The political economy of appliance replacement programs for low-income households: An empirical study.

Alexander Busch
Student-ID: 4052247
Neue Str. 11
63571 Gelnhausen-Höchst

Submitted to the Department of Economics in partial fulfilment of the requirements for the degree of

Bachelor of Science in Economics

University of Heidelberg
Supervisor: Prof. Timo Goeschl, PhD

Declaration of Originality

[English]

"I hereby certify that I have written this thesis independently and without unauthorised outside help and that all passages taken verbatim or in spirit from publications in this thesis have been individually identified with reference to the source."

[Deutsch]

"Hiermit versichere ich, dass ich die vorliegende Arbeit selbstständig und ohne unerlaubte fremde Hilfe verfasst habe und dass alle wörtlich oder sinngemäß aus Veröffentlichungen entnommenen Stellen dieser Arbeit unter Quellenangabe einzeln kenntlich gemacht sind."

Alexander Busch, Heidelberg 01.07.2021

Contents

Images

Tables

Abbreviations

- Federal Agency for Cartography and Geodesy = BKG
- Federal Ministry for Family Affairs, Senior Citizens, Women and Youth = BMFSFJ
- Federal Institute for Research on Building, Urban Affairs and Spatial Development = BBSR
- Nomenclature des unités territoriales statistiques = NUTS
- per capita = p.c.

Abstract

[English]

This paper examines the influence of political, structural, and fiscal variables on the endowment of a welfare program. The program financially supports welfare recipients who replace their inefficient fridge with a new one. In addition to federal financing, local partners that carry out the exchange were encouraged to attract additional funding. This results in a diverse landscape of regionally varying endowment. Logit and regular OLS regression models are used to explore the impact of several factors on the probability of the existence of additional funding and the amount. A leftist or female councilor, a higher share of women in the regional parliament, political contestability, vote turnout, and absence of welfare recipients increase the likelihood of additional local funding.

[Deutsch]

Dieser Beitrag untersucht den Einfluss politischer, struktureller und fiskalischer Variablen auf die Finanzierung einer sozialpolitischen Maßnahme. Das Programm unterstützt Sozialhilfeempfänger_innen, die ihren ineffizienten Kühlschrank gegen einen neuen tauschen. Neben der Finanzierung durch den Bund wurden die lokalen Partner, die den Austausch durchführen, ermutigt, zusätzliche Mittel zu gewinnen. Daraus resultiert eine vielfältige Landschaft mit regional unterschiedlicher Finanzierung. Es werden Logit- und reguläre OLS-Regressionsmodelle geschätzt, um den Einfluss einiger Faktoren auf die Wahrscheinlichkeit für das Vorhandensein zusätzlicher Mittel und deren Höhe zu ermitteln. Linke oder weibliche Landrätinnen, ein höherer Frauenanteil im Kreistag, politische Bestreitbarkeit, Wahlbeteiligung, und die Abwesenheit von Sozialhilfeempfangenden im Landkreis erhöhen die Wahrscheinlichkeit einer zusätzlichen lokalen Finanzierung.

Keywords Public Policy, Germany, Political Economy, Poverty, Fuel Poverty, Devolution, Regional Policy, Regional Studies

1 Introduction

What explains the existence and the endowment of social policy has been studied many times. However, most of these studies rely on data on the country scale. Although social policy is often a federal matter, simply comparing legislation between two national governments neglects that each government acts within a specific frame of institutions, circumstances, and public opinion that may render direct comparisons weak.

This study uses a national policy in Germany with local co-funding to identify factors that influence local variations in endowment. Specifically, the program partially covered the costs of a new fridge for welfare recipients. In addition to a partial funding by the federal government, regional partners were encouraged to acquire additional sponsors. These sponsorship-deals came from local governments, welfare organisations, or the private sector.

This paper studies what variables influence the endowment of the program on a local scale. Following previous models (Castles 1989; 1998; Busemeyer 2007), factors are categorised in political factors (e.g. the ideology of the local government), structural factors (e.g. population density), and fiscal factors (e.g. public debt). OLS regressions and logit regressions model the relationship between the program and contributing factors.

The main results are that a leftist or female councilor, a higher share of women in the regional parliament, political contestability, vote turnout, and absence of welfare recipients increase the likelihood of additional funding. The estimation of the contribution to the height of additional endowment by these factors has been complicated by the low number of counties that participate in the program, have an additional endowment, and receive their funding from the local government. While in total 69 of the 141 counties have some kind of additional funding, only 11 fulfill the previously introduced criteria. With this in mind, both models including only these 11 counties and models also including counties with no additional funding are estimated. Both models confirm that the factors influencing the likelihood of additional funding also increase the amount of additional funding, with the exception of the variable female councilor, for which the models have conflicting estimates of the direction of effect.

2 Empirical and Theoretical Discourse

2.1 Determinants of (Regional) Public Policy

While there has been significant attention to the effect of ideology of national governments on welfare and policy (e.g., Snyder and Yackovlev 2000; Potrafke 2016; Bojar 2018), relatively few studies explore within-country variations. However, considerably different effects of for example party ideology on some key indicators such as debt have been found on the local scale (Simon and Tatalovich 2014).

Important theoretical groundwork for the analysis of spending from a public policy perspective is the model of Castles (1989; 1998): Whilst originally developed for educational spending in OECD countries and further refined since (e.g., Hokenmaier 2002; Hega and Hokenmaier 2002; Busemeyer 2007), his categories proof futile for application on a local scale (Bastida et al. 2013). Furthermore, it has been expanded to social policy or public spending in general (Hokenmaier 2002; Hega and Hokenmaier 2002; Bastida et al. 2013). However, there is still little systematic research on local expenditures, thus, insights have to be derived from studies on education and healthcare. Also, few studies target German counties or regions.

Following the model of Castles as expanded by Busemeyer (2007), explanatory variables for policy endowment are grouped into three categories: Political, structural, and fiscal effects. Thus, this further literature review is organised into these categories, with some papers cited in more than one section.

2.1.1 Political Effects

Political are effects that are either connected to the ideology of political actors, public opinion, or institutions. Castle's model follows the general argument that leftist government spend more on education, due to differences in voter bases (Castles 1982: 71).

Higher regional social expenditure has been linked to left leaning local governments in Spain (Herrero-Alcalde and Tránchez-Martín 2017), and Norway (Lien and Pettersen 2004). In Sweden, socialist municipal governments spend more on homeless shelters (Blid et al. 2008). In Norway, more teachers are employed and have a higher pay in counties with a socialist council (Falch and Rattsø 1997; 1999). In Norway and Denmark, leftist

municipalities had higher taxes and more redistributive revenue policies (Blom-Hansen et al. 2006). For Spanish municipalities with more than 1,000 inhabitants, no impact of political ideology on general municipal spending was found (Bastida et al. 2013). For Germany there is evidence on the state level that leftist and centrist government are more prone to increase taxes (Krause and Potrafke 2017). This may serve as an indirect measure for expenditure.

Interestingly, Lien and Pettersen (2004) also found that budget and length of public founded social programs increased with the share of women in local parliaments in Norway. They theorize that as women are more likely to do care-work (both paid and unpaid), they might favor higher spending in this sector.

Additionally, Castles uses electoral turnout as indicator for democratization. As a very crude operationalisation, this may capture electoral pressure on politicians to act in the interest of certain groups and to expand social services (Castles 1989; Busemeyer 2007).

Castles model also highlights the importance of veto-power and differences in the constitutional institutions. However, his studies concerned comparisons between nations. On the German county scale, this factor may be ignored as counties generally face similar administrative procedures.

Falch and Rattsø (1997) found that political strength translated into lower teacher employment, as contestable governments might be able to resist the pressure of individual interest groups for unnecessary spending. Higher budget deficits in politically contestable regions (= no party dominates, more parties compete, changes in power) have been confirmed for local councils in Norway (Borge 2004) and Flanders (Geys 2007), and at the OECD country-scale (Elgie and McMenamin 2008; Roubini and Sachs 1989). However, others argue that fragmentation and contestability lead to political competition and thus efficient outcomes (Wittman 1989; Wittmann 1995). This is not necessarily at odds with the empirical observation that fragmented and contestable governments have higher deficits, as it may be hard to define what constitutes an efficient public policy.

2.1.2 Structural Effects

One key variable identified by Castles (1989; 1998) is the percentage of people under 25, following the thesis that education is a regular public good that is supplied for all citizens in developed countries. More students thus mean more spending. Busemeyer (2007) argues that instead the relative share of students of the population should be directly considered. The positive effect of more recipients on spending in education has also been documented by Bastida et al. (2013). Other studies find a positive relationship between average age and regional healthcare expansion (Cantarero 2005; Cantarero Prieto and Lago-Penas 2012), which also supports the hypothesis that the size of the entitled group drives spending. However, if the policy is not as universal as education or healthcare, an increase in recipients might increase costs and therefore reduce coverage. Especially for a more vulnerable group such as welfare claimants.

