Some Thoughts on Incidence Analysis

James Alm

jalm@tulane.edu

Tulane University

Basic elements of a micro-simulation incidence model

Start with:

- Pre-tax/pre-transfer income of unit h, or I_h
- Taxes/transfers programs R_i
- "Allocators" of program i to unit h, or s_{ih} (or the share of program i borne by unit h)

Then, post-tax/post-transfer income of unit h (Y_h) is:

$$Y_h = I_h - \sum_i R_i s_{ih}$$

All of this seems easy, and answers the key question:

Who pays the taxes (or gets the transfers)?

But there are lots of questions that must be answered.

- What is the "unit" (e.g., individual versus household versus deciles,..,)?
- What is "income"?
  o Comprehensive income?
  o Annual versus lifetime measure?
  o Market versus non-market measure (including tax evasion)?
  o Cash versus in-kind income?
  o Uses side versus sources side?
- How are components of income measured (e.g., capital income)?
- Should "consumption" be used instead of "income"?
- What is the time frame of analysis (e.g., annual versus lifetime)?
- What programs are included?
- Can behavioral responses be incorporated?
- What are the allocators – is there a consensus on incidence assumptions?
- What happens when individuals change "ranks"?
- How can the results be easily summarized?

Some specific cautions and considerations

- "Taxes" are not the same thing as "contributions".
- Horizontal equity is as important as vertical equity.
- Evasion matters, and it typically varies by income class.
- Don't forget subnational programs.
- Incidence assumptions almost certainly vary by country.

"Taxes" are not the same thing as "contributions".

- Payroll programs are a big deal in most all countries.
- But benefits are seldom considered….even though it is possible to quantify benefits.

Tax Rates from Payroll Taxes and Social Security Contributions in Selected Countries (in percent)

Country	Payroll Tax Rate (Other than SSC) (A)	Total Social Security Contribution (SSC) Rates (B)	Total Tax Rate (C) = (A)+(B)
Argentina	0	38 – 42	38 - 42
Brazil	8.5	10.75 – 14.3	19.15 – 22.8
Colombia	9	27.50	36.5
Costa Rica	0	32	32
Chile	0.05	20.04 – 20.5	20.05 - 20.55
Ecuador	1	20.5	21.5
El Salvador	5.5	13.5	19
Guatemala	0	11.5 - 14.5	11.5 - 14.5
Honduras	1	14	15
Jamaica[a]	13 – 17	5	18 - 22
Mexico	6 - 8	36.92	42.29 - 44.92
Nicaragua	2	13.25 - 21.50	15.25 - 23.5
Panama	2.75	18.56 – 23.6	21.31 - 26.35
Peru	2	22.53 - 23.55	24.53 - 25.55
Venezuela	2.5 - 4.5	21.67 - 22.67	24.17 - 27.17

Revenues from Payroll Taxes and Social Security Contributions in Selected Caribbean and Latin American Countries, 2005

Country	Payroll Taxes and Social Security Contributions	
	As Percent of Central Government Total Tax Revenues	As Percent of Gross Domestic Product
Argentina	25.66%	3.21%
Bolivia	12.00	1.78
Brazil	46.35	6.06
Chile	8.02	1.29
Costa Rica	31.54	4.72
Dominican Republic	4.43	0.78
Jamaica (for 2002/2003)	15.52	4.15
Mexico	11.85	2.43
Nicaragua	17.75	4.97
Panama	29.57	5.32
Peru	8.74	1.10
Uruguay	33.42	8.16
Venezuela	5.28	1.09

Horizontal equity is as important as vertical equity.

- The focus is typically on how average tax rates vary by income.

- But variation within income class is also important... and can be quantified.

