Does Early Life Exposure to Cigarette Smoke Permanently Harm Childhood Welfare? Evidence from Cigarette Tax Hikes

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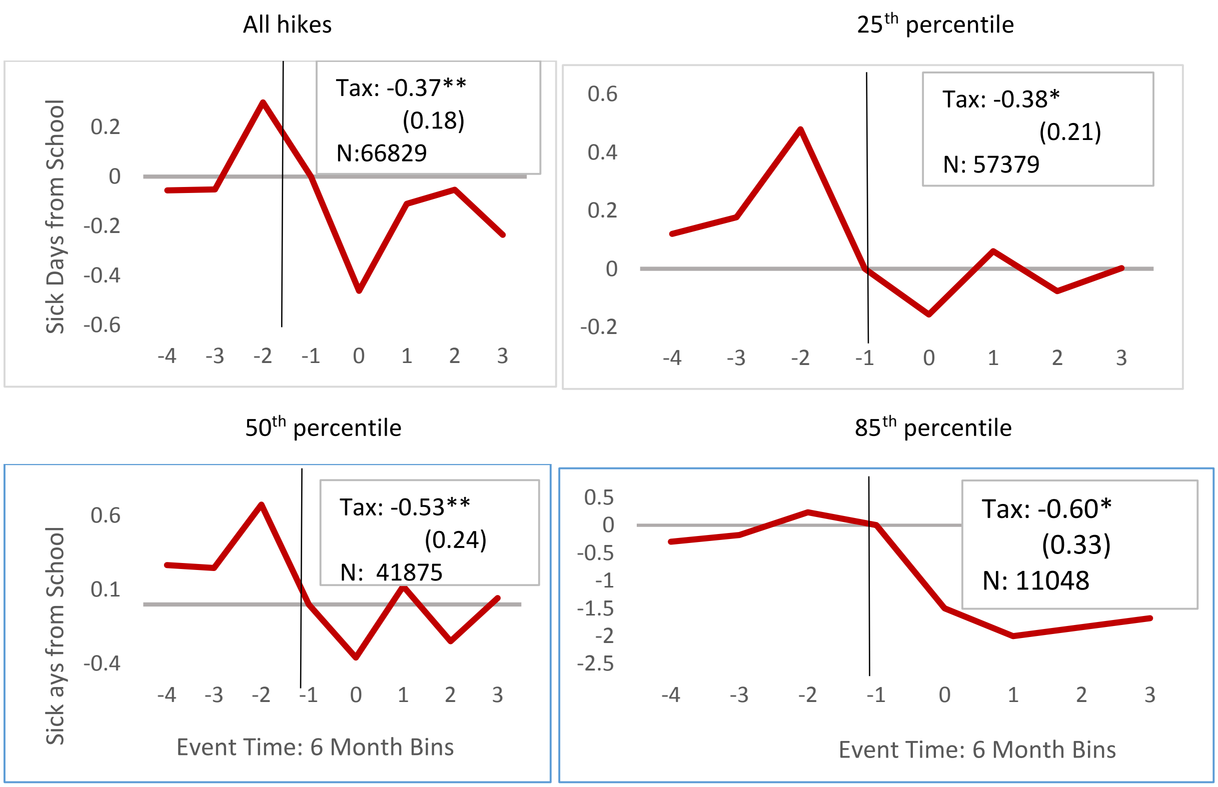
Online Appendix

Appendix A: Additional Tables and Figures

Figure A-1: Robustness of Event Study on Sick Days from School to Alternative Cutoffs.



Note: An event is defined as any cigarette tax increase equal or above the percentile indicated in the figure. Event time in six month bins is on the X-axis of each graph. In boxes in the figures, Tax is the coefficient on the excise tax from running my regression model on my event study sample. Event time tracks the number of 6 month intervals before or after a tax hike during which a cohort is in their third trimester. When event time is -1 this corresponds to a cohort being in their second or third trimester the quarter before a tax hike. This cohort will in turn be born around the time of the hike or slightly after. Therefore, the pre-trends in the event study capture both state trends in child health before a tax increase and the effect of a change in second hand smoke exposure after birth.

