

Tobacco Sales Prohibition and Teen Smoking

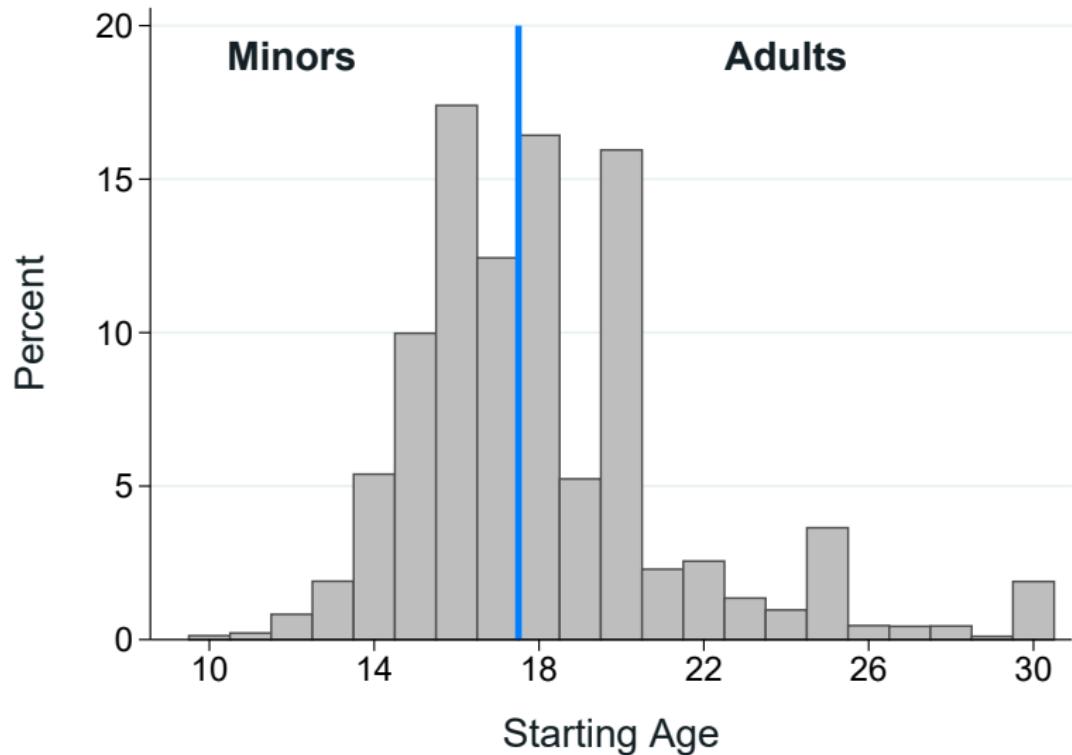
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Disclosure

- ▶ Funding sources:
University of Basel, Swiss National
Science Foundation, Faculty of Business
and Economics at the University of Basel
Forum Grant
- ▶ No funding at any point from tobacco
companies or advocacy organizations
- ▶ Other researchers can apply for access to
the data sources and we are happy to
share our code

Smokers start as teens

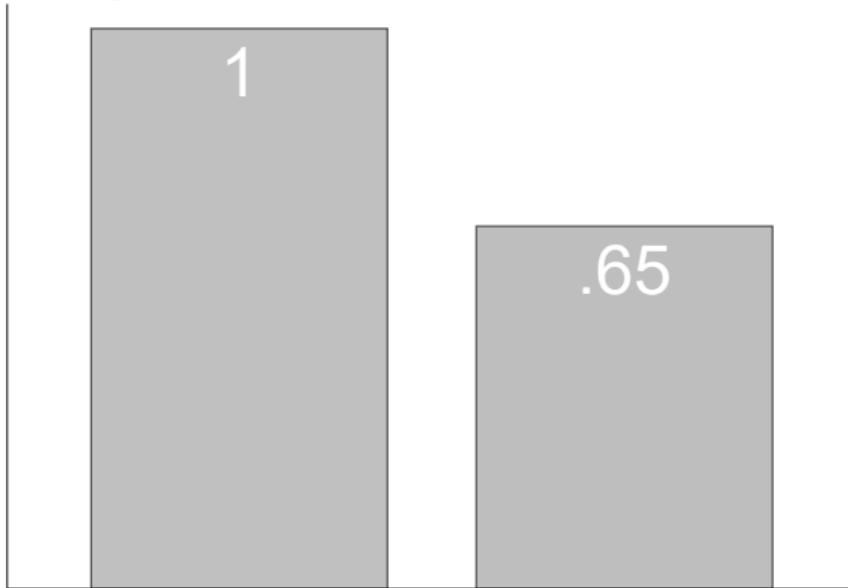


The WHO wants sales bans

Each party shall prohibit the sales of tobacco products to persons under the age set by national law or eighteen.

Health officials think sales bans work

Expect Decrease ≥ 5 Perc. P.



Framework and Evidence

Should sales bans work?

1. Cost

Should sales bans work?

1. Cost
2. Information

Should sales bans work?

1. Cost
2. Information
3. Forbidden fruit

Should sales bans work?

1. Cost
2. Information
3. Forbidden fruit
4. Circumvention

What we add

- ▶ Test of arguments
- ▶ Policy evaluation

Previous evidence

- ▶ Smoking bans and smoking

(Boes et al., 2015; Mazzonna and Salari, 2018)

Previous evidence

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(Boes et al., 2015; Mazzonna and Salari, 2018)
- ▶ Taxes and teen smoking

Previous evidence

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 - (Boes et al., 2015; Mazzonna and Salari, 2018)
- ▶ Taxes and teen smoking
- ▶ Sales bans and teen smoking:
 - ▶ Before and after
 - ▶ Policy mix in the US

(Gruber and Zinman, 2000; Cawley et al., 2006; Nesson, 2017)

Previous evidence

- ▶ Smoking bans and smoking

(Boes et al., 2015; Mazzonna and Salari, 2018)

- ▶ Taxes and teen smoking

- ▶ Sales bans and teen smoking:

 - ▶ Before and after

 - ▶ Policy mix in the US

(Gruber and Zinman, 2000; Cawley et al., 2006; Nesson, 2017)

 - ▶ Drivers?

 - ▶ Natural experiment?

Identification

Our setting

- ▶ Well-defined policy change

Our setting

- ▶ Well-defined policy change
- ▶ Staggered introduction

Our setting

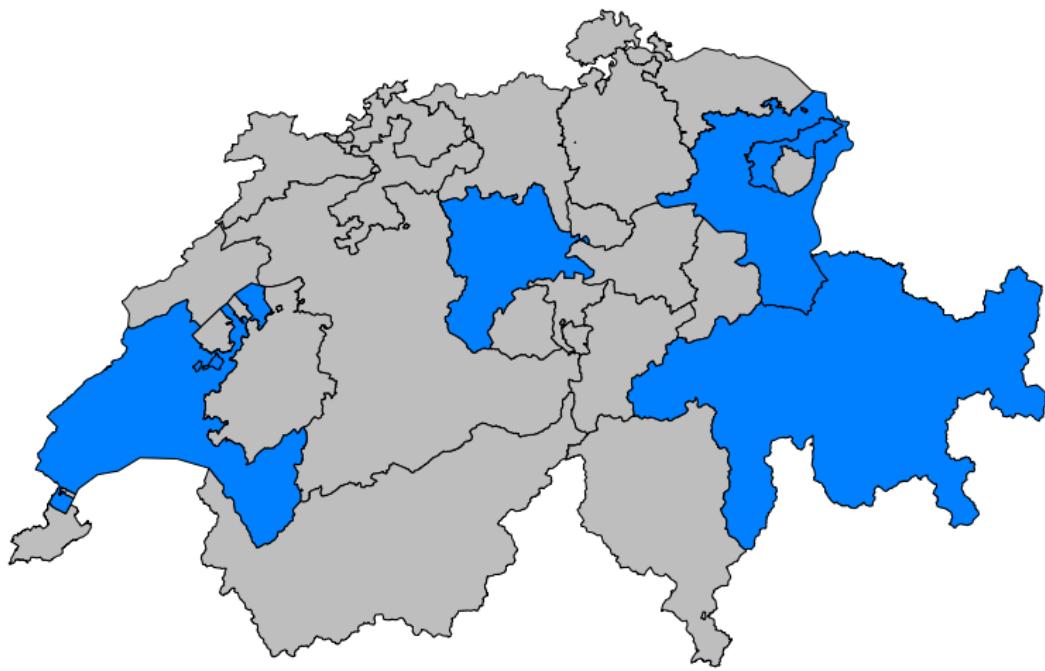
- ▶ Well-defined policy change
- ▶ Staggered introduction
- ▶ Homogeneous taxes

Our setting

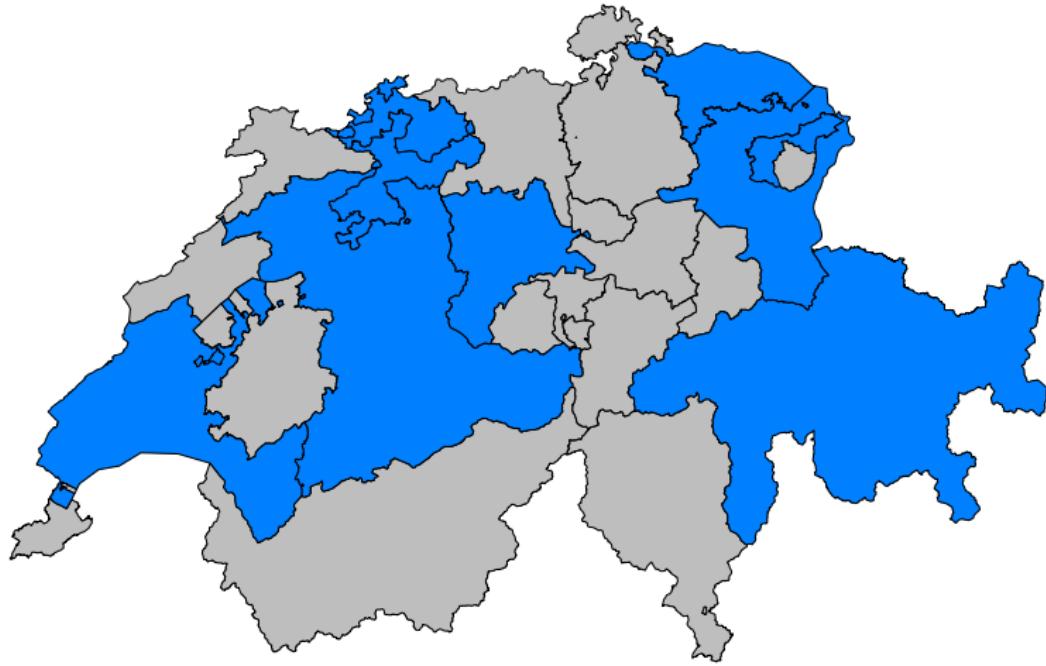
- ▶ Well-defined policy change
- ▶ Staggered introduction
- ▶ Homogeneous taxes
- ▶ High smoking prevalence