A variable that is not mentioned by Castles, as it is more important on a more granular scale, is population density. Regional studies have shown that low population density increases provision costs of public services (Real Estate Research Corporation 1972; Burchell et al. 2002; Hortas-Rico and Solé-Ollé 2010). It is argued that positive scale effects in densely populated areas decrease the costs and that sparsely populated regions are harder to supply (e.g. searching costs, mobility). Thus, both high population density as well as high population size may reduce the costs of public services and therefore allow more efficient funding. This may also apply for specific public or private social programs: Scale effects and less spending on administration and mobility increases efficiency and allows more funding for the service itself. However, for public services, there is mixed evidence for this effect: Gyimah-Brempong (1987) found no economies of scale in municipal police departments, while Ladd (1992) found a U-shaped relationship between the cost of public services and population density.

US cities with higher population spend more on public services (Holcombe and Williams 2008). There is also evidence that regional social expenditure increases with population density in Spain (Herrero-Alcalde and Tránchez-Martín 2017) and Norway (Lien and Pettersen 2004). This may indicate that per capita expenditure benefits from economies of scale in cities, as these findings are robust to socioeconomic effects (namely inner-city poverty). However, for general spending of municipalities with more than 1,000

inhabitants in Spain, Bastida et al. (2013) found a negative impact of population density. This apparent contradiction might be due to different levels of government studied and the difference between social and total expenditure.

Furthermore, cultural heritage is regarded as an important determinant of educational spending by Castles (1989; 1998). Castles argues in regards to education that a higher share of Catholics leads to less public, and more private education, thereby reducing educational spending.

2.1.3 Fiscal Effects

Castles (1989) identified GDP as important predictor of educational spending, although it alone did not have sufficient explanatory power. The effect is obvious: Richer regions can afford to spend more money on public policy. A general positive effect of GDP on public spending (Herrero-Alcalde and Tránchez-Martín 2017; Bastida et al. 2013) and healthcare spending (Cantarero 2005; Cantarero Prieto and Lago-Penas 2012) has been observed in Spain.

Fundamentally, Wagner's Law of public finances states that relative public expenditure increases faster than average income or wealth (Wagner 1892; Musgrave 1969). This has been empirically confirmed for both industrialised and emerging economies (e.g.: Peacock and Scott 2000; Funashima 2017; Mahdavi 2011), also especially for social expenditures of regional governments (Mahdavi 2011). However, especially Castles is rather critical of such general statements and notes that, for educational spending, no such clear connection is evident in the international data (Castles 1989). As this study is concerned with a fraction of county expenditure, not total budgets, Wagner's law cannot be assumed or explored 1:1. Still, a larger budget in wealthier counties might allow for more generous funding for specific programs.

2.2 Program and Policy

The 'Stromspar-Check', or 'Power Saving Check' was developed and is managed by the German 'Caritasverband', the biggest Catholic welfare organisation in Germany, and the Bundesverband der Energie- und Klimaschutzagenturen Deutschlands e.V., a nation-wide alliance of local 'green' energy suppliers.

Essentially, the idea of the program is that long-term unemployed people help others receiving government welfare to safe energy. This happens through consulting and free tools, such as efficient light bulbs. If successful, the recipients save money and greenhouse gases. Furthermore, this allows unemployed people to gain job experience which might help them to reintegrate into the labour force. All people that receive some kind of welfare, for example unemployment benefits or housing support, qualify for the program which is free of charge.

A part of the program is the 'Kühlgerätetausch', or fridge-exchange: If the fridge of a recipient of the free check-up is older than 10 years and is then professionally disposed, a cash-back is paid if the fridge is replaced with a new, efficient device.

The Power Saving Check was created in 2008 and is organised locally by Caritas sites or other regional partners (e.g. self-help organisations for unemployed people) that usually cover one city or county (Stromspar-Check 2021). Starting in 60 regions, it has expanded to more than 150 current sites (ibid.). Caritas claims that in 2018, the 1000th energy consultant had been trained by the program. Where the sites that offer the Power Saving Check are located is not centrally decided by the Caritas: local Caritas chapters and organisations apply to be included in the program.

Starting in 2008, the federal government started to sponsor the fridge-exchange with 150 Euro cash-back for recipients per new appliance (Stromspar-Check 2021). In April 2019, this was reduced to 100 Euro, as the government stated that fridges had dropped in price (ibid.). However, with even small fridges usually costing at least 200 Euro, several state governments launched further support: Saxony-Anhalt pays additional 75 Euro, Berlin 50 Euro, Hamburg 100 Euro, and North-Rhine-Westphalia adds 50 Euro per family member (max. 200 Euro) cash-back to the 100 Euro federal money. In the other 13 German states, there is currently no state-wide support, although we have been informed that negotiations are currently happening in Lower Saxony and Saarland. However, there are plenty local support schemes that each Caritas site (or regional partner) bargains for with local governments, charities, and the private sector. Details on these deals are summarised in the data chapter.

Although not the focus of this paper, it should be mentioned that similar programs have been the subject of study in other countries: Houde and Aldy (2017) find that in

the US, an ecological rebate program lead to less efficient appliances bought, had a small impact on energy demand, and was most likely much more expensive per unit of energy saved than other programs on energy efficiency. In Mexico, a program that sponsored the replacement of refrigerators and air conditioners with efficient models reduced electricity consumption of refrigerators by 8 percent, but energy used by air conditioners actually increased, while the program was comparably expensive per ton of CO2 (Davis et al. 2014).

3 Hypotheses

In accordance with the empirical findings, the hypotheses are grouped in the effect categories previously introduced. For political effects, the influence of ideology, gender, political stability, and political participation are tested. The direction of effects is mostly clear in the literature, although it should be noted that not all of the studies are on social policy and almost none are on specific programs. For structural effects, the population density, the share of (potential) recipients, religion (as Caritas is a Roman Catholic organisation), and the impact of state-funding are tested. The hypothesis is that efficiency due to higher population density allows for a bigger proportion of funding to go directly to recipients, which is the only way funding is represented in the data. Finally, GDP and debt are addressed as potential fiscal measures that influence decisions on whether programs receive funding (and how much). In this framework, GDP is used as an indirect measure for local tax revenue.

Political Effects

1.1 A county with a left of centre councilor or major is more likely to offer additional support the program.

1.2 A county with a left of centre councilor or major contributes more to the program.

1.3 A county with a female councilor or major is more likely to offer additional support for the program.

1.4 A county with a female councilor or major contributes more to the program.

1.5 A county with a higher share of women in the local parliament is more likely to offer additional support for the program.

1.6 A county with a higher share of women in the local parliament contributes more to the program.

1.7 A county with higher political contestability is more likely to offer additional support for the program.

1.8 A county with higher political contestability contributes more to the program.

1.9 A county with higher political participation is more likely to offer additional support for the program.

1.10 A county with higher political participation contributes more to the program.

Structural Effects

2.1 Counties with lower population density are less likely to offer additional support for the program.

2.2 Counties with lower population density contribute less to the program.

2.3 Counties with more potential recipients are more likely to offer additional support for the program.

2.4 Counties with more potential recipients contribute more to the program.

2.5 Counties with a higher share of Catholics are more likely to offer additional support for the program.

2.6 Counties with a higher share of Catholics contribute more to the program.

2.7 Counties with a higher share of Catholics are more likely to host the Energy Saving Check in general.

2.8 States with centralised funding have higher average funding than states in which funding is local.

Fiscal Effects

3.1 Counties with higher GDP are more likely to offer additional support for the program.

3.2 Counties with higher GDP contribute more to the program.

3.3 Counties with higher public debt are less likely to offer additional support for the program.

3.4 Counties with higher public debt contribute less to the program.

4 Data and Method

4.1 Data

4.1.1 Data on Program

For a full overview of regional specifications of the Power Saving Check and the fridge exchange, all current 157 Caritas sites that offer the service were contacted via e-mail and phone. Starting in early March 2021, all sites received a first standardised e-mail[1]. At the end of March, nonresponsive sites received another standardised e-mail. In mid April, a third e-mail was send to the Caritas regional associations to forward to nonrespondend local sites. Afterwards, a personalised e-mail was send to the remaining sites. At the end of April, sites were contacted via telephone and by the national chair of the Power Saving Check at Caritas.

For this study, relevant variables were the existence of additional financial support and characteristics of it (source, amount, type). Sites were also asked whether they were aware of other need-based fridge exchange programs, to which only two sites responded confirmatory (Lohr, full sponsorship offered by local government; Düsseldorf, 100 Euro for a new fridge). Thus, local competitions can effectively be ruled out as a confound. Additionally, sites were asked whether they were aware of non-need-based programs in their county. Although some responded that local energy providers sometimes sponsored new fridges, but also dishwashers and washing machines, close to none of the named companies was willing to share insights or even conditions for participating in their programs. With this in mind, and to prevent tarnishing the data with an incomplete picture of a control, these are also not accounted for.

