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Economics of Tobacco Control

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- Currently conducting research in Southeast Asia, Eastern and Central European region, former Soviet Republics





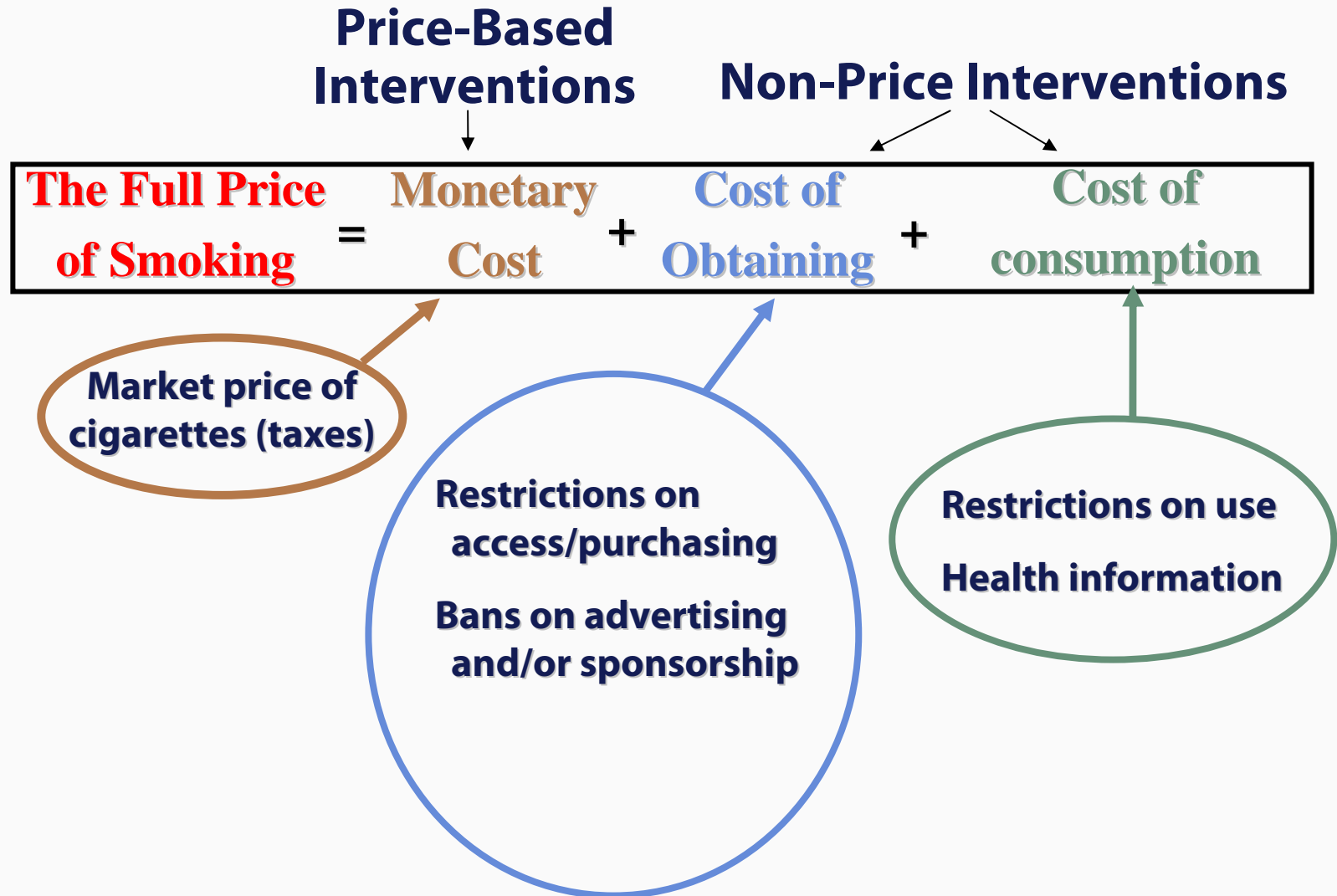
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Section A

Interventions and Costs

- **Economic theory**—a person's behavior is motivated by maximizing utility (pleasure) with given resources (budget constraint)
 - S/he achieves it by paying identical price for each unit of pleasure
 - Change in behavior can be achieved by increasing the price or by reducing utility from the behavior
- **Applying to Tobacco Control (TC)**—increase price of cigarettes, make smoking less pleasurable (e.g. smoking bans, health information, etc.)



