The Efficacy of Local Cigarette Excise Taxes in Virginia

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Class of 2020
Aims of the Study

Demonstrate the link between smoking prevalence and chronic obstructive pulmonary disease (COPD) and asthma hospitalizations

Examine whether local cigarette taxes in VA cause smoking prevalence to decline
Motivation

Percent of Counties in VA with a Local Cigarette Tax (2004-2016)

Median Population in Counties with and without Taxes, 2012
Motivation

Debate on county’s authority to levy cigarette tax

Fiscal impacts of cigarette taxes

Public health impacts
My Contributions

- Pioneer study assessing the efficacy of local cigarette taxes in VA
- Created unique locality-to-county weighted cigarette tax data set
## Summary Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observations</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Smoking Prevalence, 2004</td>
<td>133</td>
<td>26.25</td>
<td>4.02</td>
<td>14.21</td>
<td>33.94</td>
</tr>
<tr>
<td>Total Smoking Prevalence, 2012</td>
<td>133</td>
<td>23.27</td>
<td>4.28</td>
<td>10.02</td>
<td>31.65</td>
</tr>
<tr>
<td>Female Daily Smoking Prevalence, 2004</td>
<td>133</td>
<td>18.61</td>
<td>3.99</td>
<td>8.21</td>
<td>27.21</td>
</tr>
<tr>
<td>Female Daily Smoking Prevalence, 2012</td>
<td>133</td>
<td>15.85</td>
<td>3.88</td>
<td>5.36</td>
<td>25.78</td>
</tr>
<tr>
<td>Male Daily Smoking Prevalence, 2004</td>
<td>133</td>
<td>22.95</td>
<td>4.28</td>
<td>9.92</td>
<td>29.3</td>
</tr>
<tr>
<td>Male Daily Smoking Prevalence, 2012</td>
<td>133</td>
<td>18.3</td>
<td>3.98</td>
<td>5.43</td>
<td>26.61</td>
</tr>
<tr>
<td>Nominal Cigarette Tax Rate, 2004</td>
<td>133</td>
<td>0.08</td>
<td>0.16</td>
<td>0</td>
<td>0.65</td>
</tr>
<tr>
<td>Nominal Cigarette Tax Rate, 2012</td>
<td>133</td>
<td>0.11</td>
<td>0.21</td>
<td>0</td>
<td>0.85</td>
</tr>
<tr>
<td>COPD Hospitalizations (per 100,000), 2012</td>
<td>132</td>
<td>1744</td>
<td>1133</td>
<td>13</td>
<td>6530</td>
</tr>
<tr>
<td>Asthma Hospitalizations (per 100,000), 2012</td>
<td>132</td>
<td>843</td>
<td>431</td>
<td>0</td>
<td>2626</td>
</tr>
</tbody>
</table>

**VHI disclaimer:** Virginia Health Information (VHI) has provided non-confidential patient level information used in this study which it has compiled in accordance with Virginia law but which it has no authority to independently verify. By using this study, the user agrees to assume all risks that may be associated with or arise from the use of inaccurate data. VHI cannot and does not represent that the use of VHI’s data was appropriate for this study or endorse or support any conclusions or inferences that may be drawn from the use of VHI’s data.
Method & Results – Hospitalizations

Cross Sectional Regression

\[ y_i = \beta_0 + \beta_1 smoke_i + \beta_2 X_i + u_i \]

- \( y_i \) are smoking related hospitalizations in 2012 in a county \( i \)
- \( smoke_i \) is the smoking prevalence in 2012 in a county \( i \)
- \( X_i \) are varying county traits in 2012 (controls)
- \( u_i \) are unobserved differences between counties

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>ln(COPD Hospitalizations, 2012)</th>
<th>Asthma Hospitalizations, 2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012 Smoking Prevalence</td>
<td>0.0453**</td>
<td>26.90*</td>
</tr>
<tr>
<td>Observations</td>
<td>132</td>
<td>132</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.79</td>
<td>0.57</td>
</tr>
</tbody>
</table>

Population weighted standard errors displayed under estimated coefficients
Statistical significance indicated by * \( p < 0.1 \) ** \( p < 0.05 \), *** \( p < 0.001 \)
Methods & Results - Taxes

Cross Sectional Regression

\[ y_i = \beta_0 + \beta_1 TAX_i + \beta_2 X_i + u_i \]

- \( y_i \) is the smoking prevalence in a county \( i \)
- \( TAX_i \) is the population-adjusted cigarette tax in a county \( i \)
- \( X_i \) are varying county traits (controls)
- \( u_i \) are unobserved differences between counties

---|---|---|---
2004 Cigarette Tax - Nominal | -0.0287 | -0.0914* | -0.0301*
 | (0.0165) | (0.0517) | (0.0170)
Observations | 133 | 133 | 133
R-Squared | 0.703 | 0.728 | 0.723

Population weighted standard errors displayed under estimated coefficients
Statistical significance indicated by * p < 0.1 ** p < 0.05, *** p < 0.001
**Methods & Results - Taxes**

**First Difference Model**

\[ \Delta y_i = \beta_0 + \Delta \beta_1 TAX_i + \Delta \beta_2 X_i + \Delta u_i \]

\( y_i \) is \( \Delta sm\text{e}kle \) between 2004 and 2012 in a county \( i \)

\( TAX_i \) is \( \Delta TAX \) between 2004 and 2012 in a county \( i \)

\( X_i \) are \( \Delta X \) (controls) between 2004 and 2012 in a county \( i \)

\( u_i \) is the time varying error

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>( \Delta ) Smoking Prevalence</th>
<th>( \Delta ) Female Daily Smoking Prevalence</th>
<th>( \Delta ) Male Daily Smoking Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \Delta ) Cigarette Tax - Nominal</td>
<td>0.00163</td>
<td>-0.0230</td>
<td>0.0219</td>
</tr>
<tr>
<td>Observations</td>
<td>133</td>
<td>133</td>
<td>133</td>
</tr>
<tr>
<td>R-Squared</td>
<td>0.222</td>
<td>0.158</td>
<td>0.364</td>
</tr>
</tbody>
</table>

Population weighted standard errors displayed under estimated coefficients
Statistical significance indicated by * \( p < 0.1 \) ** \( p < 0.05 \), *** \( p < 0.001 \)
Discussion & Conclusion

Limitations
- Omitted variable bias in first difference model

Takeaways
- More study on the efficacy of local cigarette taxes

Policy lessons
- Local cigarette taxes may not reduce smoking prevalence
Thank you!

QUESTIONS?

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Adverse Effects of Cigarette Taxes

• Excise taxes are inherently regressive
  – The tax places an equal burden upon everyone (no matter your income)
  – Excise taxes place the highest financial burden on people of low income

• Small businesses (convenience stores)
  – Cigarette prices cheaper in nearby towns without tax
  – Consumers begin to ditch convenience stores with a tax and move to those without one
  – “Deadweight loss” of excise taxes
Fiscal Impacts of Cigarette Taxes

- Projected revenue gains from taxes fall short of actual revenue gains, on average
- Local economy is disproportionately affected