Table A-1: Cigarette Tax Amounts and Health Earmarks in Cents

State	State cigarette excise tax amount in cents	General revenue (*amount of tax not earmarked for health spending*)	Earmarks for public insurance spending	Health care / health services	Mental health services	Unspecified/other health earmarks	Cancer research	% Earmarked for health excluding research
Alabama	42.5	13.3	26		3.2			68.7%
Alaska	200	200						0.0%
Arizona	200	108	69	16			7	42.5%
Arkansas	115	115						0.0%
Colorado	84	84						0.0%
Connecticut	340	340						0.0%
Florida	134	23.5		110			0.5	82.1%
Georgia	37	37						0.0%
Hawaii	320	240				80		25.0%
Idaho	57	52.3					4.7	0.0%
Illinois	98	98						0.0%
Indiana	99.5	69	3		0.5	27		30.7%
Iowa	136					136		100.0%
Kansas	79	79						0.0%
Kentucky	60	58					2	0.0%
Louisiana	36	27			2		7	5.6%
Maine	200	200						0.0%
Massachuset	351	301				50		14.2%
Michigan	200	124	65			11		38.0%
Mississippi	68	68						0.0%
Montana	170	95.2	74.8					44.0%
Nebraska	64	64						0.0%
New Hampsh	178	178						0.0%
New Jersey	270			268.4			1.6	99.4%
New Mexico	166	148					18	0.0%
New York	435	435						0.0%
North Dakota	44	44						0.0%
Ohio	125	125						0.0%
Oklahoma	103	50.5	39	6	2		5.5	45.6%
Oregon	131	97		34				26.0%
Rhode Island	350	350						0.0%
South Dakota	153	136		17				11.1%
Tennessee	62	60		2				3.2%
Texas	141	141						0.0%
Vermont	275					275		100.0%
Virginia	30			30				100.0%
Washington	44	44						0.0%
Wyoming	60	60						0.0%
%	100%	75%	5%	9%	0%	10%	1%	23.8%

Note: This table was compiled from data online provided by the American Lung Association on 12/18/2014: http://www.lungusa2.org/slati/states.php. The first column shows the cigarette excise tax level in cents in 2014 dollars. The second column is the amount of the tax revenue either not earmarked or earmarked for non-health spending. The third through seventh columns show the amount of the tax in cents earmarked for different health related programs. The final column gives the total percent of the state tax spent on health for reasons other than cancer research. There are only 38 states in this table due to 6 states not having passed a cigarette tax increase during the years of my sample and 6 states not having information on them in the American Lung Association database. Additional notes on the construction of this table are in the data appendix section B.1.

Table A-2: Taxes on Smoking during Pregnancy, Differences by Clustering and Time Period

Clustering Scheme:	Robust	State year-month	State-year	State
Panel A:1989 - 1995: cohorts from Evans and Ringel, 2001				
Excise Tax (dollars)	-2.91***	-2.91***	-2.91***	-2.91*
	(0.21)	(0.30)	(0.87)	(1.69)
F-test on taxes	190.15	94.26	11.14	2.96
Panel B: 1989-2005: Sick Day Cohorts				
Excise Tax (dollars)	-1.01***	-1.01***	-1.01***	-1.01***
	(0.06)	(0.13)	(0.35)	(0.35)
F-test on taxes	310.37	55.65	8.06	8.18
Panel C: 1989-2009: Doctor Visit Cohorts				
Excise Tax (dollars)	-0.98***	-0.98***	-0.98***	-0.98***
	(0.04)	(0.09)	(0.26)	(0.33)
F-test on taxes	593.41	114.70	14.14	8.82

The dependent variable is a dichtomous indicator for smoking during pregnancy. The excise tax is in 2009 dollars. Linear probability model coefficients are multiplied by 100 for ease of reading. Vital statistics data is collapsed into cells based on state, time, and demographic group. I then weight by the cell size. Panel A follows the modeling of the earlier literature and controls only for demographic indicators, policy controls, and state and time fixed effects. Panel B and C include the full set of controls used in Table 2. Specifically, these models include fixed effects for state, time, state-time linear trends, policy controls, demographic controls and their interactions. I additionally weight the vital statistics in these models to be representative of the cohorts in the NHIS. *** denotes significant at 1% level; ** denotes significant at 5% level ; * denotes significant at 10 % level.

