



Department of Economics



MEASURING THE PRODUCTIVE PERFORMANCE OF PUBLIC AUTHORITIES

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Content



1. Some comments on methodology and applications
2. Recent developments in methodology
3. A case study for Belgium
4. Policy recommendations

KEEN INTEREST IN THE PERFORMANCE OF PUBLIC AUTHORITIES



EFFICIENCY

Output(s) / Input(s)

EFFECTIVENESS

Outcome(s) / Input(s)



WIDE APPLICATIONS

- **OVERALL PUBLIC SECTOR**
(General Government).

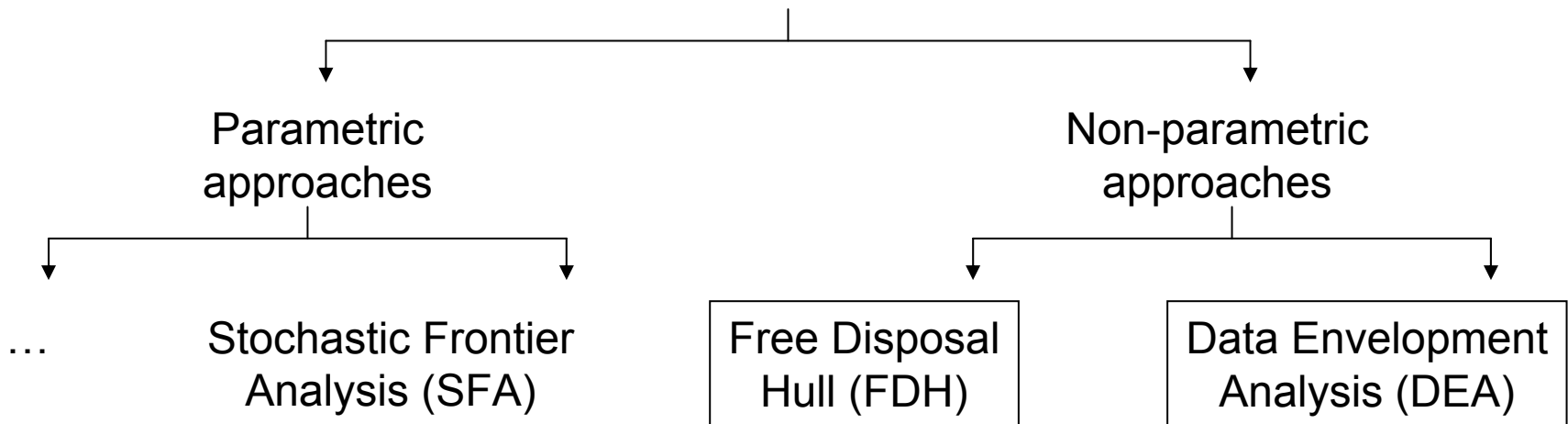
- **SUBSECTORS OF GOVERNMENT**

Education, health, social spending, public order and safety...

- **SPECIFIC PUBLIC AUTHORITIES**

Tax offices, postal services, hospitals, schools, musea, waste disposal, water supply, national parks, public transportation, companies...

METHODOLOGY



STRENGTHS AND WEAKNESSES



- **APPEAL TO INTUITION**
(No a priori specification of the production function).
- **ABLE TO IDENTIFY**
“REAL” Best Practices
- **ABLE TO IDENTIFY**
Which variables contribute to inferior performance
-

STRENGTHS AND WEAKNESSES



- **INFLUENCE OF OUTLIERS**
- **DETERMINISTIC \leftrightarrow STOCHASTIC**
- **ENVIRONMENTAL (CONTEXTUAL) VARIABLES**
- **.....**

Quite often

From 'gross' efficiency scores

to 'net' efficiency scores in order to take into account

environmental (contextual) variables



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Non-parametrically estimating efficient quantities



→ Deduce unobserved quantities x^A, x^B, x^C, x^D and y^E

By a Data Envelopment Analysis (DEA) model which allows for uncertainty (i.e. a *robust* DEA model) and for heterogeneity in the data (i.e. a *robust* and *conditional* DEA model).

→ The model is constructed in three steps:

1: a deterministic DEA model

1 + 2: add the uncertainty assumption: a robust DEA model

1 + 2 + 3: add the heterogeneity assumption: a robust and conditional DEA

Non-parametrically estimating efficient quantities



→ Deduce unobserved quantities x^A, x^B, x^C, x^D and y^E

Step 1: a deterministic DEA model

→ We make two assumptions:

1. Free disposability of inputs and outputs

→ This yields a first and very benevolent model: Free Disposal Hull (FDH) model

2. Convexity in inputs and outputs

→ This convexifies the FDH model and brings the DEA model.

Non-parametrically estimating efficient quantities

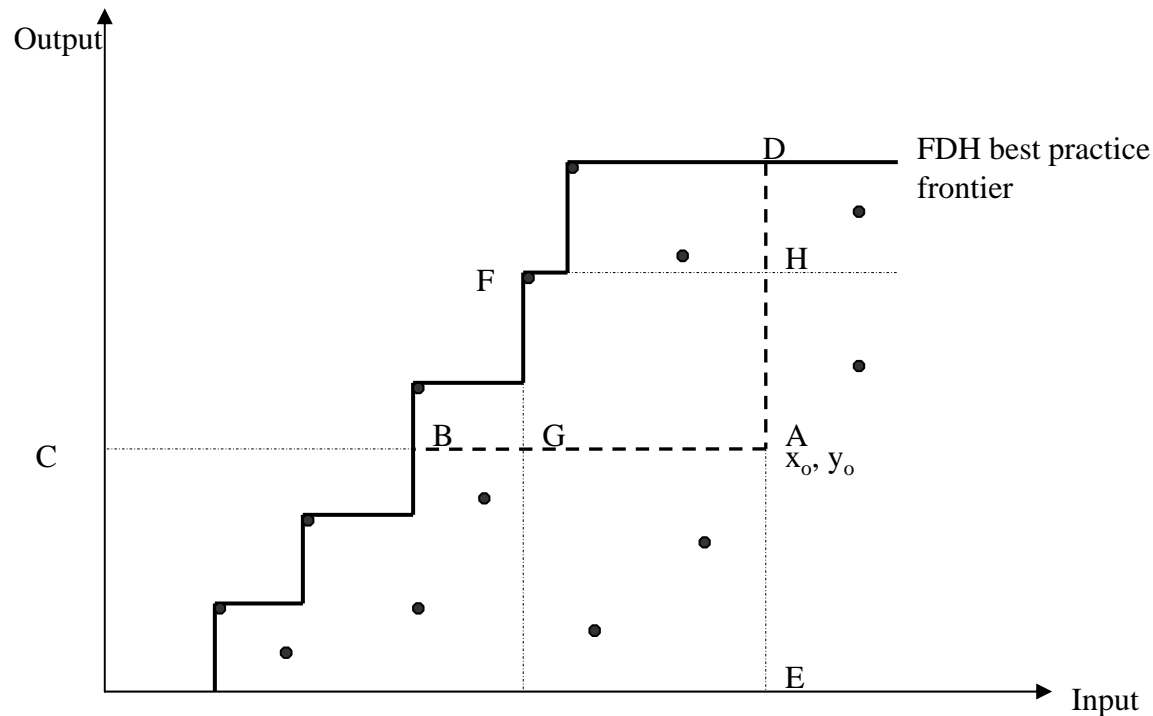
→ Step 1: a deterministic DEA model

First assumption:

1. free disposability of inputs and outputs:

$$\forall (x^t, y^t) \in \Psi^t, \text{ if } \bar{x}^t \geq x^t \text{ and } \bar{y}^t \leq y^t \text{ then } (\bar{x}^t, \bar{y}^t) \in \Psi^t$$

→ Free Disposal Hull (Deprins, Simar and Tulkens, 1984)



Non-parametrically estimating efficient quantities



→ Step 1: a deterministic DEA model

Second assumption:

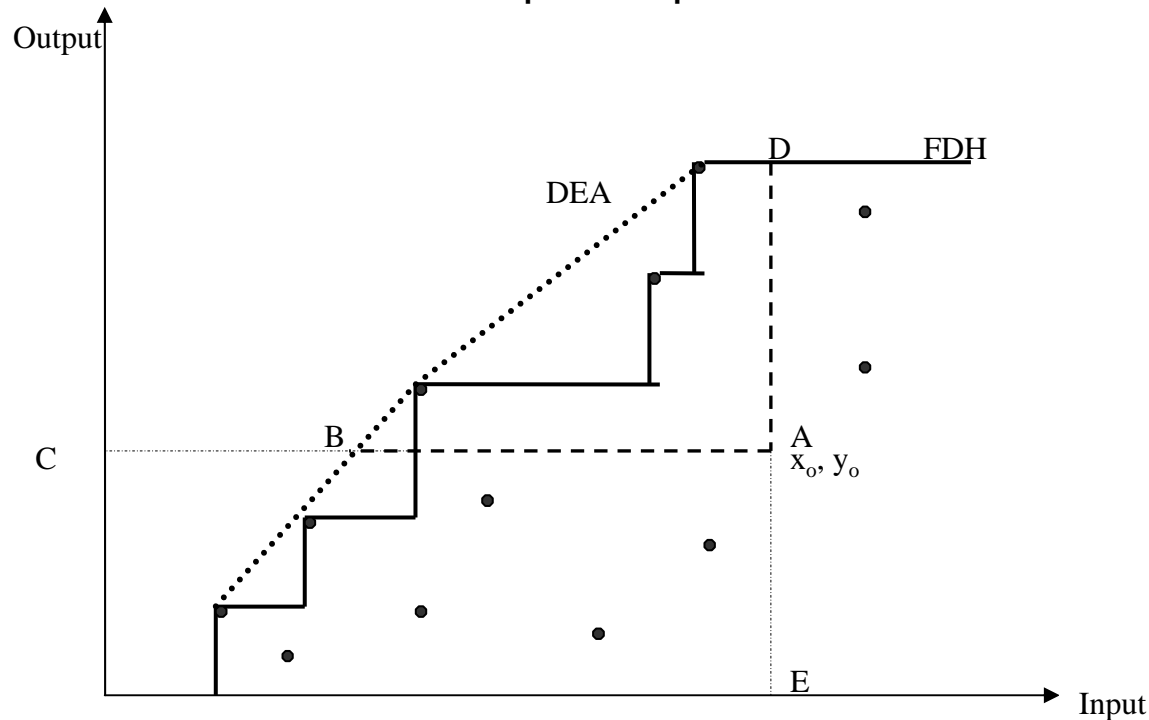
1. free disposability of inputs and outputs:

2. Convexity in inputs and outputs

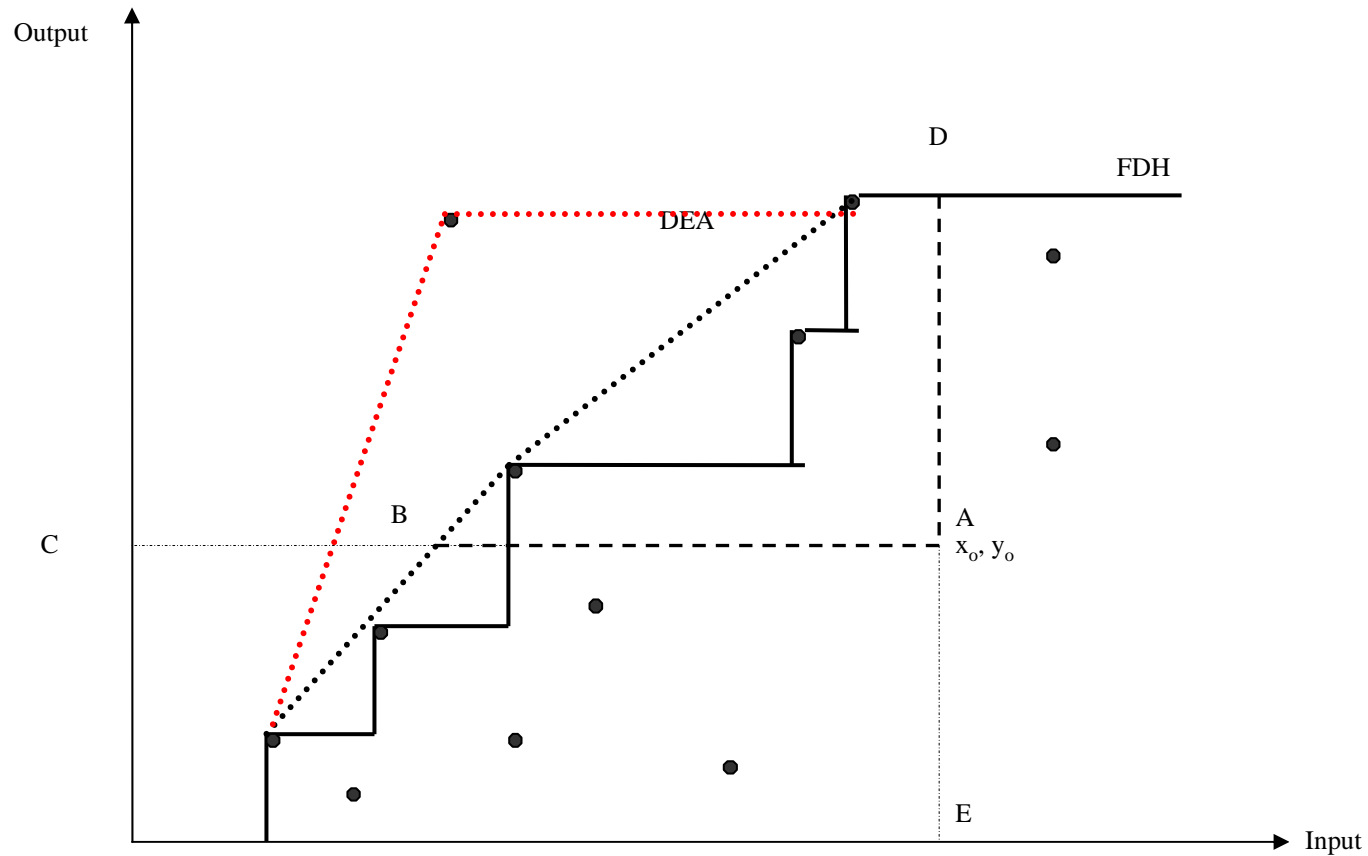
if $(x_1^t, y_1^t), (x_2^t, y_2^t) \in \Psi$ then $\forall \alpha \in [0,1]: (x^t, y^t) = \alpha(x_1^t, y_1^t) + (1-\alpha)(x_2^t, y_2^t) \in \Psi$



