National Rules, Regional Differences? Explaining the Regional Efficiency of a Public Monopolist: The Case of the German Reichspost

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Abstract

Public monopolies operate with substantial regional differences in their efficiency. This paper uses the Reichspost, the German Imperial Postal Service, to investigate what factors explain these differences. Additionally scale effects and the comparative efficiency on input and output side are investigated.

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[1] I want to thank the Gramlichs. All errors are of course my own.

1. Introduction

2. History

2.1. German Empire

Germany was one of the last of the major European nations to develop into a centralized nation state. While other states like France and especially Great Britain had created a unified state much earlier Germany only developed a similar cohesion in 1871 with the foundation of the second German Empire.

The first empire with its structure of multiple hundred sovereign territories with the supranational governance institution represented by the emperor broke apart with Napoleon's victory over German states at the turn of the 19th century, which led the Habsburg ruler to surrender the German emperor title, leading to the demise of this institutional structure. Furthermore the secularization and mediatisation process led to the consolidation of the sovereignties into a smaller number of states. After Napoleon's loss the congress of Vienna redrew the boundaries again and about 40 German states emerged, ranging from free cities like Frankfurt, small and mid-sized states to the large European powers of Austria and Prussia. Although there was a new institution with the German Federation, the *Deutsche Bund*, it only had very limited internal powers and functioned mostly as a military and internal security pact (Angelow, 2003). There were some multilateral co-operations in economic issues, most notably the Zollverein customs union of 1834, but these were purely voluntary treaty between sovereign nations and usually did not cover the whole of the German federation (Henderson, 1984; Ploeckl, 2015).

The tension between Austria's and Prussia's claims to leadership in Germany escalated in the 1850's and 1860's until the full break-out of military conflict in 1866. Although most of the smaller German states allied themselves with Austria Prussia achieved a swift military victory. As a result it became the hegemonic power in Germany, pushed Austria out of Germany and annexed many of the smaller states. Additionally it created the Norddeutsche Bund, a formal union of German states north of the Main under Prussian leadership. After the combined German troops beat the French in 1871 the political structure of Germany was once more

reorganized and the German empire was created as a federal structure of German states under the emperorship of the Prussian king (Böhme, 1974).

Although the new empire had centralized political institutions in the Bundesrat, Reichstag and the Reichskanzler, the council of member state representatives, the parliament and the chancellor, most practical executive issues remained however under the control of the individual states political structures. The close connection between the imperial offices and their Prussian counterparts, for example most chancellors were at the same time also prime minister of Prussia, implied that the imperial executive had in practice more power than it appeared on paper. There were also a number of immediate imperial offices, including the Reichspostamt, the administration of the postal service. This political structure persisted for over four decades and came to an end with Germany's defeat in the first World War (Hesse, 2002; Pierenkemper and Tilly, 2004).

The historically strong political fragmentation is also mirrored within other parts of society, including economic characteristics. The regions within Germany, partly following political borders but in many cases also crossing them, differed strongly in income, production, employment and other structures. One particular aspect is the diffusion of the Industrial Revolution, some regions, for example Saxony, had decisively entered shortly after the Napoleonic wars while other regions lagged substantially and were strongly dominated by agriculture decades later. The strong rise of the industrial Ruhr-area, which became the centre of Germany's heavy industry with large coal and steel operations, is one very visible sign of these different developments (Pierenkemper and Tilly, 2004).

2.2. Reichspost

In 1490 Maximilian I, who also ruled over the Netherlands at the time, acquired control over Tyrol in Austria and subsequently tasked the Tassis family to provide a postal relay service between the two territories. This postal course is commonly seen as the origin of the modern European postal system and with a southern extension into Italy provided the central backbone of the system for the following two centuries. By 1530 the relay system had been opened to the public and in 1597 emperor Rudolf II. went even further and declared the post an imperial privilege, effectively

granting the Tassis family a postal monopoly (Behringer, 1990).

