

## **Federal Excise Taxes on Cigarettes in the United States**

In April 2015, the Tobacco Tax and Enforcement Reform Act was introduced as a modification of the federal tax code by Senator Richard Blumenthal with Senators Dick Durbin, Jack Reed, and Barbara Boxer<sup>1</sup>. The purpose of the proposed legislation is two-fold. First, the legislation would increase and adjust federal excise taxes on tobacco products so that all tobacco products are taxed equally. Under current law, some tobacco products are taxed at higher rates than others. Tobacco companies can avoid paying taxes by marketing products so that they are eligible for the lower tax requirements<sup>2</sup>. Secondly, the proponents of the legislation hope the higher taxes will reduce smoking, particularly among young people<sup>3</sup>. The bill includes a provision to regularly increase the federal excise taxes on tobacco to account for inflation.

The most recent increase in federal cigarette tax was implemented in 2009 under the Children's Health Insurance Program Reauthorization Act, which raised the tax on a pack of cigarettes to \$1.01<sup>4</sup>. The Tobacco Tax and Enforcement Reform Act of 2015 calls for a 94% increase in cigarette tax relative to the tax established in 2009, raising the tax per pack to \$1.95. In order to meet the goals of the legislation, the higher tax must both increase federal revenue and reduce the purchase (consumption) of cigarettes, particularly by young people. The effectiveness of this legislation depends on the price elasticity of demand for cigarettes, which describes how a change in the price of cigarettes impacts consumer demand. Due to the magnitude of the tax, it is likely that the tax will reduce smoking appreciably.

### **Methodology & Data**

*Impact on Smoking.* To determine whether the legislation would reduce consumption of smoking, I estimated the percent change in quantity of cigarettes demanded, which is the product

of the percent change in price and the price elasticity of demand. The percent change in price is calculated based on the 2009 tax price and the new tax price delineated in the legislation, and is equal to 94.02%.

Values for the price elasticity of demand for cigarettes vary in economic literature. A study of cigarette consumption in 48 states found an average elasticity of -0.417, which is consistent with previous studies that estimated elasticity to be approximately -0.4<sup>5</sup>. However, state elasticity values ranged from -0.063 in New Hampshire (highly inelastic) to -2.699 in Illinois (elastic)<sup>6</sup>. Earlier studies found national values for price elasticity of demand for cigarettes to vary from -0.28 to -0.8<sup>7</sup>. One study that focused specifically on youth smokers determined price elasticity of demand for cigarettes to be -0.25%<sup>8</sup>. I have chosen to use elasticity values of -0.25 (value specific to youth smokers), -0.4 (most commonly cited value), and -0.8 (to provide a higher range estimate for comparison). The resulting percent changes in quantity demanded are summarized in Table 1.

***Impact on Federal Revenue.*** To determine whether the legislation would increase federal revenue, I estimated the change in total revenue for the federal government. Total revenue is equal to the price of the federal excise tax multiplied by the number of cigarette packs sold. The proposed federal excise tax is given by the legislation (\$1.95 per pack). To estimate the number of cigarette packs, I first determined the number of packs sold in 2014 by dividing the 2014 revenue by the current federal excise tax. In Fiscal Year 2014, the federal government earned \$13,445,284,687 in revenue from the excise tax of \$1.01<sup>9</sup>, so Americans purchased 13,312,163,060 cigarette packs. Since price elasticity of demand for cigarettes is negative, the price increase proposed by the Tobacco Tax and Enforcement Reform Act will decrease the number of cigarette packs purchased by a factor of the percent change in quantity demanded

(new quantity demanded  $Q_D$  = number of packs sold in FY 14 – (packs sold in FY14 x percent change in quantity demanded)). Adjusting the FY14 federal revenue for inflation<sup>10</sup>, the federal government would earn \$13,679,107,330 in 2016 if the legislation were not enacted and there were no other significant changes in supply or demand. Consequently, the anticipated change in revenue following enactment of the legislation is equal to difference of this value and the product of the new tax and the new quantity demanded, as shown in Table 1. Appendix A includes additional information on calculations.

