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Product Tax Modelling in INFORGE

by

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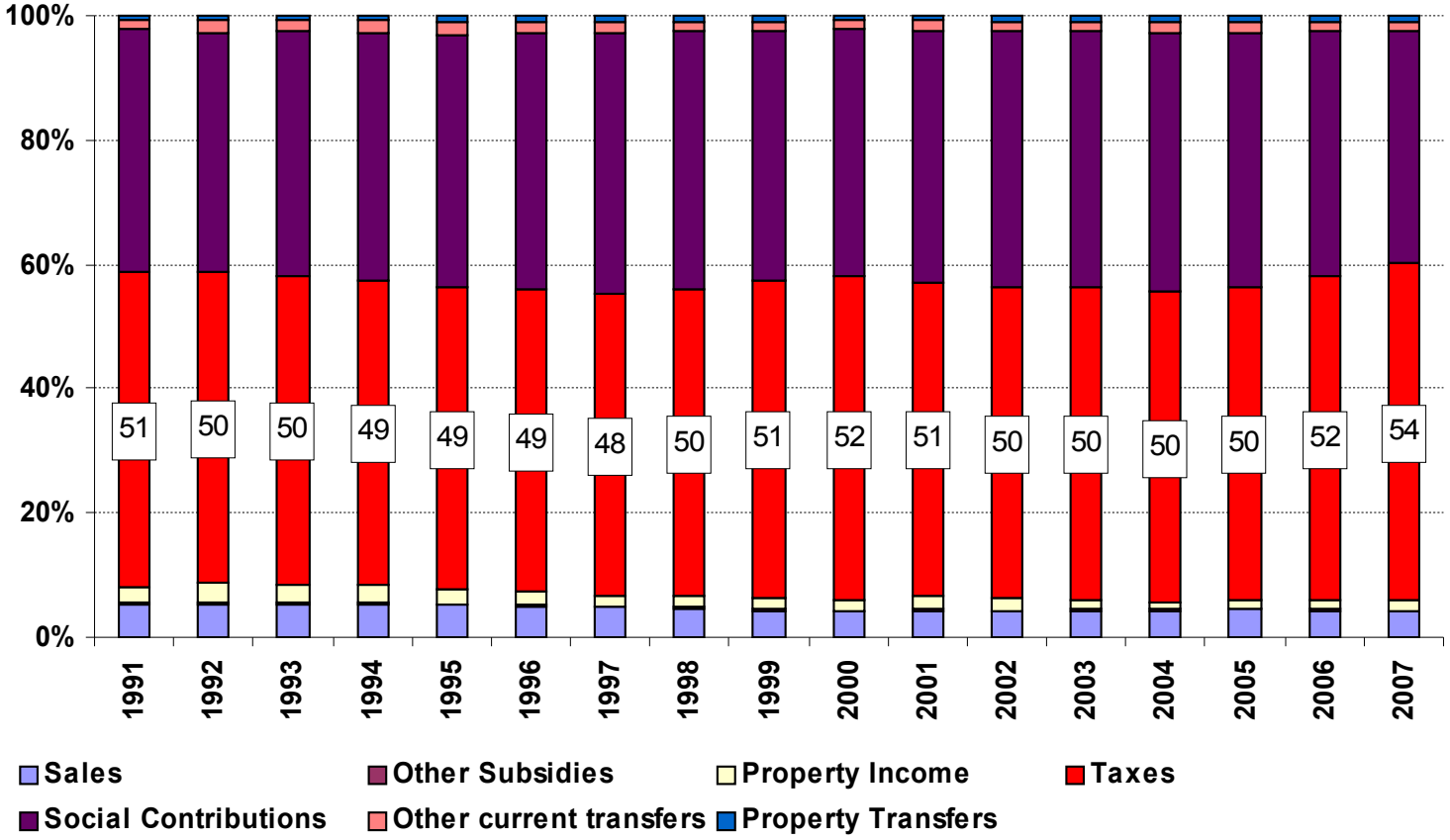
1 Introduction

- **Product Tax Modelling is important for the following reasons:**
  - Increasing role of Fiscal Policy
  - Taxes are major source of state income
  - Product Taxes (value added taxes, import taxes, excise duties) have distorting effects on purchasers' prices
    - Effect on consumed volume
    - Effect on structure of consumption

- **A differentiated and detailed approach to product tax modelling is favourable**