[1]For the first e-mail, see appendix. Other e-mail were similar in style and content.

5 sites did not respond at all, 10 further sites did not reply after been asked for additional clarifications (thus, when information was lacking). This means that in total, over 90% of the sites answered all questions asked. However, this does not necessarily mean that incomplete data had to be excluded, as these specifications may regard parts of the data irrelevant for this study.

As the vast majority of sites are responsible for their respective county, sites that cover less or more space had to be reduced or split to a county-level aggregate. For example, one site that covers both the city Cottbus and the surrounding county Spree-Neiße had to be split into two data points. This had to be applied to 8 sites resulting in 17 new county data points. On the other hand, some counties (for example Berlin with 9 sites) had several sites and thus had to be combined into one data point. This was applied to reduce 38 sites to 13 new county level data points. Thus, 157 sites were reduced to 141 counties in which the program is offered. There were only two conflicts in merging their respective financial support schemes, which indicates that sites searched for support on the county level anyway. One conflict was in the county Augsburg-Land, which was covered by the Caritas site in the city of Augsburg, but also by the site in Schwabmünchen. The former did not respond to the query, the latter reported significant support. Thus, the support of the site in Schwabmünchen was applied to the county. A similar issue presented itself in the county Göttingen, which merged with the county Osterode in 2014 but still has two Caritas sites. While Göttingen had financial support, the site in Osterode did not. The data for Göttingen was kept, as people living in Osterode should have access to the support in Göttingen.

As this study is concerned with public funding, counties with other additional sponsors (firms, churches, welfare organisations) were excluded. This reduces the counties from 141 to 125. Of these 125 counties, 42 were covered by state-wide funding, 72 had no additional support, and only 11 were supported by local governments. This creates a problem regarding the analysis of the additional support: While the group may just be big enough to distinguish factors that contribute to whether or not public funding is secured at all, to analyse the height of this support is not easily possible. This issue will be addressed in the method section.

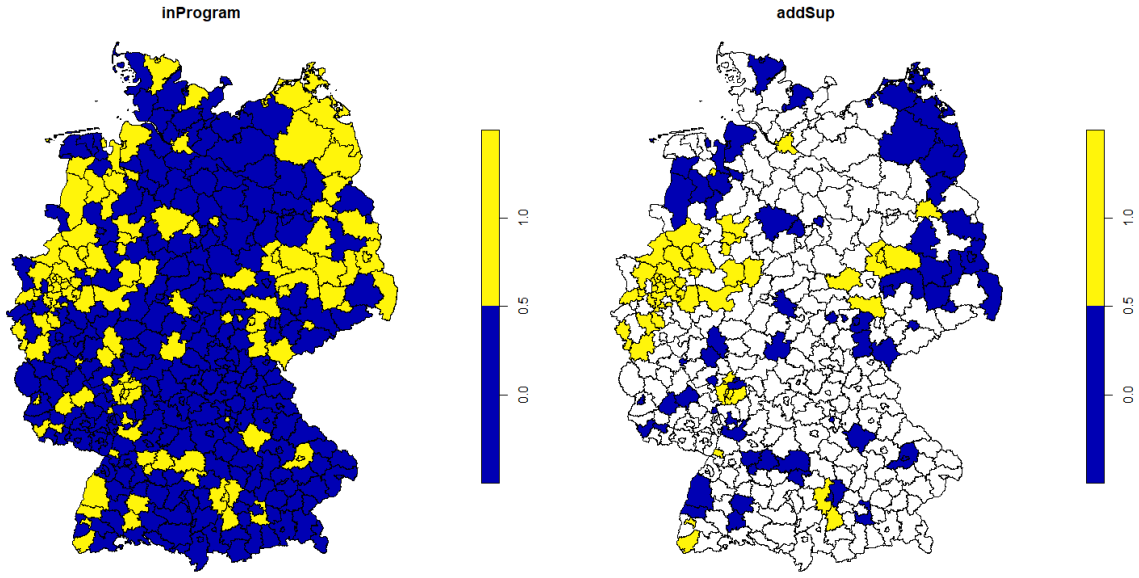

Figure 1: Map: Counties with a program-site, counties with additional support

Mapping the program reveals some geographical clustering of the program in the (north-)west and east (figure 1). Especially in (northern) Bavaria, Thuringa, Mecklenburg, western Brandenburg and the south, north and east of Lower Saxony, the Energy Saving Check is not widely spread. As the program is not centrally planned, but local organisations (usually Caritas sites, but sometimes other organisations) have to apply for becoming part of the network, this uneven spread might be due to local factors. Whether Catholicism is a driving factor in spread of the program is explored in this paper. The map with the additional support clearly shows the state support in North-Rhine-Westphalia and Saxony-Anhalt. But also some sites in Baden-Württemberg and Bavaria that have secured additional funding.

4.1.2 Other Data

Socioeconomic data from the INKAR-data base by the BBSR is used (unemployment, vote turnout, local debt, housing support, GDP p.c.) (BBSR 2021). Most of the variables stem from 2017. As the current situation in the counties is of interest, 2017 is recent enough and as relative differences within Germany are the main focus, country-wide trends are not of importance. Within-country changes in these years may confound the results, though this is expected to be of negligible influence.

There is no comprehensive public data set on regional political variables in Germany. In order to capture the regional political landscape, a variety of sources had to be combined for this study: First, the 2020 list of the 294 German county councilors published by the German Association of Counties (Deutscher Landkreistag) was used to derive political party, gender, and whether they serve their second term (if so, this was noted as no change in power and thus rather not contestable) (Deutscher Landkreistag 2020). Then, for counties with a councilors in their first term, Wikipedia was used to find out whether their predecessor had belonged to the same party (if so, this was noted as not contestable). As county councilors are elected at different intervals than regional parliaments in some states, counties might have had an election in the first half of 2021 which is not covered in the data. As Germany has 107 independent cities that do not belong to a county, the same information on their majors (equivalent to councilors in their role) was collected via Wikipedia. However, as Wikipedia may be unreliable, for 10% of both counties and independent cities, their official websites were checked for discrepancies. None were found.

In addition to the binary gender variable on local councilors and mayors, the share of women in county parliaments as of 2019 published by the Federal Ministry for Family Affairs, Senior Citizens, Women and Youth (BMFSFJ) was used for a continuous variable of female share of power (BMFSFJ 2019). The set contains data on the share of women in all regional parliaments as of end of 2019, with the exception of the state Schleswig-Holstein, which only published share of women in city parliaments following the regional elections of 2018. Thus, for non-city counties in this state, the share of women before 2018 is used (this affected 11 of 401 counties). In 4 states, local elections have been held since 2019 (Bavaria, Hess, Lower Saxony, North-Rhine-Westphalia). Thus, this data is not up-to-date for 231 of 401 counties as of June 2021. On the other hand, it is sensible to assume that there is a strong path-dependency for female share of power which makes previous local parliaments are good approximation for the status quo.

There is no current survey on religion in Germany on the county scale. The only official data stems from the German census, that asks whether people are member of the Protestant or Roman Catholic church, or not (DESTATIS 2011). The last census was 2011, the census 2021 is currently being conducted. Since 2011, several counties have merged, reducing the number of counties from 412 to 401 (-10 counties due to a reform

in the state of Mecklenburg-Vorpommern 2011, one further merger in Lower Saxony in 2016). Counties in the data file were merged to recreate the counties of 2021. Populations of merged counties were added. However, it should be noted that the data is rather old and specific percentages could have changed. Furthermore, only membership of the two big denominations in Germany (Roman Catholic, Protestant) were explicitly collected. Further small changes in county-borders during the last 10 years were not accounted for.

As the data sets mentioned use different geographic referencing systems for counties (some use the 'Kreisschlüssel', a German referencing system; some, e.g. INKAR, use NUTS-3, a European referencing system), a third data set to merge these was needed: The data set for counties by population and population density (DESTATIS 2018) by the Federal Statistical Office of Germany. Additionally, the population of states and population density of this data set was employed.

For the maps of this paper, shapefiles of the German NUTS-3 regions were obtained from the BKG (BKG 2020).

4.2 Variables

There were four dependent variables tested by the models: First of all, a dummy indicating whether a site secured additional funding for the replacement program (for a summary of the program data and variables see appendix table 4). Second, the height of this additional funding per fridge. As the state-support scheme in North-Rhine-Westphalia does not pay a fixed amount, but 50 Euro per family member, a family size of three was assumed for the one calculation comparing the height of additional local and state-wide supports. This size was chosen as this family type is associated with a high poverty risk in Germany (single adult with children) (DESTATIS 2021). Third, a dummy for whether a county receives state-support and fourth, whether the program is offered in the county or not. However, the last two variables were only part of one model each, with most of the hypotheses centred on the first two variables on additional support.

