The Economics of tobacco and other addictive goods
Hurley, pp150–153.

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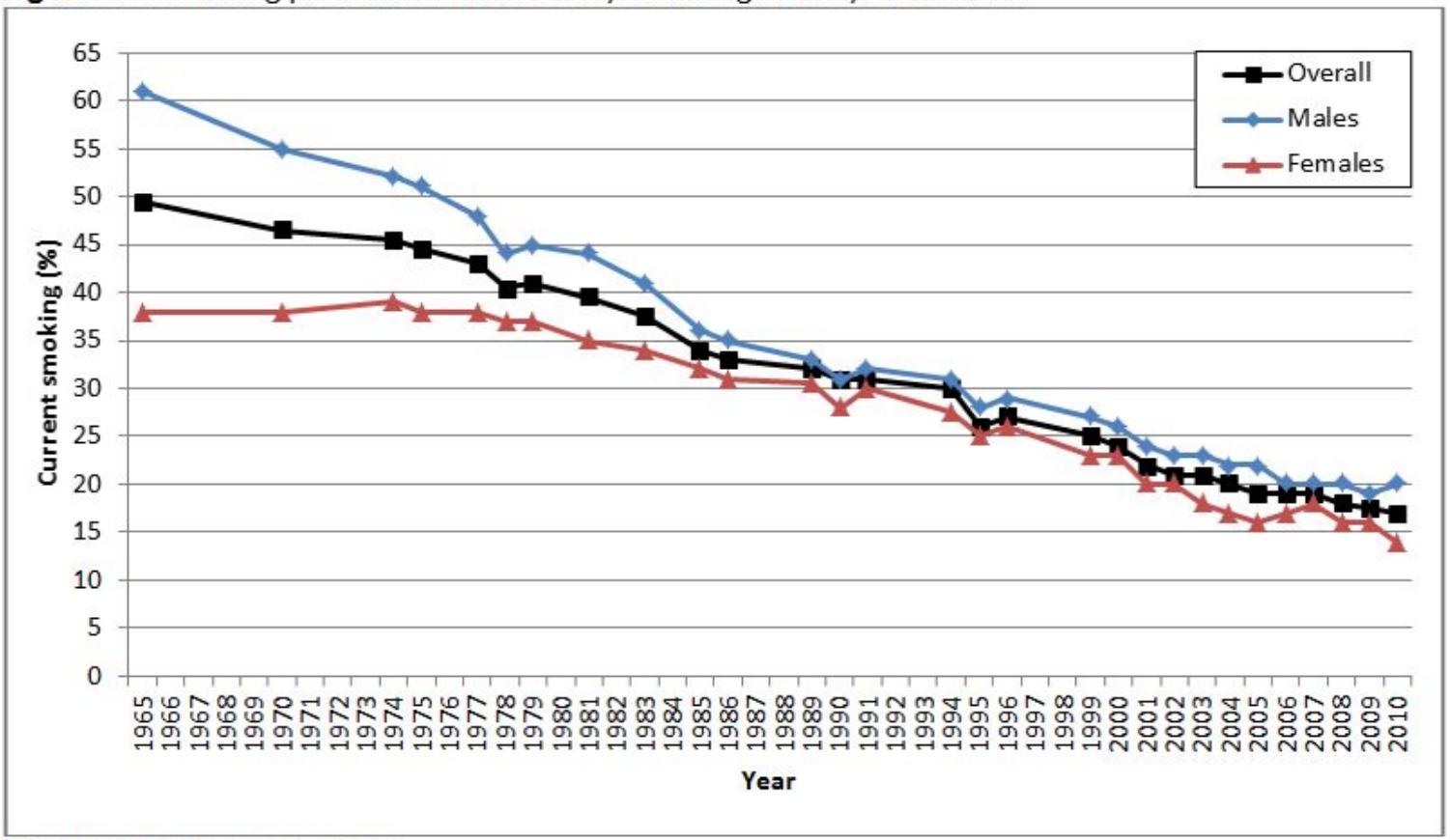
Economics 318

