

Economic and Finance statistics



Expenditure and supply & use framework

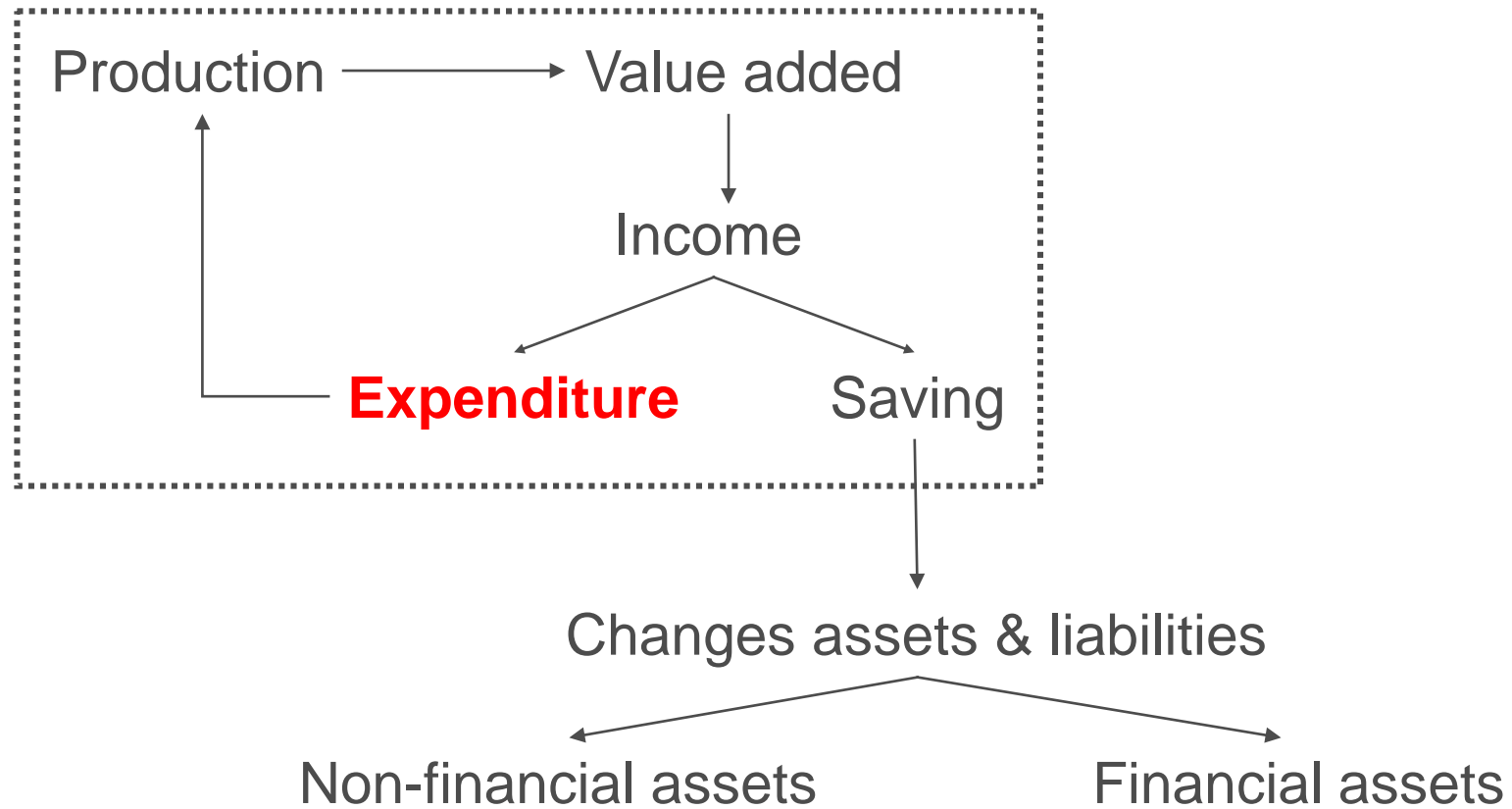
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Overview

1. Introduction
2. Expenditure categories
 - 2.1 Final consumption expenditure
 - 2.2 Gross capital formation
 - 2.3 Exports and imports
3. Supply and use tables
 - 3.1 The input-output framework
 - 3.2 Relations and relevance