As the imperial power was severely limited, some of the princes disputed the emperor's right to assert this privilege and the related monopoly. This legal dispute was never fully resolved until the demise of the empire in 1806 and did not prevent the princes from establishing their own systems with a monopoly for their respective states. The most notable example is the Prussian system established permanently in 1649 in the wake of the peace of Westphalia. This existence of multiple systems persisted and left Germany after the reordering of the political landscape in 1815 with about a dozen different postal systems and the related difficulties of sending mail between them (Behringer, 1990, 2003).

The increasing economic unification between the states also led to a push for a closer cooperation between the different system to facility easier communication within German territories. This came to a fruitful conclusion in 1850 when a number states agreed to create the Postal and Telegraph union. Next to coordinating telegraph transmissions this agreement also created a unified German postal area, making it substantially simpler to send letters to recipients in another postal area (Behringer, 1990).

The creation of the postal union coincided with some major structural changes to the systems. The introduction of prepaid mail through the use of stamps, started in Germany by Bavaria in 1849, the rise of the idea of universal access and the shift towards distance-independent pricing structurally changed the existing services, providing the framework for the continued expansion of the postal reach and in particular for the spread from towns into the countryside (von Stephan, 1859; Helbig, 1991).

Although the Taxis family had carried the operational, contingent risk of the mail services operated under imperial privilege the postal service was never really conceptualized as a business venture (Behringer, 1990). One formal example for that is the Zollverein treaty, which regulated for which goods member states could assert public monopolies and did not list the postal service as such an area (Parry, 1969). Historically the provision of mail services was therefore considered more of a public good like security and defence, allowing the idea of universal access to rise and take hold.

Prussia's victory in 1866 and the subsequent creation of the Norddeutsche Bund also led to the creation of a unified postal service with

the Prussian service taking over the existing structures in the other states of the North German federation and begin moved under the political jurisdiction of that structure. This also meant the end of the Taxis postal service, which had survived as a private monopoly for a number of Hessian and Thuringian states as well as Wuerttemberg (Behringer, 1990; Sautter, 1952).

A similar expansion happened with the foundation of the German Empire in 1871, Baden's post service was folded into the Prussian system as was the formerly French service in Alsace-Lorraine and the resulting postal system became an official agency of the new Empire. There was however one substantial difference, namely the role of Bavaria and Wuerttemberg. While in 1867 Prussia had folded the postal services of all annexed states into the common system, this did not happen with the new imperial mail. The two southern states, Bavaria and Wuerttemberg, insisted on a number of special autonomy rights in exchange for their agreement to become part of the new empire. One of these rights was the retention of an independent postal service. This meant that inside the new empire three distinct postal services operated. The size of the covered population however showed the relative disparity between them, the imperial mail serviced 36 million people, while the Bavarian service covered just over four million and the Wuerttemberg one close to two million (Hesse, 2002; Sautter, 1951).

The new imperial mail service was headquartered in Berlin, the political seat of the imperial government. A structural reform in 1876 merged the previously distinct post and telegraph administrations into the new *Reichspost- und Telegraphenverwaltung*. This new agency was headed by the Generalpostmeister[2], who reported to the chancellor of the empire. The post was filled with Heinrich von Stephan, an official who was instrumental in the creation of the Universal Postal Union in 1875. The service was organized in 40 postal districts called Oberpostdirektionen. These districts lined up roughly with internal political boundaries, and therefore also the different predecessor postal systems, though the match was far from perfect. This structure existed until the demise of the Empire in the wake of

[2]After 1880 the agency was headed by a *Staatssekretaer*, who still reported to the chancellor

Germany's defeat in the first World War (Hesse, 2002; Sautter, 1951).

The postal service not only took over the national telegraph services, but also started to push the railroads, which had opened their telegraph systems for public transmissions, out of the business. Since their systems were necessary for their operation, the state did not nationalize these systems but shifted traffic toward the expanding telegraph network of the postal service through non-compete regulations. Once a connection was served by the postal telegraph network, the railroad system was no longer allowed to transmit private telegrams between these locations (Hesse, 2002).