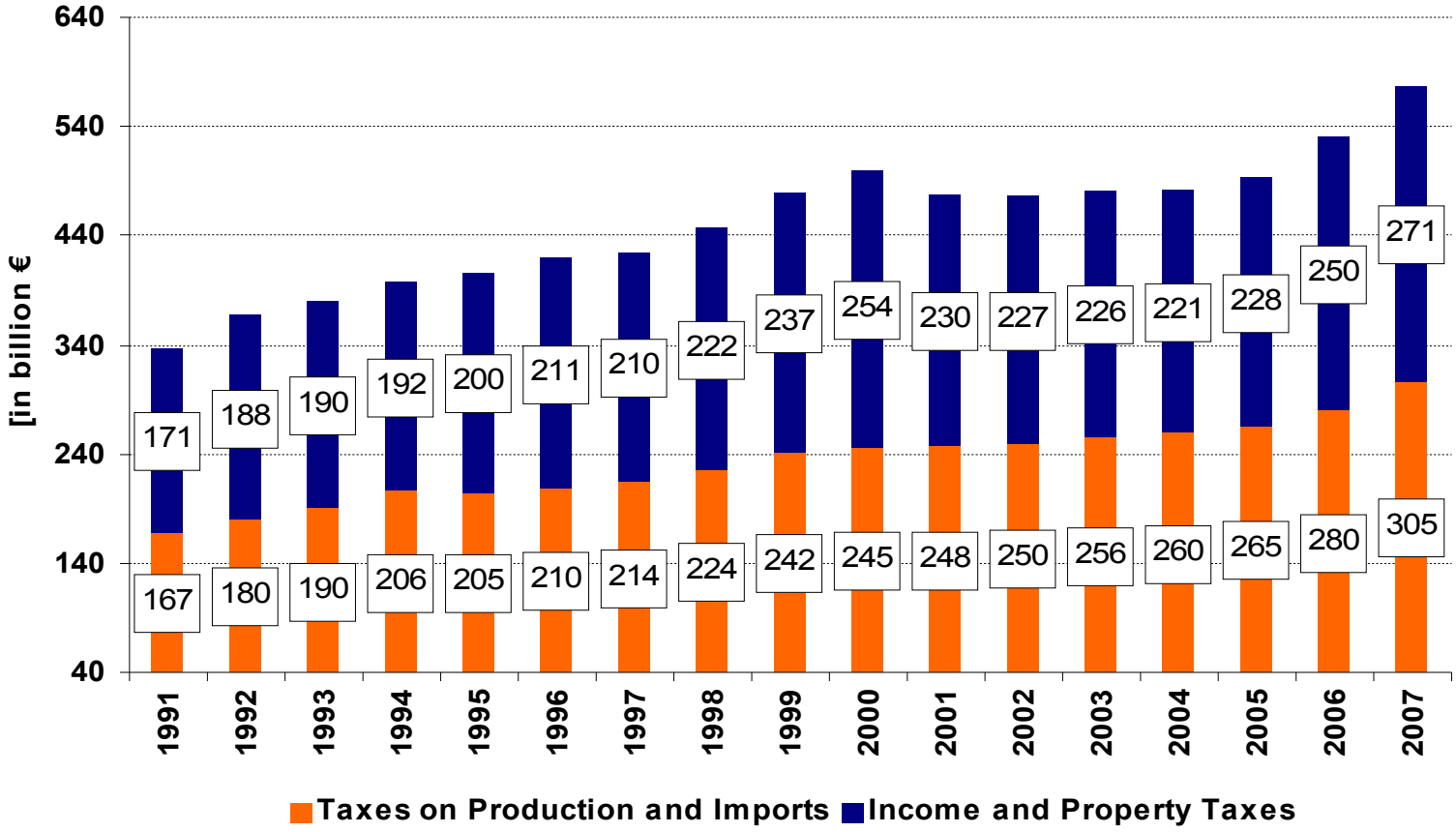
2 Taxes on Products

- **One important issue of fiscal policy is tax policy**
- **Taxes are the most important component of total state income**



