Massachusetts Tax Revenue Forecasts for FY 2017 and FY 2018

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The Beacon Hill Institute is pleased to offer its revenue forecast for Fiscal Year (FY) 2017 and FY 2018 for the Executive Office of Administration and Finance and the Joint Ways and Means Committee.[1] 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) a summary of the methodology used to provide our forecast.

(1) Current Forecast

BHI predicts that tax revenues will be:

- **$26.4 billion in FY 2017, 4.5% over FY 2016, and**
- **$27.8 billion in FY 2018, 5.2% over FY 2017.**

The 4.5% increase for FY 2017 and the 5.2% increase in FY 2018 reflect projected growth of state personal income.[2] BHI projects state personal income to increase by 5.1% and 3.9% in calendar years 2017 and 2018, respectively.[3]

[1]Prepared by the staff of the Beacon Hill Institute at Suffolk University, including Paul Bachman, Frank Conte and David G. Tuerck. Presented in Hearing Room A1 at 10 a.m.
[2] At the request of the Department of Revenue and Administration and Finance, BHI provided two updates to its December 2015 forecast in June and September 2016. See Table A1 in Appendix.
[3] 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 3.2% in the third quarter of 2016. Personal consumption (which makes up 70% of the economy), exports, private inventory investment and federal government spending contributed to the third quarter increase. In contrast to a weak report in the second quarter, corporate profits increased by $133.8 billion. The latest figure is a welcome sign that growth maybe at last approaching the 3.5% annualized average of the 1990s and is settling slightly above the postwar benchmark rate of 3.0%.[4] In the third quarter, durable goods rose by 11.6% which helped offset the declines in nondurable goods, state and local government spending and fixed investment.

The key manufacturing sector is speeding up at a sustained pace, according to the Markit U.S. Manufacturing Purchasing Managers Index.[5] The November data "pointed to a sustained acceleration in growth, with production volumes rising at the fastest pace since March 2015." The report's authors call the manufacturing sector "buoyant" based on domestic demand. Consumer confidence rose significantly in November, according to the Conference Board.[6] Consumers were positive about business activity and the job market and slightly less positive about incomes. Last month, the National Retail Federation said it expected an increase in "retail sales in November and December, a solid 3.6% to $655.8 billion — significantly higher than the 10-year average of 2.5% and above the seven-year average of 3.4% since recovery began in 2009." [7] The National Federation of Independent Business survey for November suggests that its members, buoyed by a new-found optimism, will expand payrolls.[8]

The jittery markets, plagued by uncertainty generated by the presidential campaign, has settled into a sense of new-found optimism about the new administration. Some analysts project that every sector stands to benefit from a lighter regulatory hand and tax cuts. [9]

The Wall Street Journal Economic Forecasting Survey for November 2016 predicts growth of 1.8%, 2.2% and 2.3% for the 2016, 2017 and 2018 respectively.[10] The economists in the survey also predict that the unemployment rate for December 2016 will be 4.9%. The *Economist* poll of forecasters from November

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[4] OECD, Economic Outlook Annex Tables. (May 2016) https://www.oecd.org/eco/outlook/economicoutlookannextables.htm. The 3.5% GDP benchmark is based on the years 1990-2001.

[5] IHS Markit News Release "Markit U.S. Manufacturing PMITM: Strongest rate of new order growth since March 2015," (December 1, 2016) http://tinyurl.com/hc3r9w3.

[6] The Conference Board, Consumer Confidence Index,
The Conference Board Consumer Confidence Index Rebounds Strongly in November, (November 30, 2016) https://www.conference-board.org/data/consumerconfidence.cfm.

[7] https://nrf.com/media/press-releases/national-retail-federation-forecasts-holiday-sales-increase-36.

[8] James Freeman, "Get Ready for the Trump Jobs Rally: NFIB survey finds surge in hiring plans," *Wall Street Journal*, (December 1, 2016), http://www.wsj.com/articles/get-ready-for-the-trump-jobs-rally-1480595290.

[9] Julie Verhage, "Goldman Says Trump's Presidency Will Benefit Stocks in Almost Every Sector," (November 30, 2016) http://www.bloomberg.com/news/articles/2016-11-30/goldman-says-trump-s-presidency-will-benefit-stocks-in-almost-every-sector.

