On the progressivity of increasing taxes on tobacco

An Extended Cost Effectiveness Analysis for Lebanon

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1. Introduction and motivation
    1. Why increase taxes on tobacco?
    2. Why Lebanon?
2. From workshop to paper
    1. Why Extended Cost Effectiveness Analysis?
        1. Outputs
        2. Inputs
3. Results
4. Discussion and future work

Taxes as tobacco control

What we know

- Not the only measure of tobacco control

BUT

- a recent review of over 100 articles in the literature shows it is:

HIGHLY EFFECTIVE

(Chaloupka et al, 2012)

- there are synergies to be capitalized on:

COMBINING TAXES WITH OTHER MEASURES

(Surgeon General, 2000, CDC, 1999)

What do we mean by "EFFECTIVE"?

- Increasing cigarette price by 10% is associated with a:
  - 4% reduction in total cigarettes consumption in high-income countries
  - 7-8% reduction in middle- and low-income countries (IARC, 2011)
- Price reduces consumption by:
  - inducing some smokers to quit
  - deterring non-smokers from taking up smoking (Lewit et al, 1981, Tauras et al, 2001)
  - reducing smoking among continuing smokers (Cavazos-Rehg et al, 2002)

Benefits of lower consumption

- Reduced consumption is associated with:
  - lives saved
  - private saving … spending (for some)
  - private saving … re expenditures
    - financial risk p…
  - public savings … e expenditures
  - productivity gains
- Added benefit of lowering consumption through taxes:
  - higher tax revenues for government

Equity of increasing tobacco taxes

Divided literature

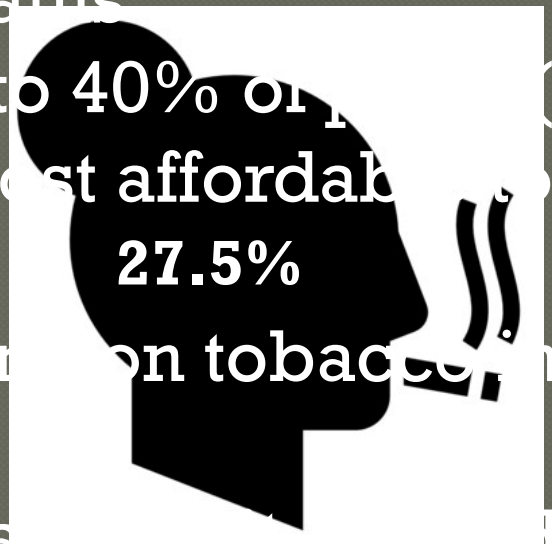
- Some studies argue that increases in tobacco taxes is progressive (Chaloupka, 1991, Warner, 2000, Gruber & Koszegi, 2004)
- Others argue that it is regressive (Borren & Sutton, 2006, Colman & Remler, 2008, Gospodinov & Irvine, 2009, Farrelly et al, 2012)

Motivation

- Simulate the effects of an increase in tobacco taxes in Lebanon an Extended Cost Effectiveness Analysis

Lebanon: context and motivation

- Framework convention on tobacco control (2005)
- Tobacco control law (2011)
- Highest smoking prevalence rates in the region
- Ischemic heart disease, stroke, lung cancer and chronic obstructive pulmonary disease account for 46% of deaths
- Taxes close to 40% of [illegible] (WHO best practice ~70%), and most affordable tobacco products in the region
- Total spending on tobacco in 2010 = 1.5% of GDP
- Massive fiscal deficit, deep debt



Extended Cost Effectiveness Analysis

Effect of a change in price

BY QUINTILE

1.tax revenue	2.household spending on tobacco	3.health (deaths averted)	4.health spending (savings)	5. poverty (cases averted)

Output: tax revenue household spending on tobacco

We estimate: expenditures on tobacco by quintile and elasticity by quintile (household living conditions survey + Almost Ideal Demand System)

ASSUME

- half the calculated elasticity is a participa elasticity, half an intensity elasiticity (Lewit & 1982, Evans & Farrelly, 1998)

Change in expenditures by quintile as a result of a price change

- change in tax revenue by quintile (tax revenue, incidence)
- change in household spending on tobacco by quintile (spending on tobacco)

Output: deaths averted

We estimate: prevalence by age/quintile (health expenditures survey) to get smokers by age/quintile (age pyramid)

