>
% change p.a.	5.8	2.2	1.6	8.3	6.6	2.4

The Department of Revenue indicates that tax law changes will alter revenue collections for a variety of taxes. According to DOR, the tax law changes will increase revenue by \$53.9 million in FY 2019 and reduce revenue by \$254.6 million in FY 2020. The DOR estimates the new Marijuana tax on recreational sales will be the most significant contributor, increasing revenues by \$63 million in FY 2019 and \$132 million in FY 2020. The repatriation of corporate dividends is expected to boost FY 2019 revenues by \$65 million. DOR expects the Income Tax Part-B personal income tax cut from 5.1% to 5.05% to reduce revenues by \$84 million

<sup>30</sup> Davis, B. (2018, November 26). Trump Expects to Move Ahead with Boost on China Tariffs. Retrieved from <https://www.wsj.com/articles/trump-expects-to-move-ahead-with-boost-on-china-tariffs-1543266545>

<sup>32</sup> Paul Bachman, Frank Conte, and David G. Tuerck, "The Trump Tariffs: A Bad Deal for Americans," (May 2016) The National Foundation for American Policy. <http://tinyurl.com/zcxcyxo>

<sup>31</sup> Foreign Trade Div. (2018, May 23). Foreign Trade. Retrieved from <https://www.census.gov/foreign-trade/statistics/state/data/imports/ma.html>

in FY 2019 and \$91 million in FY 2020. We do not include an additional Income Tax Part-B phased in personal income tax cut from 5.05% to 5% in 2020, since the bulk of FY 2019 revenues have yet to be collected and are thus unavailable to make the calculation. As a result, we reduce our FY 2020 revenue estimate by \$166.3 million due to tax law changes.

For FY 2020, we forecast a 2.4% increase in tax revenues over FY 2019. Personal income tax revenues will increase by 3.6% and sales tax revenues by 4.3%. Corporate income tax revenues will fall by 1%, and business excise tax revenues will fall by 4.4%. Business excise taxes have experienced the most volatility in the year-over-year collections, and, as a result, remain the most difficult to forecast. Other tax revenues will increase by 5.9%, and alcohol taxes will rise by 0.4%. Motor fuels taxes will increase by 1.2%, and cigarette taxes will fall by 0.2%.

We prepared tax revenue forecasts for 11 categories for every month through June 2020. Three steps were needed to develop these forecasts.

1. We used projections of personal income to derive month-by-month growth rates of personal income, allowing us to project personal income on a monthly basis through June 2020. Information on personal income in Massachusetts is available on a quarterly basis. Monthly estimates were obtained by interpolation.
2. For each tax series, we estimated a regression equation that extrapolates from historical data to predict the future. For estimated and withheld income taxes and other taxes, we included personal income as an independent variable. We used dummy variables to represent the effect of significant changes in the tax code.<sup>3</sup>
3. In estimating the regressions, we paid particular attention to the structure of the errors, to pick up the effects of seasonal, quarterly and monthly variations in tax collections. This procedure was done by estimating the equations with autoregressive (AR) and moving average (MA) components. The number and nature of the AR and MA lags were determined initially by examining the autocorrelation and partial correlation coefficients in the correlogram, and then fine-tuning after examining the structure of the equation residuals. The details are given in Table 3.<sup>3</sup>

The left side of the table contains the revenues and the percentage increases from the previous year broken out into the individual tax categories – the actual revenues for FY 2018 as well as the BHI projections for FY 2019 and FY 2020. The right side of the table provides the model specification used to forecast each tax and the timeframe for each data series used in the model.<sup>3</sup>

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<sup>3</sup> A complete breakdown of revenue forecasts by month and by the eleven tax headings is available upon request.

