



Benchmarking methodologies: with examples from Rail

Seminar: The art of ART: measuring efficiency for growth, development, and better quality in transport, Turin (September 21)

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The power of incentive regulation and benchmarking – a view from the UK



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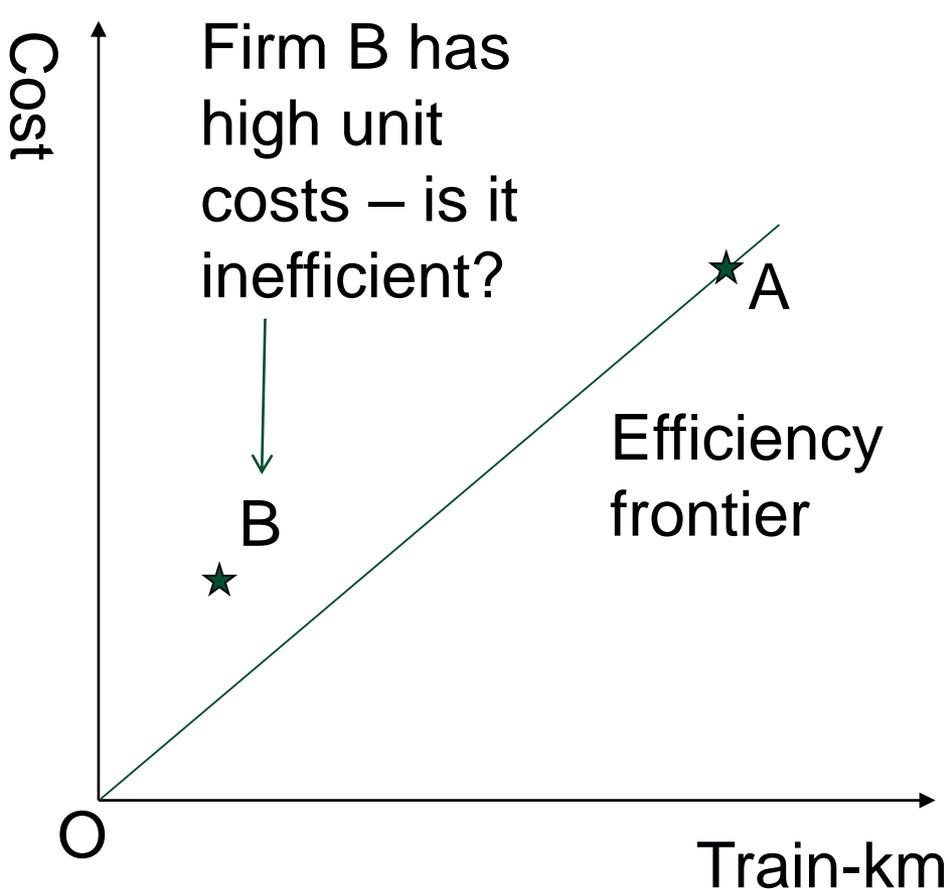
Control period	Savings per year
First	2.2%
Second	6.8%
Third	6.3%
Fourth	3.4%
Fifth	2.6%

OXERA (April 2008), *Network Rail's scope for efficiency savings in CP4: prepared for Office of Rail Regulation, London* (<http://www.rail-reg.gov.uk/upload/pdf/pr08-oxeraeffic-160408.pdf>)

Why a statistical / econometric model?