Table A-3: Impact of Taxes on Smoking and Child Health by Time Period

	Before 2000	2000 and later
	Smoking During Pregnancy	
Excise Tax (dollars)	-1.17**	0.08
	(0.51)	(0.14)
# of cells	5409234	2888819
	Sick Days from School	
Excise Tax (dollars)	-0.84***	0.05
	(0.22)	(0.73)
N	76377	8730
	Two or More Doctor Visits	
Excise Tax (dollars)	-3.37*	1.11
	(1.95)	(2.26)
N	92082	21632

The dependent variables are an indicator for smoking during pregnancy, sick days from school in the past 12 months for children 5 to 17, or two or more doctor visits in 12 months for children ages 2 to 17. Tax coefficients on doctor visits and smoking during pregnancy models are multiplied by 100. All models include trends, demographic controls and their interactions, and controls for state level covariates (medicaid eligibility, a welfare reform indicator, the unemployment rate, Impacteen clean air laws, and in the NHIS the current cigarette tax). I weight the cohorts in the vital statistics to be representative of the cohorts in the NHIS sample. The later era is divided between 2000-2005 (for sickdays) or 2000-2009 (for doctor visits). Standard errors clustered on state are in paraentheses. *** denotes significant at 1% level; ** denotes significant at 5% level ; * denotes significant at 10 % level.

Table A-4: Taxes on Sick days and Doctor Visits by Mother's Education at Time of Interview

	Dropout	High school grad	Some college	College grad
		Sick Days from School		
Excise Tax (dollars)	-0.66	-0.52	-0.45	0.13
	(0.69)	(0.35)	(0.48)	(0.16)
N	14092	20050	23544	17385
		Two or More Doctor Visits		
Excise Tax (dollars)	-8.05**	-5.31**	-4.16**	1.41
	(2.74)	(1.82)	(1.53)	(1.57)
N	20028	27408	32160	24412

Notes: The dependent variables are sick days from school in the past 12 months for children 5 to 17, and an indicator for two or more doctor visits in 12 months for children ages 2 to 17 (with the tax coefficient multiplied by 100). The excise tax is in 2009 dollars. Standard errors clustered on state are in parentheses. All regressions use NHIS child weights. All models include fixed effects for state, age in months, and time, as well as controls for race, mother's education, mother's age, gender, state level policies, the state unemployment rate, the ImpacTeen indoor smoking law rating in bars and private work places, and the current cigarette tax. *** denotes significant at 1% level; ** denotes significant at 5% level ; * denotes significant at 10 % level.

Table A-5: Impact of the Cigarette Tax by Gender

Dependent Variable	Sick Days	2+ Doctor Visits	Asthma Attach	Hospitalization	Emercency Room Visit
Male	-0.46**	-4.17***	-2.01***	-0.48*	-2.39
	(0.21)	(1.24)	(0.78)	(0.27)	(1.81)
mean	3.38	61.21	6.89	2.48	21.73
N	43748	60969	61653	134623	61426
Female	-0.27	-1.12	0.07	-0.09	-1.58
	(0.22)	(1.08)	(0.56)	(0.25)	(1.20)
mean	3.47	62.58	4.67	2.10	19.04
N	41369	57871	58516	127976	58321

Notes: The dependent variables are listed above the columns and are indicator variables for having the given malady in the past twelve months for children ages 2-17 (except for number of sick days which is continuous and for children ages 5-17). The excise tax is in 2009 dollars. Standard errors clustered on state are in parentheses. The 1997-2010 NHIS is the dataset used in this table. All regressions use NHIS weights. All models include fixed effects for state, age in months, and time, as well as controls for race, mother's education, mother's age, gender, state level policies, the state unemployment rate, the ImpacTeen indoor smoking law rating in bars and private work places, and the current cigarette tax. *** denotes significant at 1% level; ** denotes significant at 5% level ; * denotes significant at 10 % level.

