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Peter Bogetoft and Jesper Wittrup

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Address:

The ROCKWOOL Foundation Research Unit

Ny Kongensgade 6

1472 Copenhagen, Denmark

Telephone +45 33 34 48 00

E-mail: kontakt@rff.dk

en.rockwoolfonden.dk/research/

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Efficiency in Danish Local Governments: What Sets the Best Apart?

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Peter Bogetoft¹ and Jesper Wittrup

Abstract

Based on a new comprehensive measure of local government efficiency in Denmark, we identify characteristics of efficient local governments. We find that managerial, political, and structural variables are correlated with local government efficiency.

In relation to management, we find that not only a higher level of sickness absence among municipal employees but also (and perhaps more surprisingly) a higher degree of professionalization of local government administration—in the form of a greater proportion of employees with a university degree—is negatively correlated with efficiency. In relation to politics, we find that both a higher tax level and a greater left-wing composition of the municipal board are negatively correlated with efficiency.

We also analyze service levels in the same way and suggest an approach to disentangle whether low service provision is due to inefficiency or a lack of resources.

The analyses are conducted using both country-wide comparisons and local comparisons among neighboring municipalities only.

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1. Introduction

In Denmark, local governments are responsible for a very large proportion of all public expenditures, including welfare services related to schools, childcare and elder care. For this reason, it is important to not only assess municipal efficiency, i.e., the ability to generate high service levels at the lowest costs, but also identify the factors that contribute to sustained efficiency. This paper does exactly that. By applying regression analysis to new composite indicators of municipal service and efficiency, we identify factors that characterize efficient Danish municipalities.

In Section 2, we briefly introduce our new efficiency indicator. In Section 3, we discuss our explanatory variables, as well as the need to apply a supplementary model looking at efficiency relative to neighboring municipalities. The main results about which factors characterize municipalities with high service and efficiency levels are presented in Section 4, and final remarks are provided in Section 5.

2. New comprehensive measures of local government service and efficiency

In Denmark, municipal service levels have traditionally been assessed using expenditure data. Municipalities that spend more than what would be expected based on their socioeconomic and demographic characteristics are considered to offer higher service levels. However, this approach has limitations. Specifically, it fails to differentiate whether higher expenditures result from inefficient operations or the actual provision of superior services.

To provide a fair and policy-relevant overall assessment of local government service and efficiency levels, it is necessary to shift the focus away from how much money a local government spends. Service level is a question of which services are actually delivered to citizens.

With this aim, we have reviewed the existing data on the output and outcomes of local governments in Denmark and identified 55 indicators, each of which elucidates the services actually provided by local governments. For example, there are indicators for the results achieved by local government schools (controlled for the students' socioeconomic background), the staffing

levels in institutions that provide childcare services for school-aged children, the number of hours of home assistance provided to elderly individuals, library loan statistics and the quality of roads. Many of the indicators are corrected for the socioeconomic characteristics of the relevant group of citizens using individual register data. For details, see Bogetoft and Wittrup (2024a,b).

The next challenge is how to aggregate these indicators. We have decided against using a fixed-weights approach as it would require making subjective and potentially problematic detailed assumptions about the relative importance of the many indicators. Still, fixed weights have often been used to evaluate local governance performance. For example, the comprehensive performance assessment (CPA) in the UK is a well-known and ill-fated system for measuring local government performance. The CPA was carried out in the UK from 2001 to 2008, and weighted hundreds of performance indicators into an overall CPA score for each local authority. One issue with the CPA was its lack of clarity, making it challenging to interpret (Lockwood & Porcelli, 2013). In addition, CPA suffered from shortcomings in the aggregation procedure since the CPA score is a fixed-weight composite indicator (McLean et al., 2007).

Our alternative solution is to apply data envelopment analysis (DEA)² with weight restrictions to construct a composite service indicator. As argued by Cherchye et al. (2007), among others³, DEA is an attractive method for establishing composite indicators, as it makes it possible to avoid problematic subjective assumptions about the precise weightings of the underlying indicators. Another attractive feature of using DEA in this particular case is that it shows each local government in the most favorable light possible. The weights of the individual indicators are specific to each local government and are chosen from a set of reasonable weight to yield the highest possible relative measure of service levels. When a local government has a relatively high service level in certain dimensions compared with other local governments, these dimensions will

² Data envelopment analysis (DEA), first introduced in 1978 (Charnes, Cooper & Rhodes (1978, 1979)), is an approach to performance evaluation that is based firmly on economic theory and allows for multiple inputs and outputs to be included without prior knowledge of their relative importance. The DEA approach is now a well-established methodology that has been used in more than 5000 studies has been explained in numerous textbooks, including Bogetoft and Otto (2011) and Bogetoft (2012), and is an approach for which both commercial and open source software are readily available (e.g. Bogetoft and Otto (2015)). For a methodological guide aimed at public administration, see Bretchneider et al. (2005).

³ See for example Despotis (2005), González et al. (2011), OECD (2008) and Tofallis (2012).

have a higher relative weighting when this particular local government's overall service level is calculated. In this way, we allow local governments to have differing priorities and we endogenously determine the priorities that put the individual municipalities in their best possible light. Furthermore, this "benefit-of-the-doubt" approach largely avoids subjective weighting, which in turn renders the assessments more acceptable among local governments.