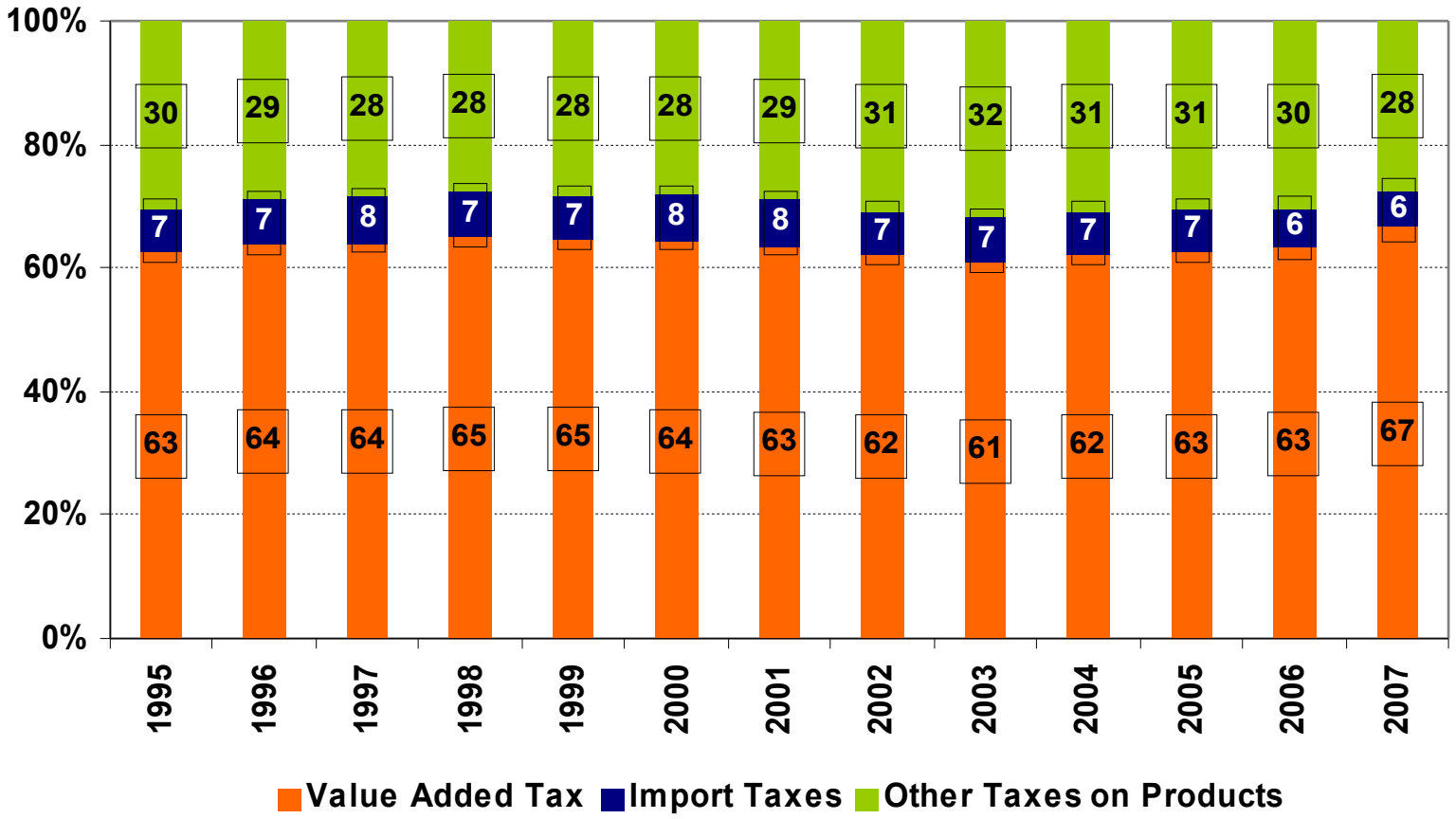
2 Taxes on Products

- **Taxes can be split in direct (income) and indirect (consumption) taxes**
- **On average, taxes on production and imports increased by 3.2% p.a. from 2000 to 2007. Income and property taxes increased by 0.9% p.a. in the same time.**



2 Taxes on Products

- **Indirect taxes can be split in three categories: value added taxes, import taxes and other taxes on products**



