



Understanding, Measuring and Combating Tobacco Smuggling

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Agenda

- I. Defining tobacco smuggling
- II. Motivations for tobacco smuggling
- III. Evidence about the supply of smuggled tobacco
- IV. Methodology to measure smuggling
- V. Using estimates of tobacco smuggling to do policy analysis

I. Defining Tobacco Smuggling

- **Smuggling** might be defined as **the evasion of excise taxes on goods by circumvention of border controls**
- We can differentiate between
 - tax avoidance
 - tax evasion

Varieties of Tobacco Smuggling

- Legal tax avoidance
- Bootlegging
- Wholesale smuggling

Legal tax avoidance

(strictly speaking not smuggling)

- Cross border shopping
 - Regular commercial activity
 - Occasional tourist activity
- Duty Free Sales

Bootlegging: Definition

- Purchase of tax paid cigarettes in low-priced area for resale in higher priced area.
- **Any price differential** (tax induced or otherwise) provide an incentive for bootlegging.

Bootlegging: Characteristics

- Between neighboring areas
- Involves relatively small quantities
- Low level of technology and organization often involved

Wholesale smuggling: Definition

- Diversion of tax (or duty) -not-paid tobacco
- Probably accounts for very large component of all tobacco smuggled worldwide.

Wholesale smuggling: Characteristics

- May involve transport of goods over long distances.
- Quantities involved tend to be large.
- Sophisticated capital-intensive transport methods (e.g. speedboats) sometimes used.
- May involve diversion of in-transit goods.

II. Motivations for Tobacco Smuggling

- Profit-Maximization
- Gain Market Share
- Undermining government tobacco policy

Profit-Maximization

- Independent (parallel) legal and illegal markets
- Coordinated legal and illegal sales

Profit Maximization: Independent Legal and Illegal Markets

- Incentives to smuggle
 - Price differentials (taxes or pricing-to-market)
 - Unemployment or low-wage legal employment
 - Corrupt (or easily evaded) border controls
- Deterrence
 - Certainty versus severity of punishment
 - Moral Suasion (public opinion)

Profit Maximization: Coordinated legal and illegal sales

- Legal sales may camouflage illegal sales and reduce the probability of detection
- A number of empirical studies (Thursby and Thursby 1991, Norton 1988) find evidence that some firms supply both smuggled and legal tobacco.

Undermining Government Tobacco Policy

- Some researchers and tobacco-control advocates argue that smugglers' goal is to undermine tobacco control policies (Joosens and Raw 1998.) They argue:
 - Low black market price stimulates demand and puts pressure on the gov't not to raise taxes
 - Smuggled tobacco “opens” markets that would otherwise be closed to foreign imports

Undermining Government Tobacco Policy (continued)

- Smuggled tobacco may also:
 - Reduce revenue from tobacco taxation
 - Undermine health warnings
 - Undermine restrictions on sales to minors
- **Smuggling does not reduce the public health benefits of taxation** (Merriman, 2002).

III. Evidence about the supply of smuggled tobacco

- Challenging subject to study because it is inevitably hidden activity
- Essential to use a variety of approaches:
 - Qualitative case studies
 - Informal evidence from journalists and industry insiders
 - Rigorous academic studies

The supply of smuggled tobacco

(continued)

What we know about the **supply chain**

- Bootleggers
 - obtain supplies legally
 - use small vehicles for transport.
 - retail sales via informal (ethnic) networks
- Wholesale smugglers
 - obtain supplies through transshipment
 - use sophisticated methods of transport
 - retail sales may involve large (and even legal) networks

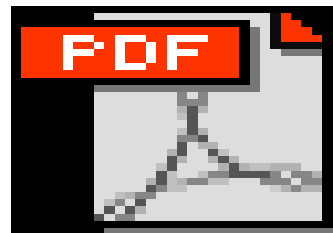
The supply of smuggled tobacco

(continued)

Journalistic Investigations (an example)

- Illegal Pathways to Illegal Profits by Campaign for Tobacco-Free Kids
 - Chapter on cigarette smuggling in Europe
 - Notes that despite low taxes Spain has extensive cigarette smuggling problem.
 - Alleged that tobacco was smuggled from Netherlands through Yugoslavia to Spain.
 - Andorra also was used as a route to smuggle into Spain

