

# X-factors in Price Cap Regulation: An Alternative Approach

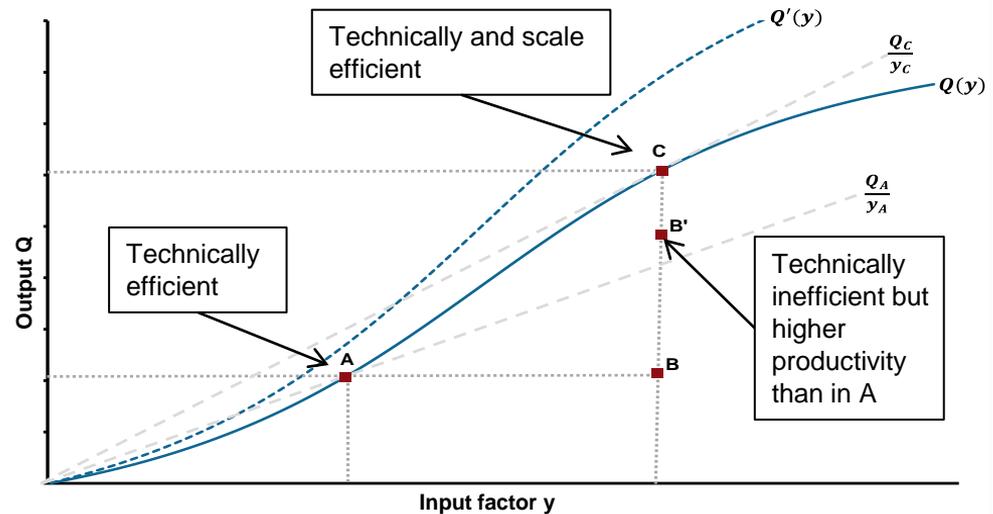
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# Measuring productivity growth (X-factor): Introduction

- Productivity is measured by the relation between output ( $Q$ ) and factor input ( $y$ )
  - Factor productivity: Relation of the output to a single input factor (e.g. labour)
  - Totale factor productivity (TFP): Relation of the output to the aggregated factor input
- Reasons for productivity growth
  - Technological progress („frontier-shift“)
  - Reduction of inefficiencies („catch-up“)
  - Utilisation of economies of scale



# X-Factors in the postal regulatory practice

- Postal productivity growth driven by two opposite effects
  - Technological progress & reduction of inefficiencies
  - Loss of economies of scale due to declining letter volume
- The German postal legislation provides for two ways to determine / inform the X factor
  - Based on cost and volume forecasts of the regulated company
  - Based on productivity growth of companies in comparable markets with competition