The independent variables generally fall into three categories: Political, structural, fiscal. Political variables are a dummy for a left-leaning county councilor or mayor (1 if member of SPD, Grüne, Linke), whether the councilor or mayor is female, share of women in local parliament, election turnout (federal election 2017, as no aggregated data set

for local elections exists), and whether the county government is politically contestable (operationalised by whether the county councilor or major was of another party in the previous election period). Structural variables are the population density, share of welfare recipients (both unemployment and housing support, the latter applying to more persons including unemployed), and the share of Catholics. Finally, fiscal variables are county debt p.c. and GDP p.c. It should be noted that all of these variables are averages on the county-scale and not data points of individuals. Thus, averages in the variable report are not weighted by population and therefore only reflect the average county, not the average person, in Germany. The geographical spread of some selected independent variables are depicted in appendix 2, and appendix 3.

Another challenge to the program data was how to count full coverage (=county pays for the whole fridge) in regression models. In order to be compared to other partial subsidies, a value for full coverage had to be determined. After inspecting various only retailers, a value of 450 Euros for an cheap fridge suitable for a family of three of high energy efficiency was set (e.g. Samsung RB3000, Hisense RB400N4EG3). After subtracting 100 Euro from the federal universal coverage, 350 Euro was determined to be a good proxy for full coverage. However, this is most likely to be a lower bound.

4.3 Method

In general, models excluded states with state-sponsoring (Berlin, Hamburg, North-Rhine-Westphalia, Saxony-Anhalt)[2] and non-public funding, if not explicitly tested for. Otherwise, local variables of e.g. counties in North-Rhine-Westphalia would be interpreted as connected to funding that these counties did not bargain for. This way, many data points are lost, but the quality of the model is improved.

First, bivariate models were estimated, then models with all variables of a category (e.g. political), and finally a complete model with all three sub-categories.

As models, ordinary least square (OLS) regressions and binary logistic regressions

[2]Berlin and Hamburg are 'city states' under German law, meaning that they are both independent states as well as cities and thus singular 'counties', or NUTS 3 / KRS regions. As states may have additional options for financing, they are grouped with the other two states that support the program. Thus, they are excluded from most of this papers models on support on the county scale.

were employed. OLS regressions can be specified as:

$$Y = \beta_0 + X_1\beta_1 + X_2\beta_2 + ... + X_n\beta_n + \epsilon \tag{1}$$

With the dependent variable Y and independent variables X_i, each with their own estimated β_i, and a general error term ϵ.

For logistic regression, the model appears similar:

$$ln(\frac{P}{1-P}) = \beta_0 + X_1\beta_1 + X_2\beta_2 + ... + X_n\beta_n + \epsilon \tag{2}$$

However, as the dependent variables is not continuous, the logarithmised odds that $Y = TRUE$ are employed. In contrast to the linear OLS regression model with a binary dependent variable, this is more sensible, as this model translates the odds with the range $(0, +\infty)$ to logarithmised odds with the range $(-\infty, +\infty)$, thus a continuous dependent variable perfectly suitable for regressions. In contrast to the first regression, the estimators in logistic regressions are calculated via maximum-likelihood estimation, not ordinary least squares. To interpret the logistic regression coefficients that are logarithmised odd-ratios, odds-ratios are regained as demonstrated in equation (3).

$$OR_i = exp(\beta_i) \tag{3}$$

As already mentioned, the exclusion of certain counties means that just 11 counties with regional public funding are left. As 72 counties have no regional funding, the data set of 83 counties is sufficient for the logit models on whether a county secures additional public support. However, this creates a problem for the analysis of the height of additional public endowment: Either, 72 counties with no (=0) additional support are included in the regression, which solves the problem of the low N and may be justified as there are probably political, structural, and fiscal reason for why there is no support (hence the logit models). On the other hand, including 72 zeros in a regression will most likely severe the linearity assumption of OLS regressions. As a compromise, partial models (political, structural, fiscal) and a full model including all 83 counties is calculated. Additionally, for the smaller subset of regional public additional funding, models for each bivariate

relationship and three partial models are estimated, but no complete model. As a complete model with 11 predictors and 11 observations is nonsensical. Obviously, for the latter subset, no statistically significant effects are expected. However, if both models find at least the same direction of a variable, it may be assumed that it generally is a predictor of height of additional support.

All models and images were created within RStudio (RStudio Team 2021) in the statistical programming language R (R Core Team 2021). For the repository, an overview of packages, and further information, see section 8.

5 Results

The full logit model regarding the impact on additional funding finds that political variables follow the hypotheses, while most structural and fiscal variables did not have the expected impact (table 1). With only 83 counties without state-support and no funding or government funding, the sample is relatively small. This is one explanation for the fact that only three variables (women in parliament, contestability, housing support) have a significant impact ($p<.1$) in the complete logit-model. Another interpretation is that the model is over-specified and many variables (e.g. political) are co-linear. On the other hand, the importance of significance levels depends on the interpretation of the program as totality or random sample. If only this program is regarded as a total sample in itself, significance levels can be ignored. However, if the program is understood as one of many programs with this funding-principle, or as an indicator for local welfare spending, significance levels are relevant.

In the full and in the partial political model, additional support for the program is more likely to exist in counties with a female councilor, a leftist councilor, and in less politically contestable counties. Furthermore, the higher the share of women in the county parliament, the higher the likelihood that additional support for the fridge exchange is granted. In the full model, counties with a leftist councilor are three times (OR=2.87), those with a female councilor also three times (OR=2.66), and those with a contestable regime sixteen times more likely (OR=15.76) to have additional financial support. Each additional percentage point of women in parliament increases this likelihood

too (OR=1.13), as does voter turnout (OR=1.16).

The share of people receiving housing support lowers the probability of additional endowment in both models (OR=0.83, full model). Population density has a significant positive impact only in the partial model. The share of Catholics had a negligible impact in the full model. But in a bivariate model, a significant negative impact of Catholicism on the probability that the program existed in the first place is observed (OR=0.99, table 7).

Other variables have no considerable impact, especially the fiscal variables. Bivarate relationships are included in the appendix, although these should not be interpreted on their own, as the partial and complete models demonstrate (bivariate models: appendix 5, 7, 9).

The impact on the endowment in the models with the greater sample (N=83) mostly follows the path of the logit-models, with one exception: Endowments are lower in counties with a female councilor (table 2). In the complete model, turnout and contestability are significant, other effects are not (p<.1). It should be noted that with 72 observation with not additional cash-back, the linearity assumption for OLS regression does not hold.

Especially political variables were able to explain variance (R^2=0.2) and had significant impact in the partial as well as the whole model. Additional endowments were higher in counties with a leftist councilor, with political contestability, with more female parliamentarians, and a higher voter turnout. Political contestability, the share of female politicians, and turnout has a significant impact on additional endowment in the political model, while only contestability and turnout are significant in the full model. Politically contestable counties pay 51 Euro more (SD=25.8) than non-contestable counties. For each percentage point increase in turnout of the 2017 federal election, additional endowment is 7 Euro higher (SD=3.7). For each percentage point increase in women in the local parliament, the additional support for single households is 2 Euro higher (SD=1.6).

While population density was significant in the singular structural model (p<.05), and for each increase of 100 people per square kilometre funding increases by about 3 Euro (SD=1.4), the effect was not significant in the whole model and much smaller. Share of welfare recipients (only housing support was added in the model to avoid co-linearity) has a negative impact on endowment in the partial model, which is surprising and contrary to the hypothesis, and is positive in the full model (although not significant in both cases). The

share of Catholics had a negligible effect and was also not significant. In regressions with a sample including counties with state-wide support, counties with state-wide endowment receive additional support of more than 100 Euro (SD=15.7, p<.01) (see appendix table 8). Additionally, the structural predictors explain less variance than the political model (R^2=0.04).

Effect size and significance was particularly low for the fiscal variables (GDP p.c., public debt).

The model only consisting of counties with support by the local government (N=11) has similar results as the larger model: With the exception of the gender of the councilor and share of welfare recipients, the direction of effects are the same (table 3). As expected, no effect is significant. The political model explains a large share of the variance (R^2=0.5).

Table 1: Logit Models, combined predictors of additional support.

