CEQ Assessments and the Fiscal Incidence Analysis Toolkit

Jon Jellema
Consultant
Day 1

1. Introduction to CEQ Assessments
2. Overview of the CEQ Assessment Methodology via the CEQ Income Concepts
3. Constructing CEQ prefiscal Income: Market Income or Market Income + Pensions
4. Constructing CEQ Disposable Income: Incorporating Direct Taxes and Direct Transfers
5. Glance at Gross Income, Net Market Income
6. Analytical Treatments for the Public Contributory Pension System
7. Constructing CEQ Consumable Income: Incorporating Indirect Taxes and Subsidies
8. Constructing CEQ Final Income: Incorporating In-kind Transfers and public service fees
1. Introduction to CEQ Assessments
What are CEQ Assessments?

Empirically grounded comprehensive and rigorous tax and benefit incidence analyses; which are transparent in method and application; and which facilitate fact-based engagement among development stakeholders on the following equity concerns:

How much income redistribution and poverty reduction is being accomplished through fiscal policy?

How equalizing and pro-poor are specific taxes and government spending?

How effective are taxes and government spending in reducing inequality and poverty?

What is the impact of fiscal reforms that change the size and/or progressivity of a particular tax or benefit?
Why CEQ Assessments?

CEQ or FIA,
Global
Coverage in
2021/22

Note:
a) New: CEQ FIA on 2015 or more recent survey data, b) In progress: CEQ FIA in progress/planned
b) Euromod: FIA for OECD countries, d) Other FIAs run by non-WB partners, e) No survey: No survey data available
f) Old: CEQ FIA on 2014 or older survey data, g) No CEQ: no CEQ or FIA done but survey data available

Note 2:
Euromod FIAs include the computation of Gini indexes at Market Income and Disposable Income but excludes Consumable Income. Results of other FIA exercises run by non-WB partners are not accessible to the WB.
Why CEQ Assessments?

How much income redistribution and poverty reduction is being accomplished through fiscal policy?

How equalizing and pro-poor are specific taxes and government spending?

How effective are taxes and government spending in reducing inequality and poverty?

What is the impact of fiscal reforms that change the size and/or progressivity of a particular tax or benefit?

Why CEQ Assessments? - Comprehensive and Rigorous

1. Analyzing taxes without spending, or spending without taxes, or in-kind transfers without e.g. price subsidies, can be misleading:
   • Taxes can be unequalizing but spending so equalizing that the effect of taxes is more than compensated
   • Taxes can be regressive but when combined with transfers make the system more equalizing than without the regressive taxes
   • Transfers can be equalizing but when combined with taxes, post-fisc poverty can be higher

2. Analyzing the impact on inequality only can be misleading
   • Fiscal systems can be and often are equalizing but poverty increasing

3. Analyzing the impact on traditional poverty indicators can be misleading
   • Fiscal systems can show a reduction in poverty and yet a substantial share of the poor could have been impoverished by the combined effect of taxes and transfers
2. Overview of the CEQ Assessment Methodology via the CEQ Income Concepts
MARKET OR PREFISCAL INCOME

PLUS DIRECT TRANSFERS MINUS DIRECT TAXES

DISPOSABLE INCOME

PLUS INDIRECT SUBSIDIES MINUS INDIRECT TAXES

CONSUMABLE INCOME

PLUS MONETIZED VALUE OF PUBLIC SERVICES: EDUCATION & HEALTH

FINAL INCOME

Source: Lusting (2018)
CEQ Assessment: fiscal interventions

- Currently included:
  - Direct taxes
  - Direct cash transfers
  - Non-cash direct transfers such as school uniforms and breakfast
  - Contributions to pensions and social insurance systems
  - Indirect taxes on consumption
  - Indirect subsidies
  - In-kind transfers such as spending on education and health at average government costs
CORE INCOME CONCEPTS
Contributory Pensions as Deferred Income (PDI)

**CONTRIBUTORY PENSIONS AS DEFERRED INCOME (PDI)**

**Market Income (PDI)**
- Factor Income (wages, salaries, capital income)
  - plus private transfers (remittances, private pensions, etc.)
  - plus imputed rent and own production
- minus contributions to social insurance old-age pensions

**Prefiscal Income (PDI) = Market Income + Pensions (PDI)**
- Market Income (PDI)
  - plus contributory social insurance old-age pensions

**Net Market Income (PDI)**
- Market Income + Pensions (PDI)
  - minus direct taxes on Market Income + Pensions (PDI)
  - minus all non-pension social insurance contributions

**Taxable Income (PDI)**
- Gross Income (PDI)
  - minus all non-taxable Gross Income (PDI) components

**Gross Income (PDI)**
- Market Income + Pensions (PDI)
  - plus direct cash and near cash transfers (conditional and unconditional cash transfers, school feeding programs, free food transfers, etc.)

