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A Differentiated Incentive Regulation as a Compromise between TOTEX-Incentive Regulation and Cost-Plus?

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Agenda

1) Basis for assessment of regulatory regimes
2) Options for designing a regulatory regime
3) Analysis of low- and high-powered incentive schemes
4) Choosing the level of incentives for electricity networks
5) The German regulatory regime: the need for reform?

1) Basis for assessment of regulatory regimes

Assessement criteria

- **Allocative efficiency (provision)**
  - Excluded from analysis: price structure, optimal choice of capacity or quality level
  - price level
- **Cost efficiency (production)**
  - welfare economic perspective
  - consumer perspective

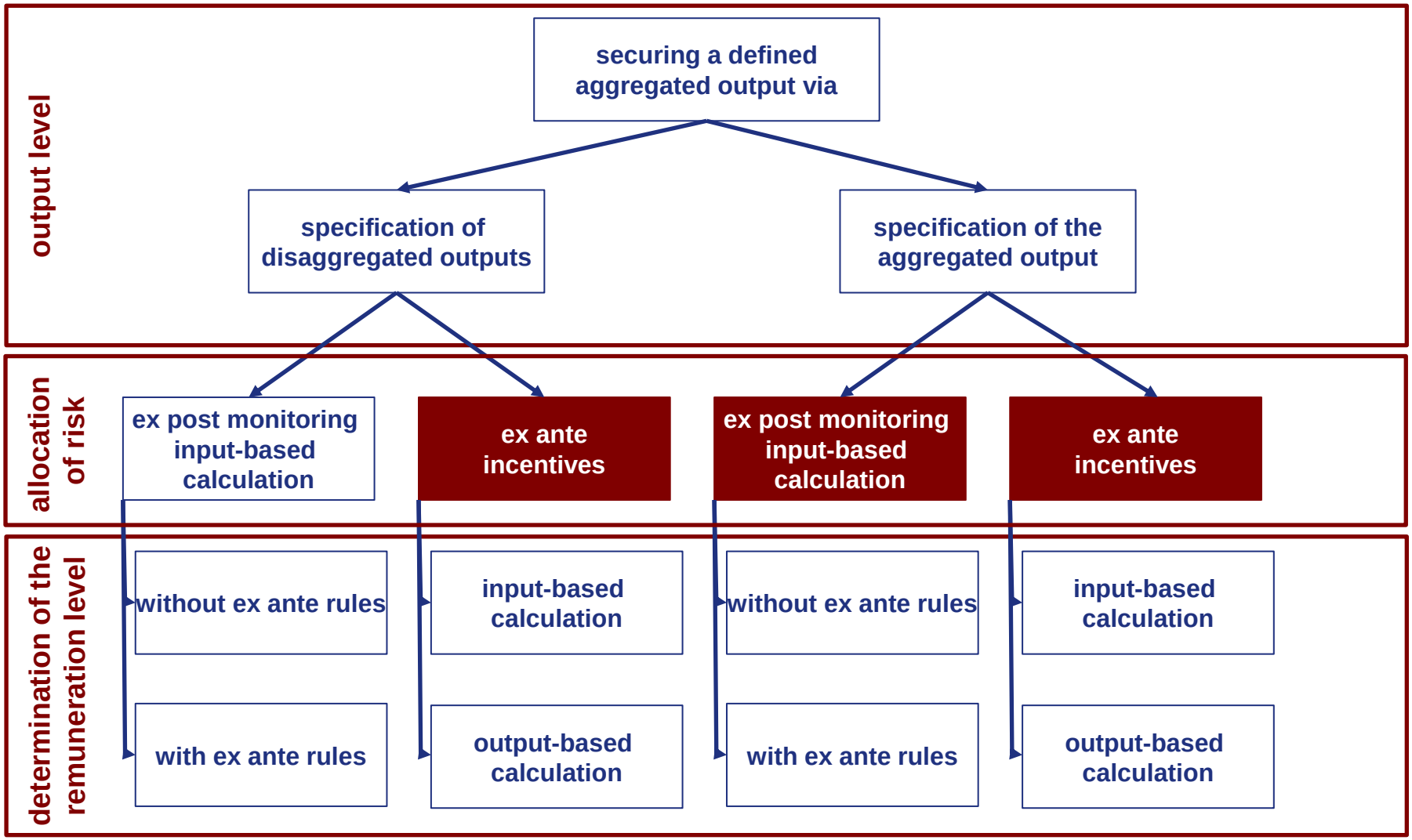
Trade offs possible

→ **Focus on consumer perspective but transaction costs of regulator and firms are taken into account**

