

## Summer School in Public Economics

Fundación Rafael del Pino, Spain  
Instituto de Estudios Fiscales, Spain  
Andrew Young School of Policy Studies

### Session IV

# Research in Tax Evasion: Issues and Challenges

Michael McKee – University of Tennessee

# Introduction

- Tax evasion arises in all tax systems
- Current estimate on tax gap across all tax sources in US: \$300 billion
- Issues:
  - Government Revenues
  - Efficiency Losses
  - Social Norms
  - Tax Administration
  - Affects All Tax Sources

# Introduction

- Research Issues and Challenges
- Measuring Evasion Extent
  - Illegal activity so hard to observe
  - Direct impacts but also spillover impacts
- Identify Factors Affecting Evasion
  - Behavioral Questions
- Control of Evasion
  - Propose and Evaluate Policy Prescriptions to Limit Evasion

# Optimal Level of Enforcement?

- Theoretical Presentations
  - Reinganum and Wilde
  - Myles
  - Cremer et al
- Argument for existence of an optimal level of enforcement can be made
- Issue: solving for parameters
- Anecdotal evidence suggest that we are far from optimal enforcement – yield per audit  $>$  cost
- Better approach may be to incorporate evasion into tax system design: Alm; Cremer and Gahvari

# Behavioral Arguments

- Basic Model of Evasion Decision
- Income  $I$  – choose  $D$  (disclose)
- Audited with fixed (random)  $p$
- States – caught  $I_C$  and  $I_N$
- $I_C = I - tD - f[t(I-D)]$  and  $I_N = I - tD$
- Max  $E U(I) = pU(I_C) + (1-p)U(I_N)$
- Comparative statics results:
  - $\frac{\partial D}{\partial p} = -\frac{[t(f-1)U'(I_C) + tU'(I_N)]}{[pt^2(f-1)^2U''(I_C) + (1-p)t^2U''(I_N)]}$

## Summary of Model Results

- We can't make  $pf > 1$  so evasion exists
- Increase  $p$  – compliance ( $D/I$ ) increases
- Under DARA – compliance decreases with  $I$
- Effect of increase in  $t$  – compliance increases under DARA (intuition?)
  
- Empirical observation – compliance is higher than can be explained by usual enforcement efforts

# Explanations for Last Observation

- Non-EUT Behavior (eg RDEU)
  - $EU(I) = gpU(I_C) + (1-g)(1-p)U(I_N)$
- Indirect Effects of Audits
- Fiscal Exchange
- Social Norms
- Cohort Effects

## Non-PIT Revenue Sources

- Firm Incentives under CIT
  - Owner vs. Management
- Excise/Sales Taxes
  - Seller vs. Buyer
- Specialty Taxes – e.g., wealth taxes

# Measuring Evasion

- Evasion continues to be an empirically large amount – US estimate is \$300 Billion
- Measure using audit data and gross up
- Measure via indirect methods as in measuring the underground economy

# Evasion Modes

- Usual modes: non-reported income and claims for deductions/exemptions that are not permitted
- Evasion as a portfolio (Martinez-Vazquez and Rider; Cummings, Martinez-Vazquez and McKee)
- Complexity – cost of filing vs. opportunity for evasion?
- Tax authority may treat the modes of evasion differently – lower penalties for some types

## Miscellaneous Evasion Activities

- Internet shopping to avoid sales tax (Alm and Melnik, 2005)
- Border shopping – Canadians after GST (Ferris, 2000)
- Excise tax evasion – cigarette taxes and sales on Native American lands
- Vehicle registration to avoid specific state taxes

## Response to Audit Effort

- Survey based studies (Shefrin and Triest; Kinsey, Elffers et al; de Juan, Lasheras, and Mayo)
  - Recalled compliance behavior as enforcement changes
- Field “experiments” (Slemrod et al):
  - Minnesota “experiment” – approximately 2000 taxpayers in Minnesota get letter from Revenue Dept
  - Letter states return subject to “close examination”
  - Analyze effect on compliance – but do not have post audit data – infer compliance from income reporting levels

## Experiment on Audit Effort

- Alm and McKee (2005) – to test the Slemrod et al setting in lab where we know the actual compliance rate
- Design follows Alm, Jackson, McKee and Alm Deskins, McKee (details below)
- Treatments are timing of audit (before vs after filing) and productivity of the audit

## Experimental Design

	Audit Success Rate?	
<i>Audit Selection Timing?</i>	1.0	0.65
Audit Selection Not Pre-Announced	<b>T1</b> Subjects = 48 Compliance Rate = .515	<b>T2</b> Subjects = 32 Compliance Rate = 0.546
Audit Selection Pre-Announced	<b>T3</b> Subjects = 32 Compliance Rate = 0.480	<b>T4</b> Subjects = 32 Compliance Rate = 0.496

# Behavioral Hypotheses

- *H1: Individuals who are told that they will be audited prior to their filing decision will comply perfectly.*
- *H2: Individuals who are told that they will not be audited will record very low (zero) levels of compliance.*
- *H3: A lower audit success rate will decrease compliance.*

