Local Public Finance: Three Essays on Accrual Accounting, Fiscal Rules and Corporatization

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Introduction

Local governments differ from national and state-level governments in several aspects, one being their comparatively high numbers (Glaeser, 2013). From the public finance perspective, local governments are a both relevant and fascinating object to study because...

- ...in many multilevel systems, they account for a significant share of the general government's fiscal activity. This can make a nation's budgetary performance critically dependent on the behavior of its local governments.
- ...most public services provided by local governments have direct impact on the daily lives of citizens. Conversely, at no other level of government do citizens have so much direct influence on the activities of the state.
- ...local governments are assumed to know best about citizens' preferences which makes them particularly relevant for policy formation and implementation. At the same time, like all governments also local governments are prone to inefficiencies, deficit bias, rent-seeking, etc.

In this cumulative dissertation I set out to investigate – together with my co-authors – fiscal decision-making of local governments by presenting three different perspectives on their budget. Each chapter can be read as a self-contained paper. While Chapter 1 focuses on the impact of the globally relevant accrual accounting reform on German local government investment expenditures and sales revenue, Chapter 2 asks from a cross-country perspective for the efficiency of numerical fiscal rules supposed to enhance budget discipline. Chapter 3 investigates drivers of corporatization which is a prominent form of shifting public service delivery outside of the local core budget. The geographical focus of this third contribution lies, again, on Germany. All three analyses have in common that they investigate phenomena which originate in the attempt to make local governments more efficient and to stabilize their budgets in the long term. Beyond their immediate significance for the research hypotheses of each chapter, the presented results may also be read as an indication of whether these initiatives were successful.

This introduction presents the fiscal situation and relevance of the German local level and makes a brief detour into the related economic theory. This underpins the

claims made at the outset about the relevance of local governments as a research topic in the field of public finance and embeds the three following chapters in the broader theoretical discourse. I will then present the individual chapters of this dissertation as well as a brief summary of the practical relevance of the main findings.

Fiscal Relevance and Situation of German Local Governments

As of 2021, Germany consisted of nearly 10,800 municipalities, most of them with less than 10,000 inhabitants (Statistisches Bundesamt, 2021b). About 86 percent of the German population lived in metropolitan areas (Eurostat, 2022). The rest resided in smaller and often rural local communities. In the everyday life of people, local governments play a significant role. Under extensive deployment of personnel and resources they provide a wide range of public services of general interest such as education, transportation, or public safety and maintain many important infrastructures like roads, school buildings, or sports facilities (Humer, 2022). German local governments employed 32 percent of all public employees in 2021, accounted for around 37 percent of all public investments and spent 17 percent of German public expenditure (Statistisches Bundesamt, 2022b,d,e). These numbers help understanding why basically everyone is affected by local government fiscal policies (Fisher, 2018).

In the same year, close to 40 percent of local government revenue in the core budget (EUR 289 billion) originated in tax revenue especially from business and income tax (Bundesministerium der Finanzen, 2022b). Both are shared taxes of which the federal and state governments receive their parts, too. Smaller shares came from two residential property taxes and less relevant local taxes such as amusement or dog taxes. Another 41 percent of revenue in 2021 consisted of transfers from higher levels of government. The remainder comprises of user fees, charges, income from capital sales, etc. (Bundesministerium der Finanzen, 2022b). In terms of expenditure categories, the German local level currently spends the largest part for social services followed by general administration, supply and waste disposal, culture and science, as well as health and sports (Statistisches Bundesamt, 2022c). Worth noting, expenditures on social services have increased considerably in the past because several costly services have been decentralized to the local level (Geißler, 2019).

From the aggregate perspective, German local governments appear to be in a financially sound state. Over the past decade, they have constantly reported annual aggregate surpluses (Bundesministerium der Finanzen, 2022b). Moreover, local debt appears negligible compared to the state and federal levels. In 2021, local government debt summed up to 5.7 percent of general government debt (Statistisches Bundesamt, 2022f). This view, however, is challenged by the existing financial inequality among German local governments. A common indicator for fiscal hardship is short-term

debt per capita, so called cash credits (Deutsche Bundesbank, 2021). Its distribution over the 13 territorial states reveals that there is a subgroup of four states with extraordinarily high average short-term debt per capita (these include: North Rine-Westphalia, Rhineland-Palatinate, Saarland, and Saxony-Anhalt) whereas the rest are currently hardly bothered with short-term debt (Statistisches Bundesamt, 2022a) – in some states, however, this is due to local government bailouts that occured in the recent past (Duve and Kümpel, 2020). Moreover, inequality in terms of cash credits within single states is considerable (Boettcher et al., 2017). This is also true for tax revenues (Boettcher et al., 2021). Existing intra-state systems of revenue equalization cannot fully counteract this inequality (Junkernheinrich, 2019). In consequence, to date there is a long list of local governments which find themselves overburdened with high debt[1] (Bundesministerium der Finanzen, 2022a), growing expenditure needs, and an inability to cover necessary infrastructure investments. The latter led to a debate about a German local government investment backlog (Gornig, 2019, Raffer and Scheller, 2022).

German local governments are the lowest tier of a multilevel system consisting of the federal government and 16 state governments of which three are city states (Berlin, Hamburg, and Bremen). They are guaranteed local self-government (Art. 28, Basic Law) but are at the same time part of and subject to one of the 13 territorial states which have legislative powers (Schefold, 2012, Scheller, 2023). German local governments can raise local taxes and have budgeting rights (Geißler, 2019). All territorial states have at least one additional local jurisdictional level that is superordinate to municipalities: the counties (Landkreise), of which 294 existed in 2021 (Statistisches Bundesamt, 2021a) and which are commissioned by the state level to supervise municipal budgets (Geißler, 2019). Only 107 larger cities are not supervised by the counties but are directly accountable to their respective state. Compared to the rest of local governments, they also provide a broader set of public services.

Most of the services delivered by local governments are compulsory in the sense that they are commissioned by the state or federal government (Gern and Brüning, 2019). Apart from that, there is also a set of services over which local governments can decide freely, for example in the fields of cultural or recreational services. In general, the administrative system of the Federal Republic of Germany is rather complex. In most cases, basic legal principles are set at the federal level and complemented by state law. Every municipality or city has a local council which is headed by a locally elected mayor. The specific role and the power of the mayor is defined by state law and therefore not the same in every German state (Wollmann, 2004). Apart from several minor territorial reforms in the last two decades which led to a slow but constant decrease in the number of municipalities (Geißler, 2019), one of the most relevant administrative reforms in the recent past was the so called accrual accounting reform. To date more than 70 percent of local governments have changed

[1] See, for example, the "Aktionsbündnis für die Würde unserer Städte", an association of German cities under fiscal distress (Aktionsbündnis, 2022).

their mode of accounting from simple cash to private sector style accrual accounting (Raffer, 2021). Currently, local governments face far-going adaptation needs in terms of demographic change, digitalization, and ecological transformation (VDZ, 2022) which is about to bring new waves of local government reform in the future (see, e. g., Raffer et al., 2022).

Local Public Finance in Economic Theory

According to Musgrave (1959) and his "Theory of Public Finance" there are three economic functions of government: allocation, distribution, and stabilization. Local governments are limited in their ability to establish their own level of redistributional policies, because individuals and firms can easily move to other jurisdictions and counteract any intended redistribution (Fisher, 2018). A second function of government, namely economic stabilization, is equally out of reach since a single local government has little control over prices, employment, and the general level of economic activity. What remains is Musgrave's third function of government: Obtaining an efficient allocation of society's resources by government intervention in the market. For local governments, this primarily means providing goods and services that the private market does not efficiently provide. This raises the question of the optimal scope, quality and composition of public services to be provided by a given local government (Arends, 2020).

An early but influential answer to this question is articulated by Tiebout (1956) in his work on how local governments combine choice and competition into the delivery of public services (Glaeser, 2013). The related model marks also the start of modern economic literature on local public finance. Following the concept of Tiebout sorting, local diversity in a system of open jurisdictions enables citizens and firms to 'vote with their feet' and move to communities which provide a set of services that fits best with their own preferences. By doing this, they reveal their hidden preferences (Arends, 2020). In case there are enough jurisdictions and variation in kind, production costs, and levels of public goods is high enough, they may be provided as efficiently as private goods. The essential assumption in the Tiebout model, however, is a very high degree of factor mobility. Wildasin (1986) calls this a key feature of local, as opposed to national public finances and one of the essential conditions for local politics.

Close to Tiebout (1956) and his concept of the alignment of local public services and citizen preferences is Oates (1972) and his analysis of the optimal distribution of locally in contrast to centrally provided public goods based on inter-jurisdictional spillovers and efficient matching to local citizens' preferences (Bloch and Zenginobuz, 2015). For his famous decentralization theorem, Oates does not need to assume a high degree of factor mobility. The theorem states that "...in the absence of cost-savings from the centralized provision of a [local public] good and of interjurisdictional

externalities, the level of welfare will always be at least as high (and typically higher) if Pareto-efficient levels of consumption are provided in each jurisdiction than if any single, uniform level of consumption is maintained across all jurisdictions" (Oates, 1972, p. 54). Hence, based on economic efficiency the theorem argues in favor of the decentralized provision of public goods (Oates, 1999). It is based on the information asymmetry argument that in contrast to the central government, local governments know the preferences of their own residents and local specificities (Oates, 2005).

A third influential solution to the determination of an optimal amount, composition, and quality of local public goods is the concept of yardstick competition (Salmon, 1987). It states that local citizens punish their elected politicians whenever the quality and scope of publicly provided goods within the own municipality, city, etc. falls behind what is provided in neighboring or otherwise observable jurisdictions. Incentivized by re-election motives, local leaders would react and optimize service provision while minimizing costs (Arends, 2020). However, this mechanism requires a high degree of accessibility to information about the situation in other jurisdictions.

All three answers to the question of optimal provision of local public goods build the baseline framework for fiscal decentralization which is a longstanding empirical trend in many countries worldwide (Arends, 2020, Lago, 2021). It describes the transfer of tasks, expenditure responsibilities, and revenue assignments from the central to lower levels of government and therefore provides a rationale for their relevance in the analysis of public finance. In general, but also in its questioning of the merits of fiscal decentralization, the decade-long scholarly debate is far more nuanced than presented so far. For example, Oates (2005) and others speak of a "second-generation theory of fiscal decentralization" which extends the above-presented early ideas by behavioral flaws and imperfect information. Whereas first generation theories were built around the assumption of benevolent public officials striving to maximize the welfare of citizens by optimal public service production decisions, the second generation of theories draws on work in public choice and political economy about political processes and agents that deviate in their functioning and decision-making from welfare maximization (see, for example, Weingast, 2014). As Oates points out, both voters and officials "have their own objective function that they seek to maximize" (Oates, 2005, p. 356). Furthermore, second generation theories are informed by insights provided by industrial organization and microeconomic theory on the existence of asymmetric information which builds another fundamental impediment to the early concepts of fiscal decentralization (Oates, 2005). Prud'Homme (1995) provides an overview of related risks.

One prominent risk with regard to the efficient local provision of public goods that has been discussed in the past is an overly undisciplined use of public funds (Arends, 2020). This fear is based on the idea that politicians are exposed to a deficit bias which leads them to overspend, undertax, or borrow excessively (Turley et al., 2021, Kotia and Lledó, 2016). Wyplosz (2013) lists several potential reasons for this bias. One is the tendency to burden future governments and generations with today's

expenditures, a second one is the problem of catering to interest groups at the cost of taxpayers in order to increase re-election probabilities, and a third potential reason is the expectation to receive transfers from higher levels of government. Only the third reason is exclusive to subnational governments (Turley et al., 2021) and relates to the fiscal illusion hypothesis which states that public services are produced less efficient when revenues are dominated by grants since tax payers cannot link service production to taxes paid (Weingast et al., 1981). All three reasons, however, are based on local politicians failing to internalize the consequences of overspending due to common-pool problems and negative spillovers. Similarly, moral hazard may appear once local governments form credible bailout expectations (Rodden, 2002). In this case, they are no longer held to a fixed budget but find the hard budget constraint they would be subject to softened by prospect of external support in case of fiscal hardship (Kornay et al., 2003).

