



mea

The Welfare Costs of Addiction

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The social costs of smoking

- Financial costs
 - direct medical costs – health care expenditures (diagnosis and treatment)
 - indirect morbidity costs – early retirement, lost workdays, etc.
 - indirect mortality costs – productivity loss from premature deaths
- Germany: 43.7 billion €per year (Welte et al. 2000)



The social costs of smoking

- ... but there are also economic "benefits"
 - social security system gains from premature deaths (6 to 9 percent; Warschburger 2001)
 - non-smokers might have higher lifetime health costs (4 to 7 percent; Barendregt 1997)



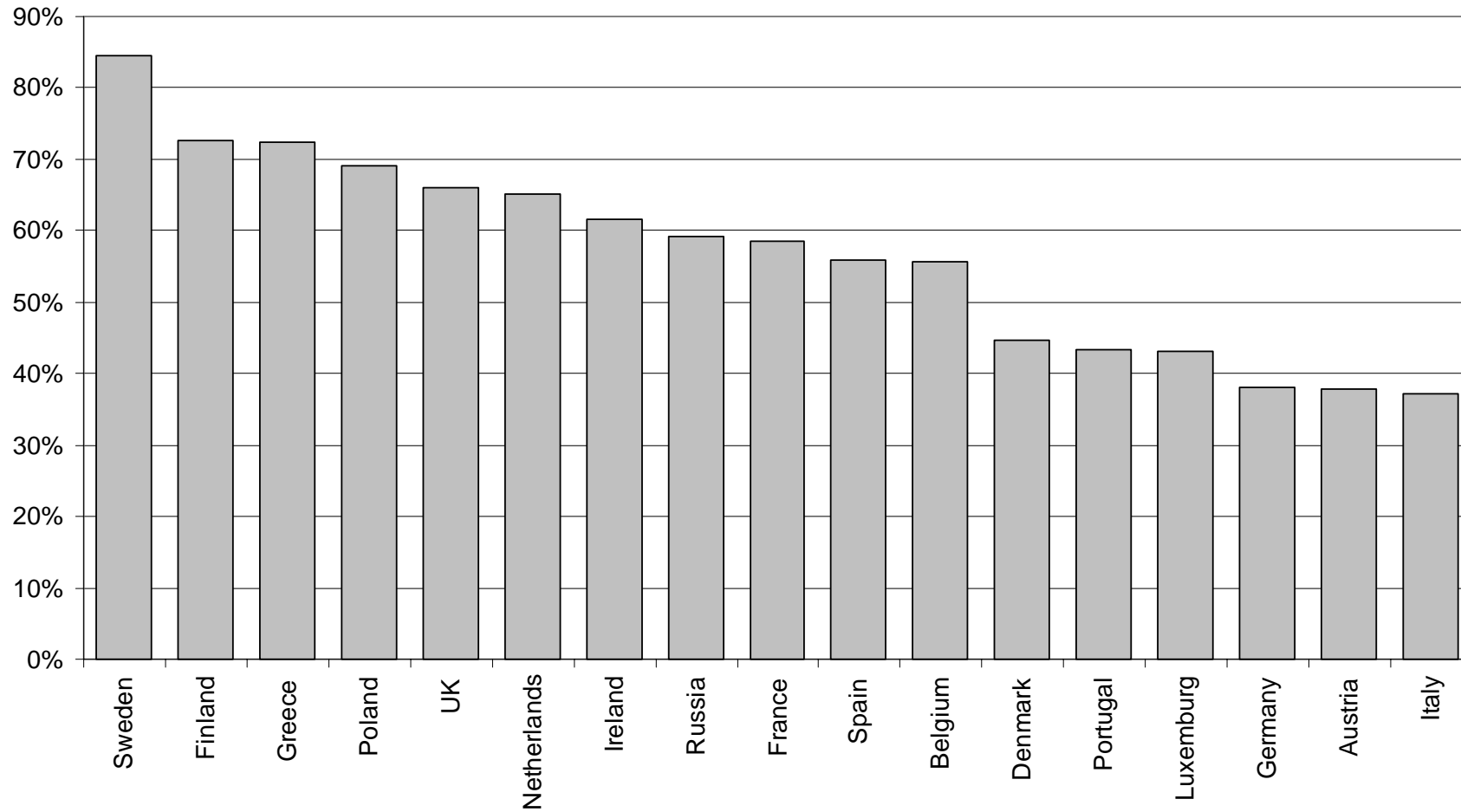
The social costs of smoking

- Non-financial (welfare) costs – losses in quality of life
 - "better health, freedom from a habit, cleaner teeth and cleaner ashtrays" (Schelling 1978)
 - experience of lack of self-control, weakness of will
 - stigmatisation through anti-smoking campaigns
- Aims of the paper:
 - to provide evidence for the existence of non-financial costs (causality)
 - to calculate a monetary value of non-financial costs



