Consumption Taxes, Redistribution & Informality

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Consumption Taxes & Redistribution

- Consumption tax neutral/regressive in OECD (Warren 2008)
  - Personal Income Taxes with ↑ top marginal rates perform heavy lifting of equity
  - Atkinson-Stiglitz (JPubE 76): consumption tax superfluous if can tax income non-linearly

- In practice for most developing countries:
  - Domestic Consumption Taxes main source of revenue
  - Constrained PIT
  - Expenditure not redistributive (Lustig, 2018; Harris et al, 2018)
Consumption Taxes with an Informal Sector

This paper: equity of consumption taxes allowing for consumption in the informal - untaxed - sector.

1. Are uniform consumption taxes de facto progressive?

2. Are differentiated consumption taxes (with exemptions) useful for equity?

3. What does it imply for optimal tax policy?
This Paper: Data and Empirics

Data
- Representative household expenditure surveys which specify place of purchase by item in 20 countries
- We assign formality status to places of purchase (e.g. street stalls vs supermarkets)

Empirics
- Description of informal consumption along the income distribution & across countries
  - Large negative corr(informal consumption, total expenditure)
  - Top decile pays 70% more taxes than bottom decile
  - Corr ↓, but significant after geography & product controls
This Paper: Theory and Policy

**Theory**: Multi-person Ramsey model: optimal commodity tax with informal consumption ⇒ Characterize equity-efficiency trade-off.

**Policy**
- Downward sloping informal consumption ⇒ ↑ rates if substitution formal-inf. small relative to own-price elasticity
- Limited equity role for tax exemptions (e.g. on food)
- Adverse distributional impact of formalization?

**Extensions and Limitations**
- Upper bound due to VAT on inputs
- Pass-through of taxes depends on competition structure
- Firms’ formality decision not endogenized
Roadmap

1. Data & Methodology

2. Description of Informal Consumption

3. Optimal Commodity Taxes with an Informal Sector
Data: Household Expenditure Surveys

Criteria for Inclusion
Representative expenditure surveys with:

▶ Place of purchase variable for each consumption item
▶ Open diaries of consumption
▶ All types of consumption coverage

Data Collection:

▶ National Statistical Agencies + World Bank Microdata library
▶ ~30 countries with appropriate surveys
▶ All in LatAm and SSA, except Morocco & PNG
Currently: 20 Countries Covered

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Formality Assignment by Place of Purchase

Larger firms, de-facto or de-jure pay VAT (Kleven et al. 16)

- **Not marketed**: Self-production, barter
- Marketed **non “brick-and-mortar”**: Street selling, markets
- Marketed **small stores**: Convenience stores, specialized shops
- Marketed **large stores**: Supermarkets, department stores
- Marketed **institutions**: Banks, Hospitals, Public Sector
Store Type within Retail in Mexico

(a) # Employees

(b) Share Paying VAT
Definition of informal consumption

- Consumption defined net of housing
- **Informal consumption := corner stores & smaller**
- Formal consumption defined as the ‘residual’ = specialized + large stores + institutions + unspecified
  - Unspecified: 15% of total consumption, > 50% utilities, gas
Roadmap

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Average Informal Consumption on GDP per capita

Informal Consumption Share vs. GDP per capita, Constant 2010 USD (log base 2)
Informality Engel Curve: Mexico
Slope of IE Curves Across Countries

- For each country $\hat{\beta}$: \( \text{Share Informal}_i = \beta \ln(\text{income pp})_i + \varepsilon_i \)
What explains the slope of the informality Engel curves?

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robustness regression results
Summary of Descriptive Results

- Informal consumption and per capita income:
  - Within country: Doubling income ↓ 5.5% informal consumption
  - Cross-country: country with pc GDP of 5,000 USD consumes on avg 55% informally & Doubling pc GDP ↓ by 9%

- What explains the slopes?
  - Basic product composition explains a third
  - Geography a quarter
  - Quality - price tradeoff explains the rest?
Simulating Tax Scenarios: Mechanical Implications

What does this imply for tax progressivity?

- Two tax scenarios:
  - Uniform tax rate on all products.
  - Exemption on food products
- Consider share of household budget that’s taxed w/out an informal sector.
- Progressivity = how this share varies with household income.

Assumptions:

- Balanced Budget: revenue kept constant at 16% of total exp.
- No behavioral responses, full pass-through of taxes to consumer prices
Taxed Budget Shares

Decile of Expenditure Distribution

- Uniform rate, No informal
- Uniform rate, Informal

Taxed Expenditure Share

Graph showing the distribution of taxed expenditure shares across different deciles of the expenditure distribution.
Taxed Budget Shares

Decile of Expenditure Distribution

- Uniform rate, No informal
- Uniform rate, Informal
- Food Exempt, No Informal
Taxed Budget Shares

Decile of Expenditure Distribution

Uniform rate, No informal
Uniform rate, Informal
Food Exempt, Informal
The informal sector makes consumption taxes de-facto progressive:

- With informal sector, effective tax rate of top decile 70% ↑ than bottom
  - Most of the burden of taxation is borne by the top decile.
- Tax exempting food marginally increases progressivity
  - Cost: higher tax rate on other products, multiple rates
- What does this imply for optimal tax policy?
  - Next slides: Multi-person Ramsey model of optimal commodity taxes (Diamond 75) with informal consumption
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Model Set-up

Household preferences:
- Hhlds vary in preferences & income $y_i$, consume commodities $j$
- For each $j$, two varieties: $j0$ (informal) and $j1$ (formal)
- Assumption: no substitution across commodities, varieties are substitutes

Government preferences:
- Sets different tax rates on commodities $j$, can’t observe varieties
- Social welfare function $G()$ increasing and concave.
- Places weight $g_i$ on one unit of income to household $i$, $\mu$ on tax revenue, where $\mu = \text{average weight } g$.

Assumptions:
- No other tax instrument
- Exogenous producer prices
- Full pass-through $\rightarrow$ satisfied under monopolistic competition
Proposition 1: Equity-efficiency trade-off

- Taking into account the informal sector increases the optimal tax rate for good $j$ as long as:
  - The IEC for $j$ is downward-sloping.
  - The elasticity substitution formal vs informal varieties is small relative to the commodities own price elasticity.

- Equity gain of informal sector: downward-sloping IECs make taxes progressive.

- Efficiency cost of informal sector: consumption taxes lead to substitution towards the informal sector
Proposition 2: less rate differentiation of commodities

- *Taking into account the informal sector leads to less variation in optimal rates across goods if IEC slopes are larger for commodities with downward-sloping Engel curves than for commodities with upward-sloping Engel curves.*

- Assumption: own price elasticities same for all commodities

- If commodities consumed more by the poor have steep IEC, less gains from taxing exempting them from taxation
Calibrated optimal tax rates

No efficiency cost
- No informal sector
- With informal sector

Substitution=50%
- No informal sector
- With informal sector
VAT on Inputs in Mexican Census

Mexican census asks for VAT on output and on inputs

- 1.9 M retailers of which 85% informal, representing 30% of sales
- 8% of informal pay VAT on inputs \( \Rightarrow s_{jIF} \approx 3\% \)
- These tend to be the large informal (25% of informal revenue)
  - Adjusting to their share in the economy \( \Rightarrow s_{jIF} \approx 10\% \)
Conclusion

▶ New evidence on informal consumption in dev. countries:
  ▶ Informality Engel Curves are downward-sloping for almost all goods and countries ⇒ Tax systems *de facto* more progressive
  ▶ If no behavioral response & uniform rate ⇒ richest decile pays 70% more taxes than poorest decile (47% with inputs VAT)

▶ Equity-efficiency trade-off of consumption taxes with informality:
  ▶ Informal consumption pushes rates ↑ if substitution elasticity formal-informal < $\frac{1}{2}$ of commodity’ own-price elasticity
  ▶ Distributional gains from exempting necessities reduced ⇒ case for rate equalization

▶ Tax enforcement policies may have adverse redistributive impact, making progressive PIT more important as informal sectors shrink.
Supply-side assumptions

Monopolistic competition micro-founds passthrough assumptions.

▶ Each variety $jl$ is produced by one firm using only labor: $x_{jl} = \phi_{jl} L_{jl}$. Labor cost fixed at $w$.

▶ Profit maximization under monopolistic competition gives:

$$p_{jl} = (1 + t_j f_{jl}) \frac{w}{\phi_{jl}} \frac{\epsilon_{jl}}{\epsilon_{jl} - 1}$$

(1)

where $f_{jl} = 1$ if the firm producing $jl$ is formal, 0 otherwise.

▶ This implies a pass-through of 1 in the formal sector, 0 in the informal sector.
Supply-side assumptions with two production stages (1)

Assumptions

- Retailers produce using inputs $k$ and a CES production function:
  \[ x_{jl} = \left( \sum_k \alpha_{jlk} x_{jlk}^{\frac{\rho-1}{\rho}} \right)^{\frac{\rho}{\rho-1}} \]  

- Suppliers produce goods $k$ using only labor.
- The consumption tax is a VAT: a tax $t_k$ is paid on inputs iFF firm $k$ is formal and firm $jl$ is informal.
- Monopolistic competition at both stages of production.
Expressions for pass-through:

- Profit maximization implies

\[
\frac{\partial p_{jl}}{\partial t_j} \frac{1 + t_j}{p_{j0}} = f_{jl} + s_{jlF}(1 - f_{jl})
\] (3)

where \(s_{jlF}\) is the share of firm \(jl\)'s input costs that are spent on formal inputs.

- Gadenne et al (2019): market segmentation between firms with different tax status ⇒ \(s_{jlF}\) likely small.
Consumption by Classification type

![Graph showing consumption by classification type.](image)
Robustness Regression Results: Average Slopes of IEC

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Household Characteristics
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- Survey Blocks
- COICOP 2-dig
- COICOP 3-dig
- COICOP 4-dig

Back to main regression results