**Disposable income**
- Gross Income (PDI) minus all direct taxes and non-pension social insurance contributions
  - OR Gross Income (PGT) minus all direct taxes and pension and non-pension social insurance contributions

**Consumable income**
- Disposable income plus indirect subsidies (energy, food, and other general or targeted price subsidies) minus indirect taxes (VAT, excise taxes and other indirect taxes)

**Final income**
- Consumable income plus monetized values of in-kind transfers in education and health services at average government cost minus co-payments, user fees

CONTRIBUTORY PENSIONS AS GOVERNMENT TRANSFER (PGT)

Prefiscal Income (PGT) = Market Income (PGT)
- Factor Income (wages, salaries, capital income)
- plus private transfers (remittances, private pensions, etc.)
- plus imputed rent and own production

Market Income + Pensions (PGT)
- Market Income (PGT)
- plus contributory social insurance old-age pensions

Gross Income (PGT)
- Market Income + Pensions (PGT)
- plus direct cash and near cash transfers (conditional and unconditional cash transfers, school feeding programs, free food transfers, etc.)

Net Market Income (PGT)
- Market Income (PGT)
- minus direct taxes on Market Income (PGT)
- minus all social insurance contributions

Taxable Income (PGT)
- Gross Income (PGT)
- minus all non-taxable Gross Income (PGT) components

Disposable income
- Gross Income (PDI)
- minus all direct taxes and non-pension social insurance contributions
- OR Gross Income (PGT)
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Final income
- Consumable income
- plus monetized values of in-kind transfers in education and health services at average government cost
- minus co-payments, user fees

CORE INCOME CONCEPTS
Contributory Pensions as Pure Government Transfer (PGT)

Data requirements

1. A recent Household Survey (possible options: expenditure-income, expenditure, employment, Living Standards Measurement Study etc.) representative at the national level (minimum)

2. Input-output table or Social Accounting Matrix (preferably of year close to household survey)

3. Detailed description of each tax and spending item to be included in the analysis

4. Budget & administrative data for the year of the survey
Data requirements

Household survey must include

• The household roster and the expenditures module - in raw or semi-cleaned, item-by-item form - are necessities
• The health and education modules are somewhere in between necessary and very desirable
• The remaining modules are often useful - we can determine taxpayer status from other questions in the labor module, for example - and if they are available we'd definitely like to have them
• If there are any *official* or even just *generally accepted* practices/methods for calculating household expenditures, household size, per-adult equivalent scales, and the national poverty line, these are highly desirable also
• When health and/or education are not covered in the HIES, we would appreciate having a reference to a secondary survey that does capture utilization of those services (the Demographic and Health Surveys, for example)
3. Constructing CEQ prefiscal Income: Market Income
CEQ Assessment - Core Income Concepts

MARKET OR PREFISCAL INCOME

PLUS DIRECT TRANSFERS MINUS DIRECT TAXES

DISPOSABLE INCOME

PLUS INDIRECT SUBSIDIES MINUS INDIRECT TAXES

CONSUMABLE INCOME

PLUS MONETIZED VALUE OF PUBLIC SERVICES: EDUCATION & HEALTH

FINAL INCOME

Source: Lusting (2018)
## Contributory Pensions as Deferred Income (PDI)

### Core Income Concepts

**Contributory Pensions as Deferred Income (PDI)**

<table>
<thead>
<tr>
<th>Core Income Concepts</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Taxable Income (PDI)</td>
<td>Gross Income (PDI) plus private transfers (remittances, private pensions, etc.) plus imputed rent and own production minus contributions to social insurance old-age pensions</td>
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### INCOME CONCEPTS & FISCAL INTERVENTIONS

<table>
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#### MARKET INCOME
- Earned and unearned income from all sources; Excluding Government Transfers
- Gifts, proceeds from sale of durables.
- Alimony
- Consumption of own production
- Imputed rent for owner occupied housing
- Other (add more rows if needed)

#### MARKET INCOME + PENSIONS

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<td>PDI: These components are not fiscal interventions</td>
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</tbody>
</table>

Other (add more rows if needed)
Pre-fiscal Income

**Factor Income**: Wage and Salary incomes + Fringe benefits; Self-employment income(s); Retirement Income(s); Capital Income (including from real estate)

**Private Transfers**: Child support/alimony and other private transfers, remittances, private pensions

**Imputed rent**: Consumption value of housing services provided via housing ownership; can be provided directly in the survey or taken from hedonic regressions of rental rates (actual) against housing characteristics.