Organizational and regulatory answers to this feared and perceived lack of efficiency and overspending in (local) government service provision are manyfold. Three approaches play a central role for this dissertation. Over the past three decades the so called New Public Management (NPM) movement in public administration sought to increase efficiency by implementing modern instruments of government (Naschold and Daley, 1999, Hood, 1991, 1995). Those where often motivated by private-business practices. One related and rather important government reform was and still is the above-mentioned replacement of public-sector cash accounting by accrual accounting similar to the double-entry bookkeeping of private-sector businesses. Another one is the shift of public service delivery out of the core administration and budget into corporatized or even fully privatized entities. Apart from those NPM-related reforms, a prominent way to tame local public expenditure and enforce budgetary discipline is the implementation of numerical fisal rules like expenditure or balanced budget rules (De Biase and Dougherty, 2022). Whereas the NPM-related approaches strive to higher efficiency in service production and are therefore indirectly linked to budget stabilization, numerical fiscal rules are supposed to directly enforce fiscal discipline. The following section presents the three empirical analyses of this dissertation in which I investigate these approaches with respect to their effects on local government budgets or potential drivers.

Three Essays: Accrual Accounting, Fiscal Rules, and Corporatization

Chapter 1 – Accrual Accounting: The first chapter of this dissertation is titled "Accrual Accounting and Local Government Investment and Divestment – A Matching Evaluation". In it, I analyze the effect of the German local government accrual accounting reform on investment expenditure and sales revenue. As part of the NPM movement, the replacement of the pure cash-flow perspective by private sector oriented double-entry bookkeeping was supposed to increase effectiveness, efficiency,

transparency, and accountability of budget-related decision making (Lampe, 2017, Burth and Hilgers, 2014, Arnaboldi and Lapsley, 2009). One relevant change resulting from reform implementation is related to the determination of the budget balance. From this rather technical change I derive two testable research hypotheses.

In contrast to cash accounting, local governments have to evaluate their assets once they implement accrual accounting and then subject them to yearly depreciation which is a hitherto unknown annual burden to the budget balance. Hence, whereas under cash accounting an investment burdens the balance only once at the point in time when it was paid, accrual accounting leads to evenly spread out burdens in the future. Since from the conventional political economy perspective politicians usually prefer to defer the recognition of spending and accrual accounting introduces the means to do so, I hypothesize that reform implementation causes an incentive to increase today's investment expenditure. My second hypothesis is deducted from the fact that under cash accounting any incoming cash payment from the sale of a capital good helps in its entire magnitude to offset or ease a budget deficit. Under accrual accounting the incoming amount of cash is counteracted by the decreasing asset position which is now also part of the budget balance. Hence, under accrual accounting selling assets is no longer an appropriate means for balancing the budget. This leads me to the second hypothesis, stating that reform implementation leads to decreasing municipal revenues from asset sales.

I analyze these hypotheses with local government budget data from the German state of Baden-Württemberg for the period 2005 to 2016. Municipalities had to implement the reform from 2009 onwards; implementation was completed in 2019. This led to a cumulative transition pattern which I exploit with different matching techniques and the conditional panel Difference-in-Difference estimator. It is the first empirical analysis which implements this method set with municipal micro-data from one institutionally homogeneous region. Results do not support the hypothesis that the reform increases today's investment expenditure. Instead, investment expenditure on immovable assets like buildings or roads decreases in the treatment compared to the control group after reform implementation. As potential explanation, I suggest the introduction of annual depreciation and the hitherto unknown emphasis on future burdens to the budget balance caused by today's investment. Considering the medium-to-long-term perspective of local politicians towards future local elections this seems to change mindsets and investment decisions. Furthermore, results on local government revenue from asset sales point cautiously to decreasing revenues from movable and financial asset sales, which is in line with the theory. These results, however, are less robust and therefore there is no ample support for hypothesis two.

These findings are broadly in line with first existing empirical research in the field (see Christofzik, 2019, Dorn et al., 2021) and therefore add to a just-emerging understanding of the impact of the accrual accounting reform on budgetary decision-making on the local level.

Chapter 2 – Fiscal Rules: The second chapter of this dissertation is titled "Local Government Fiscal Regulation in the EU: The Impact of Balanced Budget Rules". A fiscal rule is a permanent constraint on fiscal policy expressed in terms of a summary indicator of fiscal performance, like the budget deficit, debt, etc. (Kornay et al., 2003). It aims at limiting the decision-making discretion of policymakers who are prone to the deficit bias, as outlined above, and consequently at promoting fiscal discipline (Turley et al., 2021). Together with my co-author Beate Jochimsen I am interested in the impact of numerical fiscal rules on local government fiscal discipline across European Union member states, especially of the so-called "Balanced Budget Rule (BBR)" on the aggregate local budget balance.

Across OECD countries, fiscal rules are increasingly used at state and local levels to tame fiscal indiscipline (De Biase and Dougherty, 2022). Within the European Union, in 2016 only 10.5 percent of all fiscal rules were solely dedicated to the central government whereas 21 percent restricted the fiscal freedom of the local level (European Commission, 2018b). Following the European Commission's Fiscal Rule Strength Index (FRSI), over the past two decades numerical fiscal rules not only increased in numbers but also in institutional strength. This indicates that local governments are embedded in an increasingly dense web of centrally imposed fiscal rules. From existing empirical research (see, e.g., Heinemann et al., 2018, De Biase and Dougherty, 2022, and others) we know that fiscal rules are a viable means to strengthen fiscal discipline but that their effectiveness depends on the specific institutional implementation as well as on local government transfer dependency. From these findings we derive five testable research hypotheses which cover the general impact of fiscal rules on aggregate local government primary deficits (H1), the specific impact of BBRs (H2), the relevance of their institutional implementation (H3), and the role of transfers (H4 and H5). We test these hypotheses with a panel data set comprising annual data from 19 EU member states over a period of 19 years (1997-2015). The data on budget rules and their institutional strength stems from the European Commission's Fiscal Rule Database (European Commission, 2018a). The identification strategy is based upon estimating a fiscal reaction function following Debrun et al. (2008) and others over a wide range of specifications within a bias-corrected least square dummy variable (LSDVC) framework. An additional first-difference generalized methods of moments (FD GMM) model is presented as further robustness check. We are the first who focus on the impact of one single rule type for local (in contrast to subnational) governments from a cross-country perspective.

Our results show that within our sample the local government balanced budget rule had a discipline-enhancing effect and significantly mitigated aggregate local government budget deficits – contrary to debt or expenditure rules, which served as control variables in our setting. Moreover, the impact of the BBR on local governments depends on its institutional implementation. That is, relevant are the scope and quality of the statutory base, the room for setting or revising objectives, the

quality of monitoring and enforcement mechanisms, and media visibility (European Commission, 2018a). This indicates that it is not enough to just implement a fiscal rule; what counts is the concrete design. In addition, we find that a rising share of higher-level transfers to local governments is significantly linked to deteriorating local budget balances. Our major contributions to existing literature are, first, the central relevance of the BBR compared to other rules, second, the importance of a proper implementation, and, third, the narrow focus on local (instead of subnational) governments.

Chapter 3 – Corporatization: The third chapter of this dissertation is titled "Shifts in Local Governments' Corporatization Intensity: Evidence from German Cities". My co-author Maike Rackwitz and I analyze drivers of local government corporatization which describes the shift of public service provision out of the municipal core administration and its budget into municipal corporations without receding to contracting-out or full privatization (Bel and Fageda, 2010). The proliferation of corporatization in the past is often linked to liberalization and privatization initiatives which began in the EU in the mid-1990s and can be seen as part of the above-mentioned New Public Management movement aiming at higher efficiency within the public sector (Grossi and Reichard, 2008). As new form of service delivery, corporatization was touted as a panacea to address a "crisis of legitimacy, responsiveness and efficiency in government" (Thynne and Wettenhall, 2004, p.609). For some time now, however, enthusiasm has been waning and critical voices have been raised regarding accountability, achieved efficiency gains, or steering costs (Voorn et al., 2017). In light of this contentious debate, our study asks: Why do local governments create and reform public service companies despite the uncertain economic benefits and potential damage to service transparency and accountability?

We motivate our research hypotheses with the theoretical framework of economical and political transaction costs (Williamson, 1989, Epstein and O'Halloran, 1999). It suggests that political decision-makers will opt for the mode of service delivery which minimizes both types of transaction costs, whereas political transaction costs are those that can hurt the legislators' credibility and make re-election less likely. We use this theoretical frame to evaluate several potential drivers of corporatization. Our main focus lies on the reaction of local government corporatization intensity on fiscal hardship (H1), the economic orientation of political decision-makers (H2), and transparency-enhancing local government reforms (H3).

We test these research hypotheses with panel data from 34 cities in the German state North Rhine-Westphalia over the period 1998-2017. The dependent variable is corporatization intensity per city. To gather the necessary data, we descended into the city archives, analyzed 680 investment reports and extracted 11,062 year-firm combinations. This not only delivered a unique dataset that covers more years than any other empirical study published in this field so far. Even more importantly, it allows us to disentangle different levels of corporatization, that is corporatization

to directly-owned firms from corporatization to first- as well as from lower-tier subsidiaries. We exploit this data with a standard two-way fixed effects regression. As robustness check, we estimate the baseline model for a shorter sub-period.

The analysis delivers three major results. First, we can show that since 2004 the ongoing trend towards increasing corporatization intensity, which shaped the public debate, cannot be explained by the creation of additional, directly-owned public firms, but rather by increasingly complex subsidiary structures. Second, we show that many analyzed drivers of corporatization behave differently with respect to the analyzed level of corporatization. This implies that the creation of new, directly-owned companies follows a different rationale than creating first- and lower-tier subsidiaries of existing companies. Third, point estimates suggest that corporatization responds to fiscal hardship as well as to the mayor's economic orientation and that these effects are ambiguous with respect to the different analyzed levels of corporatization. Interestingly, corporatization intensity decreases over all levels with the implementation of most transparency-enhancing reforms. This is in line with the related hypothesis and may be explained by the decreasing attractiveness of corporatization as strategy to shift financial activities (including debts) out of the core budget as soon as the public or supervising authorities gain better insight.

Relevance for Practitioners

All three analyses provide a variety of empirical results that contribute to the current academic debate on municipal public finance in general and public accounting, fiscal regulation, and corporatization in particular. However, it is no less important to make these findings accessible for practitioners. Therefore, this last part of the introduction summarizes their practical relevance.

The main empirical result of the first chapter indicates that the implementation of the accrual accounting reform led to decreasing investment expenditure in reform municipalities. This is not only an important information for those governments which have not yet changed their mode of accounting but may plan to do so in the future. It is also a relevant finding for European administration. Currently, the European Commission is preparing the so-called EPSAS reform (European Public Sector Accounting Standards) which is an approach to fully implement harmonized accrual accounting standards in all governments throughout the European Union. Empirical evidence on reform effects may provide relevant arguments for the accompanying political discussion. Apart from that, it may inform the debate on how to deal with the German local public investment backlog which is a result of insufficient investment expenditure.

From the practical perspective, two central findings from the second chapter are suggested as being relevant for the discussion about financial endowment and fiscal regulation of municipalities. Among other things, the results indicate a deficit-

enhancing effect of higher transfer dependency. This finding supports the idea that local governments should enjoy a high share of own revenue sources over which they possess the discretion to decide. Increasing this share could potentially limit the identified detrimental impact of high transfers on local fiscal discipline. At the same time, however, this would mean that higher levels of government would forego opportunities for control. The second finding of practical relevance is that numerical fiscal rules show an effect as long as they are properly designed which puts increased responsibility on those national institutions which are in charge of rule implementation.