ASSUME

- elasticity for age<25 is twice the calculated elasticity (Jha et al, 2014)
- 50% of smokers die of their disease
- Survival rates by age of quitting (Jha et al, 2014

quitters by age/quintile as a result of a price change

premature deaths averted by age/quintile

Output: savings on health spending

Deaths averted

+

Global Burden of Disease data on risk factors: diagnostic distribution of tobacco deaths (CVD, stroke, ncer and COPD)

=

tobacco deaths averted by diagnosis and by quintile

Output: savings on health spending

Hospitalizations by diagnosis (MOPH)

- hospitalizations vs prevalence → utilization rates by diagnosis
- National Account average rates by

Cost of hospitalizations by diagnosis (NSSF)

- coverage rates and reimbursement rates → net cost to household hospitaliz per diagn

tobacco deaths averted by diagnosis and quintile

- ignore health costs averted other than hospitalization

health spending averted by quintile

Output: poverty cases averted

We estimate: health savings per person for households with smokers and poverty gap (household living conditions survey)

- Out of pocket savings per quintile
- Smoking prevalence by quintile
- ASSUME: a distribution of quitters in each quintile (conservative)

Out of pocket savings for quitter/quintile, poverty gap for that quintile

poverty cases averted

Results

Health gain

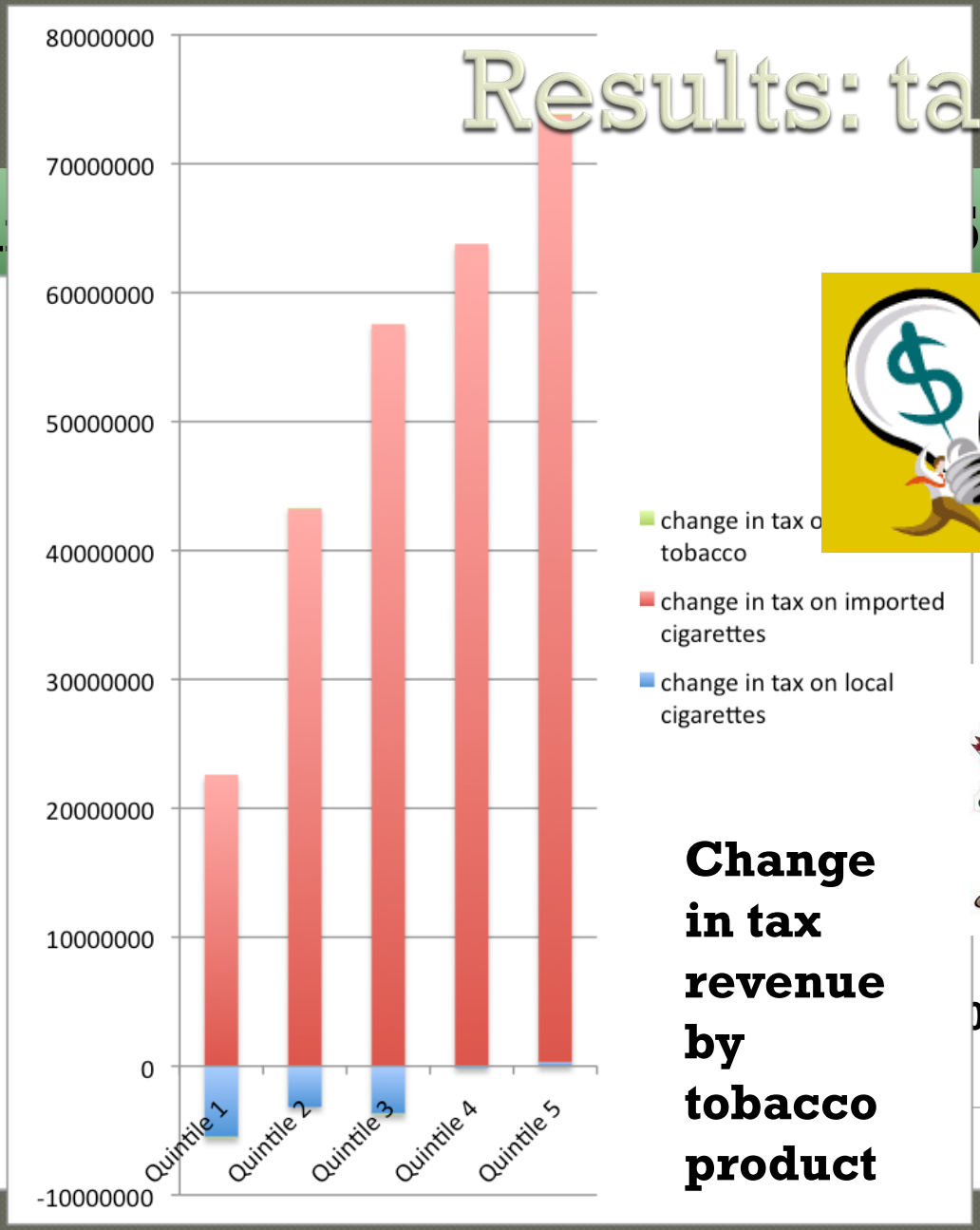
Economic gain

Improved equity

Results: tax revenue

For a … 0% higher price

- As … mo…
- Ta… … ss tob…



Quintile 1
Quintile 2
Quintile 3
Quintile 4
Quintile 5

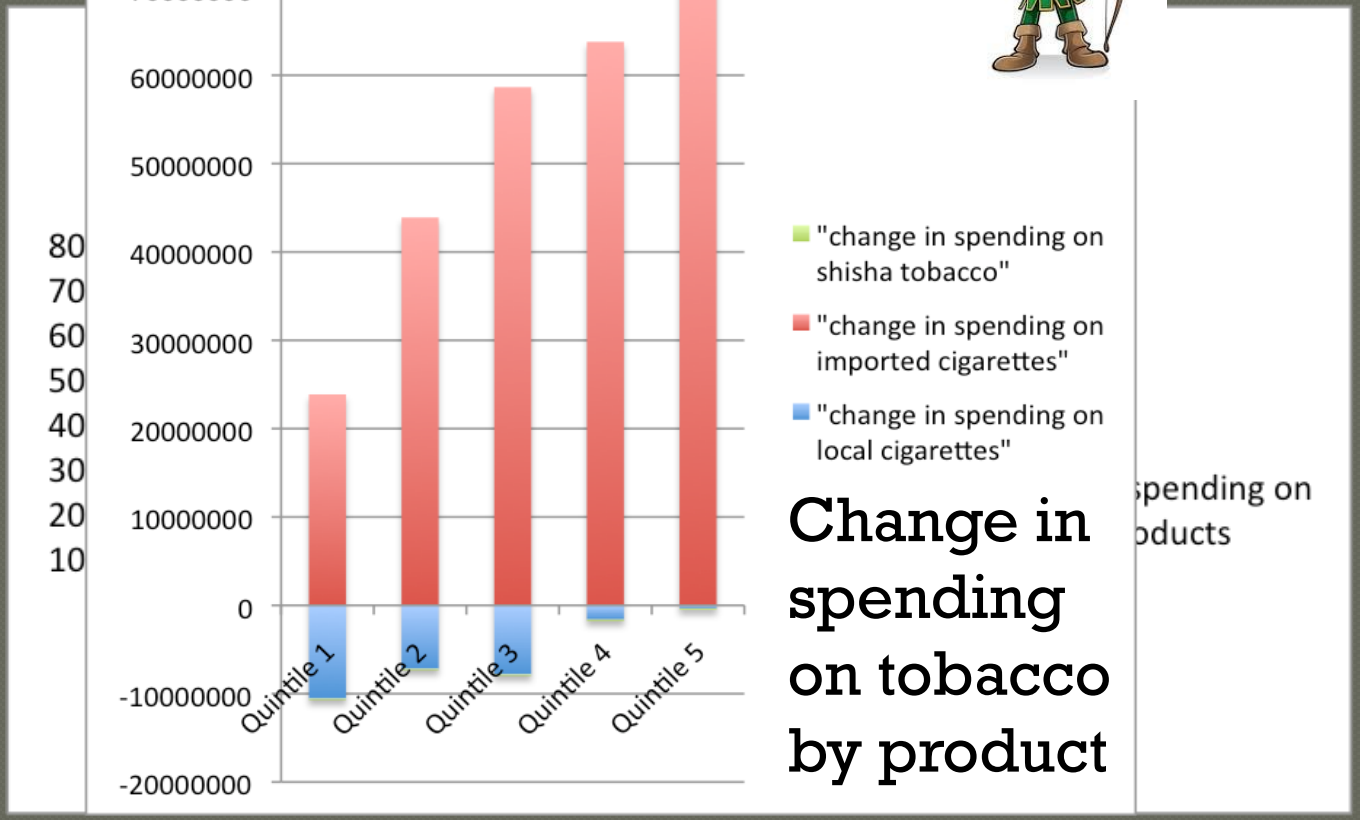
Change in tax revenue by tobacco product