When the direct electric communications became feasible with the invention of a practically useful telephone the postal service also expanded its monopoly to this new technology. One of the major drivers behind this decision was the perception that the telephone was a complementary technology to the existing telegraph rather than a substitute. This perception was likely based on the short-distance nature of the original telephone technology (Ploeckl, 2012)

The formal integration of the telegraph and telephone into the organization of the imperial postal service was the centre piece of its horizontal integration. Besides these electric communication operations it also offered a range of other services, in particular related to finance, newspapers and travel. Similar to most postal services worldwide it started to offer financial transaction services, in particular postal money orders. Ultimately these evolved into full banking services, the *Postbank* ended up serving millions of consumer clients, but this transformation only substantially started after the end of the time period under investigation here (Brüggemann, 1992). Another closely related service concerns the distribution of news. The Reichspost operated a newspaper distribution system, which provided private consumers the possibility to subscribe to a wide range of different news publications as well as run the practical distribution of said newspapers. Additionally the postal services had for centuries used mail coaches to transmit items and many German services had opened these coaches to private customers, offering transportation between towns all over Europe. The emergence of the railroads by the mid 19th century however led to an end of the long-distance travel operations and diminished the extent of postal coach travel significantly (Sautter, 1951, 1952)

3. Data

The analysis requires two types of data, first postal data utilized in the calculation of regional productivity, and second covariate variables for testing the significance of explanatory factors underlying the found productivity differences.

3.1. Postal Data

Organizing the service into distinct regional units implies that the data required for the analysis, quantitative indicators for the respective inputs and output of each region, i.e. postal districts, is readily available. The source of these postal data is the annual *Statistischer Bericht*, statistical report, of the Reichspost(Deutsches Reich, 1891 - 1908). Complementing the *Ergebnisbericht*, a more qualitative description of the service's operations (Deutsches Reich, 1876 - 1905), this report provided a thorough statistical overview about the Reichspost's service provision. Although most of the data is available from the middle of the 1880's there was a structural reorganization in 1890, which also led to changes to the reported statistics. Statistical reporting slowed substantially again in 1909. Consequently the data set utilized in this analysis contains annual observations from 1891 to 1908.

The data included in this part of the set are all variables that are either under the direct control of the Postal service or represent factors authorized by the parliament but still administered by the service. As indicated above the focus of the data set is the determination of efficiency, productivity and change before correcting for other influences, so no other district characteristics are included at this stage. Similarly, the included output data are all variables describing various aspects of the services provided by the postal service.

Input factors include the total number of employees, the number of post offices, the number of public mail boxes, the number of offices offering telegram services, the number of telegraph machines in these offices, the length of telegraph lines, the number of telephone network exchanges and the length of within exchange network telephone lines as well as wires. Output measures are the number of letters delivered, the number parcels

delivered, the number of newspapers delivered as well as the number of telegrams delivered and the number of subscribers to the telephone system.

The utilized variables are quantity measures rather than ones indicating quality values. Possible examples for the latter one would be time to delivery for a letter or telegram or the speed at which the phone service was able to establish the requested connection. Unfortunately no data is available in that regard. Furthermore services provided by multiple districts, for example a letter between Hamburg and Berlin would involve at least three districts, would be hard to assign clearly to a particular district. Conceptually measure are more also more directly customer oriented, while this case study focuses predominantly on the internal service operations.

Table 1 contains a number of values and variables for the districts for the year 1891. Map 1 shows a map of all 40 postal districts at the time, the efficiency analysis will utilize 38 districts[3] listed in table 1, leaving out Hamburg and Berlin due to systematic differences stemming from issues like the inclusion of central headquarters into the numbers and the accounting of international traffic.

3.2. Covariate Data

Explanatory factors are based on a number of district characteristics, in particular geography, demographic, political and economic values.

The data is based on Prussian statistics, consequently these data are only available for districts with a substantial territorial area within Prussia.

Some variables are constant, either due to geographic nature like elevation, or due to availability like literacy, political variables and economic characteristics. A number is based on Prussian Census data and are available every five years, in particular population, urbanization,and demographic variables.