**Table 3 – Estimation Results**

Indep. Vars.	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	0.632*** (0.042)	0.642*** (0.042)	0.649*** (0.043)	0.737*** (0.039)	0.747*** (0.039)
Income	-0.106** (0.051)	-0.102** (0.051)	-0.111** (0.051)	-0.092** (0.046)	-0.094** (0.045)
Audit Rate	0.761*** (0.038)		0.757*** (0.013)	0.365*** (0.035)	0.365*** (0.035)
Lagged Penalty	-0.031*** (0.003)	-0.032*** (0.003)	-0.030*** (0.003)	-0.028*** (0.003)	-0.028*** (0.003)
Male	-0.347*** (0.012)	-0.347*** (0.014)	-0.347*** (0.014)	-0.340*** (0.012)	-0.339*** (0.012)
Prep Taxes	-0.019 (0.013)	-0.027** (0.013)	-0.016 (0.010)	-0.023** (0.011)	-0.015 (0.014)

Table 3 – Estimation Results Treatments

Indep. Vars	Model 1	Model 2	Model 3	Model 4	Model 5
Audit Before				-0.273*** (0.012)	-0.274*** (0.012)
Known Audit				0.689*** (0.018)	0.650*** (0.025)
Audit Success Rate			-0.021* (0.012)	-0.015 (0.011)	-0.027*** (0.015)
Audit Success Rate x Audit Rate		0.832*** (0.043)			
Audit Success Rate x Known Audit					0.073** (0.032)

## Discussion of Results

- What about those who don't get "the letter"?
- Model 4 – Known Audit and Audit Before variables: those who don't get the letter respond with lower compliance
- Model 5 – audit productivity effect: for those who *know* they will be audited respond to the higher audit productivity (closely examined in letter)

## Experimental Studies on Audit Effort

- Lengthy literature of Tax Compliance in Lab
  - Friedland, Maital, Rutenburg (1978)
  - Becker, Buchner, Sleeking (1987)
  - Webley, Robben, Elffers, and Hessing (1991)
  - Alm, Jackson, McKee (1992)
- Overall Results – enforcement effort (audit and penalties) increase compliance but that the effect is limited
  - Excessive use of penalties can lead to lower compliance

## Indirect Effects of Audits?

- Field studies – Dubin and co-authors; Tauchen, Witte, and Beron;
  - Impute compliance beyond what we collect from audits as induced or indirect effects
  - Dubin estimate indirect effect as high as about 8 times collected through audits
  - Tauchen et al – smaller effect and more among high salary/wage earners

## Indirect Effects of Audits?

- Laboratory Studies – Alm, Jackson, McKee
  - Investigate the sources of the indirect effects
  - Allow communication among taxpayer subjects
  - Findings:
    - Ripple effect about 4 times tax collected via audit
    - Messages that convey audits increase compliance
    - Messages that convey high compliance within group increase compliance overall
    - Official information less productive than unofficial

# Fiscal Exchange and Compliance

- Field Data
  - Largely survey or anecdotal
- Experimental Data
  - Alm, Jackson and McKee (1993)
  - Alm, McClelland and Schulze (1999)
  - Feld and Tyran (2002)
- AJM find that the compliance increases:
  - Voting vs Imposed
  - Proposal has wide support
  - Public informed of high support

## Social Norms – Government Trust

- Surveys: World Values Survey and Afrobarometer – Field Data
- Alm and Torgler (nd) compare US and Spain
  - Finding: tax morale in Spain lower than in US
- Torgler (2003) compares East and West Germany after unification
  - Finding: tax morale higher in East Germany but eroding over time – disaffection?

## Social Norms – Government Trust

- Laboratory Experiments
- Alm, Sanchez and De Juan: US and Spain
  - Finding: compliance lower in Spain
- Non-tax compliance experiments can also shed some light here – social norm vs. government
  - Public goods contributions – Heinrich et al find differences across cultures
  - Brandts, Saijo and Schram find no differences

## Social Norms – Government Trust

- Field and Laboratory Experimental Studies
- Cummings, Martinez-Vazquez, McKee, Torgler (2005): compare Botswana and South Africa
- Use Afrobarometer Data and Lab Studies
  - Same lab experiment conducted in both countries
  - Finding that trust in government lower in SA
  - Experimental compliance levels lower in SA

## Other Policy Responses

- Amnesties
  - Theory: Andreoni; Malik and Schwab
  - Field studies: Alm and Beck; Crane and Nourzad
  - Lab studies: Alm, McKee and Beck
- Withholding at Source
  - Yaniv; Martinez-Vazquez
- Reporting Requirements
  - Matching paperwork: Alm, Deskins and McKee

# Audit Selection Strategies

- Field Data
- Income taxes
  - Alm, Bahl and Murray (Jamaica)
- Sales Taxes
  - Murray (Tennessee)
  - Alm, Blackwell and McKee (New Mexico)

# Audit Selection Strategies

- Laboratory Studies
- Alm and McKee – compliance as coordination game
  - Finding – absent a random audit process it is possible for individuals to successfully coordinate on low compliance equilibrium
- Alm, Cronshaw and McKee – endogenous audits
  - Finding – conditional back audits, conditional forward audits) are cost effective