… in tax revenue … 00,355 (an 88%

Results: spending on tobacco

For an increase in tax that leads to a 50% higher price

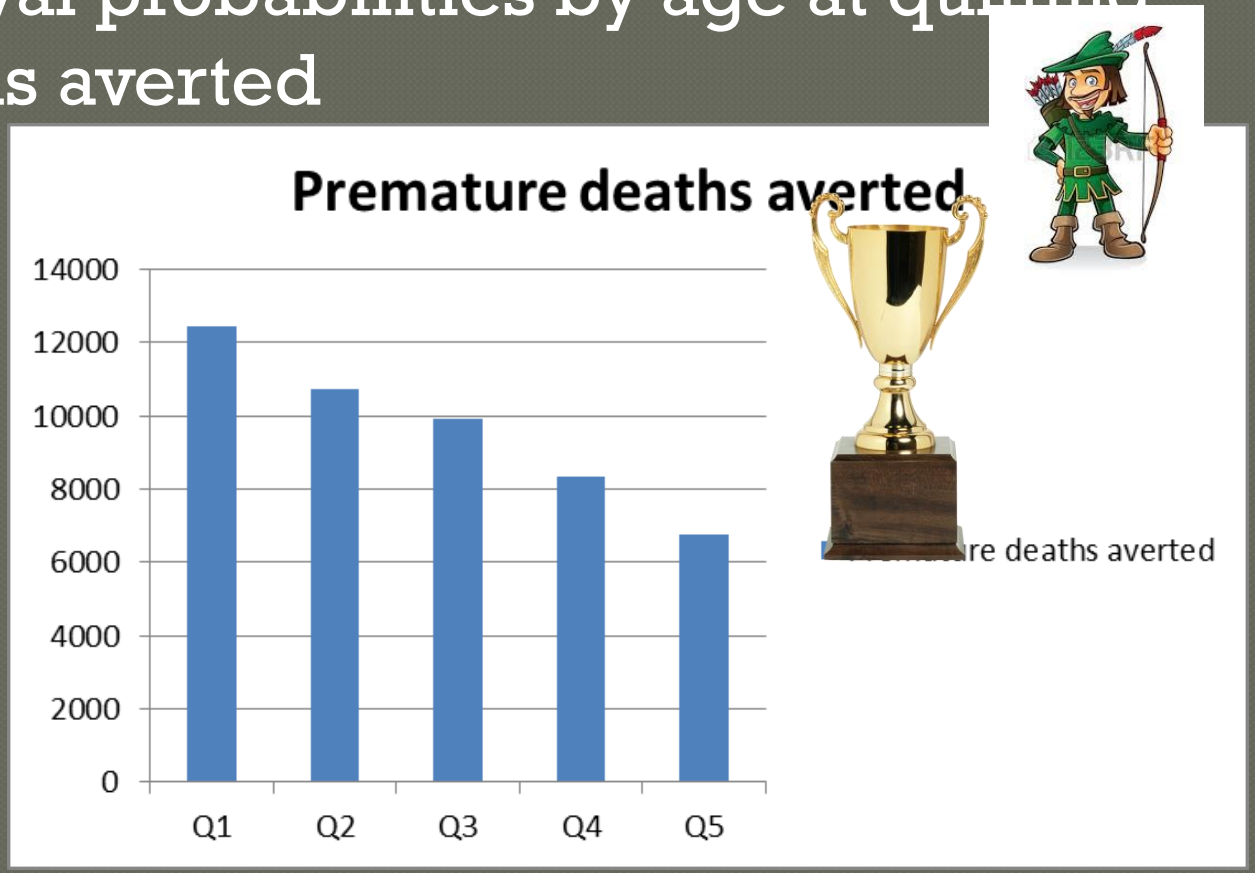
- Taking into account possible sub ons across tobacco



Results: deaths averted

For an increase in tax that leads to a 50% higher price

- Quitters by age and quintile
- Survival probabilities by age at quitting
- Deaths averted