Government Interventions in Tobacco Market

- Economic rationale for government interventions in the tobacco market
 - There is a market failure
 - Externalities
 - ▶ Physical or financial costs imposed on non-smokers (health, lower labor productivity, and economic growth)
 - ▶ Inadequate information about the health risks of tobacco
 - ▶ Inadequate information about the risks of addiction
 - Internalities (costs smokers impose on themselves)

- Changing economic **incentives** for smoking behavior (lowering the utility of smoking) by increasing the **full price** of smoking

- Changing economic **incentives** for tobacco farmers and manufacturers by increasing cost of production and distribution
- Examples—limiting youth access to tobacco products, advertising restrictions, law enforcement to prevent smuggling

1. Cost of smoking
2. Design of TC measures (what works)
3. Effectiveness of TC measures (what is the cheapest way to do TC)
4. Assessment of the impact of TC on the economy (government revenue, poverty reduction, employment, trade balance, smuggling, company profits)

- Definition of the costs depends on the **entity** bearing the costs
 - The whole society
 - An individual—smoker or non-smoker
 - The government
- When counting costs it is important to compare state of the economy **with and without** tobacco

- Direct costs (out of pocket)
 - Health care costs (e.g. preventive care, outpatient, inpatient, transportation, etc.)
 - Fire costs, cleaning costs

- Indirect costs (opportunity costs)
 - Morbidity related (e.g., lost income, time of others)
 - Mortality (e.g., lost pension)

- If adult male survival in **former Soviet Republic (FSR)** were that of Organisation for Economic Co-operation and Development (OECD) countries, annual growth rates over the last three decades would have been about 1.4% vs. 1%
- 1990 per capita **income**
 - Actual \$2,700
 - With better male survival \$3,000
 - This is **12% loss** in income, or \$140,000,000,000 cumulative loss for all FSR

Costs (Individual Perspective)

- External costs (incurred by non-smokers)
 - Direct medical care (not paid for directly by smokers)
 - Reduced productivity
 - Fire losses
 - Lost income due to early mortality

- Internal costs (incurred by smokers and their families)
 - Direct medical care
 - Lost income due to morbidity and mortality
 - Fire losses
 - Opportunity cost of buying cigarettes

- Internal costs are more than 100 times larger than external costs

- Employee smoking break
- Higher absentee rate

Example: Opportunity Costs of Smoking

- Annual household tobacco spending in **Cambodia** is equivalent to these highly demanded products

US \$69.44 million

=

274,304 Tons of Rice

63,131 Motorcycles

27,778 Cars

**27,778 Units of Big
Wooden Houses in
Rural Areas**

Costs (Government Perspective)

- Direct costs (out of pocket)
 - Depends on the extent of social services (e.g., health care subsidies, social safety net for the poor, subsidies for health care insurance and other insurance services)
 - Cost of fire, cleaning costs

- Indirect costs (opportunity costs)
 - Morbidity and mortality related (e.g., lost income tax)

- Revenue/savings
 - Tobacco taxes (but there are alternatives)
 - From tobacco production (corporate tax, profit)
 - Mortality related (saved pension benefits)

Example: Phillip Morris Study of the Czech Republic

- **Narrow view** of costs of smoking—government (budget) perspective
- All tobacco **taxes** counted **as benefits** (alternative tax base not considered)
- If taxes left out from the calculation, smoking **costs** the government **thirteen times more** than its savings (on pensions and housing for elderly)

- Economic theory provides a **framework**
 - Theory of demand assumes an individual **utility function** (but also rational behavior)
 - Utility from smoking = number of cigarettes, utility from other goods, and individual tastes
 - Utility maximization subject to **budget constraint** (price of cigarettes, income, prices of all other goods)

- Does **price/tax** affect tobacco consumption and to what extent (price/tax elasticities)?
- What **other public policies** can change smoking behavior?
- Can **advertising** encourage tobacco use?
- Does smoking depend on **personal income** (income elasticity)?
- Will **globalization**, trade liberalization, and/or privatization change the demand for tobacco products?