1 A map of ESA 2010: flows



1 Gross domestic product: 3 approaches

- There are 3 approaches in National Accounting to determine the GDP: 1) production, 2) expenditure and 3) income approach.
- Start with the premise – better: identity – that all products available in the economy are actually used (don't forget changes in inventories!):

$$\mathbf{O+M = IC+C+G+I+X}$$

(with O = output, M = imports, IC = intermediate consumption, C = private consumption, G = Government expenditure, I = gross fixed capital formation aka “investments” and X = exports)

- Rearrange to obtain the production and expenditure approaches to GDP:
$$\mathbf{O-IC = C+G+I+(X-M)}$$
- The income approach relies on the sum of factor incomes.

1 Expenditure and GDP

Resources

- Output values of all industries, incl. Intermediate consumption and Consumption of fixed capital
- Gross domestic product (GDP)

Uses (= Expenditure)

- Final consumption expenditure
 - Household final consumption
 - Government final consumption
- Gross capital formation
 - Gross fixed capital formation
 - Changes in inventories
 - Acquisitions less disposals of valuables
- Exports – imports
- Gross domestic product (GDP)

2.1 Final consumption expenditure

- **ESA2010 para 3.94:** Definition: final consumption expenditure consists of expenditure incurred by resident institutional units on goods or services that are used for the direct satisfaction of individual needs or wants or the collective needs of members of the community.
 - Final consumption \neq intermediate consumption
 - FC made by
 - Households → Individual needs → individual consumption
(*disregarding externalities*)
 - Governments } → Collective needs → collective consumption
 - NPISH } on behalf of the whole economy
- Distinction:
COFOG
classification of the
functions of
Government

2.1 Household final consumption

- Consumption by resident units to satisfy individual needs
- Includes not only the usual transient consumer goods but also e.g.:
 - Consumer durables, e.g. washing machines or sailing yachts
 - Income in kind, e.g. an employee can ride the company car free of charge
 - Services of owner-occupied dwellings (“as if” payments of rent to absorb differing home ownership rates)
- Excludes the following:
 - Social transfers in kind, e.g. reimbursed medical expenses
 - Intermediate consumption and Gross fixed capital formation (e.g. repairs on dwellings: IC; purchases of dwellings and of valuables: GFCF)
 - Acquisitions of non-produced assets, in particular purchase of land
 - Income tax expenses
 - Contributions to NPISH, e.g. dues to trade unions, churches and sport clubs
 - Voluntary transfers to charities and to aid organisations

2.1 Household final consumption

- Main aggregate on the use of income side: 53.2 % of GDP, EU-27 2019
- Time of recording
 - In general: time of change of ownership (goods), completed delivery (services)
 - Acquired under hire/credit: time of delivery
- Valuation
 - At effective purchasers' prices = incl. taxes less subsidies, trade margins, transport charges and deductions
- Main data sources:
 - Household Budget Surveys → direct measurement of expenses
 - Tax/excise data → direct measurement (provided the taxes are clearly linked to consumption amounts)
 - Retail trade statistics → indirect calculation via propensities to consume

2.1 Government final consumption

- Government final consumption expenditure includes:
 - Goods and services produced by general government other than own-account capital formation and sales
 - Purchases of goods and services from market producers by general government that will be supplied to households for free = social transfers in kind
- Similar for final consumption expenditure of NPISHs
- Corporations do not, by definition, make final consumption expenditures. Their purchases or usages of own-account production of consumer goods are
 - either intermediate consumption
 - or compensation of employees in kind.

2.2 Gross capital formation

- ‘Gross’ means including the consumption of fixed capital (CFC; depreciation) (Gross capital formation minus CFC = Net capital formation)
- Gross Capital Formation includes:
 - Gross fixed capital formation (GFCF) \Rightarrow *"Investment" in the narrower sense*
 - Changes in inventories
 - Acquisitions less disposals of valuables
- All economic sectors can undertake GCF, even households (S.14; GFCF in dwellings, Acquisitions less disposals of valuables).