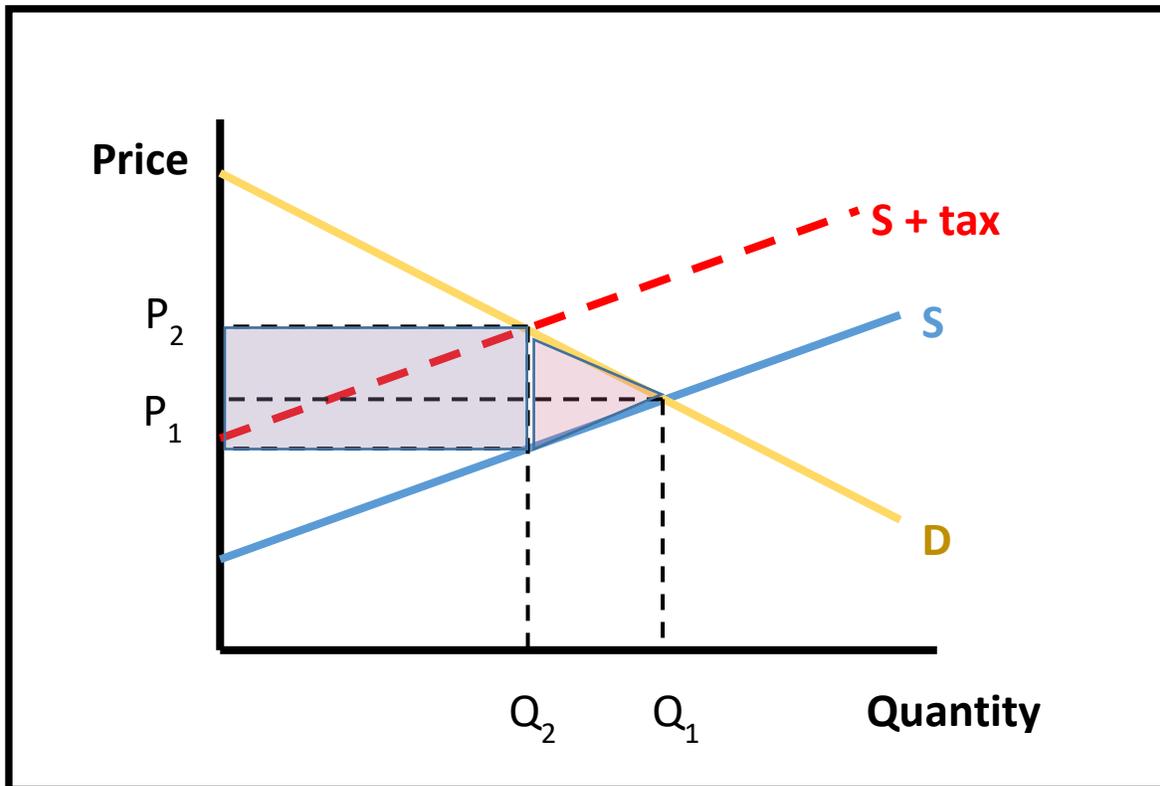
**Table 1. Projected Change in Federal Revenue Based on Increase in Federal Excise Tax by the Tobacco Tax and Enforcement Reform Act of 2015**

<b>Elasticity</b>	<b>Percent change in price</b>	<b>Percent change in quantity demanded</b>	<b>Change in Federal Revenue</b>
-0.25	94.02%	-23.5%	+\$6,544,958,247
-0.4	94.02%	-37.6%	+\$2,884,000,253
-0.8	94.02%	-75.2%	-\$6,878,554,397

**Discussion**

The value of the price elasticity of demand for cigarettes has major implications for the effect of the Tobacco Tax and Enforcement Reform Act. When cigarette demand is more inelastic, the tax will earn the government more revenue but may not significantly curb smoking. When cigarette demand is more elastic, the government will lose revenue on the tax but reduce smoking to a higher degree. Assuming that the most commonly cited elasticity value of -0.4 accurately represents the nation, then implementing this legislation will result in a decrease smoking consumption and increased revenue for the federal government. The effect of the tax on supply and demand is summarized in Figure 1, where the tax is represented as an inward shift of the supply curve that results in a higher market price ( $P_2$ ), deadweight loss (pink region), and a transfer of consumer surplus and producer surplus to the federal government (purple region).