2 Taxes on Products

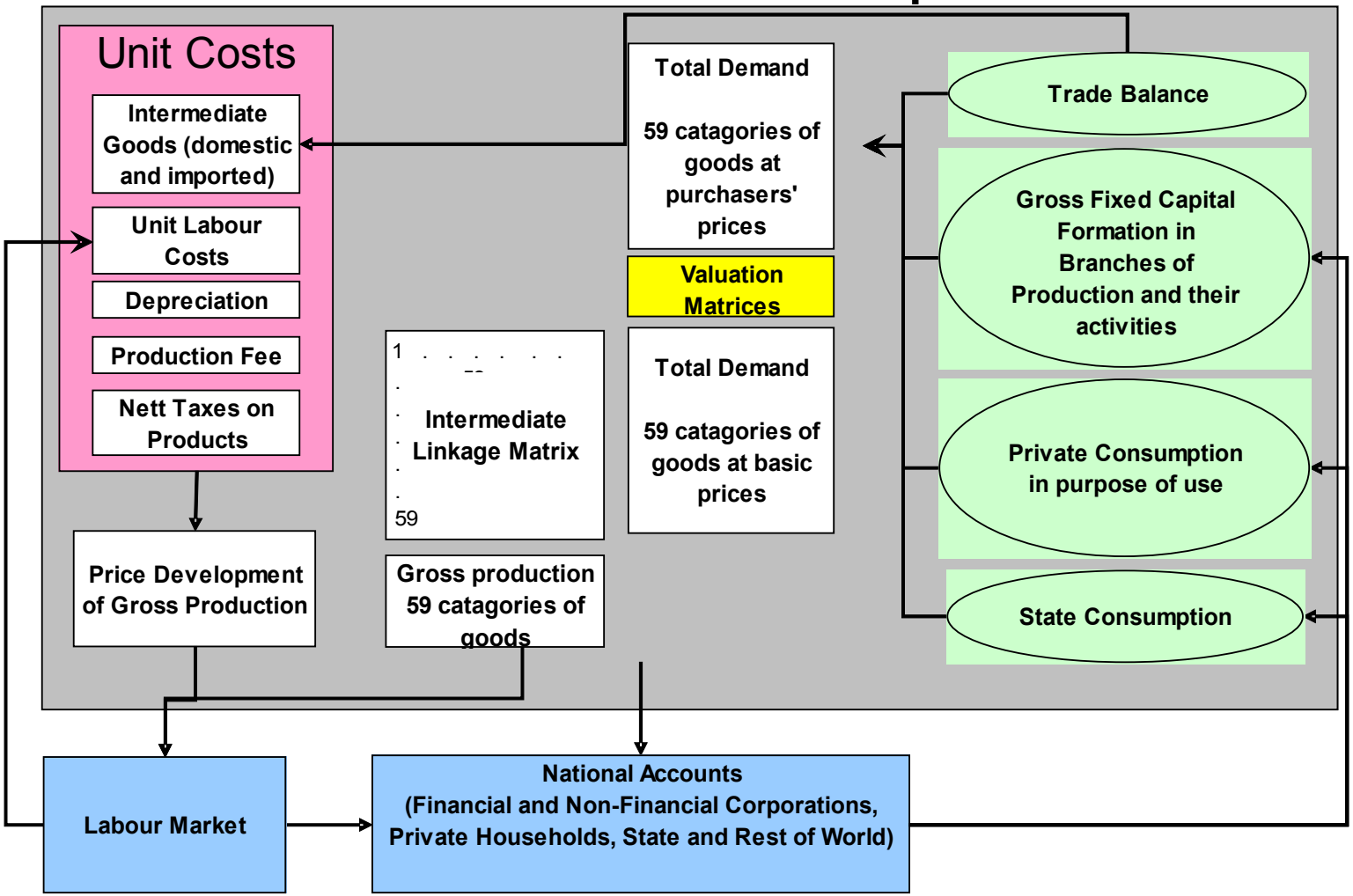
- Taxes on Products can be categorized into general and specific consumption taxes:

- **General consumption taxes**
  - E.g. value added taxes
  - Levied on the turnover of all consumed products
  - Tax rate and tax base are equal for all products
  - Product price changes have consequences on tax revenue

- **Specific consumption taxes**
  - E.g. excise duties
  - Levied on the consumed quantity of a certain product
  - Tax rate and tax base vary according to the taxed object
  - Product price changes have no direct consequences on tax revenue