March 27, 2013

Figure 1.1: Smoking prevalence* in Canada, adults aged 15+, 1965-2010



*Includes daily and non-daily smokers

Data Sources: 1965-1986: A Critical Review of Canadian Survey Data on Tobacco Use, Attitudes and Knowledge (Health and Welfare Canada, 1988); 1989: Smoking Behaviour of Canadians: A National Alcohol and Other Drugs Survey Report, 1989 (Health and Welfare Canada, 1992); 1990: Canada's Health Promotion Survey 1990: Technical Report (Health and Welfare Canada, 1993); 1991: Health Status of Canadians: Report of the 1991 General Social Survey (Statistics Canada); 1994: National Population Health Survey (Statistics Canada); 1995, 1996: General Social Survey (Statistics Canada) [all as quoted in: Physicians for a Smokefree Canada, *Smoking in Canada*, 2008[v]]; 1999-2010: Canadian Tobacco Use Monitoring Survey (Health Canada)

Figure 2. Smoking participation by selected characteristics. Source: These figures are based on Table 1.

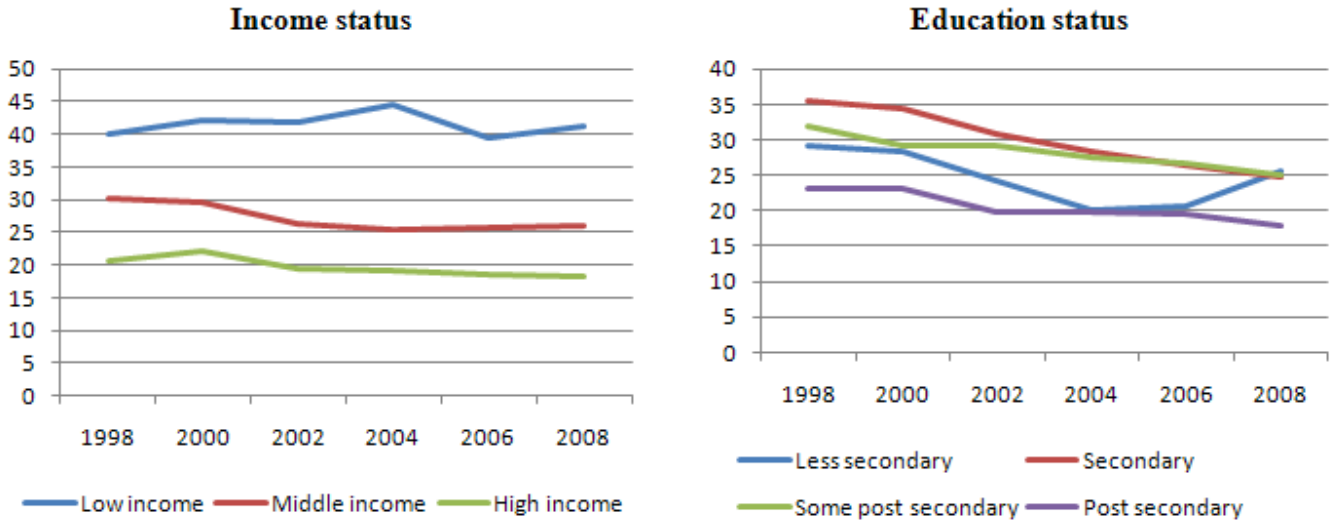
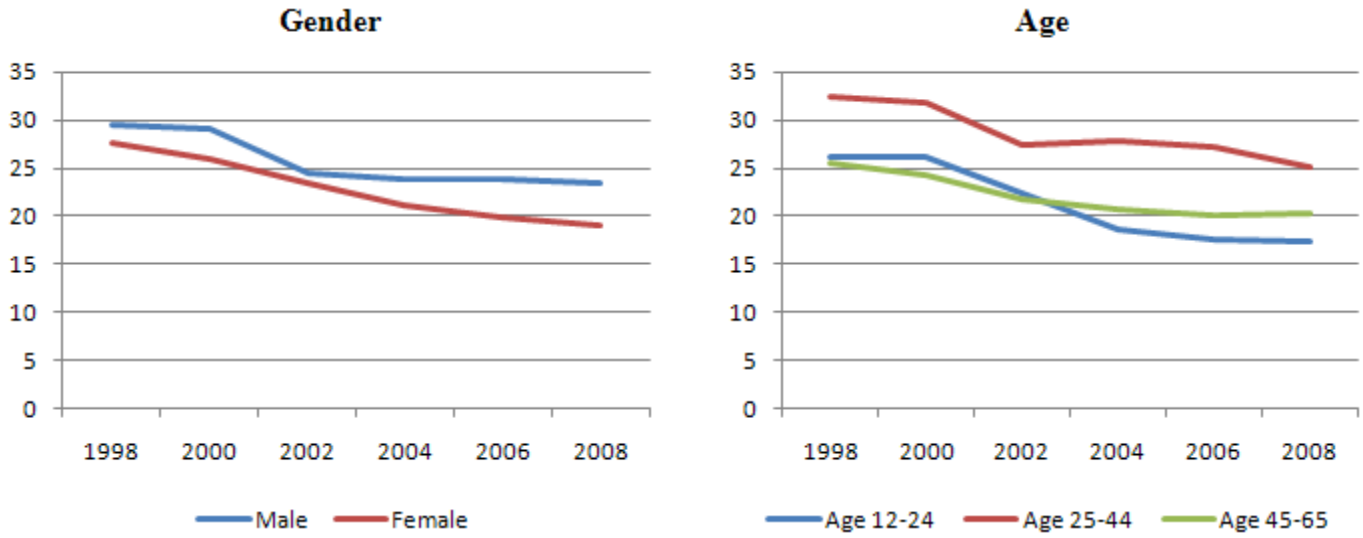
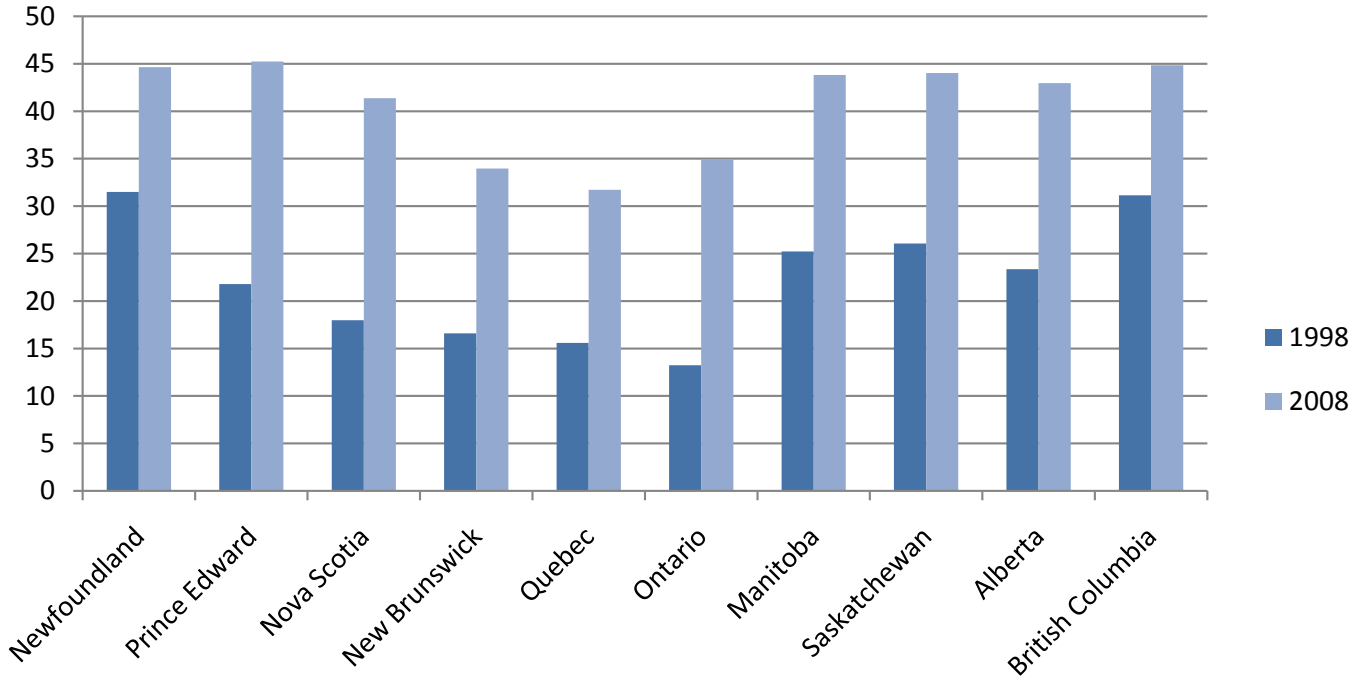


