

The European Smoking Bans and Mature Smokers: Can They Kick the Habit?

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Motivation

Motivations

- **The 1986 Surgeon General's report:** nonsmokers were inhaling similar smoke and carcinogens as smokers.
- In the US, the annual cost of excess medical care, mortality and morbidity from SHS is \$10 billion.
- Every year 695,000 Europeans die prematurely of tobacco-related causes
 - Estimated to cost the EU countries at least 100 billion Euro

Public smoking bans

- *Direct effects:* Reduce externalities of smoking
 - Declines in exposure to secondhand smoke and related health symptoms
- *Indirect effects:* Whether also reduce overall smoking behaviors?

What are the effect of public smoking bans on smoking behaviors of existing smokers?

- Smoking cessation
- Smoking reduction, if continued to smoke

Heterogeneity in the effects of public smoking bans

- Comprehensiveness, enforcement, and coverage of bans
- Exposure of smokers to the bans

Theoretical frameworks provide no conclusive answer.

- Rational addiction [Becker et al., 1991]
 - Bans imposed higher costs on smoking in restricted spaces
 - Substitution Effects → Smoking displacement into private spaces [Adda and Cornaglia, 2010]
- Addiction cued trigger process [Bernheim and Rangel, 2004]
 - Individuals are sensitized to environmental cues that triggers uses
 - Bans could potentially remove smoking cues

Empirical evidence is necessary to understand the behavioral responses of smokers.

Objectives

Evaluate the impacts of *nationwide comprehensive smoking bans* across European countries on *mature smokers*

- Top-down regulations under the EU Commission's Recommendation
- Extensive and intensive margin effects of smoking bans on existing smokers
- Mature smokers have well-established addiction and well-formed beliefs.

Sources of potential heterogeneity

- Coverage and enforcement of bans
- Levels of exposure to bans
- Smoking intensity of smokers

Public smoking bans can reduce smoking among some mature smokers

- Mature smokers are 7% more likely to quit following comprehensive bans.
 - Light smokers may quit smoking in the short-run and resume to smoking again over time.
 - Heavy smokers chances of quitting increase over time after smoking bans have been imposed.
 - No significant effect on the quit rate of average smokers.
- Heterogeneity in ban enforcement
 - Those working in industries with more strict bans, such as transportation, and health sectors, have higher quit rates.

Evaluation of more recent comprehensive smoking bans across countries.

- Cross-country panel data over 9 European countries
- Long-run: up to 9-year window following comprehensive bans
- Focus on mature smokers with well-established addiction

Limitations faced in previous studies

- Voluntary bans or lower-level smoke-free laws face endogeneity bias and self-selection bias
- Short-run effects following smoking bans
- Aggregate data: unable to pin down the actual behavioral response of mature smokers

Mature Smokers

- Have well-established addiction to tobacco smoking
- Less likely to change their consumption habits unless there are shocks, such as a newly diagnosed health conditions (Smith et. al, 2001)
- Well-informed about the costs, or risks, and benefits of smoking (Khwaja et al, 2009).
- Less responsive to health publicity campaigns about the harms of smoking (Townsend et. al, 1994)
- Less responsive to price changes (Evans and Farally, 1998).

Roadmap

Motivation

Research Design

Data and Descriptive Statistics

Identification and Estimations

Results

Conclusions

Research Design

EU Council's Recommendation

Recommendation (2003/54/C) calling for protection against exposure to tobacco smoke in public spaces, including indoor workplaces, public transport, and indoor public places.

By 2010, all member countries imposed comprehensive smoking bans.

Variation in timing of bans introduction largely depended on

- Traditional public health standing (Duina and Kurzer, 2010)
- Relationship to tobacco industries
- Public attitudes towards secondhand smoke and smoking bans

Attitude

Data and Descriptive Statistics

SHARE: Survey of Health, Ageing and Retirement in Europe

- Nationally representative samples of people age 50 or older and their partners
- Data consists of demographic, health, and employment information
- Nine original SHARE countries who are members of the EU
 - Western and Southern Europe: Austria, Italy, Sweden, Spain, Belgium, France, Denmark, Germany, and Greece
- The survey started in 2004 and is repeated every two years.
- 4 waves are included: Wave 1: 2004-05; Wave 2: 2006-07; Wave 4: 2011-12; and Wave 5: 2013