One central finding of the third chapter is that over the last two decades the experienced rising municipal corporatization intensity is based on increasingly complex ownership structures. For municipalities, and especially for medium-sized and large cities, this goes hand in hand with an ever-increasing control and monitoring effort. In addition, these complex but also large corporate structures can backfire on municipal budgets in times of economic crisis, as the owners are obliged to pay for deficits. These arguments are relevant in the practical discussion about the optimal degree of corporatization. Secondly, the empirical analysis shows that transparency-enhancing reforms are significantly related to lower levels of corporatization intensity. This finding can easily be linked to the discussion about shadow budgets, that is local financial activity outside the municipal core budget. Since shadow budgets are suspect of being used to hide debt, transparency-enhancing reforms seem to be viable means to enforce higher fiscal discipline among local governments. From this perspective, they may expand the toolbox of budget oversight institutions or higher levels of government which are interested in sound local government finances.

Chapter 1

Accrual Accounting and Local Government Investment and Divestment: A Matching Evaluation

1.1 Introduction[2]

In the mid-2000s, many local governments in Germany faced a widening gap between increasing responsibilities and lower financial support from higher levels of government (Ridder et al., 2005). One response has been to try to increase the efficiency of public service delivery by introducing new government instruments modeled on private-sector practices (Naschold and Daley, 1999). The reforms that followed relate to a broader movement in public administration called New Public Management (NPM) (Hood, 1991, 1995) and brought, among many other public sector innovations, the expansion of traditional cash or cameral accounting, which focuses only on cash flow, by accrual-based components, or the complete transition to accrual accounting, which is based on private sector style double-entry bookkeeping.[3] Public sector accrual accounting started in Anglo-Saxon countries in the 1990s (Adam, 2019) and was promoted by international organizations such as the IMF and OECD (OECD, 2017, Flynn et al., 2016, Ridder et al., 2005). By 2020, more than 70 percent out of close to 11,000 German municipalities had implemented the accounting reform.[4] To date, neither the federal level nor most German states have taken on accrual accounting which, from an international perspective, makes Germany an exception (OECD, 2017).

Among academics, accrual accounting in the public sector has always been a controversial issue, with heated debates about its relevance for decision-making (Kober et al., 2010). Several scholars relate major benefits to it, which can be subsumed under increased effectiveness, efficiency, transparency, and accountability (Lampe, 2017, Burth and Hilgers, 2014, Arnaboldi and Lapsley, 2009). Following this line of argument, accrual information discloses the financial situation of a government more accurately and consequently improves managerial and political decision making. Both enables a more efficient spending of public resources and therefore impacts positively on public service production efficiency (Burth and Hilgers, 2014). For the critics, Guthrie (1998) pointed out that accrual accounting's view on cost and efficiency and its "neoclassical" idea of performance might not be suitable for the public sector. From this perspective, cameralistic cash accounting provides sufficient information whereas accrual accounting is too complex to be used within the political-administrative system (e.g. Monsen, 2002, Brorström, 1998, Robinson, 1998, Mellett, 1997). Moreover, costs for implementing and running the new system can be substantial (Carlin, 2006). Following Weiss (2014), average fixed one-time transition costs for local governments in the German state Saxony-Anhalt ranged between EUR 100,000 and EUR 200,000 per government.

[2]I thank the participants at the 2020 Annual Congress of the International Institute of Public Finance as well as the participants of the Annual Congress of the 'Verein für Socialpolitik' in the same year. In addition, I thank the participants at the PhD student research colloquium at Freie Universität, Berlin

[3]For the different shades between pure cash and pure accrual accounting, see Flynn et al., 2016.

[4]For the cumulative development of reform implementation among German municipalities, see Figure 1.B.1 in Appendix 1.B.

Empirical research investigating the German accrual accounting reform is mainly based upon local government surveys (for a meta study, see Raffer, 2021). One general insight is that – from the perspective of German local practitioners – accrual data provides more transparency regarding the financial situation. The downside is, however, that this information is hardly used for government decisions in German local governments. Surveys in other countries come to similar conclusions.[5] Beyond the subjective perception of the reform by the surveyed practitioners it is worth asking whether the introduction of accrual accounting has an impact on more objective performance or financial indicators. In this paper, I hypothesize that the new mode of accounting changes incentives for local decision-makers when it comes to in- and divestments. I derive the hypotheses from the technical fact that the accrual accounting reform introduces depreciation to the local budget and makes asset sales less appropriate for budget balancing.

In a recently published literature review, Azhar et al. (2022) note a lack of high-quality research providing empirical evidence of the benefits of the reform. So far, only two studies have been published which employ quasi-experimental approaches to pin down causal effects of the reform on local government budget data – and both investigate the German case (Christofzik, 2019, Dorn et al., 2021). The authors find a significant reaction of budget figures to the reform.[6] My analysis adds to this emerging field by evaluating the effect of the accrual accounting reform using budget data from 1,100 municipalities in the German state of Baden-Württemberg. It is the first paper which implements a quasi-experimental approach with different matching techniques combined with the conditional panel Difference-in-Difference (DiD) estimator using data from a large number of municipalities located within one institutionally homogeneous region. It compares changes in investment in real assets and sales of real or financial assets in the years 2015 and 2016 in a set of municipalities that adopted accrual accounting in 2011 or 2012 with the change in these variables in matched municipalities that had not adopted accrual accounting before 2017. Results imply that accrual accounting reduced investment expenditure in buildings or roads by EUR 56-97 per capita depending on the year and the model. In addition, results point cautiously to lower revenue from selling financial assets among the reform municipalities after implementation compared to the control group. This contributes to a just-emerging understanding of how this large-scale public financial management reform alters the financial decision-making of local politicians and governments.

The article is structured as follows: Section 1.2 presents the institutional setting for the Baden-Württemberg accrual accounting reform and deducts research hypotheses

[5] See, e.g., Arnaboldi and Lapsley (2009) for Scotland, Cohen et al. (2013) for Greece, Kobayashi et al. (2016) for Japan, or Pilcher (2011) for Australia.

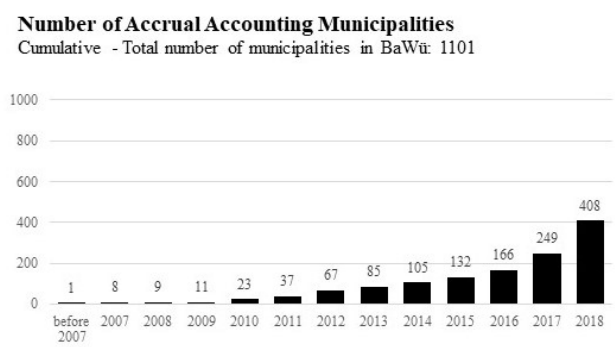
[6] Among other things, the results of Dorn et al. (2021) and Christofzik (2019) indicate decreasing investment expenditure and revenue from non-financial asset sales. For a brief summary of these findings as well as the findings of my paper, see Christofzik et al., 2020.

for this paper, section 1.3 rolls out the materials and methods. In sections 1.4 and 1.5 results are displayed and discussed; section 1.6 concludes.

1.2 Institutional Setting

In 2003, German state ministers of the interior decided to implement accrual accounting at the local level (IMK, 2013). By 2020, around 70 percent of all German municipalities had followed (for the cumulative share of reform municipalities in Germany from 2001 to 2020, see Figure 1.B.1, Appendix 1.B). Today, only the two German states Bavaria and Thuringia do not require their municipalities to apply accrual accounting. Since the ministers' agreement was based on each states' freedom to develop its own reform, nowadays there is some state-specific heterogeneity of accrual accounting practices at the municipal level (Hilgers et al., 2018). Consequently, analyses usually concentrate on single states with internally homogeneous institutions. In this study I focus on municipalities in Baden-Württemberg which show a cumulative transition pattern that is appropriate for causal analysis (see Figure 1.1). Moreover, they have not been the subject of previous studies.

The state law which obliged local governments to change the mode of accounting from cash to accrual by 2016 had passed the state parliament in 2009. Due to considerable inertia, a second law came into effect in 2013 that extended the transition period until 2020. In these early years, many municipalities in Baden-Württemberg were reluctant because they hoped to benefit from earlier adopters' experiences with the complex reform. In addition, there was a general lack of qualified personnel in public administration (Landtag von Baden-Württemberg, 2019, Hilgers and Burth, 2012). One can assume that those municipalities which were equipped with the required financial and human capital to do so implemented the reform first. Existing survey research underpins this assumption (Raffer, 2021). On the municipal level, it is the local council which has to take the decision to reform and the administration which is responsible for subsequent technical implementation.



Year of Reform	Transition	No Transition until 2017
2007	8	1100-249=851
2008	1	851
2009	2	851
2010	12	851
2011	14	851
2012	30	851
2013	18	851
2014	20	851
2015	27	851
2016	34	851
	Σ 249	

Figure 1.1: Although Baden-Württemberg has 1,101 municipalities, one was excluded since it only came into existence after 2009. Some pilot municipalities shifted their mode of accounting even before the law came into effect in 2009.

Following the Baden-Württemberg state ministry of the interior, switching from cash to accrual was a change of paradigms (Ministry of Interior Baden-Württemberg, 2019). Whereas the traditional cash accounting system differentiates between an investment-related capital budget and an operational budget, both focusing on cash flows (Ridder et al., 2005), the accrual system with double-entry bookkeeping produces three main statements: the balance sheet which covers assets and liabilities, the statement of cash flows, and the profit and loss statement which covers expense and revenue (KGSt and Bertelsmann Foundation, 2010). The results of the statement of cash flows and the profit and loss statement contribute to the balance sheet.

The reform shifts the focus from simple in- and outflows of cash when transactions are executed to a broader perception of public financial management that additionally considers resource consumption/depreciation as well as implicit debt (Hilgers et al., 2018). Depreciation, however, is only possible if the municipality knows about its assets and their value. Since a purely-cash-accounting municipality has no detailed valuation of assets, the first and most complex part of the reform is to take inventory. In many cases, this requires estimations and therefore offers some room for discretion (Christofzik, 2019).

Another relevant difference between cash and accrual accounting is the determination of the balanced budget. Whereas a cash-accounting municipality's budget is balanced as soon as all actual outflows of cash in a given period are covered by inflows in the same period, an accrual-accounting municipality's budget balance requires that available resources in each period fully cover resource consumption, which comprises net outflows of cash plus depreciation plus accruals made for future payment obligations (Budäus, 2009). This is represented by a balanced profit and loss statement, which municipalities in Baden-Württemberg must achieve in the medium term.[7] Survey research indicates that public financial managers perceive an accrual budget balance as harder to reach than a budget balance under cash accounting (e.g., Riemenschneider, 2014).

In this study, I am interested in the effects of the accrual accounting reform on two central budget variables: First, municipal investment expenditures and, second, revenues from asset sales. I build my expectation of potential effects upon the variables' changing impacts on the budget balance once cash accounting is replaced by its accrual counterpart. Figure 1.2 exemplifies the underlying mechanism with an hypothetical investment in a long-lasting machine that is bought in year one at a price of 2,000. It is assumed that the machine will depreciate linearly over ten years. Under cash accounting, only the actual payment of 2,000 in year one appears in the capital budget and counts for the budget balance. Under accrual accounting, however, in year one, the statement of cash flows shortens by spending 2,000 whereas the balance sheet does not change: the increasing asset position is fully counteracted by the decreasing cash position. In subsequent years, however, there is a yearly

[7] Following the state's municipal law (Gemeindeordnung für Baden-Württemberg, §80) the medium term is three years.

		Cash Accounting		Accrual Accounting		
		Operating Budget (VwH)	Capital Budget (VmH)	Balance Sheet	Profit and Loss Statement	Statement of Cash Flows
Acquisition of investment good	Costs of Euro 2000		-2000	+2000 -2000		-2000
Annual	Depreciation				-200	
Sale of investment good after six years	Revenue of current value (800)		+800	-800 +800		+800

Figure 1.2: Differing systematics of investment expenditure, depreciation, and sales revenue in cash versus accrual accounting (Ministry of Interior Saxony, 2019, p.8).

depreciation of minus 200, which is a future annual burden for the profit and loss statement and its balance.