Table A-6: Impact of Cigarette Tax on Placebo Outcomes

Dependent variable:	Chicken Pox	Chronic Headaches	Anemia	Food Allergy	Injured	Placebo Index
	-0.13	0.30	-0.06	-0.01	-0.01	0.01
	(1.08)	(0.45)	(0.17)	(0.01)	(0.01)	(0.03)
% Mean	37.22 %	5.13 %	1.13 %	3.97 %	2.48 %	0.03
N	118602	105903	119537	119432	120402	105709

Note: Each column represents a different regression on indicators for having the given placebo outcome on children ages 2-17. All tax coefficients are multiplied by 100 for ease of reading. The Placebo Index takes the low incidence placebo outcomes (headaches, anemia, allergy, and injuries) and normalizes each of these outcome variables to have a mean of zero and a standard deviation of one and to be signed such that a decrease in the index represents increased health. The index is the average of the four, again normalized to have a standard deviation of one. NHIS child weights are used in all models. All models include fixed effects for state, age, and time as well as controls for race, gender, state and tobacco policy variables, and the current cigarette tax. Standard errors clustered on state are in parentheses. *** denotes significant at 1% level; ** denotes significant at 5% level ; * denotes significant at 10 % level.

Table A-7: Robustness to Different Types of State Trends

	(1)	(2)	(3)	(4)
		Sick days from school		
Excise Tax (dollars)	-0.38*	-0.56**	-0.57**	-0.65***
	(0.18)	(0.25)	(0.25)	(0.23)
mean	3.43			
N	85117			
		Two or more doctor visits		
Excise Tax (dollars)	-2.92**	-2.35**	-3.09***	-2.44**
	(0.90)	(1.03)	(1.28)	(1.14)
mean	61.88			
N	113719			
Linear Trends	no	yes	yes	yes
1989-2000 and 2001-2010 linear spline	no	no	yes	no
Quadratic Trends	no	no	no	yes

Notes: The dependent variables are sick days from school in the past 12 months for children 5 to 17, and an indicator for two or more doctor visits in 12 months for children ages 2 to 17. Tax coefficients on indicator variables are multiplied by 100 for ease of reading. The excise tax is in 2009 dollars. Standard errors clustered on state are in parentheses. All regressions use NHIS child weights. All models include fixed effects for state, age in months, and time, as well as controls for race, mother's education, mother's age, gender, state level policies, the state unemployment rate, and the ImpacTeen indoor smoking law rating in bars and private work places. *** denotes significant at 1% level; ** denotes significant at 5% level ; * denotes significant at 10 % level.

Table A-8: The Impact of Current and in-Utero taxes on Current Smoking of Mother

Dependent Variable: Current Maternal Smoking	(1)	(2)	(3)
Current Tax (dollars)	-1.28**		-1.30**
	(0.63)		(0.65)
Tax in 3rd Trimester		-0.03	0.35
		(1.68)	(1.64)
Mean Smoking	19.85		
N	37905		

Notes: Excise tax is in 2009 dollars. The dependent variable is an indicator for current smoking of the mother defined as the mother having smoked some or all days. Tax coefficients are multiplied by 100 for ease of reading. Standard errors clustered on state are in parentheses. The 1997-2010 NHIS is the dataset used in this table. The Sample includes all mothers in the sample adult file who were asked questions on smoking matched with children in the sick day's sample. All regressions use NHIS child weights. All models include fixed effects for state, age in months, and time, as well as controls for race, mother's education, mother's age, gender, state level policies, the state unemployment rate, and the ImpacTeen indoor smoking law rating in bars and private work places. *** denotes significant at 1% level; ** denotes significant at 5% level ; * denotes significant at 10 % level.

Table A-9: Impact of the Cigarette Tax on Sick Days and Doctor Visits Using Different Timing Assumptions

Timing Assignment Model	3rd trimester (base case)	2nd trimester	1st trimester	All trimesters
Excise Tax Coefficient:		Sick Days from School		
Tax in 3rd trimester	-0.42**			-0.72***
	(0.19)			(0.26)
Tax in 2nd trimester		-0.33		0.47
		(0.23)		(0.64)
Tax in 1st trimester			-0.33	-0.15
			(0.23)	(0.53)
Mean of dep. Variable	3.43			
N	81547			
		Two or More Doctor Visits		
Tax in 3rd trimester	-3.08***			-5.15**
	(0.86)			(2.22)
Tax in 2nd trimester		-2.49***		1.23
		(0.98)		(3.41)
Tax in 1st trimester			-2.12**	1.96
			(0.89)	(2.75)
Mean of dep. Variable	62.03%			
N	113719			