Descriptive Statistics

Demographic characteristics of SHARE subsample in Wave 1

Characteristics	Overall		Smokers	Nonsmokers
	Average	SD		
Observations	30,804		5,912	24,732
Age	63.86	10.58	59.46	64.92
Living with a partner	0.75	0.43	0.75	0.75
Male	0.44	0.50	0.54	0.42
College	0.19	0.39	0.19	0.19
Employed	0.29	0.46	0.41	0.27
Income	3,966	134,318	2,373	4,523
(observations)	(7923)		(2052)	(5870)

Quasi-experimental setting

Exploit the multinational governance structure of the European Union (EU)

- Top-down smoke-free environment laws by the EU's Commission on its members
- Variation across time and space of national-level comprehensive smoking bans
- DID analysis comparing smoking behaviors across countries

Figure 1: Comprehensive smoking bans

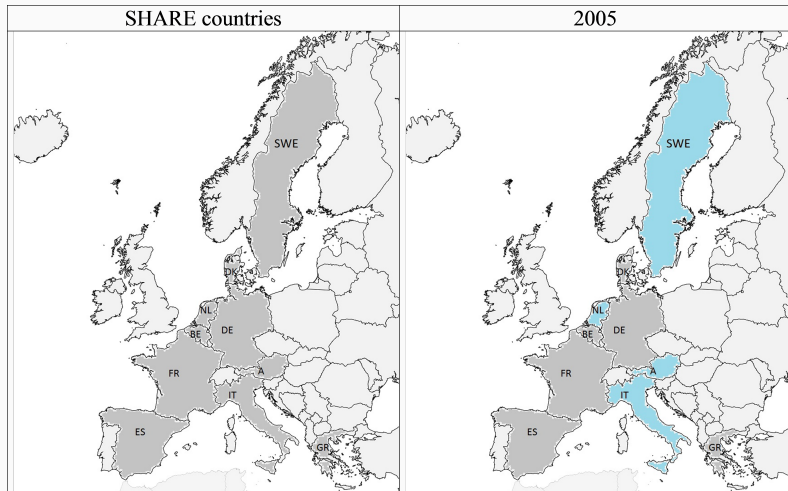
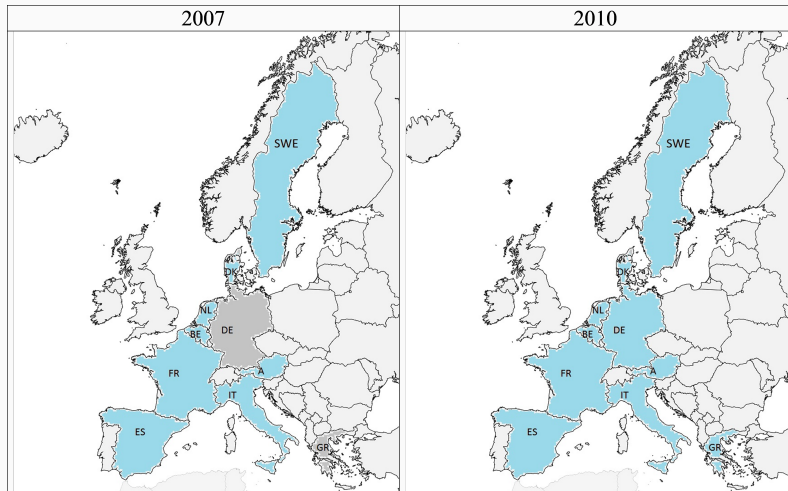
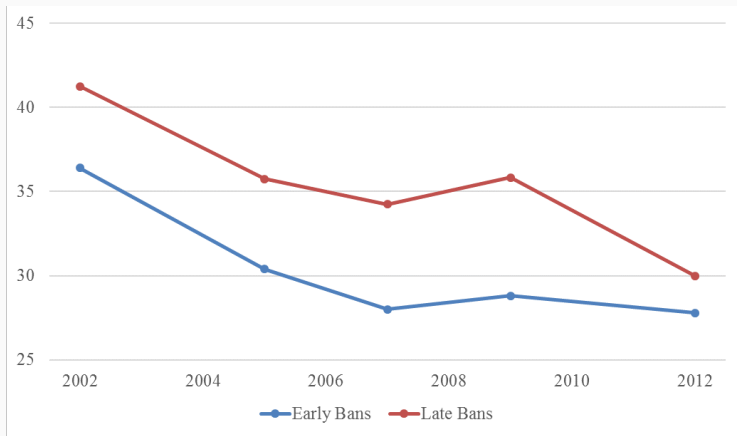