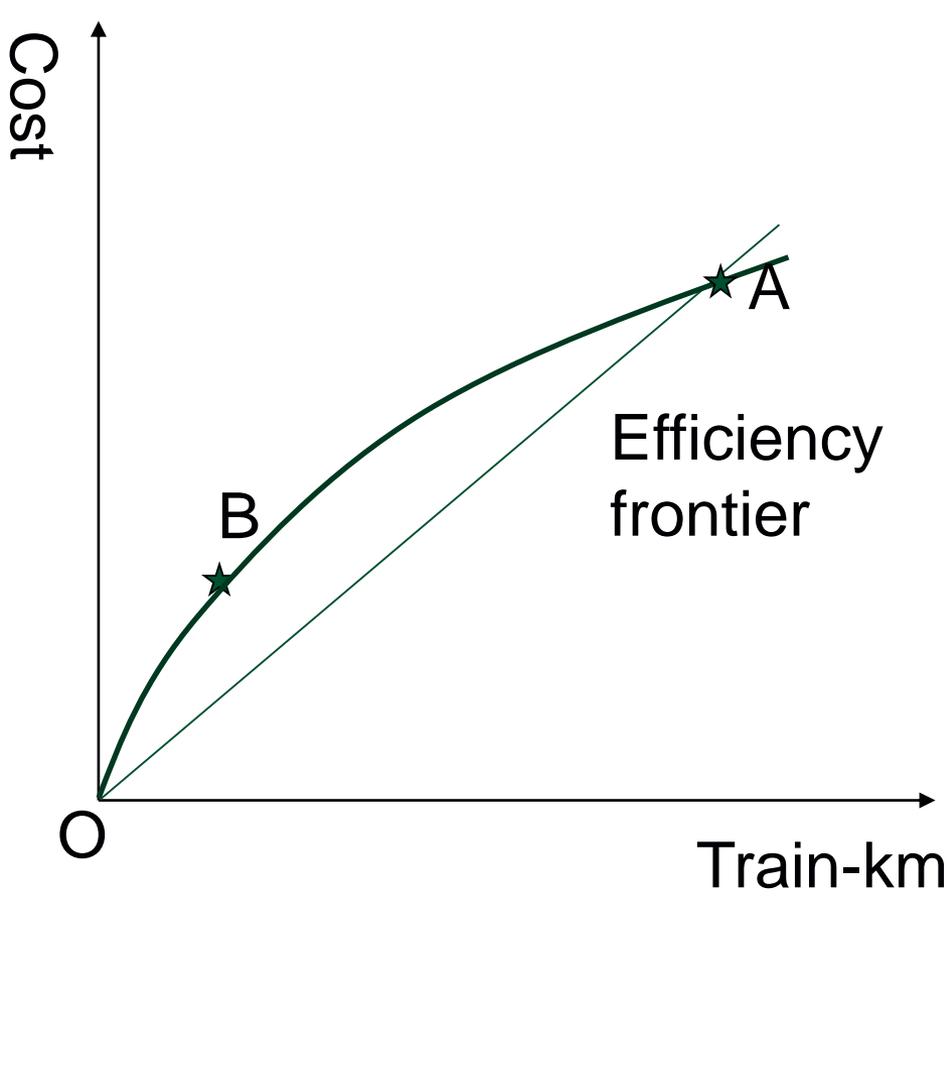
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Why a statistical / econometric model?