Illegal Pathways to Illegal Profits



Adobe Acrobat
Document

The supply of smuggled tobacco (continued)

Some Academic and Government Studies

Saba, Beard, Ekelund and Ressler (1995)	48 continental US states and DC 1960-86	Excluding DC no state lost more than 2% of sales as a result of purchases in neighboring states in 1986.
Thursby and Thursby(1998)	40 US states 1972-1990	0.69% to 7.8% of consumption is smuggled.
Galbraith and Kaiserman (1997)	Aggregate Canadian monthly consumption 1980-1994	Total consumption is much less responsive to price increases (short-run elasticity of -0.40) than taxed consumption (short-run elasticity of -1.01).
Merriman, Yurekli, Chaloupka (2000)	18 European Countries 1989-1995	Bootlegged imports account for about 3 percent of sales in a typical country
HM Customs and Excise (2000)	United Kingdom 1996-97 and 1999-2000	Smuggled cigarettes rose from about 3% of consumption to about 18%
International Centre for Policy Studies (2000)	Ukraine 1999	Smuggled cigarettes accounted for about 27% of total consumption

IV. Methodologies to Measure Smuggling

- Overview
- Survey of Experts
- Survey (observe) purchasers
- Look for missing exports
- Compare tobacco sales against surveys of consumption
- Econometrically estimate smuggling

Overview

- Estimating smuggling is difficult because it is an illegal (and hence) hidden activity.
- It is important to learn qualitative information about the markets in the region.
- Be creative there is no established appropriate methodology.
- Cross-validate if possible.

Survey of Experts

- Methodology
 - 1. Identify experts
 - 2. Develop standardized questionnaire
 - 3. Pretest questions and procedures
 - 4. Conduct round 1 interviews
 - 5. Conduct round 2 interviews at a later date
 - 6. Weight estimates explicitly to estimate smuggling
 - 7. Document all procedures and estimates

Survey(observe) purchasers

- Basic idea: Identify smuggled cigarettes by interviewing purchasers.
- Methodology
 - 1. Train those who will conduct the survey.
 - 2. Develop a method to obtain a representative sample.
 - 3. Conduct surveys (at several points in time if possible.)
 - 4. Document all procedures and estimates.

Look for missing exports

- Basic idea: In the absence of smuggling country A's exports of tobacco to country B should equal B's imports from A.
- Methodology:
 - 1. Gather data about recorded imports and exports.
 - 2. Prepare appropriate table (next slide)
 - 3. Investigate discrepancies.
 - 4. Attribute unexplained discrepancies to under-invoicing.
 - 5. Identify trends over time.

Look for missing exports (example)

Hypothetical Data on Tobacco Trade between Home Country and Trade Partners per Year

Name of Exporting Country	Exporting Country's Recorded Tobacco Exports to Home Country	Home Country's Recorded Tobacco Imports from Exporting Country	Export/Import Discrepancy
A	70	25	-45
B	83	76	-7
C	23	20	-3
D	90	58	-32
E	89	60	-29
F	46	62	16
G	84	50	-34
Total:	484	352	-134

$134 \div 484 = 27.7\%$ Estimate of under-invoicing of tobacco imports as a share of total tobacco imports.

Compare tobacco sales against surveys of consumption

- Basic idea:
- Tax-paid sales observed.
- $\text{Smuggling} = \text{Consumption} - \text{tax-paid sales}$.
- If you obtain an independent estimate of consumption smuggling can be estimated.

Compare tobacco sales against surveys of consumption (continued)

- Methodology
 - 1. Gather data on tax paid sales.
 - 2. Locate (conduct) household surveys of consumption.
 - 3. Investigate factors that might lead to under-reporting by households.
 - 4. Calculate consumption using survey data.
 - 5. Compare change in tax paid sales and reported consumption.