	Dependent variable:			
	additional support			
	(1)	(2)	(3)	(4)
leftist councilor	1.2			1.1
	(1.1)			(1.2)
fem. councilor	0.5			1.0
	(1.3)			(1.4)
% women parl.	0.1			0.1*
	(0.1)			(0.1)
pol. contestable	1.2			2.8**
	(0.9)			(1.4)
% voter turnout	0.3*			0.1
	(0.2)			(0.2)
pop. density * 100		0.1*		−0.002
		(0.04)		(0.1)
% housing support		−0.1*		−0.2*
		(0.1)		(0.1)
% Catholics		−0.005		0.02
		(0.02)		(0.02)
GDP p.c. in 1000 Euro			0.01	−0.01
			(0.01)	(0.02)
public debt p.c. * 100			0.000	0.02
			(0.02)	(0.03)
Constant	−27.8**	−0.3	−2.5***	−16.3
	(11.6)	(1.5)	(0.7)	(14.7)
Observations	83	83	83	83
Log Likelihood	-24.3	-28.8	-31.9	-21.9
Akaike Inf. Crit.	60.6	65.5	69.7	65.7
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 2: OLS Regression Models, combined predictors of height of additional support, including no support.

	Dependent variable:			
	additional cash-back			
	(1)	(2)	(3)	(4)
leftist councilor	25.7			27.4
	(25.0)			(26.1)
fem. councilor	−26.2			−24.0
	(34.0)			(35.7)
% women parl.	2.5*			2.4
	(1.3)			(1.6)
pol. contestable	49.1**			51.0*
	(22.9)			(25.8)
% voter turnout	6.7**			7.2*
	(2.7)			(3.7)
pop. density * 100		3.1**		0.3
		(1.4)		(1.8)
% housing support		−1.7		0.9
		(1.8)		(2.1)
% Catholics		0.03		0.4
		(0.5)		(0.5)
GDP p.c. in 1000 Euro			0.7	−0.1
			(0.5)	(0.5)
public debt p.c. * 100			0.3	0.3
			(0.7)	(0.7)
Constant	−558.0***	38.6	−0.5	−621.1**
	(192.1)	(40.8)	(23.8)	(289.8)
Observations	83	83	83	83
R^2	0.3	0.1	0.03	0.3
Adjusted R^2	0.2	0.04	0.005	0.2
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 3: OLS Regression Models, combined predictors of height of additional support, excluding no support.

	Dependent variable:		
	additional cash-back		
	(1)	(2)	(3)
leftist councilor	81.8		
	(79.2)		
% women parl.	9.7		
	(6.9)		
fem. councilor	46.0		
	(106.8)		
pol. contestable	62.8		
	(61.7)		
% voter turnout	16.7		
	(13.2)		
pop. density * 100		2.6	
		(4.6)	
% housing support		10.8	
		(9.5)	
% Catholics		1.2	
		(2.7)	
GDP p.c. in 1000 Euro			0.8
			(2.0)
public debt p.c. * 100			2.5
			(3.5)
Constant	$-1,466.6$	44.9	168.3
	(942.1)	(178.2)	(93.7)
Observations	11	11	11
R^2	0.8	0.2	0.1
Adjusted R^2	0.5	-0.1	-0.1
Note:			*p<0.1; **p<0.05; ***p<0.01

6 Discussion

The results show that regional characteristics play a substantial role in the existence of additional support and its amount for the fridge exchange. In the complete logit model (N=83), counties with a female councilor (OR=2.66), a leftist councilor (OR=2.87), political contestability (OR=15.76), higher voter turnout (OR=1.16, one percentage point increase), and higher share of women in parliament (OR=1.13, one percentage point increase) are more likely to give additional support to the program. Population density has no large impact in the full model. Interestingly, and contrary to similar findings regarding educational and healthcare funding, the share of potential recipients (both operationalised through unemployed and recipients of housing support) was negatively associated with the existence of additional support in partial models (for housing support: OR=0.83, percentage points). This could reflect increasing costs of the program. County debt and GDP p.c. does not seem to influence additional local funding. Also, in the complete models, only contestability, share of women in parliament, and welfare recipients (housing support) are statistically significant (p<.1).

The height of additional support in the model including non-supporting counties (N=83) broadly followed the direction of the parameters in the logit-model, with the exception of the gender of the councilor: A female councilor was associated with a -24 Euro drop in additional funding (SD=35.7). However, an explanation may be that the share of female councilors is small and extreme values could distort this relationship. Most effects expressed in monetary terms are small. Only the political variables have a stronger impact, especially the political ideology (leftist councilor: +27 Euro, SD=26.1) and the political contestability (contestable: +51 Euro, SD=25.8). But also each percentage point increase in women in parliament was associated with an increase of funding by 2 Euro (SD=1.6) and each percentage point increase in turnout of the 2017 federal election even with 7 Euro (SD=3.7). However, only political contestability and turnout are significant (p<0.1) in the complete model.

In the model only including counties that have regional and public support (N=11), as expected, no effects were significant. Otherwise, with the exception of the gender-effect of the councilor and share of welfare recipients, the direction of effects followed the regression

model including non-supporting counties.

These results imply that regional funding may lead to regional inequalities. A conclusion can be that the endowment should at least be organised by state-authorities, to prevent vast differences in endowment on which recipients have no significant influence on. Also, it can be shown that the share of Catholics does not have substantial influence on the program. This is good news, as it highlights that the cooperation with the Catholic Caritas does not lead to a biased distribution of aid. However, it is still possible that on the individual scale, welfare recipients that are not Catholic are less likely to trust a Catholic welfare organisation or are not reached to profit from the program. This question cannot be answered by the data at hand.

The regression models do not explain much variance (full model including non-supporting counties R^2=0.2). However, this is consistent with other empirical studies on regional welfare policy (Lien and Pettersen 2004). Especially on the local level, unpredictable factors, such as specific events and circumstances (e.g. personal connections, local scandals) may have a great influence.

However, some properties of the program and this study design should be considered when findings are interpreted. First, around 90% of the sites responded. If the remaining sites deviate strongly from the sample, this may weaken the reported effects. Also, the few counties that offer to pay the price of a fridge completely had to be given a specific monetary value to include them into the models. This value of 350 Euro might be too low. There was also no control for similar programs by the private sector, as these organisations were rather secretive in providing information. On the other hand, not many sites reported 'competition' from the private sector and 90% is quite close to a complete picture. Furthermore, regional financial support for the program could take other forms than a higher cash-back, for example free office space or covered administrative costs. This cannot be accounted for, as it would have meant a much more comprehensive and intimate study of the books of the organisations.

Considering data quality, most has been documented in the specific section, but in short: Some of the data is rather old, as there is no up-to-date data on e.g. regional dispersion of religion in Germany (this data stems from 2011). On the other hand, relative differences between counties are more important than the absolute levels. It is reasonable

that while e.g. the share of Catholics has dropped in Germany since 2011, regional differences and strongholds persist.

This analysis cannot claim to report causality beyond a reasonable doubt. Its data consists of the state of the Energy Saving Check during one brief period of time (March to May 2021). It would be superior having panel data and estimating the change in support after e.g. an election that brings a leftist or female candidate to power. On the other hand, the budget of such a specific and relatively small program might be 'sticky': After an election, the first priority of a politician will not be to adapt the funding of one program to their personal or political position. And there is another problem with the way the data is codified: Following this argument of 'stickiness', a councilor may have inherited the funding of a local fridge exchange. Associating characteristics of councilors with a deal before their term cannot be ruled out.

Last but not least, how to deal with significance in the setting of a specific program could not be answered satisfactory. If the data is assumed to be only a sample of a much larger totality of regionally funded welfare programs, p-levels make sense. If the data is assumed to depict a totality in itself, it does not. The number of observations is small and includes extreme values (no additional funding or full funding). This has been addressed by comparing the model including counties without additional funding with the model only including those counties with regional political funding.

Further research may explore how these relationships appear in other programs or maybe even the budget for local social policy as a whole. Especially for Germany, comparable studies are missing, for all of the three analysed factor dimensions in the domain of public and social policy. Other explorations may increase the statistical accuracy by finding an opportunity to test more sophisticated procedures (especially panel / time-series analysis).

A different, but even more pressing advance needs to be made in the availability of data in and on Germany: There is no comprehensive public data base for regional and local political variables, even though the information is and should be available in a collected form. There is no website that connects public administrative data, thus, for this study, a total of at least six different public data bases had to be connected, each from a different website, a different administrative body. If the data is available, different ministries and

authorities should join their forces for a singular, accessible data base.

In conclusion, this paper exploits variances in funding for a decentralised welfare policy to estimate the impact of regional political, structural, and fiscal differences. It finds that funding follows political and structural pathways. These differences should concern policy makers, as they reinforce local inequalities and question decentralisation in the field of social policy.

