§ 2 Some Essential Macroeconomic Aggregates

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2.5 Reconciling Global Output and Income
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Bibliography: Lequiller, F. / Blades, D. (2014): Understanding National Accounts. 2nd ed. Paris, Chapter 1. http://www.oecd.org/std/UNA-2014.pdf

Table 2.1: Main Macroeconomic Aggregates for Germany[a)]

1993 SNA, 2005 euros,annual percentage change

	2010	2011	2012	2013
Private final consumption	0,8	1,7	0,6	1,0
Gross capital formation	9,8	7,6	-4,9	-0,5
Gross domestic product	4,0	3,1	0,9	0,4
Imports	10,9	7,5	2,2	1,9
Exports	13,4	7,9	4,3	0,9
Household net saving ratio	10,9	10,4	10,3	10,3
GDP Deflator	0,9	0,8	1,3	1,2
Government net lending, as a percentage of GDP	-4,2	-0,8	0,2	-0,2

OECD (2013): Economic Projections (database): OECD Economic Outlook No.93, June 2013

a) The „OECD Economic Outlook“ used for this table dates from May 2013. At that time, the data for 2013 and 2014 were forecasts by the OECD economists..

→ Exercise 1 of § 2

2.1 Defining Gross Domestic Product (GDP)

(1) Definition: GDP

= measure of total output (with no double counting) carried out by all units in a given country during a given period

(2) Avoiding double counting

(a) Idea

- indicator measuring an economic unit‘s contribution to GDP should only reflect that unit‘s own effort („value added“)
- consequence: GDP independent from organization of production in the economy

b) Example: Pasta Industry

Year 1	Firm A
Output	$ 100,000 [$/year]
	= 100 [ton/year] x 1,000 [$/ton]

Year 2	Firm A1	Firm A2
Output	$ 30,000	$ 100,000

- problem: simply adding the two outputs → overstating macroeconomic production
- solution: summing up values added → indicator of macro production independent from organisation of production
- illustration: divison of labour continued (see next accounts)

Year 1	Farmer	Firm A	Macroeconomy
Input	Labour, Machinery	Labour , Machinery, Wheat	
Output	Wheat: $ 10,000	Pasta: $ 100,000	$ 110,000
Intermediate Consumption	0	Wheat: $ 10,000	$ 10,000
Value Added	$ 10,000	$ 90,0000	$ 100,000

Year 2	Farmer	Firm A1	Firm A2	Macroeconomy
Input	Labour, Machinery	Labour, Machinery, Wheat	Labour, Machinery, Flour	
Output	Wheat: $ 10,000	Flour: $ 30,000	Pasta: $ 100,000	$ 140,000
Intermediate Consumption	0	Wheat: $ 10,000	Flour: $ 30,000	$ 40,000
Value Added	$ 10,000	$ 20,000	$ 70,000	$ 100,000

(3) Conclusion: using value added

(a) GDP = sum of values added

more precisely (see below): sum of gross values added plus taxes on products minus subsidies on products

(b) Benefit of using value added: respect of three essential rules when moving from micro to macro level

- avoid double counting
- devise aggregates whose value is independent of non-economic factors
- create indicators that are measurable in practice

→ exercise 2 of § 2

(4) GDP versus GNP/GNI

(a) “Domestic” is in opposition to “National”

(b) GNI income of all economic agents residing within the domestic economic territory

formerly referred to as GDP

(c) Conversion of GDP into GNI:

GNI = GDP + income received by resident units from abroad
- income created by production in the domestic country but paid to units residing abroad

(d) Examples of cross-border incomes:

- Labor income
- Capital income

(e) Empirical Results

Table 1.2. **Reconciliation of GDP and GNI for Germany, Luxembourg and Ireland**

Million euros

Year 2012	Germany	Luxembourg	Ireland
B1_GS1: Gross domestic product	2 666 400	42 899	163 938
(+) D1_D4FRS2: Primary incomes receivable from the rest of the world	206 600	101 109	58 316
(-) D1_D4TOS2: Primary incomes payable to the rest of the world	142 930	114 784	88 390
B5_GS1: Gross national income at market prices	2 730 070	29 225	133 864
Difference between GDP and GNI (%)	2.4	-31.9	-18.3

Source: OECD (2013), "Aggregate National Accounts: Disposable income and net lending/borrowing", OECD National Accounts Statistics (database), *http://dx.doi.org/10.1787/data-00002-en*.