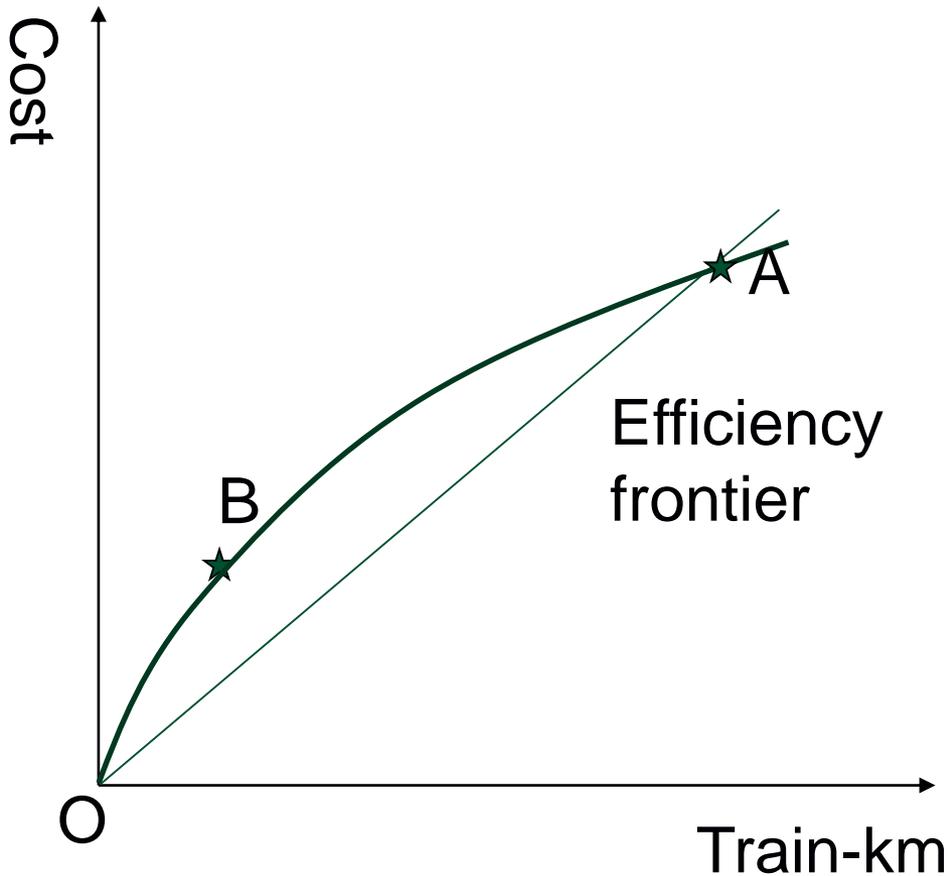
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Why a statistical / econometric model?



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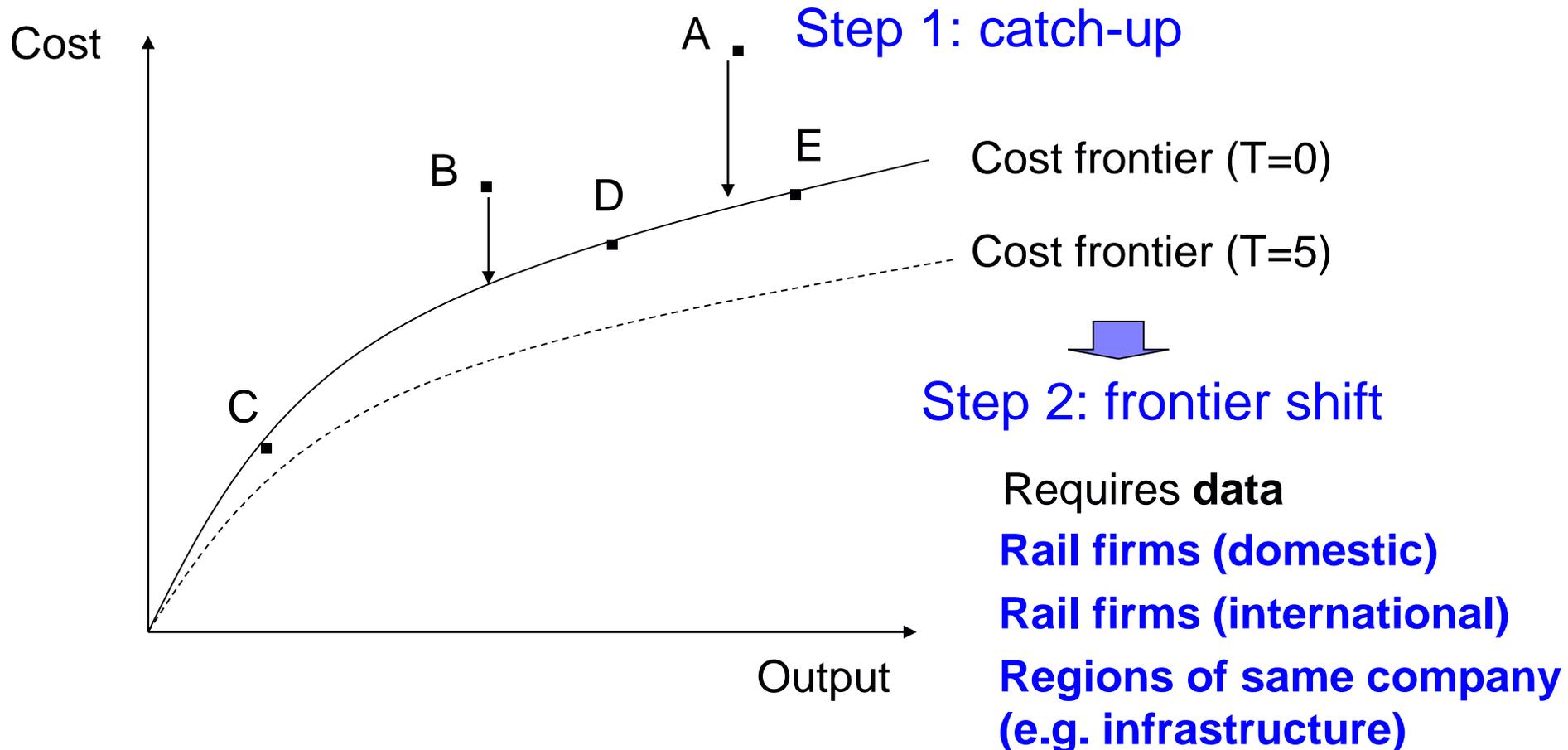
- Econometric benchmarking method allows for:
 - Possible economies of **scale**
 - Possible economies of **density**
- And
 - Takes account of **multiple factors** impacting costs
 - E.g. train-km, track-km, electrification