For local decision-makers this might change the incentives to invest. On the one hand, it might create a stimulus to drop or defer investments since future burdens to the budget balance increase the likelihood of future deficits which voters tend to punish in election years (Drazen and Eslava, 2010, Brender and Drazen, 2008, Brender, 2003). Offsetting those deficits by reducing services or increasing taxes is equally unattractive. On the other hand, under accrual accounting the budget balance is not exposed to a one-time high burden as it was under cash accounting but to lower and evenly spread-out burdens in the future – a future in which a decision maker may not be held accountable anymore. This relates to the popular idea of a deficit bias as outlined by, e.g., Wyplosz (2013). And, finally, implementation costs of the reform (Dorn et al., 2021) may limit the resources for investment in the immediate years after implementation, which may cause investments to drop at least temporarily. However, average reform costs per local government range between EUR 100,000 and 200,000 (Weiss, 2014) and this sum appears to be manageable for municipal budgets. Therefore, in my first hypothesis I concentate on the political economy argument that politicians usually prefer to defer the recognition of spending for which accrual accounting provides the means. This brings me to expect that the shift towards accrual accounting impacts positively on a local government's investment behavior:

Hypothesis 1: *The implementation of accrual accounting leads to increasing municipal investment expenditures.*

The second reform effect I am interested in relates to revenues from assets sales. Referring to the example above, the machine is sold after six years for a price reflecting its remaining value of 800. In a cash-accounting municipality, this creates a positive inflow of cash in the capital budget in year six, nothing else. For an accrual accounting municipality, however, the inflow of cash in the statement of cash flows in year six is offset by decreasing assets in the balance sheet. Hence, whereas revenues from asset sales in the cash-accounting municipality could be fully used to balance a budget deficit, this option becomes impossible once a municipality switches to accrual accounting because the transaction does not show up in the profit and loss budget as long as the asset is not sold at a price higher than its current value (in this case, only the margin would contribute to budget balancing). Consequently, local politicians may experience a weaker incentive to sell assets after the reform. In my second hypothesis, I expect decreasing revenues from asset sales after the reform.

Hypothesis 2: *The implementation of accrual accounting leads to decreasing municipal revenues from asset sales.*

1.3 Material and Methods

I test these hypotheses with a panel of annual data (2005 to 2016) from 1,100 municipalities in Baden-Württemberg. Dependent variables of interest (hereafter abbreviated to 'VOI') are municipal investments in movable and immovable assets as well as municipal revenues from sales of movable, immovable, and financial assets. Data was provided by the Baden-Württemberg Bureau of Statistics. Since a municipality reports accrual instead of cash-accounting data after the reform, the Bureau of Statistics re-transforms this into the former cash-accounting equivalent. Considering the error-proneness of municipal reporting immediately after implementation of the new practices, data from the first one to two years after the reform needs to be handled with caution. To prevent results from being driven by municipalities with extreme developments, outliers were deleted.[8]

The choice of explanatory variables which potentially determine both the likelihood of reform and the VOI comprise fiscal, socio-economic, and political economy covariates. Fiscal variables are relevant because reform cost is a potential factor driving implementation (Weiss, 2014, Articus et al., 2011, Ridder et al., 2005). I include the primary balance, total municipal debt, gross business tax, total expenditure (all measured in per capita terms) and the age ratio[9] which depicts expenditure needs to account for the fiscal situation prior to the reform. The number of inhabitants is relevant since research suggests that larger municipalities have more well-trained

[8] A municipality is defined as an outlier in a certain VOI if its 2010-2015 change lies beyond 1.5 times the interquartile range of the distribution of changes added at the first and the third quartile (Tukey, 1977). All findings of this study are robust with respect to this procedure. Outlier deletion only compresses the results.

[9] Inhabitants older than 65 as share of all inhabitants aged between 20 and 65.

employees at their disposal who are capable of implementing accounting innovations (Christensen, 2007). Finally, I consider the share of leftist seats in the council as well as voter turnout in the election prior to the reform. Solé-Ollé (2006) and others suggest that government ideology has an impact on policy diffusion and budgetary outcomes. In addition, I assume stronger demand for transparency-enhancing reforms like the accrual accounting reform in municipalities in which relatively more inhabitants care for local politics.

Table 1.1 provides summary statistics for those 44 municipalities which switched from cash to accrual accounting in the two (financial) years 2011 and 2012 (treatment group) compared to the 851 municipalities (group of non-treated municipalities) which haven not implemented the reform until 2017 (see also Figure 1.1). In my analysis, I focus on the reform years 2011 and 2012 since these years lie within an institutionally stable period between the implementation of the law in 2009 and its adaption in 2013. Table 1.1 reveals that reform municipalities of 2011 and 2012 were on average larger in population size and had accumulated higher levels of public debt per capita in 2010 compared to non-reform municipalities. Moreover, higher levels of net business tax revenue per capita indicate more intense economic activity. Whereas voter turnout in the local elections prior to the transition was lower in reform municipalities, the share of council seats won by left-wing parties was higher. Summarizing these differences, in 2011 and 2012 the more urban parts of Baden-Württemberg transitioned to accrual accounting. In the identification strategy, I account for these determinants of self-selection.

	Treated (44)	Untreated (851)
Inhabitants 2010	34012	6237
Age Ratio 2010	32.53	31.55
Voter Turnout	52.08	57.77
Leftist Share 2010	27.87	15.12
Business Tax Revenue 2010 (pc)	361.8	299.2
Municipal Debt 2010 (pc)	1079.64	629.69
Municipal Expenditure 2010 (pc)	2719.59	2585.97
Primary Balance 2010 (pc)	-27.31	-42.57

Table 1.1: Covariate means of treated and untreated municipalities in Baden-Württemberg before outlier deletion and matching.

With reference to the standard Rubin Causal Model (Rubin, 1974), I am interested in the average treatment effect on the treated (ATT) which is the average effect of switching to accrual accounting on those municipalities which effectively reformed. The identification strategy is based on the idea of comparing the post-reform devel-

opment of the VOI in the group of reform municipalities with a group of most similar control municipalities which I select from the 851 non-treated. For this selection, I use propensity score matching (Rosenbaum and Rubin, 1983). Propensity scores are estimated with a logit regression and can be interpreted as the individual probabilities of reform implementation conditional on relevant observed characteristics including covariates of Table 1.1, measured in 2010, as well as all available pre-treatment years of the respective VOI (Austin, 2011). The logit regression is specified as follows:

$$y_i = \beta_0 + \beta_{1k} * VOI_{ik} + \beta_{2j} * X_{ij} + \epsilon_i \tag{1.1}$$

in which y_i is a 0/1 dummy indicating treatment of municipality i and VOI_{ik} is the model-specific variable of interest in all k available pre-treatment years. In the first model, the VOI is aggregate municipal investment in movable plus immovable assets, in the second model it is only investment in immovable assets and the third model captures only movable assets. The fourth model's VOI is aggregate revenue from sales of immovable, movable and financial assets; models 5, 6, and 7 zoom into the three components separately. Vector X_{ij} contains all j remaining covariates, measured pre-treatment in 2010. Model specification followed the rationale of reaching the highest possible level of covariate balance, i.e. similarity, of treated and controls.

Matching upon propensity scores mitigates the selection on observables problem. It does not, however, account for a potential simultaneous impact of unobserved variables upon reform propensity and outcome variable which would bias the ATT. For this reason, I conduct a Rosenbaum sensitivity analysis (Keele, 2010, Rosenbaum, 2002) which indicates the likelihood of existence of unobserved variables. Moreover, I implement the conditional panel Difference-in-Difference estimator (Caliendo and Kopeinig, 2008, Smith and Todd, 2005, Heckman et al., 1997) which accounts for potential time-invariant unobserved variables. For robustness reasons, I apply three different propensity score matching techniques which differ in the way they assign control municipalities to treated ones: nearest neighbor (NN) with replacement, NN without replacement as well as matching with a caliper distance (Austin, 2011, Rosenbaum and Rubin, 1985). For ensuring appropriate matching, I calculate several measures of quality.[10] In addition, I repeat the matching exercise with a maximum entropy reweighting scheme (Hainmüller, 2012) which is outlined in Appendix 1.C

The ATT was retrieved by mean comparison; inference was taken with a paired t-test (Austin, 2011). I calculate the ATT for the years 2015 and 2016 but not for earlier post-treatment years since official budget data is prone to errors in the immediate years after the reform. For the conditional Difference-in-Difference estimate, I implement the following panel-model:

[10] Minima/maxima comparison and visual inspection of propensity score distribution, post-matching mean convergence, t-testing mean differences, standardized bias improvement following Rosenbaum and Rubin (1985) and Pseudo-R2 comparison (Sianesi, 2004).

$$y_{it} = \beta_0 + \beta_1 * treat_i + \beta_2 * time_t + \beta_3 * treat_i * time_t + \epsilon_{it} \tag{1.2}$$

in which y is now the VOI for municipality i in year t. The variable $treat_i$ is a 0/1 treatment dummy for each municipality, with 1 for treatment and 0 otherwise. The variable $time_t$ is a dummy for each year t indicating post-treatment years with 1 and pre-treatment years with 0. Finally, the coefficent β_3 of the multiplicative term $treat_i * time_t$ is the conditional DiD estimator, 'conditional' since sample selection is conditional on the covariate set imposed in the propensity score estimation. As the estimation uses matched data, there is no need for additional covariates. For the conditional DiD estimator, the two treatment years 2011 and 2012 were combined to one period which assumes the absence of fundamental structural changes that impacted on the VOIs in these two years. Considering the accrual accounting history of Baden-Württemberg, this seems to be justified. Estimation was implemented with robust standard errors.

1.4 Results

1.4.1 Matching on the Propensity Scores

Although the concrete coefficients of the logit model for propensity score estimation are of minor relevance for matching success, they indicate that especially municipality size matters for the likelihood to reform (see Tables 1.B.1 and 1.B.2 in Appendix 1.B). More important is that propensity scores are distributed similarly among treated and controls. Over all models, these distributions show a sufficient degree of overlap. For illustration, see Figure 1.3 covering Models 1 and 4.

The success of the matching exercise was evaluated by the degree of convergence of covariate means between the groups of treated and matched non-treated municipalities. Since seven models times three matching methods makes 21 outputs of covariate balance, this paper only provides results for the aggregate Model 1 (see Table 1.2) and for the aggregate Model 4 (see Table 1.B.3 in Appendix 1.B). The balance situation for the remaining matching exercises is sufficient, too.

One relevant pair of means (treated versus controls) presented in Table 1.2 describes convergence in municipality size. As seen above (Table 1.1), the raw data before matching revealed an average population of 34,012 for reform municipalities and only 6,237 for non-reform municipalities. After matching with propensity scores estimated for the VOI aggregate investment, the average city size of the 40 remaining treated municipalities lies at 21,222 inhabitants whereas the average of the 40 control group municipalities lies at 20,663 inhabitants. This balance improvement shows that now cities of equal size are compared. Moreover, balance improves in total debt per capita, the age ratio, and the two political variables – leftist share and voter turnout in the most recent election prior to the reform.

	Means Treated	Means Control	Abs. Conv.	Std. Bias Reduct.	T-test (p-value)
Investment p.c. 2005	168.94	181.82	49.17	25.27	0.579
Investment p.c. 2006	192.36	189.73	66.8	38.59	0.916
Investment p.c. 2007	211.95	205.63	65.33	34.02	0.809
Investment p.c. 2008	239.91	224.71	48.78	27.96	0.604
Investment p.c. 2009	291.54	287.94	62.71	34.15	0.915
Investment p.c. 2010	283.87	261.47	29.13	14.8	0.508
Primary Bal. 2010	-37.28	-19.14	-16.39	-9.8	0.540
Total Exp. p.c. 2010	2573.96	2626.99	-19.06	15.91	0.689
Total Debt p.c. 2010	973.15	1041.48	267.64	59.96	0.709
Bus. Tax Rev. p.c. 2010	336.6	379.7	-3.68	5.96	0.520
Age Ratio 2010	32.53	32.27	0.65	12.41	0.778
Inhabitants 2010	21222.43	20662.7	14118.7	70.11	0.903
Leftist Share	26.31	28.11	8.63	62.07	0.623
Voter Turnout	52.96	51.37	2.82	48.38	0.295
pseudo-R^2	McFadden (before)	0.2185		Control	Treated
	McFadden (after)	0.0645	All	607	40
			Matched	40	40
			Unmatched	567	0

Table 1.2: Model 1 – Aggregate investments in movable and immovable assets, per capita: Evaluation of covariate balance after propensity score matching (NN w/o replacement). Absolute Convergence and Standardized Bias Reduction take the raw data without outliers as base.