Notes: The dependent variables are sick days from school in the past 12 months for children 5 to 17, and an indicator for two or more doctor visits in 12 months for children ages 2 to 17 (multiplied by 100). The excise tax is in 2009 dollars. Standard errors clustered on state are in parentheses. The 1997-2010 NHIS is the main dataset used in this table. All regressions are weighted using NHIS child weights. All models include the same controls and fixed effects as in my baseline models. Sample size changes slightly relative to table 3 since I only include observations to which I can assign the cigarette tax for all three trimesters, which causes some of the latest births to be excluded. The baseline results are unaffected by this change. *** denotes significant at 1% level; ** denotes significant at 5% level ; * denotes significant at 10 % level.

Table A-10: Sample Robustness Checks

	Original sample	Drop if missing mom	Drop if missing date of birth	Match Tax on State of Birth
		Sick Days		
Excise tax (dollars)	-0.04**	-0.34*	-0.33*	-0.41***
	(0.15)	(0.18)	(0.19)	(0.15)
		Doctor Visits		
Excise tax (dollars)	-2.28***	-3.22**	-2.50**	-2.52***
	(0.84)	(0.94)	(1.11)	(0.72)

Notes: The dependent variables are sick days from school in the past 12 months for children 5 to 17, and an indicator for two or more doctor visits in 12 months for children ages 2 to 17 (with tax coefficients multiplied by 100). The first column is the original estimates from my preferred specification in tables 3 and 5. The second column drops observations that are missing the mother identifier and therefore cannot be matched to a mother. The third column drops observations missing date of birth. The fourth column matches the excise tax on the state of birth for those observations for which it is available in the data. See the text for more details. *** denotes significant at 1% level; ** denotes significant at 5% level ; * denotes significant at 10 % level.

Table A-11: Monetized Benefits of a Dollar Tax Hike to Childhood Health

Outcome:	Doctor Visit	Sick Days from School	Treatment of Asthma
Average Cost ($2009) of outcome	$606	$312	$1,359
Treatement effect of tax (ITT) per year of exposure	-0.03	-0.38	-0.01
Years of health effects	15 years	12 years	15 years
Childhood benefits ($2009) from tax hike	$272	$1422	$204
Total decrease in health costs per child (ignoring potential double counting)		$1626	

Notes: All benefits are in 2009 dollars. The cost of a doctor visit is the average cost of visiting a doctor for children ages 5-17. The cost of asthma is the average expenditures on asthma treatment services. Both doctor visit and asthma values were calculated by the Agency for Healthcare Research and Quality (The Center for Financing, Access and Cost Trends) from the Medical Expenditure Panel Survey (2009). The cost of a sick day from school is the forgone wages of missing a day of education. This assumes that a year of education increases wages by 7% and uses the median household earnings in 2009 to approximate the value of a day of education. I "ignore potential double counting" by only adding together the cost of sick days and asthma treatment, since some doctor visits will be for the treatment of asthma, making it inappropriate to count both.

Appendix B. Data Notes and Institutional Details

B.1 Notes on the Excise Tax Process and Earmarks for Tax Spending

A state's legislature is responsible for approving the state budget and passing laws for enacting taxes, including cigarette excise taxes. Though policies and processes can vary across states, typically the state House of Representatives (or larger chamber of the state) has exclusive power to propose tax laws. A tax increase must first pass the House of Representatives with a majority vote, before going to the senate, where it also must pass with a majority vote. If then signed by the governor, the proposed tax becomes law. Most states have a department of revenue or taxation who is responsible for regulating and enforcing tax law (National Conference of State Legislatures, 2014).

