

Towards efficiency orientated regulation in water supply

ROUNDTABLE UTILITY REGULATION IN UKRAINE

01 March 2005





Outline

- **Why efficiency analysis?**
- **How to implement efficiency analysis?**
 - Choice of model (algorithm)
 - Choice of parameters
- **Conclusion**

What is the 'best' way to regulate?

- **There is a growing preference for regime that:**
 - delivers cost and price reductions;
 - safeguards quality;
 - provides returns to shareholders; and
 - deals with other regulatory objectives transparently.

Price Caps and Yardstick competition are alternatives for incentive regulation

Price Caps	Yardstick competition
<p>Prices based on firms own cost: $RPI - X + Q = RPI +/- K$</p> <p>Tariff adjustment after 5 years linked to firm's own costs</p>	<p>Annual tariff change to reflect average industry cost reduction</p> <p>Tariff adjustment not linked to firm's costs</p>

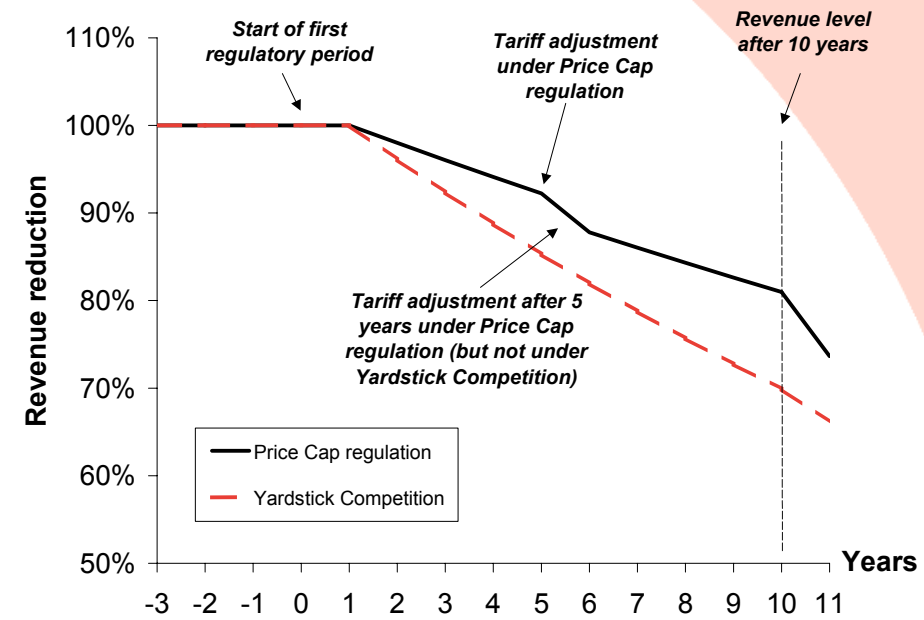
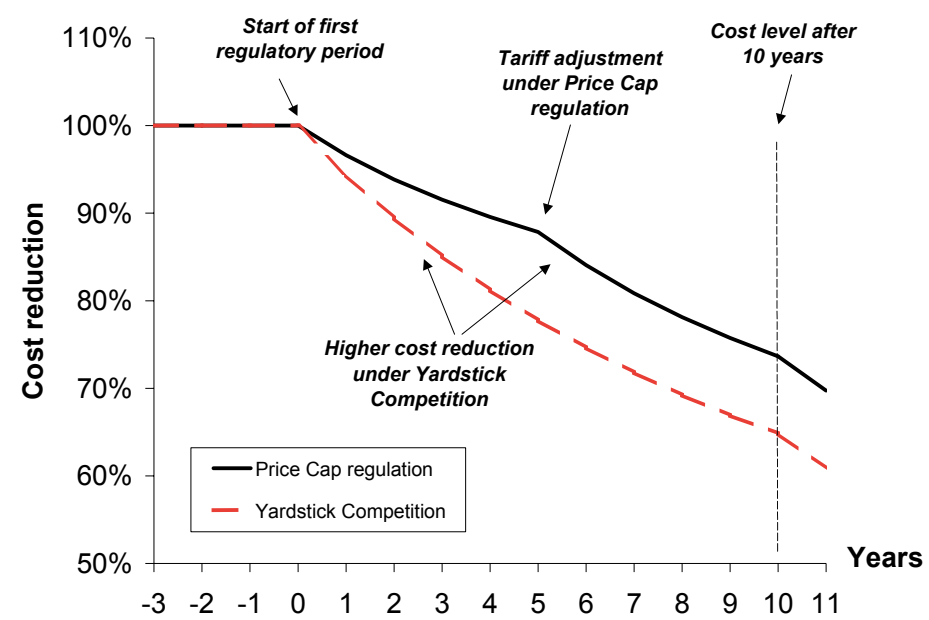


