IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Inter-municipal Cooperation and Local Public Expenditures: The Case of Local General Administration in Germany

Peter Haug
Simon Melch

Cooperative Activities and Governance:
Cases from Germany and Italy
Halle (Saale), February 14, 2017

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Motivation

- Increasing tendency to cooperate in provision of selected municipal services ↔ "traditional" forms and fields of cooperation: multi-purpose municipal associations (*Verwaltungsgemeinschaft* etc.), water provision and sewage disposal
- Programs in several German states (Hessen, Lower Saxony, Bavaria) to support intermunicipal cooperation (IMC) → IMC considered as more politically convenient than municipal territorial reforms

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Main research question

- What are the effects of IMC on costs and efficiency of certain selected local public services?
- Efficiency as the relation of inputs to a given output quantity → "input efficiency" = expenditures /aggregate actual output quantity or output proxies

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Literature

- Cost effects of IMC
  - meta-study of Bel/Warner (2015): mixed evidence, cooperation mostly reduces costs
  - but: studies focus (capital intensive) on solid waste disposal!
- Evaluations of municipal mergers
  - mixed evidence: from no economies of scale (e.g. Lüchinger/Stutzer (2001)) to significant expenditure reductions (e.g. Blom-Hansen et al. (2014))
  - Blesse/Baskaran (2016): significant reductions of public expenditures after compulsory mergers in Brandenburg 2003 (Gemeindereform); however no saving effect for voluntary mergers
- Evaluations of public service delivery arrangements (public vs. private) (e.g. Bel et al. (2010)) and government efficiency (e.g. Geys et al. (2013))

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Effects of IMC on costs and efficiency: theory

- There is no comprehensive economic theory of IMC:
  - Agency theory (principal-agent relations, X-efficiency , economic theory of bureaucracy)
  - Transaction cost theory (Coase's market-hierarchy-paradigm)
  - Public management science (institutional collective-action framework)
- **In a nutshell:**
  - Pros: economies of scale, reduced power of utility-maximizing local politicians or bureaucrats
  - Cons: transaction costs (Costs of control, information or negotiations, decision-making costs), free-riding (especially on controlling activities)

⇒ Overall effect of IMC: „It depends…"

Empirical Model I

- Starting point: translog cost function assuming constant and identical factor prices:

$$\ln C_i = \beta_0^* + \sum_{j=1}^{M} \beta_j^* \cdot \ln y_{j,i} + \frac{1}{2} \sum_{j=1}^{M} \sum_{k=1}^{K} \beta_{jk} \ln y_{j,i} \cdot \ln y_{j,i}$$

$$\text{with} \quad \beta_0^* = \beta_0 + \sum_{J} \gamma_j \ln \overline{w}_j + \frac{1}{2} \sum_{j=1}^{J} \sum_{k=1}^{J} \gamma_{jk} \ln \overline{w}_j \cdot \ln \overline{w}_k$$

$$\text{and} \quad \beta_j^* = \beta_j + \frac{1}{2} \sum_{k=1}^{J} \delta_{jk} \ln \overline{w}_k$$

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Empirical Model II

- Municipal agents do not necessarily act as cost-minimizers →

  Alternative interpretation of

$$\ln C_i = \beta_0^* + \sum_{j=1}^{M} \beta_j^* \cdot \ln y_{j,i} + \frac{1}{2} \sum_{j=1}^{M} \sum_{k=1}^{K} \beta_{jk} \ln y_{j,i} \cdot \ln y_{j,i}$$

  - Input-distance function (1 input, multiple outputs)
  - Equation of variables determining municipal expenditures

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Empirical model III

- Translog-average cost function (1 output; environmental variables as shift parameters)

$$C_i^a = e^{\varepsilon \mathbf{z}_i'} \cdot C_i$$

$$\ln C_i^a = \beta_0^* + \sum_{j=1}^{M} \beta_j^* \cdot \ln y_{j,i} + \frac{1}{2} \sum_{j=1}^{M} \sum_{k=1}^{K} \beta_{jk} \ln y_{j,i} \cdot \ln y_{j,i} + \varepsilon \mathbf{z}_i' + v_i$$

$$\text{for } \mathrm{M} = 1:$$

$$\ln(C_i^a / y_i) = \beta_0^* + (\beta_1^* - 1) \cdot \ln y_i + \frac{1}{2} \beta_2 (\ln y_i)^2 + \varepsilon \mathbf{z}_i' + v_i$$