7 Appendix

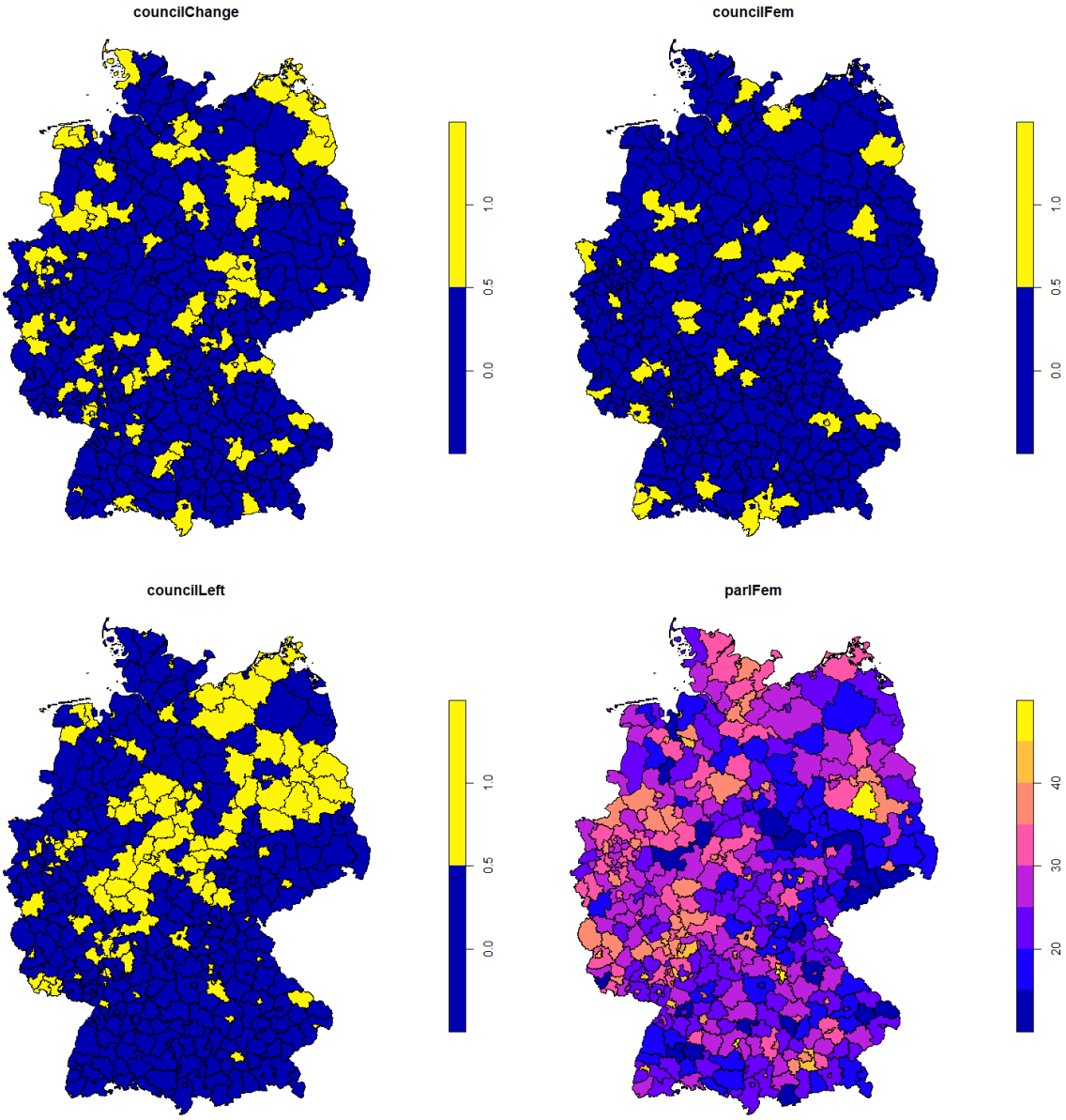

Figure 2: App: Map: Political variables, stability, gender / ideology of councilor, share of women in parliament

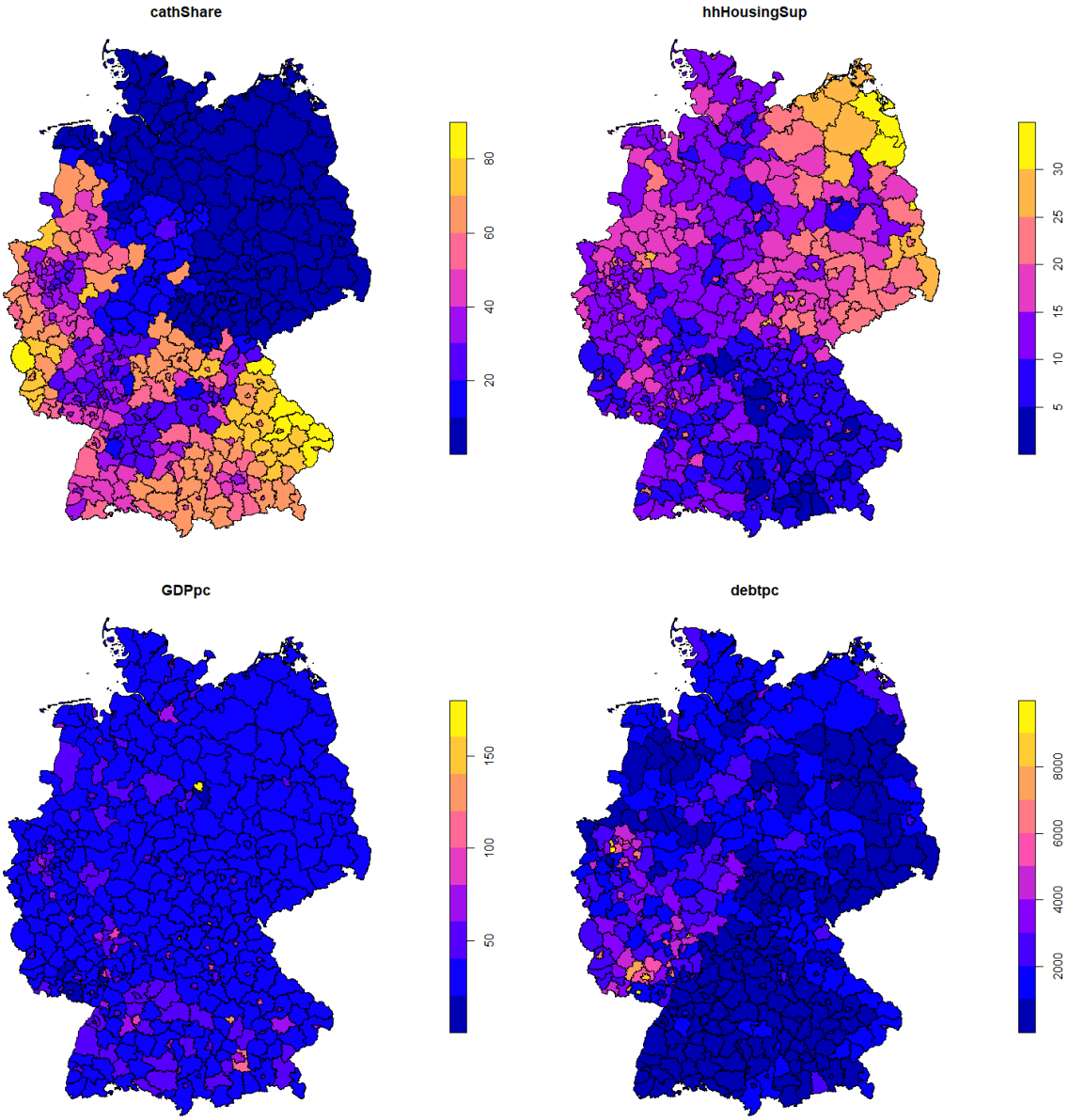

Figure 3: App: Map: Further variables, share of Catholics, people receiving housing benefits, GDP p.c. and public debt p.c.

English translation of personalised e-mail sent to local sites

Dear X,

My name is Alexander Busch and I work as a student assistant at the Chair of Environmental Economics at the University of Heidelberg.

We are researching the effects of the Electricity Saving Check in cooperation with the Federal Coordination Office of the Power Saving Check. We are particularly interested in the exchange of refrigerators.

Unfortunately, I have not yet received any feedback via your e-mail address as mentioned on the website. This can have many reasons, sometimes our emails end up in the spam folder, for example.

It is important for our work to receive feedback from all local bodies. We need to record exactly how the Power Saving Check environment differs regionally. Who gets additional support? Where are there additional offers from other organisations?

That is why I am sending you the following questions:

Are you aware of other programmes locally that offer similar support to the Electricity Saving Check for the purchase of refrigerators? Were there such programmes in the past (last 10 years) that no longer exist?

These may be (have been) offered by e.g. charities or also by municipalities. You would just have to forward me an internet link and/or a telephone number of the responsible body so that I can collect the exact details. If there are (were) such programmes, I would like to know if these services can (could) be combined with your programme.

Do you provide additional financial support for the refrigerator exchange? Was there any support in the past (last 10 years) that no longer exists?

This support can take different forms. In some federal states there are subsidies from the state (e.g. in NRW: 50 euros per household member up to a maximum of 200 euros), other cities and municipalities finance interest-free loans for the purchase of refrigerators. Here we are interested in the (preferably) exact duration, the partner organisation, the concrete support service, whether this service can also be obtained without the refrigerator subsidy, and whether programme details changed during the term (e.g. an increase in the subsidy amount).

