

Productivity and efficiency of central government departments:

a mixed-effect model applied to Dutch
data in the period 2012-2019

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Aim IPSE Studies

- How productive is the public sector?
- How can politicians, policymakers and public sector management stimulate efficient use of public means?
- Various parts of public services, such as hospitals, schools, courts of law, municipalities, public libraries et cetera

Outline

- What are CGDs?
 - Research questions;
 - Methodology and data;
 - Results;
 - Conclusions.
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- For all the details see:
 - Blank, J. L. T., Heezik, A. A. S. van, & Blank, B. (2023). Productivity and efficiency of central government departments : a mixed-effect model applied to Dutch data in the period 2012-2019. *Journal of Public Sector Economics*, 47(3), 17

Casus: central government departments (CGD)

1. The development of policy, laws and regulations;
2. The implementation of new policies;
3. Organization of funding;
4. The evaluation of policy pursued.

Note: not involved in the actual execution of service provision (most of these bodies are separated from central government)

Very unique research object in efficiency research

Research questions

1. What are the cost efficiencies of CGDs?
2. What are the main determinants for the cost efficiency of CGDs?
3. What is the generic productivity trend of CGDs between 2012 and 2019?

Cost model

$$\ln(c_{dt}) = a_0 + \sum_m b_m \ln(y_{dtm}) + h \cdot time + het_d + eff_{dt} + err_{dt}$$

$$eff_{dt} = \exp\left[-\sum_k \theta_k \ln(z_{dtk})\right]$$

c_{dt} = actual costs department d at time t (adjusted for prices);

y_{dtm} = production of service m by department d at time t ;

$time$ = trend, reflecting technical change;

het_d = percentage of deviating costs department d due to the heterogeneity of production;

eff_{dt} = percentage of additional costs due to inefficiency department d at time t ;

err_{dt} = measurement error department d at time t ;

with z_{dtk} = characteristic k of department d at time t .

Data

Output measured by:

- Number of documents;
- Number of parliamentary questions;
- Program expenditures (at constant 2012 prices).
 - Mention the 106 indicators from the 2009 study

Resources measured by:

- Expenditures on personnel;
- Expenditures on material supplies;
- Wage index;
- Consumer price index.

Efficiency determinants:

- Share of women;
- Share of top positions;
- Share of women in top positions;
- Share of support staff;
- Absenteeism by reason of illness;
- Average age of employees;
- Entrance ratio;
- Exit ratio;
- Working time factor;
- Share of external staff;
- Cost share of material supplies.

