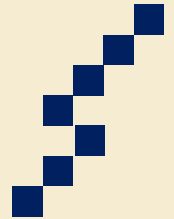




Forum 2013, Track 5



HELENA



Higher Education Global
Efficiency Analysis

European University Efficiency Ranking with HELENA – Indicator and University Selection

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EAIR Forum 2013, Erasmus University of Rotterdam, 29.08.2013

Agenda

- 1. Introduction**
- 2. University Performance Data**
- 3. DEA Method**
- 4. Results**
- 5. Conclusions**

1. Introduction

Background

- International efforts to increase the performance of universities
- Questions of university selection, evaluation and efficiency in the context of rankings
- Efficiency analysis methods
 - MCDM (Multi Criteria Decision Making), DEA (Data Envelopment Analysis), AHP (Analytic Hierarchy Process), SFA (Stochastic Frontier Analysis)

Specific Research Question

- Can efficiency measurement according to the HELENA concepts contribute to the performance discussion for European universities?

2. University Performance Data

- **Basic problem of any comparative & quantitative view: Different definitions in data gathering and accumulation**
- **Additional problem of changing measurement concepts as well as withheld data with ranking publications**
- **Examples in this case:**
 - ARWU ranking scores: Only top 100, 101-150 = 20, 151-200 = 10
 - THE ranking scores: Only top 200
 - Leiden ranking: Publication numbers (alternative: impact, very “level”)
 - EUMIDA data: PhD graduates and BA student numbers
 - Input: Budget data according to official university homepages