**Value of own production**: Can be a direct question, but often use consumption value of own production
Imputed Rent for Owner-Occupied Housing

Direct identification

• “How much would this house be rented for if it were rented?”

Prediction

• e.g. Bolivia, Georgia, Honduras
• Predict rental rates among households that rent
• Predictors: number of rooms, electricity, sanitation, piped water, geographic location, household income...
• Use coefficients in out-of-sample prediction for owner-occupiers
Imputed Rent for Owner-Occupied Housing

Alternate survey + prediction
- e.g., United States
- No question on how much paid in rent
- Predict using alternate housing survey
- Use coefficients for out-of-sample prediction

Secondary source
- e.g. Armenia using administrative accounts
- Use a secondary source estimate of average imputed rent as a proportion of income
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5. Glance at Gross Income, Net Market Income
CEQ Assessment - Core Income Concepts

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FINAL INCOME

Source: Lusting (2018)
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Net Market Income (PDI)
Market Income + Pensions (PDI) minus direct taxes on Market Income + Pensions (PDI) minus all non-pension social insurance contributions

Taxable Income (PDI)
Gross Income (PDI) minus all non-taxable Gross Income (PDI) components

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## INCOME CONCEPTS & FISCAL INTERVENTIONS

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### MARKET INCOME + PENSIONS
- (+) Contributory Pensions
- (-) Contributions to social security for Old-age Pensions
  - Employer contributions to social security for old-age pensions
  - Employee contributions to social security for old-age pensions
  - Self-employed contributions to social security for old-age pensions
- Other (add more rows if needed)

**PDI**: These components are not fiscal interventions
### NET MARKET INCOME = MARKET INCOME + PENSIONS - (direct taxes and contributions to social security that are not directed to old-age pensions)

<table>
<thead>
<tr>
<th>Direct Taxes</th>
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</thead>
<tbody>
<tr>
<td>Personal Income Tax</td>
</tr>
<tr>
<td>Corporate Income Tax</td>
</tr>
<tr>
<td>Payroll Tax</td>
</tr>
<tr>
<td>Taxes on Property</td>
</tr>
<tr>
<td>Other (add more rows if needed)</td>
</tr>
</tbody>
</table>

### Contributions to social security for Other Contributory Programs (unemployment, disability, health, etc.)

### DISPOSABLE INCOME = NET MARKET INCOME + DIRECT GOVERNMENT TRANSFERS

<table>
<thead>
<tr>
<th>Social Protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Assistance</td>
</tr>
<tr>
<td>Conditional and Unconditional Cash Transfers</td>
</tr>
</tbody>
</table>

**Add one row per program analyzed**

- Noncontributory Pensions
- Near Cash Transfers (Food, School Uniforms, etc.)

**Add one row per program analyzed**

- Social Insurance
- Other social insurance transfers different from old-age pensions (add more rows if needed)
Direct Taxes: Components

Individual income taxes
Agricultural income tax (e.g. Ethiopia)
Payroll taxes (by both employee and employer)
Property taxes
Corporate income taxes?

**Assumption:** fully shifted forward to labor in the form of lower wages

**Important:** determine whether reported incomes are gross or net of taxes
Direct Taxes: Allocation Methods

Direct identification
  • Individual income taxes in several countries
  • Property taxes in Brazil (expenditure module of survey)

Imputation
  • Agricultural income tax in Ethiopia

Simulation
  • Individual income taxes in many countries

Alternate survey + direct identification
  • Property taxes in US
When primary income is consumption expenditure:

for **Direct Taxes and Pensions** direct identification will be impossible, instead:

1. Impute/Predict a Pool of Taxpayers/Pensioners

2. Use statutory rules or marginal rate schedules to impute amounts paid

3. Calibrate total Pensions/Taxes allocated this such that the size of the instrument overall matches the relative size of the instrument in fiscal accounts (ie, size relative to disposable income or consumption expenditures)
Tax shifting assumptions