## Details on an Experimental Design

- Example Alm, Deskins, and McKee (2005)
- Parallelism Emphasis
- Procedure: subjects earn income, disclose income, and face an audit process similar to that in the naturally occurring setting
- Tax Language: screen refers to tax form, tax rate, audit, income reported by employer and so on
- Investigate difference in compliance between income subject to third party reporting and that not subject to such reporting

# Experiment Steps

- Earn Income – figure 1
- Pay Taxes (Disclose Income) – figure 2
- Two classes of income – matched & non-matched
- Timed stage – failure to file: 10% penalty plus audit
- Undergo Audit (random)
- Bingo cage on screen – after the filing decision
- Receive feedback information and Round ends
- Treatments: % income matched & audit productivity on non-matched income
- We don't include:
  - Public goods – tax receipts in “black hole”
  - Systematic (endogenous) audits
  - Varying tax rates or penalty rates

# Income Earning Image

Subject 1
Earn Your Income
Training Round!

Completed Product

?	?	?
?	?	?
?	?	?

Sort These

2	8	1
6	7	5
3	4	9

Timer

0.0

Continue

There are two blocks above. The right has nine numbers in a random order (selected by the computer). To earn income you must move these numbers to the block on the left and put them in ascending order (lowest number in the upper left corner, next lowest to the right, and so on). Use the mouse to click the number you want to move first. The computer will move this number to the left block. Then click on the number you want to move next and so on. You must move the numbers in the correct order (smallest to largest). When you click the first correct number the timer will begin and continue until you have finished moving all the numbers. Your earnings depend on how quickly you complete this task. The first person to finish will get the highest income, the second person, the second highest income and so on. You will learn your earnings on the next page.

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## Experimental Design

	Probability Evaded Non-Matched Income Discovered			
<i>Percent of Income not "Matched"</i>	N/A	0.25	0.50	0.75
Zero	T1			
25%			T2	
50%		T6	T3 tax rate= 0.35 T7 tax rate= 0.20 T8 tax rate= 0.50	T5
75%			T4	
100%			T9	

# Behavioral Hypothesis

- *H1: Individuals are more likely to evade taxes when a larger share of their income is of the type that is not perfectly detectable by the tax authority; that is, the compliance rate falls as the percentage of income received as non-matched income increases.*
- *Note – we omit the usual hypotheses relating to the effect of income, wealth, etc*

# Analysis of Data

- Econometric analysis of data
- Model:  $Compliance\ Rate_{i,t} = \beta_0 + \beta_1 Income_{i,t} + \beta_2 Wealth_{i,t} + \beta_3 Audit\ Rate_{i,t} + \beta_4 Lagged\ Audit_{i,t} + \beta_5 Y + \beta_6 Z + \varepsilon_{it}$

*Y represents individual characteristics*

*Z represents treatment effects*

- Estimated using GLS with heteroskedastic errors
- Panel dataset with 124 subjects and 30 decision periods

# Estimation Results

Indep. Vars.	Model 1	Model 2	Model 3	Model 4
Income	-0.660*** (0.065)	-0.693*** (0.064)	-0.482*** (0.064)	-0.677*** (0.067)
Wealth			-0.034*** (0.002)	
Audit Probability	0.245*** (0.070)	0.245*** (0.050)	0.287*** (0.126)	0.289*** (0.074)
Lagged Audit				-1.645 (1.865)
Audit Success Rate	0.150*** (0.057)	0.104* (0.056)	0.106* (0.055)	0.163*** (0.058)
Percent Non-matched	-0.245*** (0.014)	-0.231*** (0.014)	-0.241*** (0.014)	-0.242*** (0.014)
Prep Taxes		-20.744** (1.524)		
Tax Rate	-0.776*** (0.098)	-1.023*** (0.098)	-0.882*** (0.095)	-0.782*** (0.100)

## Discussion of Results

- Taxpayer subjects respond as predicted to enforcement (Audit Probability and Audit Success)
- Higher the fraction of income not reported to tax authority (third party reporting) the lower the Compliance Rate
- Higher tax rate leads to lower compliance. Future work will look at interaction between tax rate and choice of matching/non-matching income

## What Do We Think We Know?

- Enforcement effort works to a point
- Social norms matter and can be influenced
- Individuals can likely strategize against tax authority when systematic audit selection rules applied
- Endogenous audits (conditional and cut off rules) are cost effective
- Fiscal exchange plays a positive role

# What Should We be Investigating?

- Use of criminal sanctions in tax enforcement
  - In FY 2002 the CI Division of IRS sentenced 1023 individuals for tax evasion and 1178 for other financial crimes
  - The CI Division had 2903 agents in FY 2002
- Design a laboratory experiment to investigate effect of criminal sanctions – loss of earning during incarceration and for a period after

# What Should We be Investigating?

- Can we manipulate social norms to increase compliance?
  - Are there tipping points – if compliance levels among the social network increase is there a contagion effect?
- What has greater impact – audit or outcome of audit?
  - Allocation of resources – many low level audits or few substantial audits?