

The Public Sector in EURACE

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Overview

Topics of this presentation:

- 1 The public sector module
- 2 The Government module
- 3 The Eurostat module

Main aim

Major policy issue in the EU: Lisbon Strategy

'EU should become the most competitive and dynamic knowledge based economy'

Objectives of the "Lisbon Strategy for Growth and Jobs" (2000):

- Fostering sustainable economic growth and job creation
- Invest in R&D activities: total (public and private) investment of 3% of Europe's GDP in research and development by 2010
- Invest in human capital: an employment rate of 70% by the same date.

Research questions

- How do the actions of the Government affect the income of specific groups of people (workers with different skill levels, households in different regions)?
- How do they affect the behavior of the different actors mentioned above?
- How do they affect the factor productivity and the (regional or economy-wide) growth?

Features

Empirical calibration according to European data as much as possible:

- unemployment benefit schemes differ across European counties, e.g. the net replacement rate (the percentage of the last earned wage paid out as unemployment benefit in the first month of unemployment)
- size of Government expenditures as a fraction of GDP
- distribution of the budget between different kind of expenditures

Stages of model development

Stage 1: Government only has redistributive functions

- Simple taxation: only income and corporate profit tax (these are social security contributions)
- Expenditures: unemployment benefits
- A provisional Government budget is thus given by the total subsidies and total unemployment benefits.
- Deficit financing: bond issuing to households, ECB, or fiat money creation by ECB
- Any surplus is deposited at the central bank.

Budget forecasting

- The forecast for next year's GDP is a naive expectation that follows from extrapolating the current GDP growth rate:

$$Y_{t+1}^e = (Y_t / Y_{t-1}) Y_t. \quad (1)$$

- The Government budgeting starts with an estimate of next year's Government income which is expected to grow at the same rate as the GDP growth rate:

$$Y_{t+1}^g = (Y_t / Y_{t-1}) Y_t^g. \quad (2)$$

- Projected Government expenditures:

$$G_{t+1}^e = (Y_t / Y_{t-1}) G_t \quad (3)$$

- Projected Government budget balance (surplus/deficit):

$$B_{t+1}^e = Y_{t+1}^g - G_{t+1}^e \quad (4)$$

Deficit financing

When does the Government execute the actual financing of the deficit?

- The Government computes its budget deficit once per month, but enters the bond market on a daily basis.
- The Government runs the budget accounting function each month to determine the monthly budget deficit.
- The Government has a standing facility at the Central Bank that functions as a buffer account to finance ongoing payments.

Deficit financing (cont.)

Financing options:

- Bond financing: The budget deficit can be 100% financed by selling bonds on the bond market to households
- Money financing: Bonds can be sold to ECB, which creates fiat money to buy the bonds.
- Quantitative easing: no bonds are sold, but the ECB directly creates fiat money for the government.

Government balance sheet

Positive cash flows

Tax revenues

New bond issues

Total incomeNegative cash flows

Investments

Consumption

Unemployment benefit payments

Subsidy payments

Bond interest payments

Total expensesAssets

Gov. cash holdings

Liabilities

Outstanding bonds

Stage 2: Subsidies

Stage 2: Government distributes subsidies

- Expenditures: unemployment benefits, household subsidies
- Subsidies are conditional on a specific purpose under which they are granted:
 - a firm can receive a subsidy for internal training of employees that will raise the general skills.
 - a firm can receive an investment subsidy to buy investment goods
 - a household can receive a consumption subsidy to buy consumption goods
- The subsidies are non-discriminatory: they are available to all firms or households.

Stage 2: Subsidies (cont.)

- Allows the possibility of regional policies: some subsidies are available in one region, not in the other.
- Firms and households decide whether to apply for a subsidy. The corresponding behavioral rules need to be modelled.
- Firms or households who apply for a subsidy are certain to receive it, and they spend it as required by the Government.

Stage 3: Government consumption and investment

(Stage 3 is not yet implemented)

- Government consumption: Government purchases with CGP (interaction with the malls).
- Government investments: Government purchases with IGP (general expenditure for any capital formation, e.g. infrastructure projects).

The investment and/or consumption can have diverse impacts, such as:

- lowering transportation costs (commuting and/or distribution costs)
- augmenting the productivity of the firms
- augmenting the productivity of labour

Stage 4: Government employment

Government buys investment and consumption goods, hires labour, and uses it to produce a public good. (Stage 4 is not yet implemented)

- The Government hires workers with specific characteristics (government officers).
- Hiring can be local or interregional.
- The public good can have diverse local or inter-regional impacts
 - augmenting the productivity of the firms (technological infrastructure)
 - augmenting the productivity of labour (general skill level)

Stage 5: Government finance

Advanced Government fiscal and monetary policy. (Stage 5 is not yet implemented)

- As in Stage 1, but in addition the Government has a more refined financial policy; smoothing expenditures in response to macroeconomic variables
- It manages its debt and/or surpluses on the money and bond market according to standard fiscal and monetary policy rules.

Implementation details

- At the start of the year: the Government announces new policies by sending a general
policy_announcement_message:
gov_id
tax_rate_corporate
tax_rate_hh_labour
tax_rate_hh_capital
tax_rate_vat
unemployment_benefit_pct
hh_subsidy_pct firm_subsidy_pct

- At the start of the year: all agents read the Government policy announcements (only from their own Government), and store that information in memory variables for later use. When an agent applies for any payment (benefits, subsidies, or transfers) it sends a notification message to its Government.

- List of notification messages:

```
tax_payment_message(gov_id, tax_payment)
```

```
unemployment_notification_message(gov_id, unemployment)
```

```
hh_subsidy_notification_message(gov_id, subsidy_payment)
```

```
firm_subsidy_notification_message(gov_id, subsidy_payment)
```

```
hh_transfer_notification_message(gov_id, transfer_payment)
```

```
firm_transfer_notification_message(gov_id, transfer_payment)
```

- Government computes total payments by looping over these notification messages each day and also computes monthly and yearly sums.

Other messages in the Government module

- When households become unemployed *during* the month, they send an `unemployment_notification` message to their Government immediately.
- At the end of the subjective month all agents send their `tax_payment` message, read by the Government daily and added to the Government's payment account.
- At the end of the year Eurostat sends multiple `data_for_Government` messages (one for each region) that contains the data for that region.

Eurostat module

Aims of the Eurostat module

Data collection:

- Micro to macro: construction of macro variables following statistical procedures of real Eurostat.
- Macro to micro: feedback to micro-level (downward causation). The macrovariables influence the behavior of Governments, Households, Firms, Banks.

Aims of the Eurostat module

Spatial levels:

- Regional data for a single region
- National data for a set of regions belonging to a Government (`region_list`)
- Supra-national data for the economy as a whole

EU-27:

- 268 regions (the number of NUTS level 2 regions)
- 27 states
- 1 supranational entity

Contents of Eurostat memory

- Storing histories of simple statistics: output, GDP, employment, ...
- Storing month-on-month growth rates and 'monthly based' annual growth rates
- Storing quarter-on-quarter growth rates and 'quarterly based' annual growth rates
- Composite indices: CPI
- Measuring imports and exports
- Firm demographics: firm birth and death rates, firm survival rates
- Indicators for the start/end of recessions, duration of recessions