[10] *Wall Street Journal* Economic Forecasting Survey (May 2016) http://projects.wsj.com/econforecast/#r=10&ind=gdpa.

2016 predicts that U.S. GDP growth will be between 1.3% and 1.6 % in 2016 and 1.3 % and 1.5 % in 2017.[11] The Federal Reserve Bank reports a median long run of 2.0%.[12] Making a long-term outlook, the OECD stated, "GDP is projected to return to a moderate growth trajectory in 2017 and strengthen in 2018, mainly due to the projected fiscal stimulus, which takes effect particularly in 2018. Indeed, projected fiscal support will boost GDP growth by just under 0.5 and 1 percentage point in 2017 and 2018 respectively."[13]

Table 1
Economic Forecasts for the United States, 2016 through 2018

Calendar Year	WSJ Survey of Economists	Federal Reserve Bank (Median Range June '16)	*The Economist poll*	OECD
2016	1.80%	2.00%	1.30%	1.50%
2017	2.20%	2.00%	1.70%	2.30%
2018	2.30%	2.00%	N/A	3.00%

The Bureau of Labor Statistics reported that the November 2016 unemployment rate declined to 4.6% with nonfarm payrolls increasing 178,000 jobs virtually matching consensus forecast of 176,000 jobs. The BLS revised the original September 2016 estimate upward (191,000 to 208,000) and the October downward (161,000 to 142,000) resulting in a net of 2,000 new jobs over the two months. Professional and business services added 63,000; health care added 28,000 and the construction sector added 19,000 (of which residential home builders contributed 15,000). The three month-average is now 176,000 new jobs per month.

The Labor Force Participation (LFP) rate declined to 62.7%. The employment-population rate remained at 59.7%. The number of persons employed part-time is down 416,000 over the past year. There were 591,000 discouraged workers in November, essentially unchanged from a year ago.

The number of persons considered long-term unemployed (27 weeks or more) was little changed at 1.9 million, though the portion of the long-term unemployed labor force is down to 24.8% of all the unemployed.

Average hourly earnings for all private nonfarm employees declined by 3-cents following an 11-cent increase in October. Still, year over year, earnings have risen by 2.5%. The average workweek remained at 34.4 hours.

One warning sign is apparent should the tax revenue picture continue to change. Revenue for all 50 state governments declined by 0.5% in the second quarter of 2016 according to the Rockefeller Institute of

[11] *The Economist* poll of forecasters, April 2016 averages (April 6, 2016). http://www.economist.com/news/economic-and-financial-indicators/21709959-economist-poll-forecasters-november-2016. See also http://www.economist.com/indicators

[12] https://www.federalreserve.gov/monetarypolicy/mpr_20160621_part3.htm

[13] https://www.oecd.org/eco/outlook/economic-forecast-summary-united-states-oecd-economic-outlook-november-2016.pdf

Government.[14] This represents a "substantial deterioration from the 5.0 percent average growth for the four previous quarters." Declines in corporate income taxes, estimated payments, slower withholding taxes on wages and substantial weakness in sales taxes along with lower severance taxes accounted for the decline. On the other hand, local government revenue has increased due to mounting housing prices and stable revenues generated from property taxes.

To address a number of public policy concerns, the U.S. needs to move beyond what economist Brian Wesbury of First Trust calls the "plow horse economy" and to a "race horse economy."[15] The President-elect's proposed tax plans are growth-oriented and it is clear that the new administration seeks to restrain the regulatory reach of the last eight years.

In September, The Beacon Hill Institute applied its National Center for Policy Analysis-DCGE model to the tax plan and found that the plan would increase real GDP by 9.36% and create 3.762 million new private sector jobs by 2026.[16] The NCPA-DCGE model also found that the plan would also lower combined federal, state and local tax revenues by $7.379 trillion over the 10-year period 2017-26. However, state and local tax revenue would increase (See Table A2 in Appendix). These tax cuts would provide a substantial boost to the private economy by increasing employment, and investment could be 11.7% higher by 2026. (See Table A3 in Appendix).