If you are not aware of a comparable programme, it would also help us to hear back!

I am happy to receive a reply by e-mail. Otherwise, I would also be happy to make an appointment with you by phone.

Thank you very much for your help!

With kind regards

Alexander Busch

Table 4: App: Variables (county averages)

Statistic	N	Mean	St. Dev.	Min	Max
additional cash-back	125	67.4	91.8	0	350
% women parl.	401	27.3	7.5	10.6	47.5
% voter turnout	401	75.1	3.8	63.1	84.1
% Catholics	401	32.2	24.4	1.7	87.8
population	401	207,030.5	243,880.3	34,209	3,644,826
population density	401	533.7	702.7	36	4,686
% unemployment	401	5.4	2.4	1.5	14.0
% housing support	401	13.5	5.7	0.6	34.4
GDP p.c.	401	37.1	16.1	16.4	172.4
public debt p.c.	401	1,647.2	1,532.8	0.0	9,630.2

	counties with	counties without
fridge exchange	141	260
full response to query	125	16
additional sponsorship		
commercial- or charity-sponsorship	16	125
local gov.- sponsorship	11	130
state-sponsorship	42	99
leftist councilor or major	121	280
female councilor or major	44	357
change in party last election	101	300

Table 5: App: H1: Logit Models for Political Predictors of additional Support

	Dependent variable:					
	additional cash-back					
	(1)	(2)	(3)	(4)	(5)	(6)
leftist councilor	0.6					1.2
	(0.7)					(1.1)
fem. councilor		0.1				0.5
		(1.1)				(1.3)
% women parl.			0.1***			0.1
			(0.05)			(0.1)
pol. contestable				1.2*		1.2
				(0.7)		(0.9)
% voter turnout					0.3**	0.3*
					(0.1)	(0.2)
Constant	−2.1***	−1.9***	−5.9***	−2.3***	−21.6***	−27.8**
	(0.4)	(0.3)	(1.6)	(0.4)	(8.4)	(11.6)
Observations	83	83	83	83	83	83
Log Likelihood	-32.1	-32.5	-27.8	-30.9	-29.0	-24.3
Akaike Inf. Crit.	68.2	68.9	59.6	65.7	62.1	60.6

Note: *p<0.1; **p<0.05; ***p<0.01

Table 6: App: H1: OLS Models for Political Predictors of additional endowment, excluding no support

	Dependent variable:					
	additional cash-back					
	(1)	(2)	(3)	(4)	(5)	(6)
leftist councilor	108.3					81.8
	(68.3)					(79.2)
fem. councilor		−155.0				46.0
		(123.5)				(106.8)
% women parl.			16.3***			9.7
			(3.8)			(6.9)
pol. contestable				80.8		62.8
				(72.4)		(61.7)
% voter turnout					18.2	16.7
					(13.8)	(13.2)
Constant	191.7***	255.0***	−348.7**	204.2***	−1,162.6	−1,466.6
	(46.1)	(37.2)	(139.4)	(48.8)	(1,061.0)	(942.1)
Observations	11	11	11	11	11	11
R^2	0.2	0.1	0.7	0.1	0.2	0.8
Adjusted R^2	0.1	0.1	0.6	0.02	0.1	0.5

Note: *p<0.1; **p<0.05; ***p<0.01

Table 7: App: H2: Logit Models, structural predictors of additional support.

	Dependent variable:						
	additional cash-back				in program	additional cash-back	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
pop. density * 100	0.1*					0.1**	0.1*
	(0.04)					(0.05)	(0.04)
% unemployment		−0.3				−0.5*	
		(0.2)				(0.3)	
% housing support			−0.1*				−0.1*
			(0.1)				(0.1)
% Catholics				0.01	−0.01**	−0.01	−0.005
				(0.01)	(0.005)	(0.02)	(0.02)
Constant	−2.4***	−0.5	−0.3	−2.2***	−0.5***	0.6	−0.3
	(0.5)	(0.9)	(0.8)	(0.5)	(0.2)	(1.8)	(1.5)
Observations	83	83	83	83	401	83	83
Log Likelihood	-31.0	-31.0	-30.4	-32.2	-246.3	-28.2	-28.8
Akaike Inf. Crit.	65.9	66.1	64.9	68.3	496.7	64.3	65.5

Note: *p<0.1; **p<0.05; ***p<0.01

Table 8: App: H2: OLS Models for Structural Predictors of additional endowment, excluding no support

	Dependent variable:						
	additional cash-back						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
pop. density * 100	3.7					0.2	2.6
	(4.2)					(5.6)	(4.6)
% unemployment		23.8				66.8	
		(24.8)				(64.7)	
% housing support			10.0				10.8
			(7.4)				(9.5)
% Catholics				−0.7		4.4	1.2
				(2.3)		(5.1)	(2.7)
state-scheme					105.6***		
					(14.6)		
Constant	203.7***	124.4	116.2	261.5***	31.9***	−221.0	44.9
	(56.0)	(126.5)	(97.9)	(78.2)	(8.5)	(431.1)	(178.2)
Observations	11	11	11	11	125	11	11
R^2	0.1	0.1	0.2	0.01	0.3	0.2	0.2
Adjusted R^2	-0.02	-0.01	0.1	-0.1	0.3	-0.1	-0.1

Note: *p<0.1; **p<0.05; ***p<0.01

Table 9: App: H3: Logit Models, fiscal predictors of additional support.

	Dependent variable:		
	additional cash-back		
	(1)	(2)	(3)
GDP p.c. in 1000 Euro	0.01		0.01
	(0.01)		(0.01)
GDP p.c. in 1000 Euro		−0.000	0.000
		(0.02)	(0.02)
Constant	−2.5***	−1.9***	−2.5***
	(0.6)	(0.5)	(0.7)
Observations	83	83	83
Log Likelihood	-31.9	-32.5	-31.9
Akaike Inf. Crit.	67.7	68.9	69.7

Note: *p<0.1; **p<0.05; ***p<0.01

Table 10: App: H3: OLS Regression Models, fiscal predictors of height of additional support, excluding no support.

	Dependent variable:		
	additional cash-back		
	(1)	(2)	(3)
GDP p.c. in 1000 Euro	1.4		0.8
	(1.7)		(2.0)
GDP p.c. in 1000 Euro		3.0	2.5
		(3.0)	(3.5)
Constant	176.5*	196.6***	168.3
	(90.3)	(57.0)	(93.7)
Observations	11	11	11
R^2	0.1	0.1	0.1
Adjusted R^2	-0.04	0.002	-0.1
Note:	*p<0.1; **p<0.05; ***p<0.01		

8 Code Repository and Data

All software used for this paper ist publicly available and free of charge. Only open source software was used for calculations and image creation. With the exception of the Caritas-data set, that was collected by the author, all data is publicly available from German government agencies.

All calculations, models, and images were created within RStudio (RStudio Team 2021) in the statistical programming language R (R Core Team 2021). Packages used: plyr (Wickham 2011), dplyr (Wickham et al. 2021), ggplot2 (Wickham 2016), ggpubr (Kassambara 2020), purrr (Henry and Wickham 2020), readxl (Wickham and Bryan 2019), stringr (Wickham 2019), sf (Pebesma 2018), and stargazer (Hlavac 2018).

The complete code of this study is available as repository at GitHub: Click on this sentence for the GitHub-Repository containing all R scripts for calculations and image creation. Alternatively, it can be assessed at https://github.com/hieronymusBusch/BA-Economics/

9 References

Bastida, F., Guillamón, M.-D., and Benito, B. (2013). Municipal spending in spain: Spatial approach. *Jorunal of urban planning and development*, 139(2):79–93.

BBSR (2021). INKAR-Daten, erhoben aus der laufenden Raumbeobachtung, basierend auf dem Zensus 2011 BRD: Altered by Alexander Busch. `https://www.inkar.de/`. [Online; last access May 4, 2021].

BKG (2020). Digitales Landschaftsmodell 1:250 000 (Ebenen): Altered by Alexander Busch. `https://gdz.bkg.bund.de/index.php/default/catalog/product/view/id/773/s/nuts-gebiete-1-250-000-stand-01-01-nuts250-01-01/category/8/?__store=default`. [Online; last access May 4, 2021].

Blid, M., Gerdner, A., and Bergmark, A. (2008). Prediction of homelessness and housinng provisions in swedish municipalities. *European Journal of Housing Policy*, 8(4):399–421.

Blom-Hansen, J., Monkerud, L. C., and Sorensen, R. (2006). Do parties matter for local revenue policies? a comparison of denmark and norway. *European journal of political research*, 45(3):445–465.

