Chapter 2: A tour of the book

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- Learning goals

1. GDP: An introduction
   - Four calculation methods of GDP
   - Real versus nominal GDP
2. The inflation rate
   - The GDP-deflator
   - Consumer Price Index
   - Comparison
3. Unemployment rate
   - Federal Employment Agency
   - ILO Unemployment rate
   - Comparisons: ILO versus Federal Employment Agency

Learning Goals of chapter 2

After this chapter, you would be able to

a) name and apply alternative definitions of Gross Domestic Product (GDP),

b) explain why GDP is not a perfect measure of economic activity,

c) know differences between nominal and real variables as well as level and growth variables,

d) know what problems can arise in measuring inflation, and

e) know what problems can arise in measuring unemployment.

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GDP per capita

	Germany	USA
Population (Mill.)	82.4	295.7
GDP in Mrd. USD	2465	12393
GDP per Capita in USD	29901	41906
Labor force (Mill.)	35.9	141.3
GDP in USD /Labor force	68596	87687
Working hours of each employee (Hours per year)	1443	1819
Productivity GDP in USD/Working hour	47.55	48.2

GDP per capita

- Real GDP per capita: What does that mean?
- Low GDP per capita: Voluntary decision?
- Higher preference for leisure is not covered by GDP.

GDP is only an imperfect indicator:

- Market distortions, such as involuntary unemployment.
- All activities without market prices are not fully recorded.

Kennedy video https://www.youtube.com/watch?v=77IdKFqXbUY

Kennedy video: Transcript

The GDP is the total market value of all final goods and services produced in a economy in a country in a given year.

Robert F. Kennedy Speech
Remarks at the University of Kansas, March 18, 1968

but that Gross National Product - if we judge the United States of America by that - that Gross National Product counts air pollution and cigarette advertising, and ambulances to clear our highways of carnage. It counts special locks for our doors and the jails for the people who break them. It counts the destruction of the redwood and the loss of our natural wonder in chaotic sprawl. It counts napalm and counts nuclear warheads and armored cars for the police to fight the riots in our cities. It counts Whitman's rifle and Speck's knife, and the television programs which glorify violence in order to sell toys to our children. Yet the gross national product does not allow for the health of our children, the quality of their education or the joy of their play. It does not include the beauty of our poetry or the strength of our marriages, the intelligence of our public debate or the integrity of our public officials. It measures neither our wit nor our courage, neither our wisdom nor our learning, neither our compassion nor our devotion to our country, it measures everything in short, except that which makes life worthwhile. And it can tell us everything about America except why we are proud that we are Americans.

Hans Rosling's 200 Countries, 200 Years

https://www.youtube.com/watch?v=jbkSRLYSojo

2.1 Measuring production – GDP

- Gross Domestic Product (GDP): Measure of the aggregate economic production.

Production approach: 2 definitions!

1. GDP is the sum of the value of the final goods and services in the economy during a given period.
2. GDP is the sum of the value added on each layer of the economy.

Income approach

3. GDP is the sum of incomes in the economy during a given period.

Composition of GDP

4. Aggregated demand of goods from the different sectors of the economy.

Calculation of GDP: A numerical example

Steel (Firm 1)		**Automotive (Firm 2)**	
Sales	100	Sales	210
Expenditures (Wages)	−80	Expenditures (Wages)	−70
		Intermediates	−100
Profit	20	Profit	40

Cars are bought by

- Private consumers 150,
- Companies 20,
- Government 30,
- Foreign countries 10.

GDP: Production approach I

1. GDP is the sum of the value of the final goods and services in the economy during a given period.

- Only cars serve final consumption.
- Sales in automotive industry $= 210 \Rightarrow$ GDP $= 210$.