• Economic burden of direct personal income taxes is borne by the recipient of income
• Burden of payroll and social security taxes is assumed to fall entirely on workers
• Consumption taxes are assumed to be shifted forward to consumers
• These assumptions are strong implying that labor supply is perfectly inelastic and that consumers have perfectly inelastic demand
• In practice, they provide a reasonable approximation (with important exceptions such as when examining effect of VAT reforms), and they are commonly used
Direct Transfers: Allocation Methods

Direct identification
- Many examples from all countries

Inference
- Non-Contributory Pensions in Argentina
- Milk transfers in Brazil
- Public Scholarships in United States

Imputation
- Food aid in Ethiopia
- School uniforms and textbooks in Ecuador, Sri Lanka
Direct Transfers: Allocation Methods

Simulation

- Targeted transfers in various countries
- Some studies assume perfect targeting, full coverage (Argentina, Bolivia)
- If targeting is poor, randomly allocate among eligible until exhausting total number of beneficiaries

Alternate Survey + Direct Identification

- Conditional cash transfer in Indonesia
- Included in 2013 survey but not 2012 survey
Underestimation of Beneficiaries

Problem: number of direct transfer recipients underestimated

- Brazil: 7.3 million Bolsa Família recipients (survey) vs. 12.4 million (Ministry of Social Development)
- Occurs in developed countries too (Meyer et al., 2015)

Solution: assume some beneficiaries erroneously did not report benefit

- Assume similar to beneficiaries that did report benefits
- Probit to assign additional beneficiaries
Direct Identification can be easier, but...

“There is information on specific transfers received but the item codes are not labeled so I cannot tell which transfer each line item is. The codes spreadsheet sent by CSO says only:

- 95 abcdef, goods received under Government aid program (e.g. drought relief) - incl. Rations and food aid from other institutions
- The codes with 95 in the first two positions are transfers, but I cannot interpret the other six positions. There may be a general formula for this…”
Use administrative data to make reasonable imputations

- Direct Transfers: Pilot programs in Uganda
- Direct Taxes: PAYE in Zambia
Steps:

• Identify benefit levels:
  
  "..in NUSAF II, approximately 250 beneficiaries (one per household) are expected to benefit from each community project, for a duration of 22 working days... According to the Operations Manual, the wage will be set at the level of the lowest-paid civil servant in the area. Uganda Social Protection Public Expenditure Review (p.32)

• Select a set of active districts from set of potential recipient districts:
  
  o Random selection of 20 districts; yearly average of active districts is closer to 17
Steps:

• Determine wages:
  o Compare empirically-derived wage from the lowest-prevailing civil servant wage to the average program wage as reported in supporting documentation (they’re close)

• Generate a program-eligible pool of potential recipients in the HH survey
  o Not employed last week and poor

• Allocate program benefits randomly among the eligible until the per-district benefit amounts are exhausted.
6. Analytical Treatments for the Public Contributory Pension System
Treatment of contributory pensions

Deferred income (PDI)

- Pensions included in pre-fiscal income and contributions treated as mandatory savings

Government transfer (PGT)

- Pensions included among direct transfers and contributions treated as a direct tax
Pensions as Deferred Income (PDI) treatment:

- Contemporaneous Pension benefits are treated as Market Income, or private income earned in a previous period and deferred until today.

- Contemporaneous Pension contributions are treated as savings, or as income earned today but deferred to a future period.

- Under PDI, contributions made today will lower today's Market Income.

- Neither Public Contributory Pension System benefits nor contributions are fiscal items in the CEQ fiscal accounting.
# INCOME CONCEPTS & FISCAL INTERVENTIONS

## Included:
*Yes/No*

### MARKET INCOME

Earned and unearned income from all sources; Excluding Government Transfers

- Gifts, proceeds from sale of durables.
- Alimony
- Consumption of own production
- Imputed rent for owner occupied housing
- Other (add more rows if needed)

These components are not fiscal interventions

### MARKET INCOME + PENSIONS

(+) Contributory Pensions

(-) Contributions to social security for Old-age Pensions

- Employer contributions to social security for old-age pensions
- Employee contributions to social security for old-age pensions
- Self-employed contributions to social security for old-age pensions
- Other (add more rows if needed)

**PDI:** These components are not fiscal interventions
Pensions as Government Transfer (PGT) treatment:

• Contemporaneous Pension benefits are treated as Government Transfers.

• Pension benefits therefore are accounted for (in the CEQ fiscal accounting) in Disposable Income and do not appear in Market Income

• Contemporaneous Pension contributions are treated as taxes which reduce Net Market Income.