- Data collection (consumption and its attributes, farming and manufacturing, TC regulations)
 - **Macro/micro-level** data have advantages and disadvantages
 - **Minimum information**—quantities, price, income
 - Other data of interest—price of other tobacco products, smuggling, health knowledge, advertising exposure, smoking restrictions, other TC measures, social-demographic data

- Econometric **models** derived from **hypothesis** (tobacco is a normal good or an addictive substance)
- **Functional form** (linear, log forms, etc.)—based on assumptions about consumers' price responsiveness

Analysis of Demand for Tobacco

- Example of **conventional linear demand** (aggregate data, time series):

$$Q_t = b_0 + b_1 P_t + b_2 Y_t + b_3 T_t + b_4 SR_t + b_5 D_m \varepsilon_t$$

- Q_t = per capita consumption of cigarettes per adult in year t
- P_t = weighted average real retail price per cigarette in year t
- P_t = real personal disposable income per adult in year t
- T_t = time trend variable in year t
- Y_t = index of smoking restrictions in year t
- T_t = 0–1 indicator for the introduction of information campaign in year m
- SR_t
- D_m

- Estimating methods

1. Ordinary Least Square (OLS)—for continuous variables

2. Probability distribution models (**Probit** or **Logit**) for dichotomous variables

- Test the model performance
 - Assumption of exogeneity
 - Does the model fit the data?
 - Stability of coefficients
 - Efficiency of estimates

- Interpreting results
- Price elasticity
 - Percentage of change in demand (both quitting and fewer cigarettes among smokers) resulting from a one percent change in price)
 - $\% \Delta Q / \% \Delta P = b_1 \times P_t / Q_t$ (linear demand function)
- Expected values
 - -0.14 to -1.23 (higher in low-income and middle-income countries)