**Link to own cost
reduces efficiency
incentives**



**Link to other firm's
cost enhances
efficiency incentives**

Benefits of Yardstick Competition



With base case assumptions, yardstick competition delivers higher cost reduction incentives and hence higher revenue reductions...

... Benefits of Yardstick Competition

- Plus benefit for average and above average company (shareholder)
 - not guaranteed for all companies

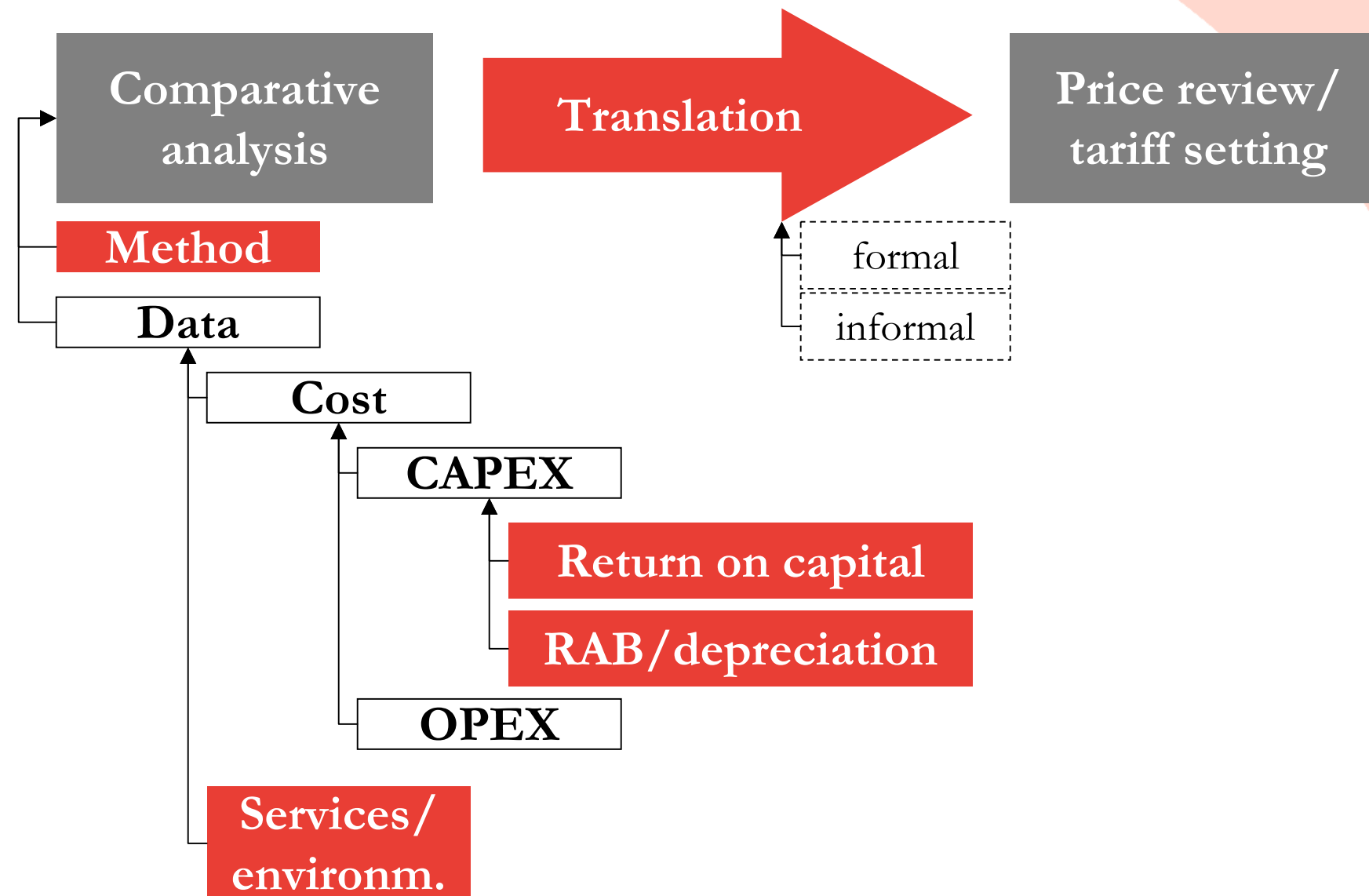
Regulatory mechanism	10 year revenue reduction	Average annualised return on capital
Cost plus	7%	7% (approx)
Price cap with 2% p.a. required revenue reduction – 5 year lag	19%	7.8%
Yardstick competition with 2% p.a. revenue reduction during period – 10 year lag	17%	9.5%
Yardstick competition with 4% p.a. revenue reduction during period – 10 year lag	30%	8.1%