(2b) The Massachusetts Economy

For most of the recovery since 2009, Massachusetts has enjoyed above average growth in employment. As the Commonwealth moves forward, the good run may shift downward. In its fall 2015 forecast, the latest available, the New England Economic Partnership (NEEP) predicts slowing growth: namely: 3.1% (2016); 2.2% (2017) and 1.5% (2018).[17]

The Massachusetts economy grew by 2.0% in 2015. However, the BEA is reporting that the state's economy only grew by 1.6% in the first quarter of 2016, the most recent data available. That number puts the state 22th in the nation. The New England leader, New Hampshire with 2.9%, ranked 5th nationally in first quarter growth.[18] The size of Massachusetts's economy, measured by nominal GDP, is more than $476.7 billion[19] with a real GDP value of $427.5 billion in 2009 dollars.[20]

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[14] Lucy Dadayan and Donald J. Boyd, "Widespread declines in state tax revenues for the second quarter of 2016: State budgets face new uncertainties in the aftermath of the election." State Revenue Report, (November 2016). The Nelson A. Rockefeller Institute of Government, State University of New York. http://www.rockinst.org/pdf/government_finance/state_revenue_report/2016-11-30-srr_105.pdf.

[15] Brian Wesbury, First Trust DataWatch, (November 30, 2016) https://www.ftportfolios.com/retail/blogs/economics/index.aspx.

[16] 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.

[17] New England Economic Partnership, Fall 2015, "Economic Outlook," http://www.neepecon.org. (Data file)

[18] Bureau of Economic Analysis, "Gross Domestic Product by State: First Quarter 2016: Construction Led Growth across States in the First Quarter, (July 27, 2016) http://www.bea.gov/newsreleases/regional/gdp_state/qgsp_newsrelease.htm. http://www.bea.gov/newsreleases/regional/gdp_state/2016/qgsp0716.htm

[19] BEA, http://tinyurl.com/knep34d.

[20] Bureau of Economic Analysis.

The Massachusetts unemployment rate dropped to 3.3% in October 2016, according to the Executive Office of Labor and Workforce Development (LWD).[21] The state's unemployment rate is well below the national April rate of 4.6%. According to preliminary measures, the state actually lost 5,500 jobs but that was offset by an upward September revision that added 3,000 to the original number of 5,100.[22] The state's labor force participation (LFP) rate remains above the national rate, at 64.9%. The latest figures show employment gains for government, professional, scientific and business services, manufacturing and other services. Education and health services, construction, leisure and hospitality, finance and information lost jobs over the month. The state's labor force stands at 3.608 million, for a decrease of 2,300. At the local level, the BLS found that the unemployment rate dropped to 2.6 % for the city of Cambridge in September 2016.[23] The city of Springfield saw an unemployment rate of 6.3% in September 2016 while the Worcester area saw a rate of 3.7%.[24] According to LW&D, since 2008 when the unemployment rate registered at 8.8%, the Bay State has 327,100 more residents employed, 186,800 fewer residents unemployed and a labor force that has increased by 140,400.

According to its September Employment Outlook Survey, ManpowerGroup, the human resources consulting firm, found hiring sentiment to be upbeat and stable for Massachusetts. "From October to December, 20 percent of the companies interviewed plan to hire more employees, while 9 percent expect to reduce their payrolls. Another 70 percent expect to maintain their current workforce levels and 1 percent are not certain of their hiring plans."[25]

The Federal Reserve Bank's October 2016 "Beige Book" reports that a modest to moderate pace of growth in the New England district.[26] The bank notes, that "most retail and manufacturing respondents report increasing sales or revenues from a year earlier… and staffing services firms are seeing growth in placements and revenues." The Boston Fed noted that its contacts report that the "amount of speculative office construction remains limited and contacts feel that the current office construction pace is, if anything, slower than what is justified by fundamentals. " Manufacturing is doing better than expected with one "diversified manufacturer of aerospace and construction goods said that he "cannot think of when the domestic economy has been so strong."

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[21] Labor and Workforce Development, "October Unemployment Rate Dropped to 3.3 percent in October: Year-to date, Massachusetts has added 61,300 Jobs," (November 17, 2016) http://lmi2.detma.org/Lmi/News_release_state.asp.

[22] Labor and Workforce Development, "Quick Stats," (April 2016), http://lmi2.detma.org/lmi/Quick_StatsCES.asp

[23] BLS Economic Summary Boston-MA-NH Metro Area (November 2, 2016), http://www.bls.gov/regions/new-england/summary/blssummary_boston.pdf.