4. Public Service Productivity Measurement

There are a number of ways to measure the productivity of public service provision. Concerning nation-wide services one important aspect is the

[3]The districts of Leipzig and Dresden cede some of their territory to a newly created district, Chemnitz, in 1897, which I do not include in the analysis at the moment.

level of observation, so is the intent to measure the productivity of the service as a whole (i.e. one single unit) or is there a separation into smaller parts (i.e regional units or multiple service providers). In both cases one common approach in the Economic History literature is to calculate TFP, Total Factor productivity, which assumes a particular functional form for the production function, adds observed input and output values to estimate the function parameters and then designates the resulting residuals as the levels of productivity. This approach is commonly used for example for infering railroad productivity (Cite Bogart)

In this context there are however two important considerations that lead to the use of a different methodology, namely Data Envelopment Analysis (DEA). As Coelli et al. (2005) describe this methodology is perfectly suitable for measuring the productivity of multi-unit entities and has been widely applied in the benchmarking and productivity literature[4] The two considerations are the use of a single outcome variable and the effect direction between input and output values. Studies using TFP methodology[5] require a single output whose precise nature however is flexible. It can be a physical measure, for example number of units produced, passengers transported, or letters delivered, or a monetary one, for example profit, revenues or also cost of production. The Imperial German Postal service however was a multi-service provider, covering not only different mail products but also other services[6] like telephone and telegraph. It is obviously possible to derive a combined output statistic, for example total revenues, however this requires the assignment of relative prices to the different outputs, indicating the relevant trade-offs. The actual prices for its products, however, were fairly inert and mostly exogeneously determined through the role of government and parliament in the price setting process and not all outputs are directly priced, for example the number of phone subscriber, or not correctly assigned, for example the use of *delivered* telegrams leads to a

[4]Bogetoft and Otto (2010) mentions that thousands of studies use this methodology.

[5]There is an alternative benchmarking methodology, Stochastic Frontier Analysis, which relies similarly on the single outcome assumption (Bogetoft and Otto, 2010)

[6]Additionally it also provided a number of financial and transportation services, however given their comparatively very small magnitude I don't include them in the calculations.

mismatch of revenues as services were paid for at the posting rather than delivery location. This leads to the preference for a methodology that can accommodate multiple outputs like DEA.

The second consideration is the clean directionality of input and output. Due to their econometric estimation TFP calculations[7] require a clearly identified, causal direction[8] from inputs to output. DEA however is a more descriptive approach, which does not require that for the derivation of efficiency values[9]. As the postal service had a quite high flexibility in positioning staff members following demand, i.e. ouput, it is not clear whether labour as an input factor is clearly exogenous. This reinforces the appropriateness of applying the DEA methodology.

4.1. Data Envelope Analysis

The central point of DEA is to derive a production possibility frontier (PPF) non-parametrically from the given observations. The basic idea is to approximate the actual, unknown, frontier by spanning a convex hull around the observations with the consequence that the most-efficient observations which end up spanning that hull, are taken as operating at full efficiency. After the PPF is approximated through this hull it is then possible to calculate the distance between any observation and the frontier and take the resulting value as the efficiency of that unit. As the distance measurement between observation and frontier is relative, not absolute, the resulting efficiency values are between 0 and 1, which 0 indicating complete inefficiency and 1 being full efficiency.

Paragraph explaining Multi-dimensionality in inputs and outputs

4.2. Postal Service

DEA as a methodology offers a fairly robust estimation approach that can be usefully applied to many instances. This includes the public service, for exampleCoelli (2003) provides an instructive overview about the application in such circumstances, and in line with the above outlined reasons makes the method eminently suitable for understanding the postal service.

[7]SFA also uses an estimation approach, therefore faces the same constraints.

[8]There are estimation approaches, for example Instrumental Variable estimation, that can be adjust for some forms endogeneity.

[9]It does however play a role in the interpretation of the found productivity differences.