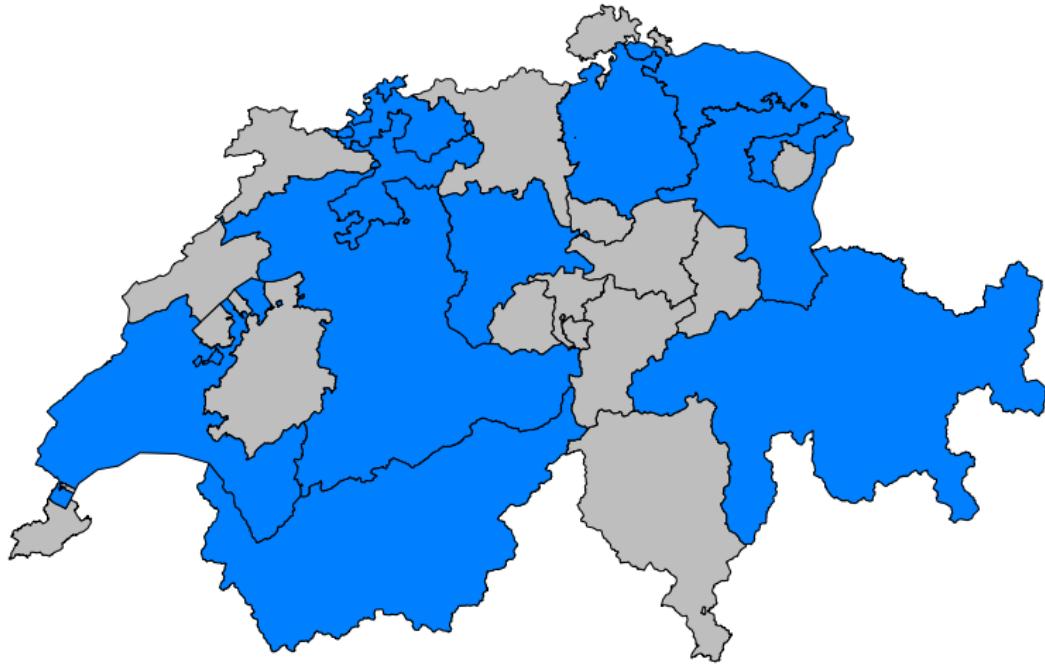
2005



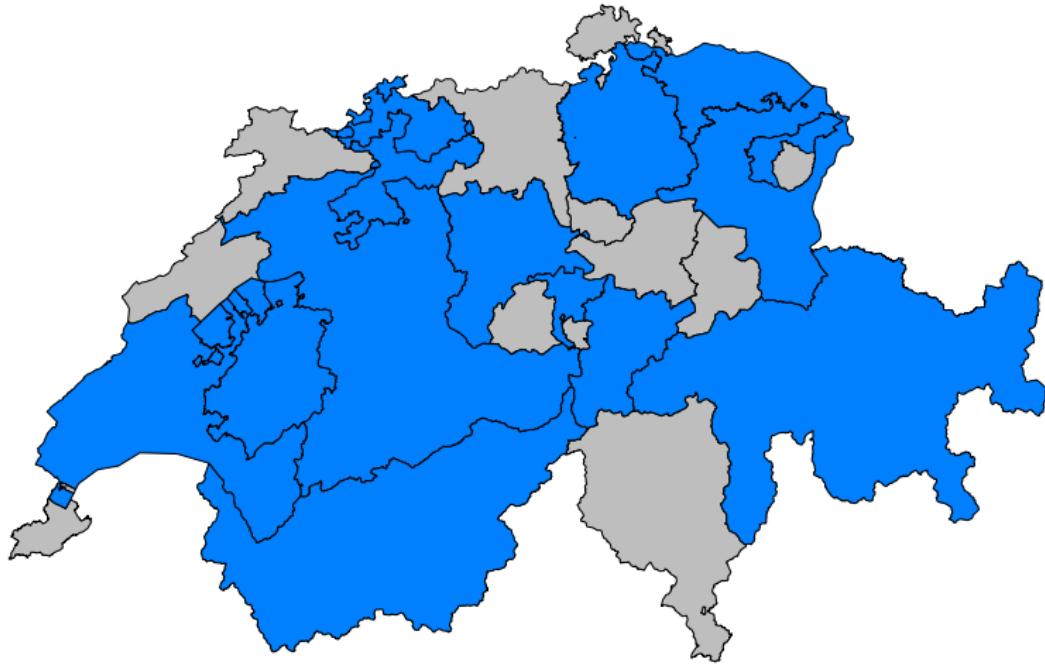
2006



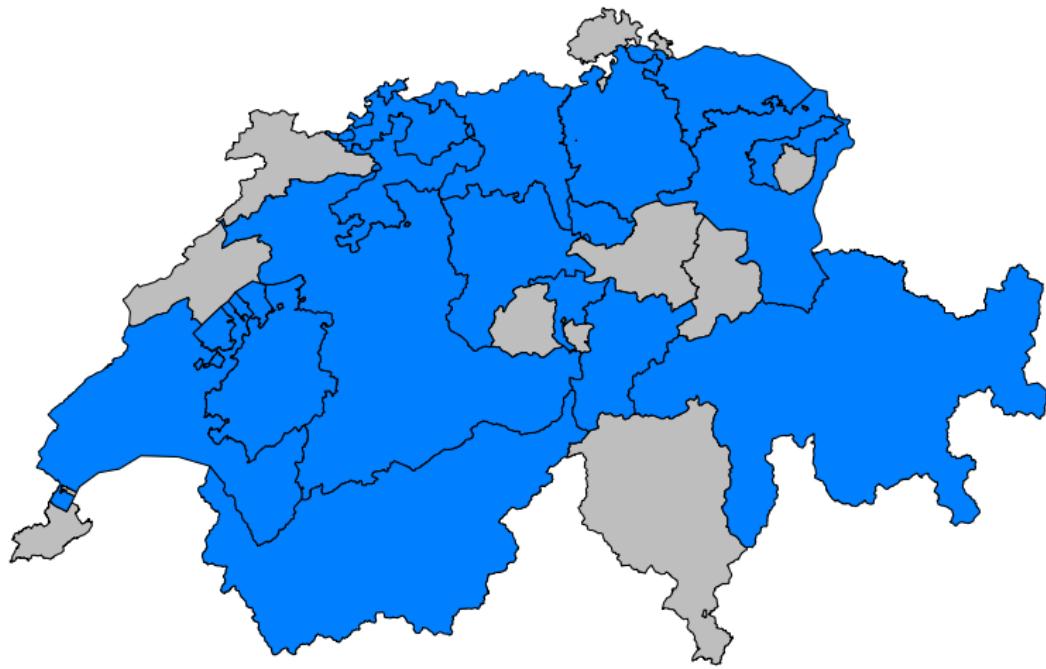
2007



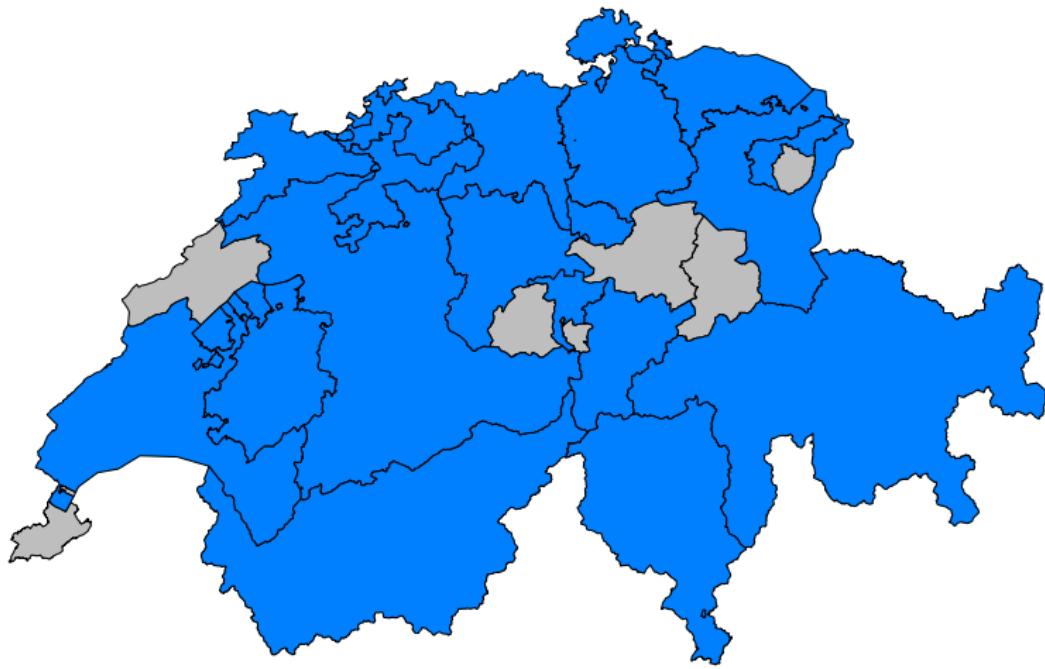
2008



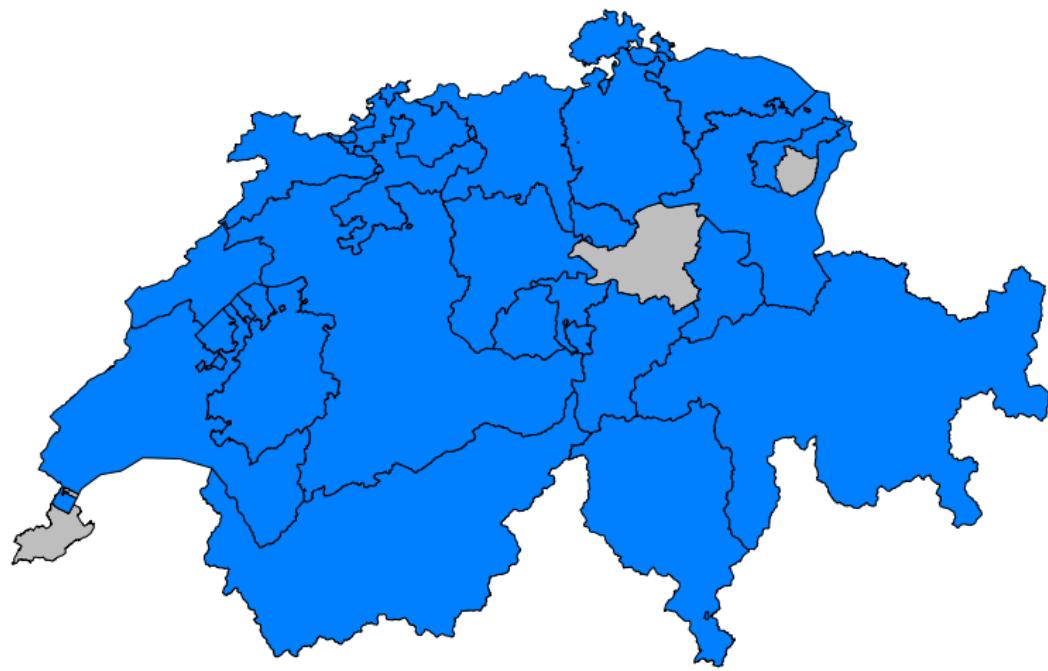
2009



2010



2013



2016

Swiss data

- ▶ Quarterly repeated cross-section of individuals from 14 to 98
- ▶ 2001 to 2016 – N=167,000
 - ▶ Tobacco and Addiction Monitoring

Map Min. Ages

Intro. Dates

Nr. Cantons, Share Under Ban

Descr. Stat.

Trends

Swiss data

- ▶ Quarterly repeated cross-section of individuals from 14 to 98
- ▶ 2001 to 2016 – N=167,000
 - ▶ Tobacco and Addiction Monitoring
- ▶ Smoking status
- ▶ Attitudes toward smoking
- ▶ Purchasing behavior

Map Min. Ages

Intro. Dates

Nr. Cantons, Share Under Ban

Descr. Stat.