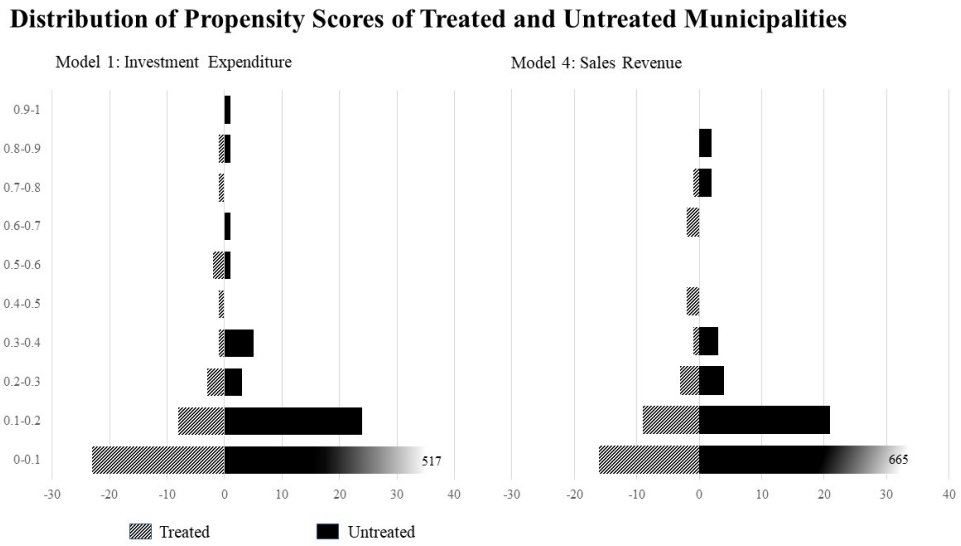


Figure 1.3: Distribution of propensity scores estimated for Model 1 (VOI 'aggregate investment', left panel) and Model 4 (VOI 'aggregate revenue from non-financial/financial asset sales', right panel).

Notably, there is a slight absolute divergence in the variables primary balance, total expenditure and business tax revenue (all measured in 2010 and in per capita terms). This is not an uncommon phenomenon in propensity score matching (Hainmüller, 2012). The magnitude of divergence is so small, however, that treated municipalities can still be compared to control group municipalities, which is supported by insignificant t-test results for all mean differences after matching. In addition, the Pseudo-R2 comparison shows a level of 0.2185 before matching which decreases to 0.0645 when re-estimating the specification with the matched sample. Evaluated with the standardized bias, which considers the first and the second moment of distribution, the primary balance remains the only covariate with a marginally deteriorating bias. To sum up, matching has sufficiently removed the impact of observable covariates on the propensity to reform.

1.4.2 ATT and Conditional DiD Estimator

This analysis focuses on ATTs for 2015 and 2016 as well as the conditional DiD estimator (see Tables 1.3 and 1.4). In Model 1, I analyze the VOI 'aggregate investment in movable and immovable assets' and Model 2 captures its component 'investment in immovable assets' which, for the municipal level, is investment in buildings, roads, etc. ATTs for 2015 and for 2016 are significant and similar in magnitude over different variants of the matching algorithm. Interpretation of the ATT of -70.09 generated with caliper matching in Model 2 for 2016 is as follows: Due to reforming from cash to accrual accounting in the years 2011 and 12, municipalities spent an average of EUR 70.09 less per capita in 2016 on immovable assets than

they would have spent had they not implemented accrual accounting but stayed in the cash accounting mode.

	Matching Algorithm	ATT (2015)	ATT (2016)	DiD
VOI 1	NN without replacement	-56.24	-97.39**	-73.69***
	NN with replacement	-64.68*	-94.36**	-75.38***
	Caliper	-59.26*	-93.71**	-64.54***
VOI 2	NN without replacement	-56.17*	-58.86*	-55.40***
	NN with replacement	-62.29**	-66.04**	-55.76***
	Caliper	-62.99*	-70.09**	-92.57***
VOI 3	NN without replacement	0.29	-5.88	-1.21
	NN with replacement	0.45	-5.21	-1.26
	Caliper	-0.92	-9.53*	-1.57

Table 1.3: Average treatment effects on the treated (ATT) and conditional Difference-in-Differences effects (DiD). VOI 1: Model with total investment p.c. as dependent variable; VOI 2: Model with investment in immovable assets p.c.; VOI 3: Model with investment in movable assets p.c. ATTs are mean differences in the matched sample; inference was taken by a paired t-test. Panel DiD results with robust standard errors; dependent on the respective model, number of matched municipalities varies from 73-80. Significance levels: $p < 0.1^{*}, p < 0.05^{**}, p < 0.01^{***}$

Two remarks to these results: First, since effects for the different VOI stem from independent matching analyses, the effects of Model 2 and Model 3 do not add up to the effects of Model 1. However, the fact that the only significant coefficient of Model 3 (caliper, ATT 2016: -9.53) has the same sign as its Model 2 equivalent (caliper, ATT 2016: -70,09) indicates the aggregate nature of VOI 1. Second, the 2016 ATT for VOI 1 estimated with nearest neighbor matching without replacement (-97.39) was disentangled for both years. This helps to underpin the assumption that the presented ATTs are linked to the accruals reform and do not depend on an unconsidered other event that only happened to the subset of the 2011 or the 2012 reform municipalities. It shows that the effect is based upon a treatment group with 12 municipalities having reformed in 2011 and 28 municipalities having reformed in 2012.[11] Whereas the 2016 ATT for the reform municipalities of 2011 is -54.14, the 2016 ATT for the reform municipalities of 2012 lies at -115.92. The weighted average matches the presented ATT of -97.39. Disentangling the effect for 2011 and 2012

[11]The remaining four municipalities in the group of 44 dropped out during data preparation (outlier deletion, min-max comparison).

reform municipalities strengthens the assumption of the absence of an unobserved one-time event.[12]

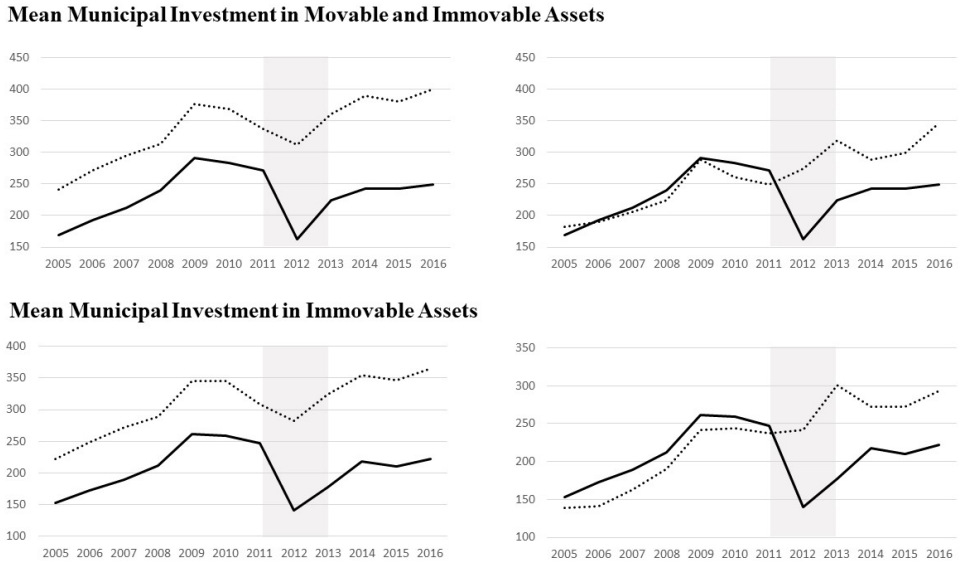


Figure 1.4: Development of municipal investment expenditure (in EUR per capita) from 2005 to 2016 for treated (solid line) and untreated (dotted line) municipalities before matching (left panel) and for treatment (solid line) and control group (dotted line) after matching (right panel).

Figure 1.4 provides the graphical representation of municipal investment behavior for VOIs 1 and 2: The two right panels show the development in treatment and control groups in the pre- and post-treatment years for the matched sample. The pre-treatment similarity after matching supports the common trend assumption necessary for the DiD-estimator (Angrist and Pischke, 2009). The 2016 gaps between the solid and the dashed line represent the 2016 ATTs. The graphs illustrate that the ATT does not solely consist of decreasing average investment expenditures of treated municipalities after the reform but, to an even larger extent, of increasing average investment expenditures of control group municipalities. The 2016 ATT of Model 1 retrieved by nearest neighbor matching without replacement (-97.39), for example, results from a 12.39 percent decline of investment expenditure of the average treatment group municipality from 2010 (EUR 283.87 p.c.) to 2016 (EUR 248.68 p.c.) plus a 32.36 percent increase in the average control group municipality.

The two right figures for the matched sample also show that the lower investment of treated municipalities after the reform cannot be explained by a relatively higher investment activity (and consequently a lower investment gap) compared to the control group prior to the reform. This means that self-selection of municipalities with lower investment needs can be excluded.

[12]Further support comes from the estimation of 2016 ATTs for municipalities which adopted the reform in 2013. Sign and magnitude of estimated ATTs fit to the results presented in Tables 1.3 and 1.4. Explicit results are not part of this paper since in 2013 the institutional setting changed (the transition period was extended) which presumably had an impact on the composition of the group of 2013 reform municipalities.

The central implication of the DiD results which range for Model 1 between -64.54 and -75.38 is that they are within an acceptable range compared to the respective ATTs and that they show the same sign. That is, once the analysis accounts for time-invariant unobserved covariates the results hold. ATTs as well as conditional DiD estimates are insignificant for investment in movable assets (VOI 3).

The results for revenues from asset sales after the reform (Models 4 to 7) are not as clear and lack robustness (see Table 1.4). The partial significance of the ATTs of Model 6 (revenue from movable assets sales) and Model 7 (revenue from financial asset sales) indicate a negative effect of the reform. However, regarding Model 7 it is worth to mention that only a few municipalities have revenue from financial assets and, therefore, this result must be interpreted with caution.

	Matching Algorithm	ATT (2015)	ATT (2016)	DiD
VOI 4	NN without replacement	-39.43	-30.24	-15.21
	NN with replacement	-37.25	-23.35	-9.42
	Caliper	-26.55	-19.52	-18.37
VOI 5	NN without replacement	-46.29	-21.87	-12.29
	NN with replacement	-39.41	-20.59	-9.19
	Caliper	-29.32	-15.91	-15.31
VOI 6	NN without replacement	-0.18	-0.59*	-0.14
	NN with replacement	-0.09	-0.53	-0.13
	Caliper	-0.07	-0.83	-0.35*
VOI 7	NN without replacement	-3.27**	-0.94*	3.26
	NN with replacement	-3.24**	-0.94*	2.59
	Caliper	-6.45*	-2.29	-5.22

Table 1.4: Average treatment effects on the treated (ATT) and conditional Difference-in-Differences effects (DiD). VOI 4: Model with total revenue from immovable, movable and financial asset sales p.c. as dependent variable; VOI 5: Model with revenue from immovable asset sales pc; VOI 6: Model with revenue from movable asset sales p.c. VOI 7: Model with revenue from sales of financial assets p.c. ATTs are mean differences in the matched sample; inference was taken by a paired t-test. Panel DiD results with robust standard errors; dependent on the respective model, number of matched municipalities varies from 52-82. Significance levels: $p < 0.1^{*}, p < 0.05^{**}, p < 0.01^{***}$

1.4.3 Sensitivity Analysis and Further Robustness Tests

To cope with unobserved time-varying covariates which might cause biased results, significant ATTs of Models 1 and 2 were subjected to sensitivity analysis following Rosenbaum (2002) (see Table 1.5). Column 4 for Model 1 shows upper bounds for the p-value of the 2016 ATT given increasing levels of Γ.[13] Results show that Γ may rise until a level of 1.5 and the p-value would still be below the critical 0.1 level. In terms of interpretation, a Γ of 1.5 means that it would be possible to have omitted an unobserved but relevant covariate that increases the odds of being treated by the factor 1.5. That is: A highly important unobserved covariate would be necessary to render the measured effect on investment expenditure insignificant. It seems rather unlikely that such an important driver is unknown and was therefore neglected. Two obvious candidates, reform perception of decision-makers and geographical neighboring effects, are discussed in detail in Appendix 1.A.