Average annualised rate of return for average company

Source: Frontier Economics model

 **Potential improvement for all stakeholders in case of yardstick approach rather than price cap or cost plus**

Principle issues for implementation



Robustness of benchmarking approaches

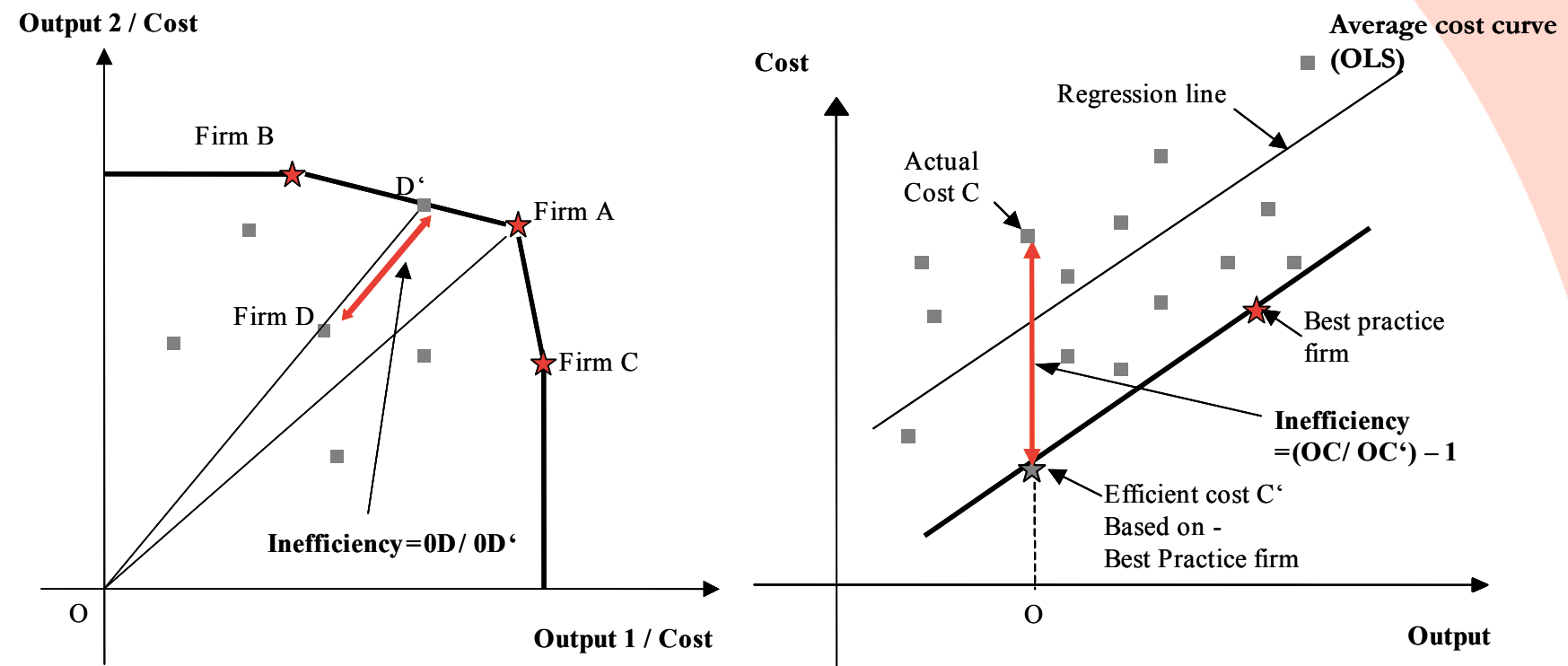
○ Concern

- “As there is no single model or methodology which can be justified it is inappropriate to simply choose one for regulatory purposes”