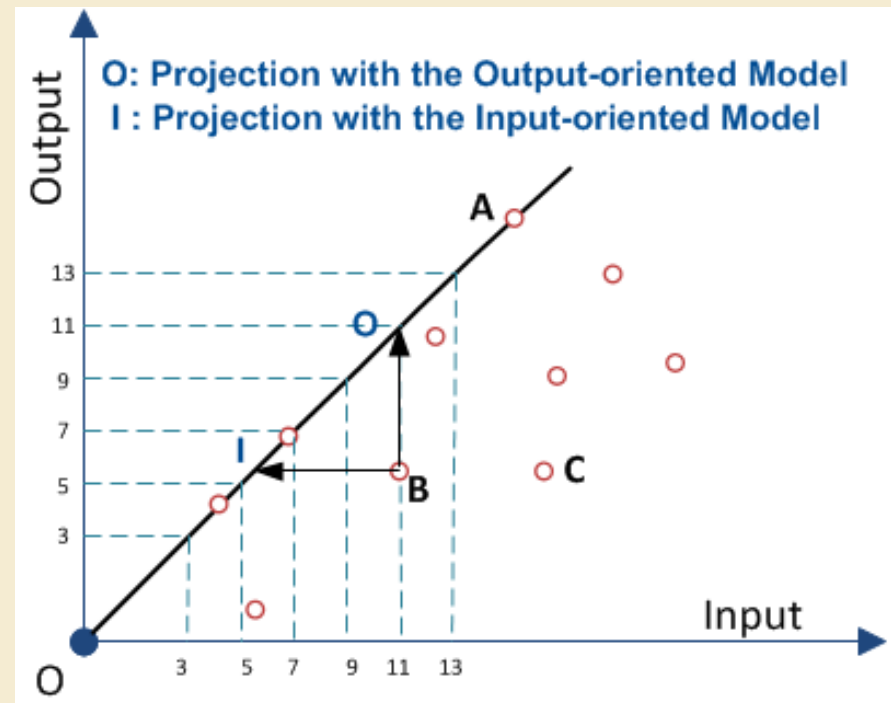
2. University Performance Data

Dataset for 67 European Universities, Top 10 Cutout

	O1: THE Score	O2: ARWU Score	O3: Leiden Score (P)	O4: PhD Graduates	O5: BA Students	I: Budget 2011 in €
<u>U Oxford, UK</u>	93,7	55,9	12208	850	19583	1093538183
<u>U Cambridge, UK</u>	92,6	69,6	11742	950	17837	942019645
<u>Imperial C. London, UK</u>	90,6	41,6	10098	725	11027	837396247
<u>ETH Zürich, CH</u>	87,8	43,5	7257	581	10364	1189794717
<u>University C. London, UK</u>	85,5	43,0	11208	610	17181	953219017
<u>U Edinburgh, UK</u>	76,1	30,5	6320	520	20823	773930364
<u>ETH Lausanne, CH</u>	73,0	20,0	4139	266	4749	646111066
<u>Karolinska Inst., SE</u>	72,4	32,7	6920	352	6416	604377426
<u>LMU München, DE</u>	70,4	29,5	6896	1270	39297	488600000
<u>U Manchester, UK</u>	70,1	0,0	8531	830	33640	962018693

3. DEA Method

- DEA is a mathematical programming technique that produces a single aggregate measure for each DMU in terms of its utilization of inputs to produce desired outputs (Kao and Hung, 2008).
- DEA offers two main possible orientations in efficiency analysis (Charnes et al 1994):
 - Input-oriented models
 - Output-oriented models
- In this analysis input-oriented CCR model used