Formally, we can define our composite relative service indicator as follows. Let us assume that there are N service indicators, $j = 1, \dots, N$, for each of the K local governments, $k = 1, \dots, K$. Now let

y_j^k = service indicator j for local government k

w_j^k = weight assigned to service indicator j in local government k

The benefit-of-the-doubt indicator S_{BoD}^k for municipality k can formally be calculated like this

$$S_{BoD}^k = \max_{w \in W_{Plausible}} \min_{h \neq k} \frac{\sum_{j=1}^N w_j y_j^k}{\sum_{j=1}^N w_j y_j^h}$$

where $W_{Plausible}$ is the set of restrictions we impose on the weights $w = (w_1, w_2, \dots, w_N)$. The solution to this problem is the specific weights $w^k = (w_1^k, w_2^k, \dots, w_N^k)$ that put municipality k in its best possible light. The relative service level S_{BoD}^k is the service level in municipality k divided by the service level in the municipality h which are doing the best using the same weights as municipality k . Thus, the BoD index for local government k can be interpreted as the result of a "game" between the local government and an evaluator. The local government seeks to find a weighting among the various indicators that will make its service levels appear as good as possible, whereas for a given weighting, the evaluator seeks a local government to compare with that has performed particularly well with the same weighting.

In terms of weight restrictions, we allow considerable flexibility. If an area has 5 service indicators, each of them can take up 10% to 40% of the area weights. For particular strong indicators, we allow even more weight flexibility. We split the municipality into four service areas. Across areas, we use less flexible weightings. If a municipality for example spends 15% of its service budget on

childcare, then this indicates the relative importance it assigns to this area, and the combined weight of all the childcare indicators should thus be 0.15.⁴

To the best of our knowledge⁵, our approach is the first to include such a substantial number of output indicators in a DEA-based assessment of local government service and efficiency. The large number of indicators combined with the “benefit-of-the-doubt” approach provides a fairer and more comprehensive assessment of each local government and makes it more difficult for inefficient local governments to fabricate excuses for their subpar performance.

Efficiency is a question of producing services at the lowest possible costs. Efficiency is measured by a DEA model in which the 55 service performance indicators serve as outputs and cost serves as input. Formally, we can summarize the definition of the efficiency like the service level S_{BOD}^k above. Let

$$x^k = \text{cost indicator in local government } k$$

As cost indicators, we use expenditures relative to expected expenditures given the local governments’ demographic and socioeconomic circumstances. The efficiency (sometimes called productivity) of municipality k , E_{BOD}^k , can now be calculated as follows:

$$E_{BOD}^k = \max_{w \in W_{Plausible}} \min_{h \neq k} \frac{\sum_{j=1}^N w_j y_j^k / x^k}{\sum_{j=1}^N w_j y_j^h / x^h}$$

Municipalities with an efficiency score below 1 are deemed inefficient, while those with a score above 1 are considered "superefficient". For example, a score of 0.85 indicates that the municipality could reduce its spending by 15% while maintaining the same service level if it adopted the best practices of other municipalities. Similarly, a score of 1.1 suggests that the

⁴ We allow for $\pm 1\%$ flexibility around the expenditure proportion. If an area has a cost share of 20%, the total weight in this area must sum to 19%-21%. With 5 service indicators, each of which can take up 10% to 40% of the area weights. So basically, we have 6 weights constraints, $0.1 \leq \frac{w_j}{w_1 + w_2 + \dots + w_5} \leq 0.4, j = 1, 2, \dots, 5$ and $0.19 \leq w_1 + w_2 + \dots + w_5 \leq 0.21$.

⁵ See, e.g., the literature review on local government efficiency by Narbón-Pepiñaja et al (2017a, 2017b).

municipality could increase its spending by 10% and still be perceived as following best practices, provided it maintains its current service level.

Municipal service level and efficiency is calculated separately for each year from 2009 to 2021.

The distributions of the efficiency and service scores from all years are shown in Figure 1. Here and in the regressions, we have used 100 times E_{BOD}^k and S_{BOD}^k .