[24] See Labor Force and Unemployment Data at http://lmi2.detma.org/lmi/lmi_lur_a.asp#3 and Springfield, MA-CT, Area Economic Summary (November 2, 2016), http://www.bls.gov/regions/new-england/summary/blssummary_springfield_ma.pdf

[16] ManpowerGroup, "Favorable Job Market Expected for Massachusetts," September 13, 2016, http://press.manpower.com/reports/2016/favorable-job-market-expected-for-massachusetts-2/

[26] Board of Governors of Federal Reserve Bank, Beige Book, (October 2016) https://www.federalreserve.gov/monetarypolicy/beigebook/beigebook201610.htm.

The ever-critical Massachusetts technology sector is riding post-election momentum. Publicly-held tech companies such as semiconductor manufacturers and cybersecurity firms have posted gains in the market since November 8.[27]

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.[28] 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 ratio of state and local taxes over per capita of income 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 attractive for global investment.

In its October 2016 survey, the Suffolk University Political Research Center found that 61.0% of Massachusetts respondents think that the Bay State is heading in the right direction, up from 57% in May 2016.[29] Consistent with the May polling data, the sentiment in the October 2016 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 3.9% gain in retail sales in November and December compared with 2015.[30] Massachusetts sales increased last year by a very strong 4.7%, which marked the sixth consecutive year of local holiday sales increases.

Changing demographics for Massachusetts could cause long-term changes to the state's revenue mix.[31] The effects of the first wave of baby boom retirements on state budget is a topic of discussion among public finance economists who have only begun to study the implications on state tax revenue. Massachusetts's population is expected to grow by at least 6% by the year 2030 and thus far the predicted expenditure growth is modest.[32] While more research is necessary to forecast workforce participation and overall spending of aging populations, state governments should examine whether the current reliance on the mix income and sales taxes are sufficient to meet future expenditures. State budget writers should be especially mindful of the Commonwealth's long-term obligations, such as pensions and health care benefits. The Mercatus Center at George Mason University recently found Massachusetts

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[27] Kelly J. O'Brien, "20 Mass. tech stocks that have performed best since the election," Boston Business Journal, (December 1, 2016) http://tinyurl.com/je3yfd6.

[28] Beacon Hill Institute at Suffolk University, *State Competitiveness Report* (15), http://www.beaconhill.org/Compete15/Compete2015.pdf.

Suffolk University Political Research Center, SUPRC-Boston Globe (October 2016) http://www.suffolk.edu/documents/SUPRC/10_27_2016_marginals.pdf, (5/2 – 5/5)). See also http://www.suffolk.edu/documents/SUPRC/10_27_2016_tables.pdf and "Governor Baker – Year 2," (March 2016) http://www.suffolk.edu/documents/SUPRC/5_9_2016_marginals.pdf, (5/2 – 5/5

[30] RAM predicts local holiday sales increases of 3.9%: Stable Consumer Confidence and Year to Date Trends Should Help Massachusetts Retailers Boost Sales for Seventh Year In A Row, Press Release (November 17, 2016)

[31] Alison Felix and Kate Watkins, "The Impact of an Aging U.S. Population on State Tax Revenues," Economic Review, Federal Reserve Bank of Kansas City, (Fourth Quarter 2013):95-127, https://www.kansascityfed.org/publicat/econrev/pdf/13q4Felix-Watkins.pdf.

[32] Ibid, 113.

to be among the bottom five states "largely owing to the low amounts of cash it has on hand and its large debt obligation."[33]

The demise of the Trans-Pacific Partnership (TPP) may prove to be a lost opportunity for Massachusetts exporters. The incoming administration has made clear its intention to rewrite landmark trade deals such as NAFTA. While lower in volume compared with other states, Massachusetts exported $3.3 billion of goods and services to Mexico. [34] Canada remains a major trading partner; Massachusetts exported $5.5 billion of goods and services in 2014 and is expected to rely on its partner for reliable sources of energy.[35] The deleterious effects of trade protection is an iron law of economics. The burden of higher tariffs of the kind proposed by the president-elect on Mexico, China and Japan will most certainly fall disproportionately on low income consumers.[36] Widespread changes in trade agreements are sure to impinge upon the Massachusetts economy which relies on expanding markets.

[33] Eileen Norcross and Olivia Gonzalez, "Ranking the States by Fiscal Condition," 2016 Edition, (June 2016) http://mercatus.org/sites/default/files/Norcross-Fiscal-Rankings-2-v2_1.pdf.