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Section B

Taxation Reduces Demand

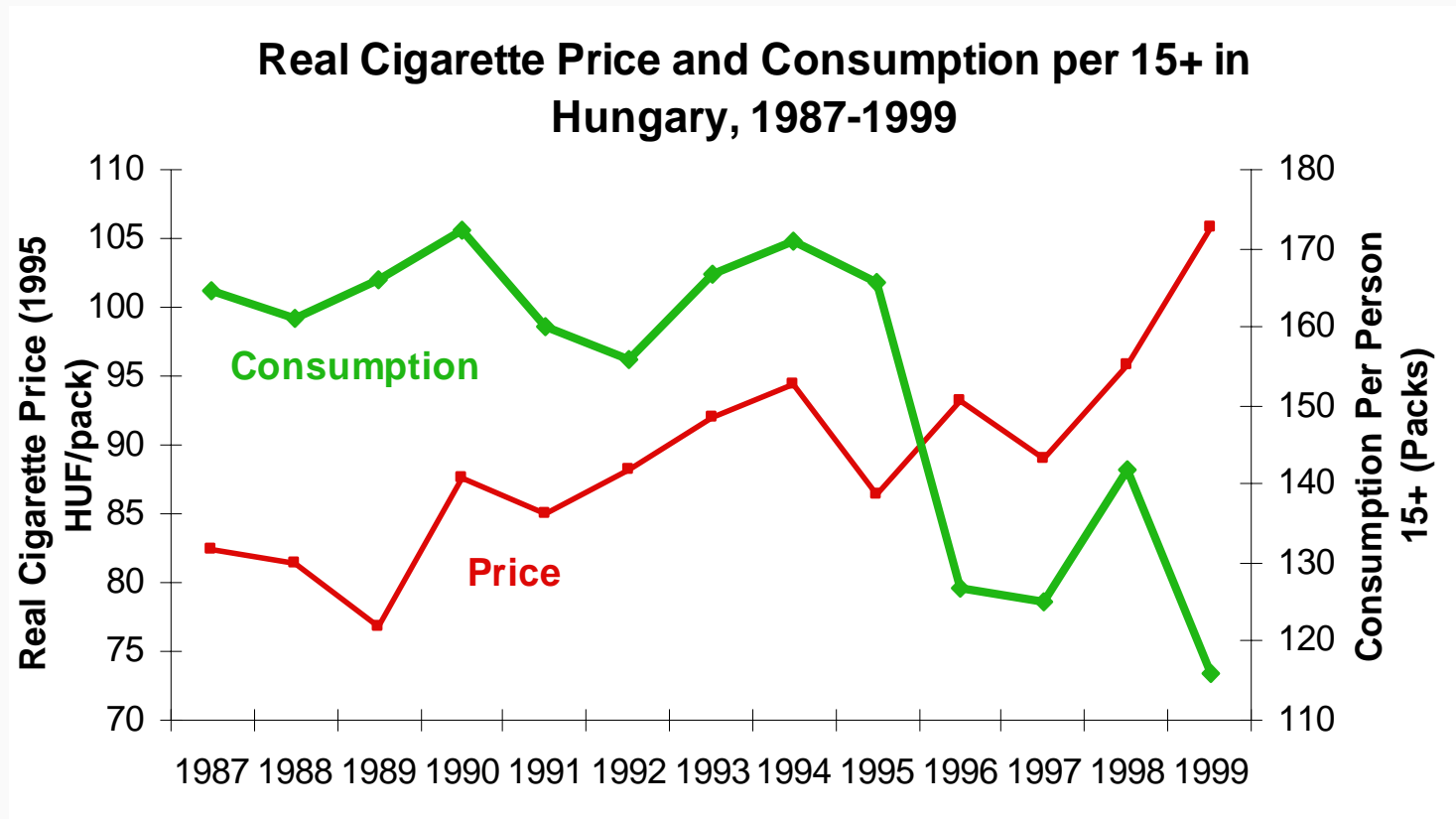
Taxation Is the Most Effective Measure

- Higher taxes induce **quitting**, **reduce** consumption, and **prevent** starting
- A 10% price increase reduces demand by ...
 - 4% in high-income countries
 - 8% in low or middle-income countries
 - About half of the effect is on amount and half on initiation
 - **Long-run** effects may be greater
- **Young** people and **the poor** are the most price responsive