	ATT 2015		ATT 2016	
	Γ	P-Value	Γ	P-Value
Model 1	1	0.062	1	0.012
	1.1	0.096	1.1	0.021
	1.2	0.136	1.2	0.034
			1.3	0.049
			1.4	0.069
			1.5	0.092
			1.6	0.118
Model 2	1	0.027	1	0.042
	1.1	0.046	1.1	0.068
	1.2	0.071	1.2	0.102
	1.3	0.102		

Table 1.5: Results sensitivity analysis. Γ represents the factor by which two units in the matched sample might differ in treatment probability due to unmeasured covariates.

In addition, ATTs were re-estimated with entropy balancing following Hainmüller (2012). By estimating matching weights with a maximum entropy scheme, this technique differs from propensity score matching. As central advantage there is no longer the propensity score matching tradeoff between improving balance for certain covariates at the cost of deteriorating it for others. Entropy balancing improves balance for all included covariates. Regarding the results, relevant ATTs for VOIs 1 and 2 range at similar levels as they did under propensity score matching and the 2016 ATT for Model 3 turns significant (Table 1.6). Also, the findings for asset sales find support (VOIs 4-7). This strengthens the robustness of the effects presented above.

[13] A subject in a matched sample is by the factor $\Gamma > 1$ more likely to select into treatment than another subject because they differ in unobserved factors.

	ATT (2015)	ATT (2016)
VOI 1 (Aggregate investments p.c.)	-72.57***	-88.56***
VOI 2 (Investment immov. assets p.c.)	-69.19**	-80.66***
VOI 3 (Investment mov. assets p.c.)	-2.14	-8.81***
VOI 4 (Aggregate sales rev. p.c.)	-18.53	-5.75
VOI 5 (Sales immov. assets p.c.)	-10.63	-1.32
VOI 6 (Sales mov. assets p.c.)	-0.13	-0.34*
VOI 7 (Sales financial asset p.c.)	-6.83*	-1.51**

Table 1.6: ATT – Entropy Balancing. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

1.5 Discussion

Results do not support Hypothesis 1 (*The implementation of accrual accounting leads to increasing municipal investment expenditures.*). After the reform, municipalities invest on average significantly less in immovable assets compared to their control group counterparts. In interpretative terms, this means that they invest less than they had invested had they not implemented accrual accounting. This unexpected result may be explained by the changing over-time distribution of financial burdens after investment due to depreciation which seems to change incentives for political decision-makers at the local level. In this vein, mayors appear motivated to avoid future budget deficits (or counteracting adjustments of service levels or local taxes) since this could lead to a loss of voter support (Drazen and Eslava, 2010, Brender and Drazen, 2008, Brender, 2003). As the empirics of Baden-Württemberg mayors show, they usually keep their positions for many years, sometimes even over decades (see Appendix 1.A). Hence, their decision-making is likely to take long term consequences into account.

Unlike cash accounting, financial information provided by accrual accounting puts more emphasis on long-term consequences of municipal investment plans (Articus et al., 2011). This focus on depreciation is not only a pure technicality but one of the most important advantages linked to the reform. From the perspective of public infrastructure quality, the reform is therefore rather supposed to spur investment than to limit it (Christofzik et al., 2020). After all, depreciation makes deterioration

of infrastructure visible in the budget.[14] Following this line of argument, the results could be linked to the widely discussed German local public investment gap (Raffer and Scheller, 2022, Gornig, 2019, Bach et al., 2013). Consequently, it is not clear if the implementation of accrual accounting on the German state or the federal level would increase or rather limit public invesment (Christofzik et al., 2020). At the same time one additional idea is at least worth considering: Under the assumption that less important investments are skipped first, the indicated behavioral change might also be interpreted as an increase of fiscal responsibility.

As an alternative explanation for the identified effect on investment, reform costs might be considered. Since reform municipalities face certain expenditures for implementing accrual accounting, scope for investments in subsequent years could be limited as suggested by Dorn et al., 2021. However, this effect should drive down investments in the immediate post-reform years. After five years, which represents one electoral cycle, it should have phased out and the 2016-ATT is likely to be unaffected. In addition and as mentioned above, average reform costs of EUR 100,000 to 200,000 (Weiss, 2014) appear to be manageable for municipal budgets.

Since ATTs and DiD estimates for VOI 4 to VOI 7 are not overly robust, there is only limited support for Hypothesis 2: *The implementation of accrual accounting leads to decreasing municipal revenues from asset sales.* Although being consistent in their negative signs, all ATTs for revenues from immovable asset sales and most ATTs for revenues from movable assets are insignificant. Compared to that, almost all ATTs for revenues from financial asset sales are significant. The negative direction of the effects cautiously points to the idea that implementing accrual accounting spoils the strategy of selling assets so as to balance the budget. This is consistent with the theoretical considerations presented above. Selling an asset under accrual accounting only leads to changes in the profit and loss statement if there is a positive margin between the actual price of the sold asset and its book value. Since under cash accounting the full price of the good accounts as revenue the reform seems to make selling it for budget balancing less attractive.

The generally weak results regarding Hypothesis 2 may be explained with the financially sound condition in which municipalities in Baden-Württemberg are due to the decade-long striving economy in the German southwest. There may simply have been no need to sell assets in order to balance budgets during the economic boom years 2015 and 2016. As existing empirical research shows, there are similar but more robust results for local governments in other German states which suffer from more fragile financial conditions (Christofzik, 2019).

In sum, these findings corroborate recently published work by Dorn et al. (2021) and Christofzik (2019). Both studies investigate effects of the German local government accrual accounting reform on budget data. Since Dorn and colleagues cover Bavarian counties and Christofzik analyzes local governments in all German

[14] It needs mentioning, however, that the used investment data does not include public expenditures for infrastructure maintainance.

states (except city states) with the help of aggregate data, my study is the first one which analyzes reform effects on municipalities with microdata stemming from one institutionally homogeneous region. That results of Dorn et al. (2021) and Christofzik (2019) go in a similar direction indicates that the findings in this study are relevant not only for the treated municipalities in Baden-Württemberg but for all municipalities which replaced cash with accrual accounting in Germany and beyond.

One limitation of this study is that the group of analyzed reform municipalities compared to the control group is relatively small. This is partially alleviated by the fact that the group of non-reform municipalites in the years 2015 and 2016 was rather large which made it possible to identify and to assign highly appropriate control municipalities. Still, future empirical research in this field should try to take larger groups of reform municipalities into account.

1.6 Conclusion

The local government accrual accounting reform is a prominent topic among public administration practitioners as well as local public finance and accounting scholars. Although controversially discussed for decades, empirical evidence of reform effects on local budgets is still scarce. This paper is one of the first contributions to close this gap. For this purpose, municipal data of the German state of Baden-Württemberg for the years 2005 to 2016 was analyzed in an observational study. It exploits the slow but successive transition of municipalities into accrual accounting since 2009. Several propensity score matching algorithms were used to estimate average treatment effects on the treated for investment expenditure and local government revenues from asset sales.

Results provide support for the hypothesis that the reform changes local decision-makers' investment behavior and dampens expenditures on immovable assets like buildings or roads. One potential explanation is that accrual accounting introduces annual depreciation and therefore emphasizes future financial burdens to the budget balance caused by todays' investments. Considering the medium-to-long-term perspective of local politicians towards future local elections this might change mindsets and investment decisions. In addition, results on local government revenue from asset sales point cautiously to decreasing revenues from movable and financial assets after the reform. This is in line with the theory since the new mode of accounting considers public assets which previous cash accounting did not and therefore renders sales for short-lived deficit balancing less attractive.

Despite similar general patterns, concrete standards of accrual accounting are not entirely homogeneous within Germany and beyond. This is a limitation for cross-state and even more cross-country analyses as well as a fundamental problem for Eurostat government finance statistics. Therefore, the European Commission is currently preparing the so-called EPSAS (European Public Sector Accounting

Standards) reform, which is an approach to fully implement harmonized accrual accounting standards in all governments throughout the European Union. From this perspective, empirical evidence on reform effects may provide relevant arguments for the accompanying political discussion.

In addition, the results of this paper may motivate more rigorous empirical investigation of the accrual accounting reform in future. Although it consumed uncounted billions of public money all over the world which could have been spent for other, maybe more welfare-enhancing purposes, we still cannot sufficiently answer the question of whether the reform lives up to its promises. Latest empirical results in this and other papers indicate changes in financial behavior once accrual accounting is implemented but there is still a lot of work to be done.

1.A Appendix A

Selection on Unobservables

From Italian survey literature (Anessi-Pessina et al., 2008) we know that potential drivers of the decision to switch from cash to accrual accounting at the local level are geographical location and preparers' perception, which is the attitude or openness towards budget innovations within the municipal financial department. The analysis of geographical patterns among reform municipalities in 2012 shows no distinct clusters which would point to neighboring effects (Figure 1.A.1).

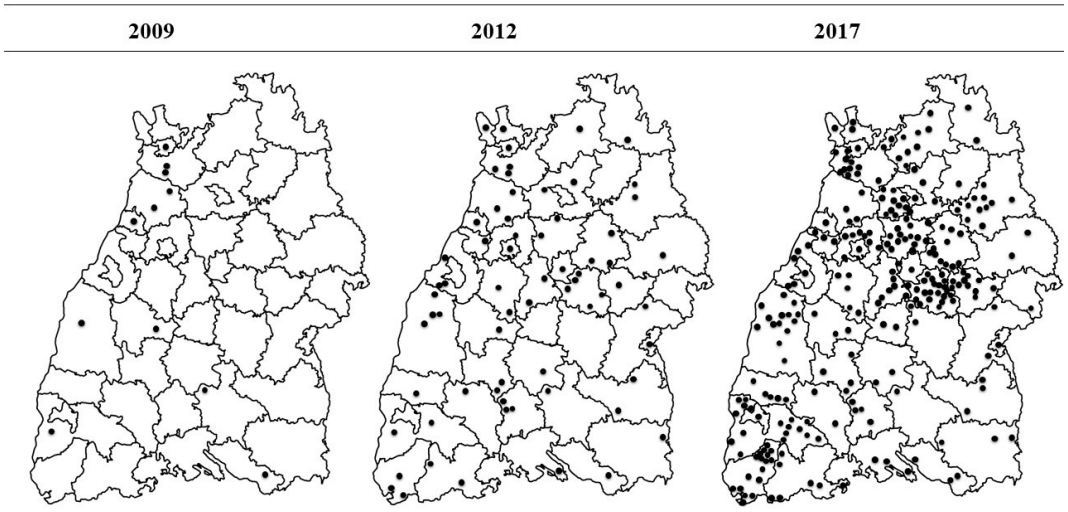


Figure 1.A.1: Geographical distribution of reform municipalities in the years 2009 (year in which the accrual accounting state law came into effect), 2012 and 2017 in Baden-Württemberg. The 2009 reform municipalities are early adopters/pilot municipalities. The 2012 map shows that in the first years distinct clusters of reform municipalities are widely absent. This indicates the irrelevance of spatial neighboring effects for matching.

Reform perception or openness towards budget innovations, however, is harder to observe but potentially influential for both the reform probability and the budget outcome variables. Based on existing literature and additional empirical analysis, two arguments challenge this presumed impact. First, one may question that the innovation openness of local decision-makers shows much variation over time. Managerial staff in municipal finance departments do not usually hop from job to job but stay there for many years (Christiaens and Van Peteghem, 2007, Kobayashi et al., 2016). To confirm this with data from Baden-Württemberg, publicly available accrual accounting survey responses from municipalities in two districts from the year 2012 were analyzed.[15] Among the 31 respondents who in 2012 held relevant positions in the local finance department, 24 still had their job in 2019 and two of

[15]The survey was conducted as part of a published thesis at the University of Applied Sciences Ludwigsburg, Author: Elisabeth Lohr.

those who were no longer in their position had left after at least 12 years in office. Twenty-nine respondents were mayors in 2012 and 18 of them were still in office in 2019; among the 11 who dropped out eight did so after 12 to 36 years of incumbency. Hence, the conditional DiD estimator should account for practitioners' time-invariant long-term attitudes toward innovation.