StatLink http://dx.doi.org/10.1787/888933143536

(5) „Net“ aggregates

(a) GDP versus NDP

- Production: Conversion of input into outputs
  - outputs: goods and services
  - inputs: goods and services (intermediate consumption), labor, capital (i.e. real capital)
- Aim: measurement of the *new wealth created during the period*
- Action: deduction for the cost of using up capital (consumption of fixed capital)
- Result: NDP = GDP - consumption of fixed capital

  = sum of net values added

(b) GNI versus NNI

NNI = GNI – consumption of fixed capital

(c) In practice: preference for gross aggregates

- Methods for calculating consumption of fixed capital differ between countries
- When ranking countries or when analyzing growth, differences between gross and net values are small

2.2 Deriving GDP in volume

- Aim: distinguishing elements of change of aggregates

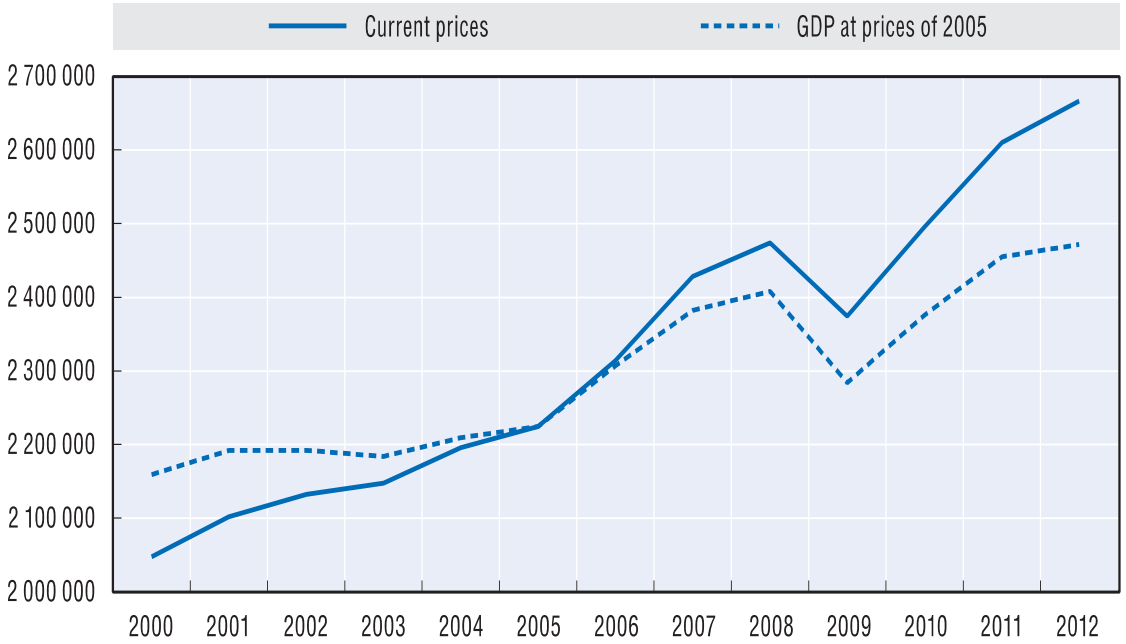
- [1 + the growth rate (divided by 100) of GDP at current prices]
  = [1 + the growth rate (divided by 100) of GDP in volume]
  x [1 + the growth rate (divided by 100) of the GDP deflator]

- In absolute levels: GDP at current prices = GDP in volume x deflator, where deflator = price index/100

- Empirical example

Figure 1.1. **Gross domestic product, in value and in volume**

Germany, million euros



- Exercise 3 of §2

Source: OECD (2013), "Aggregate National Accounts: Gross domestic product", OECD National Accounts Statistics (database), *http://dx.doi.org/10.1787/data-00001-en.*

StatLink http://dx.doi.org/10.1787/888933143546

2.3 Defining demand: the role of investment and consumption

(1) Gross capital formation (GCF)

= Gross fixed capital formation (GFCF)

+ Change in inventories

(2) Private final consumption

- Concept:
  - All purchases made by consumers → purchases that are consumed ("used up") during the period
  - "final"
  - Households and non-profit institutions serving households
- Relevance: most important component of GDP

2.4 Reconciling Global Output and Demand

(1) Fundamental equality between domestic output and final demand aggregates

- GDP = sum of final demand aggregates
  = final consumption + gross capital formation (I_g) + net exports of goods and services (TB)
- Empirical example: see next slide
- This “expenditure approach” illustrates the Keynesian idea of the impact of demand on output, at least in the short run
- Conclusion: „the value of national accounts is that the general macroeconomic concept of the influence of demand on supply in this way takes concrete form as an accounting equation“; Lequiller/Blades (2014), p. 26
- Implication: in case of conceptual changes, GDP is only modified if these have an impact on components of final demand

→ exercise 7 of § 2

Table 1.4. **Germany, expenditure approach**

Germany, 2012

Codes[a]		Million euros	% of GDP
B1_GE	Gross domestic product (expenditure approach)	2 666 400	
P3	**Final consumption expenditure**	**2 048 220**	
	of which:		
P31S14	Final consumption expenditure of households	1 490 500	55.9
P31S15	Final consumption expenditure of non-profit institutions serving households	43 370	1.6
P3S13	Final consumption expenditure of general government	514 350	19.3
P5	**Gross capital formation**	**460 270**	
	of which:		
P51	Gross fixed capital formation	470 550	17.6
P52	Changes in inventories	-13 150	
B11	**External balance of goods and services**	**157 910**	
	of which:		
P6	Exports of goods and services	1 381 030	51.8
P7	Imports of goods and services	1 223 120	45.9

a) The table shows the official SNA codes, which the reader can find on the website accompanying this book. These codes facilitate the understanding and manipulation of the data.