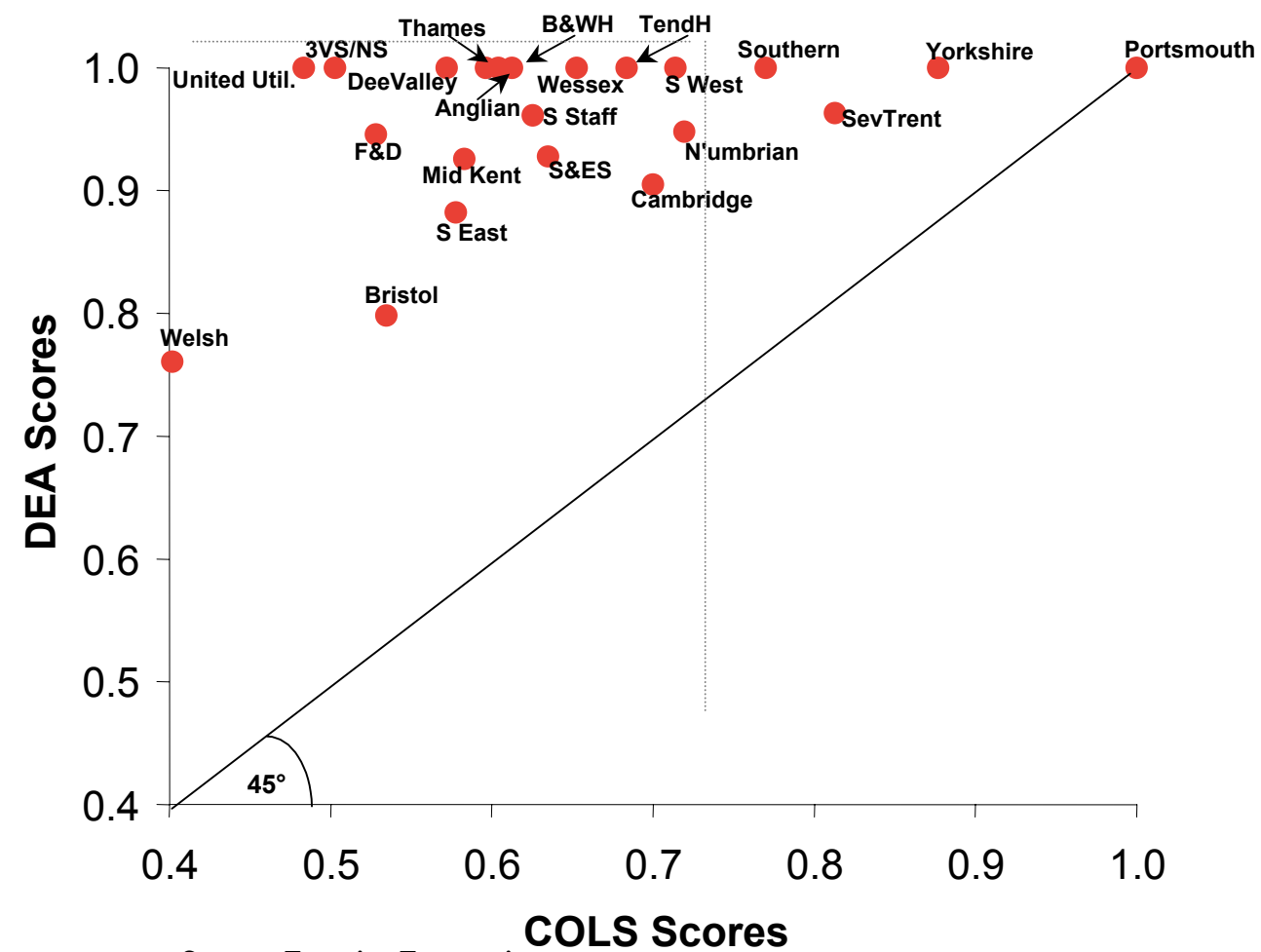
○ Response

- Different models serve to answer different regulatory questions
- It is essential to initially pose the correct “benchmarking question”, which may differ depending on the political and historical context and this affects the method to be adopted

DEA and regression analysis are commonly applied techniques



Indikative comparison: Opex benchmark of UK water companies DEA versus COLS



Source: Frontier Economics

Interpretation and applications may differ

DEA	Regression
<ul style="list-style-type: none">○ „Local“ efficiency comparison<ul style="list-style-type: none">• only compares firms with the structurally most comparable peer companies• (in small samples) firms with exceptional characteristics may be shown as efficient „by default“○ Allows multiple input analysis	<ul style="list-style-type: none">○ „Global“ efficiency comparison<ul style="list-style-type: none">• tries to fit all firms to one equation



e.g. applicable in large samples
with diverse firms



e.g. applicable for sample with
fairly homogenous firms

Uncertainty about structural variables

○ Concern

- “There is uncertainty about which cost drivers to include in the benchmarking analysis, again making it unsuitable for ensuring convergence across firms in the regulated industry”

○ Response

- The choice of variable firstly depends on the precise scope of analysis
 - Long run versus short run efficiency comparison
- Formal approaches exist to identify the most appropriate variables

First need to determine the scope of comparison...

Short-run efficiency analysis	Long-run efficiency analysis
<ul style="list-style-type: none">○ Is the firm operating and maintaining the existing asset base efficiently○ The existing asset base is therefore treated as an <u>output</u>	<ul style="list-style-type: none">○ The analysis now also extends to the question of whether the existing assets are actually needed