There are a few studies focusing on the efficiency of the postal service, though the extent of literature is comparatively small in contrast to the large size of the benchmarking literature in other services, for example the railroad. Although postal firms may use benchmarking and other methods internally, the nature of most postal firms as public monopolies has consequences for the treatment in the academic literature. In particular the units of comparison are usually either complete national services or individual branches. Lampe et al. (2015) provide a historical case study, other examples for the first type of analysis are Perelman and Pestieau (1988) and Perelman and Pestieau (1994), which investigate the relative productivity of a set of postal services in developed countries. An analysis of post branch efficiency is provided by Doble (1995) and Borenstein et al. (2004). While these studies follow the general methodology applied in this paper there are a few other approaches focusing on different but related aspects. Examples are productivity changes of a single provider over time (Grifell-Tatjé and Lovell, 2008) or the construction of a cost function as practically discussed by Dodgson (2004). I am not aware of a study of this kind focusing on telegraph services, however there is a substantial literature on the telephone and telecommunications more general. Lam and Shiu (2008) provide an overview about it in their study on the Chinese telecommunications sector. Conceptually that study comes also closest to this one as they use Chinese provinces as decision making units, however as the market is already open to private enterprises they aggregate the regional inputs and outputs of active private firms to conduct their study.

Ploeckl (2016 Cite), the source of the utilized data, provides a first look at the regional efficiency of the German Reichspost, focusing however on the comparison between the different communication services. It documents a fairly stable system of substantial regional differences in operating efficiencies with a certain correlation between the different service branches of the Imperial Service.

5. Empirical analysis

The DEA method allows for a two step approach[10] to determine the effect of external factors on regional efficiency. The first step uses postal variables, or more precisely all inputs under direct control of the postal service, to determine the regional efficiency; the second step then uses these values in as outcome variables in a regression with the external factors as independent variables. The estimation starts with the first step of deriving the regional efficiency values, followed by a short check of possible scale effects in the composition of regional postal districts. After the second step, the estimation of the impact of explanatory factors on the these efficiencies, the final part of the analysis uses total revenue as well as total expense values to look at differences in efficiency in the input respective output mix.

5.1. Postal Service Productivity

The estimation of regional efficiency values for a time period of multiple years requires two practical choices, first an assumption about possible changes in the frontier between years and second an assumption about returns to scale in the production process. Here I use a consistent frontier over the whole time period, which implies that all efficiency values are measure against the same, unchanging frontier. Although there undoubtedly was technological progress Ploeckl (Cite 2016) demonstrates that the speed of increase was very muted and especially for the mail service part even completely counteracted by other developments. Consequently I believe that the advantages of keeping the frontier constant, in particular the ability to directly compare values from different years, outweigh the distortions introduced through this simplification. The second part is the choice of a returns to scale assumption. This paper utilizes a basic constant returns to scale assumption as it doesn't imply a scaling cutoff at the 'lower' and 'upper' bound as the main alternative, variable returns to scale, does. The difference between the two will later on be used to determine whether there

[10]Alternatively in a one-step approach all factors, postal and external, are used as input factors in the DEA analysis. This however increases the number of fully efficiency observations and complicates the interpretation of the results.

are any significant scale effects with regard to the size of postal districts present.

5.1.1. Calculation

Practically I calculate a Farrell efficiency measure (Bogetoft and Otto, 2010) for each region. This commonly used concept assigns each decision making unit, i.e. a postal district in this case, an efficiency score $E(x^k, y^k, T^*)$ which indicates the relative position of the unit k's input/output (x^k, y^k) production combination versus the Production Possibility Frontier (PPF) based on technology T^*. The latter describes the maximal amount of output that can possibly be produced given a specific amount of inputs and the best available technology. The efficiency score than compares this frontier with the observed production of a unit and calculates what share of the observed input is necessary to produce the same output given the optimal technology implied by the frontier. Practically this score ranges between 0 and 1 with 1 indicating that the unit is fully efficient while for example 0.6 implies that only 60% of the inputs are necessary, so all of them could be reduced by 40% and the resulting output would still be the same with the use of the optimal production technology.[11]