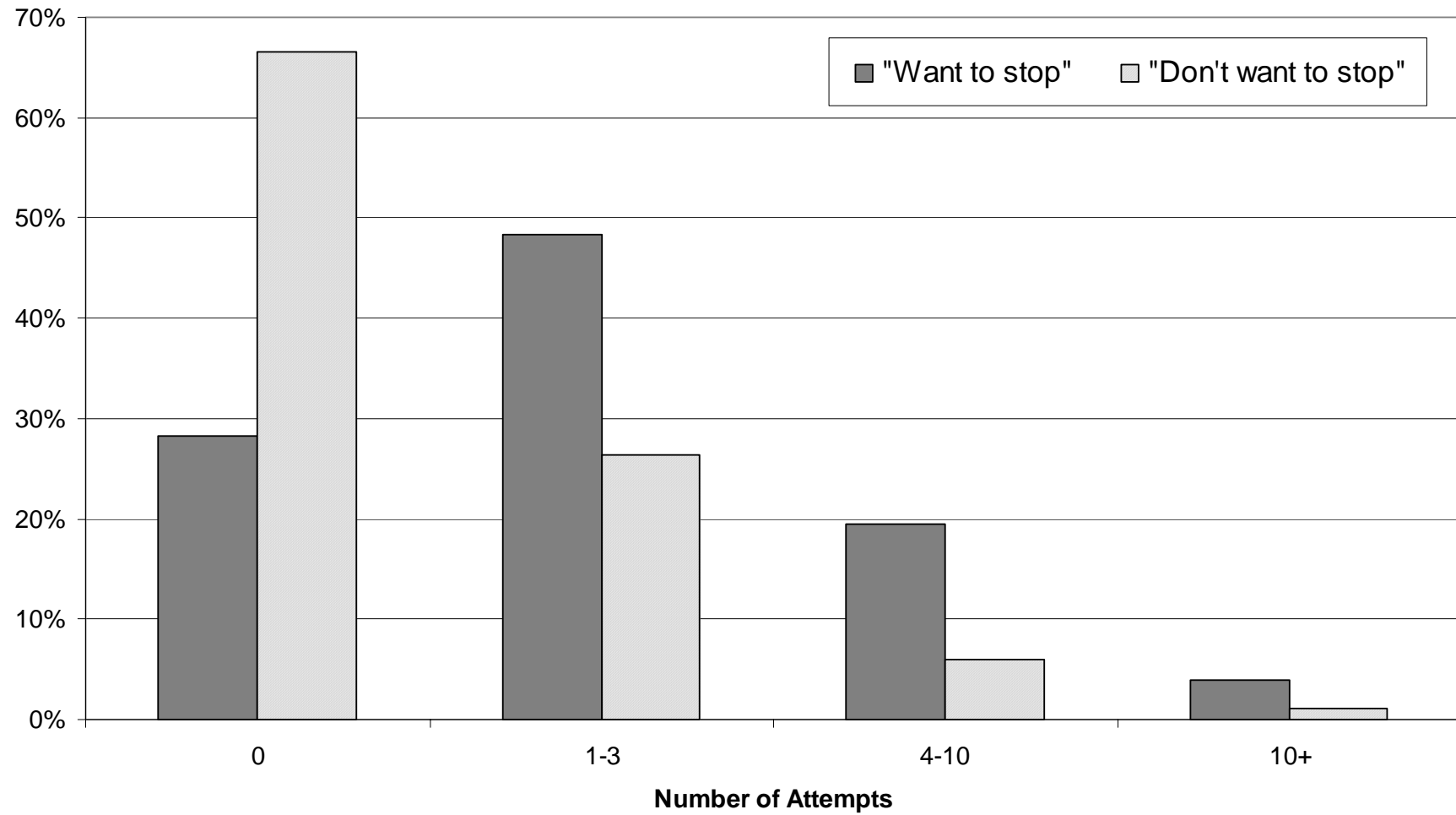
Proportion of Smokers who "Want to Stop"

(Source: Boyle et al. 2000)





Number of Attempts to Stop Smoking (Source: Boyle et al. 2000)





Conceptual Framework

- Estimate "reported well-being" function

$$RWB = f[u(\underset{-}{addict}, \underset{+}{y}, Z)] + \varepsilon$$

then solve

$$u(\underset{-}{addict} = 0, y, Z) = u(\underset{+}{addict} = 1, y + \Delta, Z)$$

for Δ .

- Income in logs or linear:

– logs: $u(\underset{-}{addict}, y, Z) = \beta \underset{-}{addict} + \gamma \ln y + \zeta Z \Rightarrow \Delta = \left[\exp\left(-\frac{\beta}{\gamma}\right) - 1 \right] y$

– linear: $u(\underset{-}{addict}, y, Z) = \beta \underset{-}{addict} + \gamma y + \zeta Z \Rightarrow \Delta = -\frac{\beta}{\gamma}$



Related studies

- Clark (1996): Shadow wages for working overtime
- Winkelmann/Winkelmann (1998): Non-monetary costs of unemployment
- van Praag/Baarsma (2000): Shadow prices of aircraft noise nuisance
- Gruber/Mullainathan (2002): The effect of cigarette taxes on smokers' happiness.
- ... Conceptual framework applicable to a wide range of topics