Convex hull of the undominated input-output combinations: DEA



Non-parametrically estimating efficient quantities



Non-parametrically estimating efficient quantities



→ Step 2: add the uncertainty assumption: a robust DEA model

→ Robust order- m approach of Cazals *et al.* (2002):

Instead of using a full frontier (with all undominated observations), we construct a partial frontier

→ Advantage:

1. more robust to atypical observations
2. statistical inference

→ procedure:

1. draw R times with replacement a subsample of size m from the original sample among those x_i such that $y_i \geq y$
2. estimate for each draw the linear FDH program
3. average the R obtained efficiency estimates
4. convexify the FDH efficient frontier and calculate DEA model

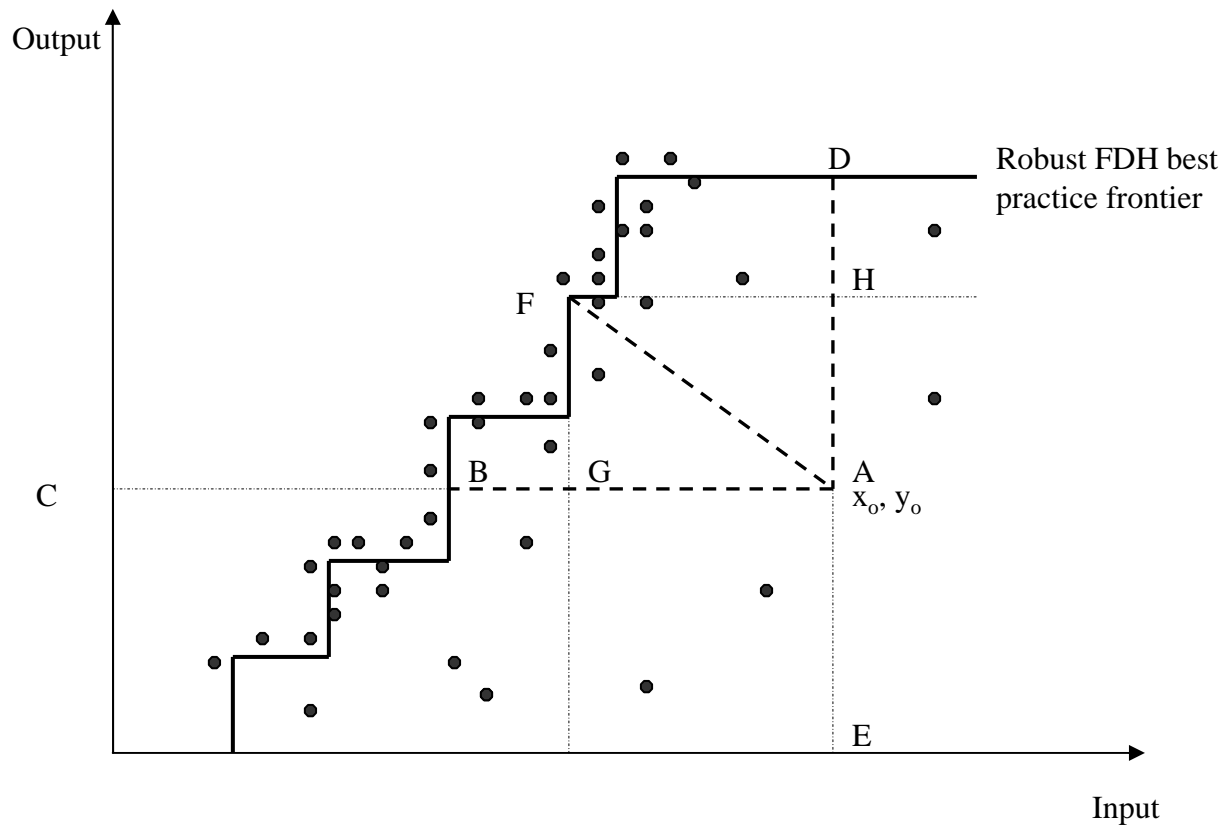
→ Remark: the higher m , (1) the closer the approximation to the full sample, and (2) the higher the probability an influential observation constitutes the frontier.

Non-parametrically estimating efficient quantities



→ Step 2: add the uncertainty assumption: a robust DEA model

→ robust order- m approach of Cazals *et al.* (2002):



Non-parametrically estimating efficient quantities



→ Step 3: add the heterogeneity assumption: a robust and conditional DEA

→ conditional estimates of Daraio and Simar (2005, 2007)

→ Idea: compare like with likes (similar exogenous characteristics)

→ Procedure: Condition on the value of z_E such that it selects only input-output vectors with z in the neighbourhood of z_E by a nonparametric Kernel function



For a given x , draw a sample of size m with replacement and with a probability $K((z-z_i)/h) / \sum (K((z-z_j)/h))$, among those x_i such that $y_i \geq y$

Content

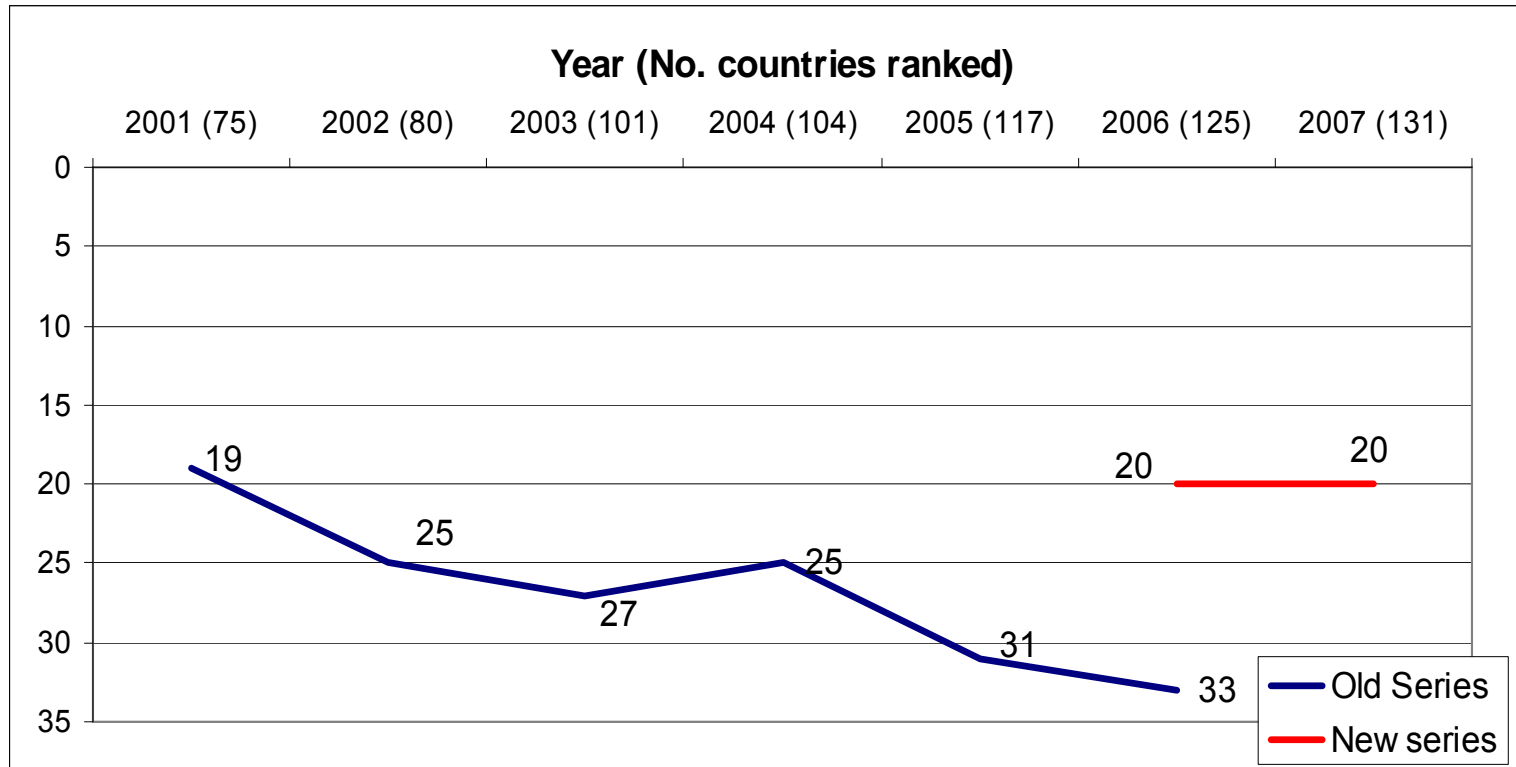
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Global competitiveness report 07-08