Trends

Swiss data on pupils

- ▶ Data on pupils aged 11 to 15 years
- ▶ 2002, 2006, 2010, 2014 – N=56,000
 - ▶ Health Behaviour in School-aged Children
 - ▶ Subset of cantons

Availability

Trend Pupils

Swiss data on pupils

- ▶ Data on pupils aged 11 to 15 years
- ▶ 2002, 2006, 2010, 2014 – N=56,000
 - ▶ Health Behaviour in School-aged Children
 - ▶ Subset of cantons
- ▶ Smoke status
- ▶ Age of first puff

Availability

Trend Pupils

Variation and data: EU

- ▶ Introduction or increase of minimum ages
 - ▶ 17 introductions
 - ▶ 8 increases

Intro. dates

Variation and data: EU

- ▶ Introduction or increase of minimum ages
 - ▶ 17 introductions
 - ▶ 8 increases
- ▶ 9 repeated cross-sections of individuals
- ▶ 1990 to 2012, 32 countries – N=138,000
 - ▶ Eurobarometer
- ▶ Smoking status

Empirical strategy

$$Smoker_{ict} = \beta BindingSalesBan_{ict} + \alpha SalesBan_{ct}$$

$Smoker_{ict}$ 1 if an individual smokes

$BindingSalesBan_{ict}$ 1 if the sales ban binds

$SalesBan_{ct}$ 1 if a sales ban exists

Empirical strategy

$$Smoker_{ict} = \beta \text{ } BindingSalesBan_{ict} + \alpha \text{ } SalesBan_{ct}$$

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Empirical strategy

$$\begin{aligned} Smoker_{ict} = & \beta BindingSalesBan_{ict} + \alpha SalesBan_{ct} \\ & + \gamma_a + \eta_{cxteen} + \theta_{yxteen} \end{aligned}$$

γ_a Age FE

η_{cxteen} Age group (< 21 vs. ≥ 21) specific
canton FE

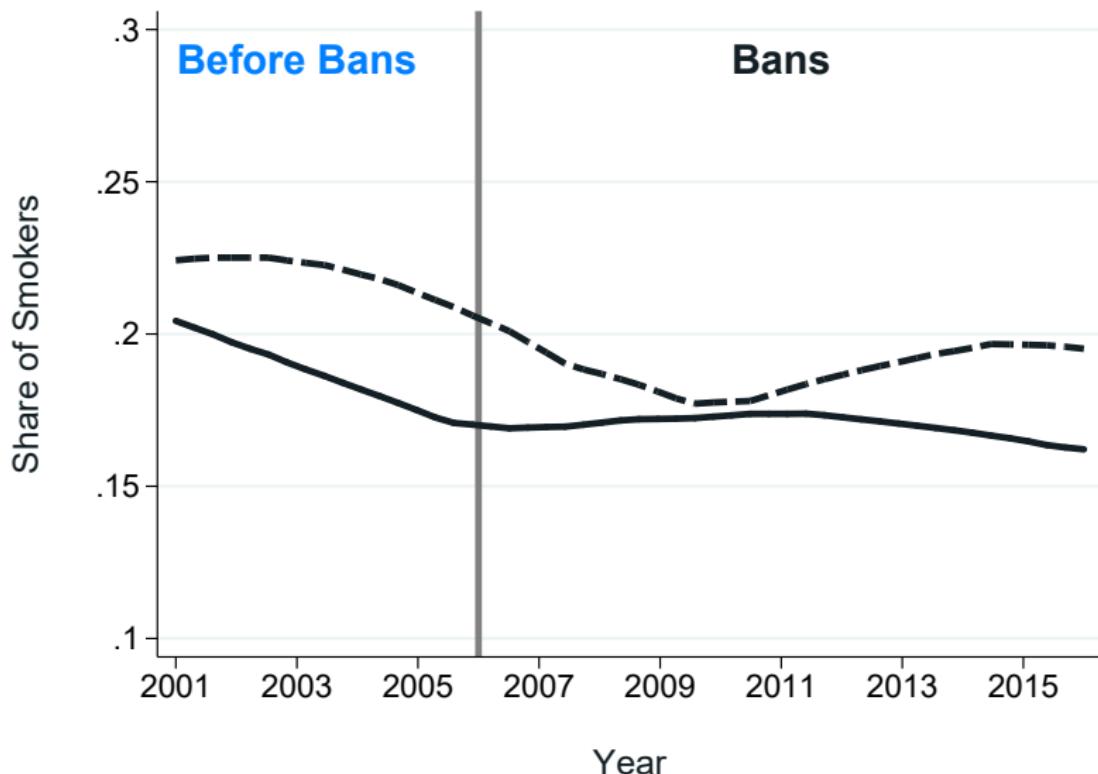
θ_{yxteen} Age group specific year FE

Empirical strategy

$$\begin{aligned} Smoker_{ict} = \beta & \ BindingSalesBan_{ict} + \alpha SalesBan_{ct} \\ & + \gamma_a + \eta_{cxteen} + \theta_{yxteen} + X'_{ict}\delta + \varepsilon_{ict} \end{aligned}$$

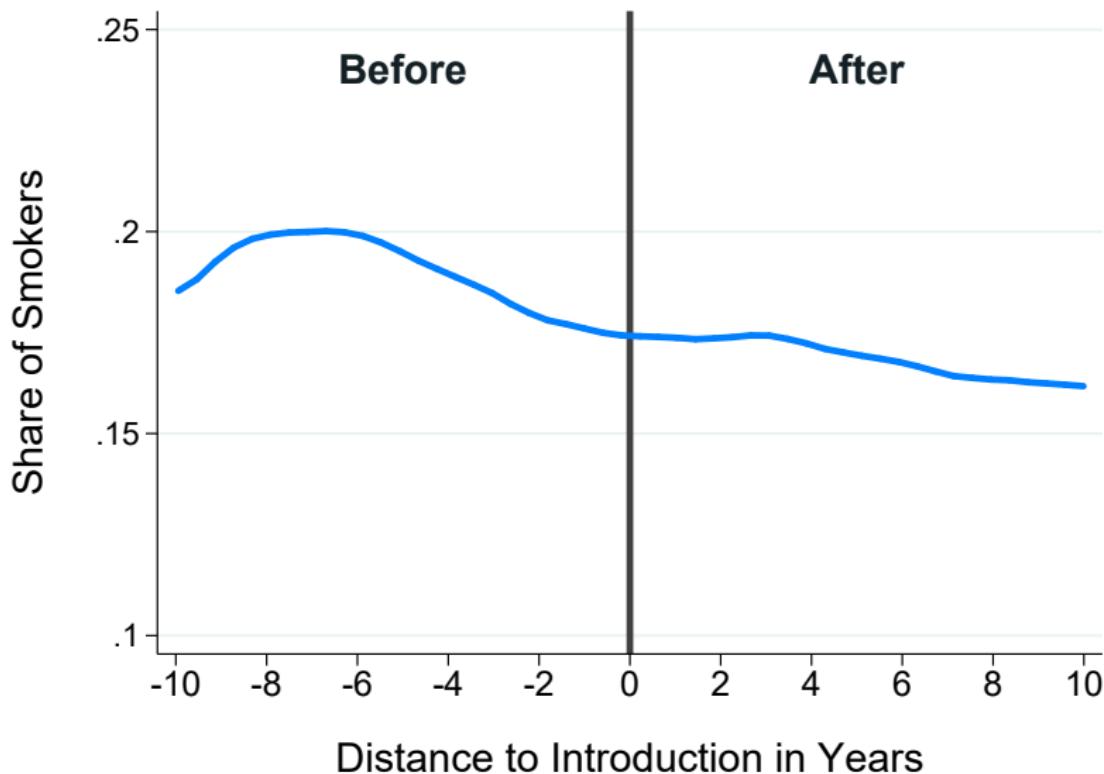
- X'_{ict} Gender, foreigner, household size
 dummies, physician density,
 youth and general unempl.
- ε_{ict} Clustering on 26 cantons

Cantons have common trends



Results

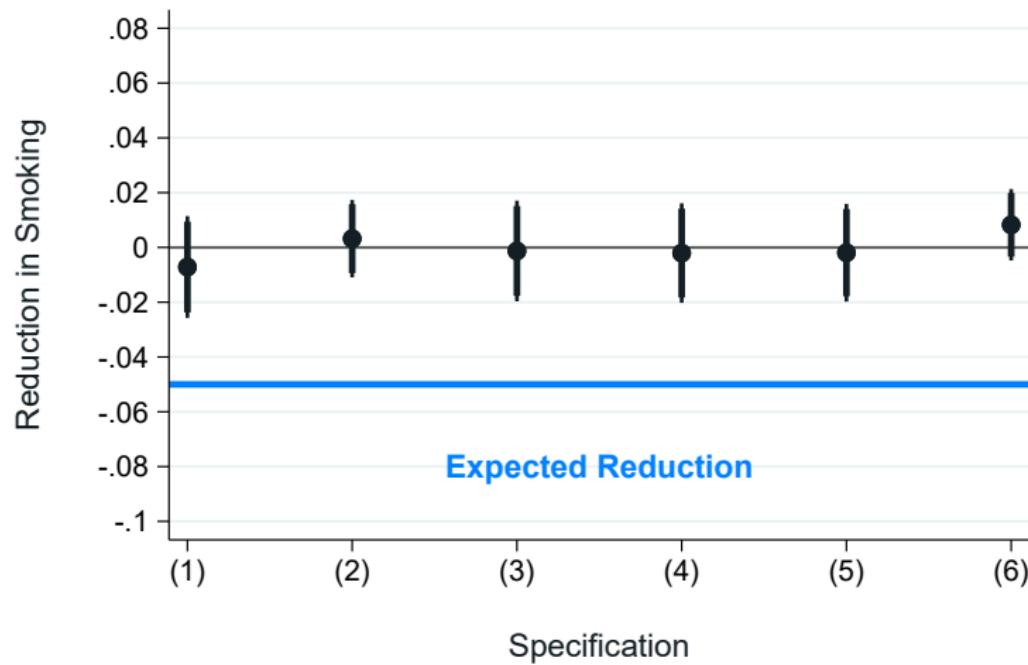
Smoking trend does not change



| Dependent Variable | All Ages | | 11–15 Years Old | |
|--------------------|-------------------|-------------------|------------------|------------------|
| | Smoker | Packs (Smokers) | Smoker | Age First Puff |
| | Avg. for Minors | 0.178 | 0.438 | 12.5 |
| | (1) | (2) | (3) | (4) |
| Binding Sales Ban | -0.002 (0.009) | -0.009 (0.020) | 0.008 (0.007) | 0.001 (0.051) |
| Sales Ban | -0.002 (0.003) | 0.005 (0.008) | | |
| Age FE | X | X | X | X |
| Canton FE | X | X | X | X |
| Year FE | X | X | X | X |
| Canton x Teen FE | X | X | | |
| Year x Teen FE | X | X | | |
| Ind. Controls | X | X | X | X |
| Cant. Controls | X | X | | |
| Observations | 167,376 | 35,120 | 56,335 | 13,177 |
| | 26 | 26 | 15 | 15 |
| R-squared | 0.05 | 0.08 | 0.07 | 0.25 |

[More](#)[Add. Dependent Var.](#)

Effect is smaller than expected



| Dependent Variable | Smoker | Packs (Smokers) |
|--------------------|-------------------|--------------------|
| Avg. for Minors | 0.219 | 0.547 |
| | (1) | (2) |
| Binding Sales Ban | -0.006 (0.021) | 0.006 (0.030) |
| Sales Ban | -0.001 (0.013) | -0.009 (0.021) |
| Age FE | X | X |
| Country FE | X | X |
| Year FE | X | X |
| Country x Teen FE | X | X |
| Year x Teen FE | X | X |
| Country Trends | X | X |
| Ind. Controls | X | X |
| Country Controls | X | X |
| Observations | 138,311 | 38,853 |
| Clusters | 32 | 32 |
| R-squared | 0.10 | 0.12 |

More

Further results and robustness

- ▶ Common trends Trends Lead Table EU
- ▶ Trends
- ▶ Lead
- ▶ Sample restrictions, balance checks

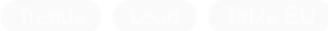
Further results and robustness

- ▶ Common trends 
- Trends
- Lead
- Sample restrictions, balance checks
- ▶ Advertisement and smoking bans 