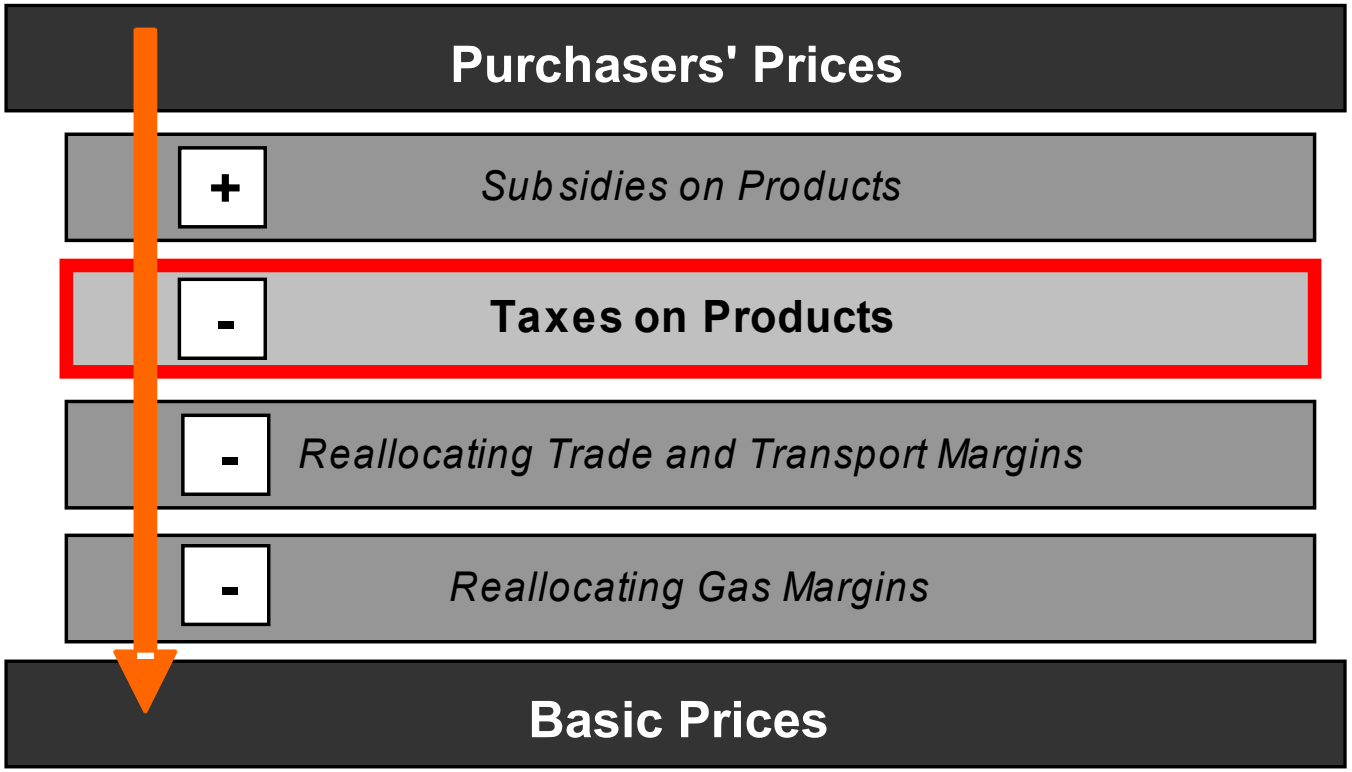
3 Product Tax Modelling in INFORGE

- **INFORGE and the location of taxes on products**



3 Product Tax Modelling in INFORGE

- **In INFORGE, taxes on products are located at the transition point of total demand at purchasers‘ prices and total demand at basic prices.**
- **Valuation matrices guarantee the correct transformation from purchasers‘ to basic prices.**



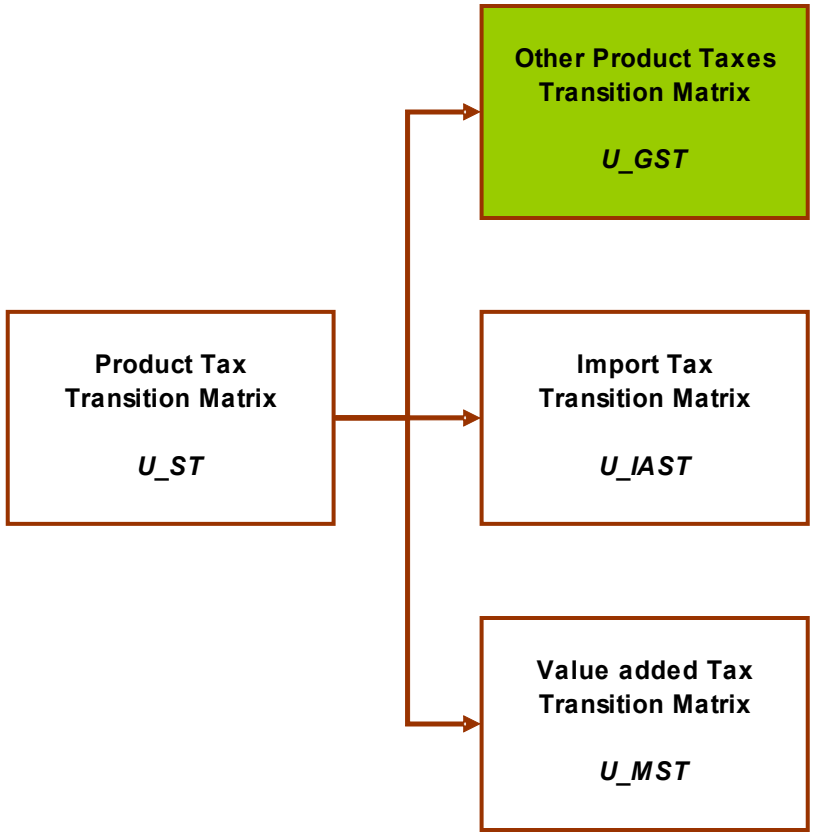
3 Product Tax Modelling in INFORGE

- **Each valuation matrix has exactly the same configuration.**
- **The valuation matrix of taxes on products shows the tax revenue for each i=59 categories of goods and for each of the j=8 components of total demand.**