Figure 2: Comprehensive smoking bans



Population smoking prevalence

Figure 3: Population smoking prevalence among countries with early and late bans



Source: Eurobarometer

Table

1995

Weighted

Smoking prevalence in SHARE samples

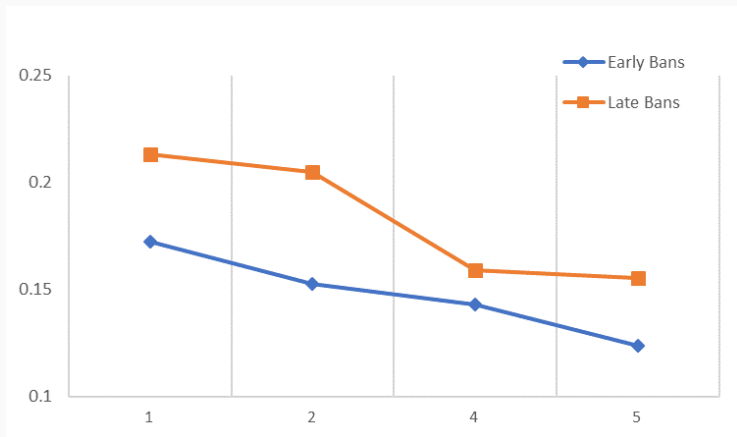


Figure 4: Smoking prevalence of subsample interviewed in wave 1

Identification and Estimations

Smoking Status

$$Y_{ist} = \gamma_s + \lambda_t + \beta D_{st} + X'_{ist} \delta + \epsilon_{ist}$$

Where $t = 1, 2, 3$ or 4 ;

Y_{ist} is the smoking status of i , who lives in s , at time t .

$$Y_{ist} = \begin{cases} 1 & \text{if } i \text{ smokes daily at time } t. \\ 0 & \text{otherwise} \end{cases}$$

and

$$D_{st} = \begin{cases} 1 & \text{if there are comprehensive bans in country } s \text{ at time } t \\ 0 & \text{otherwise} \end{cases}$$

Control variables include age, college attainment, whether living with a partner, and employment status.

- Short run: $t = 1$, and 2 , the maximum of two years following smoking bans

Annual smoking cessation rates

The number of years that bans have been in place

$$Y_{ist} = \gamma_s + \lambda_t + \beta Duration_{ist} + X'_{ist} \delta + \epsilon_{ist}$$

Where $t = 1, 2, 3$ and 4;

$Duration_{ist}$ is the number of years between the time that i was interviewed at time t and when smoking bans in country s have been in placed. Coef

Results

Table 1: Short and long-run smoking cessation rates

Dependent Variable:	Short Run				Long Run	
Smoking Status	(I)	(II)	(III)	(IV)	(V)	(VI)
Comprehensive bans	-0.0651** (0.0288)	-0.0715*** (0.0264)	-0.0764 (0.0458)	-0.0462* (0.0265)	-0.0481* (0.0263)	-0.0574 (0.0474)
Year fixed effects	yes	yes	yes	yes	yes	yes
Country fixed effect	yes			yes		
CountryX year			yes			yes
Individual Fixed effects		yes	yes		yes	yes
Control variables	age, male, living status, education, employment					
Subsample	Smokers from wave 1					
No. of observations	7593	7593	7593	10904	10904	10904

Note: Standard errors clustered by NUTS level 1 (54 clusters)