Figure 2. *Cont.*



4.1. Estimation Results

Figure 1. Average real cigarettes tax in Canada by province.



Addiction.

- Can we use standard microeconomic models to study addictive goods?
- How can we modify standard models to capture aspects of addictive behavior?
- How should governments respond to addictive goods?

Standard models.

- For many purposes it is reasonable to use "off the shelf" models even when the good is addictive.
- e.g. The government intends to raise the tax on cigarettes by $1 per pack. What effect will this have on tax revenues? Standard analysis is ok for a rough answer.
- (graph: supply and demand of cigarettes)
- Some people might object that addicts are not rational. Recall: (1) "rational" is jargon. (2) We might view a model as being ok for positive but not for normative purposes in this sort of circumstance.

Models of addictive behavior.

- Standard models do capture aspects of addiction we might think are important.
- Addiction is inherently a *dynamic* process, but standard models are static.
- Difficult to capture differences in behavior between addicts and non-addicts in standard models.

Defining "addiction."

- There are many different concepts of addiction across various disciplines, none are right or wrong.
- In social sciences we tend to take a behavioral, as opposed to physiological, stance on addiction.

Economic definition

- The modern economic definition is: A good or activity is addictive to a given person if there is a positive causal effect of today's consumption on future consumption.
- Notice that activities like going to church or watching TV can be addictive under this definition, that addictions are not necessarily harmful (e.g., exercise).
- A given activity can be addictive for one person but not for another, and may be addictive for a given person at one time but not another.

Rational Addiction.

- An influential paper by Gary Becker and Kevin Murphy in 1988 presented a model of "rational addiction."
- One way to view this model is as an extension of an older model called a "habit formation" (or "myopic addiction") model.
- In habit formation models the marginal utility of, say, cigarettes today depends on how much you've smoked in the past, but you choose how much to smoke today ignoring the fact that you will be more addicted tomorrow if you smoke more today.
- (graph: cig/other goods tradeoff for light and heavy smokers)

Rational addiction continued.

- Rational addiction differs from habit formation in that people in the world imagined in the model are fully aware that they will be more addicted in the future if they smoke more today.
- A rational addict considering smoking one more cigarette reasons:
  - If I smoke one more, that will cost me a bit of money today and I will get some pleasure today.
  - But I will wake up tomorrow a bit more addicted, and that will change my behavior tomorrow, and the next day, and the day after that....
  - I should add up all the costs and benefits over the remainder of life that will result from smoking one more cigarette today.

- Does smoking more today induce the person to smoke more tomorrow?
- Smoking more today increases the pleasure of smoking tomorrow, but also increases the present value of the costs (health, money, etc) of smoking more in the future.

$$\text{total cost} = \text{money cost} + \text{PV of all future costs}$$

- If the net effect of one more cig is positive, then smoking more today causes smoking more tomorrow and the good is by definition *addictive* for this person.