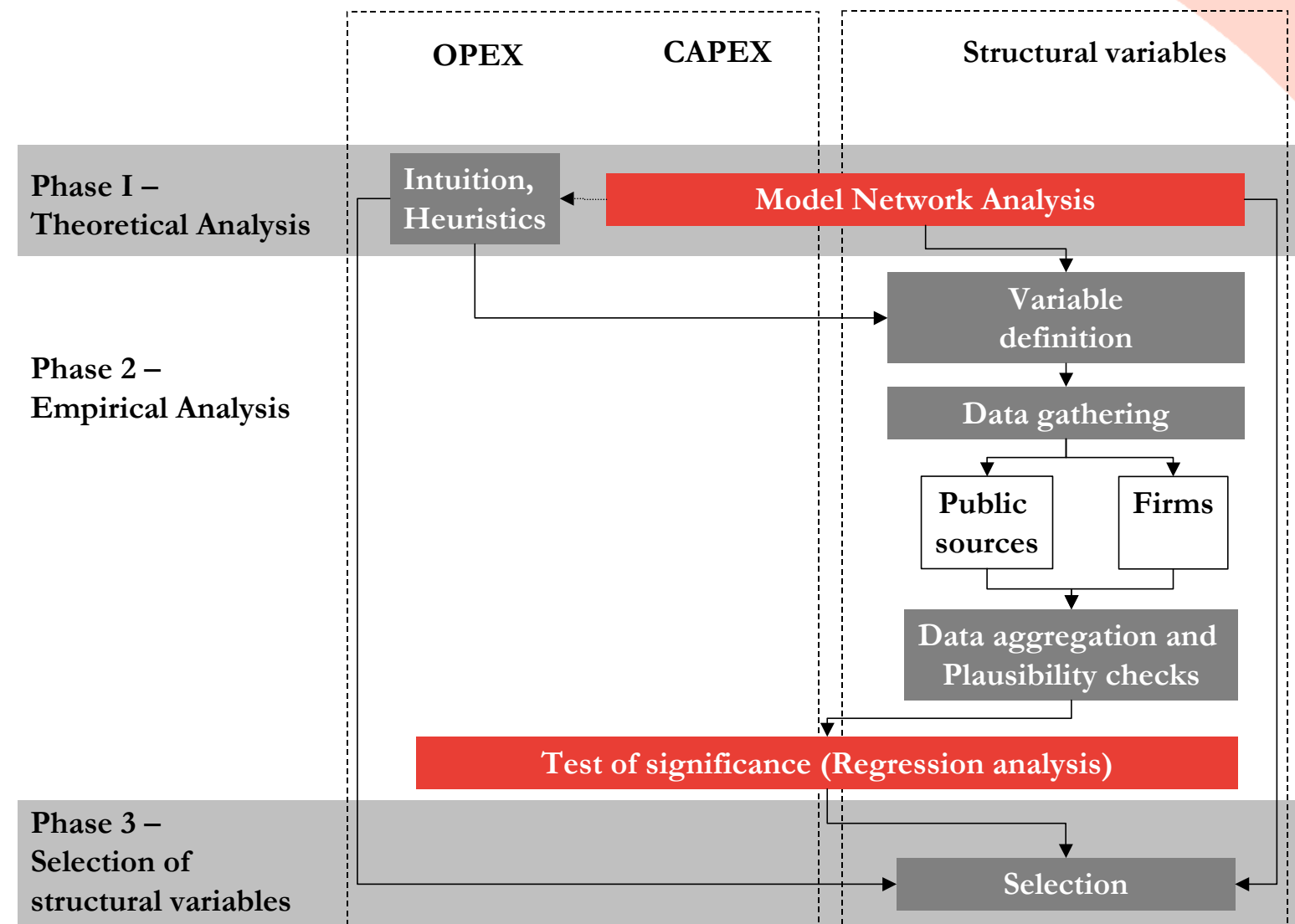


Short run
„maintenance model“



Long run
„service model“

... then select the structural variables



UK example: diverse benchmarking models for sub-processes

Modell	Input- und Outputgrößen
1 Distribution OPEX	Inputs: LN ((Distribution functional expenditure excluding power expenditure)/(residents winter population)) Outputs: (Length of main with diameter > 300mm)/(total length of main)
2 Resources and treatment OPEX	Inputs: (Resources and treatment functional expenditure less power expenditure less environment agency charges)/(resident winter population) Outputs: (Number of sources/distribution input); Proportion of supply from rivers.
3 Power expenditure OPEX	Inputs: LN(Power expenditure) Outputs: LN(distribution input) multiplied with (Average pumping head)
4 Business activities OPEX	Inputs: LN(Business activities expenditure including doubtful debts less local authority rates) Outputs: LN(Number of Billed Properties)
10 Resources and treatment CAPEX	Inputs: LN(Av annual resources and treatment functional expenditure/distribution input) Outputs: Proportion of total distribution input surface water works; Proportion of total distribution input from works>25ML/d capacity
11 Distribution infrastructure CAPEX	Inputs: LN((Annual average water distribution infrastructure functional expenditure)/(Length of main)) Outputs: Proportion of mains<150mm diameter; Proportion of communication pipes that are lead
12 Distribution non-infrastructure CAPEX	Inputs: LN((Annual average water distribution non-infrastructure functional expenditure)/(Pumping station capacity)) Outputs: LN((Service reservoir and water tower storage capacity)/(Pumping station capacity)); LN((Number of meters)/(Distribution Input))
13 Management and general expenditure CAPEX	Inputs: LN((Average annual water management and general expenditure)/(number of billed properties)) Outputs: Proportion of Properties that are non-household

Conclusion

- **Yardstick Competition and benchmarking have better incentive properties than Cost based (Price Cap) regulation**
- **Choice of benchmarking model and parameter values need to be selected in line with the objectives of the analysis**
 - Short-run versus long run efficiency
 - Inherited versus new cost
 - Comparison of closest peers versus global comparison



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