Further results and robustness

- ▶ Common trends 
- Trends
- Lead
- Sample restrictions, balance checks
- ▶ Advertisement and smoking bans 
- ▶ Sensitivity to cantons 

Further results and robustness

- ▶ Common trends 

 - ▶ Trends
 - ▶ Lead
 - ▶ Sample restrictions, balance checks

- ▶ Advertisement and smoking bans 
- ▶ Sensitivity to cantons 
- ▶ Heterogeneities 
 - ▶ Low education

Debate Over Prohibition

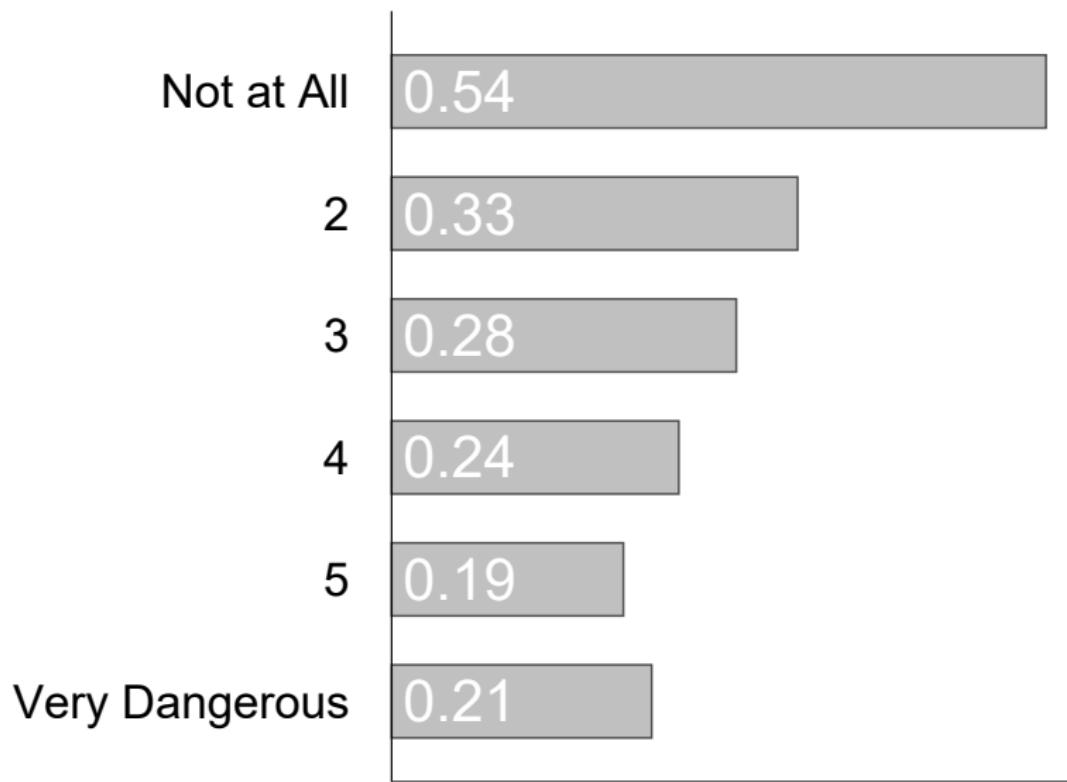
Prohibition could affect:

1. Cost
2. Information
3. Forbidden fruit
4. Circumvention

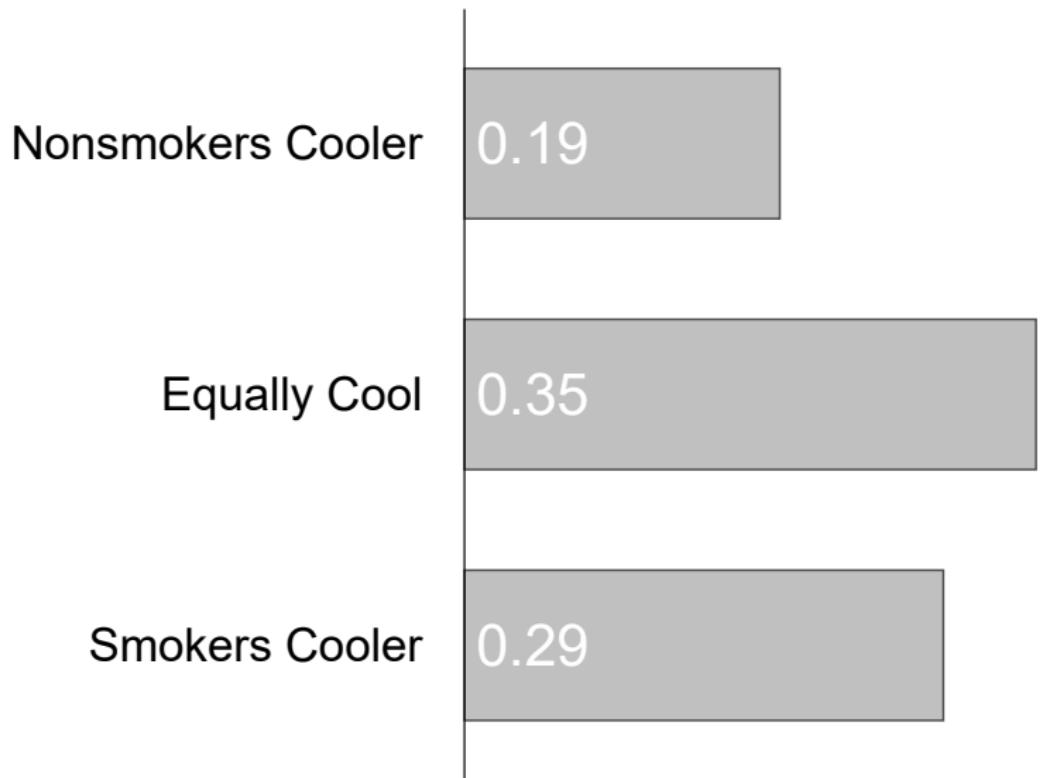
Prohibition could affect:

1. Cost
2. **Information**
3. **Forbidden fruit**
4. Circumvention

Danger and smoking



Coolness and smoking



| Dependent Variable | Smokers Are More: | | | Smoking is Dangerous |
|--------------------|--------------------|-------------------|--------------------|-------------------------|
| | Cool | Avg. | Avg. Smokers | |
| Avg. | 0.307 | 0.288 | 0.367 | 3.70 |
| | (1) | (2) | (3) | (4) |
| Binding Sales Ban | -0.026* (0.013) | -0.021 (0.013) | -0.031* (0.017) | -0.005 (0.053) |
| Sales Ban | -0.012 (0.018) | -0.003 (0.008) | 0.020 (0.023) | 0.043 (0.055) |
| Age FE | X | X | X | X |
| Colony FE | X | X | X | X |
| Year FE | X | X | X | X |
| Colony x Teen FE | X | X | X | X |
| Year x Teen FE | X | X | X | X |
| Ind. Controls | X | X | X | X |
| Colony. Controls | X | X | X | X |
| Observations | 6,010 | 5,662 | 1,446 | 7,632 |
| Colony Clusters | 26 | 26 | 26 | 26 |
| R-squared | 0.03 | 0.06 | 0.05 | 0.06 |

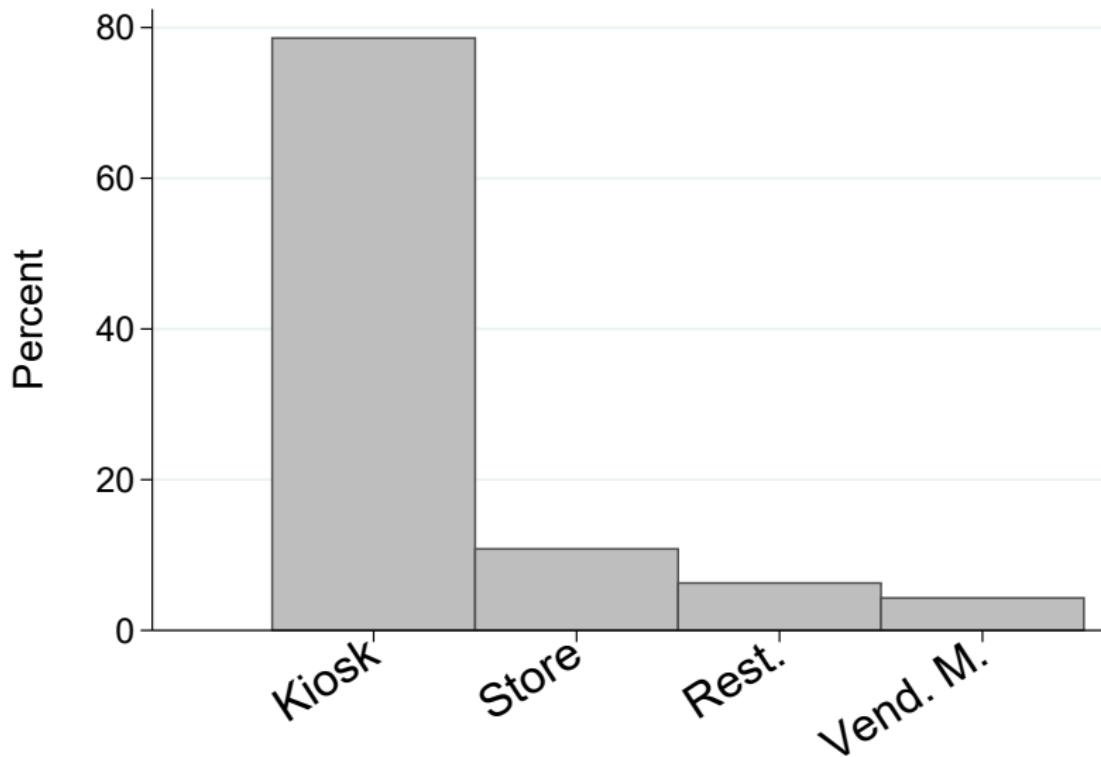
Expand

Parental and peer attitudes

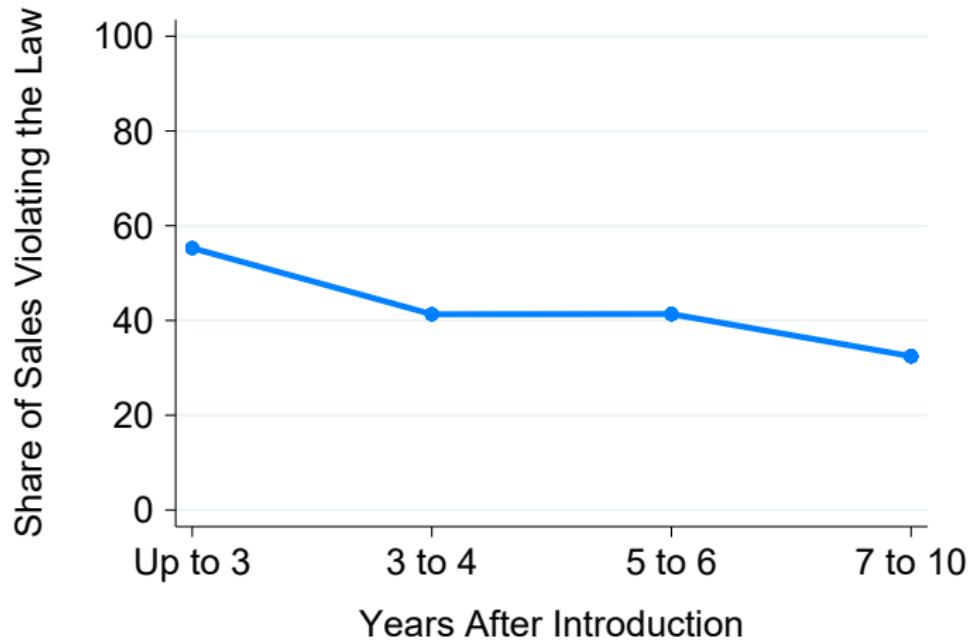
Prohibition could affect:

1. Cost
2. Information
3. Forbidden fruit
4. **Circumvention**

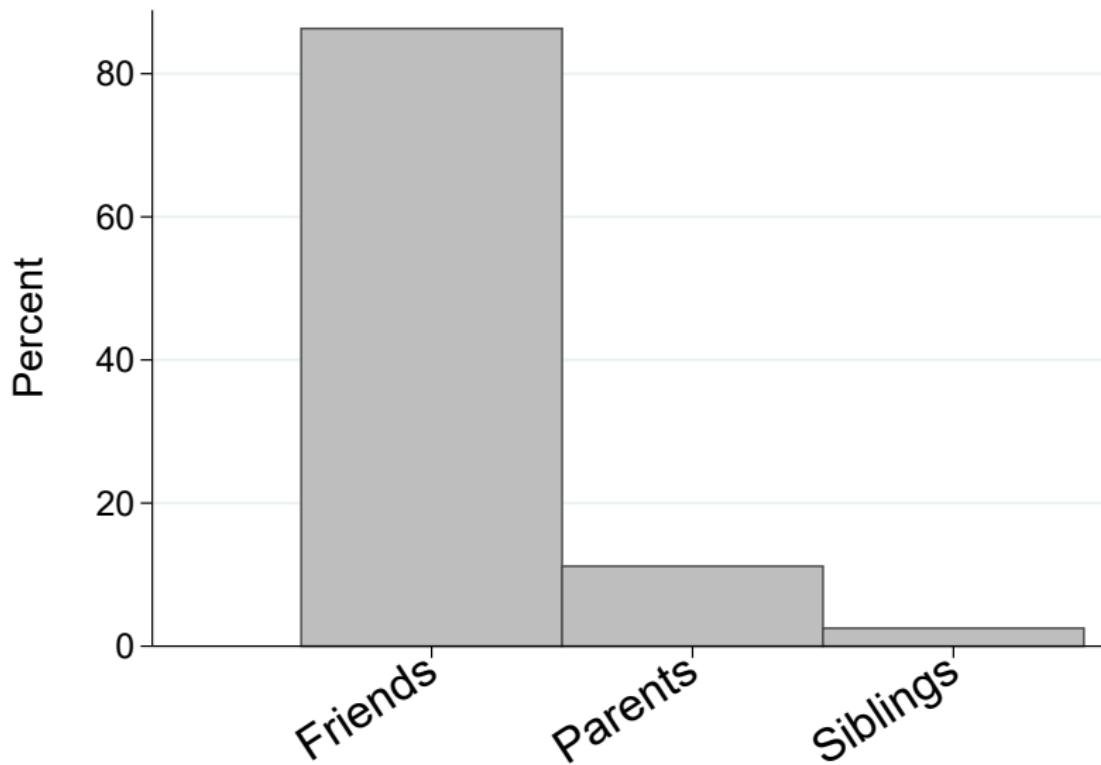
Self purchase



Reduction in sales to minors



Peers as a cigarette source



| Tobacco and Addiction Monitoring, Ages 14-20 | | | | | |
|--|------------------------|-------------------|----------------------------|-----------------------|--------------------------|
| Dependent Variable | Own Purchase (Smokers) | | Smoker | | |
| | | | Sample | | |
| | Yes = 1 | All | All with Info. on Peers | Peers Are: Smokers | Peers Are: Nonsmokers |
| Avg. for Minors: | 0.756 | 0.257 | 0.190 | 0.371 | 0.071 |
| | (1) | (2) | (3) | (4) | (5) |
| Binding Sales Ban | -0.088** (0.043) | -0.003 (0.008) | -0.014 (0.025) | 0.010 (0.031) | -0.069** (0.026) |
| Sales Ban | 0.007 (0.027) | -0.009 (0.019) | -0.006 (0.027) | 0.014 (0.036) | 0.007 (0.023) |
| Age FE | X | X | X | X | X |
| Canton FE | X | X | X | X | X |
| Year FE | X | X | X | X | X |
| Canton x Teen FE | X | X | X | X | X |
| Year x Teen FE | X | X | X | X | X |
| Ind. Controls | X | X | X | X | X |
| Cant. Controls | X | X | X | X | X |
| Observations | 2,245 | 15,735 | 5,481 | 2,507 | 2,974 |
| Canton Clusters | 26 | 26 | 26 | 26 | 26 |
| R-squared | 0.08 | 0.09 | 0.10 | 0.08 | 0.07 |

Further results

- ▶ Cantonal heterogeneities
 - ▶ Test purchases Table
 - ▶ Minimum ages, minimum smoking age Table
 - ▶ Lag and vending machines Table

Further results

- ▶ Cantonal heterogeneities
 - ▶ Test purchases
 - ▶ Minimum ages, minimum smoking age
 - ▶ Lag and vending machines
- ▶ Circumvention by travelling Table

Further results

- ▶ Cantonal heterogeneities
 - ▶ Test purchases
 - ▶ Minimum ages, minimum smoking age
 - ▶ Lag and vending machines
- ▶ Circumvention by travelling
- ▶ Experience Table

The effects of sales prohibition

- ▶ Small if any effect on smoking

The effects of sales prohibition

- ▶ Small if any effect on smoking
- ▶ No information effect

The effects of sales prohibition

- ▶ Small if any effect on smoking
- ▶ No information effect
- ▶ Evidence against forbidden fruit

The effects of sales prohibition

- ▶ Small if any effect on smoking
- ▶ No information effect
- ▶ Evidence against forbidden fruit
- ▶ Teens substitute sources

The effects of sales prohibition

- ▶ Small if any effect on smoking
- ▶ No information effect
- ▶ Evidence against forbidden fruit
- ▶ Teens substitute sources
- ▶ Reduction only if no peers who smoke

The effects of sales prohibition

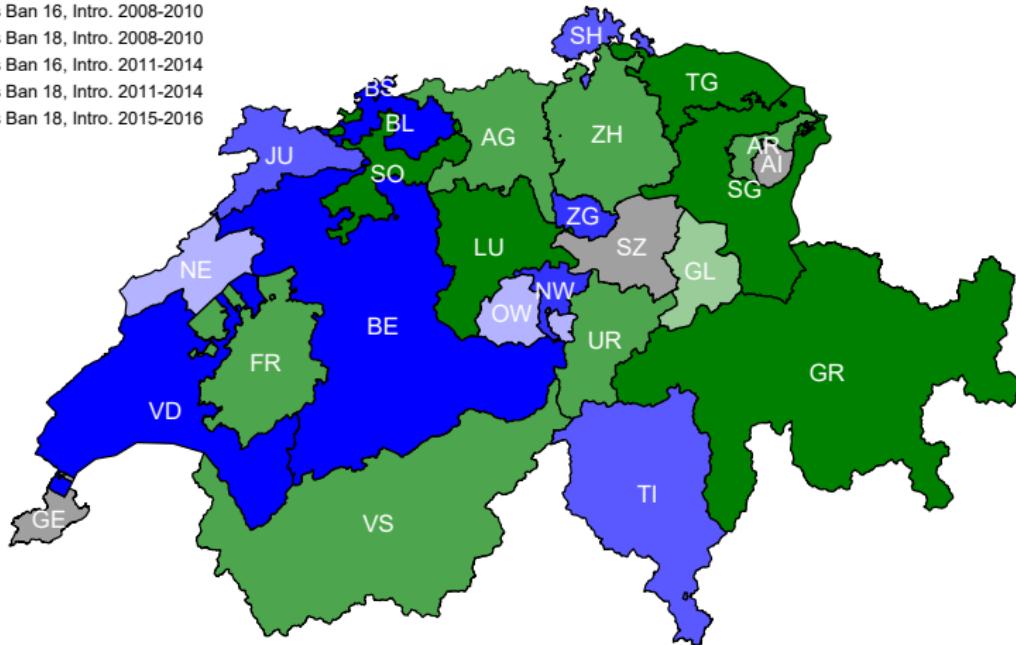
- ▶ Small if any effect on smoking
- ▶ No information effect
- ▶ Evidence against forbidden fruit
- ▶ Teens substitute sources
- ▶ Reduction only if no peers who smoke
- ▶ Peers as gatekeepers

Does tobacco sales prohibition for teens reduce smoking?

Not really



- No Sales Ban Until 2018
- Sales Ban 16, Intro. 2006-2007
- Sales Ban 18, Intro. 2006-2007
- Sales Ban 16, Intro. 2008-2010
- Sales Ban 18, Intro. 2008-2010
- Sales Ban 16, Intro. 2011-2014
- Sales Ban 18, Intro. 2011-2014
- Sales Ban 18, Intro. 2015-2016