GDP: Production approach II

2. GDP is the sum of the value added on each layer of the economy.

- Sum of all added values $\Rightarrow$ Production value at each stage of the value chain must be determined.
- Value of production $-$ Value of intermediates $=$ Value added

	Value of production	Value of intermediates	Value added
Steel	100	0	100
Automotive	210	100	110
Sum			**210**

GDP: Income approach

3. GDP is the sum of incomes in the economy during a given period.

	Income (Steel)	Income (Automotive)	Sum
Wages	80	70	150
Profit	20	40	60
Sum	**100**	**110**	**210**

GDP: Composition approach

4. The GDP corresponds to the value of all expenditures, i.e. the aggregated demand of goods from the different sectors of the economy.

$$GDP = C + I + G + NX \tag{1}$$

$$GDP = 150 + 20 + 30 + 10 = 210$$

Real versus nominal GDP

Year	Number of cars	Car price	Nominal GDP
2000	10	20,000 €	200,000 €
2001	12	24,000 €	288,000 €
2002	13	26,000 €	338,000 €

Base Year 2000			
Year	Number of cars	Car price	Real GDP
2000	10	20,000 €	200,000 €
2001	12	20,000 €	240,000 €
2002	13	20,000 €	260,000 €

- Nominal and real GDP are equal in the basic year.

The inflation rate: The GDP-deflator

- If nominal GDP increase to a larger extend than real GDP, this is due to an increase of the price level
- Price increases can be measured by the change in the GDP deflator
- GDP deflator in year t is defined as the ratio of nominal GDP over real GDP:

$$P_t = \frac{\text{nominal GDP}}{\text{real GDP}} \tag{2}$$

The inflation rate: The GDP-deflator

$$P_t = \frac{\text{nominal GDP}}{\text{real GDP}} \tag{3}$$

- In the basis year GDP deflator takes the value of 1 (or 100 %).
- GDP deflator is an index number $\Rightarrow$ The level has no economic meaning at all.
- Only changes of the deflator level can be interpreted as inflation:

Either:

$$\pi_t = \frac{P_t - P_{t-1}}{P_{t-1}} \quad \textit{for example} \quad \pi = \frac{122.4 - 120}{120} = 0.02 \tag{4}$$

or

$$\pi_t = ln(P_t) - ln(P_{t-1}) \quad \textit{for example} \quad \pi = ln(122.4) - ln(120) = 0.0198 \tag{5}$$

Laspeyres Price Index

$$P_{La,t+1} = \frac{\sum_{i=1}^{n} p_{i,t+1} \cdot q_{i,t}}{\sum_{i=1}^{n} p_{i,t} \cdot q_{i,t}} \tag{6}$$

Let's go shopping

Shopping tour in period t

Item # i	1	2	3	4	n	
Item	Banana	Milk	Sausage	Beer	Choco	SUM
$q_{i,t}$	1	5	5	10	3	
$p_{i,t}$	2	5	3	4	6	
$p_{i,t} \cdot q_{i,t}$	2	25	15	40	18	100

$$P_{La,t+1} = \frac{}{\sum_{i=1}^{n} p_{i,t} \cdot q_{i,t}} \tag{7}$$

One year later: Shopping tour in period $t+1$

$$P_{La,t+1} = \frac{\sum_{i=1}^{n} p_{i,t+1} \cdot q_{i,t}}{} \tag{8}$$

Item # i	1	2	3	4	n	
Item	Banana	Milk	Sausage	Beer	Choco	SUM
$q_{i,t}$	1	5	5	10	3	
$p_{i,t+1}$	4	5	3	4	6	
$p_{i,t+1} \cdot q_{i,t}$	4	25	15	40	18	102

Comparison t and $t+1$: Official inflation

Item # i	1	2	3	4	n	
Item	Banana	Milk	Sausage	Beer	Choco	SUM
$q_{i,t}$	1	5	5	10	3	
$p_{i,t}$	2	5	3	4	6	
$p_{i,t} \cdot q_{i,t}$	2	25	15	40	18	100

