Simple Difference in Difference Example

Bill Evans
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All states and the Federal government levy excise taxes on cigarettes. There have been dozens of studies that use changes in taxes and corresponding changes in consumption to estimate the elasticity of demand for cigarettes. In this problem set, we will examine how a large tax hike altered smoking rates in an important and interesting population.

In 1993, Michigan voters passed a referendum eliminating local property taxes, which are the main source of revenues for schools. To make up for lost revenue, the Michigan legislature raised the cigarette tax from 25 to 75 cents per pack. The higher tax rate went into effect on May 1, 1994. The Surgeon General of the US estimates that smoking during pregnancy doubles the chance a baby will be born with a low birth weight (<2500 grams). Although smoking rates among pregnant women have fallen considerably over the past 20 years, roughly 17 percent of births are to women who smoked during their pregnancy. In recent years, a number of public health officials have suggested that higher cigarette taxes can be used as way to improve birth outcomes. We will use the data from the Michigan "experiment" to evaluate this conjecture.

The data for this project are taken from the Natality Detail File, which is an annual census of births in the US. I have taken a 5% random sample of births for the state of Michigan for the 32 months prior and 24 months after the tax hike. I have also include a 5% random sample of data over the same period for two Midwestern states that had no nominal change in their state cigarette tax rates over this period: Iowa and Pennsylvania.

The data for this project is in the STATA data file michigan.dta. The data set has a little more than 76,000 observations. Detailed variable definitions are listed below.

Variable	Definition
MONTH	This is an index that equals 1 in the first month (October 1991) 2 in the second (October 1992), through month 56. Month 33 is the month the new tax went into effect (May of 1994).
STATE	2-digit state FIPS code. Michigan is state 26.
SMOKED	Dummy variable, =1 if a mother self-reported that she smoked during her pregnancy, =0 otherwise.
MRACE3	3 level variable, =1 if mother wife, =2 if Black, =3 if other race.
MEDUC6	6-level variable for mother's education: =1 if <9 years, =2 if 9-11 years, =3 if 12 years, =4 if 13-15 years, =5 if 16+ years, =6 if education was not reported.
PARITY	4-level variable for mother's parity of birth. =1 if this is the first birth, =2 if the second birth, =3 if third birth, =4 if fourth or higher birth.
HISPANIC	Dummy variable, =1 if mother is Hispanic, =0 otherwise.
MARRIED	Dummy variable, =1 if mother is married, =0 otherwise.