• Public Pension system benefits and contributions are fiscal items in the CEQ fiscal accounting
Contributory Pensions: Avoid Double Counting

Pensions as deferred income (PDI)

- Factor income during working years = Y
- Factor income during retirement years = 0
- Contributions to pensions at rate s
- Receive pensions = sY in retirement (0 interest)
- Direct taxes = T, direct benefits = B (T’, B’ in retirement)

<table>
<thead>
<tr>
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<th>Contributions</th>
<th>Pre-fiscal Income</th>
<th>Disposable Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working age</td>
<td>Y</td>
<td>sY</td>
<td>(1-s)Y</td>
<td>(1-s)Y - T + B</td>
</tr>
<tr>
<td>Retirement age</td>
<td>0</td>
<td>0</td>
<td>sY</td>
<td>sY - T' + B'</td>
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## Contributory Pensions: Avoid Double Counting

Pensions as deferred income (PDI)
- Pre-fiscal income is **market income plus pensions**
- Market income plus pensions is **net of contributions**

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Contributory Pensions as Government Transfer

Pensions as government transfer (PGT)

- Contributions **not subtracted** out of pre-fiscal income
- Subtracted later (like a tax)
- Pre-fiscal income for retirement age is 0
- For retired, pension added when moving to disposable
- Note: disposable income is the same in all scenarios

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<td>sY (as a tax)</td>
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<td>(1-s)Y − T + B</td>
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<td>0</td>
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Contributory Pensions: Intermediate Scenario

Pensions treated as **partially** deferred income

- Proportion of pension benefits funded by general revenues or deficit spending $\omega$
- Transfer benefit is $\omega$*observed pension income
  - Remaining $(1-\omega)$ is part of pre-fiscal income
- Contribution treated as in fully deferred income (PDI)

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<td>0</td>
<td>$(1-\omega)sY$</td>
<td>$sY - T' + B'$</td>
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PDI versus PGT:

- Both **PDI** and **PGT** can describe actuarially-fair (or unfair) systems and pay-as-you-go, fully-funded, or underfunded plans and defined contribution and defined benefit plans.

- **PDI** eliminates any redistributive impact the public contributory system might be having

- **PGT** produces the maximum redistributive impact the public contributory pension system could have

- **PGT**: Individuals living mostly or entirely from pension incomes will likely be counted as Market Income-poor. Some of these individuals will be “false poor” in the following sense: had they *not* used the public contributory pension system they would have made *private arrangements* to defer income to their non-working future selves.

- **PGT**: The more “false poor”, the better the pro-poor targeting of the public contributory pension system begins to look.
7. CEQ Consumable Income: Incorporating Indirect Taxes and Subsidies
MARKET OR PREFISCAL INCOME

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PLUS INDIRECT SUBSIDIES MINUS INDIRECT TAXES

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PLUS MONETIZED VALUE OF PUBLIC SERVICES: EDUCATION & HEALTH

FINAL INCOME

Source: Lusting (2018)
**Core Income Concepts**

**Taxable Income (PDI)**
- Gross Income (PDI)
  - minus all non-taxable Gross Income (PDI) components

**Net Market Income (PDI)**
- Market Income + Pensions (PDI)
  - minus direct taxes on Market Income + Pensions (PDI)
  - minus all non-pension social insurance contributions

**Prefiscal Income (PDI)**
- Market Income + Pensions (PDI)
  - plus contributory social insurance old-age pensions

**Market Income (PDI)**
- Factor Income (wages, salaries, capital income)
  - plus private transfers (remittances, private pensions, etc.)
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**Contributionary Pensions as Deferred Income (PDI)**
- Market Income (PDI)
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**Gross Income (PDI)**
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**Disposable Income**
- Gross Income (PDI) minus all direct taxes and non-pension social insurance contributions
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**Consumable Income**
- Disposable income plus indirect subsidies (energy, food, and other general or targeted price subsidies) minus indirect taxes (VAT, excise taxes and other indirect taxes)

**Final Income**
- Consumable income plus monetized values of in-kind transfers in education and health services at average government cost minus co-payments, user fees