Basis of analysis

- New institutional economics: especially principal-agent and transaction cost theory

2) Options for designing a regulatory regime



A selection of relevant literature

BACK UP

Fundamental findings by the new institutional economics

- Theory of incomplete contracts: setting of incentives for bundled or unbundled outputs (e.g. Hart 2003)
- Transaction cost theory: opportunistic behavior in case of incomplete contracts (e.g. Williamson 1990)
- Principal-Agent-Theory: incentives vs. monitoring; trade-off between positive effects of setting incentives and costs of risk taking (e.g. Jensen 1983, Fama/Jensen 1983)

Vast amount of literature, but often only single aspects are discussed

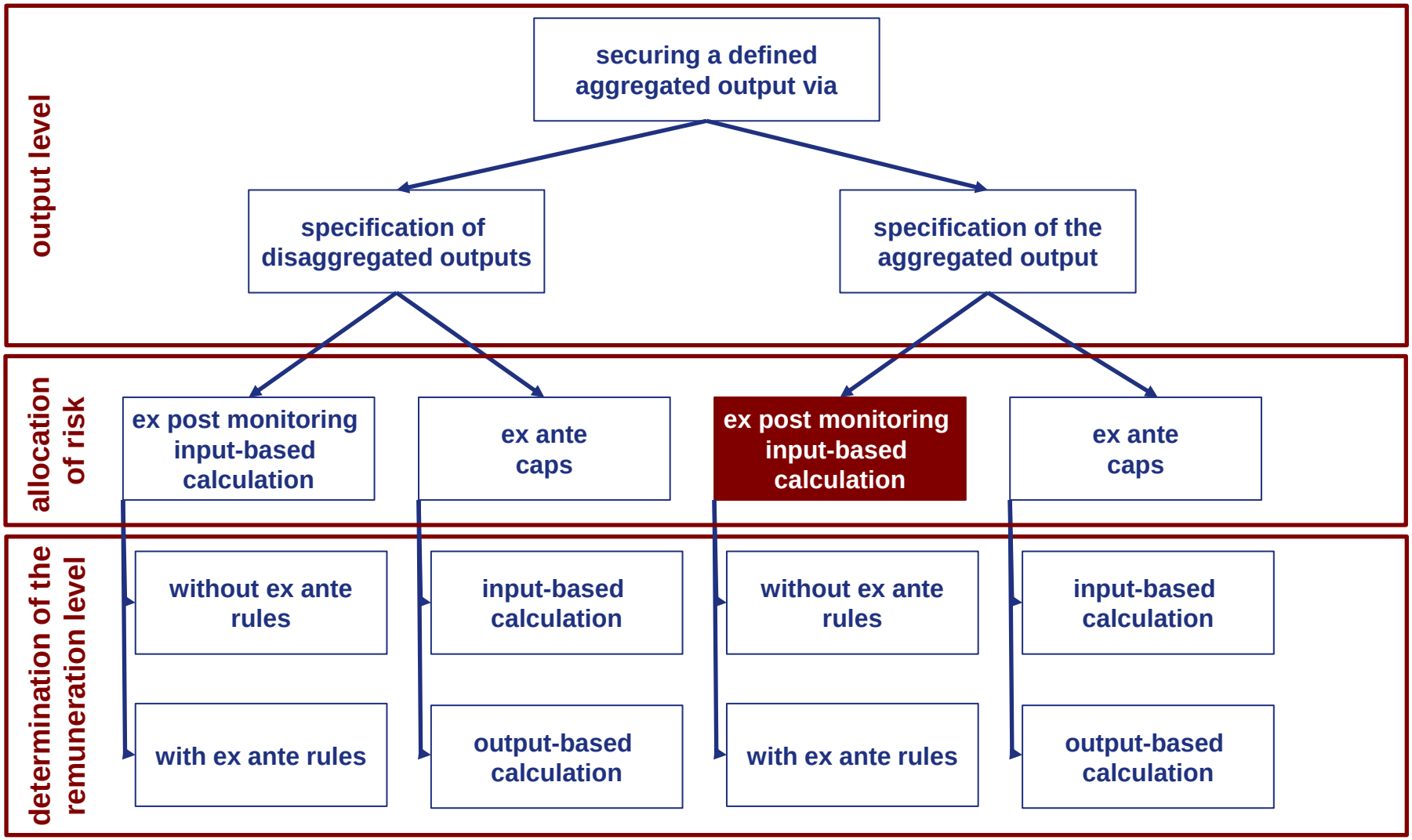
Intensified discussion of deficits of incentive regulation and trend back from incentive regulation towards more cost-based elements in regulation.