CGDs statistics

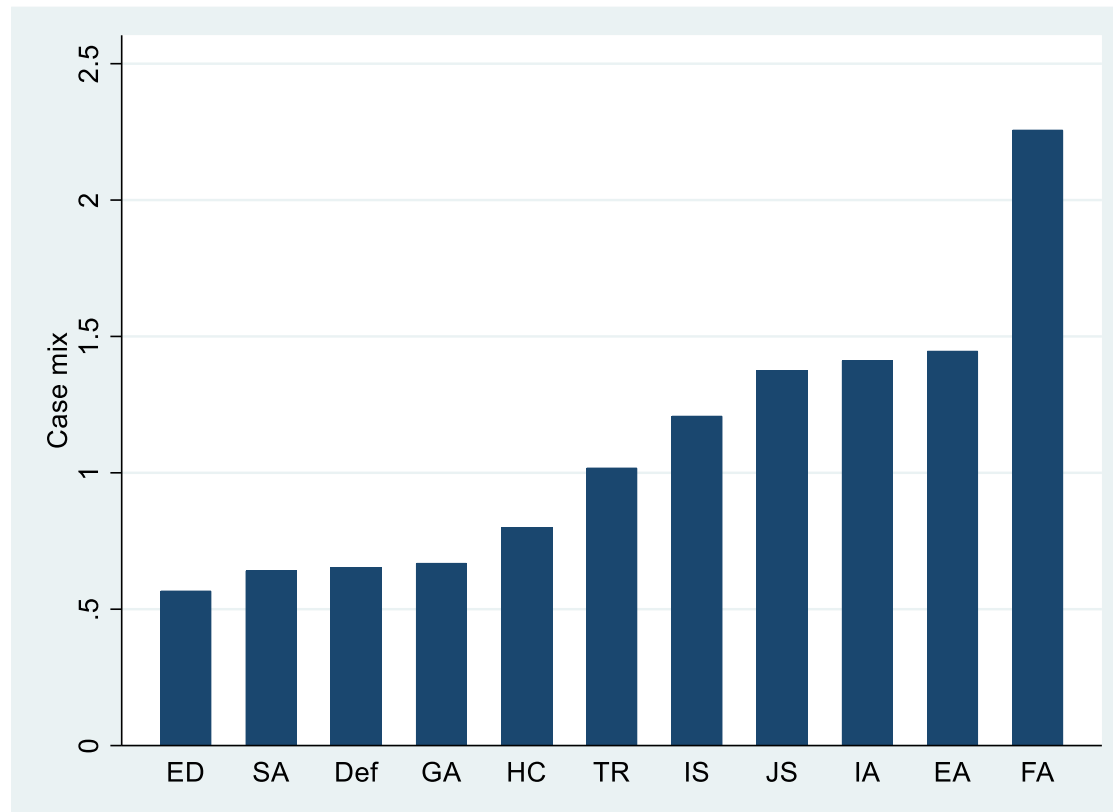
1. General Affairs (GA);
2. Foreign Affairs (FA);
3. Interior Affairs (IA);
4. Economic and Agricultural Affairs (EA);
5. Treasury (TR);
6. Infrastructures (IS);
7. Education (ED);
8. Social Affairs (SA);
9. Justice and Safety (JS);
10. Health Care (HC);
11. Defence (Def);

Variable	Number	Average	Std. dev.	Minimum	Maximum
Means					
Total costs	88	240.38	134.81	28.92	553.78
Personnel costs	88	158.01	84.35	16.11	358.78
Cost of material	88	82.36	54.31	8.94	203.46
Production					
Documents	88	403.19	226.24	22.00	892.00
Parliamentary questions	88	307.16	226.86	5.00	954.00
Program expenditures	88	13507.29	11523.06	27.08	42921.50
Efficiency determinants					
Share of women	88	48.77	9.53	22.41	62.03
Share of top positions	88	8.09	2.83	2.23	15.83
Share of women in top positions	88	31.37	10.79	8.67	50.75
Share of support staff	88	31.93	10.32	18.16	57.84
Absenteeism by reason of illness	88	4.02	0.78	1.89	5.56
Average age of employees	88	46.14	1.35	42.90	48.56
Entrance ratio	88	9.68	4.21	2.08	23.93
Exit ratio	88	9.92	2.51	5.30	17.04
Working time factor	88	94.82	1.05	92.61	96.83
Share of external staff	88	8.38	4.91	1.76	21.12
Cost share of material	88	33.16	6.66	18.84	56.00