➔ Belgium's competitiveness rank: 2001-2007

(World Economic Forum)



Old series: growth competitiveness index

New series: global competitiveness index

Global competitiveness report 07-08



	Global competitiveness Index 2007-2008	rank in GCI	rang in 23 OECD countries
US	5.67	1	1
Switzerland	5.62	2	2
Denmark	5.55	3	3
Sweden	5.54	4	4
Germany	5.51	5	5
Finland	5.49	6	6
Japan	5.43	8	7
UK	5.41	9	8
Netherlands	5.40	10	9
Canada	5.34	13	10
Austria	5.23	15	11
Norway	5.20	16	12
France	5.18	18	13
Australia	5.17	19	14
Belgium	5.10	20	15
Ireland	5.03	22	16
Iceland	5.02	23	17
New Zealand	4.98	24	18
Luxembourg	4.88	25	19
Spain	4.66	29	20
Portugal	4.48	40	21
Italy	4.36	46	22
Greece	4.08	65	23

The 12 pillars of competitiveness

Basic requirements:

- institutions
- infrastructure
- macro-economic stability
- health and primary education



Key for
factor-driven
economies

Efficiency enhancers

- higher education and training
- goods market efficiency
- labor market efficiency
- Financial market sophistication
- technological readiness
- market size



Key for
efficiency-driven
economies

Innovation and sophistication factors

- Business sophistication
- innovation



Key for
innovation-driven
economies



Global
Competitiveness
Index

Global competitiveness report 07-08



➔ Pillar rankings better than our 20th position

Pillar	Name	Rank	Score
5	Higher education and training	11	5,6
11	Business sophistication	12	5,4
4	Health and primary education	13	6,3
2	Infrastructure	15	5,6
12	Innovation	16	4,7

Global competitiveness report 07-08



→ Belgium's 10 best single items

Pillar	Name	Rank
Health and primary education	Malaria incidence	1
Health and primary education	Quality of primary education	2
Higher education and training	Quality of math and science education	2
Higher education and training	Quality of management schools	2
Higher education and training	Quality of educational system	5
Infrastructure	Quality of railroad infrastructure	6
Infrastructure	Quality of port infrastructure	6
Business sophistication	Local supplier quality	6
Health and primary education	Infant mortality	7
Goods market efficiency	Intensity of local competition	247

Government effectiveness



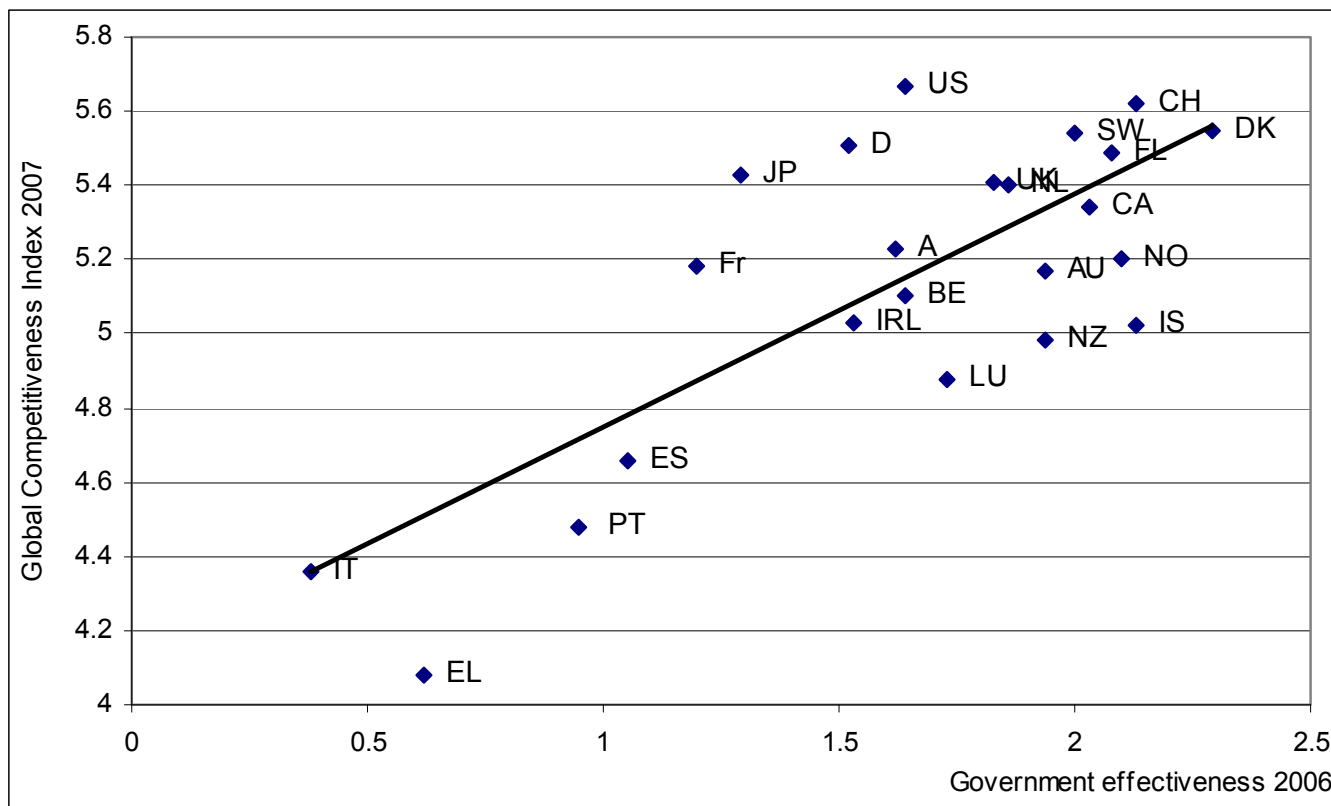
→ Data on Government Effectiveness

→ borrowed from World Bank:

Kaufmann *et al.*, 'Governance Matters', (edition 2007)

- Survey data for 212 countries
- Composite indicator

Global competitiveness versus government effectiveness



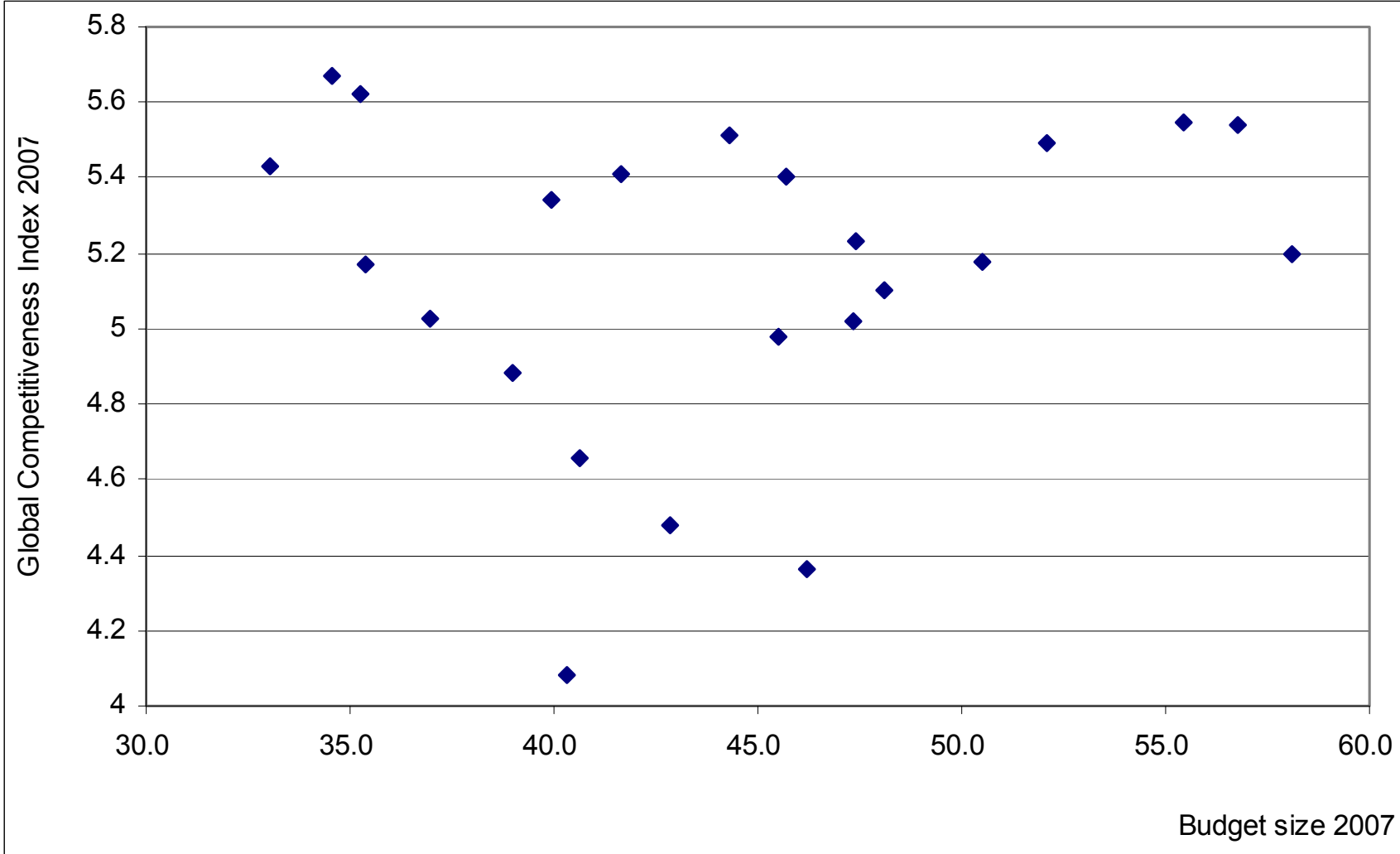
	GCI	coefficient	Std. Error	p-value
constant		4.123	0.202	0.000
effectiveness		0.627	0.119	0.665
R-squared		0.570		