- Methodical problems with estimating the remuneration level are known (Brunekreeft 2012, Shuttleworth 2005, Consentec 2006)
- Commitment problems and regulatory risk (e.g. Brunekreeft/Meyer 2011, Helm 2009)

Consideration of central aspects by Glachant et al. (2012): The adequacy of a regulatory regime depends on

- the knowledge of the regulator
- the heterogeneity of tasks of the regulated firm.

3) Analysis of low- and high-powered incentive schemes



3.1) Ideal-typical cost-based regulation

Theory: cost based regulation (cost pass through)

Characteristics

- Determination of remuneration level based on observed costs
- Firm does not bear any cost or demand risk

Evaluation

\+ Low capital costs due to cost pass-through and low regulatory risk

\- No incentives for cost efficient behaviour

Praxis: ex post monitoring

Ex.: Regulation in Germany 2005-2008

Monitoring

\+ More efforts of reducing costs and more appropriate investment activity

\- Higher knowledge requirements for the regulator

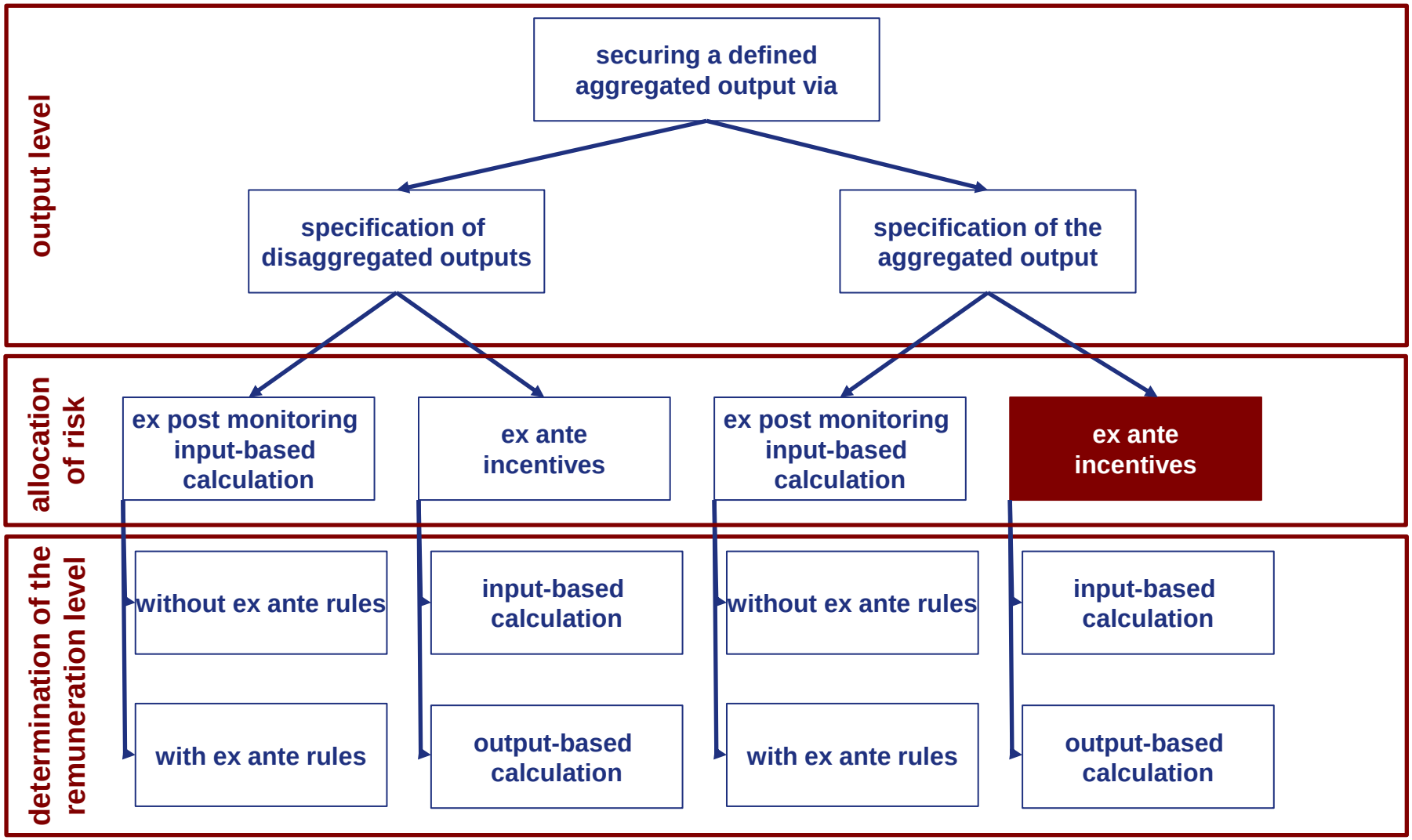
\- Cost of capital rises due to regulatory risk