Distribution of Effective Tax Rates, Jamaica Labor Taxes

Income Class (J$, annual, Total Emoluments)	PAYE			Total Payroll Taxes: Potential Tax Paid Employee Share Only			Total Payroll Taxes: Potential Tax Paid Employee Plus Employer Share		
	Min	Max	CV	Min	Max	CV	Min	Max	CV
Less than J$50,000	0	0	NA	5.50	10.40	75.33	8	18.75	93.35
50,000-100,000	0	0	NA	5.50	10.40	98.0	8	18.73	121.09
100,000-120,432	0	0	NA	5.50	10.40	56.88	8	18.73	66.65
120,432-150,000	0	4.24	634	5.50	10.40	55.06	8	18.73	62.71
150,000-250,000	0	12.33	371	5.50	10.40	43.49	8	18.73	45.19
250,000-500,000	0	18.35	255	5.50	10.40	43.57	8	18.73	43.35
500,000-1,000,000	5.90	21.66	115	4.33	10.40	60.92	5.65	18.74	63.76
1,000,000-5,000,000	12.90	24.31	59	3.60	9.19	58.23	4.19	16.36	65.58
Greater than 5,000,000	11.70	24.70	44	3.15	8.22	59.63	3.30	14.44	64.76

Evasion matters, and it typically varies by income class.

- Measuring evasion is difficult.
- But advances are being made… and it matters a lot.
  - Measuring via the shadow economy – aggregate
  - Measuring via nonfiling – individual

Underground Economy Estimates (as percent of GDP): Summary Statistics by Income Group, 1984-2006
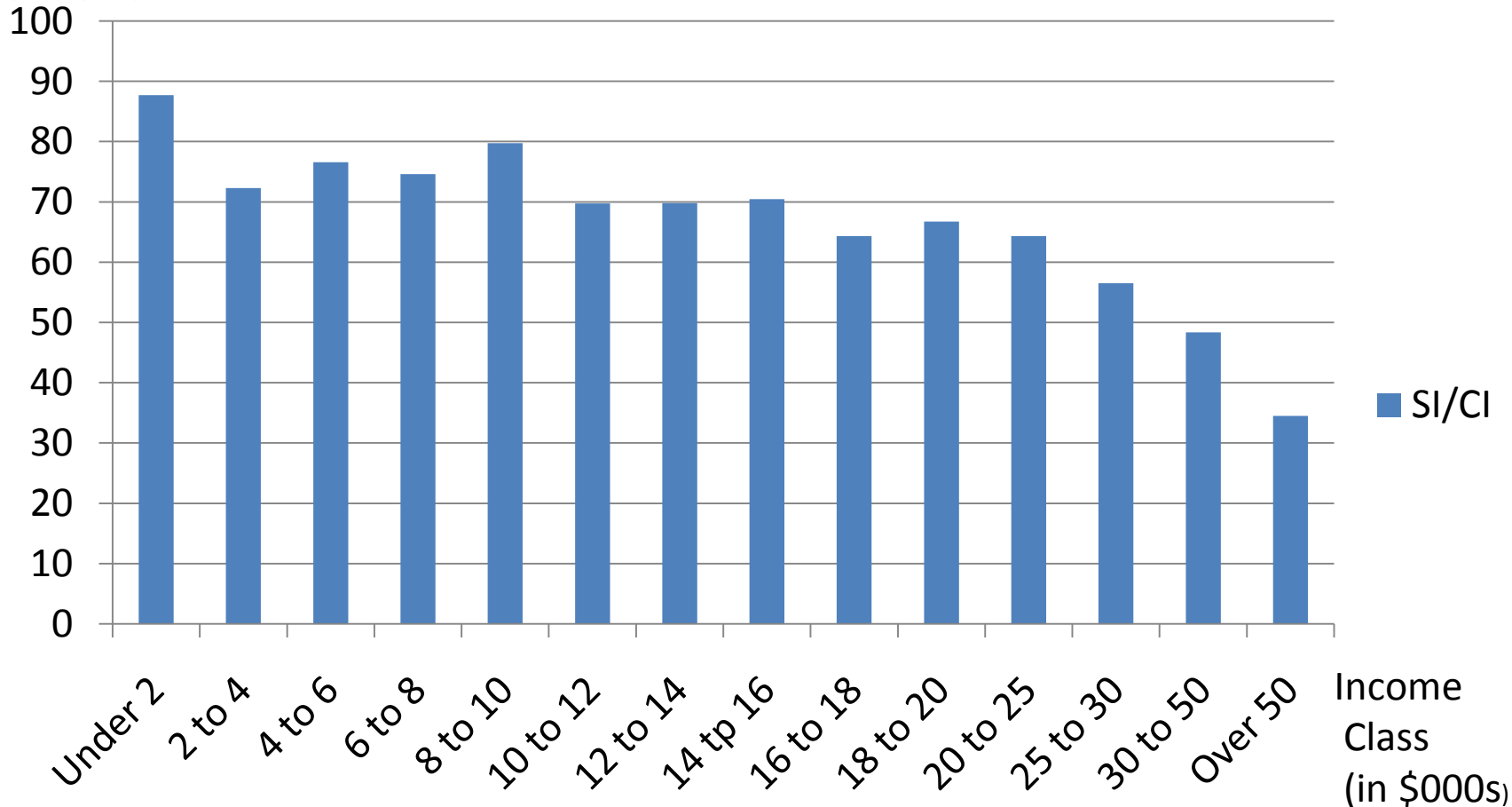
Income Group	Observations	Mean	Standard Deviation	Minimum	Maximum
Low Income	621	47.7	13.5	24.2	83.9
Lower Middle Income	572	36.7	10.2	17.3	71.2
Upper Middle Income	395	25.9	5.1	13.7	41.6
High Income, non-OECD	118	16.2	4.2	9.3	28.9
OECD	413	14.7	2.3	9.1	20.3
All Countries (Unweighted)	2119	32.5	15.6	9.1	83.9