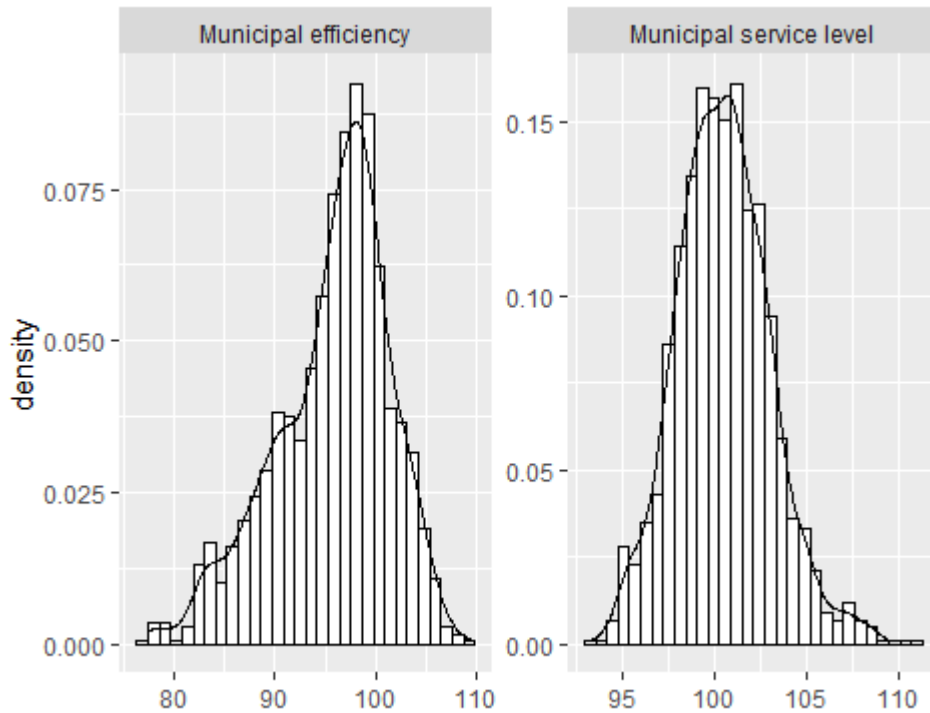


Figure 1: Distributions for efficiency and service measures

For more details about the underlying indicators and the aggregation of these indicators, see Bogetoft and Wittrup (2024a; 2024b).

3. Methodology and variables

3.1 Neighboring municipalities

Figure 2 shows the geographical distribution of municipal efficiency from 2019–2021. It is clear that the most efficient municipalities tend to be located in the western part of Denmark, whereas

municipalities in the eastern part of the country tend to be less efficient. For the service score, there are similar tendencies.

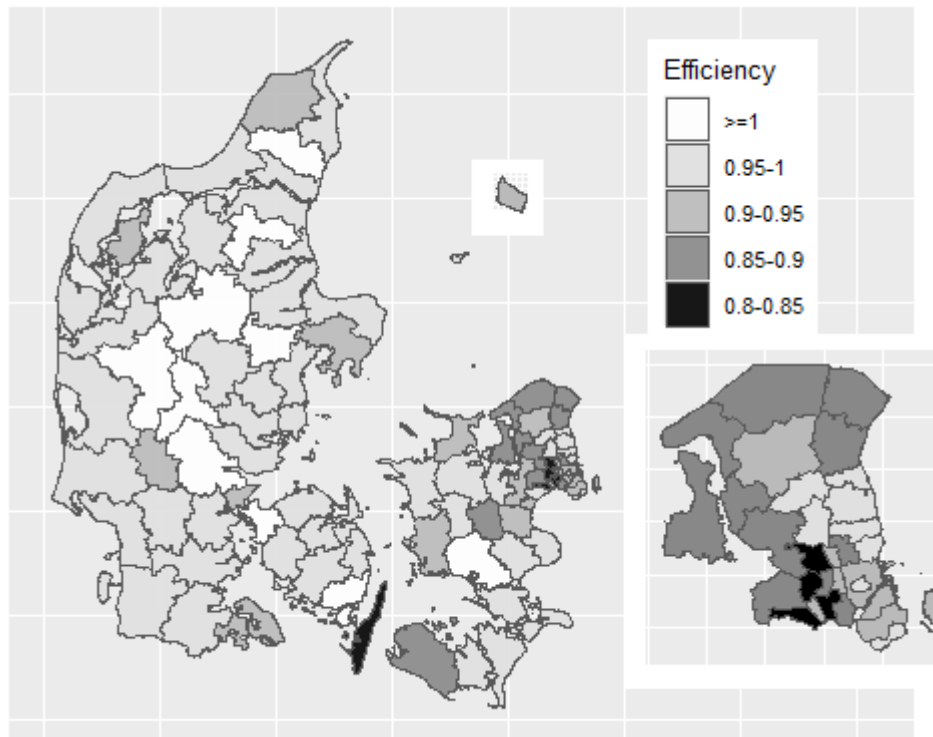


Figure 2: Municipal efficiency in Denmark 2019–2021

In a regression model with municipal efficiency serving as the dependent variable, there is therefore a risk that the regressors will identify the location of the municipality rather than the more interesting managerial, political, and structural variables. For this reason, as a supplementary model, we also look at the marginal difference in efficiency and service between a given municipality and its neighboring municipalities.

We consider municipalities to be neighbors if they either share a common border or if the travel distance between them by car is less than 30 minutes.

3.2 Managerial variables

The managerial characteristics of municipalities can be described in many ways. It would be interesting to know more details about centralization vs. decentralization, i.e., the extent to which decision-making is concentrated at the top levels or more autonomy is introduced at lower levels.

Somewhat related, one can distinguish participative styles from authoritarian styles, i.e., the extent to which decision-making either involves employees or is based more on directives coming from the top, with little input from lower levels. Other interesting dimensions include professionalism, i.e., the extent to which managers have formal education and training in public administration or related fields; innovativeness, i.e., the willingness and ability of municipal management to adopt new technologies, processes, and ideas; and performance orientation, i.e., the focus on outcomes and results using performance metrics and benchmarks. It would be interesting to collect data on such aspects, using, for example, the framework of the so-called Management and Organizational Practice Survey (MOPS) from the United States Census Bureau (Buffington et al, 2017) as a guide.⁶

Unfortunately, the present project did not allow us to conduct specialized surveys on management practices. Instead, we rely on easily available data and combine these data with ongoing discussions of managerial challenges in Danish municipalities.