Second, it is not clear whether the reform perception of decision makers is a good predictor for transition probability. This, for example, is suggested by the results presented by Christiaens and Van Peteghem (2007) and Kobayashi et al. (2016) who find no impact of the local treasurers' education and (business accounting) experience on the state of reform implementation/usage of accrual information in Flemish and Japanese municipalities. Support also comes from Gärtner (2014) who tried to overcome the issue of selection into the accruals reform due to municipal openness towards accounting innovation in the German state of Lower-Saxony by conducting post-econometric expert interviews. The results provide qualitative indication that innovation openness is no major reason to self-select into the accrual accounting reform. To a certain extent, these findings stand in opposition to the results of Anessi-Pessina et al. (2008). Hence, the picture is at best inconclusive. In the case of Baden-Württemberg, a point can be made by analyzing the above-mentioned survey responses from 2012. Municipal decision-makers were asked whether – if they had the choice – they would opt for cash or accrual accounting. The answers are revealed preferences of identifiable local decision-makers in the actual sample of this study given in one of the two analyzed treatment years. These preferences were compared with reform implementation within the subsequent six years (until 2018). Figure 1.A.2 shows the results

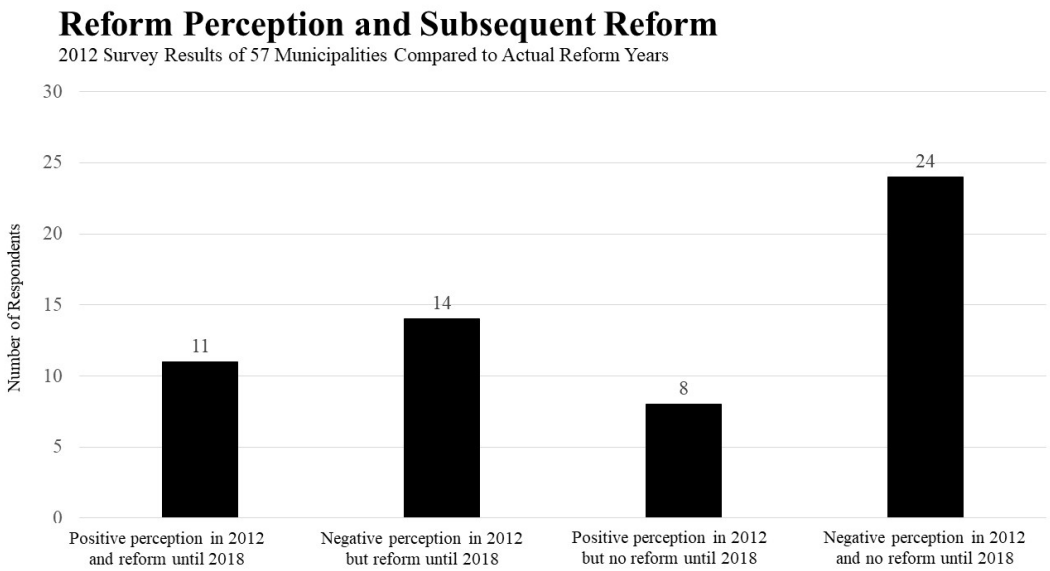


Figure 1.A.2: Revealed reform perception in 2012 compared to reform status in 2018. Total number of surveyed municipalities: 62. Answers of five municipalities were either inconclusive or excluded since they had reformed before 2012. The survey was conducted as part of a thesis at the University of Applied Sciences Ludwigsburg, Author: Elisabeth Lohr.

Around 61.4 percent (or 35 respondents) show consistent behavior according to their revealed preference. That is, in 2012 they had either revealed a positive perception of the accruals reform and switched in subsequent years or they had revealed a negative perception and then did not reform until 2018. Around 38.6 percent (22 municipalities) behaved opposite to the revealed preference of the answering local decision-makers. Either they had revealed a positive preference and did not reform until 2018 (eight municipalities) or they had revealed a negative preference and reformed thereafter (14 municipalities). This indicates that the relation of reform perception on transition probability is far from perfect and that the described selection on unobservables problem based upon reform perception is a minor concern in this study. But even in the event of being relevant, the unobserved covariate should be rather time-consistent and the resulting bias should be removed by the conditional DiD estimator.

1.B Appendix B

Additional Figures and Tables

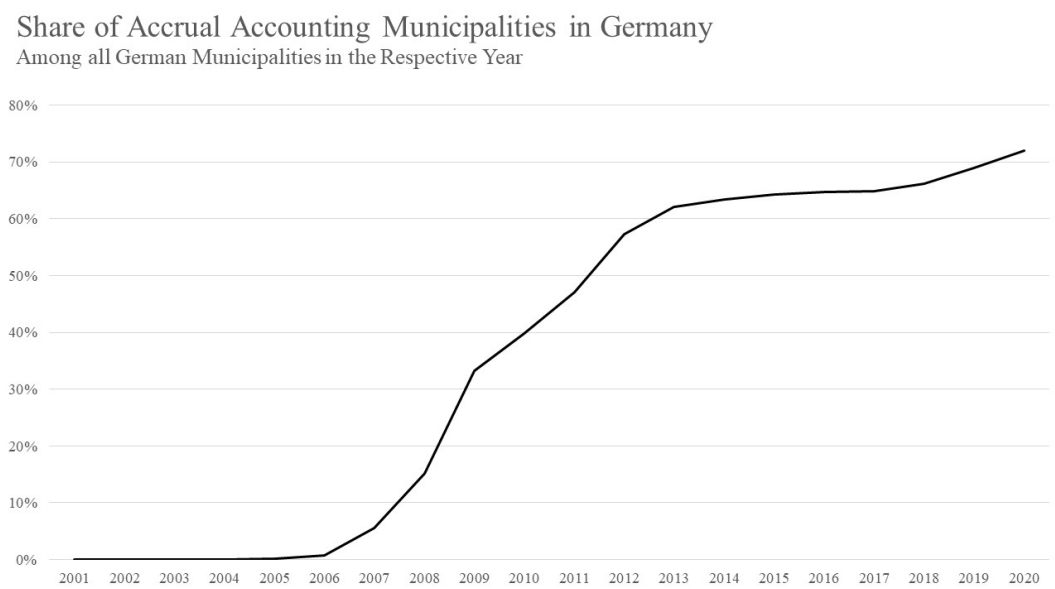


Figure 1.B.1: Own figure based on data from Christofzik (2019) and the statistical offices of Thuringia, Bavaria, and Schleswig-Holstein.

	Dependent Treatment Variable of Interest (VOI): Expenditures for:		
	(Total)	(Immov. Assets)	(Mov. Assets)
VOI 2008 pc	-0.001	-0.001	-0.0001
	(0.001)	(0.001)	(0.011)
VOI 2009 pc	-0.0003	-0.0003	-0.002
	(0.001)	(0.001)	(0.006)
VOI 2010 pc	0.0001	-0.0001	0.010
	(0.001)	(0.001)	(0.007)
Primary Balance 2010 pc	0.0001	0.00002	-0.0002
	(0.001)	(0.001)	(0.001)
Total Expenditure 2010 pc	0.0003	0.0003	-0.0002
	(0.0004)	(0.0004)	(0.0004)
Total Debt 2010 pc	0.0003	0.0003	0.003
	(0.0003)	(0.0003)	(0.003)
Busines Tax Revenue 2010 pc	-0.045	-0.1	0.024
	(0.782)	(0.782)	(0.750)
Age Ratio 2010	0.006	0.005	0.008
	(0.033)	(0.033)	(0.034)
Inhabitants 2010	0.0001***	0.00001***	0.0001***
	(0.00001)	(0.00001)	(0.00001)
Leftist Share	0.368	0.348	1.083
	(1.347)	(1.347)	(1.328)
Voter Turnout	0.007	0.008	-0.002
	(0.034)	(0.033)	(0.033)
Constant	-4.272*	-4.296*	-4.064*
	(2.360)	(2.357)	(2.353)
Observations	831	830	895
Log Likelihood	-134.509	-134.458	-137.188
Akaike Inf. Crit.	299.018	298.916	304.377

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 1.B.1: Logit Models 1-3: Estimation of propensity scores. For reasons of readability, only results for the VOI 2008 to 2010 are presented. Results for the years 2005 to 2007 are insignificant.

	Dependent Treatment Variable of Interest (VOI): Revenue from Sales of:			
	(Total)	(Immov. Ass.)	(Mov. Ass.)	(Fin. Ass.)
VOI 2008 pc	-0.002	-0.0001	0.045	-0.040
	(0.003)	(0.002)	(0.178)	(0.029)
VOI 2009 pc	-0.004	-0.004	-0.660	0.002
	(0.004)	(0.004)	(0.443)	(0.009)
VOI 2010 pc	0.002	0.003	0.816***	0.001
	(0.002)	(0.002)	(0.296)	(0.006)
Primary Bal. 2010 pc	0.0003	0.0003	-0.001	0.00001
	(0.001)	(0.001)	(0.001)	(0.0003)
Total Exp. 2010 pc	-0.00001	-0.00003	-0.0003	-0.00002
	(0.0004)	(0.0004)	(0.001)	(0.0003)
Total Debt 2010 pc	0.0002	0.0003	0.001*	0.0003
	(.0003)	(0.0003)	(0.0003)	(0.0003)
Bus. Tax Rev. 2010 pc	0.059	0.024	0.292	-0.147
	(0.741)	(0.741)	(0.932)	(0.747)
Age Ratio 2010	0.024	0.022	0.030	0.011
	(0.036)	(0.036)	(0.037)	(0.035)
Inhabitants 2010	0.0001***	0.0001***	0.0001***	0.0001***
	(0.00002)	(0.00002)	(0.00002)	(0.00002)
Leftist Share	1.713	1.577	0.137	1.329
	(1.435)	(1.460)	(1.623)	(1.327)
Voter Turnout	-0.007	-0.004	-0.034	0.006
	(0.035)	(0.035)	(0.039)	(0.034)
Constant	-4.440*	-4.476*	-2.312	-4.933***
	(2.473)	(2.494)	(2.714)	(2.326)
Observations	789	787	604	895
Log Likelihood	-113.897	-114.831	-91.169	-132.055
Akaike Inf. Crit.	257.793	259.661	212.338	294.111

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 1.B.2: Logit Models 4-7: Estimation of propensity scores. For reasons of readability, only results for the VOI 2008 to 2010 are presented. Results for the years 2005 to 2007 are insignificant.

	Means Treated	Means Control	Bal. Impr.	Std. Bias Reduct.	T-test (p-value)
Sales Revenue p.c. 2005	78.62	65.43	-90.39	-11.17	0.422
Sales Revenue p.c. 2006	81.91	86.44	51.89	7.91	0.813
Sales Revenue p.c. 2007	88.29	115.79	-508.47	-15.07	0.511
Sales Revenue p.c. 2008	69.01	83.53	-2832.27	-8.03	0.422
Sales Revenue p.c. 2009	55.15	64.67	-71.34	-0.18	0.440
Sales Revenue p.c. 2010	90.32	128.46	-73.57	0.57	0.264
Primary Bal. 2010	-24.28	-11.71	-28.8068	5.33	0.695
Total Exp. p.c. 2010	2590.49	2704.31	-146.0391	10.66	0.591
Total Debt p.c. 2010	1002.47	956.03	86.32	66.76	0.776
Bus. Tax Rev. p.c. 2010	356.4	410.5	15.22	16.89	0.671
Age Ratio 2010	33.33	32.37	21.1	-1.64	0.261
Inhabitants 2010	21883.48	20175.32	88.8	67.95	0.722
Leftist Share	27.21	29.14	85.21	76.31	0.663
Voter Turnout	52.28	52.69	92.04	82.77	0.823
pseudo-R^2	McFadden (before)	0.25		Control	Treated
	McFadden (after)	0.12	All	697	34
			Matched	34	34
			Unmatched	663	0

Table 1.B.3: Model 4 – Revenues from sales of immovable, movable capital and financial assets, per capita: Evaluation of covariate balance after propensity score matching (NN w/o replacement).