Back

Staggered introduction of bans

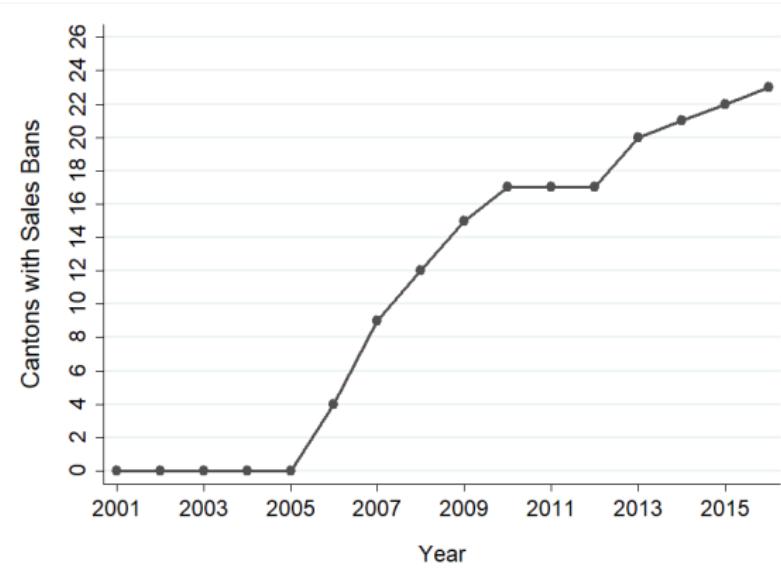


Figure: Cantons with Bans by Year

Staggered introduction of bans

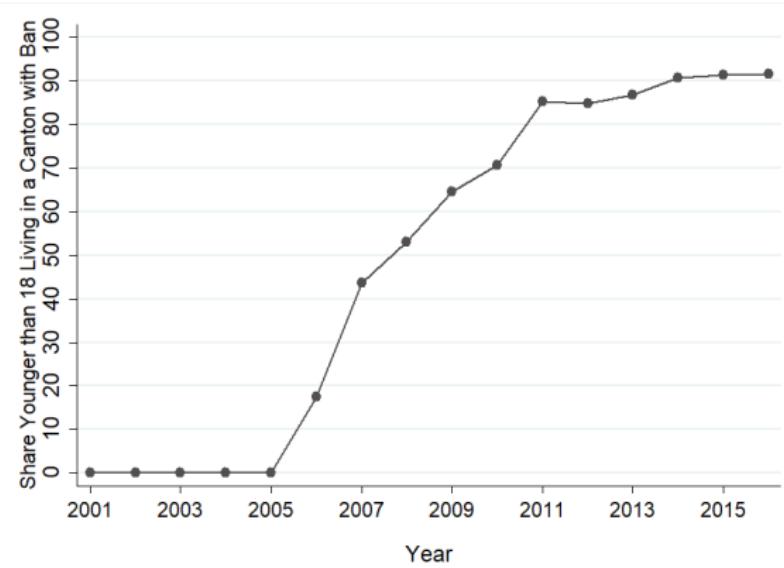


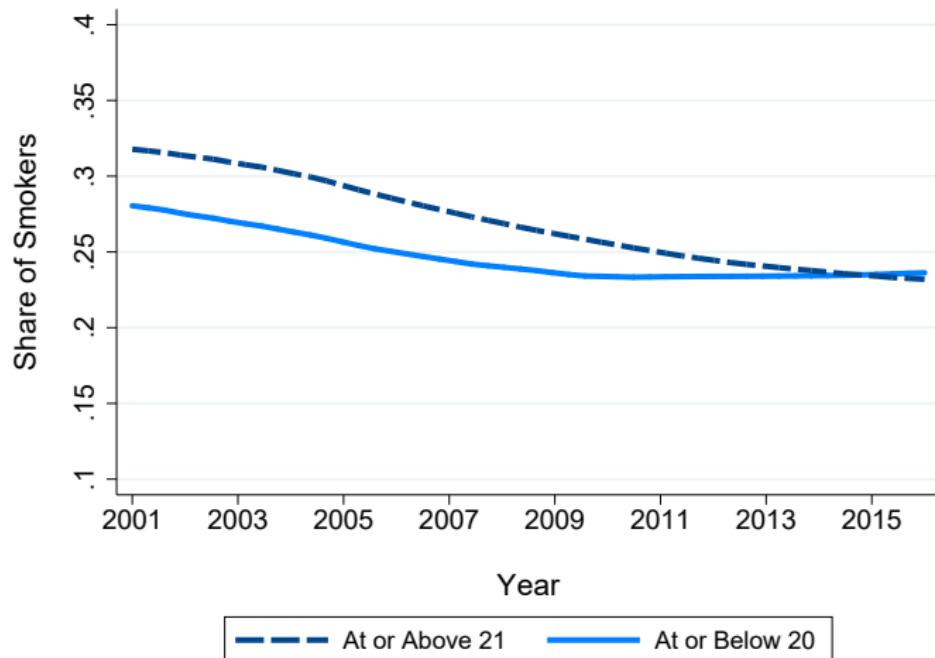
Figure: Share of Minors in Cantons with Bans

| Canton | Introduction Date | Minimum Age |
|--------|-------------------|-------------|
| VD | 01.01.2006 | 18 |
| LU | 01.01.2006 | 16 |
| GR | 01.07.2006 | 16 |
| SG | 01.10.2006 | 16 |
| SO | 01.01.2007 | 16 |
| BL | 01.01.2007 | 18 |
| TG | 01.01.2007 | 16 |
| BE | 01.01.2007 | 18 |
| BS | 01.08.2007 | 18 |
| AR | 01.01.2008 | 16 |
| VS | 01.01.2008 | 16 |
| ZH | 01.07.2008 | 16 |
| FR | 01.01.2009 | 16 |
| NW | 01.03.2009 | 18 |
| UR | 01.09.2009 | 16 |
| AG | 01.01.2010 | 16 |
| ZG | 01.03.2010 | 18 |
| JU | 01.01.2013 | 18 |
| SH | 01.01.2013 | 18 |
| TI | 01.09.2013 | 18 |
| GL | 01.01.2014 | 16 |
| NE | 01.01.2015 | 18 |
| OW | 01.02.2016 | 18 |
| SZ | — | — |
| GE | — | — |
| AI | — | — |

| Variable | Mean | SD | Tobacco Monitoring [†] | | | | Aged 17 or Below | | | |
|------------------------------------|--------|-------|---------------------------------|-----|---------|--------|------------------|------|------|--------|
| | | | All Ages | | N | Mean | SD | Min. | Max. | N |
| <i>Dependent Variables</i> | | | | | | | | | | |
| Smoker | 0.27 | 0.44 | 0 | 1 | 167,376 | 0.18 | 0.38 | 0 | 1 | 16,433 |
| No. of Packs (Smokers) | 0.64 | 0.47 | 0 | 10 | 35,120 | 0.44 | 0.35 | 0 | 4 | 1,684 |
| No. of Packs | 0.13 | 0.34 | 0 | 10 | 167,376 | 0.04 | 0.17 | 0 | 4 | 16,433 |
| <i>Main Independent Variables</i> | | | | | | | | | | |
| Sales Ban | 0.51 | 0.50 | 0 | 1 | 167,376 | 0.51 | 0.50 | 0 | 1 | 16,433 |
| Binding Sales Ban | 0.03 | 0.17 | 0 | 1 | 167,376 | 0.31 | 0.46 | 0 | 1 | 16,433 |
| <i>Individual Level Covariates</i> | | | | | | | | | | |
| Age | 40.77 | 17.83 | 14 | 98 | 167,376 | 15.73 | 1.03 | 14 | 17 | 16,433 |
| Male | 0.42 | 0.49 | 0 | 1 | 167,376 | 0.51 | 0.50 | 0 | 1 | 16,433 |
| No. of Persons in Househ. | 2.87 | 1.39 | 1 | 13 | 167,376 | 4.14 | 1.07 | 1 | 11 | 16,433 |
| Foreigner | 0.32 | 0.47 | 0 | 1 | 167,376 | 0.29 | 0.45 | 0 | 1 | 16,433 |
| <i>Cantonal Level Covariates</i> | | | | | | | | | | |
| Youth Unemployment Rate | 3.73 | 1.99 | 0 | 9 | 167,376 | 3.69 | 1.94 | 0 | 9 | 16,433 |
| Unemployment Rate | 2.84 | 1.35 | 0 | 7 | 167,376 | 2.82 | 1.34 | 0 | 7 | 16,433 |
| No. of Physicians per 10,000 | 171.42 | 64.96 | 86 | 425 | 167,376 | 172.80 | 67.29 | 86 | 425 | 16,433 |
| Indoor Air Law | 0.49 | 0.50 | 0 | 1 | 167,376 | 0.50 | 0.50 | 0 | 1 | 16,433 |
| Advertisement Ban | 0.46 | 0.50 | 0 | 1 | 167,376 | 0.46 | 0.50 | 0 | 1 | 16,433 |

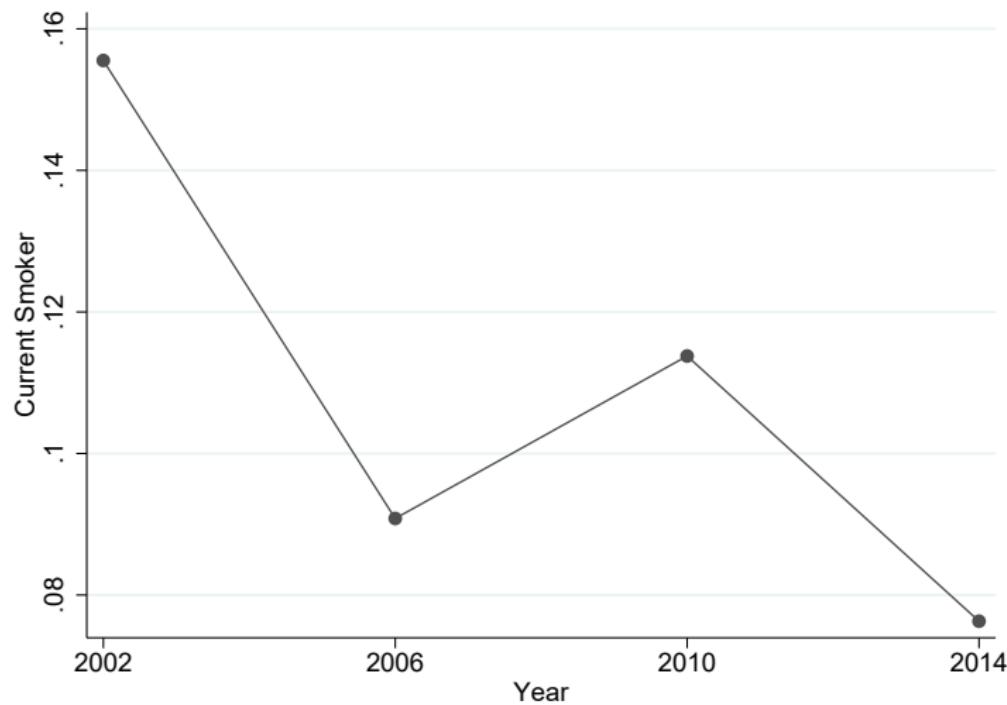
| Variable | Health Behaviour in School-aged Children | | | | |
|-----------------------------------|--|-------|------|------|--------|
| | Mean | SD | Min. | Max. | N |
| <i>Dependent Variables</i> | | | | | |
| Current Smoker | 0.10 | 0.30 | 0 | 1 | 56,335 |
| Age of First Puff | 12.50 | 1.22 | 11 | 15 | 13,177 |
| Ever Smoked Tobacco | 0.29 | 0.45 | 0 | 1 | 56,207 |
| Smoke Frequency | 1.94 | 0.86 | 1 | 3 | 5,832 |
| Cigarettes per Day | 0.32 | 1.63 | 0 | 20 | 35,242 |
| <i>Main Independent Variables</i> | | | | | |
| Binding Sales Ban | 0.58 | 0.49 | 0 | 1 | 56,893 |
| Age in Years | 13.02 | 1.35 | 11 | 15 | 56,893 |
| Gender | 1.50 | 0.50 | 1 | 2 | 56,893 |
| <i>Cantonal Level Covariates</i> | | | | | |
| Youth Unemployment Rate | 3.90 | 1.46 | 2 | 8 | 56,893 |
| Unemployment Rate | 3.10 | 1.06 | 1 | 7 | 56,893 |
| No. of Physicians per 10,000 | 192.82 | 50.92 | 131 | 371 | 56,893 |

Trends in smoking prevalence: teens



| Canton | 2002 | 2006 | 2010 | 2014 | Intro. Date |
|--------|------|------|------|------|-------------|
| AG | X | X | X | X | 1/1/2010 |
| BE | X | X | X | X | 1/1/2007 |
| BL | | X | X | | 1/1/2007 |
| FR | X | X | X | X | 1/1/2009 |
| GE | X | | X | X | — |
| GR | X | | X | X | 7/1/2006 |
| JU | X | X | | | 1/1/2013 |
| LU | | X | X | X | 1/1/2006 |
| SG | | X | X | X | 10/1/2006 |
| TG | | | X | X | 1/1/2007 |
| TI | X | X | X | X | 9/1/2013 |
| VD | | | X | X | 1/1/2006 |
| VS | X | X | X | X | 1/1/2008 |
| ZG | | X | X | X | 3/1/2010 |
| ZH | X | X | X | X | 7/1/2008 |