Government effectiveness and budget size

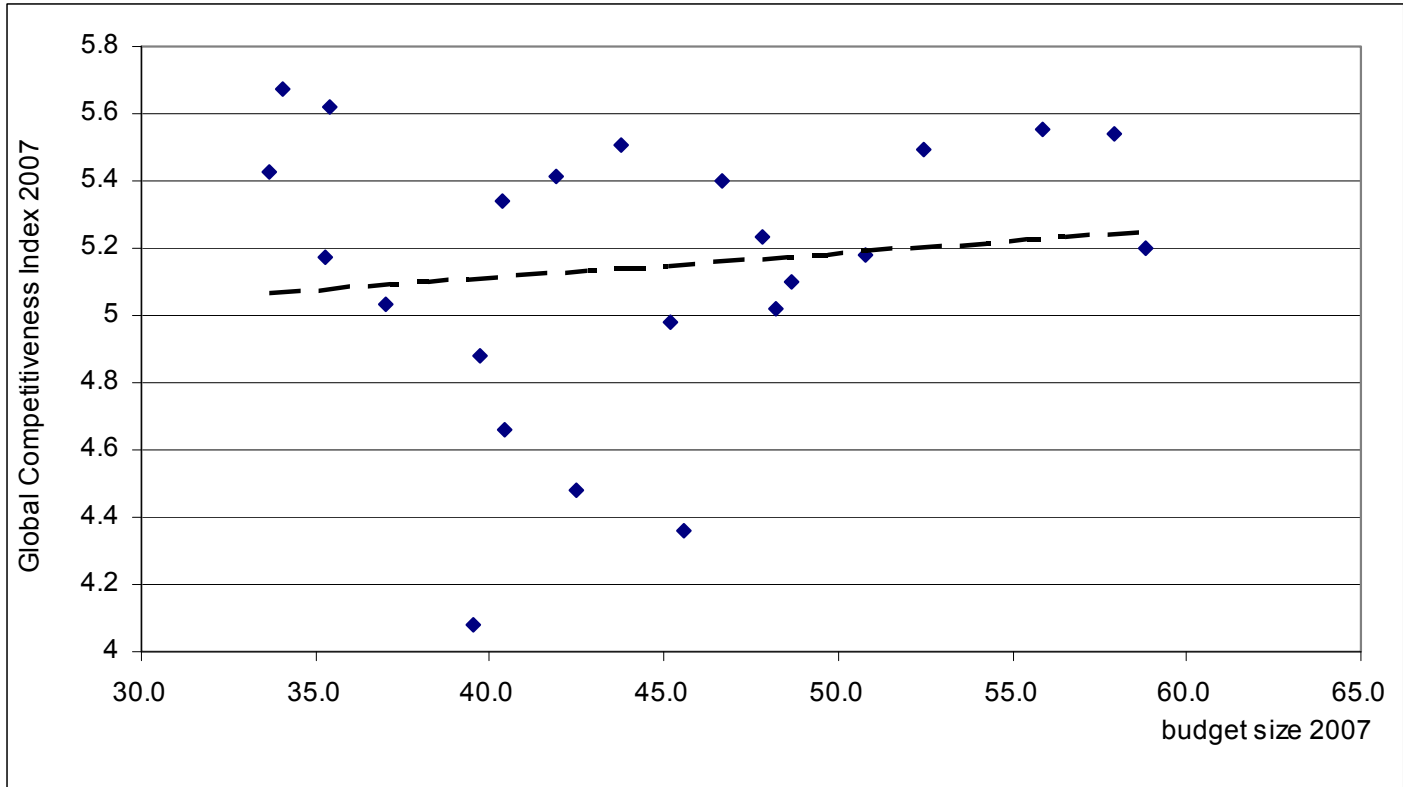


	Budget size		Government effectiveness	
	2007	order		order
Denmark	55.47	3	2.29	1
Iceland	47.35	8	2.13	2
Switzerland	35.24	21	2.13	3
Norway	58.10	1	2.1	4
Finland	52.09	4	2.08	5
Canada	39.92	17	2.03	6
Sweden	56.75	2	2	7
Australia	35.39	20	1.94	8
New Zealand	45.52	11	1.94	9
Netherlands	45.68	10	1.86	10
UK	41.67	14	1.83	11
Luxembourg	38.98	18	1.73	12
Belgium	48.09	6	1.64	13
US	34.55	22	1.64	14
Austria	47.43	7	1.62	15
Ireland	36.95	19	1.53	16
Germany	44.31	12	1.52	17
Japan	33.06	23	1.29	18
France	50.53	5	1.2	19
Spain	40.62	15	1.05	20
Portugal	42.86	13	0.95	21
Greece	40.31	16	0.62	22
Italy	46.19	9	0.38	23