How regulators use econometric benchmarking: Yardstick Competition



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Regulator eliminates inter-company efficiency differences



International benchmarking study – PR2008 for ORR (used also in 2013)



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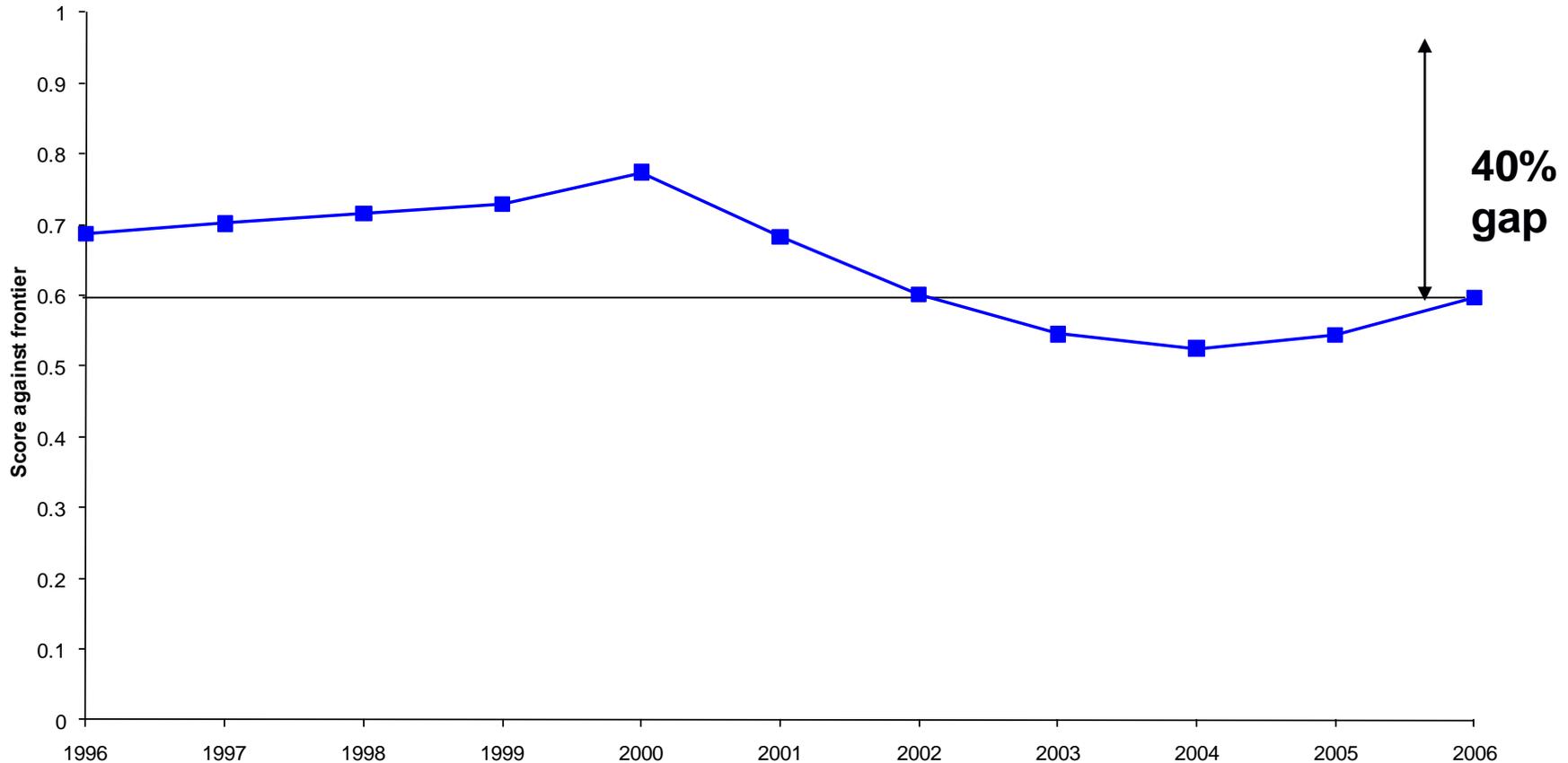
- Panel data: 13 European countries over 11 years
- Was used by International Union of Railways (UIC) in its benchmarking
- Standard definitions – to an extent