Ex ante rules and controls

\+ Reduction of regulatory risk

\- Even higher knowledge requirements

3) Analysis of low- and high-powered incentive schemes



3.2) Ideal-typical TOTEX-incentive regulation

Characteristics

Setting of incentives for the aggregated output

- Determination of remuneration level independently of individual costs
- Cost (and optionally demand) risk is transferred to the firm

Evaluation:

low incentives for long term efficient investments

\+ Incentives for cost efficiency including an optimization of the interface between OPEX and CAPEX (provided that the commitment is credible!)

\- Increased costs of risk taking

\- Danger of reduction of supply quality

\- Time lag problem

\- **Methodical difficulties → high security premiums!**

\- **Commitment-problem**

  - short term investment strategy → degeneration of substance quality
  - increased regulatory risk!

\- … a possible opposing effect: incentives to overinvest in case of high capital costs with high security premiums

\- Complexity impedes political control of the regulation and simplifies lobbyism

Evaluation depends on perspective (consumer / welfare)

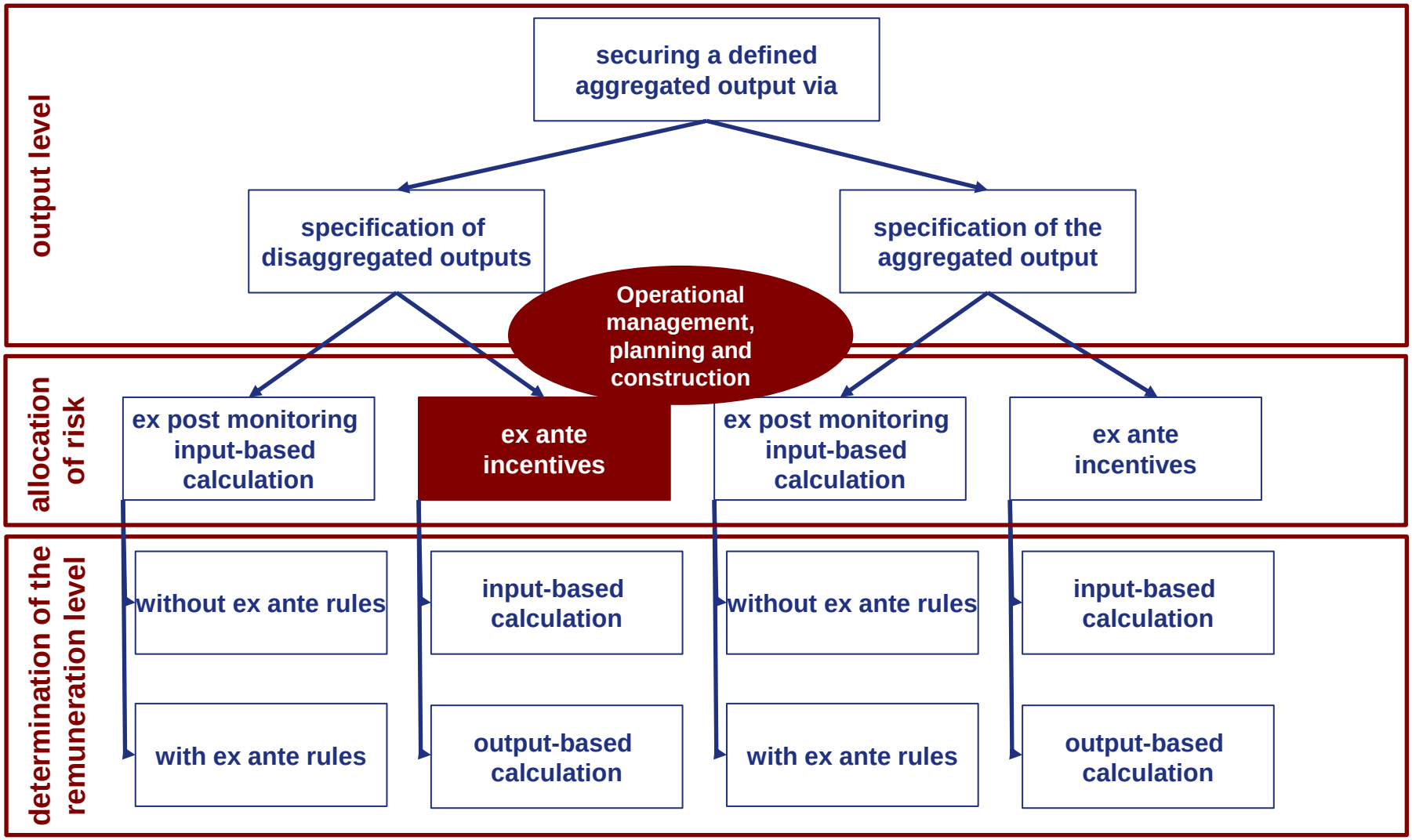
Modifications in praxis

Ex.: Regulation in Germany since 2009

Cost risk is only partially transferred to the firm

- Reduction of costs of risk taking, relevance of methodical problems…
- Other disadvantages, e.g. ratchet effect

3) Analysis of low- and high-powered incentive schemes



3.3) Differentiated incentive regulation (DIR)

Characteristics: separated allocation of cost risk for each (disaggregated) output

Operational management

- Incentives for efficient OPEX, often output-based determination of the remuneration level

Planning and construction

- Ex ante control and approval for investment projects / plans by the regulator
- Incentives for each investment project via fixed or target price

Regulated Asset Base

- Network investments become part of the RAB after completion (fixed or target price)
- Regulator commits that the RAB is safe
- Interests comparable to government bonds possible (almost risk-free)

Evaluation

Advantages

- Lower capital costs
- Solving of deficits of a TOTEX-incentive regulation
  - Low commitment problem
  - Low time lag problem
  - Lower absolute security premiums

Disadvantages

- Definition of the interface between OPEX and CAPEX
- Increased regulatory effort due to micromanagement for investments
- Danger of reduced supply and substance quality, but incentives for sufficient investment

4) Choosing the level of incentives for electricity networks

Differentiated Incentive Regulation

- Especially advantageous if
  - share and volume of long-living, specific assets high