Item # i	1	2	3	4	n	
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$p_{i,t+1} \cdot q_{i,t}$	4	25	15	40	18	102

Actual behaviour & inflation of private household

Item # i	1	2	3	4	n	
Item	Banana	Milk	Sausage	Beer	Choco	SUM
$q_{i,t}$	1	5	5	10	3	
$p_{i,t+1}$	4	5	3	4	6	
$p_{i,t+1} \cdot q_{i,t}$	4	25	15	40	18	102

Item # i	1	2	3	4	n	
Item	Apples	Milk	Sausage	Beer	Choco	SUM
$q_{i,t}$	1	5	5	10	3	
$p_{i,t+1}$	2	5	3	4	6	
$p_{i,t+1} \cdot q_{i,t}$	2	25	15	40	18	100

When the price hammer hits...

- Private households are *directly* substituting expensive goods by cheaper goods.

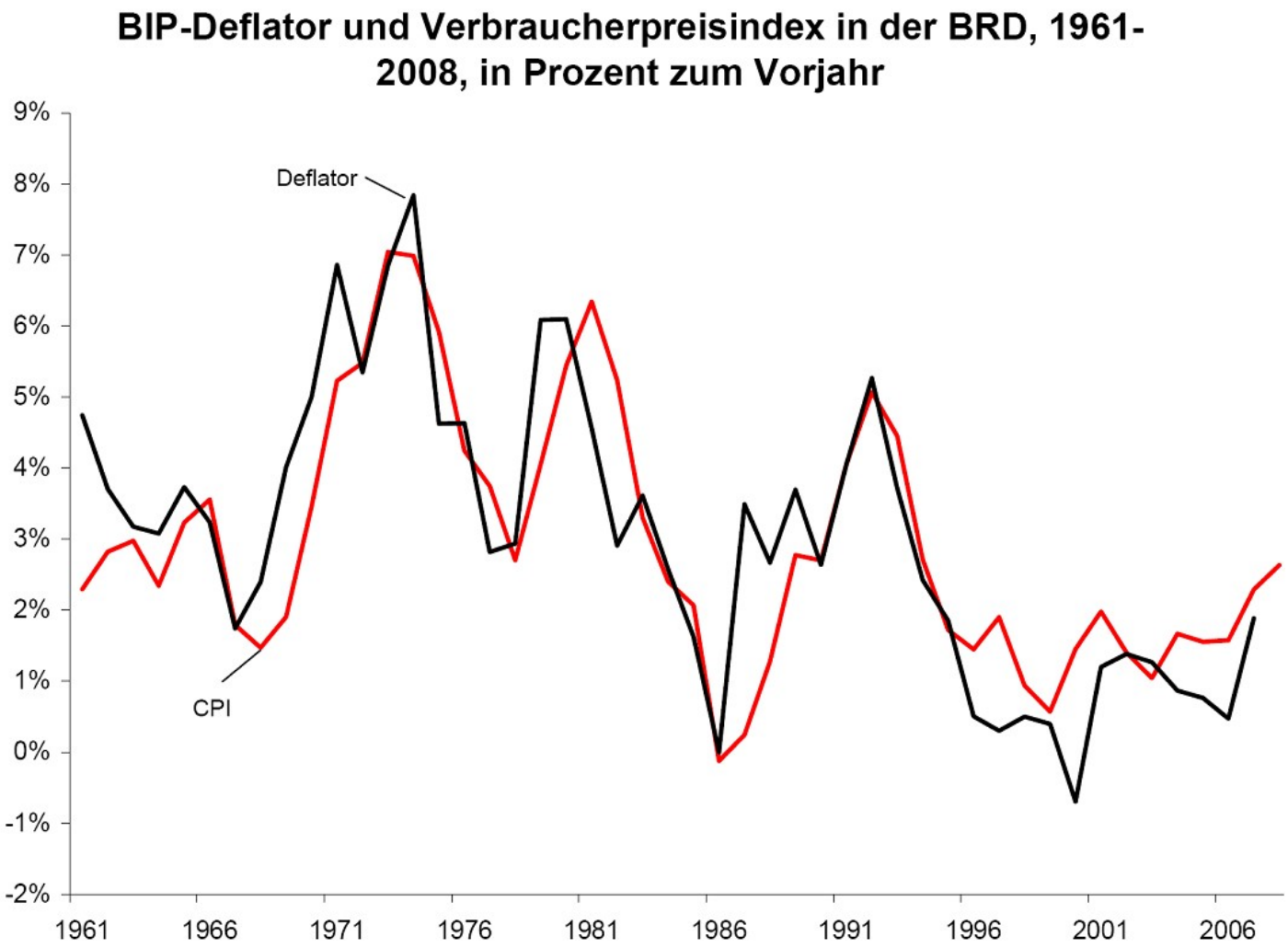
Problems of keeping the quantity structure constant