Results: spending on health

For an increase in tax that leads to a 50% higher price

- Calculation of deaths averted
- Distrib
- tobacco
- & bladd
- Costs
- NSSF, ne
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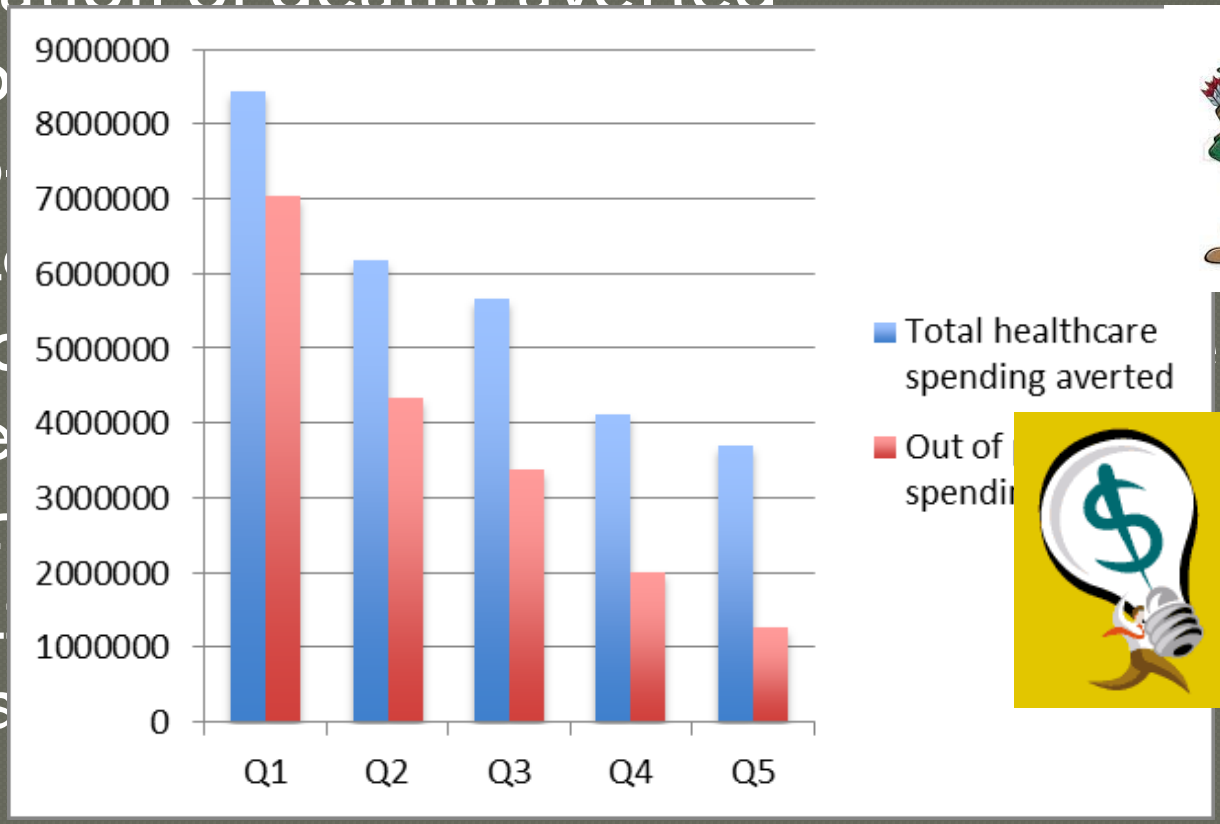
- Assum
- healthca



Results: poverty cases averted

For an increase in tax that leads to a 50% high

- Poverty line of $4 of expenditures per cap per day
- Poverty gaps calculated by quintile
- Out of pocket savings per quintile accrue

smokers who quit

- We assume a distribution of quitters within quintile

2% of poor households are pus

above the poverty line

88% of those are from the poorest quintile Q1

12% from Q2

Discussion: review of progressivity results

Poorest quintile

- benefits from 26% of deaths averted
- bears only 7% of **extra tax revenue**
- incurs only 5.6% of **extra spending on tobacco products**
- benefits from 30% of the saved healthcare spending
- benefits from 40% of the saved out-of-pocket payments on health
- benefits from 88% of poverty cases averted

Discussion: sensitivity analysis

- results are driven by elasticities of demand
- using the 95% confidence intervals for the elasticities give a range of results but progressivity is preserved

Discussion and future research

- Results are conservative (a lower bound on progressivity) because:
  - assumptions about the age distribution of each quintile
  - assumptions about the distribution of quitters within quintiles
  - avoided fatalities only among quitters
  - savings on health from non-hospitalizations and for non-fatalities excluded
  - productivity gains excluded
  - distribution of how tax revenue is spent is ignored