see *ESA10 para 3.122f.*

2.2 Gross fixed capital formation

- Acquisitions less disposals by resident producers of fixed assets, i.e.
 - produced assets
 - used in production
 - for more than one year. (see *ESA2010 para 3.124ff.*)
- Main components of GFCF:
 - Dwellings, other buildings and structures (incl. major improvements to land)
 - Machinery and equipment (e.g. industrial facilities, workshop installations, all kinds of vehicles, IT hardware)
 - Intellectual property products (R&D, software & databases, entertainment, literary or artistic originals)
- Also includes:
 - Military weapons systems
 - Changes in livestock and trees used in production
 - Major improvements to fixed assets (substantial updates and expansions, service life prolonging repairs) and also to tangible non-produced assets (land)

2.2 Gross fixed capital formation

- Major aggregate on the use of income side: 22.5 % of GDP, EU-27 2019
- Time of recording
 - In general: time of ownership transfer to the investor (valid for purchased fixed assets)
 - Own-account GFCF: time of production
 - Buildings and structures (often perennial projects): according to production progress
- Valuation
 - At effective purchasers' prices = incl. taxes less subsidies, markups, deductions, transport charges, installation charges, staff training expenses and other costs of ownership transfer up to the availability for use
- Main data sources and calculation methods:
 - Structural business statistics, surveys of investments → direct measurement of GFCF
 - Production & turnover statistics + external trade statistics → indirect calculation via commodity flow method

2.2 Consumption of fixed capital

- = “Depreciation” in national accounts. Definition (see *ESA2010 para 3.139*): Decline in value of fixed assets owned, as a result of normal wear and tear and obsolescence.
- Business data on depreciation from operating statements are determined by e.g. fiscal legislation and hence not suitable for National Accounting.
- Instead: Measurement of CFC through “perpetual inventory method” (PIM) within the National Wealth Accounts. Main elements:
 - Detailed time series of Gross fixed capital formation for decades (depending on service live lengths)
 - Replacement prices (current cost accounting method)
 - Service lives (by cohort)
 - Impairment model

2.2 Changes in inventories

- Changes in inventories =
 - entries of materials and supplies, goods for resale and/or produced output (finished goods as well as work-in-progress)
 - - withdrawals from inventories and
 - - recurrent losses of goods held in inventories
 - over the reporting period (year or quarter) (see **ESA2010 para 3.146ff.**)
- Valuation
 - Entries are valued at the time of entry, withdrawals and losses at the time of departure.
 - In the [oh, so frequent] case of data gaps: valuation at average prices of the period.
 - Exclusion of holding gains/losses (= changes in stock values induced by price changes only)
- Practical measurement issues
 - owing to lack of surveys or even indicators often additionally used for balancing GDP resources and uses

2.2 Acquisitions less disposals of valuables

- Valuables =
 - non-financial goods like precious stones and metals, antiques, art objects, jewelry etc.,
 - not used primarily for production or consumption,
 - do not physically deteriorate over time under normal conditions,
 - are acquired and held primarily as stores of value. (see **ESA2010 para 3.154ff.**)
- Valuation
 - Production of valuables: at basic prices.
 - Later acquisitions: at purchasers' prices incl. trade margins, agents' fees or commissions.
 - Disposals: prices received by sellers after deducting any fees or commissions paid to intermediaries.
- Importance of external trade
 - Acquisitions and disposals of valuables cancel out between resident sectors (leaving only agents and dealers margins), hence positive or negative balances stem from external trade effectively.

2.3 Exports and imports

- Exports and imports consist of transactions in goods and services (sales, barter and gifts) between residents and non-residents. (see *ESA2010 para 3.158ff.*)
 - Ex-/imports of goods occur when economic ownership of goods changes between residents and non-residents.
 - Ex-/imports of services consist of all services rendered between residents and non-residents.
 - Ex-/imports do not necessarily imply physical movements of the respective good across frontiers.
- Exports and imports of goods and services do not include
 - Establishment trade (deliveries to non-residents by non-residents affiliates of resident enterprises + vice versa)
 - Goods in transit through a country without any mentioned changes of ownership
 - Cross-border flows of primary income (compensation of employees, interest, revenues)
 - Cross-border sales or purchases of financial assets or non-produced assets, such as land
- The SNA delineates in detail numerous possible ex-/import cases to define the scope of National Accounting against external trade statistics.