- Notice that under this definition of "addictive" an increase in price, or the realization that smoking is more dangerous than previously thought, can turn a good from addictive to non-addictive.

Modeling the "stock" of addiction.

- We want to capture the notion that how addicted you are today depends on your past consumption.
- Consumptions farther away in the past has less effect than consumption in the immediate past.

Stock of addiction.

Law of motion for addiction:

$$S_t = S_{t-1} - \delta S_{t-1} + c_t \tag{1}$$

In *steady state*, level of addiction does not change,

$$S = S - \delta S + c \tag{2}$$

$$\rightarrow c = \delta S \tag{3}$$

Predictions of the model.

- (graphs)
- Both short and long run changes in behavior as prices change.
- "Cold turkey" quitting, short v long run demand curves, temporary shocks have long effects.
- Addiction is more likely for people with high discount rates (such as young people): they don't place much weight on the future costs of smoking more today.
- Major empirical implication: an anticipated increase in the future price of the addictive good should reduce consumption immediately.

Statistical evidence on cigarette demand.

- Many studies from different countries and different times, using various types of data and various statistical methods, overwhelmingly find that demand for cigarettes slopes down.
- The elasticity of cigarette consumption to price is thought to be around -0.5, more elastic in long run than short run.
- Policy implication: taxes reduce smoking.

Evidence on future prices and current consumption.

- The theoretical models makes the possibly counter-intuitive prediction that higher future prices reduce current demand.
- Econometricians looked for this effect after the theory was published and found good evidence that it's true.

Criticism of the Rational Addiction model.

- No uncertainty and rational forward-looking behavior imply no regret, but we observe people who regret their decisions.
- The model is inconsistent with the fact that people sometimes try to restrain their future behavior, e.g., project CARES—deposit money in a bank account, only get it back if a nicotine blood test comes back clean in six months.
- Model is unrealistic—treat normative prescriptions cautiously.

Extending the Rational Addiction model.

- Many of the restrictive assumptions of the basic model have been relaxed by subsequent research.
- E.g. add uncertainty over how addictive tobacco is to you, consider more than one addictive good, allow for certain types of irrational behavior.
- These models sometimes fit the data better.

Information and smoking.

- We expect to see people smoke less, quit, or fail to start in the first place if they learn new information which tells them smoking is more harmful to health than previously thought.
- Cascade of information in the 1960s about smoking and cancer and other risks estimated to have caused large reductions in smoking rates.
- Individuals who think smoking is more harmful are less likely to start.
- However, currently people probably OVERestimate the health risks of smoking—more accurate information unlikely to further reduce smoking.

If people understood the lung cancer risk accurately as opposed to overestimating it, the societal smoking rate would increase by 6.5 to 7.5%.

– Kip Viscusi 1998.

Social costs of smoking.

- As economists, we are concerned with the external costs of smoking, not the private costs.
- The external costs are surprisingly small.
- Some external costs include: effects of smoking on neonatal health and risk of fire.
- A related but distinct argument is that we need to regulate smoking to prevent children from becoming addicted.

Health costs.

- We all die someday, smoking brings that date closer.
- The effect of smoking on health care costs are:

$$\text{Costs if smoker} - \text{Costs if non-smoker} \tag{4}$$

  ie, the net cost.
- Many estimates in the popular media are instead gross costs.