BMFSFJ (2019). Digitaler Gleichstellungsatlas: Altered by Alexander Busch. `https://www.bmfsfj.de/bmfsfj/service/online-rechner/gleichstellungsatlas`. [Online; last access June 19, 2021].

Bojar, A. (2018). Biting the Hand that Feeds: Reconsidering the Partisan Determinants of Welfare Spending in Times of Austerity . *Government and Opposition*, 53(4):621 – 652.

Borge, L.-E. (2004). Strong politicians, small deficits: evidence from Norwegian local governments. *European Journal of Political Economy*, 21:325 – 344.

Burchell, r. W., Lowenstein, G., Dolphin, W. R., Galley, C. C., Downs, A., Seskin, S., Still, K. G., and Moore, T. (2002). *Costs of Sparwl - 2000*. National Academy Press, Washington D.C., USA.

Busemeyer, M. R. (2007). Determinants of public education spending in 21 OECD democracies, 1980-2001. *Journal of European Public Policy*, 14(4):582 – 610.

Cantarero, D. (2005). Decentralization and health care expenditure: the Spanish case. *Applied Economics Letters*, 12(15):963 – 966.

Cantarero Prieto, D. and Lago-Penas, S. (2012). Decomposing the determinants of health care expenditure: the case of Spain. *European Journal of Health Economics*, 13:19 – 27.

Castles, F. G. (1982). The impact of parties on public expenditure. In Castles, F. G., editor, *The Impact of Parties: Politics and Policies in Democratic Capitalist States*, pages 21–96. Sage, London.

Castles, F. G. (1989). Explaining public education expenditure in OECD nations. *European Journal of Political Research*, 17:431 – 448.

Castles, F. G. (1998). *Comparative Public Policy: Patterns of Post-War Transformation*. Edward Elgar, Cheltenham, United Kingdom.

Davis, L. W., Fuchs, A., and Gertler, P. (2014). Cash for coolers: Evaluating a large-scale appliance replacement program in mexico. *American Economic Journal: Economic Policy*, 6(4):207–38.

DESTATIS (2011). Ergebnisse des Zensus 2011: Altered by Alexander Busch. `https://www.zensus2011.de/DE/Home/Aktuelles/DemografischeGrunddaten.html?nn=3065474`. [Online; last access June 19, 2021].

DESTATIS (2018). Kreisfreie Städte und Landkreise nach Fläche, Bevölkerung und Bevölkerungsdichte am 31.12.2018: Altered by Alexander Busch. `https://www.destatis.de/DE/Themen/Laender-Regionen/Regionales/Gemeindeverzeichnis/Administrativ/Archiv/Standardtabellen/04_KreiseVorjahr.html;jsessionid=8484FA1B86F77062B91D6B2B726EE9AC.live741`. [Online; last access May 4, 2021].

DESTATIS (2021). Armutsgefährdungsquote (monetäre Armut) nach Sozialleistungen in Deutschland nach dem Haushaltstyp. `https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Einkommen-Konsum-Lebensbedingungen/`

Lebensbedingungen-Armutsgefaehrdung/Tabellen/armutsgef-quote-typ-silc.html. [Online; last access June 26, 2021].

Deutscher Landkreistag (2020). *Die 294 deutschen Landkreise, ihre Kreistage und Landräte 2021*. Deutscher Landkreistag, Berlin, Germany.

Elgie, R. and McMenamin, I. (2008). Political fragmentation, fiscal deficits and political institutionalisation. *Public Choice*, 136:255 – 267.

Falch, T. and Rattsø, J. (1997). Political economic determinants of school spending in federal states: Theory and time-series evidence. *European Journal of Political Economy*, 13(2):299–314.

Falch, T. and Rattsø, J. (1999). Local public choice of school spending: disaggregating the demand function for educational services. *Economics of Education Review*, 18(3):361–373.

Funashima, Y. (2017). Wagner's law versus displacement effect. *Applied Economics*, 49(7):619–634.

Geys, B. (2007). Government Weakness and Electoral Cycles in Local Public Debt: Evidence from Flemish Municipalities. *Local Government Studies*, 33(2):237 – 251.

Gyimah-Brempong, K. (1987). Economies of scale in municipal police departments: The case of florida. *Review of Economics and Statistics*, 69(2):352–356.

Hega, G. M. and Hokenmaier, K. G. (2002). The welfare state and education: a comparison of social and educational policy in advanced industrial societies. *German Policy Studies*, 2(1):143 – 173.

Henry, L. and Wickham, H. (2020). *purrr: Functional Programming Tools*. R package version 0.3.4.

Herrero-Alcalde, A. and Tránchez-Martín, J. M. (2017). Demographic, political, institutional and financial determinants of regional social expenditure: the case of Spain . *Regional Studiese*, 51(6):920–932.

Hlavac, M. (2018). *stargazer: Well-Formatted Regression and Summary Statistics Tables*. Central European Labour Studies Institute (CELSI), Bratislava, Slovakia. R package version 5.2.2.

Hokenmaier, K. G. (2002). *Education, Social Security, and the Welfare State: Alternative Policy Choices in the United States and Germany*. Kalamazoo: Western Michigan University. dissertation, Michigan, United States.

Holcombe, R. G. and Williams, D. W. (2008). The impact of population density on municipal government expenditures. *Public finance review*, 36(3):359–373.

Hortas-Rico, M. and Solé-Ollé, A. (2010). Does urban sprawl increase the costs of providing local public services? evidence from spanish municipalities. *Urban studies*, 47(7):1513–1540.

Houde, S. and Aldy, J. E. (2017). Consumers' response to state energy efficient appliance rebate programs. *American Economic Journal: Economic Policy*, 9(4):227–55.

Kassambara, A. (2020). *ggpubr: 'ggplot2' Based Publication Ready Plots*. R package version 0.4.0.

Krause, M. and Potrafke, N. (2017). The real estate transfer tax and government ideology: Evidence from the german states. *CESifo Working Paper*, 6491.

Ladd, H. F. (1992). Population growth, density and the costs of providing public services. *Urban Studies*, 29(2):273–295.

Lien, S. and Pettersen, P. A. (2004). Local government and welfare generosity: Municipality spending on social welfare. *Scandinavian Political Studies*, 27(4):343–365.

Mahdavi, S. (2011). A re-examination of wagner's law using us total state and local expenditure and its sub-categories. *Journal of Economic Studies*, 38(4):398–413.

Musgrave, R. A. (1969). *Fiscal Systems*. Yale University Press, New Haven, CT.

Peacock, A. and Scott, A. (2000). The curious attraction of wagner's law. *Public Choice*, 102(1/2):1–17.

Pebesma, E. (2018). Simple Features for R: Standardized Support for Spatial Vector Data. *The R Journal*, 10(1):439–446.

Potrafke, N. (2016). Partisan politics: The empirical evidence from oecd panel studies. *CESifo Working Paper*, 6024.

R Core Team (2021). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria.

Real Estate Research Corporation (1972). *The Costs of Sprawl: Environmental and Economic Costs of Alternative Residential Development Patterns at the Urban Fringe*. Portland Regional Planning History, Washington D.C., Washington D.C.

Roubini, N. and Sachs, J. D. (1989). Political and economic determinants of budget deficits in the industrial democracies. *European Economic Review*, 33(5):903 – 933.

RStudio Team (2021). *RStudio: Integrated Development Environment for R*. RStudio, PBC., Boston, MA.

Simon, C. A. and Tatalovich, R. (2014). Party, ideology, and deficits: Provincial fiscal policy and the cameron thesis, 1966–2009. *Canadian journal of political science*, 47(1):93–112.

Snyder, J. M. and Yackovlev, I. (2000). Political and economic determinants of changes in government spending on social protection programs. *Conference Paper 'Securing Our Future in a Global Economy' Conference*.

Stromspar-Check (2021). Website Stromspar-Check. `https://www.stromspar-check.de/`. [Online; last access June 8, 2021].

Wagner, A. (1892). *Grundlegung der politschen Ökonomie, Part I*. Winter, Leipzig, Sachsen, 3rd edition.

Wickham, H. (2011). The split-apply-combine strategy for data analysis. *Journal of Statistical Software*, 40(1):1–29.

Wickham, H. (2016). *ggplot2: Elegant Graphics for Data Analysis*. Springer-Verlag New York.

Wickham, H. (2019). *stringr: Simple, Consistent Wrappers for Common String Operations*. R package version 1.4.0.

Wickham, H. and Bryan, J. (2019). *readxl: Read Excel Files*. R package version 1.3.1.

Wickham, H., François, R., Henry, L., and Müller, K. (2021). *dplyr: A Grammar of Data Manipulation*. R package version 1.0.3.

Wittman, D. (1989). Why democracies produce efficient results. *Journal of Political Economy*, 97:1395 – 1424.

Wittmann, D. (1995). *The Myth of Democratic Failure: Why Political Institutions are Efficient*. Chicago University Press, Michigan, United States.