[34] The Business Roundtable The TPP Agreement: An Opportunity for Massachusetts (2015) http://www.tradebenefitsamerica.org/sites/default/files/BRT_TPP_2015_Massachusetts.pdf.

[35] Ibid.

[36] 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.

Methodology

Table 2
Economic Forecasts for Massachusetts, 2017 through 2018

Massachusetts (calendar year end)1	Actual 2013	Actual 2014	Actual 2015	Forecast 2016	Forecast 2017	Forecast 2018
Gross State Product	415	425	440	454	463	470
% change p.a.	*1.1*	*2.3*	*3.5*	*3.1*	*2.2*	*1.5*
Personal income ($ billion)	383	400	422	447	470	488
% change p.a.	*1.7*	*4.3*	*5.5*	*6.0*	*5.1*	*3.9*
Employment ('000)	3,359	3,414	3,482	3,546	3,594	3,619
% change p.a.	*1.7*	*1.6*	*2.0*	*1.8*	*1.4*	*0.7*
Unemployment rate, %	6.6	5.7	4.7	4.4	4.2	4.1
BHI forecast, MA taxes, (fiscal year)	**Actual**	**Actual**	**Actual**	**Actual**	**Forecast**	**Forecast**
Personal income tax ($ million)	12,829	13,202	14,375	14,388	15,204	16,213
% change p.a.	*7.7*	*2.9*	*8.9*	*0.1*	*5.7*	*6.6*
Sales Tax	5164.0	5495.8	5774.5	6047.0	6,211	6,369
% change p.a.	*2.1*	*6.4*	*5.1*	*4.7*	*2.7*	*2.5*
Corporation Excise	1821.6	2049.0	2054.9	2158.7	2,274	2,430
% change p.a.	*2.8*	*12.5*	*0.3*	*5.1*	*5.3*	*6.9*
Business Excises	439	461	365	377	423	401
% change p.a.	*(20.0)*	*5.0*	*(20.9)*	*3.3*	*12.2*	*(5.2)*
Motor Fuels	652	732	756	766	785	801
% change p.a.	*(1.6)*	*12.4*	*3.2*	*1.3*	*2.5*	*2.0*
Total Taxes	22,121	23,369	24,717	25,267	**26,405**	**27,771**
% change p.a.	*4.8*	*5.6*	*5.8*	*2.2*	*4.5*	*5.2*

Notes: [1] From New England Economic Partnership, Fall *Economic Outlook*, 2015.

BHI revenue forecasts assume that there will be no major change in Massachusetts tax policy for the forecast period, which runs through June 2018. Table 2 shows the forecasts by year and by major tax.

For FY 2018, we forecast a 5.2% increase in tax revenues over FY 2017. Personal income tax revenues will increase by 6.6% and sales tax revenues by 2.5%. Corporate income tax revenues will rise by 6.9%, and business excise tax revenues will decrease by 5.2%. 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 rise by 4.5% and alcohol taxes will rise by 4.3%. Motor fuels taxes will rise by 2.0% and cigarette taxes will rise by 0.7%.

We prepared tax revenue forecasts for 11 categories for every month through June 2018. 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 2018.

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 pick up the effect of major changes in the tax code.

3. In estimating the regressions, we paid particular attention to the structure of the errors, in order to pick up the effects of seasonal, quarterly and monthly variations in tax collections. This 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.

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 2016 as well as the BHI projections for FY 2017 and FY 2018. 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.[37]

[37] A complete breakdown of revenue forecasts by month and by the eleven tax headings is available upon request.

Table 3
Revenue forecasts, disaggregated, for FY17 and FY18, including technical estimation details