One relevant indicator used herein is the level of sickness absence among municipal employees. According to the Danish Association of Local Governments (KL), reducing the level of sickness absence is a high priority for municipal management⁷.

A lower level of sickness absence is presumably associated with a better work environment, continuity in daily work, and higher quality of service to citizens.

According to data from the Municipal Salaries Data Office (KRL), the average level of sickness absence in days per full-time employee in municipalities dropped from 13.3 in 2008 to 11.5 in 2012 and then increased again to 13.3 in 2021.⁸ However, the degree of sickness absence differs substantially and persistently among municipalities, with municipalities in the western part of Denmark generally having a lower level of sickness absence than those in eastern Denmark.

⁶ A related example in the Danish context is the analysis of high school performance in connection with a survey of management practices (Andersen et al, 2014).

⁷ <https://www.kl.dk/arbejdsgiver/arbejdsgiverpolitik-og-analyse/sygefravaer/sygefravaer-kraever-et-staerkt-arbejdsgiverfokus> (website accessed March 2024).

⁸ KRL fraværstatistik 2022.

Regarding the professionalization of management, an interesting and easily available indicator is the proportion of municipal employees with a university education⁹. A persistent trend in municipal administration in recent years has been the increase in the proportion of such employees. The number of municipal employees with a university degree has increased by 75% since 2006.¹⁰ This increased professionalization level of the municipal workforce implies that university-educated employees are gradually replacing employees with a more office-based education. Municipal managers, such as the director of the municipality of Thisted, which has seen a major increase in the number of employees with an academic degree, argue that such replacement increases efficiency and growth and allows the municipality to better match and respond to demands from state regulators.¹¹

Given the managerial focus on the level of sickness absence—and given the marked change in the composition of the municipal workforce by the introduction of highly educated employees—we find it relevant to investigate how these two variables relate to municipal efficiency.

Figure 3 shows the distributions for the two variables in both absolute and relative differences from neighboring municipalities¹². The value of the proportion of employees with a university degree is inverted¹³ to achieve an approximate normal distribution.

⁹ More specifically, we have data on the proportion of municipal employees categorized as 'academics,' excluding those with technical university education, such as dentists or engineers.

¹⁰ Altinget (September 20, 2023): Antallet af konsulenter, journalister og akademikere er eksploderet i kommunerne.

¹¹ DR Nyheder 19. oktober, 2023: Kommunerne ansætter akademikere som aldrig før: 'Vi kan ikke undvære dem'.

¹² If the value for municipality k is v^k and the average value of neighboring municipalities for the same variable is v^n , then the relative difference is calculated as $(v^k - v^n)/v^n$.

¹³ "Inverted" implies that x is transformed into $1/x$.

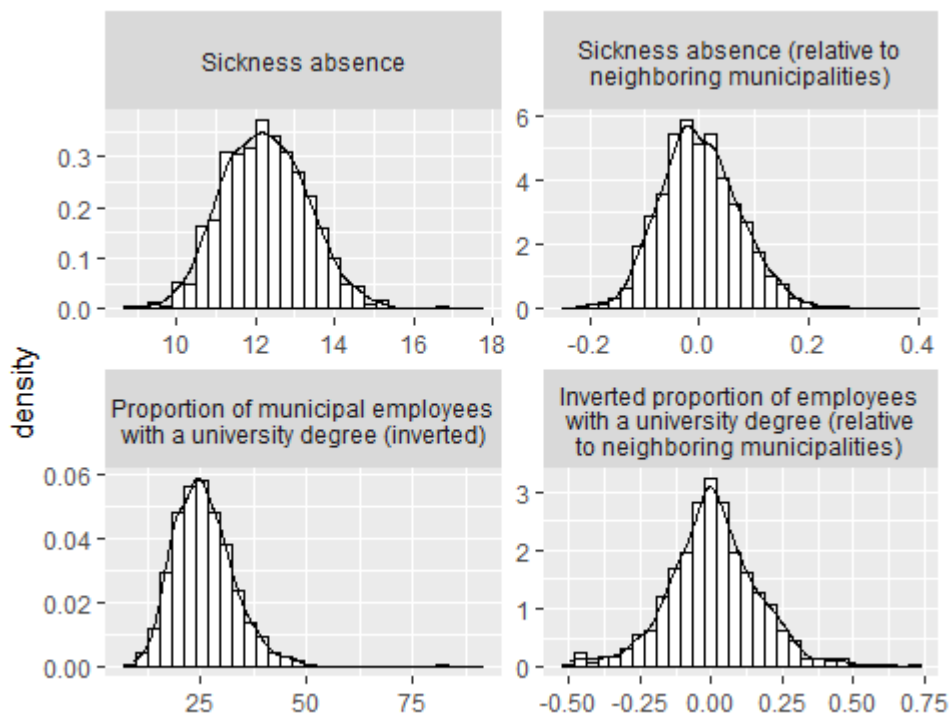


Figure 3: Distributions for managerial variables

3.3 Political variables

Similar to the managerial attributes of municipalities, the political conditions and priorities within these entities can be delineated with varying degrees of specificity. For example, one might examine aspects such as the extent of partisanship, political stability, and citizen engagement in politics, including voter participation rates and the various mechanisms through which residents contribute to decision-making processes, such as attending public meetings and engaging in consultations. For the purposes of this project, we limit our focus to two readily quantifiable dimensions, namely, the level of taxation and the political composition of municipal councils.