Cost Data	Network Size	Final Outputs	Network Characteristics
Maintenance costs	Track kilometres Route kilometres	Passenger train kilometres	Ratio of single track to route kilometres (as a measure of the extent of single / multiple track)
Total costs (Maintenance + renewals)	Single track kilometres	Passenger tonne kilometres	Proportion of track electrified
	Electrified track kilometres	Total tonne kilometres	
		Freight train kilometres	Number of stations per route km
		Freight tonne kilometres	Number of switches per track km
		Total train kilometres	

Efficiency estimates for Network Rail (PR2008) - output



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Implies a gap against the frontier of 40% in 2006

Regional benchmarking done by by ORR during PR2018 [1]



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- The underlying model can be checked for conformity to engineering / business understanding
- Other models have richer set of variables including **electrification, linespeed, labour price, passenger / freight traffic (separate), criticality**

Example model	Elasticity	Significance
Track-km	0.953	***
Train-km	0.792	***
Average number of tracks	-0.341	*
Time trend	0.004	
End of control period dummy	0.214	***

Regional benchmarking done by by ORR during PR2018 [1]



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- Output is a set of indicative efficiency gaps (by region) that can be used for further investigation or targeting

	2016 scores	Implied saving
Anglia	0.88	12%
EM	0.95	5%
Kent	0.74	26%
LNE	0.85	15%
LNW	0.76	24%
Scotland	1.00	0%
Sussex	0.80	20%
Wales	0.86	14%
Wessex	0.86	14%
Western	0.77	23%
Average	0.85	15%

Indicates that Network Rail could reduce costs by **around 15%** if it eliminated internal inefficiency

Though the gaps may not be inefficiency...



Ultimately the model is an approximation to reality but...

1. Access to good and comparable data (firms; time)
2. Control for genuine differences between firms that drive cost
3. Care needed when considering lumpy capital expenditure
4. Appropriate statistical tests need to be satisfied
5. Statistical techniques/judgement - translate scores into targets
6. Input of engineering / business understanding
7. Process – consultation and communication (simplicity?)
8. Triangulation – avoids over-reliance on one model

Overall the above provide credibility and robustness to challenge



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Thank you for your attention

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