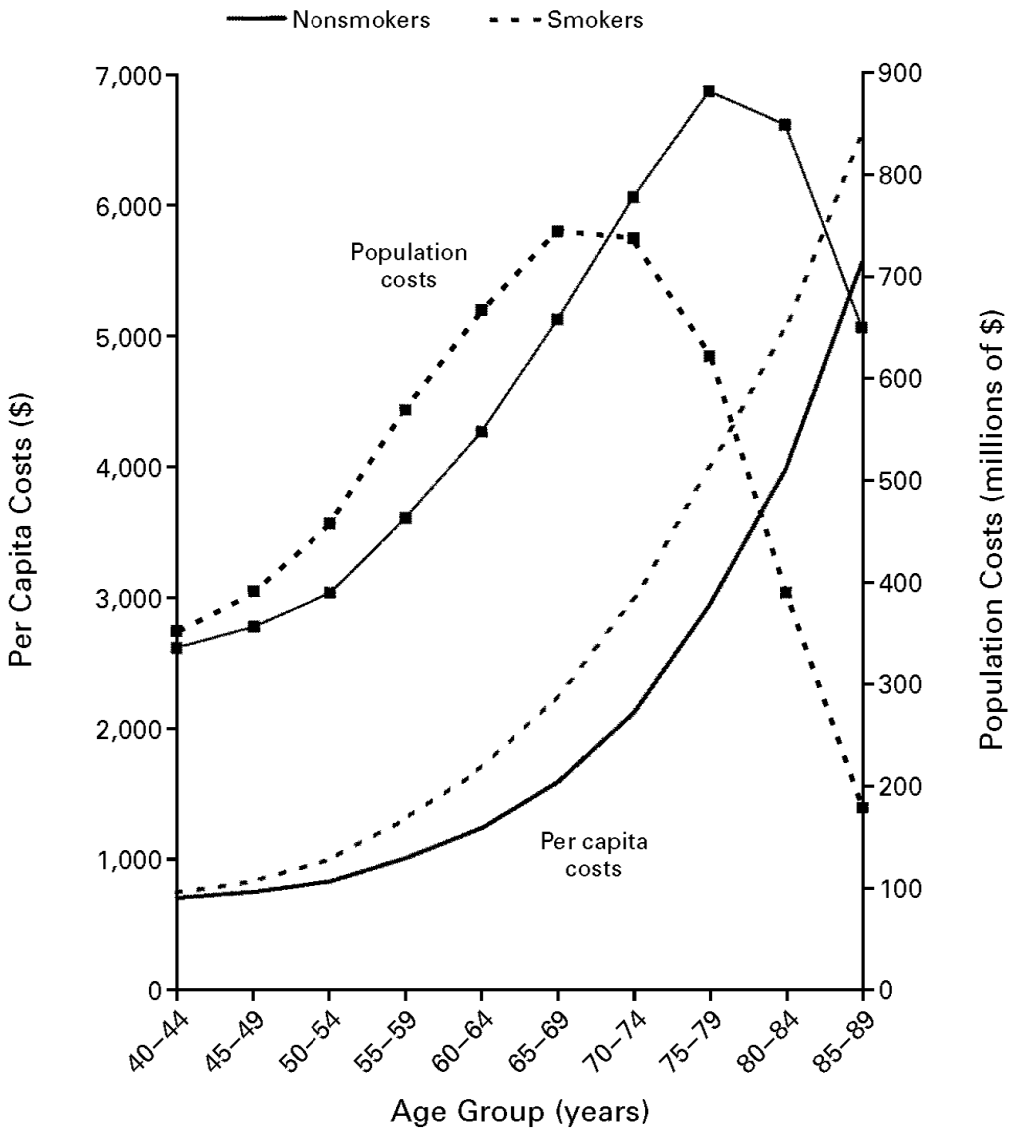


Figure 1. Estimated Annual per Capita Health Care Costs for Dutch Men in 1988 and for the Male Population in a Life Table, According to Age and Smoking Status.

Per capita health care costs for women in the same age groups are very similar to those for men.

Health care costs cont.

- Suppose a person quits smoking today. Does that increase or decrease her lifetime demand on the health care system?
- Data suggest: costs first fall because the person is now healthier, but in the long run costs are higher because the person lives longer and tends to need more care over longer periods.
- Whether the present value of lifetime costs goes up or down depends on the discount rate.
- In any case, the health care costs of smoking are very small, and probably negative, ie, smokers subsidize non-smokers through the health care system.