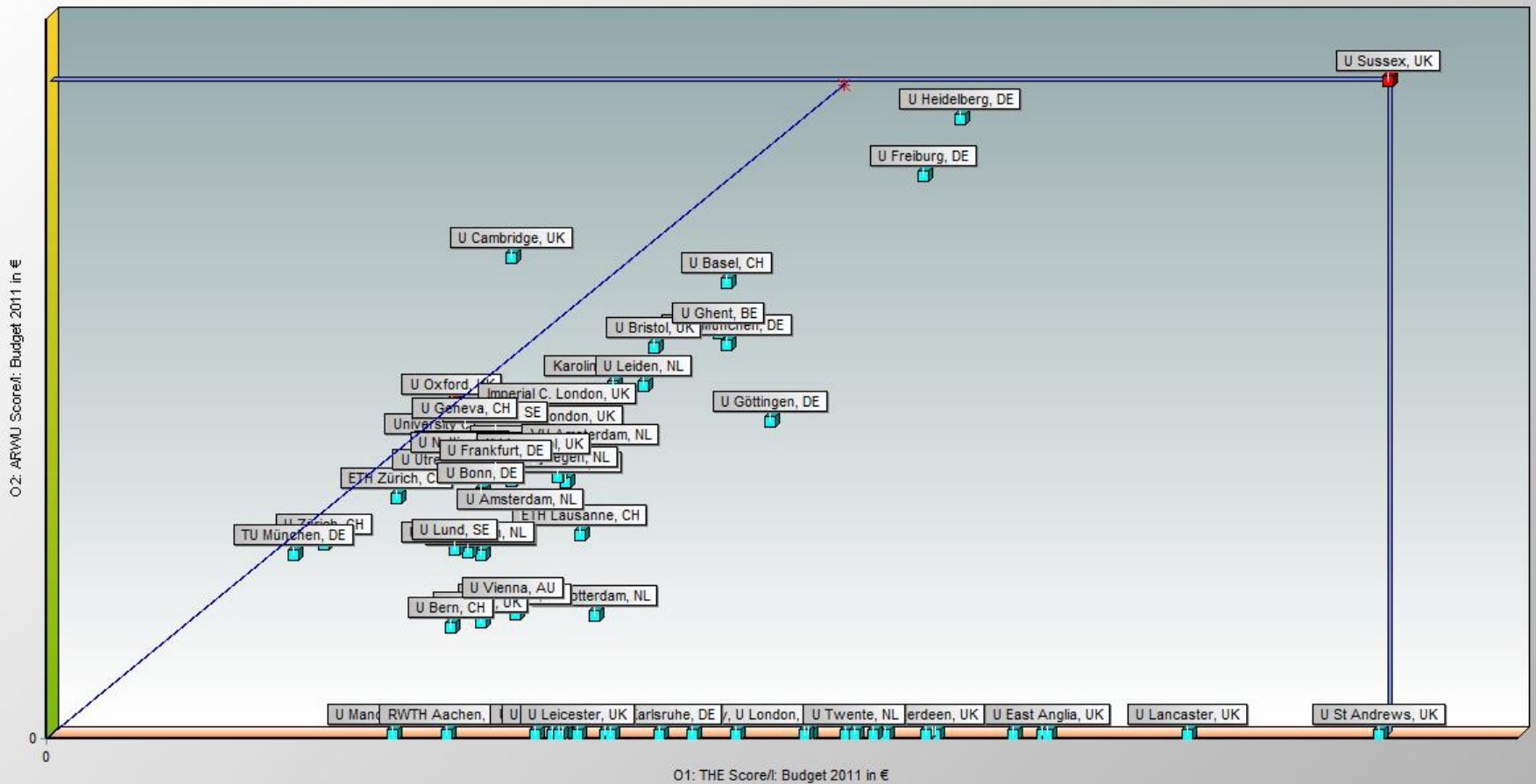
4. Results – Table

Unit name	Score	Unit name	Score	Unit name	Score
U St Andrews, UK	100,00%	VU Amsterdam, NL	63,20%	U Bonn, DE	51,70%
U Sussex, UK	100,00%	U Bristol, UK	62,30%	King's C. London, UK	51,50%
U Heidelberg, DE	100,00%	U Amsterdam, NL	62,20%	U Newcastle, UK	51,30%
U Vienna, AU	100,00%	KIT Karlsruhe, DE	61,70%	U Liverpool, UK	50,90%
LMU München, DE	94,80%	KU Leuven, BE	61,60%	RWTH Aachen, DE	50,80%
U Ghent, BE	92,70%	U Warwick, UK	60,60%	KTH Royal Inst. of Techn., SE	50,40%
U Freiburg, DE	92,10%	Imperial C. London, UK	60,10%	TU Delft, NL	50,10%
HU Berlin, DE	91,30%	U Leiden, NL	59,80%	U Leicester, UK	48,50%
U Lancaster, UK	90,90%	U Leeds, UK	59,70%	U Geneva, CH	48,20%
U East Anglia, UK	88,90%	Karolinska Inst., SE	59,60%	U Manchester, UK	46,30%
FU Berlin, DE	82,40%	University C. London, UK	58,60%	U Edinburgh, UK	46,00%
Trinity C. Dublin, IR	81,90%	EU Rotterdam, NL	57,80%	ETH Lausanne, CH	46,00%
U Durham, UK	79,20%	U Nottingham, UK	57,50%	U Bern, CH	39,10%
U Aberdeen, UK	76,70%	U Helsinki, FI	57,30%	ETH Zürich, CH	37,50%
U Reading, UK	76,10%	U Sheffield, UK	57,20%	U Wageningen, NL	37,50%
U Cambridge, UK	75,90%	RU Nijmegen, NL	57,00%	U Zürich, CH	31,30%
U Göttingen, DE	71,20%	U Groningen, NL	56,90%	TU München, DE	29,10%
U York, UK	71,10%	Queen Mary, U London, UK	55,80%		
U Basel, CH	70,70%	U Oxford, UK	55,60%		
TU Eindhoven, NL	70,30%	U Col. Dublin, IR	55,50%		
U Maastricht, NL	69,30%	U Southampton, UK	54,50%		
U Exeter, UK	68,60%	U Utrecht, NL	53,10%		
U Twente, NL	66,60%	U Lund, SE	51,90%		
U Frankfurt, DE	66,20%	U Glasgow, UK	51,90%		
U Lausanne, CH	64,40%	U Uppsala, SE	51,80%		

Including all five
output indicators.