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DISPOSABLE INCOME = NET MARKET INCOME + DIRECT GOVERNMENT TRANSFERS

CONSUMABLE INCOME = DISPOSABLE INCOME + INDIRECT SUBSIDIES - INDIRECT TAXES

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<thead>
<tr>
<th>Indirect taxes</th>
</tr>
</thead>
<tbody>
<tr>
<td>VAT</td>
</tr>
<tr>
<td>Sales Tax</td>
</tr>
<tr>
<td>Excise Taxes</td>
</tr>
<tr>
<td>Add one row per excise tax analyzed</td>
</tr>
<tr>
<td>Customs Duties</td>
</tr>
<tr>
<td>Other (add more rows if needed)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indirect subsidies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
</tr>
<tr>
<td>Fuel</td>
</tr>
<tr>
<td>Food</td>
</tr>
<tr>
<td>Agricultural Inputs</td>
</tr>
<tr>
<td>Other (add more rows if needed)</td>
</tr>
</tbody>
</table>
Types of goods

- We calculate Indirect tax in two parts:
  - A direct effect of policy on one or many final goods
  - An indirect effect of the policy on final goods via
    - changes in input prices

- Why? should the method be different for
  - a cigarette excise tax versus
  - a fuel tax versus
  - a value-added tax
Cigarette excise tax

• Direct effects only
• Impute the value of the tax based on
  • statutory rates, or
  • effective rates
• The latter requires data on excise revenue and the total sales value of the taxable base broken down by type
Tobacco and Alcoholic Beverages Taxes, China (2014)

Not available in main survey - China Family Panel Studies
  • Consumption of tobacco and alcohol in year 2014

Available
  • Statutory rates
  • Consumption and prices of goods in previous round (2012)
  • Common variables in previous round (2012)
China (2014) : Tobacco and alcoholic beverages excises

<table>
<thead>
<tr>
<th>Taxable Items</th>
<th>Tax Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tobacco</strong></td>
<td></td>
</tr>
<tr>
<td>Grade A Cigarettes</td>
<td>56%+0.003 Yuan/Item</td>
</tr>
<tr>
<td>Grade B Cigarettes</td>
<td>36%+0.003 Yuan/Item</td>
</tr>
<tr>
<td>Cigars</td>
<td>36%</td>
</tr>
<tr>
<td>Cut Tobacco</td>
<td>30%</td>
</tr>
<tr>
<td>Wholesale process of cigarette</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Alcoholic Drinks and Alcohol</strong></td>
<td></td>
</tr>
<tr>
<td>White Spirit</td>
<td>20%+0.5 Yuan/500ml</td>
</tr>
<tr>
<td>Yellow Wine</td>
<td>240 Yuan/Ton</td>
</tr>
<tr>
<td>Type A Beer</td>
<td>250 Yuan/Ton</td>
</tr>
<tr>
<td>Type B Beer</td>
<td>220 Yuan/Ton</td>
</tr>
<tr>
<td>Other Alcoholic Drinks</td>
<td>10%</td>
</tr>
<tr>
<td>Alcohol</td>
<td>5%</td>
</tr>
</tbody>
</table>
Solution:

- Estimate a regression to determine the units consumed of tobacco and alcohol in year 2014

- Select the same percentage of population that drinks and consume tobacco in year 2014 according to observed characteristics in year 2012

- Estimate tax paid by household using statutory rates.
Predictions (in 2012)

Probit
• Probability of drinking
• Probability of smoking

OLS
• Tobacco amount
• Tobacco prices
• Spirits consumption units
• Wine consumption units
• Beer consumption units
Estimating tobacco and alcoholic beverages excises in China (2014)

- Apply statutory rates
- Select only those consuming alcoholic beverages and tobacco
  - Population with higher estimated probability
Electricity tax

- Direct effect: using secondary sources, calculate the share of tax in overall price for households
- Indirect effects:
  - Share of tax in overall price for industrial consumers
  - Use an IO table to determine the share of electricity as an input in each industry
  - Run our model to determine the increase in prices of all other goods in the economy due to electricity price increase
Types of VAT

• Standard-rated
• Exempt
• Zero-rated

• What is the difference? How would we apply VAT to these types?
VAT indirect calculation

• Standard-rated: apply the normal rate of VAT
• Exempt: VAT on inputs only
• Zero-rated: incurs no VAT
Standard-rated goods (direct VAT)

• Assign a VAT rate to each final good
• Impute the VAT for that good
• For example: if clothes has a standard VAT rate of 18%
  • Observed price: $c_{\text{clothes}}$
  • Consumption net of tax: $c_{\text{clothes}} \times \frac{1}{1+0.18}$
  • Tax: $c_{\text{clothes}} \times \frac{1}{1+0.18} \times 0.18$
Exempt goods (indirect VAT)