2.3 Exports and imports

- External balance of goods and services (= exports minus imports) as an aggregate on the use of income side reflects the “openness” of the economy.
- Time of recording
 - In general: time of ownership transfer (goods) or time of rendering (service)
 - Coincides with record in individual accounts (goods) or time of production (service)
- Valuation
 - Exports of goods and services: at basic prices; in detail goods: FOB of the exporting country
 - Imports of services: at purchasers’ prices; imports of goods in supply and use tables: CIF
- Data sources and recording:
 - In former times external trade statistics and customs forms were highly sufficient
 - Today, integrations like the EU Common Market and international flows of intangible goods like intellectual property products make recordings of exports and imports in National Accounting increasingly difficult

3.1 The input-output framework

- Core of the input-output framework: supply and use tables (ST and UT) in current prices and previous year's prices.
- Deviated from ST and UT: symmetric input-output tables that show how supply matches uses product-by-product or industry-by-industry.
- The primal monetary ST and UT and symmetric input-output tables can be extended and modified for specific purposes such as
 - productivity accounts,
 - labour accounts,
 - quarterly accounts,
 - regional accounts,
 - environmental accounts, in monetary or physical terms, respectively.

3.1 Supply tables (ST)

- A ST shows the supply of goods and services by product and producing industry, distinguishing domestic industries from imports.
- Primary (main) activities of industries are reported on the diagonal of the production matrix while secondary activities of industries are reported off the diagonal.

Table 1.1: A simplified supply table

Products	Industries	Industries			Imports	Total
		Agriculture	Industry	Service activities		
Agricultural products		Output by product and by industry			Imports by product	Total supply by product
Industrial products						
Services						
Total		Total output by industry			Total imports	Total supply

(Eurostat Manual of Supply, Use and Input-Output Tables, Luxembourg 2008, p.18)

3.1 Use tables (UT)

- A UT shows the use of goods and services by product and by type of use, distinguishing domestic uses from exports.

Table 1.2: A simplified use table

Products \ Industries	Industries			Final uses			Total
	Agriculture	Industry	Service activities	Final consumption	Gross capital formation	Exports	
Agricultural products	Intermediate consumption by product and by industry			Final uses by product and by category			Total use by product
Industrial products							
Services							
Value added	Value added by component and by industry						Value added
Total	Total output by industry			Total final uses by category			

(Eurostat Manual of Supply, Use and Input-Output Tables, Luxembourg 2008, p.20)


- Two types of identities hold in ST and UT:
 - total output by industries is equal to total input by industries and
 - total supply by products is equal to total uses by products (see below).
 - Given ubiquitous data gaps in reality, a balancing process is necessary to achieve this.

3.1 Integration of ST and UT: the IO table

- Identities for each industry: output = sum of intermediate consumption plus value added. And for each product: output + imports = intermediate consumption + final consumption + gross capital formation + exports.

Table 1.3: A simplified supply and use framework

		Products			Industries			Final uses			Total
		Agri-cultural products	Industrial products	Services	Agri-culture	Industry	Service activities	Final con-sumption	Gross capital formation	Exports	
Products	Agricultural products	= not applicable			Intermediate consumption by product and by industry			Final uses by product and by category			Total use by product
	Industrial products										
	Services										
Industries	Agriculture	Output of industries by product			= not applicable			= not applicable			Total output by industry
	Industry										
	Service activities										
Value added		= not applicable			Value added by component and by industry			= not applicable			Total value added
Imports		Total imports by product			= not applicable			= not applicable			Total imports
Total		Total supply by product			Total output by industry			Total final uses by category			

 = not applicable

(Eurostat Manual of Supply, Use and Input-Output Tables, Luxembourg 2008, p.23)

3.2 Identities and valuation in IO tables

- This identity is valid only when supply and use are on the same valuation basis, i.e. both at purchasers' prices or both at basic prices!
Accordingly, for each product:

- supply at purchasers' prices*
- = output of the product at basic prices*
- + imports at basic prices
- + trade and transport margins
- + taxes less subsidies on products
- = use of the product at purchasers' prices,
- = intermediate demand for the product
- + final consumption expenditure
- + gross capital formation
- + exports.

* *Price definitions:*
see **ESA2010 para 3.44** for basic prices
and
ESA2010 para 3.06 for purchasers' prices

3.2 Functions and relevance of IO tables

ESA2010 para 9.13ff.: Supply and use tables and the input-output framework combine three different roles:

- description,
- statistical tool,
- tool for analysis; direct effects and indirect effects each inside and outside of NA institutions.

Thank you! Any questions?