Trend pupils, 11–15



| Country | Sales Ban 16 (Min. Smoking Age 16) | Sales Ban 18 (Min. Smoking Age 18) |
|----------------------------|---------------------------------------|---------------------------------------|
| Belgium | 01.12.2004 (0) | |
| Cyprus (Republic of) | | 01.01.1980 (0) |
| Denmark | 01.07.2004 (0) | 01.09.2008 (0) |
| Estonia | | 01.01.1988 (1) |
| Finland | 01.03.1977 (0) | 01.03.1995 (0) |
| France | 03.08.2003 (0) | 23.07.2009 (0) |
| Germany | 01.04.2003 (1) | 01.09.2007 (1) |
| Ireland | 12.07.1988 (0) | 27.03.2002 (0) |
| Italy | 24.12.1934 (1) | 01.01.2013 (1) |
| Latvia | | 21.01.1997 (0) |
| Lithuania | | 07.02.1996 (0) |
| Luxembourg | 05.09.2006 (0) | |
| Malta | 12.12.1986 (0) | 12.09.2003 (0) |
| Netherlands | 01.01.2003 (0) | 01.01.2014 (0) |
| Portugal | 04.04.2005 (0) | 01.01.2008 (0) |
| Slovakia | | 26.05.2004 (0) |
| Slovenia | | 19.10.1996 (0) |
| Spain | | 01.01.2006 (0) |
| Sweden | | 01.01.1997 (0) |
| Regions of Austria: | | |
| Burgenland | 06.06.2002 (1) | |
| Kärnten | 03.01.1998 (1) | |
| Niederösterreich | 01.10.2007 (1) | |
| Salzburg | 01.10.2006 (1) | |
| Steiermark | 01.10.2013 (1) | |
| Tirol | 01.01.1988 (1) | |
| Oberösterreich | 01.10.2001 (1) | |
| Wien | 22.02.2007 (1) | |
| Vorarlberg | 09.04.1999 (1) | |
| Regions of UK: | | |
| England | 1933 (0) | 01.10.2007 (0) |
| Northern Ireland | 21.01.1979 (0) | 01.09.2008 (0) |
| Scotland | 1937 (0) | 01.10.2007 (0) |
| Wales | | 01.10.2007 (0) |

| Dependent Variable | Tobacco and Addiction Monitoring | | | | | Health Behaviour in School-aged Children 11–15 Years Old | | |
|--------------------|----------------------------------|-------------------|--------------------|-------------------|-------------------|--|------------------|------------------|
| | All Ages | | | | | | | |
| | Smoker | | Packs (Smokers) | Smoker | Smoked Ever | Age First Puff | | |
| Avg. for Minors | 0.178 | | 0.438 | 0.104 | 0.287 | 12.503 | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Binding Sales Ban | -0.007 (0.010) | 0.003 (0.007) | -0.001 (0.009) | -0.002 (0.009) | -0.009 (0.020) | 0.008 (0.007) | 0.012 (0.014) | 0.001 (0.051) |
| Sales Ban | -0.002 (0.003) | -0.002 (0.003) | -0.002 (0.003) | -0.002 (0.003) | 0.005 (0.008) | | | |
| Age FE | X | X | X | X | X | X | X | X |
| Canton FE | X | X | X | X | X | X | X | X |
| Year FE | X | X | X | X | X | X | X | X |
| Canton x Teen FE | | | X | X | X | | | |
| Year x Teen FE | | X | X | X | X | | | |
| Ind. Controls | | | X | X | X | X | X | X |
| Cant. Controls | | | X | X | X | | | |
| Observations | 167,376 | 167,376 | 167,376 | 167,376 | 35,120 | 56,335 | 56,207 | 13,177 |
| Canton Clusters | 26 | 26 | 26 | 26 | 26 | 15 | 15 | 15 |
| R-squared | 0.03 | 0.03 | 0.03 | 0.05 | 0.08 | 0.07 | 0.14 | 0.25 |

Back

| Dependent Variable | Tobacco and Addiction Monitoring | | | Health Behaviour in School-aged Children | |
|--------------------|----------------------------------|----------------------|------------------|---|---------------------|
| | All Ages | | | 11–15 Years Old | |
| | Daily Smoker | In(Nicotine) Smokers | >=100 Cigar. | Smoke Freq. | Cigarettes per Week |
| Avg. | 0.130 | 1.741 | 0.187 | 1.939 | 0.318 |
| | (1) | (2) | (3) | (4) | (5) |
| Binding Sales Ban | -0.001 (0.013) | -0.138 (0.119) | 0.011 (0.014) | -0.057 (0.060) | 0.008 (0.023) |
| Sales Ban | 0.004 (0.004) | 0.035 (0.048) | 0.004 (0.006) | | |
| Age FE | X | X | X | X | X |
| Canton FE | X | X | X | X | X |
| Year FE | X | X | X | X | X |
| Canton x Teen FE | X | X | X | | |
| Year x Teen FE | X | X | X | | |
| Ind. Controls | X | X | X | X | X |
| Cant. Controls | X | X | X | | |
| Observations | 116,145 | 11,867 | 66,378 | 5,832 | 35,242 |
| Canton Clusters | 26 | 26 | 26 | 15 | 15 |
| R-squared | 0.16 | 0.09 | 0.14 | 0.09 | 0.03 |

Back

| Dependent Variable | Smoker | | Packs (Smokers) | |
|--------------------|-------------------|-------------------|--------------------|-------------------|
| Avg. for Minors | 0.219 | | 0.547 | |
| | (1) | (2) | (4) | |
| Binding Sales Ban | -0.016 (0.022) | -0.007 (0.021) | -0.006 (0.021) | 0.006 (0.030) |
| Sales Ban | -0.019 (0.015) | -0.019 (0.013) | -0.001 (0.013) | -0.009 (0.021) |
| Age FE | X | X | X | X |
| Country FE | X | X | X | X |
| Year FE | X | X | X | X |
| Country x Teen FE | X | X | X | X |
| Year x Teen FE | X | X | X | X |
| Country Trends | | | X | X |
| Ind. Controls | | X | X | X |
| Country Controls | | X | X | X |
| Observations | 138,311 | 138,311 | 138,311 | 38,853 |
| Clusters | 32 | 32 | 32 | 32 |
| R-squared | 0.06 | 0.10 | 0.10 | 0.12 |

| Dependent Variable | Tobacco and Addiction Monitoring | | | | | |
|--|----------------------------------|-------------------|-------------------|-------------------|-------------------|--------|
| | Smoker, Avg. for Minors: 0.178 | | | | | |
| | Before 2006 | Before 2006 | Before 2006 | (1) | (2) | (3) |
| Binding Sales Ban | -0.000 (0.010) | 0.001 (0.009) | 0.004 (0.012) | | | |
| Sales Ban | -0.002 (0.003) | -0.003 (0.003) | -0.002 (0.003) | | | |
| Ever Introd. Trend x Minor | -0.001 (0.001) | -0.013 (0.009) | | | | |
| Ever Introd. Trend | 0.000 (0.001) | -0.004 (0.004) | | | | |
| Early Introd. Trend x Minor | | -0.001 (0.001) | -0.013 (0.009) | | | |
| Early Introd. Trend | | 0.000 (0.001) | -0.005 (0.004) | | | |
| Late Introd. Trend x Minor | | -0.000 (0.001) | -0.012 (0.009) | | | |
| Late Introd. Trend | | -0.000 (0.001) | -0.002 (0.006) | | | |
| Min. Age 18 Ever Introd. Trend | | | | 0.001 (0.001) | -0.004 (0.003) | |
| Min. Age 18 Ever Introd. Trend x Minor | | | | -0.001 (0.001) | -0.009 (0.006) | |
| Age FE | X | X | X | X | X | X |
| Canton FE | X | X | X | X | X | X |
| Year FE | X | X | X | X | X | X |
| Canton x Teen FE | X | X | X | X | X | X |
| Year x Teen FE | X | X | X | X | X | X |
| Ind. Controls | X | X | X | X | X | X |
| Cant. Controls | X | X | X | X | X | X |
| Observations | 167,376 | 49,854 | 167,376 | 49,854 | 167,376 | 49,854 |
| Canton Clusters | 26 | 26 | 26 | 26 | 26 | 26 |
| R-squared | 0.05 | 0.04 | 0.05 | 0.04 | 0.05 | 0.04 |

Back

| Dependent Variable | Tobacco and Addiction Monitoring | | | | |
|------------------------------------|----------------------------------|------------------|-------------------|-------------------|-------------------|
| | Smoker, Avg. for Minors: 0.178 | | | | |
| | After 2002 | Intro. < 2013 | (4) | (5) | |
| | (1) | (2) | (3) | (4) | (5) |
| Binding Sales Ban | 0.003 (0.007) | 0.008 (0.012) | -0.005 (0.013) | -0.001 (0.009) | -0.002 (0.010) |
| Sales Ban | 0.002 (0.004) | 0.001 (0.004) | 0.002 (0.003) | -0.002 (0.003) | -0.002 (0.003) |
| Binding Sales Ban Lead 1 | | | 0.006 (0.013) | | |
| Sales Ban Lead 1 | | | -0.005 (0.004) | | |
| Binding Sales Ban After or in 2013 | | | | 0.002 (0.018) | |
| Sales Ban After or in 2013 | | | | -0.003 (0.006) | |
| Age FE | X | X | X | X | X |
| Canton FE | X | X | X | X | X |
| Year FE | X | X | X | X | X |
| Canton x Teen FE | X | X | X | X | X |
| Year x Teen FE | X | X | X | X | X |
| Ind. Controls | X | X | X | X | X |
| Cant. Controls | X | X | X | X | X |
| Cant. Trends | X | X | | | |
| Cant. Trends x Teen | | X | | | |
| Observations | 167,376 | 167,376 | 167,376 | 147,367 | 167,376 |
| Canton Clusters | 26 | 26 | 26 | 26 | 26 |
| R-squared | 0.05 | 0.30 | 0.05 | 0.05 | 0.05 |

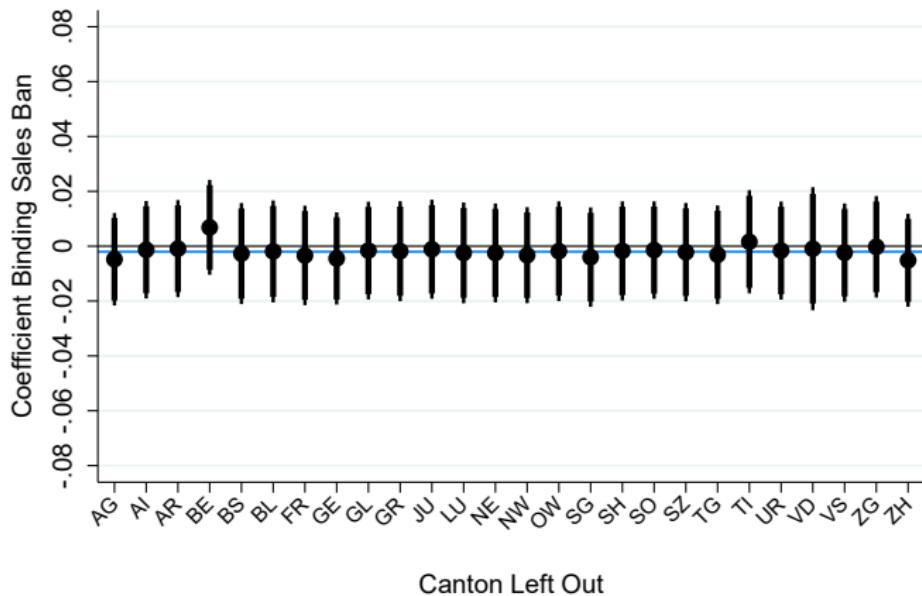
Back

| Dependent Variable Avg. for Minors | Smoker 0.219 | | | | |
|---------------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| | (1) | (2) | (3) | (4) | (5) |
| Binding Sales Ban | -0.007 (0.021) | -0.005 (0.020) | -0.006 (0.020) | -0.012 (0.018) | -0.012 (0.018) |
| Sales Ban | -0.001 (0.013) | 0.001 (0.015) | -0.001 (0.013) | -0.001 (0.013) | -0.001 (0.013) |
| 1y Lead Binding Sales Ban | 0.064 (0.082) | | | | |
| 1y Lead Sales Ban | 0.002 (0.009) | | | | |
| In(Real Cigarette Price) | | 0.012 (0.017) | | 0.013 (0.016) | |
| In(Real Cigarette Price) x Minor | | 0.004 (0.021) | | 0.000 (0.019) | |
| Indoor Air Law | | | 0.001 (0.010) | 0.002 (0.010) | |
| Indoor Air Law x Minor | | | 0.023 (0.034) | 0.023 (0.033) | |
| Age FE | X | X | X | X | X |
| Country FE | X | X | X | X | X |
| Year FE | X | X | X | X | X |
| Country x Teen FE | X | X | X | X | X |
| Year x Teen FE | X | X | X | X | X |
| Country Trends | X | X | X | X | X |
| Country Trends x Teen | X | | | | |
| Ind. Controls | X | X | X | X | X |
| Country Controls | X | X | X | X | X |
| Observations | 138,311 | 138,311 | 138,311 | 138,311 | 138,311 |
| Clusters | 32 | 32 | 32 | 32 | 32 |
| R-squared | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 |