Given the legislative process behind cigarette tax increases: which state legislatures pass tax hikes and why? Traditionally, the primary purpose of state cigarette taxes was to increase state revenue. The price elasticity of smoking is relatively inelastic across most demographics group, making taxing cigarettes a stable source of revenue that can be implemented at a low administrative cost. Maag and Merriman (2003) in turn document that raising tobacco taxes was a favorite response to revenue short falls during the 2001 recession, even among states that typically had low excise tax levels. Since the 1950s and 1960s knowledge about the adverse health effects of smoking has increased, and in response states have also used taxes to reduce cigarette consumption. Reducing cigarette consumption is politically popular given that, though the response to taxes are inelastic, those who do end up quitting have improved health, and this improved health in turn defrays long term public medical expenditures (Gruber 2001). Because elasticities are highest among teens, public opinion also typically supports taxes as a way of preventing addiction: "polls often find support for cigarette excise increases among American voters, even smokers (Chalolupka and Warner 2000, pg. 1566)." As shown in Appendix Table 1, sometimes cigarette taxes are earmarked for a specific purpose, however most of the time the revenue goes directly into the general state fund. Given that state fixed effects absorb any constant state characteristics, the near ubiquitousness of tax hikes across states, and the use of hikes for spending mostly on areas other than health; I believe this suggests that the child health impacts I observe are exogenous to the political processes behind tax increases.

To check the association between taxes and health spending, I constructed Appendix Table 1 showing how much money from cigarette taxes in each state were earmarked for health related spending. This table breaks the tax earmarks into several major categories: health insurance, health services, mental health, other health, cancer research, and a "general spending" category. General spending shows the amount of taxes that either went un-earmarked into the state general fund or were not specifically allocated to programs related to health or child outcomes. It is important to note that the laws earmarking tax revenue can be complicated and are not always easily compared across states. Directly below I include my notes on how I assigned the tax earmark when it was not clear which category of spending an earmark should be assigned to.

Alabama — For 26 cents of the tax, \$2 million goes to local governments and the remainder is earmarked for spending on Medicaid. Using year 2013 state cigarette tax revenue, a back of the envelope calculation suggests that Medicaid spending is 24 cents of the tax.

Colorado	During times of state fiscal emergencies some of the cigarette tax money has been dedicated to health program spending.
Hawaii	80 cents of the tax goes to health spending some of which is cancer research, the division between cancer research and other health spending is not clear, so I classified all of this as "general" health spending.
Illinois	In 2012 additional money from the tax was earmarked to healthcare spending. There are no cohorts born in 2012 in my sample, so this does not apply to my study.
Indiana	Money earmarked to the Indiana checkup plan trust fund goes to providing health care services.
Kentucky	For Kentucky It was not clear exactly how much of the tax is earmarked for cancer research but it was reported as being a "small amount." I ended up assigning 2 cents of the tax to cancer research.
Massachusetts	In 2013, legislation was passed such that an unspecified portion of the tax goes to support the Mass. health insurance system; however, this earmark began outside of the years my sample so I did not count an additional portion as going towards public health insurance.
Michigan	The state legislature has power to override any earmarks and does so regularly. For example, additionally, tax revenue was sent by the state to the "Healthy Michigan fund" which was largely not used on public insurance.
New Jersey	The first 1 million deposited from the tax goes to cancer research (I treated this as 0.6%), the next 150 million goes to health care (99.4%).
New York	Before July 2010, cigarette taxes were not earmarked for spending related to public insurance or health services (http://codes.lp.findlaw.com/nycode/TAX/8/171-a). Since none of the cohorts in my sample were born after 2008, I do not count the New York tax as being earmarked for health spending in these areas.
Oklahoma	Some of the Oklahoma tax is earmarked to the health employee and economy improvement fund which includes Medicaid/SCHIP, so I counted this as Medicaid spending in my table.
South Dakota	The formula for distributing the tax is complicated. In 2013, 11% of the tax revenue went to health services. As a percent of the tax this is 16.83 cent.

B.2 Notes on Construction of the Samples

i. National Health Interview Survey

Roughly 6% of my sample in the NHIS is missing information on year or month of birth. I deal with observations missing year of birth by using a simple assignment rule: year of birth = year of interview − age of child. Fewer children were missing the month of birth. I assign these to being born in June, the midpoint of the year. This is unlikely to affect my results since cigarette taxes do not change in high frequency within the same state. I check this by dropping all of the observations missing date of birth and re-running my baseline models. I also perform a second check for which I randomly impute the birth date over the possible years and months a child was born based on year of interview and age. Neither of these robustness checks changes my results.

In the child detail file of the NHIS, there is some birth weight data. At first, it seemed promising to estimate birth weight in the same sample as I estimate the childhood health outcomes.