*** Significant at the 1 percent, ** 5 percent, and * 10 percent level

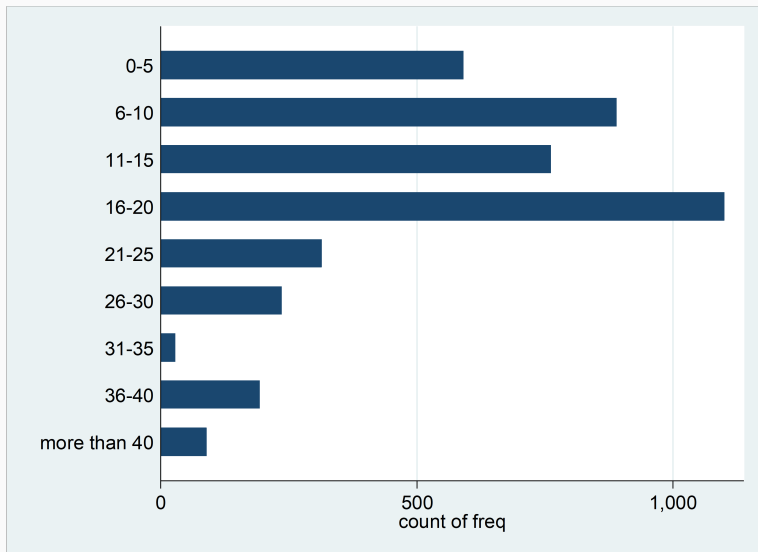
Table 2: Smoking Cessation Rates Over time

Smoking Status	(I)	(II)	(IV)	(III)	(IV)
Years after smoking bans	-0.0270** (0.0108)	-0.0295* (0.0172)			
Years after squared		0.0003 (0.0013)			
Comprehensive Bans			-0.0462* (0.0265)	-0.0221 (0.0456)	-0.1050** (0.0520)
1 Year after				-0.0345 (0.0486)	0.0071 (0.0431)
4 Year after				-0.028 (0.0420)	0.1041 (0.0814)
6 Year after				-0.0262 (0.0198)	0.0751* (0.0388)
8 Year after				-0.0564** (0.0249)	-0.0625 (0.0471)
Year fixed effect	yes	yes	yes	yes	yes
Country fixed effect			yes	yes	yes
CountryXyear					yes
Individual fixed effect	yes	yes			
No. of observations	10904	10904	10904	10904	10904

Note: Standard errors clustered by NUTS level 1 (54 clusters)

*** Significant at the 1 percent, ** 5 percent, and * 10 percent level

Cigarette consumption per day of smokers in Wave 1



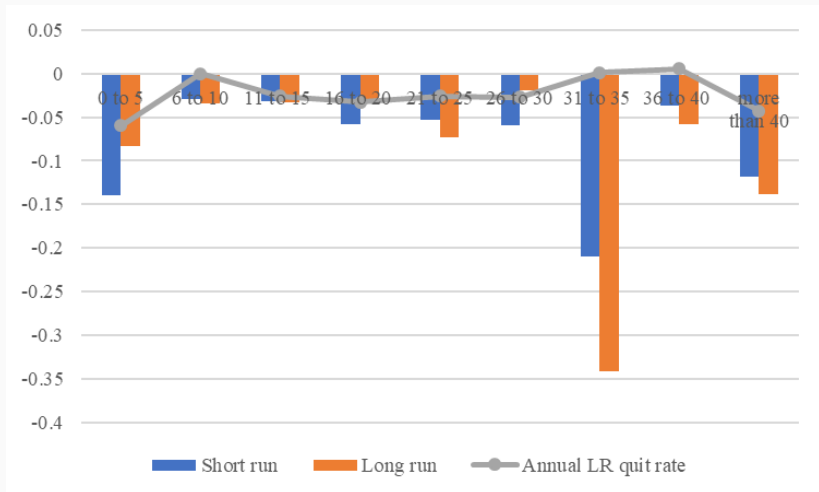
Cessation rates by smoking intensity

Table 3: Cessation rates by smoking intensity of smokers from wave 1

Smoking Cessation Rates	Short run		Long run		
Smoking Intensity	Short run	N	I(Ban)	4 years after	N
0 to 5	-0.1391***	994	-0.0848*	-0.0324	1470
6 to 10	-0.0291	1466	-0.032	0.0475	2156
11 to 15	-0.0314	1245	-0.0303	0.0655	1823
16 to 20	-0.0582**	1804	-0.0336	-0.1178*	2553
21 to 25	-0.053	525	-0.0716**	0.024	731
26 to 30	-0.0586	396	-0.0215	-0.0807	547
31 or more	-0.0699	530	-0.0967**	-0.2053***	673