- Substitution effect.
- Discounters.
- Innovations of goods and services.
- Quality changes.

Consumer price index versus GDP deflator

- GDP deflator is a measure of the average price of all final goods produced.
- Consumer Price Index is a measure of the average price of consumer goods.
- Consumer price index is calculated monthly by the Federal Statistical Office, GDP deflator only quarterly.
- Eurostat calculates the inflation rate for the entire euro area using the Harmonized Index of Consumer Prices (HICP).

GDP deflator versus consumer price index



Cost of inflation

If inflation rate is high and constant:

- Relative low cost, because adjustments can be anticipated and increases are incorporated in all expectations.
- But transaction costs are higher $\Rightarrow$ Example: Gas station or ATMs in Turkey

If inflation rate is high and variable:

- Redistribution, because prices and wages d not adjust simultaneously. Redistribution between:
  - Employed and pensioners or
  - Borrower and lender
  - Tax progression leads to higher tax revenues.
- Inflation increases uncertainty and one does not have a good basis to build expectations on

2.2.2 Unemployment rate

- Labor force (L) = Employed (N) + Unemployed (U)
- Unemployment rate: $u = \frac{U}{L}$

It seems to be easy to judge who is employed, but difficult to decide whether a person is unemployed and employment seeking.

- Number of unemployed is measured by the *Federal Employment Agency of Germany (Bundesagentur für Arbeit)*
- Incentive to declare unemployment depends on whether
  - a person receives unemployment benefits and how much
  - and on the likelihood to receive job offers through this institution.

Unemployment rate according to International Labor Organization (ILO)

- According to the definition of the International Labor Organization (ILO) one person is unemployed if:
  - he/she confesses in an interview that he/she is without a job,
  - he/she is able to begin a new job within two weeks and
  - he/she has tried to find a job by himself/herself within the last 4 weeks.
  - These criteria are valid independent of whether a person is registered as unemployed or not.
- Registered unemployed who do not want to work, are not in the labor force according to the ILO concept!