Estimation results

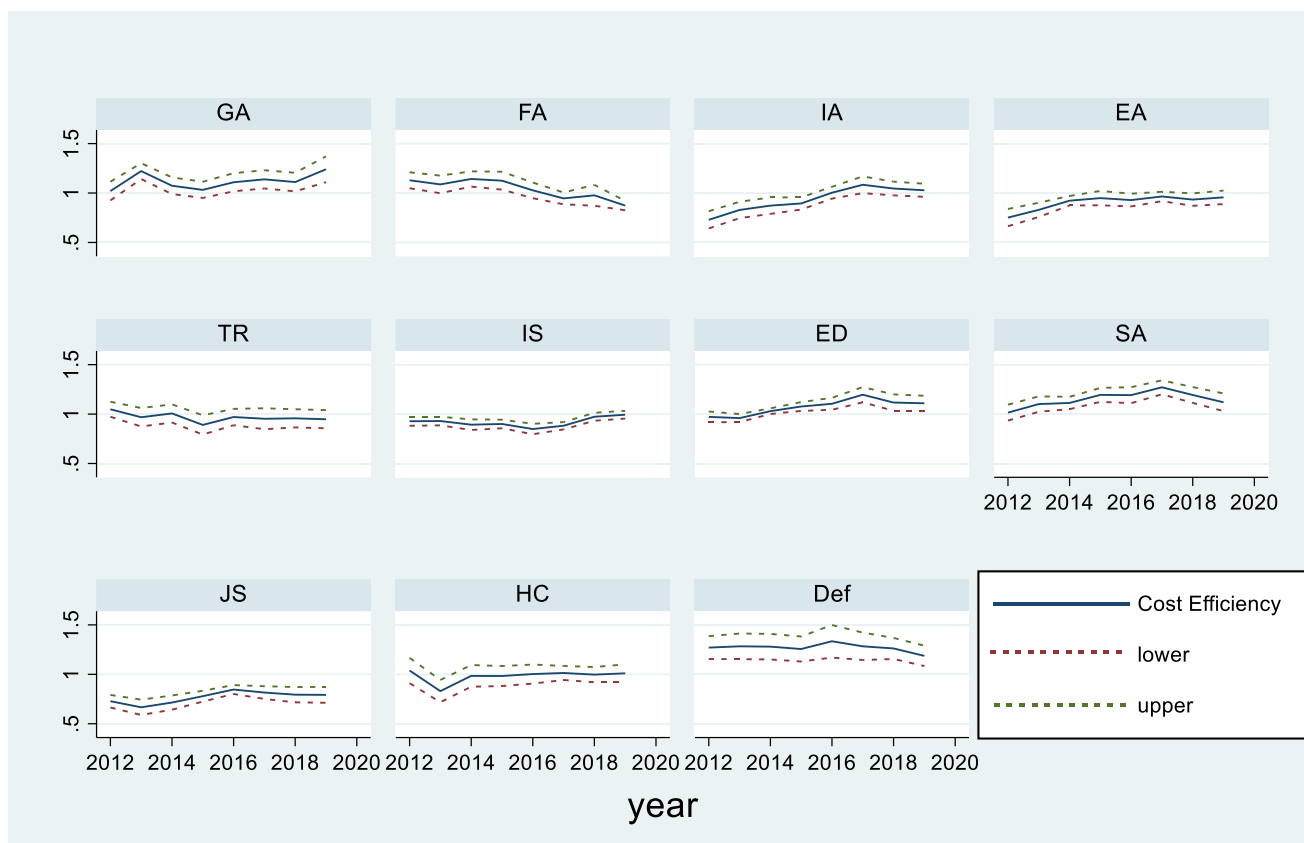
Variables		Estimate	St. Dev.	Signif.
Documents	b_1	0.383	0.040	0.000
Parliamentary questions	b_2	0.168	0.030	0.000
Program expenditure	b_3	0.449	0.047	0.000
Constant	b_0	-0.741	0.136	0.000
Absenteeism by illness	θ_5	0.338	0.116	0.004
Entrance ratio	θ_7	-0.147	0.026	0.000
Working time factor	θ_9	6.943	2.571	0.007
Share of external staff	θ_{10}	0.112	0.029	0.000
Cost share of material	θ_{11}	0.458	0.059	0.000

Casemix (heterogeneity)



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Cost efficiency per CGD 2012-2019



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Technical change (overall)

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Conclusions

- Cost efficiency varies greatly among CGDs → room for improvement;
- Most effective instruments (+/- effect on efficiency) :
 - illness absence (-);
 - working time (-) ;
 - External hiring (-);
 - Influx of personnel (+);
 - share of material supplies (-);
- Effect of case mix on cost is substantial → still some hidden inefficiency?
- no generic productivity trend for the CGDs (in spite of the digital revolution)

Thank you !

Questions ?