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Focus on the following service categories (classification of municipal budget statistics)

- General Administration: Gl.-Nr. 02, 03 und 06
- Administrative IMC very common (Rosenfeld et al. 2016)
  - internal administration (IT, personnel administration, fiscal administration, procurement)
- Key features:
  - Most important municipal budget item (ca. 1/3 % in our sample of total current expenditures) : “costs of running an administration”
  - Mostly overhead cost : intermediate inputs for other administration units
  - Output difficult to measure and quantify

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Sample I

- Source: municipal survey conducted by IWH/University of Kassel in 2015 (≈ 7,800 German municipalities outside agglomeration centers)
- 746 district-affiliated municipalities with single-entry booking system in 2011:

German state	N	%
SH	103	13.81
NDS	16	2.14
BW	134	17.96
BY	322	43.16
SA	66	8.85
ST	14	1.88
TH	91	12.20

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Sample II

- Excluded due to missing budget data:
  - Saarland, Hessen, Rhineland-Palatinate, North Rhine-Westphalia and Brandenburg: none or too few single-entry municipalities in 2011
  - Mecklenburg-West Pomerania: unable to deliver any budget data

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Outputs I

- Rough proxies, indicating demand for outputs
- General administration: total staff expenditures, total expenditures current and capital budget

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Outputs II

- Aggregation of multivariate output by linear projection (similar to principal component analysis)
- Requires sufficiently high correlation (reduces loss of information): Spearman rho + 0.93
- Weighting factors of the mean-scaled variables: eigenvector belonging to the highest eigenvalue of matrix X‘X (Daraio und Simar 2007)

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Inputs I

- Expenditures on labor, capital and intermediate inputs
- Capital costs: only interest payments and rents

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Inputs II

- Basic principle: (net-) expenditures caused by own population either directly or that could be allocated to municipality according to their population share
- Costs = own original costs minus reimbursements from other local governments plus costs of municipal association allocated pro rata (population share)

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Environmental variables I

- Dummy cooperation = 1 → at least 1 cooperation in 2011 in general administration
- State dummies
- Organizational forms: independent municipality (*Einheitsgemeinde*), members of municipal association with common administration office (*VG mit gemeinsamen Amt* and *amtsangehörige Gemeinden*), fulfilling municipalities (*erfüllende* Gemeinden), outsourcing municipalities (*beauftragende Gemeinden*), members of *Samt-* and *Verbandsgemeinden*
- Interaction term BW_VG: control for missing municipal association budget data in Baden-Württemberg

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Environmental variables II

- Settlement structure: population density
- Demography:
  - Age structure (share of senior citizens, share of under 18)
  - Population change during the last 10 years
  - Percentage of foreign nationals
- Fiscal power: tax revenues per capita, grants received per capita, debts per capita core budget (including short-term lendings *Kassenkredite*)

IWH Leibniz-Institut für Wirtschaftsforschung Halle

Results general administration (only significant variables and variables of prime interest)

lc_ad	Coef.	Robust Std. Err.	t	P>t
cooperation	-.0010813	.0289122	-0.04	0.970
SA	-.3881219	.080699	-4.81***	0.000
TH	-.4429496	.0518735	-8.54***	0.000
VG	-.2436547	.0396647	-6.14***	0.000
erfG	-.2092455	.070705	-2.96***	0.003
BG	-.4540982	.1518639	-2.99***	0.003
SG	-.2504205	.1390781	-1.80*	0.072
BW_VG	-.2453102	.1205797	-2.03**	0.042
Popg_00_10_2011	-.4558558	.2290522	-1.99**	0.047
Tax_revenues_2011 pc	-.0002301	.0000306	-7.53***	0.000
loutput_2011	-.156122	.019139	-8.16***	0.000
loutput_2011_sq	-.0117038	.0044844	-2.61***	0.009
_cons	13.68863	.1864407	73.42***	0.000
Number of obs = 728	R-squared = 0.4891			