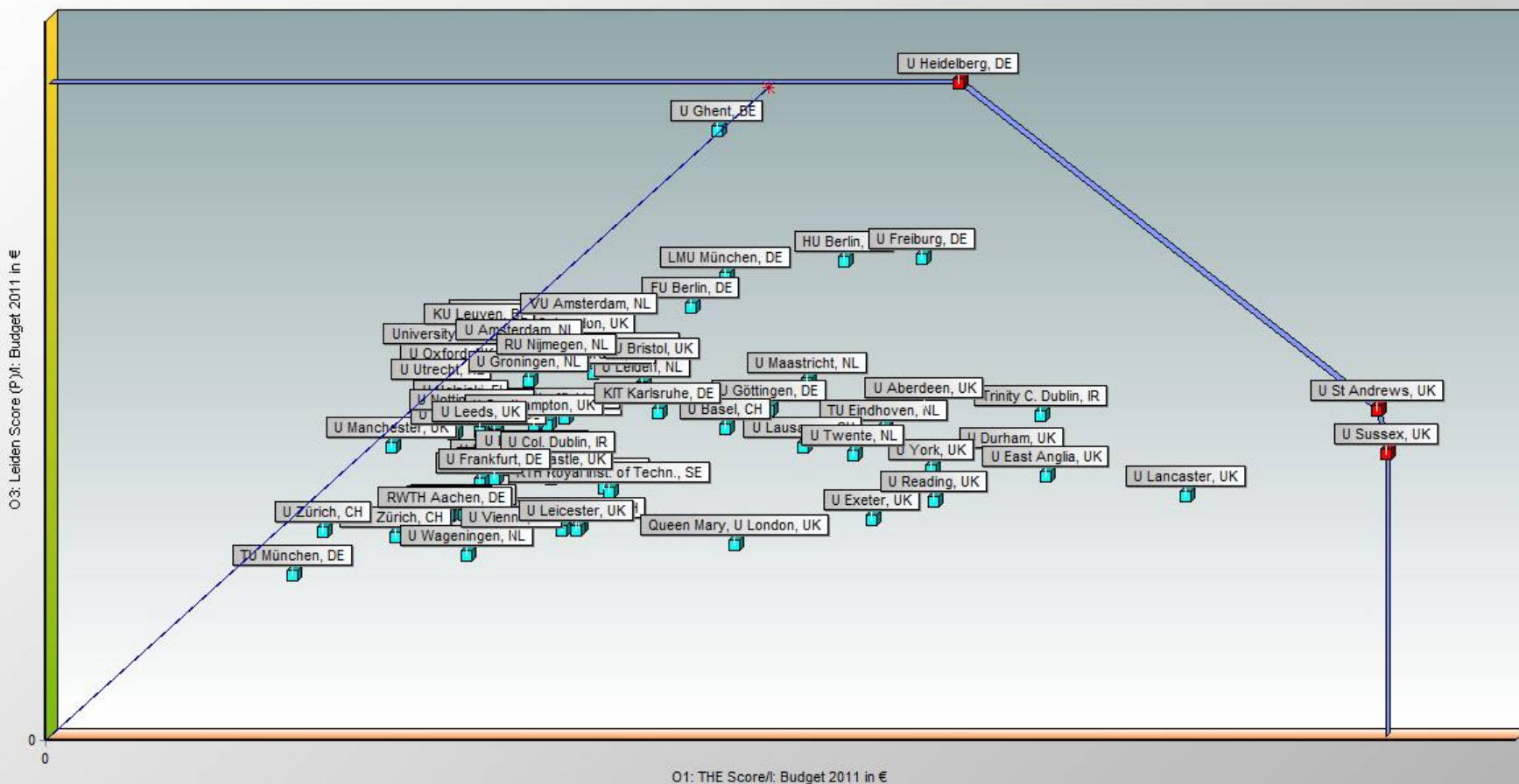
4. Results

„Efficiency Frontier“ – THE & ARWU



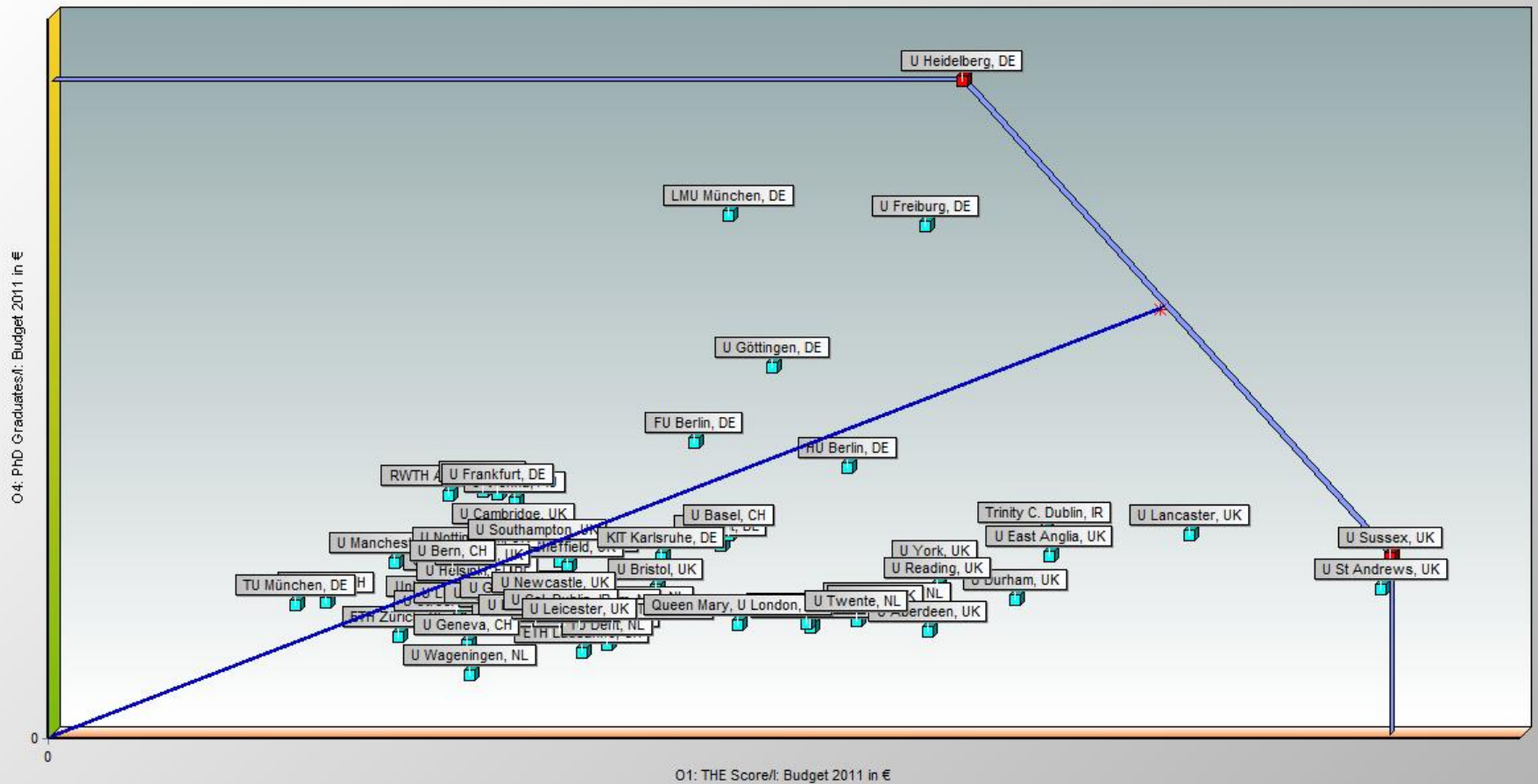
4. Results

„Efficiency Frontier“ – THE & Leiden



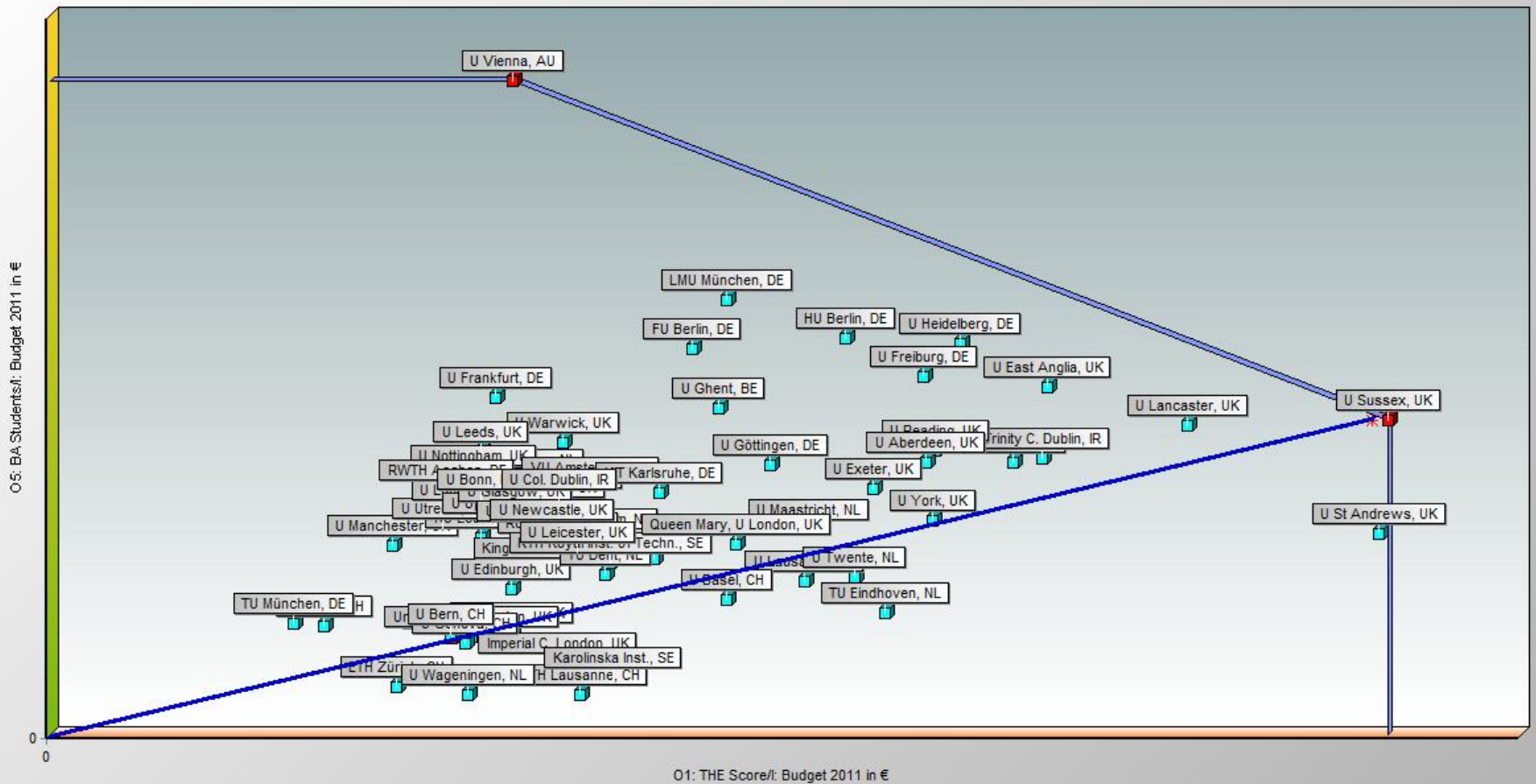
4. Results

„Efficiency Frontier“ – THE & PhD