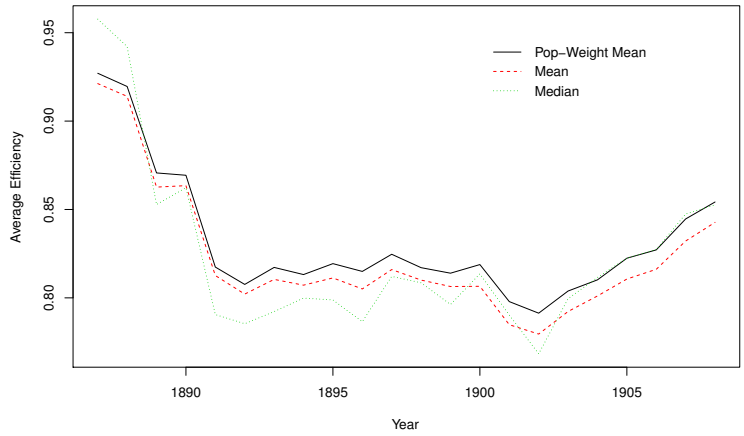
The main idea of DEA is to use the observed input /output combinations (x^k, y^k), with m inputs and n outputs, for all units $k = 1, ..., K$ to derive an approximation of the PPF. This is done by finding a production technology T^*, which is the smallest subset of $\mathbb{R}^m_+ x \mathbb{R}^n_+$ that contains all data combinations (x^k, y^k) and fulfils certain assumptions, in particular some form of convexity, free disposability, certain scaling properties, and additivity and replicability. The technology, and thereby frontier, is found through a linear programming solution, which in practical terms spans a convex hull around the observed input / output observations.

[11] Alternatively to the described 'input-oriented' approach there is also an 'output-oriented' measure which focuses on the amount of additional output the application of optimal technology to a given input combination would have achieved.

5.1.2. Average Productivity

Figure 1 diplays the average efficiency of the postal districts using the full set of input and output values to derive the regional efficiency scores. The difference between population-weighted mean and unweighted mean indicates that larger districts appear to be slightly more efficient. Surprisingly the median is at certain points below the mean, which is unexpected due to the upward bounding of the efficiency values at 1.

Figure 1: Average District Efficiency



The graph plots the average efficiency of postal districts. Black/solid is population-weighted, Red/dashed is the unweighed mean, and Green/dotted is the median.

There are three distinct time periods visible, a sharp drop until 1891, a even period until 1901 and then after a short drop a consistent upward trend until the end of the observation period.

The sharp drop during the first part however might be due to changes in the underlying data definition rather than actual efficiency changes, which needs further investigations

Similarly, it is not clear whether the change in structural developments around 1901 is due to change in operational structures or is explained by changes in underlying factors driving these efficiency differences.

5.1.3. Scale Effects

The calculation of the efficiency values in the previous section takes the size of observations, the individual postal districts, as given. The distinction between assuming a constant returns to scale and a variable returns to scale frontier however offers the possibility to infer whether these district sizes are effective or whether a rescaling could improve their operative efficiency. Defining scale efficiency (SE) as the ratio of efficiency under CRS over efficiency under VRS we rewrite this as

$$E(x, y; crs) = E(x, y; vrs) * SE(x, y)$$

which decompose the CRS efficiency value into a pure technological efficiency under VRS and a scale efficiency, which measures whether the observation is in within an area where the average output bundle per input bundle is maximal. This decomposition however does not revel whether a possible scale efficiency implies that the district was too small or too large. This can be determined by calculating efficiency scores under decreasing[12] returns to scale, $E(x, y; drs)$, as $E(x, y, drs) = E(x, y, crs)$ implies that the district is below optimal size, and $E(x, y; drs) = E(x, y; vrs)$ implies above optimal size. Calculating the efficiency values under these different returns to scale assumptions results in the following:

	Number	Average efficiency value
Efficient	280	1.00
Too small	290	0.93
Too large	266	0.94