Identification

- Most important issue: identification of β (causal effect of smoking on well-being)
- Potential sources of bias
 - reverse causality
 - unobserved heterogeneity / personality traits
 - measurement error
- Identification strategies:
 - fixed effects
 - instrumental variables



Data description

- GSOEP 1998 and 1999
- 28000 observations; 14000 individuals
- Overall life satisfaction measured on an 11-point scale from 0 (totally dissatisfied) to 10 (totally satisfied)



Data description

Table 2. Smoking Behaviour and Life Satisfaction

	N	Percent	Mean Life Satisfaction	Percent Life Satisf. ≥ 8
1998				
Non-smokers	9,959	68.0	7.06	47.2
Smokers	4,694	32.0	6.72	39.6
- 1/10 units	1,612	34.8	6.91	44.2
- 11/20 units	2,261	48.9	6.70	39.1
- 21/30 units	541	11.7	6.53	33.5
- 31+ units	213	4.6	5.97	29.6
1999				
Non-smokers	9,362	66.7	7.06	48.0
- never smoked	6,653	71.0	7.11	49.2
- formerly smoked	2,709	29.0	6.95	45.3
Smokers	4,672	33.3	6.79	42.5



[4] Cross-section regressions

	1998-1999		1998		1999	
	(1)	(2)	(3)	(4)	(5)	(6)
Smoker	-0.214 (10.30)	-0.218 (10.48)				
1/10 Cig			-0.110 (2.56)	-0.111 (2.58)		
11/20 Cig			-0.263 (6.91)	-0.266 (6.99)		
21/30 Cig			-0.447 (6.30)	-0.453 (6.37)		
30+ Cig			-0.735 (6.69)	-0.744 (6.75)		
Current smoker					-0.183 (5.84)	-0.187 (5.94)
Former smoker					-0.008 (0.21)	-0.002 (0.06)
Log per capita income	0.443 (21.21)		0.419 (14.14)		0.465 (15.78)	
Per capita income (in 1000€)		0.372 (17.31)		0.364 (11.72)		0.379 (12.69)



Data description

Table 5. Individual and Aggregate Welfare Costs of Addiction

	Log Specification (based on Table 4, Column 1)	Linear (based on Table 4, Column 2)
Mean Individual Monthly Loss in 1999 (€per smoker)	562.4	584.9
Median Individual Monthly Loss in 1999 (€per smoker)	474.8	
Aggregate Monthly Loss in 1999 (billion €)	10.38	11.41



Instrumental variables

Variables	Marg. effects on Pr(smoke=1)
Education dummies: <ul style="list-style-type: none">➤ "no degree"➤ "less than high school"➤ "high school"➤ "more than high school"	baseline +6.9% +4.3% -3.9%
Sports dummies: <ul style="list-style-type: none">➤ "every week"➤ "every month"➤ "less often"➤ "never"	baseline +4.1% +10.3% +11.6%
Savings dummies: <ul style="list-style-type: none">➤ "neither saves nor repays"➤ "saves and repays"➤ "only repays debt"➤ "only saves"	baseline -0.1% +8.0% -7.9%



Results

[6] OLS, Instrumental Variables (IV), Random Effects and Fixed Effects Estimates of Life Satisfaction

	Pooled OLS	Random Effects	FD 1	FD 2	Pooled IV	G2SLS	FD 1-IV (W2SLS)	FD 2-IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Smoker	-0.214 (10.30)	-0.209 (9.09)	-0.063 (1.24)		-1.224 (6.44)	-0.975 (5.03)	-3.846 (3.06)	
Quit				0.139 (1.82)				3.071 (1.25)
Start				0.002 (0.03)				-4.247 (2.55)
Log Income	0.443 (21.21)	0.430 (18.55)	0.274 (5.19)	0.275 (5.21)	0.412 (18.16)	0.433 (17.21)	0.293 (4.50)	0.286 (4.25)
N	27059	27059	12174	12174	26833	23970	11628	11628
Instruments					S	ES	ESD	ESD
F-Test instr.					118.3**	63.1**	3.61**	2.20*
$\Delta R\text{-sq } 1^{\text{st}} \text{ st.}$					0.011	0.014	0.003	0.001
F-Test instr.								4.04**
$\Delta R\text{-sq } 1^{\text{st}} \text{ st.}$								0.004
Endog. t/F					5.60**	4.08**	2.31*	6.59**
Ov.id. χ^2 (df)					0.60 (2)	7.76 (5)	8.00 (7)	7.99 (6)
FE v RE χ^2 (df)		533.8 (19)**				463 (19)**		
€month	476	480	198	504	14195	6522



Summary

- A comprehensive measure of the welfare costs of smoking should include non-financial costs
- Given smokers are „unhappy“, non-financial costs can be estimated using satisfaction data
- Empirical analyses for Germany suggests that smoking is likely to cause unhappiness
- However, finding reasonable estimates for the money value of unhappiness is difficult
- Still, conventional studies appear to grossly underestimate the welfare costs of addiction to tobacco