Figure 1. Effect of Federal Excise Tax on Supply & Demand of Cigarettes



Cigarette producers tend to hike up prices over the threshold needed to account for the tax in order to make up for potential lost revenue and to account for inflation<sup>11</sup>. Since producers protect themselves against the tax hike, the extra cost of cigarettes is largely transferred to the consumer. This paper only accounts for the increase in federal excise tax and not any additional price increases imposed by manufacturers. Consequently, smoking consumption may drop further than anticipated by this study if the Tobacco Tax and Enforcement Reform Act is implemented.

Variation in price elasticity of demand for cigarettes amongst states may be attributable to interstate variation in income elasticity of demand<sup>12</sup>. Income elasticity of demand measures how a consumer's spending habits change with respect to a change in their income. An increase

in the cost of a pack of cigarettes effectively reduces a smoker's available income to spend on cigarettes and other goods. For some smokers, the increased price may even be prohibitive for their budget, and smokers may substitute to consuming more coffee or alcohol instead of paying extra money for cigarettes<sup>13</sup>. Evaluating the price elasticity of demand by state rather than assuming one value for the nation as a whole would likely produce a better estimate of the change in revenue for the federal government, as well as the impact on consumption. Additionally, state and local governments also levy excise taxes on tobacco purchases. The average price of a pack of cigarettes varies widely by state and can differ by as much as \$5 per pack<sup>14</sup>. States with larger tobacco taxes, or states like Illinois that exhibit very elastic demand for cigarettes, may lose revenue if the federal excise taxes increase.

## **Conclusion**

Smoking is relatively inelastic across the nation, and most nationwide studies on price elasticity of demand for cigarettes determine a value of about -0.4%<sup>15</sup>. As a result, the Tobacco Tax and Enforcement Reform Act of 2015 will increase federal revenue and reduce consumption of smoking by -37.6% overall. Though youth smoking tends to be more inelastic than adult smoking, a tax increase of this magnitude would reduce youth smoking by a factor of 23.5% or more. These results are concurrent with the stated goals of the Tobacco Tax and Enforcement Reform Act, but the bill has not been signed into law due to a lack of support from the majority party<sup>16</sup>. For a balanced analysis, policymakers should consider the impact of this legislation on tobacco farmers and manufacturers in addition to the policy's effects on smoking and federal revenue.

**Appendix A**

Elasticity = (percent change in quantity demanded) / (percent change in price)

$$E = \frac{\Delta Q}{\Delta P}$$

Percent change in quantity demanded = E x (percent change in price)

$$E * \Delta P = \Delta Q$$

Total revenue = Price x Quantity

<b>Elasticity</b>	<b>% Change in Price</b>	<b>% Change in Quantity Demanded</b>
-0.25	94.02%	-23.51%
-0.4	94.02%	-37.61%
-0.8	94.02%	-75.22%

<b>FY16 Revenue Before Legislation</b>	<b>Quantity of Packs Demanded</b>	<b>New Federal Excise Tax</b>	<b>FY16 Revenue After Legislation</b>	<b>Change in Total Revenue</b>
\$13,312,163,056	10,183,139,130	\$1.95	\$19,857,121,303.53	\$6,544,958,247.09
\$13,312,163,056	8,305,724,774	\$1.95	\$16,196,163,309.63	\$2,884,000,253.19
\$13,312,163,056	3,299,286,492	\$1.95	\$6,433,608,659.21	-\$6,878,554,397.23

Quantity of Packs Demanded = FY16 Revenue Before Legislation + (Fiscal Revenue Before Legislation x % Change in Quantity Demanded)

FY16 Revenue After Legislation = (Quantity of Packs Demanded) x (New Federal Excise Tax)

Change in Total Revenue = FY16 Revenue After Legislation - FY16 Revenue Before Legislation

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