**Table 3**  
**Revenue forecasts, disaggregated, for FY2019 and FY2020, including technical estimation details**

	FY17	FY18	FY19	FY20	FY17	FY18	FY19	FY20	AR	MA	Vars/Dummies	Dates
Income tax												
Estimated payments	2,975	3,141	3,307	3,442	-7.5%	5.6%	5.3%	4.1%	1,2,4,5,12	3	PI	79:6-16:08
Tax Withheld	11,970	12,732	13,113	13,639	4.8%	6.4%	3.0%	4.0%	1,2,3,9,10,12	12	PI	79:6-16:08
Returns & Bills	1,941	2,146	2,244	2,300	-5.0%	10.6%	4.6%	2.5%	12	1,12	PI	79:6-16:08
Refunds	(2,202)	(1,779)	(1,755)	(1,865)	-4.0%	-19.2%	-1.3%	6.2%	1,2,12	3,12	PI	79:6-16:08
Income Net	14,684	16,240	16,909	17,516	2.1%	10.6%	4.1%	3.6%				
Sales & Use taxes	6,211	6,454	6,705	6,991	2.7%	3.9%	3.9%	4.3%	1,12	1,3,12,13	PI	79:6-16:08
Corporation Excise	2,197	2,392	2,779	2,751	1.8%	8.9%	16.2%	-1.0%	12	1,3,12	CIT(-3)	79:6-16:08
Business Excises	358	380	426	407	-5.0%	6.3%	11.9%	-4.4%	3,12	1,3,12	BUSEXC(-4)	79:6-16:08
Alcohol Beverages	84	85	86	86	2.3%	0.6%	1.3%	0.4%	1,12	1,3,12	PI	79:6-16:08
Cigarettes	490	471	468	467	-3.0%	-3.9%	-0.6%	-0.2%	1, 12	1,24	83:7, 93:1, 96:10, 02:8, 08:7	79:6-16:08
Motor Fuels	769	769	788	797	0.5%	0.0%	2.4%	1.2%	1,12	1,2,12	PI	79:6-16:08
Other taxes	868	996	1,394	1,476	-7.9%	14.7%	39.9%	5.9%	1,12	2,12	PI	79:6-16:08
<b>Effect of Tax Law Changes</b>			54	(166)								
<b>Total Taxes</b>	25,662	27,787	29,608	30,327	1.6%	8.3%	6.6%	2.4%				

AR refers to Autoregressive lags used in the regression. MA refers to Moving Average lags used in the regression. "Dummies" gives starting dates of each Dummy variable used (e.g., 01:1 is a dummy that is set equal to 1 from January 2001 onwards and to 0 otherwise). "Dates" refers to a period of data used in regression estimates." (PIEST)-12 refers to the income tax estimated payments data lagged by 12 months. PI refers to Personal Income and C, a constant variable. We directly incorporated into our estimates the cigarette and motor fuels tax increases.®

## Appendix

**Table A1: Revenue Effects of the Tax Cuts and Jobs Act Relative to CBO Benchmark**

	Change in revenue					
	2018		2027		Cumulative, 2018-28	
	<i>\$ billion</i>	%	<i>\$ billion</i>	%	<i>\$ billion</i>	%
Federal Revenue	-378	-11.80	-443	-11.92	-3,980	-11.53
Payroll Tax	11	0.87	15	1.04	111	3.81
Personal Income Tax	-259	-18.22	-308	-18.35	-2,841	-18.38
Corporate Income Tax	-106	-33.71	-124	-33.58	-1,002	-29.39
Estate and Gift Taxes	-22	-100	-36	-100	-238	-100
Other Taxes and Fees	1	0.58	1	0.45	6	0.48
State and Local Revenue	7	0.30	11	0.45	79	0.30
<b>Total Government Revenue</b>	-371	-6.36	-432	-6.62	-3,901	-6.32

Source: Based on BHI-DCGE model simulations.

**Table A2: Economic Effects of the Tax Cuts and Jobs Acts on the United States**

	Change relative to CBO baseline			
	2018		2027	
	<i>'000 jobs</i>	%	<i>'000 jobs</i>	%
<b>Total Employment</b>	<b>2,706</b>	<b>1.75</b>	<b>2,792</b>	<b>1.48</b>
Private	2,908	1.90	3,032	1.94
Public Employment	-202	-7.79	-240	-9.09
	<i>\$ billion</i>	%	<i>\$ billion</i>	%
Real GDP (\$billion)	562	3.15	1,142	5.28
Personal Income	551	3.11	1,036	4.28
Business Investment	179	6.32	382	7.81
Imports	35	1.02	98	2.28
Exports	34	1.21	97	2.75

Source: BHI-DCGE model.

**Table A3: Effects of the Tax Cuts and Jobs Act on Massachusetts\***

	2018		2022	
	'000 jobs	%	'000 jobs	%
Private Employment	29,240	0.96	30,000	0.88
	<i>\$ billion</i>	<i>%</i>	<i>\$ billion</i>	<i>%</i>
Real Disposable Income	6.716	1.71	5.543	1.22
Business Investment	3.210	3.22	2.071	1.82

Source: BHI-STAMP model.

The Beacon Hill Institute for Public Policy Research focuses on federal, state and local economic policies as they affect citizens and businesses. The Institute conducts research and educational programs to provide timely, concise and readable analyses that help voters, policymakers and opinion leaders understand today's leading public policy issues.

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## **THE BEACON HILL INSTITUTE FOR PUBLIC POLICY RESEARCH**

**165 Main Street, Suite 306,  
Medway, MA 02053  
Tel: 855-244-4550  
bhi@beaconhill.org  
<http://www.beaconhill.org>**