Danish local governments are empowered to set the local tax level; in this way, municipal councils have a major political impact. They also must adapt their expenses to match the revenues defined by the local tax level. We may therefore expect the local tax level to have some impact on efficiency.

Furthermore, we may expect socialist or left-wing local governments to have a greater focus on delivering services and nonsocialist or right-wing local governments to have a greater focus on lowering taxes.

We measure the local tax level as the local tax income in proportion to maximum potential local tax income.¹⁴

In addition, we measure the proportion of left-wing¹⁵ members of the municipal council. The distributions for the variables are shown below.

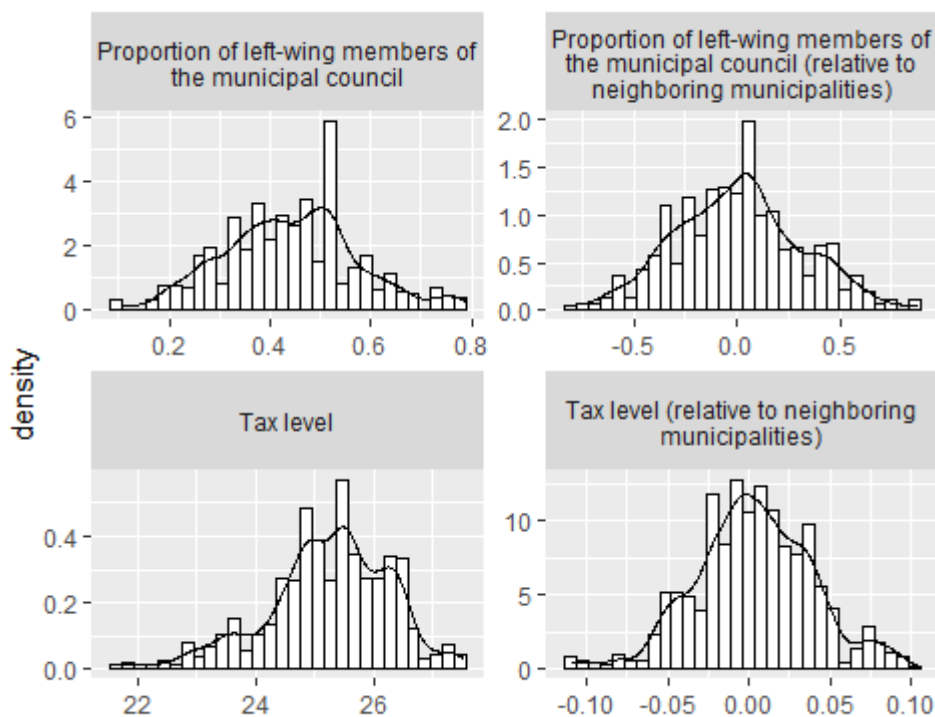


Figure 4: Distributions for political variables

¹⁴ The specific calculations are somewhat intricate. A description is available in Danish as part of governments inter-municipal equalization, see section 8.5 in <https://www.ism.dk/Media/638237134874224156/Kommunal%20udligning%20og%20generelle%20tilskud%202024.pdf>

¹⁵ Members of the Social Democratic Party and parties to the left of that party are considered left-wing. We have not assessed the political orientation of political parties which are not organized nationally, so these are not counted as socialist even if they are in fact so. However, the local political parties in general tend to be non-socialist.

3.4 Structural variables

Certain structural characteristics may make it more or less difficult to deliver efficient municipal services. In our analysis, we consider population density, the educational level of residents, and the proportion of children of single parents. The distributions of these variables are shown in Figure 4.