  - investment needs are high
- Monitoring / cost pass-through for innovative investment projects possible

Cost-based regulation (if possible mixed with incentives)

- Cost pass-through while acquiring know-how
- Alternatively in TOTEX incentive regulation high security premiums would be unavoidable

TOTEX-incentive regulation is in general more suitable in sectors with a low share and volume of long-living, specific assets.

5) The need for reform of the German regulatory regime

Onshore transmission networks

- Regulator and parliament decides on the necessity of investments
- High share and volume of long-living, specific assets; further increase due to investment needs
- Wide dispersion of knowledge for construction and costs of 380/220-kV-AC-lines

→ Change to a differentiated incentive regulation would be advantageous

Offshore transmission networks

- Knowledge concerning technology and costs low; high unforeseeable risks

→ Cost-based regulation with monitoring and where applicable ex ante rules

- Integration into a differentiated incentive regulation would be possible without difficulty
- In the long run, if possible integration into a DIR (further knowledge about cost structures and technology has to be acquired)

Distribution networks ?

- Change to a differentiated incentive regulation in case of bigger firms probably possible and advantageous.
- Discrimination of regulation for example according to size or ownership has to be examined

Thank you for your attention!

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References

Brunekreeft, Gert (2012): On the role of international benchmarking of electricity Transmission System Operators facing significant investment requirements; Bremen Energy Working Papers, 12.

Brunekreeft, Gert; Meyer, Roland (2011): Regulation and Regulatory Risk in the Face of Large Transmission Investment; Bremen Energy Working Papers, 05.

Consentec (2006): Untersuchung der Voraussetzungen und möglicher Anwendung analytischer Kostenmodelle in der deutschen Energiewirtschaft. Untersuchung im Auftrag der Bundesnetzagentur für Elektrizität, Gas, Telekommunikation, Post und Eisenbahn. Abschlussbericht vom 20.11.2006.

Fama, Eugene F.; Jensen, Michael C. (1983): Separation of Ownership and Control. In: Journal of Law and Economics 26 (2), S. 301–325.

Helm, Dieter (2009): Utility regulation, the RAB and the cost of capital [URL: http://www.dieterhelm.co.uk/node/676].

Shuttleworth, Graham (2005): Benchmarking of electricity networks: Practical problems with its use for regulation. In: Utilities Policy 13, S. 310–317.

Williamson, O. E. (1990): Die ökonomischen Institutionen des Kapitalismus: Unternehmen, Märkte, Kooperationen, Tübingen: Mohr.