Compare tobacco sales against surveys of consumption (continued)

1	Year	1992	1999	percentage change 1992 to 1999
2	Reported consumption (from survey data)	80	72	-10%
3	Tax paid sales (from official statistics)	100	70	-30%
4	Assumed under reporting (25% of reported consumption)	20	18	-10%
5	Total estimated consumption (reported consumption plus assumed under-reporting)	100	90	-10%
6	Estimated smuggling** (total estimated consumption minus tax paid sales)	0	20	
7	Estimated smuggling as a percent of total estimated consumption	0	22%	

Econometrically estimate smuggling

- Basic idea: Use data on observed sales to estimate the demand for tobacco including:
 - the usual control variables (price, income, etc.)
 - measures of the incentives for illegal imports.
 - measures of the incentives for illegal exports.
- Use estimated coefficients to simulate change in smuggling as a result of policy changes.

Econometrically estimate smuggling (continued)

- Conceptual explanation:
 - Imagine that we could observe tobacco consumption behavior in some isolated region where we knew smuggling was impossible.
 - We could use data from this region to estimate price elasticity of demand.
 - Otherwise identical region where smuggling was possible would have higher price elasticity of demand. The difference would be due to smuggling.

Econometrically estimate smuggling (continued)

- Mathematical explanation:
- Sales = consumption – bootlegged imports + bootlegged exports
- Consumption = $f(P, Y, X)$
- Bootlegged imports = $h_j(I_j, E_j)$
- Bootlegged exports = $h_x(I_x, E_x)$
- Sales = $f(P, Y, X) - h_j(I_j, E_j) + h_x(I_x, E_x)$

Econometrically estimate smuggling (continued)

- Methodology
 - 1. Assemble an appropriate dataset.
 - 2. Construct measures of the incentive for smuggled imports and exports.
 - 3. Run regressions and estimate coefficients.
 - 4. Conduct simulations.

Five Methods and their Data Requirements and Availability, Strengths, and Weaknesses

Method	Data Requirements	Data Availability	Strengths	Weaknesses
1. Ask the experts.	Open-ended survey of experts.	Primary collection of data is necessary in most countries.	Low cost. Provides an agreeable, "common sense" view. Highly specialized training not required.	Difficult to establish constant and consistent selection of experts. Results may not be objective and cannot be replicated.
2. Observe smokers and their buying habits.	Consumer surveys follow a precise and established process.	Primary collection of data is necessary in most countries.	Provable and reproducible. Potential bias is discernable to those who carefully study the methodology.	Very high cost. Requires high level of expertise to select appropriate survey locations. Smuggling may be underestimated in countries with strict legal codes.
3. Monitor tobacco trade.	Data on exports and imports by country and product.	Appropriate data is available in most countries.	Very low cost. Provable and reproducible. "Common sense" results are easy to explain.	Does not detect bootlegging. Relies on a questionable assumption about "lost" exports.
4. Compare tobacco sales against consumption via surveys.	Data on tax paid sales and a variety of income, demographic, and population characteristics in neighboring areas.	Appropriate data is available in some countries. Primary collection of data on cigarette smoking is necessary in some countries.	Provable and reproducible. "Common sense" results are easy to explain. Comparable to similar data in other countries.	High cost if cigarette consumption surveys not available. Results may be inaccurate in countries with changing perceptions about smoking.
5. Compare tobacco sales against consumption via modeling and calculations.	Data on tax paid sales and a variety of income, demographic, and population characteristics in neighboring areas.	Appropriate data is available in most countries.	Low cost if appropriate expertise is used. Provable and reproducible. Comparable to similar data in other countries.	Does not detect wholesale smuggling. Requires high level of expertise. Appropriate data not available in some countries.

General Advice about Interpreting Research Results

- Every quantitative estimate has some implicit or explicit confidence interval.
- Cross-validated results are likely to be more persuasive.
- Seek to establish reasonable **upper** and **lower** bounds rather than precise point estimates.