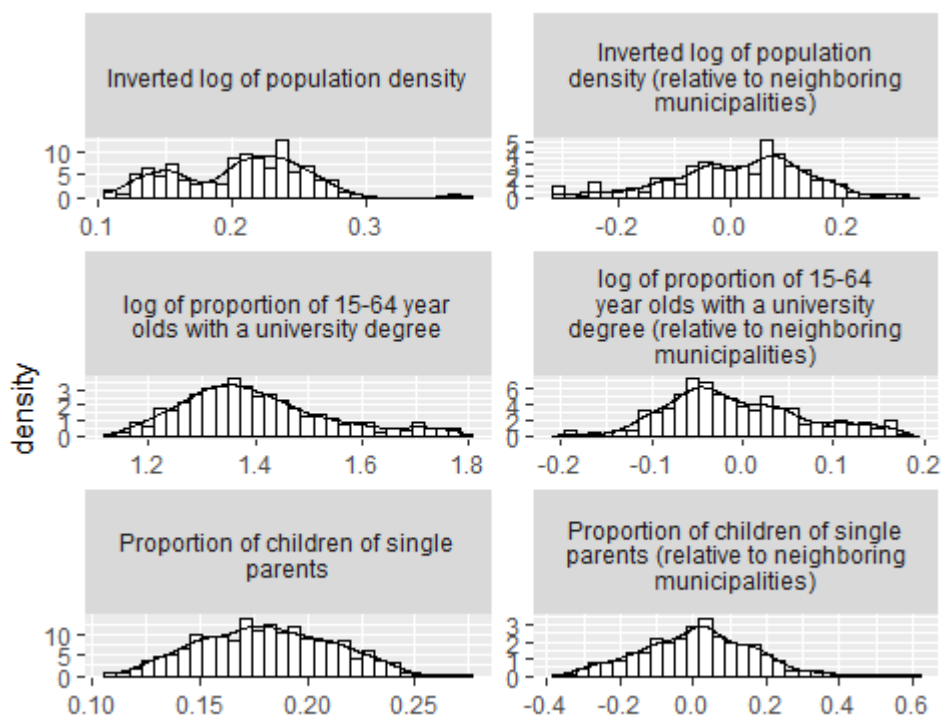


Figure 5: Distributions for structural variables

As explained in greater detail in Bogetoft and Wittrup (2024a; 2024b), many of the indicators used to construct the indices for service level and efficiency are, in principle, corrected for socioeconomic differences. For example, school performance is measured by looking at each student’s grades compared with the grades that should be expected given the socioeconomic background of the student. In the same way, the quality of dental health for children is measured relative to what should be expected given their socioeconomic background. However, such corrections are not possible for all indicators; therefore, the concentration of certain socioeconomic groups may also matter. For these reasons, it is relevant to also include

socioeconomic indicators, such as the proportion of residents with a university degree and the proportion of children of single parents, in the analysis.

4. Analysis

Managerial, political and structural factors can affect municipalities either by increasing the quality of service or by decreasing spending (or both). In the following, we first look at the combined effects on efficiency. We analyze both at the countrywide level and the more local neighborhood level. Finally, we take a closer look at variations in the service level.

4.1 Countrywide variations in efficiency

Table 1 below shows the results of a regression of the abovementioned variables with municipal efficiency ($100 * E_{Bod}^k$) serving as the dependent variable. For example, the coefficient of -2.616 for the sickness variable in Model 1 implies that efficiency decreases by 2.6 points when the average sickness absence increases by one day.

Sickness absence is correlated with a lower level of efficiency¹⁶. Similarly, a greater proportion of employees with an academic degree is negatively correlated with efficiency.

The tax level and proportion of left-wing council members are also negatively correlated with efficiency; however, the statistical significance of the effect of council composition disappears when controlling for other variables.

The structural variables indicate that efficient municipalities tend to have low population density, a high proportion of citizens with higher education, and a low proportion of children of single parents.¹⁷

¹⁶ A few of the 55 indicators used to construct the composite service indicator are directly related to sickness absence in specific service areas. We test and confirm that there is a significant negative correlation between general sickness absence and efficiency calculated by omitting any indicator related to sickness absence.

¹⁷ It can be argued that the significance of structural variables suggests our cost and service corrections may not fully account for socioeconomic, demographic, and geographic factors across municipalities. As noted by Bogetoft and Wittrup (2024a,b), ex post corrections are common in benchmarking. However, we consider these corrections to be minor, as shown by comparing the coefficients with the structural variable variations in Figure 5.

Table 1: Municipal efficiency as the dependent variable

| | (1) | (2) | (3) | (4) |
|---|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| Sickness absence | -2.616*** (-17.14) | | | -1.199*** (-8.489) |
| Proportion of municipal employees with a university degree (inverted) | 0.1862*** (6.987) | | | 0.2361*** (8.863) |
| Tax level | | -0.5377*** (-3.879) | | -1.665*** (-11.50) |
| Proportion of left-wing members of the municipal council | | -15.47*** (-12.02) | | -1.144 (-1.040) |
| Inverted log of population density | | | 84.80*** (17.05) | 82.55*** (15.30) |
| log of proportion of 15-64-year-olds with a university degree | | | 20.58*** (13.20) | 19.82*** (14.47) |
| Proportion of children of single parents | | | -40.27*** (-7.608) | -7.976 (-1.513) |
| Fixed-effects: Year | ----- ----- | ----- ----- | ----- ----- | ----- ----- |
| VCOV type | Heterosked asticity-rob. | Heterosked asticity-rob. | Heterosked asticity-rob. | Heterosked asticity-rob. |
| Observations | 1,222 | 1,222 | 1,222 | 1,222 |
| R2 | 0.28881 | 0.16673 | 0.40666 | 0.54712 |
| Within R2 | 0.27915 | 0.15540 | 0.39860 | 0.54097 |

T-stat in parenthesis. Signif: **** 0.001; *** 0.01; ** 0.05; * 0.1

4.2 Local variations in efficiency

As mentioned above, it is likely that some of these correlations can be explained by regional differences in efficiency. For example, the most efficient local governments tend to be located in the less densely populated western part of Denmark, which may explain why population density appears to help explain efficiency.

For this reason, it is also relevant to look at the difference in efficiency for a given municipality relative to its neighboring municipalities¹⁸.

Table 2 below shows the results of a regression analysis with this variable serving as the dependent variable. All explanatory variables are also recalculated so that they measure the value of each municipality relative to the average value of its neighboring municipalities. Furthermore, the explanatory variables are standardized.

