

Selected Issues in Public Sector

Shadow Economy

Content

- 1 Measuring shadow economy
 - Direct approaches
 - Indirect approaches
 - Statistical and econometric models
- 2 References and discussion

Introduction

- What is the underground economy?
- Example: produce vendor on the street who sell the vegetables → cash only, no taxes.
- Considerable value to the economy!
- Developing countries: 36% of GDP.
- Developed countries: 13% of GDP.
- Note: average size 2002-2003 (source Restrepo-Echavarria, 2015).
- How the economists "measure" the informal sector?
- What can be measured?

Notation

- Informal economy.
- Shadow economy.
- Underground economy.

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Introduction

- Measures \times estimates.
- Three approaches: direct, indirect, statistical.
- Relative vs. absolute size.
- What could be "measured"?

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Motivation

- Methods relying on surveys, samples based on voluntary replies, tax audits and other compliance methods.
- Main problem: the results depend on the questions asked and only few surveys are alike \Rightarrow difficulties with using the same parameters to measure and compare informal economy in different countries.
- Requirements to define the informal sector in a simple way (using one parameter only).

Example of simple definiton

- Informal sector defined as those people who do not have the right to a pension when they retire.
- Simple and clear definition × excludes several important elements that would describe the underground economy.

Example of another definition

- People are considered to work in the informal economy if they work for a firm that has N or fewer workers.
- Commonly used definition.
- Problem: very small firm can comply with the law \rightarrow its production can be reported to the authorities (its value added appears in the GDP despite the small size of the firm).

Reporting problem

- Direct questionnaire → people are not willing to admit that they are not reporting taxes or are engaging in fraudulent activities.
- Reasons: to be feeling affraid of getting caught or to be feeling ashamed (moral issues).
- Problem to estimate the extent of undeclared work.

Direct comparison method

- Direct estimate based on calculating the discrepancy between income declared for tax purposes and that measured by selective checks.
- Example: comparing the number of jobs declared by firms with the number of employed people found through household surveys → the number of employed people exceeding the number of jobs.
- Estimating the size of informal sector: identified number of workers in informal sector and assumption about the same net compensation as similar to the workers in formal economy.

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Motivation

- Macroeconomic approaches.
- Using an indicator of the informal economy as a proxy for its size or growth.
- Approaches:
 - ① Discrepancy between the national expenditure and income statistics;
 - ② Discrepancy between official and actual labor force;
 - ③ Transaction approach;
 - ④ Currency demand approach;
 - ⑤ Physical input (electricity consumption) method.

Differences in national expenditure and income statistics

- Theory: both measures should be equal.
- Informal activities only in the expenditure measurement.
- Income side measured through the value added of registered firms (formal economy) \times expenditure side through self-reporting.
- Differences as an indicator of the size of informal economy.
- Problems:
 - 1 Statisticians would like to make this difference as small as possible \Rightarrow ideal using the initial measures rather than the published ones.
 - 2 Other sources of differences (sampling error, statistical error).

Differences in official and actual labor force

- Assuming constant total labor force participation rate \rightarrow decrease in labor force participation in formal economy as an indicator of an increase in the activity in the formal economy.
- Problem: other causes of the changes in participation rate (e.g. recent recession and exit from labor force), people may work in both sectors of the economy.
- Not a reliable estimator.

Transaction approach

- Edgar Feige (1979).
- Quantitative theory of money: $M \cdot V = p \cdot T$.
- M money, V velocity, p prices, T total transactions.
- Main assumption: constant relationship of the volume of transactions and official GNP over time.
- Value of total transaction (pT) as an estimate of nominal GNP \rightarrow differences between nominal GNP and official GNP.
- Problems: strong assumption about the time-invariant constant ratio of transactions to official GNP, difficulties to obtain accurate estimates of the total number of transaction.

Currency demand approach

- Based on the correlation between currency demand and tax pressure, assuming that informal activities operate with cash.
- Tax burden increases + increase of the demand for money \Rightarrow indicator of an increase in the underground sector.
- Calculating excess in money demand using econometric methods \rightarrow equation for money demand.
- Controlling variables: development for income, payment habits, interest rates etc.
- Other variables: government regulation, direct and indirect tax burden, complexity of the tax system.

Currency demand approach (example)

- Currency demand function including drivers of shadow economy (tax burden, regulation etc.).
- Simulations of the amount of money that would be necessary to generate official GDP → comparison with actual money demand → differences as an indicator of the shadow economy.
- Calculated difference multiplied by the velocity of money of the official economy = size of the shadow economy.

Currency demand approach (critique)

- Not all the transactions in the shadow economy are paid in cash.
- Using only the tax burden factor and ignoring other tax factors such as "tax morality", regulation and attitudes toward the state (× how to obtain these data?).
- Rise in currency/demand deposits due to slowdown in demand deposits (not the rise of currency due to informal activities).
- Assumptions about the same velocity of money in formal and informal economy.

Physical input method

- Assumptions that electricity demand is the best physical indicator of both formal and informal economic activity.
- Observation: elasticity of electricity demand to GDP close to 1.
- Indicator of informal economic activity: using electricity as proxy for the overall economic activity and then subtracting the GDP from it \Rightarrow the differences between the growth of electricity consumption and official GDP as an indicator of the growth of underground economy.
- Problems:
 - ① Not all informal activities require a considerable amount of electricity (or other energy sources may be used – oil, gas, coal etc.)
 - ② More efficient use of electricity in both sectors.
 - ③ Differences in elasticities between the sectors across countries (or changing over time).

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Motivation

- Methods used depends on the specific question being asked by the researcher (policy maker).
- Macroeconomic studies – indirect approaches suffice, microeconomic studies – direct approaches more generally used.
- Newer methods (more-technical, model-based estimations):
 - 1 MIMIC model (Multiple Indicator Multiple Causes procedure).
 - 2 Dynamic Stochastic General Equilibrium models.

MIMIC model

- Assumption: shadow economy is an unobservable phenomenon (a latent variable) → estimates using quantitatively measurable causes of shadow economic activity as well as indicators of illicit activity.
- Causes: tax burden, intensity of regulation.
- Indicators: demand for currency, official national income, official working hours.
- Econometric models → some technical challenges (endogeneity): size of tax burden → increase in the size of the underground economy × increase in the size of the shadow economy → raising tax rates (tax burden) by the government.
- Disadvantage: relative estimates only (e.g. currency demand approach for calibrating relative to absolute values).
- MIMIC estimation - 21 OECD countries.

DSGE approach

- Structural econometrics approach, which exploits equilibrium conditions from an economic model to provide estimates for unobserved variables.
- Note: MIMIC model as a reduced form model (factor model, purely statistical without any assumption a priori regarding the relationship between the variables).
- Economy: households, firms, government.
- Objective functions, probability of being inspected and forced to pay evaded taxes and penalty surcharges.
- Orsi et al. (2014).

DSGE outputs

- Size and dynamics of the shadow economy of Italy.
- Laffer curve (corporate taxation).
- Laffer curve (income taxation).

Comparison of methods

- Comparison of estimates - Germany.

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Policy question

- There is a widespread feeling that a substantial and increasing share of activities take place outside the official economy. What should be done to fight against the underground economy?
 - ① A deterrence policy (punishment).
 - ② Increase the motivation to stay in the official economy.

Supplementary materials

- Orsi et al. (2014) - policy changes.
- Size of shadow economy.
- Electronic payments and the size of shadow economy.
- Size of the shadow economy by economic activities.
- Electronic payments advantages by economic activities.