Source: OECD (2013), "Aggregate National Accounts: Gross domestic product", OECD National Accounts Statistics (database), *http://dx.doi.org/10.1787/data-00001-en*.

StatLink http://dx.doi.org/10.1787/888933143564

(2) Macroeconomic supply and demand

$$\underbrace{\text{GDP} + \text{Imports}}_{y^s_g} = \underbrace{\text{Household consumption} + \text{GCF} + \text{Exports}}_{y^d_g}$$

(3) Contributions to growth

$$GDP_t = C_t + I_t + EX_t$$

$$\frac{\Delta GDP_t}{GDP_{t-1}} = \frac{C_{t-1}}{GDP_{t-1}}\frac{\Delta C_t}{C_{t-1}} + \frac{I_{t-1}}{GDP_{t-1}}\frac{\Delta I_t}{I_{t-1}} + \frac{X_{t-1}}{GDP_{t-1}}\frac{\Delta X_t}{X_{t-1}}$$

weight growth rate

Growth contribution of consumption

→ Exercises 4 and 8 of § 2

2.5 Reconciling Global Output and Income

(1) Production

Inputs
(factors of production) → Outputs
(goods & services)

Intermediate consumption
(of goods and services)

Use of capital
Labor services
} Value added (net output)

} Gross output

(2) Generation of income

in the production process, income is generated:

– total amount = value added

– split up into capital income and labor income:
  - for the owners of production factors: revenues (“salaries”, “profits”)
  - for the producing units: costs

(3) Income approach to GDP

GDP = compensation of employees
+ gross operating surplus and gross mixed income
+ taxes less subsidies on production and imports

Note:
- compensation of employees includes social contributions payed by employers
- mixed income = gross operating surplus of unincorporated enterprises
- “gross” operating surplus includes depreciation of capital (so-called consumption of fixed capital)

2.6 Summary: Three Ways to Measure GDP

- output approach: GDP = sum of gross values added
- final demand approach: GDP = sum of final consumption, gross investment and net exports
- income approach: GDP = sum of compensation of employees and gross profits
- next slide illustrates those approaches for the case of Germany
- three approaches can also be calculated in terms of net domestic output (NDP):, i. e. after deduction of consumption of fixed capital:
  - NDP = sum of net values added
  - NDP = sum of final consumption, net investment and net exports
  - NDP = sum of compensation of employess and net profits

Table 1.5. **The three approaches to GDP**

Germany, billion euros

		1991	2012
GDP	Gross domestic product (output approach)	1 535	2 666
B1B	Gross value added at basic prices, excluding FISIM	1 393	2 387
D21_D31	+ Taxes less subsidies on products	141	280
GDP	Gross domestic product (expenditure approach)	1 535	2 666
P3	Final consumption expenditure	1 171	2 048
P5	+ Gross capital formation	369	460
P6	+ Exports of goods and services	394	1 381
P7	– Imports of goods and services	400	1 223
GDP	Gross domestic product (income approach)	1 535	2 666
D1	Compensation of employees	859	1 376
B2+B3	+ Gross operating surplus and gross mixed income	554	1 016
D2	+ Taxes less subsidies on production and imports	122	274

Source: OECD (2013), "Aggregate National Accounts: Gross domestic product", OECD National Accounts Statistics (database), *http://dx.doi.org/10.1787/data-00001-en*.

StatLink *http://dx.doi.org/10.1787/888933143571*

2.7 Some Additional Macroeconomic Indicators

(1) Household saving ratio

- definition: saving by households / disposable income of households
- relevance:
  - determines the relation between income and consumption
  - represents funds available for financing investment

Germany

Summary of recent results and forecasts

	2010	2011	2012	2013	2014
Household saving ratio[a]	10.9	10.4	10.3	10.3	10.1
General government financial balance[b]	-4.2	-0.8	0.2	-0.2	0.0

a) Net saving as % of net disposable income.

b) % of GDP.

Source: OECD (2013), "OECD Economic Outlook No. 93", OECD Economic Outlook: Statistics and Projections (database), doi: *http://dx.doi.org/10.1787/data-00655-en*.

(2) General government financial balance

- general government: central government, local authorities, social security and the various organizations depending on them
- “public surplus”, “public deficit”: in national accounts, name is “net lending / net borrowing of general government”
- calculated as sum of general government revenue minus sum of general government expenditures
  negative value = net borrowing: indicates a borrowing requirement
- for purposes of international comparison, ususally expressed as a percentage of GDP
- empirical illustration: Germany (see slide before)

→ Exercise 5 of § 2