- Population price elasticity = - 0.8; tax increase causes cigarette prices to double (e.g. from \$4 to \$8)
 - There is 100% increase in price
 - Formula for price elasticity
 - Price elasticity = % quantity / % price
 - $- 0.8 = \% \text{ quantity} / 100$
 - $\% \text{ quantity} = - 0.8 * 100 = - 80\%$
- **Result**—doubling the price leads to 80% decline in consumption

Price Elasticity Evidence from Hungary

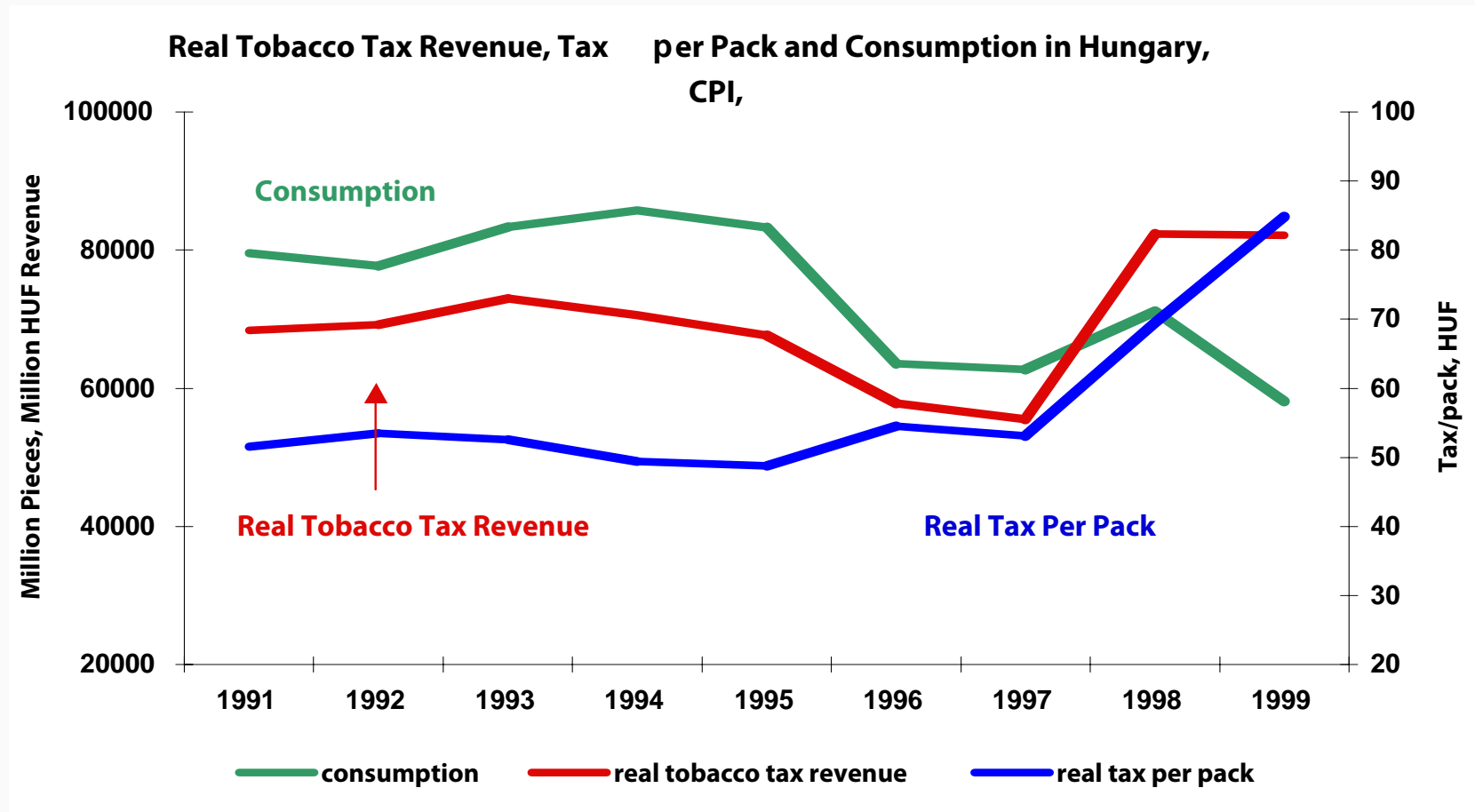
- As tax increases, consumption decreases