The numbers indicate that there was a fairly even distribution in terms of scale effects, with a number of units too small, in the efficient area, and too large. As input and puts consist of multiple variables it is however not really possible to quantify by *how much* the districts are too small/large (i.e. what redistribution would be necessary to make them fully scale efficient). The displayed average values indicate that the potential improvement in efficiency was fairly limited, although it seems to have been feasible

[12]Alternatively this can also be done with increasing returns to scale.

by redistributing areas over postal districts rather than increasing (or decreasing) the number of operational units

5.2. Explanatory Factors

The second step of the analysis now uses the derived efficiency values $E(x, y; crs)$ and investigates which exogeneous factors can explain the found differences. At this preliminary stage the analysis only links these factors to the general level of efficiency, not yet whether it can explain the above found break in trajectory.

The estimation is a tobit estimation with a selected number of pooled observations, in particular those for which Prussian statistics are available in that particular year. In total the estimation uses 116 observations, distributed over the years 1890,1895,1900 and 1905.

Column 1 of table 1 shows the results of the estimation. It clearly demonstrates that the pattern of inefficiencies is linked, and thereby explained, by a number of exogenous factors. Positive coefficients imply a higher efficiency. While population density has a positive effect, the more dense a district is populated the higher is the efficiency of operations in the district. Surprisingly, the degree of urbanization is negatively correlated, though not statistically significant. There is a weak positive effect of the share of Catholics, though substantially offset by the share of literate people in the district. A higher conservative vote share leads to a more inefficient operation, which tentatively could indicate that there was political capture of the postal service. There is also a negative effect of industrialization.

The time dummies reflect the pattern found in the raw efficiency values as described above with the averages. There is a drop in efficiency after 1890 with not that much difference afterwards.

5.2.1. Superefficiency

One additional check is to calculate and then include superefficiency values in the dependent variable. This allows consequently to estimate the impact of explanatory factors with a pooled OLS regression.

Column 2 of table 1 shows the results for this estimation. The numbers essentially confirm the results found for the basic bounded efficiency values setting.

5.3. Financial Efficiency

The previous section uses non-monetary input and outputs. However, for a number of years there are also total revenues as well as expenses numbers available. This allows for another analysis testing how efficient the districts are in output terms given a certain amount of expenses as well as in input terms given a certain amount of revenues.

Correlation between the two as well as general productivity results Quantification of inefficiency in financial terms

6. Conclusion

This paper demonstrates what factors drive the efficiency of public service provision.

The paper calculates full service efficiency using multiple inputs and outputs. The average efficiency points to three different periods of developments.

It determines scale effects of district size

It identifies which factors are influencing the found efficiency differences.

Additionally, financial efficiencies are determined.

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Tables

	Efficiency Tobit	Super Efficiency Pooled OLS
Intercept	1.22^{***}	1.31^{***}
	(0.11)	(0.09)
Density (Prussia)	0.02^{*}	0.03^{**}
	(0.01)	(0.01)
Urban	-0.06	-0.14
	(0.12)	(0.16)
Catholics	0.18^{*}	0.22^{*}
	(0.08)	(0.09)
Literacy 1871	-1.30^{***}	-1.51^{***}
	(0.38)	(0.34)
Military	-0.43	-0.90
	(2.07)	(1.64)
Conservatives 1884	-0.21^{*}	-0.22^{*}
	(0.10)	(0.09)
Industry 1882	-1.71^{*}	-2.20^{***}
	(0.67)	(0.60)
IncomeTax 1900	0.01	0.01
	(0.01)	(0.01)
Elevation	-0.00	-0.00
	(0.00)	(0.00)
1895	-0.05^{**}	-0.03
	(0.02)	(0.03)
1900	-0.07^{**}	-0.06^{*}
	(0.02)	(0.03)
1905	-0.07^{**}	-0.07^{*}
	(0.02)	(0.03)
Log(scale)	-2.43^{***}	
	(0.08)	
Num. obs.	116	116
AIC	-170.14	
BIC	-131.59	
Log Likelihood	99.07	
R^2		0.43
Adj. R^2		0.36

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 1: Statistical models