Unfortunately, the birth weight data appears to be of low quality compared to the vital statistics. The NHIS birth weight variable is retrospective, which is likely to be noisier than the administrative vital statistics data. More importantly, when comparing low birth weight status in the NHIS to the administrative vital statistics data, the NHIS consistently overstates the fraction of low birth weight births by several percentage points. Due to these issues, I rely on the higher-quality administrative data.

ii. Vital Statistics

The Public Use Vital Statistics stops reporting state identifiers after 2004. I applied for access to the restricted use version of the vital statistics data through the National Association of Public Health Statistics and Information Systems (NAPHSIS). Researchers can apply directly to the NAPHSIS for a version of the data with state identifiers. Even with the state identifiers, not every state reports data on smoking during pregnancy in every year. This means that including all states in a regression model with year and state fixed effects leads to an unbalanced panel, which can in turn bias results (Kennedy, 2003). The following states do not report smoking during pregnancy for the majority of the pregnancies up to midway through the sample period: California, Florida, Indiana, New York, and South Dakota. To address this, I balance the panel by dropping these states from the smoking during pregnancy regressions; though I get similar results when I use the unbalanced panel. I collapse the vital statistics into cells based on state, year-month of birth, mother's race, father's race, mother's age category, fathers' age category, and number of prenatal care visits, marital status, and the version of the birth certificate used. I then reweight the cells to get estimates at the population level.

In both the vital statistics and NHIS, I include cohorts of children born between 1989-2005 (or 2009 for doctor visits); however, in the NHIS the sample is necessarily weighted towards earlier cohorts. The reason for this is that I observe cross sections of children in the NHIS, making cohort a function of time of interview and age. The latest year of my survey is 2010 and for sick days the youngest child in the sample is 5, this necessarily means that only 5 year olds are in the 2005 cohort. Children older than five will be born to an earlier cohort and children younger than 5 have not yet entered school, and therefore have no information on sickdays from school. Similarly, for cohorts born past 2000, there will be disproportionately fewer (and younger) children observed in the NHIS for these cohorts. To account for this, I reweight the birth cohorts in the vital statistics to be representative of the cohorts observed in the NHIS. For example, if cohorts born in 2003 are 10% of the vital statistics sample and 5% of the NHIS sample, I reweight the vital statistics proportionately. Due to the differences in cohort years observed, I apply different weights both when I look at the sick day cohorts (1989-2005) and the doctor visit cohorts (1991-2009).

B.3 Details on the Construction of the Event Study

I make several adjustments to a traditional event study so that it fits in the cigarette excise tax policy framework. To address variation in magnitudes across tax hikes, take all tax hikes and assign them percentiles (un-weighted by state population). I show that I get approximately similar figures when looking at the 85^{th}, 50^{th}, 25^{th}, percentile or 0^{th} percentile (all hikes), or a flat cutoff of 25 cents (following Lien and Evans, 2004).

I use two modifications of the event study techniques for addressing the fact that at lower cutoffs there are two (or even three and four) events per state. My main technique for addressing the multiple events per state, and the one I present in my paper, is to just run the event study counting only the first tax hike in each state as the event. This has the advantage of being a simple and transparent way of choosing an event. However, one drawback to this approach is that using the first hike as opposed to later ones is a relatively arbitrary choice. My second approach is to include every event in the event study and perform a reweighting scheme to account for multiple events per state. When there are multiple large hikes within a state I duplicate the observations and assign each set of observations a different event. I then down-weight the observations by the number of events per state. For example, if there were three tax hikes large enough to be considered events in Michigan, I would duplicate the observations in Michigan three times, assign each a different event, and then down weight each of the sets of observations by $1/3^{rd}$. The down weighting insures that none of the original observations has a weight of more than 1. This is more complicated than the first method, but is also richer and allows for the incorporation of multiple events per state into the event study.

I balance the event study such that events are only included if there are two full years in both the pre-period and post-period. Balancing event studies has been previously well established in the literature (see Almond et al., 2012). Without balancing, the graphic depiction of the event study could pick up demographic changes from states entering and exiting the event window. I also exclude any events in which there was a cigarette tax hike in the same state within the two-year pre-period before that event occurred. This preserves the pre-trends from showing a spurious trend due to an earlier hike, although only one event was excluded from the sick days' event study due to having a hike in the pre-period. Because my event study sample changes from my main regression model, I re-estimate the preferred regression specifications on only the event study sample.