Global Competitiveness Index versus budget size

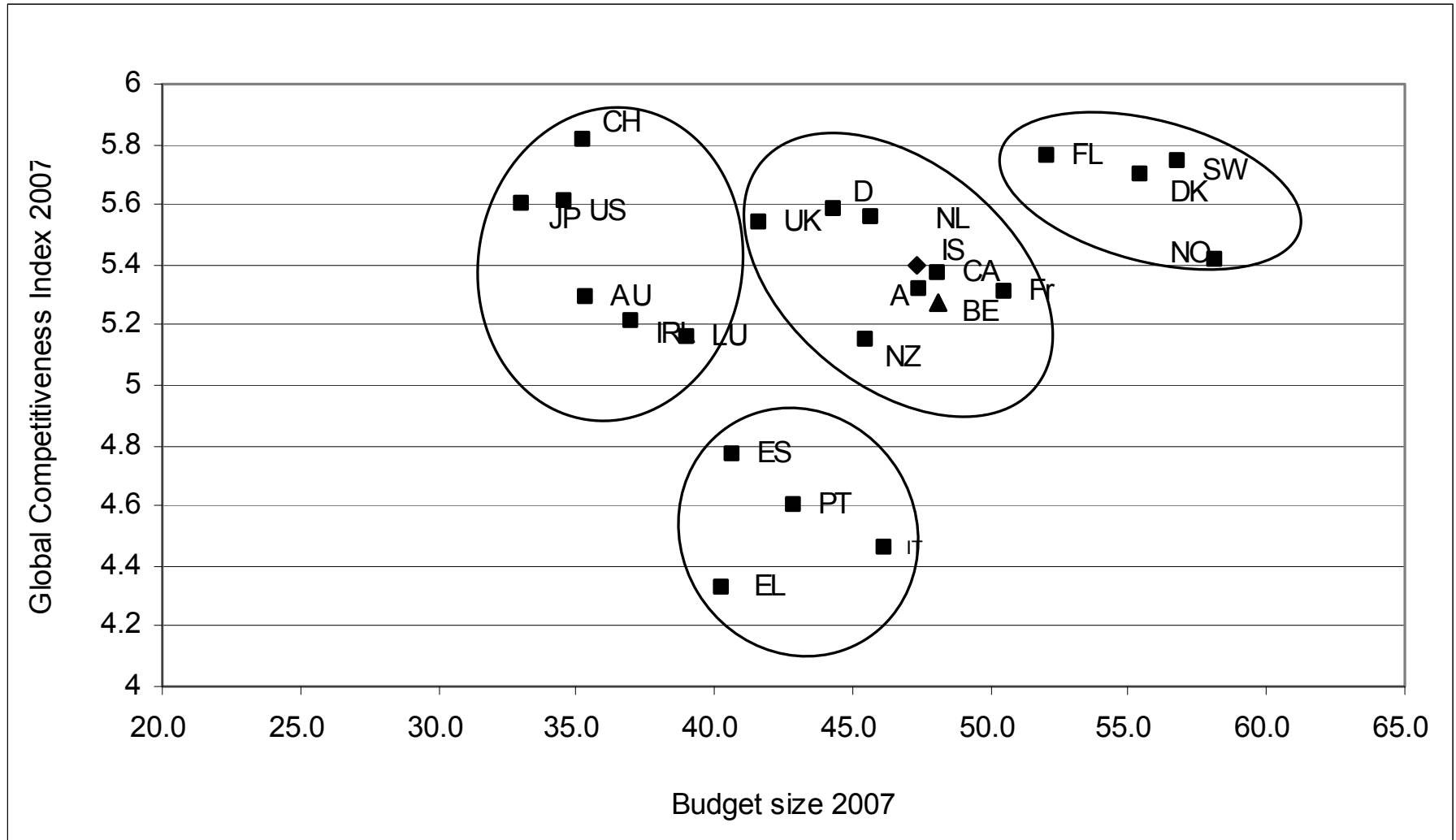


Global Competitiveness Index versus budget size – bivariate econometrics

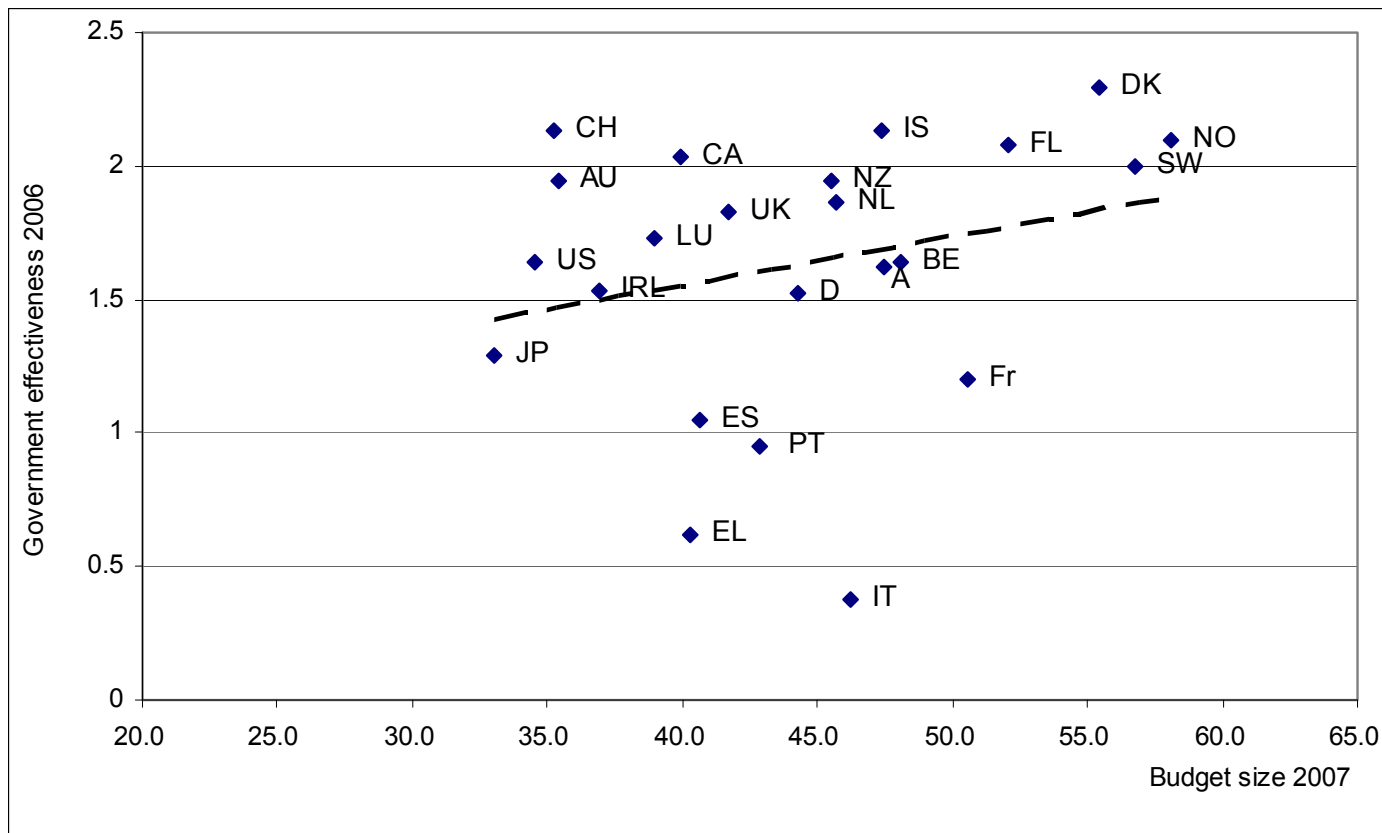


GCI	coefficient	Std. Error	p-value
constant	4.898	0.571	0.000
budget size	0.006	0.013	0.665
R-squared	0.009		