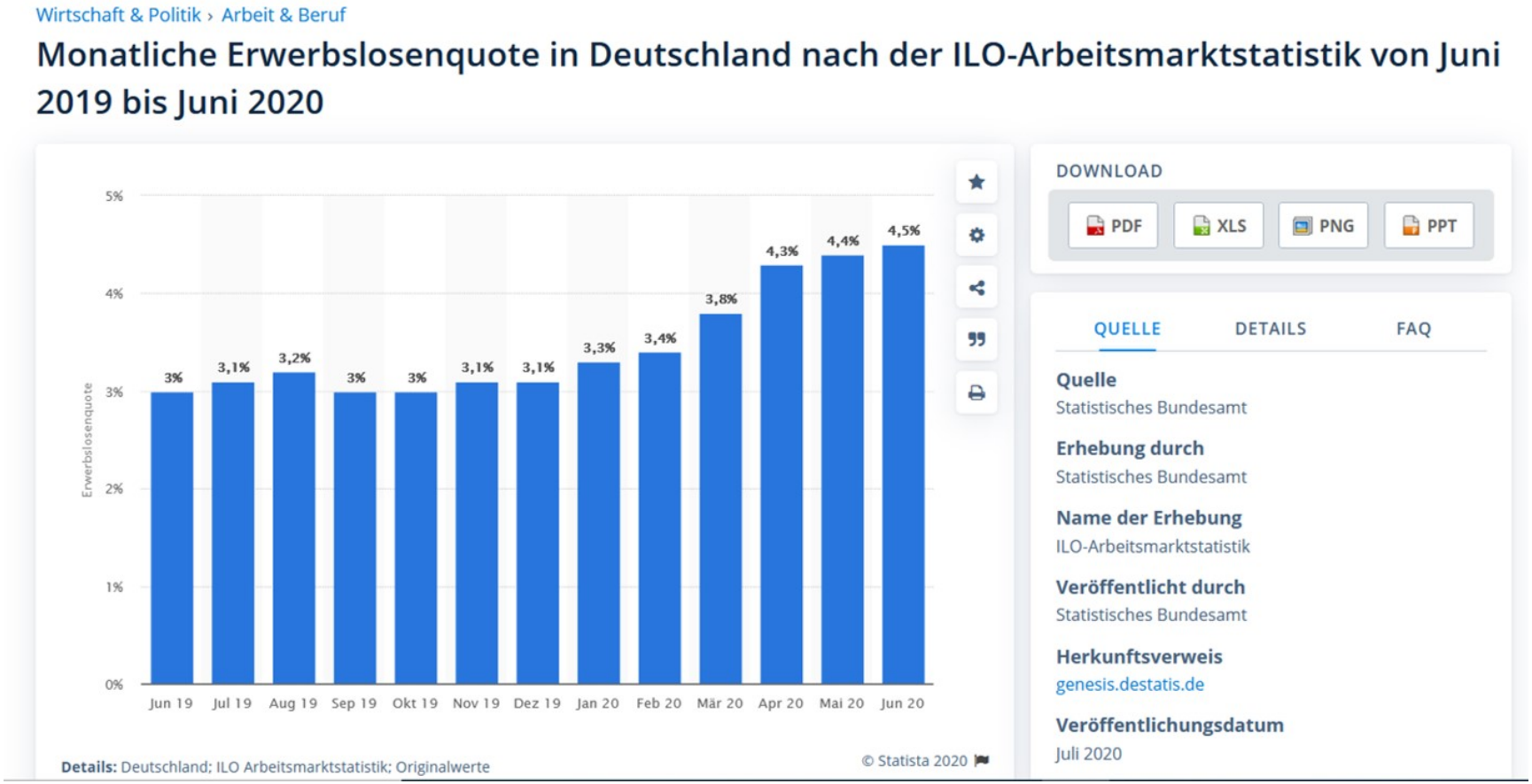
Unemployment rate according to ILO

- International comparisons of unemployment rates not meaningful if not adjusted for country specific effects.
- International comparisons only possible if we measure the same incidences with the same methods.

In Germany

- Until 2004, only once a year assessment of the unemployment rate according to the ILO concept.
- Micro-census: about 1 % of the households are interviewed yearly.
- Since 2005: Federal Statistical Office of Germany (Statistische Bundesamt) uses monthly telephone questionnaires according to the ILO-standards.