| Dependent Variable | Tobacco and Addiction Monitoring | | | | |
|---------------------------|----------------------------------|-------------------|-------------------|-------------------|-------------------|
| | Smoker, Avg. for Minors: 0.178 | | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Binding Sales Ban | | -0.005 (0.011) | -0.006 (0.009) | -0.007 (0.011) | |
| Sales Ban | | -0.005 (0.003) | -0.001 (0.003) | -0.004 (0.003) | |
| Advertisement Ban | 0.006 (0.005) | | 0.008 (0.005) | | 0.009 (0.005) |
| Advertisement Ban x Minor | 0.005 (0.010) | | 0.007 (0.011) | | 0.002 (0.010) |
| Indoor Air Law | | 0.006 (0.007) | | 0.006 (0.007) | 0.006 (0.007) |
| Indoor Air Law x Minor | | 0.014 (0.010) | | 0.016 (0.010) | 0.015* (0.009) |
| Age FE | X | X | X | X | X |
| Colony FE | X | X | X | X | X |
| Year FE | X | X | X | X | X |
| Colony x Teen FE | X | X | X | X | X |
| Year x Teen FE | X | X | X | X | X |
| Ind. Controls | X | X | X | X | X |
| Cant. Controls | X | X | X | X | X |
| Observations | 167,376 | 167,376 | 167,376 | 167,376 | 167,376 |
| Colony Clusters | 26 | 26 | 26 | 26 | 26 |
| R-squared | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |

Back

Sensitivity to cantons



| | Tobacco and Addiction Monitoring | | | | | | HBSC | |
|--------------------|----------------------------------|-------------------|-------------------|-------------------|------------------|---------------------|------------------|------------------|
| | All Ages | | | Ages 14–20 | | | Ages 11–15 | |
| Dependent Variable | Smoker | | | | | | | |
| Sample | Male | Female | Foreign B. | Swiss B. | High Edu. | Low Edu. | Male | Female |
| Avg. for Minors | 0.184 | 0.171 | 0.168 | 0.182 | 0.175 | 0.192 | 0.109 | 0.098 |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Binding Sales Ban | -0.002 (0.013) | -0.000 (0.012) | -0.000 (0.012) | 0.002 (0.011) | 0.018 (0.022) | -0.035** (0.013) | 0.000 (0.010) | 0.016 (0.011) |
| Sales Ban | 0.000 (0.005) | -0.003 (0.003) | -0.014 (0.010) | -0.000 (0.004) | 0.020 (0.032) | -0.009 (0.028) | | |
| Age FE | X | X | X | X | X | X | X | X |
| Canton FE | X | X | X | X | X | X | X | X |
| Year FE | X | X | X | X | X | X | X | X |
| Canton x Teen FE | X | X | X | X | X | X | | |
| Year x Teen FE | X | X | X | X | X | X | | |
| Ind. Controls | X | X | X | X | X | X | | |
| Cant. Controls | X | X | X | X | X | X | | |
| Observations | 70,927 | 96,449 | 53,695 | 113,681 | 4,648 | 6,970 | 27,958 | 28,377 |
| Canton Clusters | 26 | 26 | 26 | 26 | 26 | 26 | 15 | 15 |
| R-squared | 0.05 | 0.04 | 0.06 | 0.05 | 0.09 | 0.09 | 0.07 | 0.08 |

Back

Attitudes 1

| Sample | | Tobacco and Addiction Monitoring Ages 14–20 | | | | | | | |
|--------------------|------|--|------------|--------------|---------|------------|---------|------------|---------|
| | | All | | | | Smokers | | | |
| Dependent Variable | Avg. | Smokers Are More: | | | | | | | |
| | | Cool | Attractive | Appreciative | Happy | Successful | Avg. | Successful | Avg. |
| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| Binding Sales Ban | | -0.026* | 0.008 | -0.041** | -0.020 | -0.017 | -0.021 | -0.077* | -0.031* |
| | | (0.013) | (0.018) | (0.018) | (0.021) | (0.021) | (0.013) | (0.037) | (0.017) |
| Sales Ban | | -0.012 | -0.005 | -0.018 | 0.011 | -0.005 | -0.003 | 0.050 | 0.020 |
| | | (0.018) | (0.014) | (0.023) | (0.017) | (0.015) | (0.008) | (0.045) | (0.023) |
| Age FE | | X | X | X | X | X | X | X | X |
| Canton FE | | X | X | X | X | X | X | X | X |
| Year FE | | X | X | X | X | X | X | X | X |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| Observations | | 6,010 | 5,983 | 5,988 | 5,950 | 5,939 | 5,662 | 1,532 | 1,446 |
| Canton Clusters | | 26 | 26 | 26 | 26 | 26 | 26 | 26 | 26 |
| R-squared | | 0.03 | 0.07 | 0.08 | 0.02 | 0.07 | 0.06 | 0.06 | 0.05 |

Attitudes 2

| Sample | Tobacco and Addiction Monitoring Ages 14–20 | | | | | Ages 14–25 |
|--------------------|--|-----------------------|--------------------|-----------------------|----------------------|------------|
| | Smokers | | Nonsmokers | | All | |
| Dependent Variable | Peers for Stopping | Parents Ok w. Smoking | Peers for Starting | Parents Ok w. Smoking | Smoking is Dangerous | |
| Avg. | 2.595 | 0.502 | 1.397 | 0.244 | 3.719 | |
| | (1) | (2) | (3) | (4) | (5) | |
| Binding Sales Ban | 0.121* | 0.051 | -0.006 | -0.004 | -0.005 | |
| | (0.063) | (0.033) | (0.028) | (0.023) | (0.053) | |
| Sales Ban | -0.032 | -0.002 | -0.042 | -0.013 | 0.043 | |
| | (0.047) | (0.039) | (0.030) | (0.027) | (0.055) | |
| Age FE | X | X | X | X | X | |
| Canton FE | X | X | X | X | X | |
| Year FE | X | X | X | X | X | |
| Canton x Teen FE | X | X | X | X | X | |
| Year x Teen FE | X | X | X | X | X | |
| Ind. Controls | X | X | X | X | X | |
| Cant. Controls | X | X | X | X | X | |
| Observations | 1,572 | 1,552 | 4,466 | 4,378 | 7,632 | |
| Canton Clusters | 26 | 26 | 26 | 26 | 26 | |
| R-squared | 0.09 | 0.12 | 0.04 | 0.09 | 0.06 | |

| Dependent Variable Avg. for Minors | Tobacco and Addiction Monitoring | | | |
|---|----------------------------------|-------------------|-------------------|----------------------|
| | Smoker 0.178 | | | |
| | (1) | (2) | (3) | (4) |
| Binding Sales Ban | 0.006 (0.028) | -0.019 (0.014) | 0.007 (0.011) | 0.017 (0.010) |
| Sales Ban | | -0.000 (0.013) | 0.001 (0.006) | -0.004 (0.004) |
| Binding Sales Ban x Share Sold in Test Purch. | | -0.009 (0.039) | | |
| Sales Ban x Share Sold in Test Purch. | | 0.005 (0.017) | | |
| Binding Sales Ban x Test Purchase | | 0.020 (0.018) | | |
| Sales Ban x Test Purchase | | -0.003 (0.006) | | |
| Binding Sales Ban x Early Test Purchase | | | -0.014 (0.014) | |
| Sales Ban x Early Test Purchase | | | 0.004 (0.006) | |
| Binding Sales Ban – Age 18 | | | | -0.031*** (0.011) |
| Sales Ban – Age 18 | | | | 0.007 (0.005) |
| Age FE | X | X | X | X |
| Canton FE | X | X | X | X |
| Year FE | X | X | X | X |
| Canton x Teen FE | X | X | X | X |
| Year x Teen FE | X | X | X | X |
| Ind. Controls | X | X | X | X |
| Cant. Controls | X | X | X | X |
| Observations | 117,752 | 167,376 | 167,376 | 167,376 |
| Canton Clusters | 14 | 26 | 26 | 26 |
| R-squared | 0.05 | 0.05 | 0.05 | 0.05 |

| | | Tobacco and Addiction Monitoring All Ages | | | | |
|---|--|--|-------------------|------------------|-------------------|-------------------|
| Dependent Variable | | Smoker | | | | |
| Avg. for Minors | | No Circumv. | | 0.178 | | |
| | | (1) | (2) | (3) | (4) | (5) |
| Binding Sales Ban | | -0.006 (0.018) | -0.009 (0.015) | 0.002 (0.014) | -0.008 (0.012) | -0.001 (0.011) |
| Sales Ban | | -0.002 (0.003) | -0.002 (0.003) | 0.000 (0.004) | -0.005 (0.005) | -0.005 (0.004) |
| Binding Sales Ban x Distance to Nonb. in 10k km | | 0.001 (0.007) | | | | |
| Binding Sales Ban x Distance > 75 perc. | | | 0.013 (0.013) | | | |
| Binding Sales Ban Lag 1 | | | | 0.007 (0.012) | | |
| Sales Ban Lag 1 | | | | 0.005 (0.005) | | |
| Binding Sales Ban x Vending Machine Contr. | | | | | -0.001 (0.013) | |
| Sales Ban x Vending Machine Contr. | | | | | 0.006 (0.006) | |
| Age FE | | X | X | X | X | X |
| Canton FE | | X | X | X | X | X |
| Year FE | | X | X | X | X | X |
| Canton x Teen FE | | X | X | X | X | X |
| Year x Teen FE | | X | X | X | X | X |
| Ind. Controls | | X | X | X | X | X |
| Cant. Controls | | X | X | X | X | X |
| Observations | | 164,533 | 164,533 | 121,613 | 167,376 | 167,376 |
| Canton Clusters | | 26 | 26 | 22 | 26 | 26 |
| R-squared | | 0.05 | 0.05 | 0.05 | 0.05 | 0.05 |

| Dependent Variable Avg. for Minors | Tobacco and Addiction Monitoring | | | |
|--|----------------------------------|-------------------|--------------------|-------------------|
| | Smoker 0.178 | | | |
| | (1) | (2) | (3) | (4) |
| Binding Sales Ban | -0.007 (0.014) | 0.002 (0.013) | 0.011 (0.013) | 0.015 (0.013) |
| Sales Ban | -0.001 (0.003) | -0.002 (0.003) | -0.004 (0.003) | -0.004 (0.003) |
| Binding Sales Ban – Age 18 | | | -0.031* (0.014) | -0.026 (0.014) |
| Sales Ban – Age 18 | | | 0.007 (0.006) | 0.006 (0.005) |
| Experienced a Binding Sales Ban | -0.007 (0.009) | | -0.010 (0.010) | |
| Years of Experience with a Binding Sales Ban | | 0.001 (0.002) | | -0.001 (0.001) |
| Experienced a Binding Sales Ban x Min. Age 18 | | | 0.004 (0.017) | |
| Years of Experience with a Binding Sales Ban x Min. Age 18 | | | | 0.003 (0.004) |
| Age FE | X | X | X | X |
| Canton FE | X | X | X | X |
| Year FE | X | X | X | X |
| Canton x Teen FE | X | X | X | X |
| Year x Teen FE | X | X | X | X |
| Ind. Controls | X | X | X | X |
| Cant. Controls | X | X | X | X |
| Observations | 167,376 | 167,376 | 167,376 | 167,376 |
| Canton Clusters | 26 | 26 | 26 | 26 |
| R-squared | 0.05 | 0.05 | 0.05 | 0.05 |