Short-run and long-run quit rates

Figure 5: Smoking cessation rates by smoking intensity



For smokers in wave 1 who continued to smoke in wave 2, their cigarette consumption is specified as followed:

Cigarette consumption

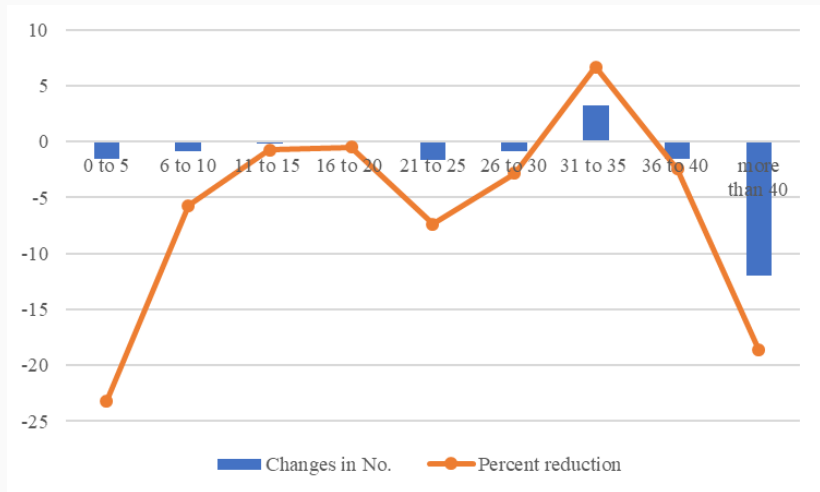
$$Y_{ist} = \gamma_s + \lambda_t + \theta_i + \beta D_{st} + X'_{ist} \delta + \epsilon_{ist}$$

where $t = 1$ or 2 ;

Y_{ist} is the average daily consumption of cigarettes of i , living in s , at interview t .

Changes in consumption among continued smokers

Figure 6: Heterogeneous effects of bans on smokers, varied by smoking intensity



Heterogeneous effects in workplace bans

From the baseline specifications, the potential heterogeneity in smoking bans in workplaces of different industries are examined.

$$Y_{ist} = \gamma_s + \lambda_t + \beta D_{st} + X'_{ist} \delta + \omega Industry_{ist} + \theta DWorkBan_{st} X Industry_{ist} + \epsilon_{ist}$$

Employment by industries

Employment	Precent
Retired or not employed	72.76
Employed	27.24
-Services	30.54
-Manufacturing	21.33
-Health	14.28
-Others or don't know	10.54
-Education	9.69
-Public Admin	8.63
-Transportation	4.99

Effects of workplace bans in different industries

Bans Variables	Indicator	
	(I)	(II)
Independent variables		
Comprehensive Bans	-0.0119 (0.0273)	-0.0133 (0.0269)
Bans in workplaces	-0.0444 (0.0273)	-0.0451 (0.0284)
Workplace bans X being employed	-0.0223 (0.0224)	
Workplace bans X industry in which was employed		
-hotels and restaurants		0.0741 (0.0718)
-transport, storage and communication		-0.1930** (0.0878)
-public administration and defence		-0.0677 (0.0916)
- education		-0.0904 (0.0708)
- health and social work		-0.0765 (0.0547)
- community, social and personal services		-0.0229 (0.0838)

Note: Standard errors in parenthesis , clustered by NUTS level 1

*** Significant at the 1 percent , ** 5 percent, and * 10 percent

Conclusions

Nationwide comprehensive bans increase cessation rates among mature smokers by approximately 7 %.

- Heavy smokers are 10% more likely to quit smoking within two years after smoking bans, and additional 20% more likely to quit in the long-run
- Light smokers are the most likely to quit immediately following smoking bans but the likelihood to remain quitting declines over time

Workplace Bans

- Strict and comprehensive enforcement of smoking bans in workplaces can lead to higher smoking cessation rates among employees

References

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