		1	2	3	4	5	6	7	8	9	10
	product tax revenue (U_ST) 2004, in million Euro	Intermediate Demand	Private Consumption	Consumption of non-profit Organization	State Consumption	Fixed Capital Formation	Construction	Changes in Inventory	Export	Final Demand	Total Demand
1	Agriculture, Hunting and related activities	1481	1559	0	0	0	406	0	0	1965	3446
2	Forestry, logging and related service activites	2	45	0	0	0	0	0	0	45	47
3	Fishing	2	22	0	0	0	0	0	0	22	24
4	Mining of coal and lignite;extraction of peat	3	55	0	0	0	0	0	0	55	58
5	Extraction of crude petroleum and gas	2969	3460	0	12	0	0	0	0	3472	6441
6	Mining of uranium and thorium ores	0	0	0	0	0	0	0	0	0	0
7	Mining of ores	0	0	0	0	0	0	0	0	0	0
8	Mining and quarrying of stones and earthes	47	17	0	0	0	0	0	0	17	64
9	Manufacture of food products	579	8016	0	16	0	0	0	0	8032	8611
10	Beverages	932	6696	0	27	0	0	0	0	6723	7655
11	Manufacture of tobacco products	226	16526	0	0	0	0	0	0	16526	16752
12	...	...	...	...	...	...	...	...	...	...	...

3 Product Tax Modelling in INFORGE

- **The technical implementation**
  - ⇨ Database Setting
    - The setting of the database requires the unbundling of the historical given total product tax matrix (U_ST)
    - The process consists of three steps, beginning with **other product taxes** (U_GST):



$$U\_GST_{ij} = U\_ST_{ij} / U\_ST_{i10} * gsta_i$$

+

Balancing U_GST on its basic value of the SNA

3 Product Tax Modelling in INFORGE

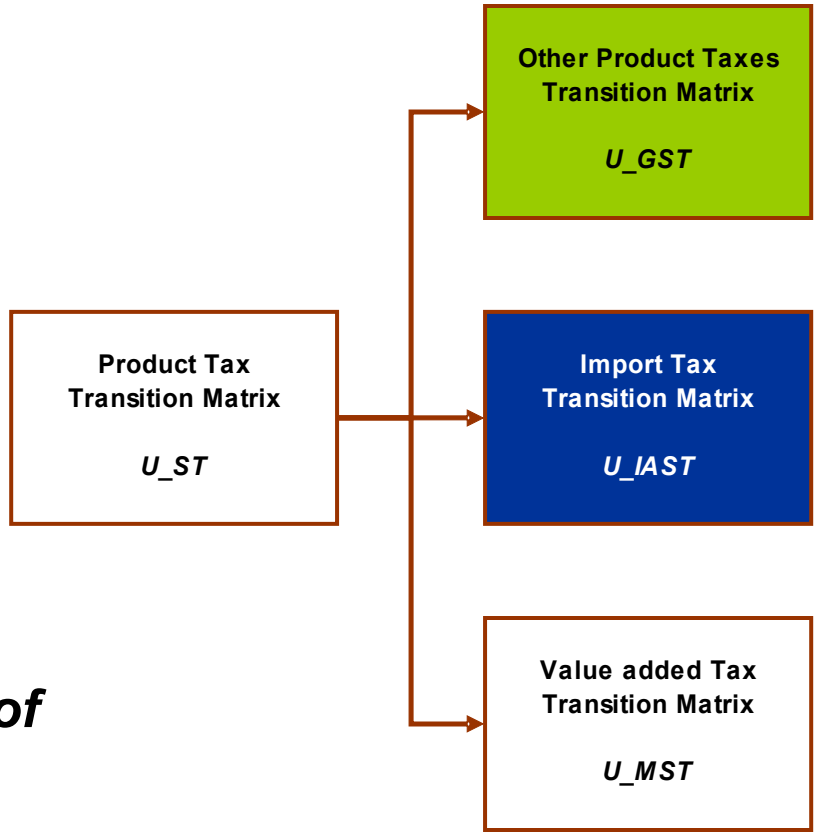
- **The technical implementation**
  - ⇨ Database Setting
    - **<u>Import tax matrix</u>** (U_IAST):