Source: Economics of Tobacco in Hungary. In Country Economics of Tobacco Briefs. World Bank and USDA (2000).
<http://www1.worldbank.org/tobacco/countrybrief.asp> accessed 3/1/06

- Impact of a tax increase on **tax revenue**
 - Current tax revenue = tax base (number of cigarette packs) * tax rate (tax per pack)
 - Percentage increase in price = proposed tax increase/current price*100
 - Change in demand after tax increase = current demand (tax base) * price elasticity * percentage increase in price/100
 - New tax revenue = new demand * new tax rate

- Since 1997 the tax rate has increased and so has total revenue (in real terms)



Source: Economics of Tobacco in Hungary. In Country Economics of Tobacco Briefs. World Bank and USDA (2000).

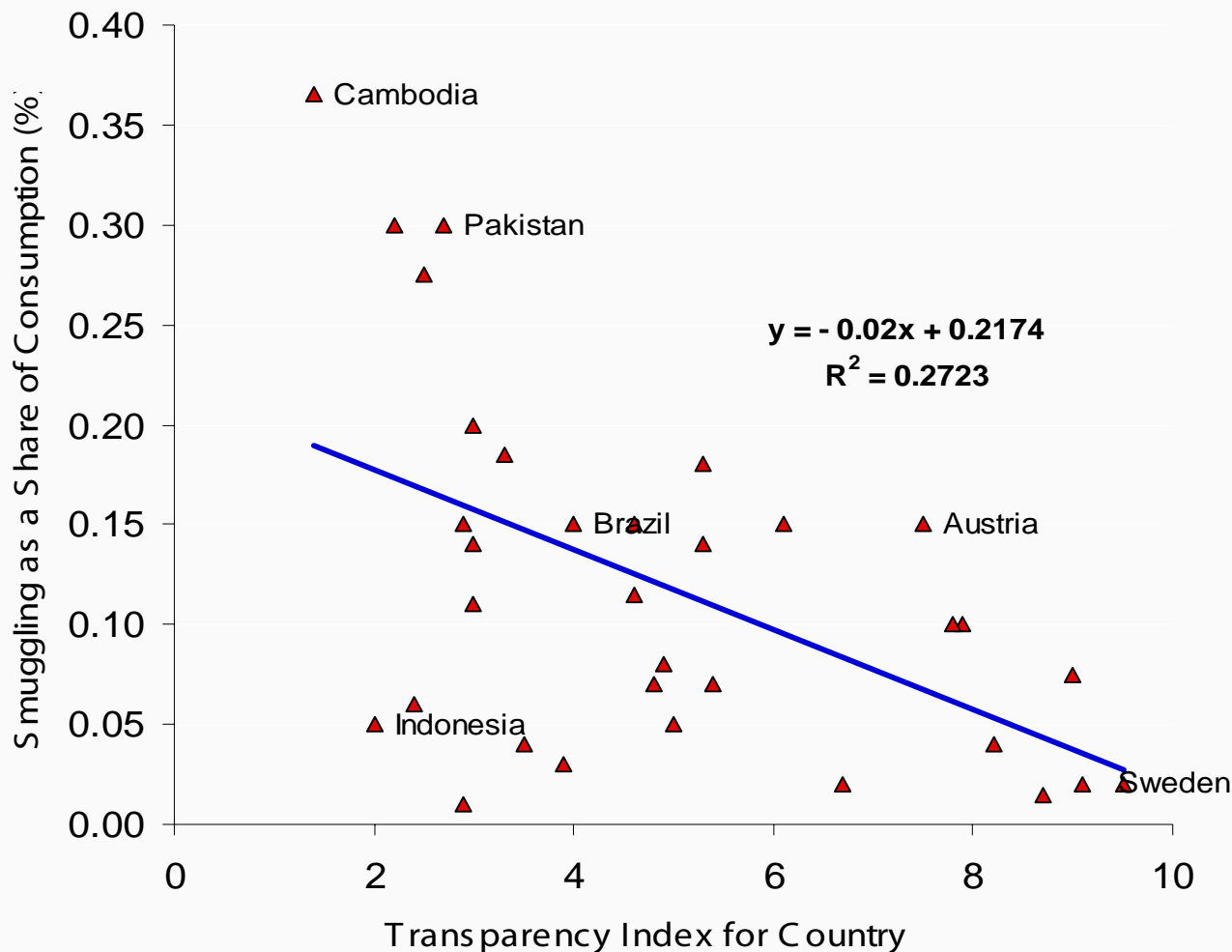
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Smuggling Undermines the Impact of Taxes

- **Motivation** for smuggling—tax avoidance and price differentials
- Industry has incentives to smuggle to achieve higher sale/profit
- Best **estimate**—6 to 8.5% of total consumption
 - Perceived level of corruption more important than cigarette prices
- Tax increase will lead to **revenue increase, even in the event of increased smuggling**

Smuggling as a Function of Transparency Index

- Tobacco smuggling tends to rise in line with the degree of corruption



Measures to Address Smuggling

- Countries need not make a choice between higher cigarette tax revenues and lower cigarette consumption; **higher tax** rates can achieve both
- Measures
 - Focus on large container smuggling
 - Prominent local language warnings and tax stamps
 - Increase penalties
 - Licensing and tracking of containers
 - Increase export duties or bonds
 - Multilateral tax increases

- Tax increases can be **progressive**
 - greatest sensitivity to price in lowest income populations
- Tobacco taxes should be considered in context of overall tax and spending system
 - Revenues generated from tax can be used to support programs targeting the poor (**earmarking**)
- **Health benefits** of tobacco control are progressive
 - Tobacco accounts for about half of the health gap between the rich and the poor

- Information dissemination
- Ban on advertising/promotion
- Restrictions on smoking in public and work places
- Access to cessation services and nicotine replacement therapy (NRT)
- Individually less effective compared to a tax increase
 - Combining a tax increase with other TC measures (**comprehensive programs**) is a cost effective public health method

- Removing trade barriers reduces import tariffs, increase competition (more advertising), motivates specialization, which leads to **lower prices** and **higher tobacco consumption**
- Solution
 - Adopt special trade rules for tobacco, because of its externalities (harms public health) and/or
 - Adopt stronger TC policies

- Trade agreements usually do not adequately protect tobacco control measures from trade-based challenges
- There is a **precedent** in other international agreements for provision to restrict trade in harmful products such as tobacco
- World Trade Organization (WTO) needs to consider the impact of tobacco trade on public health when negotiating trade agreements

Tobacco Importance to the Economy

- A significant economic **presence** does not imply significant economic **dependence**:
 - Tobacco taxes generate only a few percent of total revenues
 - Employment generated by tobacco is under 1%
- Spending on tobacco is rarely important to an economy—money not spent on tobacco will be spent on **other goods** and services instead, thereby creating a comparable number of jobs
- Real costs = **costs of transition** to alternative products