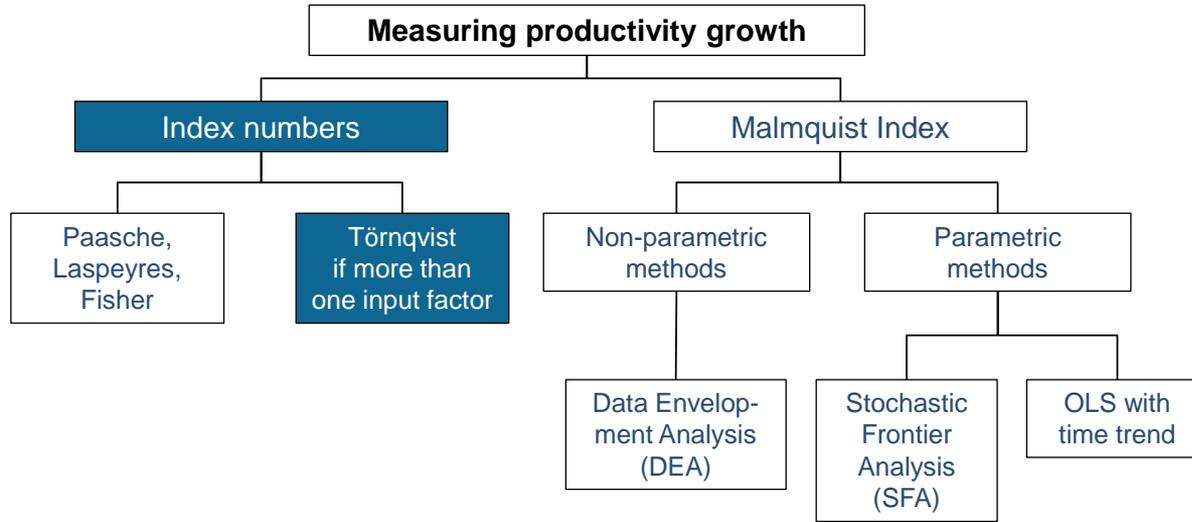
## WIK Study & Excel tools

Bundesnetzagentur commissioned WIK to

- identify appropriate methods to estimate productivity growth based on companies in comparable markets
- develop a tool box with different approaches to measure productivity growth
- discuss the pros and cons of each approach (without recommendation)

- 'Comparable market approach' not applied in postal tariff regulation by other EU Member States
- Bundesnetzagentur applied WIK tools in their decision for the next price cap period 2022-2024

# Measuring productivity growth: Appropriate methods



$$\Delta TFP = \frac{TFP_t}{TFP_{t-1}} = \frac{\frac{Outputindex_t}{Inputindex_t}}{\frac{Outputindex_{t-1}}{Inputindex_{t-1}}} = \frac{Outputindex_t}{Inputindex_t} \cdot \frac{Inputindex_{t-1}}{Outputindex_{t-1}}$$

Output	Input factors
Production value (PV)	Labour & Capital Purchased goods & services
Gross value added (GVA)	Labour & Capital

# Measuring productivity growth: WIK developed four tools

#	Tools	Data sources	
1	Development of TFP and labour productivity in the German postal and courier sector	EU KLEMS Economic sector: Postal and courier activities (NACE Rev. 2 Division 53)	Sector data
2	Development of the labour productivity in the postal and courier sectors of other European countries	EU KLEMS Economic sector: Postal and courier activities (NACE Rev. 2 Division 53)  Eurostat: Population, GDP per head	
3	Development of TFP and labour productivity based on a composite sector index in Germany	Destatis (German Federal Statistical Office) Selection of appropriate economic sectors for each element of the postal value chain (excluding postal and courier activities)	USP data
4	Development of TFP and labour productivity based on postal universal services providers in Europe (excluding Deutsche Post)	Financial and employment data of 30 European USPs best reflecting the regulated services (segment information, if available)  Eurostat: Deflators, population and exchange rates	

# (1) Total factor & labour productivity in the German postal and courier sector

## Pros

- EU KLEMS Data is publicly available
- Sector data includes data of many companies
- Standardised data (by collection)

## Cons

- Regulated company is part of the sector data (with significant weight)
- Historic data & time lag in data collection: time series end 2016 / 2017

Tool options	
Output	<ul style="list-style-type: none"><li>• Production value (PV)</li><li>• Gross value added (GVA)</li><li>• PV per person employed</li><li>• GVA per person employed</li></ul>
Available time series	<ul style="list-style-type: none"><li>• PV: 1998 – 2016</li><li>• GVA: 1998 – 2017</li></ul>
Calculation of the mean value	<ul style="list-style-type: none"><li>• Arithmetic mean</li><li>• Geometric mean (always smaller than the arithmetic mean)</li></ul>

## (2) Labour productivity in the postal and courier sectors of other European countries

### Pros

- Data is publicly available
- Sector data includes data of many companies
- Standardised data (by collection)
- Regulated company is not part of the sector data

### Cons

- Second best: Labour productivity can change without change in TFP
- Historic data & time lag in data collection: time series end 2017
- National universal service providers may have a significant weight in the sector data
- More letter volume decline compared to Germany