$$U\_IAST_{ij} =$$

Constant Import Tax Quota * U_ST_{ij}

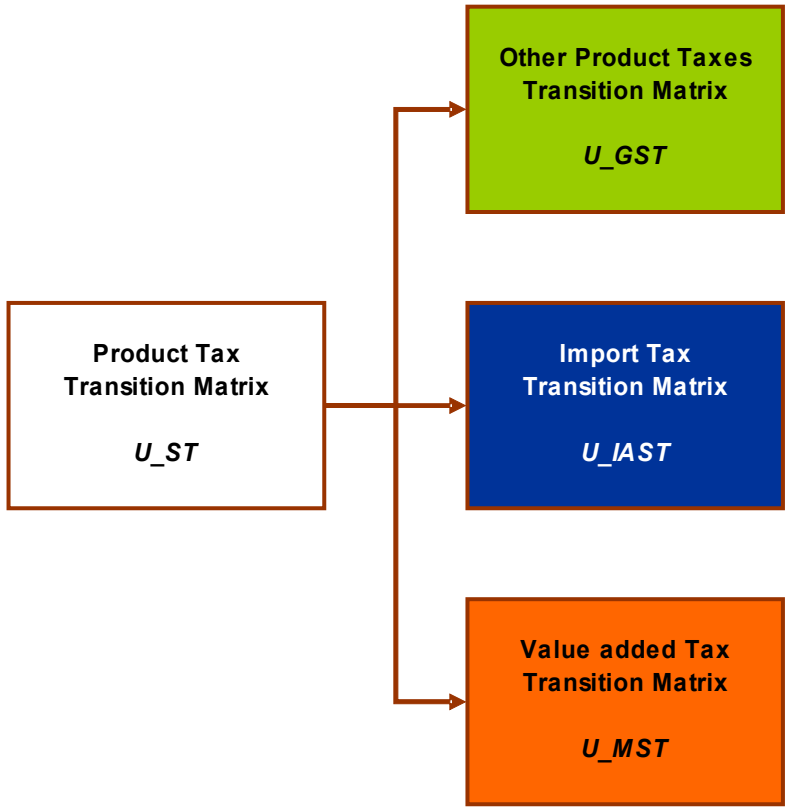
+

Balancing U_IAST on its basic value of the SNA



- **The technical implementation**
  - Database Setting
    - **Value added tax matrix** (U_MST):