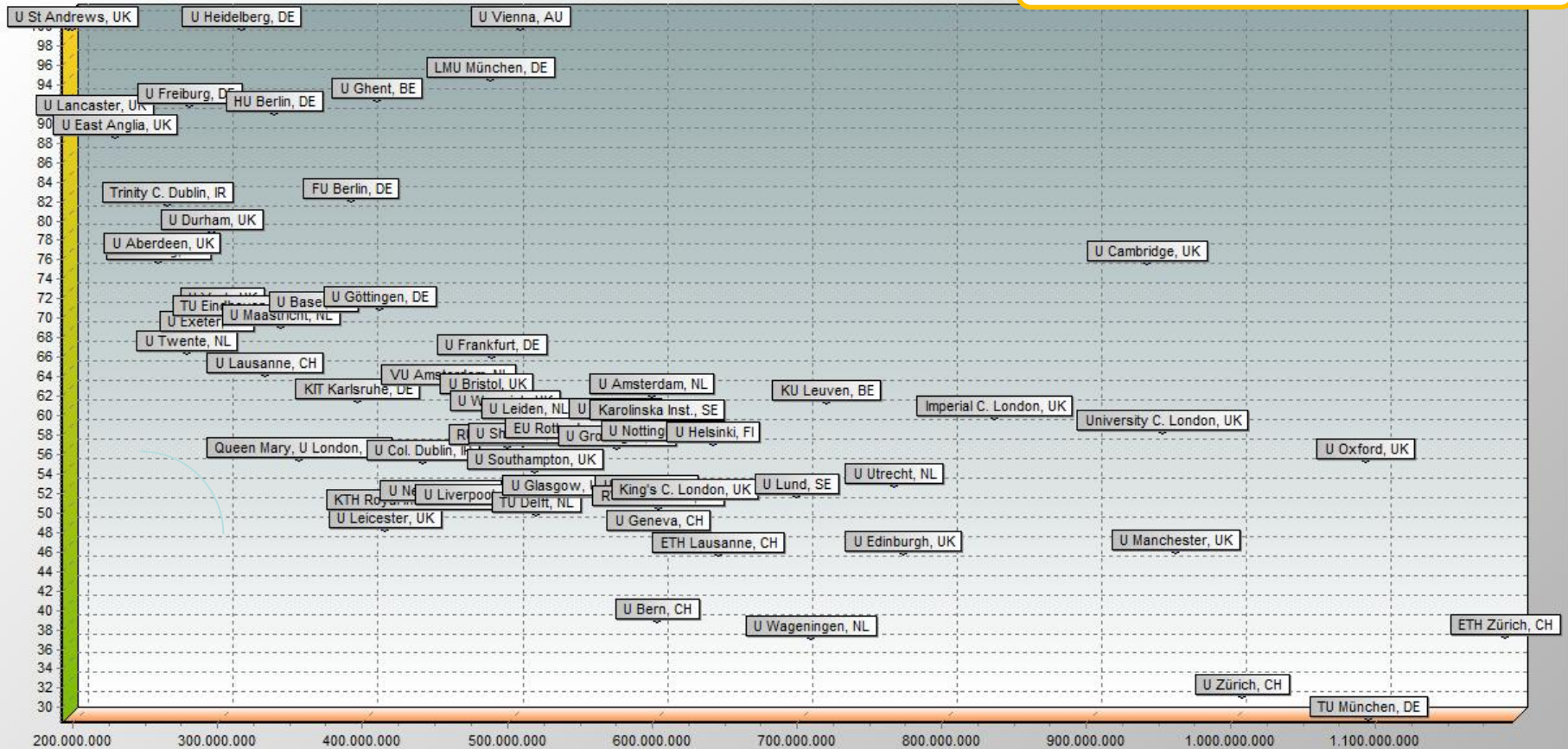
4. Results

„Efficiency Frontier“ – THE & BA Students



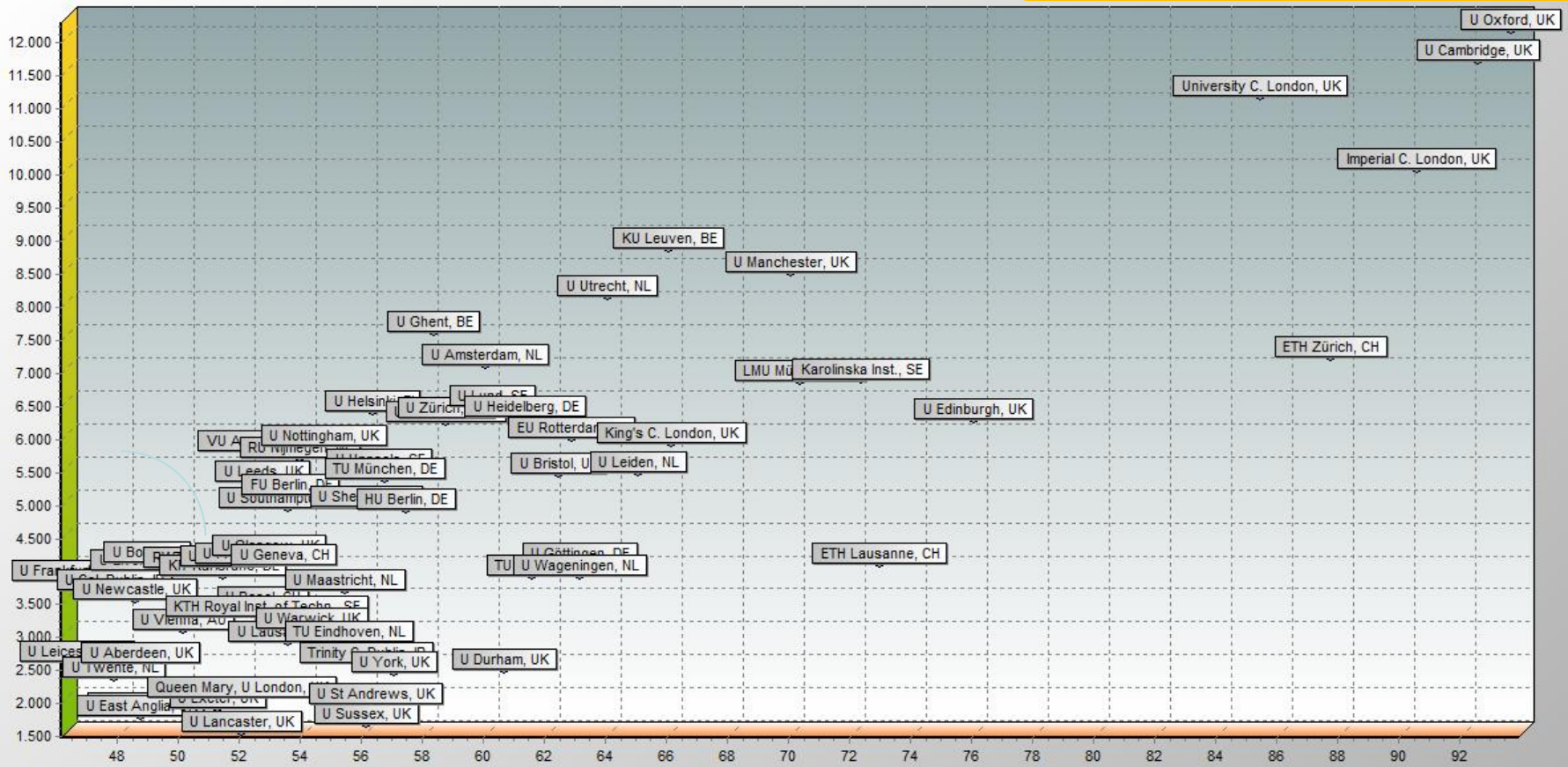
4. Results

„Efficiency-Size-Correlation“ ($r=-0.65$)



4. Results

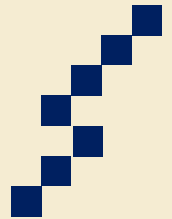
„Leiden-THE-Correlation“ (r= 0.80)



5. Conclusions

Can efficiency measurement according to the HELENA concepts contribute to the performance discussion for European universities?

- (A) Selection and results of different rankings varying, depending on objectives and indicators as well as selection system.**
- (B) Overall interestingly stable group of top universities, predictor PhD graduates (basis for strategies of cumulation/size).**
- (C) Efficiency analysis has unusual suspects as efficiency leaders.**
- (D) Strong hints for diseconomies of scale in universities in this dataset.**
- (E) Low-level data hurdles to be overcome (publishing score data).**



**Thank you for
your attention!**

HELENA



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<http://www.helena.wiwi.uni-due.de>

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