Table 2: Municipal efficiency relative to neighboring municipalities as the dependent variable

| | (1) | (2) | (3) | (4) |
|--|---------------------------|---------------------------|---------------------------|---------------------------|
| Sickness absence (relative to neighboring municipalities) | -1.567*** (-10.13) | | | -0.8139*** (-6.872) |
| Inverted proportion of employees with a university degree (relative to neighboring municipalities) | -0.0862 (-0.5695) | | | 0.7998*** (7.093) |
| Tax level (relative to neighboring municipalities) | | -2.324*** (-18.81) | | -1.655*** (-14.30) |
| Proportion of left-wing members of the municipal council (relative to neighboring municipalities) | | -1.341*** (-10.23) | | -0.4659*** (-3.524) |
| Inverted log of population density (relative to neighboring municipalities) | | | -0.1451 (-0.7129) | 0.0745 (0.3978) |
| log of proportion of 15-64-year-olds with a university degree (relative to neighboring municipalities) | | | 2.539*** (16.86) | 2.179*** (15.02) |
| Proportion of children of single parents (relative to neighboring municipalities) | | | -2.148*** (-12.49) | -1.345*** (-7.996) |
| Fixed-effects: Year | ----- ----- | ----- ----- | ----- ----- | ----- ----- |
| VCOV type | Heteroskedasticity-robust | Heteroskedasticity-robust | Heteroskedasticity-robust | Heteroskedasticity-robust |

¹⁸ In this paper, we have used differences relative to the simple average value for neighboring municipalities, see footnote 12.

| | (1) | (2) | (3) | (4) |
|--------------|---------|---------|---------|---------|
| Observations | 1,214 | 1,222 | 1,222 | 1,214 |
| R2 | 0.09063 | 0.33027 | 0.41898 | 0.56289 |
| Within R2 | 0.09038 | 0.33010 | 0.41883 | 0.56276 |

Standardized coefficients. T-stat in parenthesis. Signif: **** 0.001; *** 0.01; ** 0.05; * 0.1

If a municipality has a higher level of sickness absence than its neighbors do, then it tends to have a lower level of efficiency.

If a municipality has hired a greater proportion of employees with a university degree than its neighbors, this does not seem to have an impact immediately; however, if we control for the general proportion of citizens with a university degree (compared to neighbors), then this variable is found to have a negative impact. In general, municipalities with a higher proportion of well-educated citizens are more efficient, as long as the municipality does not hire these citizens to work for it.

If a municipality decides to implement a higher tax level or has a larger proportion of left-wing council members than its neighboring municipalities do, then it also tends to have lower efficiency.

Population density does not seem to matter in relation to efficiency when neighboring municipalities are considered. However, a municipality with a low proportion of single parents and a high proportion of well-educated citizens still fares better than its neighbors do.

4.3 Variations in service quality

As mentioned above, a factor can contribute to efficiency by either increasing the quality of service or decreasing spending (or both).

To investigate how managerial, political and structural factors may impact isolated service quality, we regress service quality, S_{BOD}^k , on different factors. Table 3 shows a regression model with service quality (relative to neighbors) serving as the dependent variable.

Table 3: Municipal service quality relative to neighboring municipalities as the dependent variable

| | (1) | (2) | (3) | (4) |
|--|---------------------------|---------------------------|---------------------------|---------------------------|
| Sickness absence (relative to neighboring municipalities) | -0.5860*** (-7.676) | | | -0.4508*** (-5.878) |
| Inverted proportion of employees with a university degree (relative to neighboring municipalities) | 0.3931*** (6.560) | | | 0.4086*** (6.233) |
| Tax level (relative to neighboring municipalities) | | -0.1933** (-3.015) | | -0.1889** (-2.675) |
| Proportion of left-wing members of the municipal council (relative to neighboring municipalities) | | -0.0409 (-0.5916) | | 0.4655*** (5.904) |
| Inverted log of population density (relative to neighboring municipalities) | | | -0.0787 (-0.7456) | 0.1009 (0.9390) |
| log of proportion of 15-64-year-olds with a university degree (relative to neighboring municipalities) | | | 0.1811* (2.130) | 0.3544*** (3.910) |
| Proportion of children of single parents (relative to neighboring municipalities) | | | -0.7047*** (-6.997) | -0.6932*** (-6.768) |
| Fixed-effects: Year | ----- ----- | ----- ----- | ----- ----- | ----- ----- |
| VCOV type | Heteroskedasticity-robust | Heteroskedasticity-robust | Heteroskedasticity-robust | Heteroskedasticity-robust |
| Observations | 1,214 | 1,222 | 1,222 | 1,214 |
| R2 | 0.09413 | 0.00838 | 0.09052 | 0.18658 |
| Within R2 | 0.09379 | 0.00802 | 0.09018 | 0.18628 |

Standardized coefficients. T-stat in parenthesis. Signif: '***' 0.001; '**' 0.01; '*' 0.05; '.' 0.1

It is evident that the level of sickness absence and a high proportion of university-educated employees are negatively correlated with service quality.

The proportion of left-wing council members is positively correlated with higher service quality (when controlling for other variables). Since this variable is also negatively correlated with

efficiency, this latter impact likely comes from a boost in expenditure by left-wing-dominated councils.