$$U\_MST_{ij} = U\_ST_{ij} - U\_GST_{ij} - U\_IAST_{ij}$$

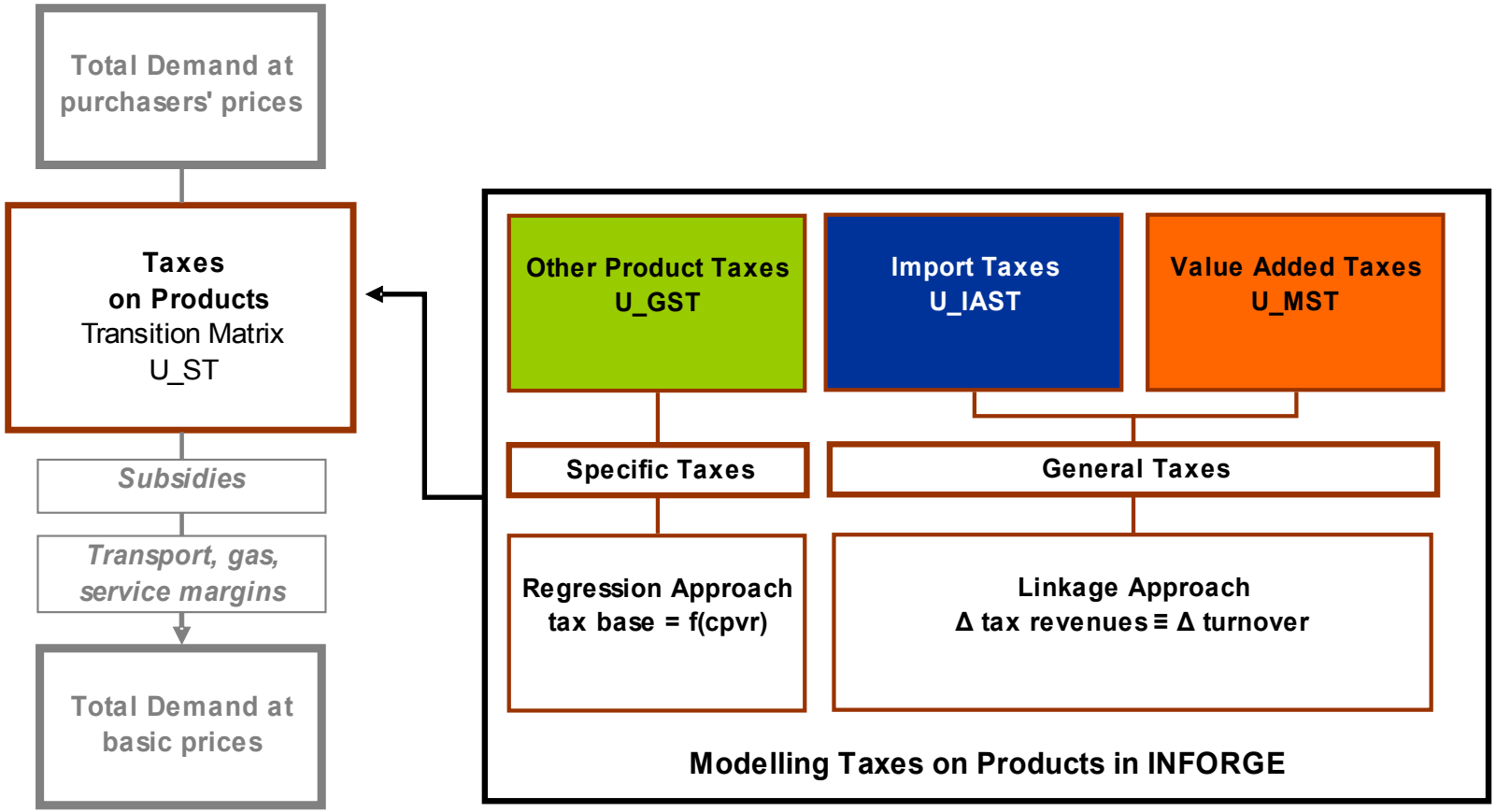


3 Product Tax Modelling in INFORGE

- **Modelling Taxes on Products**
  - The Method of modelling taxes on products depend on the tax type
    - Specific product taxes: Other product taxes
    - General product taxes: Import taxes and value added taxes

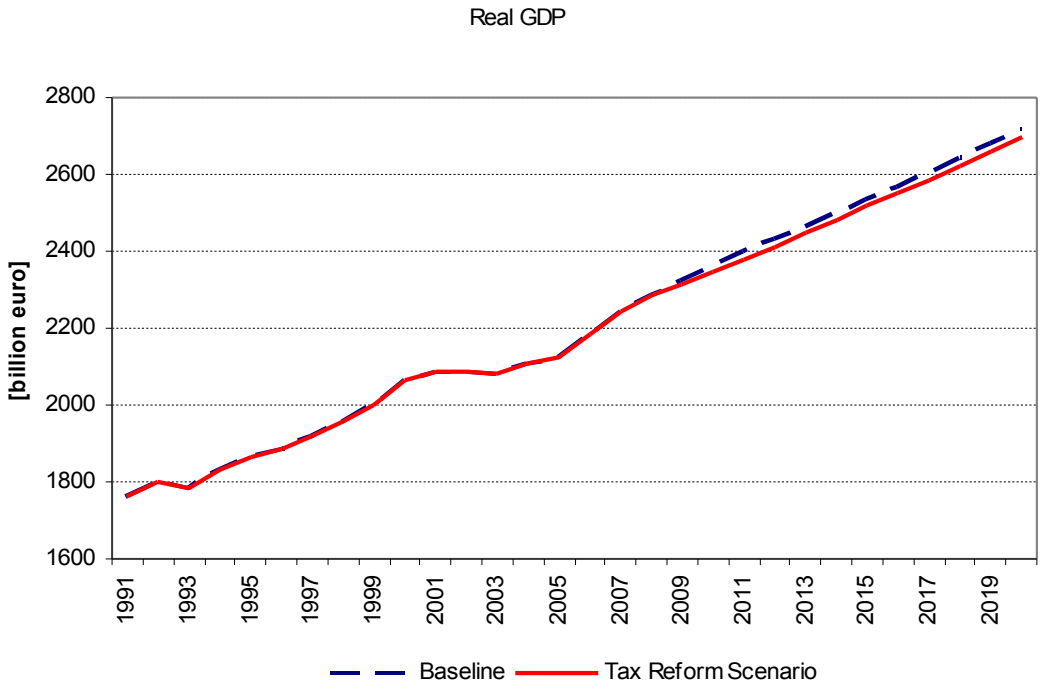
3 Product Tax Modelling in INFORGE

Modelling Taxes on Products



4 Simulation on Product Taxes

- **Running a Simulation**
  - It is assumed that the national government in Germany decides on the abolition of the reduced value added tax rate (7%) in 2009. From that time on, a uniform value added tax rate of 13% is set
  - Overall result:



4 Simulation on Product Taxes

- **Running a Simulation**
  - Short-term results:
    - Increase in consumer prices
    - Immediate decline in all components of final demand
    - Immediate increase in product tax revenues
  - Medium-term results:
    - Unemployment increases
    - Pressure on social security system
    - Further increase in prices
    - Total demand decreases further
  - Long-term results:
    - Consolidation of state budget
    - Cumulating effects slow down

5 Conclusion

- **Empirical modelling helps to analyse FP shocks**
- **Their effects on the output and structure of the economy can be interpreted.**

- **Possible soft spots:**
  - Unbundling of taxes on products are subject to certain assumptions (e.g. constant import tax quota)
  - Specific consumption taxes are more complex in reality (e.g. different tax rates for cigarettes or shag)
- **Data restriction leads to an insufficient endowment in official data.**
- **With a more sophisticate historical dataset, the modelling of taxes on products could be improved.**

Thank you for your attention

Any Questions ?

Any Comments ?