Filing versus Non-filing Rates, Jamaica

| Sample	Population	Sample Size	Filers	
			Number	Percent
Occupational Sample				
Service Stations	630	252	14	5.6
Customs Brokerages	366	147	4	2.7
Auto Repair	888	318	31	9.7
Auto Parts	402	158	12	8.2
Hair Care	2,280	919	53	5.8
Real Estate	105	79	8	10.1
Contractors	297	132	7	5.3
Transport	13,485	5,857	781	13.3
Beverage and Spirits	11,385	4,474	430	9.6
Total	**29,838**	**12,336**	**1,341**	**10.9**
Professional Sample				
Accountants	384	176	45	25.6
Architects	75	25	5	20.0
Attorneys	373	100	22	22.0
Medical Doctors	1,146	225	43	19.1
Optometrists	9	9	4	44.4
Veterinarians	37	37	10	27.0
Total	**2,024**	**572**	**129**	**22.6**

Statutory Income as a Percent of Comprehensive Income, Jamaica

Taxes as a Percent of Statutory and Comprehensive Income, Jamaica

Percent

Income Class (in $000s)

Legend: T/SI, T/CI
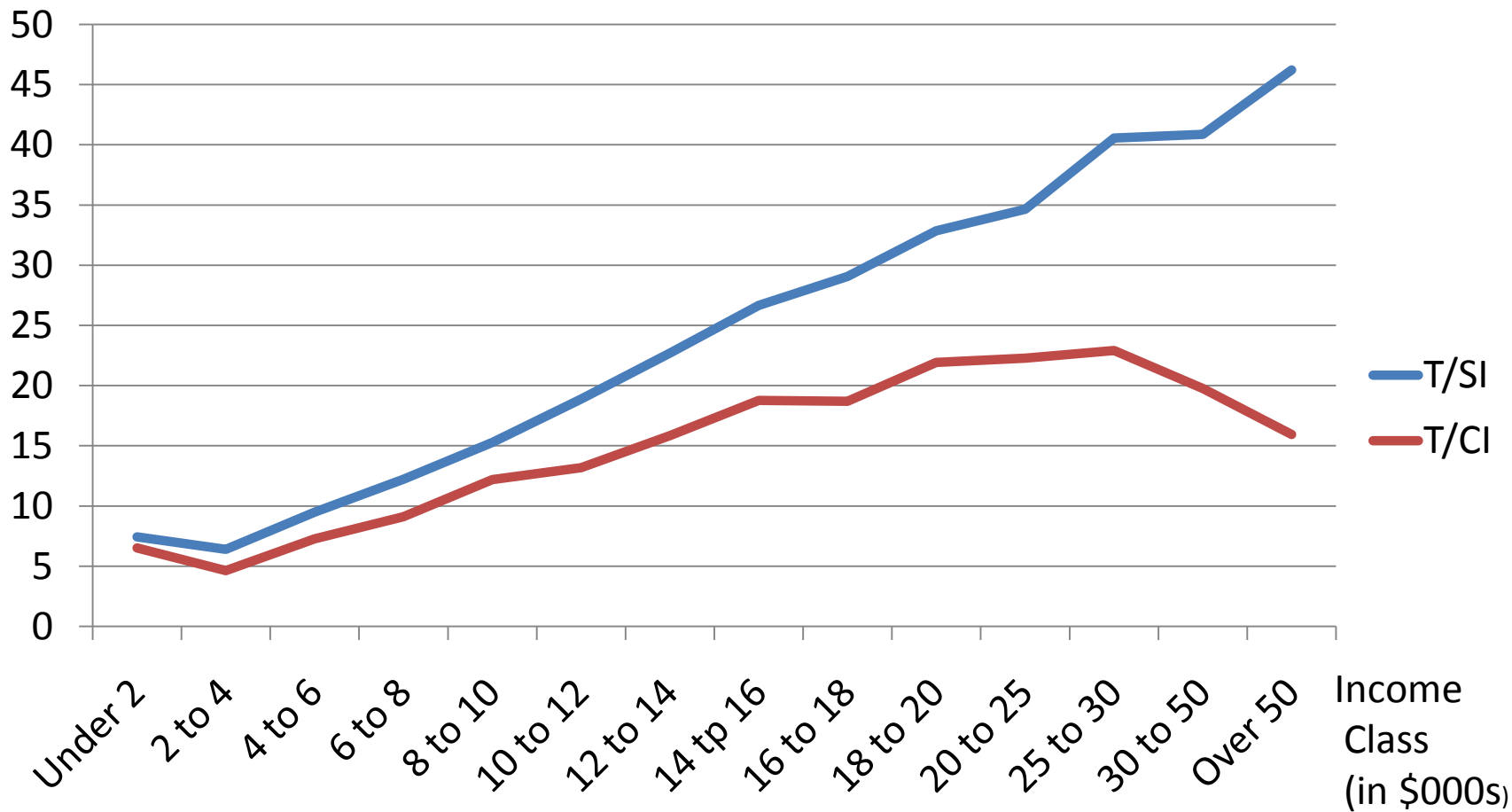
Don't forget subnational programs.

- Subnational governments are often small.
- But in some cases subnational taxes and expenditures are significant – and should not be forgotten.

Incidence assumptions almost certainly vary by country.

- Individual income tax: there is mobility out of the formal sector and out of the country…
- Payroll taxes: there is mobility, there are benefits,…
- Corporate income tax: there is mobility out of country,…
- Excise taxes: there are price controls and imperfect competition,…

Some general lessons

1. There is no single "best practice" – the "best" approach depends upon the "question", the specific country circumstances and institutions, the data, …
2. Do extensive robustness tests.
3. More empirical work on incidence is needed.
4. Do the best you can – but recognize and acknowledge the inherent limitations of the analysis.
5. Indeed, one can <u>never</u> know the distribution of income that would have existed in the absence of the taxes/transfers, so "marginal" analysis of programs is especially useful.