Statistisches Bundesamt: ILO-Concept

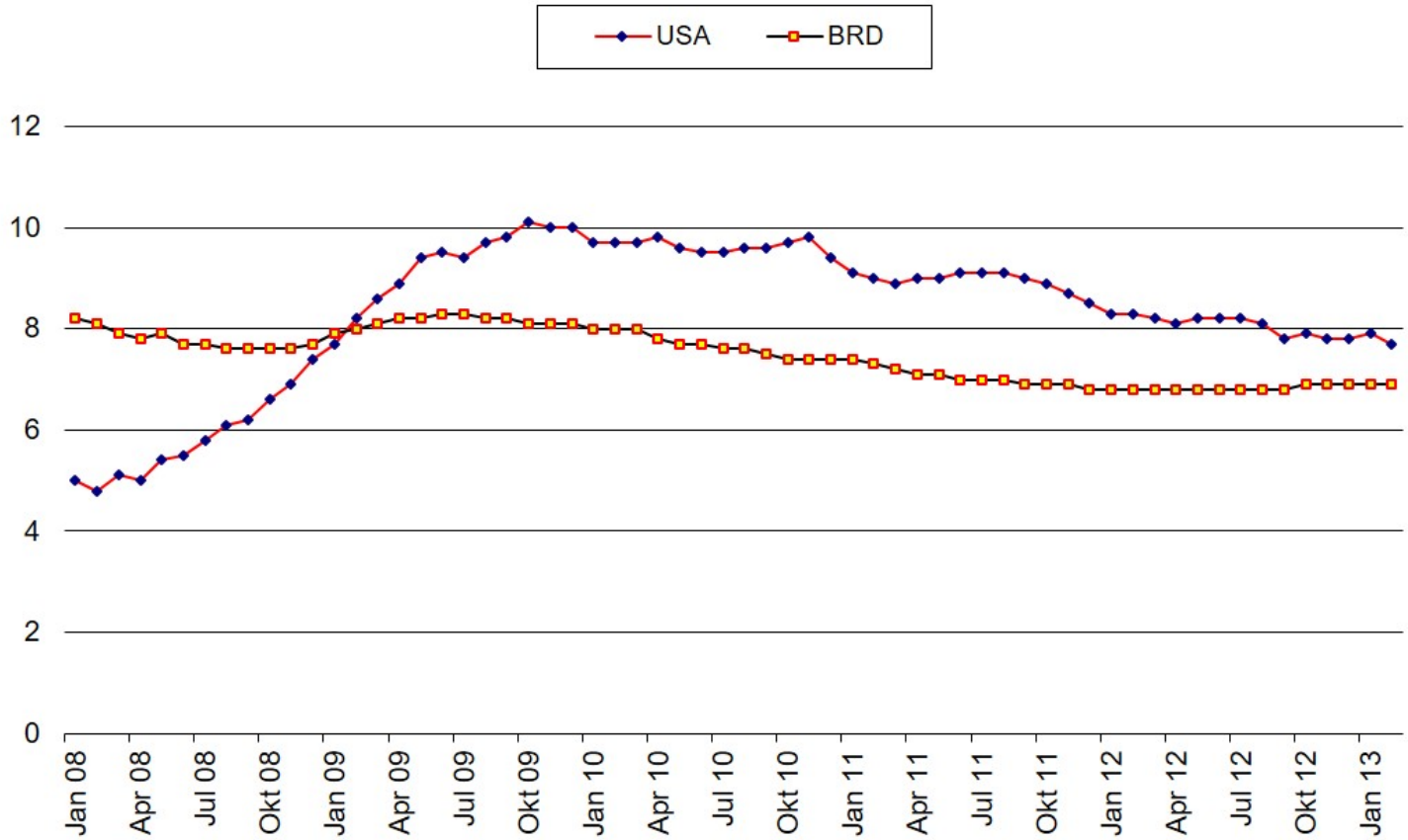


Source: Statista und Statistisches Bundesamt.

Bundesagentur für Arbeit

Source: Statista und Bundesagentur.

USA versus Germany: Unemployment rate



Deutschland: Bundesagentur für Arbeit: Der Arbeits- und Ausbildungsmarkt in Deutschland.
USA: US Bureau of Labor Statistics: A-10. Unemployment rates by age, sex, and marital status, seasonally adjusted
`http://www.bls.gov/cps/tables.htm`