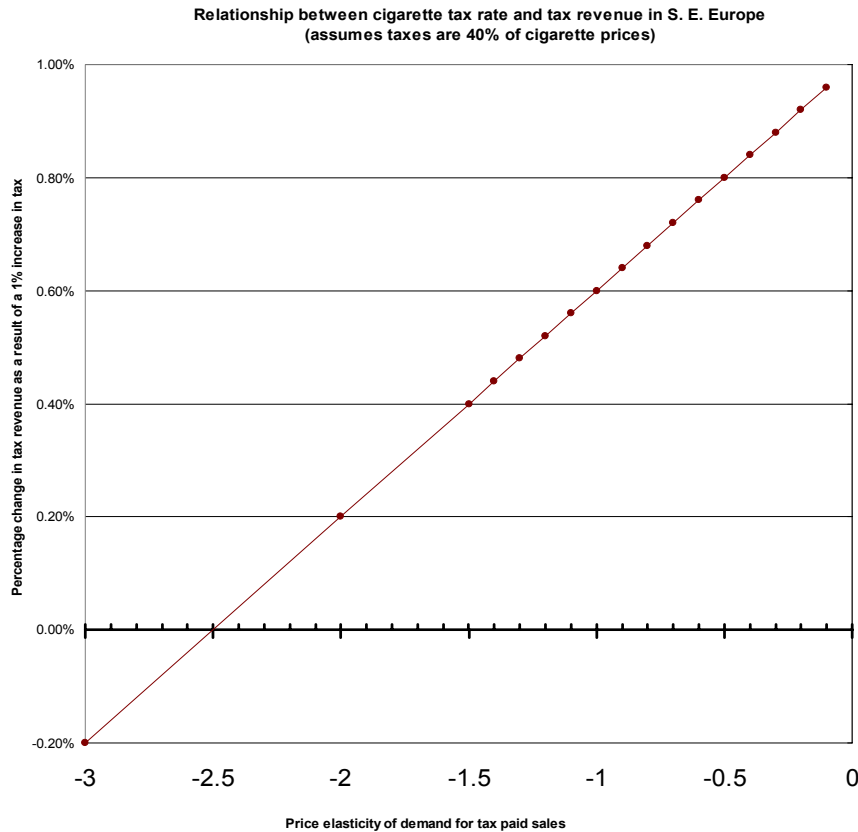
V. Using Estimates of Tobacco Smuggling for Policy Analysis

- Tax revenue change from tax policy change
 - A Theoretical Point
 - Unilateral changes
 - Multilateral changes
- Changes in consumption from tax changes
- Changes in consumption from anti-smuggling policies
 - reductions in corruption
 - increased enforcement

Tobacco smuggling and tobacco tax revenue: A Theoretical Point

- Even **if** smuggling rises when tax increases, tax revenues are likely to increase.
- Short-run cigarette demand is inelastic ($1\% \uparrow$ in $P \rightarrow Q \downarrow$ by $< 1\%$). Total revenue rises with price increases.
- If taxes are a relatively small portion of price, tax revenue will rise even when demand for **legal** cigarettes is quite elastic.

Tax revenue rises even when demand for **legal** cigarettes is elastic



Tax revenue change & tax policy change —empirical analyses

- Econometrically estimate the parameters of $\text{Sales} = f(P, Y, X) - h_j(I_j, E_j) + h_x(I_x, E_x)$
- Key value needed to obtain tax revenue changes is $\frac{\partial \text{sales}}{\partial P}$
- Unilateral policy changes
- Multilateral policy changes
- Consumption, imports and exports may all change with changes in tax

Tax revenue changes from changes in tax policy (continued)

- Estimates of change in sales resulting from a change in price can be used to estimate revenue changes as a result of tax policy changes.
- See handouts
- All simulation results have confidence intervals!

Changes in consumption from tax changes

- Theory
- Health effects of tobacco depend on consumption rather than sales.
- Tax increases reduce consumption even when smuggling is possible (see handout).

Changes in consumption from tax changes (continued)

- Estimation
- When smuggling is possible **changes in sales** as a result of a tax increase **overstate changes in consumption**.
- Econometric estimates of smuggling can be used to estimate change in consumption.

Changes in consumption from anti-smuggling policies

- Reductions in corruption
- Increased enforcement

Reductions in corruption

- Empirical evidence in OUP book shows link between corruption and smuggling.
- Measures of corruption are difficult to obtain
- Might be able to make argument for reductions in corruption as anti-smuggling policy

Increased enforcement

- Economics of crime literature demonstrates link between certainty and severity of punishment and crime
- Might study the relationship between enforcement activities (e.g. border inspections) and change in smuggling.
- Might study the relationship between penalties for smuggling and level of smuggling