Tool options	
Output	<ul style="list-style-type: none"><li>• PV per employed person</li><li>• GVA per employed person</li><li>• GVA per working hour</li></ul>
Country selection	All available countries AT, BE, CZ, DK, EE, EL, ES, FI, FR, HU, IE, IT, NL, PT, RO, SI, SK, UK
Available time series	<ul style="list-style-type: none"><li>• Depends on country and output</li><li>• Max. 1996 – 2017</li></ul>
Country weights	<ul style="list-style-type: none"><li>• Equal weights</li><li>• Weighted by inhabitants</li><li>• Weighted by GDP per head</li></ul>
Calculation of the mean value	<ul style="list-style-type: none"><li>• Arithmetic mean</li><li>• Geometric mean</li></ul>

# (3) Total factor & labour productivity based on a German composite sector index

## Pros

- Sector data is publicly available
- Sector data includes data of many companies
- Standardised data (by collection)
- Regulated company is not part of the sector data
- Sectors are usually competitively structured

## Cons

- Historic data & time lag in data collection: time series end 2018
- Availability of appropriate sector data
- Sector productivities do not reflect losses in economies of scale
- More appropriate to use as proxy for productivity growth due to technological progress

Tool options	
Output	<ul style="list-style-type: none"><li>• GVA</li><li>• GVA per employed person</li></ul>
Available time series	<ul style="list-style-type: none"><li>• 1992 – 2018</li></ul>
Weight of each element of the postal value chain	<ul style="list-style-type: none"><li>• Collection, Processing, Transport, Delivery und Others</li><li>• Freely selectable (should ideally reflect cost shares of the regulated company)</li></ul>
Comparative economic sectors (NACE Rev. 2)	<ul style="list-style-type: none"><li>• 11 sectors (pre-defined by WIK)</li><li>• Freely selectable for each element of the value chain</li><li>• If more than one sector per element, results are equally weighted</li></ul>
Calculation of the mean value	<ul style="list-style-type: none"><li>• Arithmetic mean</li><li>• Geometric mean</li></ul>

# (4) Total factor & labour productivity based on postal universal services providers in Europe

## Pros

- Financial data is publicly available for most European national postal operators
- Deutsche Post is not part of the data base
- Activities of European national postal operators are comparable with activities of the regulated company

## Cons

- Historic data & time lag in data collection: time series end 2020
- The longer the time series the more likely are changes in the segment definitions (structural breaks in revenues and OPEX)
- National letter markets usually not competitively structured
- Benchmark USPs with more decline in letter volume compared to Deutsche Post

Options	
Output	<ul style="list-style-type: none"> <li>Deflated revenues (proxy PV)</li> <li>Deflated revenues per FTE</li> </ul>
Input	<ul style="list-style-type: none"> <li>Deflated OPEX (proxy inputs)</li> </ul>
Time series available	<ul style="list-style-type: none"> <li>Availability depends on the USP</li> <li>Max. 2011 – 2020</li> </ul>
Company selection	<p>Option 1: Individual selection (EU-26, CH, IS, NO, UK)</p> <p>Option 2: Selection based on criteria</p> <ul style="list-style-type: none"> <li>Listed companies (yes/no)</li> <li>Services provided (three categories)</li> </ul>
Company weights	<ul style="list-style-type: none"> <li>Equal weights</li> <li>Weighted by inhabitants</li> </ul>
Calculation of the mean value	<ul style="list-style-type: none"> <li>Arithmetic mean</li> <li>Geometric mean</li> </ul>

# BNetzA applied the WIK tools in its draft decision

- WIK provided the Bundesnetzagentur with a tool box and a detailed discussion of the different approaches / options
- Bundesnetzagentur decided whether and how to apply the tools
- The tools are based on data of companies in comparable markets with (more or less) competition
- Although none of the tools are perfect they can be useful to validate the cost-based X-factor with data that is broadly independent from the regulated company

## BNetzA Draft Decision Price Cap (2022-2024)

Cost-based X-factor	-1.35%
Tool 1 (TFP)	-0.736%
Tool 2 (Labour productivity)	-1.476%
Tool 3 (TFP)	-0.006% (not considered as appropriate benchmark)
Tool 4 (TFP)	Letter & parcel services: -2.96% & Listed: -1.76%

The WIK study and the Excel tools are published on the homepage of the Bundesnetzagentur

# Thank you for your attention!



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