- Determine the share of standard-rated inputs
- Impute the VAT for those inputs
- For example: if medicines are exempt, and 50% of the value-added in medicines comes from intermediate inputs (at 18% VAT) then:
  - Observed price: $c_{medicines}$
  - Consumption net of tax: $c_{medicines} \times \frac{1}{1+(0.18 \times 0.5)}$
  - Tax: $c_{medicines} \times \frac{1}{1+(0.18 \times 0.5)} \times (0.18 \times 0.5)$
Price-shifting model

• Describes and quantifies the magnitude of sectoral changes in producer and retail prices resulting from any exogenous (demand, supply, or price) shock
• Requires information on the structure of the economy at current levels of production
• Assumption: costs are pushed forward to output prices, or back to input prices
• Constant returns to scale, perfect competition, fixed factors of production
• Static model – upper bound
1. Introduction to CEQ Assessments

2. Overview of the CEQ Assessment Methodology via the CEQ Income Concepts

3. Constructing CEQ prefiscal Income: Market Income or Market Income + Pensions

4. Constructing CEQ Disposable Income: Incorporating Direct Taxes and Direct Transfers

5. Glance at Gross Income, Net Market Income

6. Analytical Treatments for the Public Contributory Pension System

7. Constructing CEQ Consumable Income: Incorporating Indirect Taxes and Subsidies

8. CEQ Final Income: Incorporating In-kind Transfers and public service fees
MARKET OR PREFISCAL INCOME

PLUS DIRECT TRANSFERS MINUS DIRECT TAXES

DISPOSABLE INCOME

PLUS INDIRECT SUBSIDIES MINUS INDIRECT TAXES

CONSUMABLE INCOME

PLUS MONETIZED VALUE OF PUBLIC SERVICES: EDUCATION & HEALTH

FINAL INCOME

Source: Lusting (2018)
Taxable Income (PDI)
Gross Income (PDI) minus all non-taxable Gross Income (PDI) components

Net Market Income (PDI)
Market Income + Pensions (PDI) minus direct taxes on Market Income + Pensions (PDI) minus all non-pension social insurance contributions

CONTRIBUTORY PENSIONS AS DEFERRED INCOME (PDI)
Market Income (PDI)
Factor Income (wages, salaries, capital income) plus private transfers (remittances, private pensions, etc.) plus imputed rent and own production minus contributions to social insurance old-age pensions

Prefiscal Income (PDI) = Market Income + Pensions (PDI)
Market Income (PDI) plus contributory social insurance old-age pensions

Gross Income (PDI)
Market Income + Pensions (PDI) plus direct cash and near cash transfers (conditional and unconditional cash transfers, school feeding programs, free food transfers, etc.)

Disposable income
Gross Income (PDI) minus all direct taxes and non-pension social insurance contributions OR Gross Income (PGT) minus all direct taxes and pension and non-pension social insurance contributions

Consumable income
Disposable income plus indirect subsidies (energy, food, and other general or targeted price subsidies) minus indirect taxes (VAT, excise taxes and other indirect taxes)

Final income
Consumable income plus monetized values of in-kind transfers in education and health services at average government cost minus co-payments, user fees

FINAL INCOME = CONSUMABLE INCOME + GOVERNMENT IN-KIND TRANSFERS

**Education**
- Pre-school
- Primary
- Secondary
- Post-secondary non-tertiary
- Tertiary
- School Fees
- Education Net of Fees

**Health**
- Contributory
- Noncontributory
- In-patient
- Out-patient
- Copayments or Fees
- Health Net of Co-pay & Fees

**Housing**
Education: Allocation Methods

Imputation
- Data in survey on who attends public school
- Admin accounts data on spending (total/per student)

Inference + imputation
- If survey doesn’t ask whether public vs. private school
- Sri Lanka: use question from consumption module on school fees to infer whether attends public vs. private
Education: Allocation Methods

Alternate survey + prediction + imputation

- US: main survey doesn’t ask public vs. private
- Alternate survey with income data and public vs. private school attendance
- For children attending school, predict Prob(public) using covariates common to both surveys
- Use coefficients to predict Prob(public) in main survey
- Multiply Prob(public) by average benefit per student
- Expected value of benefit received
Health: Some Tips

1. Know the system
   - What services does the government pay for?
   - For whom?
   - Are there co-pays or user fees?
   - How do user fees differ by service?
   - How do user fees differ by beneficiary?
Health: Some Tips

2. Know your data
   • How does the household survey collect information about publicly funded health care services?
   • How narrowly can you disaggregate services?
   • Does the survey collect information on the provider?
   • Does it collect payments disaggregated by purpose (consultation, diagnostic, medicine, etc.)?
   • What administrative data can you get on public spending on health services and beneficiaries?
   • Disaggregated by type of service or beneficiary?
Health: Some Tips

3. Options to Allocate:
   • To users (those who have accessed the system during the recall period)
   • To all *eligible* (including those who haven’t accessed the system)

4. Disaggregate as much as the crosswalk between admin accounts and survey data allows
   • By type of service
   • Geographically
   • Caution: be sure to be consistent with common sense
Health: Allocation Methods

Use approach

• Assign benefits to those who report receiving health services at public facilities

• Use when access is an issue and eligibility would overestimate the beneficiary population

• Subtract user fees?