					% change							
	FY15	FY16	FY17	FY18	FY14	FY15	FY16	FY17	FY18	AR	MA	Vars/Dummies	Dates
Income tax													
Estimated payments	*3,174*	*3,217*	*3,287*	*3,480*	*6.0%*	*15.0%*	*1.4%*	*2.2%*	*5.9%*	1,2,5,12	3	PI, PIEST(-12)	79:6-16:08
Tax Withheld	*11,063*	*11,422*	*12,202*	*12,920*	*4.9%*	*5.3%*	*3.2%*	*6.8%*	*5.9%*	1,12	12	PI	79:6-16:08
Returns & Bills	*2,183*	*2,042*	*2,214*	*2,365*	*-8.0%*	*12.4%*	*-6.5%*	*8.4%*	*6.8%*	1,12	1,12	PI	79:6-16:08
Refunds	*(2,045)*	*(2,293)*	*(2,499)*	*(2,551)*	*5.7%*	*1.9%*	*12.1%*	*9.0%*	*2.1%*	1,2,12	1,3,12	PI	79:6-16:08
Income Net	*14,375*	*14,388*	*15,204*	*16,213*	*2.9%*	*8.9%*	*0.1%*	*5.7%*	*6.6%*				
Sales & Use taxes	*5,774*	*6,047*	*6,211*	*6,369*	*6.4%*	*5.1%*	*4.7%*	*2.7%*	*2.5%*	4,12	1,13	C	79:6-16:08
Corporation Excise	*2,055*	*2,159*	*2,274*	*2,430*	*12.5%*	*0.3%*	*5.1%*	*5.3%*	*6.9%*	12	3,12	PI	79:6-16:08
Business Excises	*365*	*377*	*423*	*401*	*5.0%*	*-20.9%*	*3.3%*	*12.2%*	*5.2%*	12	3,12	C	79:6-16:08
Alcohol Beverages	*80*	*83*	*85*	*88*	*1.9%*	*2.7%*	*3.4%*	*2.5%*	*4.3%*	1,3,12	12	PI	79:6-16:08
Cigarettes	*510*	*506*	*492*	*495*	*18.3%*	*-2.0%*	*-0.9%*	*-2.7%*	*0.7%*	1,24	1, 12	83:7, 93:1, 96:10, 02:8, 08:7	79:6-16:08
Motor Fuels	*756*	*766*	*785*	*801*	*12.4%*	*3.2%*	*1.3%*	*2.5%*	*2.0%*	1,13	1,12	PI	79:6-16:08
Other taxes	*802*	*942*	*932*	*974*	*18.9%*	*-3.4%*	*17.4%*	*-1.1%*	*4.5%*	1,12	2,12	PI	79:6-16:08
Effect of Tax Law Changes													
Total Taxes	24,717	25,267	26,405	27,771	*5.6%*	*5.8%*	*2.2%*	*4.5%*	*5.2%*				

Notes:

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 period of data used in regression estimates." (PIEST)-12 refers to the income tax estimated payments data lagged by 12 month. 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 - Beacon Hill Institute Previous Forecast Updates

Forecast Date	FY17($b)	% Change over previous period	FY18 *($b)*	% Change over previous period
Sep-16	26.1	3.1	26.9	3.3
Jun-16	26.4	4	27.3	3.3
Dec-15	27.3	5.6	-	-

Table A2: Revenue Effects of the Trump Tax Proposals Relative to CBO Benchmark

	Change in revenue					
	2017		2026		Cumulative, 2017-26	
	$ billion	*%*	*$ billion*	*%*	*$ billion*	*%*
Federal Revenue	-707	-19.40	-993	-19.69	-8,394	-19.94
Payroll Tax	31	2.63	69	4.33	514	3.81
Personal Income Tax	-486	-26.49	-742	-27.85	-6,040	-27.86
Corporate Income Tax	-236	-64.48	-299	-67.34	-2,682	-67.25
Estate and Gift Taxes	-21	-100	-30	-100	-249	-100
Other Taxes and Fees	5	2.06	9	2.88	63	2.37
State and Local Revenue	62	0.03	139	3.98	1,015	3.49
Total Government Revenue	**-645**	**-10.94**	**-854**	**-10.01**	**-7,379**	**-10.37**

Source: Based on NCPA-DCGE model simulations.

Table A3: Economic Effects of the Trump Tax Proposals

	Change relative to CBO baseline			
	2017		2026	
	'000 jobs	*%*	*'000 jobs*	*%*
Total Employment	**2,512**	**1.66**	**3,162**	**1.61**
Private Employment	3,066	2.07	3,762	1.94
Public Employment	-554	-21.31	-601	-23.20
	$ billion	*%*	*$ billion*	*%*
Real GDP ($billion)	985	5.64	1,981	9.36
Personal Income	646	3.83	1,374	5.64
Business Investment	191	7.16	540	11.72
Imports	23	0.69	95	2.26
Exports	27	0.98	97	2.80

Source: NCPA-DCGE model.

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