4.4 Variations in optimized service quality

A natural question arising from these findings is whether low service levels are primarily due to a lack of resources or to inefficiencies in resource use.

This issue is also politically relevant in the Danish context, as it relates to the municipal equalization scheme¹⁹. If the system fails to sufficiently reallocate resources from municipalities with strong tax bases to those with weaker ones, some municipalities may impose high taxes on residents yet still lack the resources to deliver best-practice services.²⁰

Table 3 suggests a negative relationship between tax levels and service provision, indicating that some municipalities may simply lack the resources to offer adequate services. However, Table 2 shows a negative correlation between taxes and efficiency, implying that high-tax municipalities may be more inefficient, and thus unable to provide sufficient services.

To better address these questions, we attempted to eliminate inefficiency across all municipalities.

This results in an optimized service level, calculated as $\frac{S_{BoD}^k}{E_{BoD}^k}$, representing service levels with all inefficiencies removed.²¹ Next we repeated the analysis in Table 3 using the optimized service levels. The results are shown in Table 4 below.²²

¹⁹ The system transfers money from affluent to less affluent municipalities.

²⁰ In fact, this argument was recently put forward by a large group of mayors, cf. <https://www.dr.dk/nyheder/indland/danskerne-skal-have-samme-velfaerd-halvdelen-af-landets-borgmestre-gaar-sammen-i> .

²¹ We did not lower the service level in municipalities with efficiencies above 1. We have however tested and confirmed that doing this does not provide different results.

²² We also conducted the analysis using country-wide comparisons, and the results are similar. With optimized service levels, we find a significant positive relationship between taxes and services. However, when examining taxes and actual service levels, the relationship is negative, though not statistically significant.

Table 4: Optimized municipal service quality relative to neighboring municipalities as the dependent variable

| | (1) | (2) | (3) | (4) |
|--|---------------------------|---------------------------|---------------------------|---------------------------|
| Sickness absence (relative to neighboring municipalities) | 12.16*** (5.563) | | | 4.516* (2.490) |
| Inverted proportion of employees with a university degree (relative to neighboring municipalities) | 2.393** (2.689) | | | -2.737*** (-3.671) |
| Tax level (relative to neighboring municipalities) | | 52.05*** (16.03) | | 34.58*** (9.313) |
| Proportion of left-wing members of the municipal council (relative to neighboring municipalities) | | 4.385*** (10.41) | | 3.763*** (8.391) |
| Inverted log of population density (relative to neighboring municipalities) | | | -0.3808 (-0.2635) | -0.0175 (-0.0122) |
| log of proportion of 15-64 year olds with a university degree (relative to neighboring municipalities) | | | -29.24*** (-15.00) | -22.93*** (-11.67) |
| Proportion of children of single parents (relative to neighboring municipalities) | | | 7.974*** (7.183) | 2.184* (1.968) |
| Fixed-Effects: Year | ----- ----- | ----- ----- | ----- ----- | ----- ----- |
| VCOV type | Heteroskedasticity-robust | Heteroskedasticity-robust | Heteroskedasticity-robust | Heteroskedasticity-robust |
| Observations | 1,214 | 1,222 | 1,222 | 1,214 |
| R2 | 0.04214 | 0.31460 | 0.30051 | 0.43755 |
| Within R2 | 0.04202 | 0.31452 | 0.30042 | 0.43748 |

T-stat in parenthesis. Signif: '****' 0.001; '***' 0.01; '**' 0.05; '*' 0.1

We observe that when inefficiency is removed, there is a positive relationship between taxes and service levels. Therefore, it is difficult to argue that low services persist despite high tax levels.

Additionally, the impact of several other variables changes, which is not surprising. Previously, high sickness absence and a higher proportion of university-educated employees were linked to lower efficiency, but this effect has now been eliminated.

5. Discussion

In this paper, we investigate how key managerial, political, and structural variables can help explain variations in efficiency and service provision in Danish municipalities.

Danish municipalities allegedly consider reducing the level of sickness absence among municipal employees to be a high priority. Our analysis validates this approach. The level of sickness absence is a key factor in explaining differences in efficiency and service among municipalities.

Danish municipalities are also actively hiring more employees with a university degree than they used to do, apparently with the aim of increasing efficiency. However, this approach does not appear to have been a success thus far. In contrast, it appears that municipalities with a lower proportion of university-educated employees—not only overall but also compared with neighboring municipalities—are more efficient.²³

Politics also matter. A larger proportion of left-wing council members is associated with not only higher levels of service quality but also lower levels of efficiency. Higher taxes are also negatively correlated with efficiency.

Finally, structural variables contribute to explaining differences in efficiency. Municipalities with a well-educated population and a low proportion of children of single parents are more likely to be efficient than their counterparts.

There are many interesting extensions of the research reported herein. Specifically, we recommend a deeper exploration into the managerial variances across Danish municipalities. By employing a structured approach akin to that utilized in the Management and Organizational

²³ A natural next step could be to examine whether a higher proportion of university-educated employees leads to more legally accurate decisions, potentially at the expense of operational efficiency.

Practice Survey (MOPS), it is conceivable that we might uncover strategies and solutions that can enhance both municipal efficiency and service delivery.

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