Global Competitiveness Index versus budget size – clusters of countries

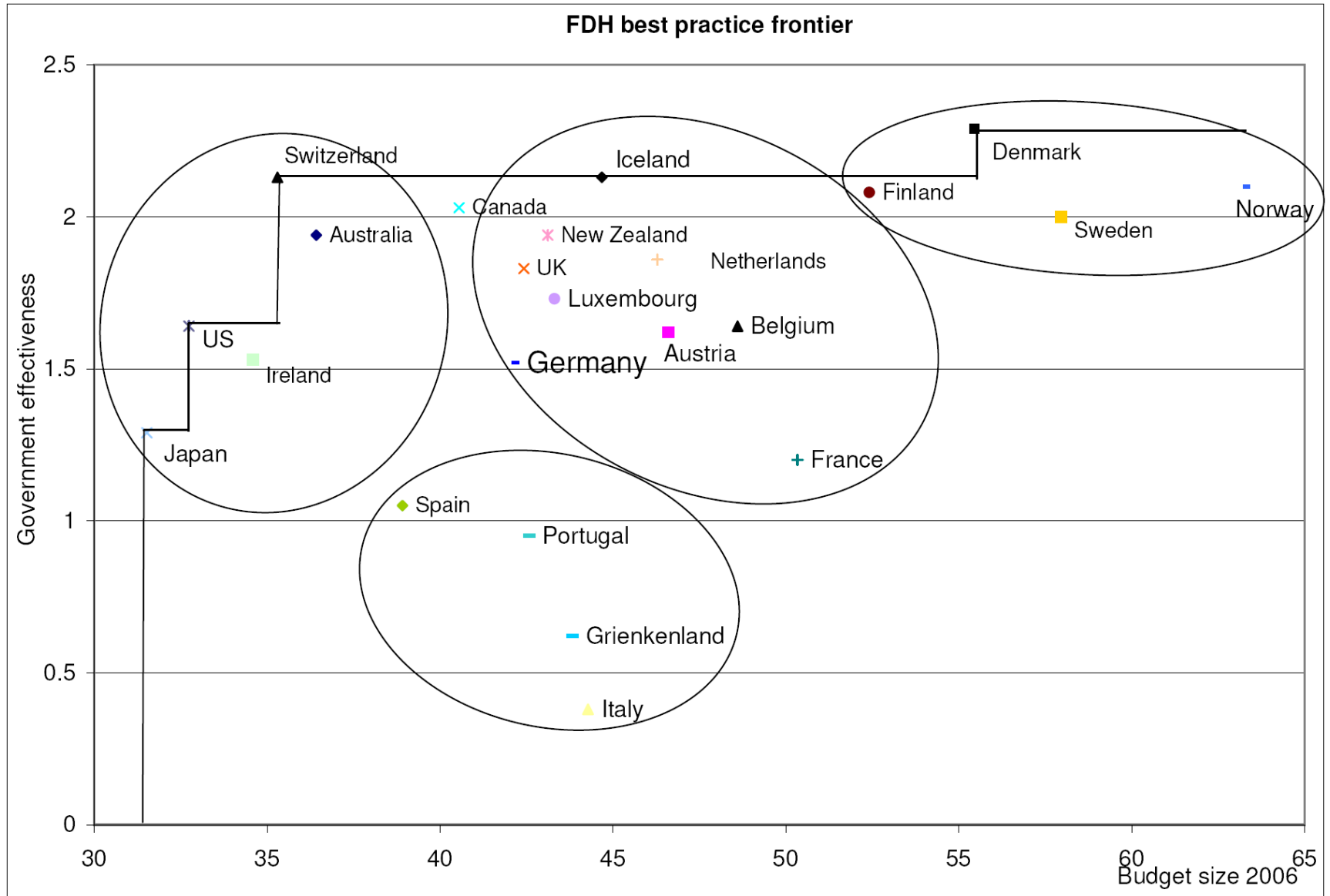


Government effectiveness versus budget size

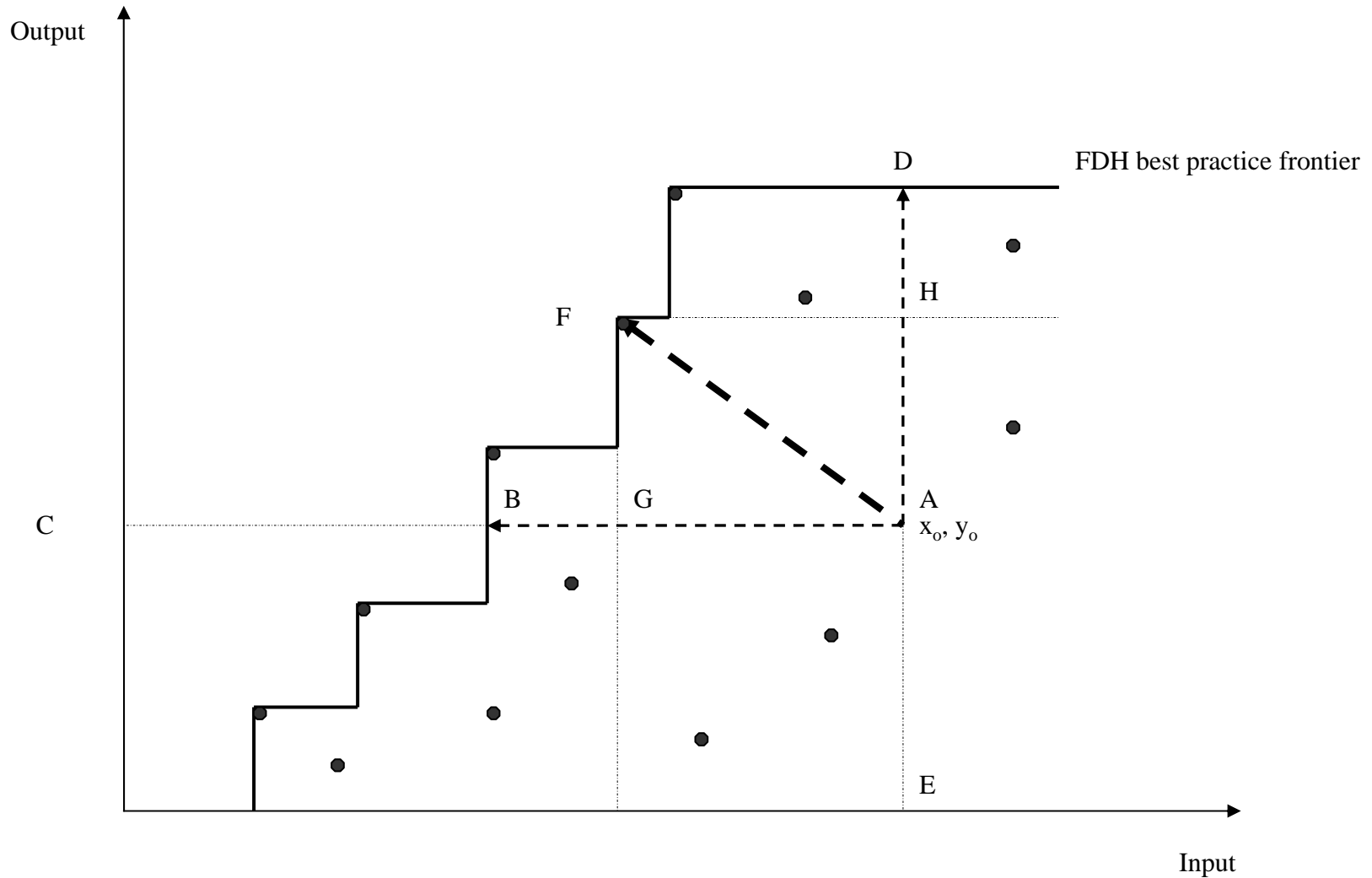


effectiveness	coefficient	Std. Error	p-value
constant	0.824	0.667	0.230
budget size	0.018	0.015	0.235
R-squared	0.067		

Non-parametric approach



Non-parametric approach



Non-parametric approach



Budget size corrected for:

- Small open economy (Dani Rodrick, 1998)
- Small family size

	order-m		order-m	
	zonder cor.		cor.gezin	en openh
	score	st. fout	score	st. fout
Australië	0,0197	0,0021	0,0185	0,0022
Oostenrijk	0,2196	0,0058	0,2358	0,0029
België	0,2384	0,0072	0,0794	0,0112
Canada	0,0286	0,0035	0,0355	0,0032
Denemarken	0,0000	0,0000	0,0000	0,0000
Finland	0,0207	0,0012	0,0231	0,0007
Frankrijk	0,3324	0,0036	0,3364	0,0032
Duitsland	0,1432	0,0050	0,1594	0,0017
Griekenland	0,2660	0,0034	0,2753	0,0025
IJsland	0,0000	0,0000	0,0000	0,0000
Ierland	0,0310	0,0038	0,0000	0,0000
Italië	0,2694	0,0036	0,2842	0,0014
Japan	0,0000	0,0000	0,0000	0,0000
Luxemburg	0,1663	0,0056	0,0000	0,0000
Nederland	0,1210	0,0050	0,1401	0,0032
Nieuw Zeeland	0,0671	0,0058	0,0649	0,0035
Noorwegen	0,0655	0,0052	0,0859	0,0026
Portugal	0,2425	0,0040	0,2503	0,0034
Spanje	0,1729	0,0040	0,0000	0,0000
Zweden	0,0645	0,0005	0,0646	0,0004
Zwitserland	0,0000	0,0000	0,0000	0,0000
VK	0,1104	0,0081	0,1413	0,0066
VS	0,0000	0,0000	0,0000	0,0000

The quality of government



The quality of government is related to	(correlation coefficient)
- The strictness of the budgetary procedures (12 EU-countries)	0.66
- The trust in other people (23 OECD-countries)	0.62
- The trust of foreigners (19 EU-countries)	0.89

Trust in Belgian institutions



Health care	82.6
Education	77.9
Social security	69.4
Police	55.4
Public administration	46.1
Parliament	39.1
Justice	36.4

(source: European values study, 2000)

Trust in Belgian institutions

Education	79.1%
Municipal administration	52.5%
Flemish administration	40.4%
Justice	30.1%

(source: Public Administration Institute (KUL), Werken aan de overheid, 2002)

Trust in Belgian institutions

→ Social profit sector provides 'merit goods'
(health care, education, etc.)

Two principles:

1. Under pricing (solidarity)
2. Feet voting (competition)

→ Upward pressure on quality

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Policy recommendations



→ 'Value for tax money'

Operational models of public administrations

'Authority' model ↔ 'Accountability' model

→ Need for civil servants with higher qualifications

Policy recommendations



→ 'Value for tax money'

Benchmarking for better

→ Need for Key Performance Indicators (KPI's)

Policy recommendations

→ Why not in T+? New symposium by the VVBB with contributions from

- International keynote speaker(s)
- Applications from
 - National Bank of Belgium
 - National Accounting Office (Cour des comptes / Rekenhof)
 - Department of Studies Ministry of Finance
 - Regional governments
 - Universities
 - ...

Inauguration speech Obama



Tuesday January 20, 2009

“The question we ask today is not whether our government is too big or too small, but **whether it works** – whether it helps families find jobs at a decent wage, care they can afford, a retirement that is dignified.

Where the answer is yes, we intend to move forward. Where the answer is no, programs will end. And those of us who manage the public’s dollars will be held to **account** – to spend wisely, reform bad habits, and do our business **in the light of day** – because only then can we restore the vital trust between people and their government”.

MEASURING THE PRODUCTIVE PERFORMANCE OF PUBLIC AUTHORITIES

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