• How might inequality be overestimated?
Health: Allocation Methods

**Eligibility approach**

- Use when benefits available have well-defined beneficiary populations (e.g. Medicare vs. Medicaid in the USA)

- Use when public system w/ universal access

- Subtract *expected* user fees?

- How might inequality be underestimated?

- What to do with *conditional* & universal programs like expectant mother/neonatal/postnatal care?
Health: Some Examples

1. Public facilities with equal access in practice
   • Eligibility approach
   • Divide total spending by # eligible users

2. Social insurance system
   • Eligibility approach
   • Only among those who are registered in public insurance system

Drawback: assume equal access among “eligible”
   • Can underestimate inequity of public health spending
3. **Reimbursement system**
   - Government reimburses service provider a fixed fee

   • Obtain data on these fees, as disaggregated as possible

   • Impute benefits to those who receive service

   • Net benefit to user is this fee paid by government
     • Do not subtract off user fee
Health: Some Examples

4. Public facilities with unequal access in practice
   • Impute average benefit to those who report using in survey
   • Data on total spending and on # visits from admin accounts
   • Subtract user fees in some cases
Health: Some Examples

4. Public facilities with unequal access in practice

- Annualizing visits for individuals will overestimate visits for individuals…

- …but cumulative visits per psu (for example) are expected to have mean zero error

- Inequality within a psu (or decile, or social group) is overstated while that across groups is likely reasonable

- Use Theil index instead?
Health: User Fees

Three important questions:
1. Are fees and other OOP costs counted in consumption expenditures?
2. Is the same fee charged for all individuals?
3. Are all individuals paying fees?
Health: User Fees

Three important questions:
1. Are fees and other OOP costs counted in consumption expenditures?

➢ When “yes”, then we are treating them as a (voluntary) use of income to purchase real goods and services...

If fees are being paid to acquire the same good that the government is providing in kind, the fees could instead be considered a tax that doesn’t increase purchasing power over real goods and services
Health: User Fees

Three important questions:

1. Are fees and other OOP costs counted in consumption expenditures?

➢ When “no” and incomes are derived from consumption expenditures, those paying fees appear poorer.

When the full government cost of provision is allocated to individuals who pay fees, the distribution of these in-kind benefits will appear more progressive and pro-poor than they truly are
Health: User Fees

Three important questions:

2. Is the same fee charged for all individuals?

➢ When “yes”, then there are fewer opportunities for everyone to use OOP costs to acquire better care (i.e. a visit with the doctor instead of the nurse)
Health: User Fees

Three important questions:

3. Are all individuals paying fees?

➢ When “yes”, then there are fewer opportunities for everyone to use OOP costs to acquire better care (i.e. a visit with the doctor instead of the nurse)
Health: User Fees

Three important questions:
1. Are fees and other OOP costs counted in consumption expenditures?
2. Is the same fee charged for all individuals?
3. Are all individuals paying fees?

➢ When fees/OOP expenditures look like an “access tax” …
➢ …rather than a (voluntary) acquisition of goods and services,
Then we could subtract fees/OOP expenditures from the value of in-kind services at Final Income.
Health: User Fees

Knowledge of system is important

• Complication: cross-subsidization within providers
• Complication: what if govt cost minus user fee< 0?
  o Remember: benefits are an average for all users; OOP costs are recorded for each individual
  o User would not get service with <0 benefit --- truncate
Quality of in-kind services?

- Can “effective” units (of education or health) be estimated/inferred?
- Adjust the government-cost value based on number of “effective” units provided
- Also important to have geographic breakdowns of expenditure amounts
Education

• Valued at government cost for each level
  o e.g. day care, preschool, primary, secondary, tertiary

• Include recurring spending (including maintenance/depreciation investments)

• Include administrative costs

• Disaggregate by geographic area if possible
End Day 1 – Thank you!