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Robustness checks

- Reverse-causality problem? Probit-Estimation: Do average costs of past years influence the probability to cooperate in 2011?
- Output heterogeneity: Regression only for certain size classes

Probit estimation general administration (only cost per unit and state dummies)

i_ad	Coef.	Robust Std. Err.	z	i_ad	Coef.	Robust Std. Err.	z
cost_1998	-2.30e-07	5.71e-07	-0.40	cost_2006	-4.21e-07	4.93e-07	-0.85
SH	-1.069129	.3173055	-3.37***	SH	-1.102398	.2951818	-3.73***
NS	.0563932	.368461	0.15	NS	.0044928	.3611808	0.01
BW	0	(omitted)		BW	0	(omitted)	
SA	.5992186	.1803727	3.32***	SA	.5419011	.186021	2.91***
ST	.3537773	.3579802	0.99	ST	.3139434	.360216	0.87
TH	-.082284	.183054	-0.45	TH	-.1219608	.1848399	-0.66
_cons	-.9075666	.1911273	-4.75***	_cons	-.8007782	.2156991	-3.71***
	Number of obs = 614	Pseudo R^2 = 0.0716	Log pseudolikelihood = -250.26445		Number of obs = 614	Pseudo R^2 = 0.0725	Log pseudolikelihood = -250.00638

IWH Leibniz-Institut für Wirtschaftsforschung Halle

Results general administration – municipalities <= 10.000

lc_ad	Coef.	Robust Std. Err.	t	P>t
Coop	-.0003621	.0313052	-0.01	0.991
SA	-.3862854	.0878512	-4.40***	0.000
TH	-.4723684	.0551938	-8.56***	0.000
VG	-.2493779	.0415307	-6.00***	0.000
erfG	-.2514211	.081325	-3.09***	0.002
BG	-.4834959	.164252	-2.94***	0.003
SG	-.3414418	.1480881	-2.31**	0.021
BW_VG	-.2827112	.1391789	-2.03**	0.043
Popg_00_10_2011	-.4510516	.2350412	-1.92*	0.055
Tax_revenues_2011_pc	-.000221	.0000307	-7.19***	0.000
loutput_2011	-.1540816	.023176	-6.65***	0.000
loutput_2011_sq	-.0122651	.0069847	-1.76*	0.080
_cons	13.33752	.19045	70.03	0.000

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Results

- IMC without any effects on average costs for general administration
- Other variables such as institutional form, state-specific institutional frameworks or other unobservable factors are much more important.
- Robustness of results: no indication for reverse causality , no significant changes if large municipalities are excluded
- Increasing returns to scale

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

Policy implications

- IMC is not the politician's panacea for cost saving in public services ↔ 70% of the sample. municipalities declared in questionnaire that they intended cost reduction/efficiency increase.
- Cost hysteresis might counteract cost savings effects → local politicians must be willing to enforce cost savings.
- IMC usually intended for expanding output quality and quantity

IWH
Leibniz-Institut für
Wirtschaftsforschung Halle

References

Bel/Fageda/Warner (2010): Is Private Production of Public Services Cheaper than Public Production? A Meta-Regression Analysis of Solid Waste and Water Services, in: Journal of Policy Analysis and Management 29 (3), pp. 553–577.

Bel/Warner (2015): Inter-municipal Cooperation and Costs: Expectations and Evidence, in: Public Administration 93 (1), pp. 52–67.

Blesse/Baskaran (2016): Do Municipal Mergers Reduce Costs? Evidence from a German Federal State, in: Regional Science and Urban Economics 59, pp. 54-74.

Blom-Hansen/Houlberg/Serritzlew (2014): Size, Democracy, and the Economic Costs of Running the Political System, in: American Journal of Political Science 58 (4), pp. 790-803.

Daraio/Simar (2007): Advanced Robust and Nonparametric Methods in Efficiency Analysis – Methodology and Applications, New York.

Geys/Heinemann/Kalb (2013): Local Government Efficiency in German Municipalities, in: Raumforschung und Raumordnung 71(4), pp. 283–293.

Lüchinger/Stutzer (2002): Skalenerträge in der Öffentlichen Kernverwaltung: Eine Empirische Analyse anhand von Gemeindefusionen, in: Swiss Political Science Review 8 (1), pp. 27–50.