1.C Appendix C

Entropy Balancing

The implementation of entropy balancing in order to provide alternative ATTs for those Baden-Württemberg municipalities which reformed their mode of accounting in 2011 or 2012 follows the baseline scenario in Hainmüller (2012). Again, the goal was to estimate ATTs using the difference in mean outcomes between the treatment group and the reweighted control group. The counterfactual mean is estimated by:

$$\mathbb{E}[\widehat{Y(0)|D} = 1] = \frac{\sum_{i|D=0} Y_i w_i}{\sum_{i|D=0} w_i}$$

where w_i is a weight chosen for each control unit according to the following reweighting scheme:

$$\min_{w_i} H(w) = \sum_{i|D=0} h(w_i)$$

subject to balance and normalizing constraints

$$\sum_{i|D=0} w_i c_{ri}(X_i) = m_r \text{ with } r \in 1, ..., R \text{ and}$$

$$\sum_{i|D=0} w_i = 1 \text{ and}$$

$$w_i \geq 0 \text{ for all } I \text{ such that } D = 0$$

where $h(\cdot)$ is a distance metric and $c_{ri}(X_i) = m_r$ describes a set of R balance constraints imposed on the covariate moments of the reweighted control group.

The loss function $h(\cdot)$ uses an entropy divergence defined by $h(w_i) = w_i \log(w_i/q_i)$ with estimated weight w_i and base weight q_i (with q_i being uniform weights). The loss function measures the distance between the distribution of estimated w_i and predetermined q_i. Since this distance is minimized, estimated weights remain as close as possible to the uniform base weights and relevant information of the original covariate distribution is preserved. On the other hand, the balance constraints are imposed to equalize the moments of the covariate distributions between the treatment and the reweighted control group.

Following Hainmüller (2012, p. 31) the 'balancing scheme can be understood as a generalization of the conventional propensity score weighting approach where the researcher first estimates the unit weights with a logistic regression and then computes balance checks to see if the estimated weights indeed equalize the covariate distributions'. Conceptually, propensity score weighting and propensity score balancing are rather close. In entropy balancing, the adjustment problem is tackled from the reverse: weights are directly estimated from the imposed balance constraints. For more details and applications, see Hainmüller, 2012.

Chapter 2

Local Government Fiscal Regulation in the EU: The Impact of Balanced Budget Rules

2.1 Introduction[16]

Numerical fiscal rules are a recurring theme in the European debate on strengthening fiscal frameworks on the national as well as on the supranational level (Reuter, 2017).[17] Moreover, they are often applied by central governments to combat one of the "most formidable challenges facing multi-tiered systems of government: fiscal indiscipline among subnational governments" (Rodden, 2002, p. 670). Numerical fiscal rules are supposed to constrain lower level governments' fiscal policy in order to keep municipalities, counties, provinces, etc. on a sound financial path (Lledó and Pereira, 2015). In 2016, only 10.5 percent of all national fiscal rules in the European Union (EU) were solely dedicated to the central government (European Commission, 2018b). In contrast, 21 percent of existing rules restricted the fiscal freedom of the local level and 51 percent referred to the general government but might also have had some distinct local government breakdowns. Therefore, it seems reasonable to conclude that local governments in the EU are already exposed to a dense web of numerical fiscal rules. Following the European Commission's Fiscal Rule Strength Index (FRSI), during the past two decades numerical fiscal rules not only increased in numbers but also in institutional strength (European Commission, 2018b). The four most relevant rules constrain deficits, borrowing and debt, expenditure, and revenue (Turley et al., 2021).[18] The most common rule type on the local level is the so-called Balanced Budget Rule (henceforth: BBR, see Figure 2.2).

The impact of fiscal rules has been analyzed for different layers of government. There are plenty of publications on supranational, national and subnational fiscal regulations. Heinemann et al. (2018) provide a detailed meta analysis on this literature. However, existing empirical research, particularly on local government regulation, often focuses on single countries. The main reason is that due to the multitude of institutional arrangements within the European Union there is only limited consistent and comparable data on local fiscal rules (for a qualitative overview, see Geißler et al., 2019). The only exception is the European Commission's FRSI which is provided also for the local level. In consequence of this lack of data, in past years not much cross-country empirical work on subnational fiscal regulation has entered the field (e.g. Kotia and Lledó, 2016, Foremny, 2014, Plekhanov and Singh, 2006, De Biase and Dougherty, 2022). Most studies do not disentangle the relevance of different rule types but instead focus on type-overarching drivers of fiscal discipline. In our study we concentrate on the importance of different types of existing numerical rules. Specifically, we ask how distinct fiscal rules impact on the aggregate local government primary balance. Our focus lies on the prevalent BBR.

[16] I thank the participants at the 2020 Annual Congress of the "Verein für Socialpolitik" as well as the participants of the 2018 conference of the European Group for Public Administration (EGPA).
[17] See the so-called Six-pack (EU regulation 1173/2011 to 1176/2011, EU directive 2011/85/EU), the Two-pack regulations (EU regulations 472/2013 and 473/2013) and also the Fiscal Compact (Treaty on Stability, Coordination and Governance in the Economic and Monetary Union).
[18] For a detailed typology of fiscal rules, see Table 2.A.1 in the Appendix 2.A.

Moreover, we do not integrate local and regional governments to a summarizing subnational level but concentrate on local government budgets only. We also consider the fiscal entanglement between local and higher government levels. Finally, we study whether the strength of implementation based on regulatory embeddedness, monitoring, enforcement, and media visibility influences the BBR's effect on fiscal discipline.

In order to identify the potential impact of the BBR on local governments' budgetary discipline we estimate a dynamic fiscal reaction function in the tradition of Debrun et al. (2008). We implement it for a sample of 19 EU members and a period of 19 years (1997-2015). This is done within a least square dummy variable correction (LSDVC) framework with time and country fixed effects. The bias-corrected LSDVC estimator for dynamic panel models helps us to overcome the so called Nickel bias (Nickel, 1981) arising in dynamic models with small panels. In this we differ from a strand of empirical literature in this field which uses General Method of Moment (GMM) models to account for the risk of endogeneity. An example is Kotia and Lledó (2016) who implement a First Difference (FD) GMM model with the help of external instrumental variables drawn from the central government level and apply LSDVC only as a robustness check. Since in our case the very instruments did not show the necessary correlation pattern with the dependent and independent variables of our model and, moreover, we assume limited validity of central level instruments, we refrain from putting an Arellano-Bond dynamic panel GMM estimator (Arellano and Bond, 1991) in the centre of our analysis and provide it only as one robustness check. This, however, is potentially at the expense of excluding certain forms of endogeneity.

Our results show a robust positive relation of the BBR and the aggregate local level primary balance. Although not being significant in most specifications, an interaction term consisting of the BBR and a Vertical Fiscal Imbalance (VFI) variable indicates decreasing rule effectiveness at higher levels of transfer dependency. By estimating the fiscal reaction function in two specifications, first with the Fiscal Rules Strength Index for the BBR (BBR FRSI) and second with a BBR dummy, we can show that the pure existence of a BBR does not improve the local primary balance. What counts is the rules' institutional implementation. Other rules like the debt rule (DR) and the expenditure rule (ER) seem to have no influence on the local primary balance. The results are robust against different model specifications and estimation techniques. In sum, our findings indicate that a well-institutionalized BBR for local level governments can be a proper tool against the local government deficit bias.

In section 2.2 we provide a theoretical detour to the deficit bias and its origins which pave the way to the necessity of fiscal regulation; moreover, we discuss existing literature. Section 2.3 provides some descriptives about local level fiscal regulation within the European Union. In section 2.4 and 2.5 we present five testable research hypotheses, explain the data, the model, and the estimation strategy before we present and discuss our results in section 2.6. Section 2.7 concludes.

2.2 Theory and Literature

One of the most convincing theoretical frameworks for fiscal rules is based on the theory of the deficit bias of politicians and governments (Wyplosz, 2013).[19] It describes a government's adverse incentive to over-spend, under-tax, or excessively borrow and is on the local level usually associated with the presence of soft budget constraints (Kotia and Lledó, 2016). A soft budget constraint emerges once a higher-level governments' promise not to step in and bailout becomes ineffective and consequently local level governments form bailout expectations (Kornay et al., 2003, Baskaran, 2017). Next to the soft budget constraint interregional competition, unfinanced public services mandated by the central government, or short electoral cycles may play a role (Plekhanov and Singh, 2006).

Although challenged by empirical work on the Netherlands (Allers, 2015) and Sweden (Dietrichson and Ellegard, 2015), the theoretical origins of the soft budget constraint are attributed to common pool problems and moral hazard (Kotia and Lledó, 2016). Whereas moral hazard among politicians is assumed to appear in the expectation of a future bailout, common pool issues arise since local governments usually receive most of their resources as either conditional or unconditional transfer from the central government, hence from a common pool. This prevents them from fully internalizing the cost of their public expenditure and may lead to excesses in expenditure and borrowing (Hallerberg and von Hagen, 1999). Consequently, large vertical transfers as indicator of high levels of common pool revenues on the subnational level may soften the budget constraint. Von Hagen and Eichengreen (1996) were the first who identified the interrelatedness of high vertical transfers/low local revenue or local tax autonomy with bailout expectations. Effective numerical fiscal rules are supposed to build a dam to the deficit bias on the local level (Foremny, 2014).

Following the definition of Kopitz and Symansky (1998), a fiscal rule is a permanent constraint on fiscal policy, expressed in terms of a summary indicator of fiscal performance like the budget deficit, debt, etc. Similarly, Turley et al. (2021, p. 24) define it as "predetermined numerical limit on budgetary aggregates or summary indicators" which is a "long-lasting institutional constraint on budget policymakers' decision-making discretion, aimed at promoting overall fiscal discipline and ensuring sustainable public finances". In its FRSI Database, the European Commission (European Commission, 2010) broadly differentiates four types of numerical fiscal rules: Balanced Budget Rules (BBR), Debt Rules (DR), Expenditure Rules (ER), and Revenue Rules (RR) and aggregates several institutional features of these rules on all government levels to one country index, the FRSI.

There is abundant empirical work analyzing the potential impact of fiscal rules on all levels of government. The meta regression analysis of Heinemann et al.

[19]For a detailed discussion of this and other potential theoretical approaches to numerical fiscal rules for local-level governments, see Plekhanov and Singh (2006).

(2018) provides a helpful overview of the more recent scholarly discussion. Given its relevance, the academic interest in subnational rules is not surprising and circles around themes like the relation to the electoral budget cycle, expenditure growth and composition, budgetary sustainability, and fiscal discipline. Clustering these empirical publications according to the employed data one can differentiate between, on the one hand, cross-sectional studies analyzing aggregate subnational government budget data for a set of countries and, on the other hand, single country studies relying on either local government microdata or also aggregate data for a set of states in federalistic systems. From the methodological perspective, one can observe a continuum of implemented methods that ranges from simple descriptive analysis to non-dynamic and dynamic panel modelling (instrumental variable estimation – IV, Bias Corrected Least Square Dummy Variable Models – LSDVC, General Method of Moments Models – GMM) on to quasi-experimental settings using state of the art methods like regression discontinuity (RD), Difference-in-Difference (DiD) designs, or matching techniques. The more advanced these methods are, the more presented results may be interpreted as being causal. At the same time, however, the demands on the data increase and far-going exogeneity assumptions with respect to instrumental variables become necessary.

Three empirical publications which are close to the work presented in our paper use the FRSI (or reformulations of it) for subnational governments to estimate its impact on fiscal discipline. Kotia and Lledó (2016) implement a first difference GMM framework and present results which indicate a discipline-enhancing effect of subnational fiscal rules which becomes weaker at high levels of VFIs. That is, the more subnational governments are reliant on transfers from higher-level governments, the more the disciplining effect of numerical fiscal rules seems to vanish. Foremny (2014) presents findings based on a LSDVC model. These results indicate that fiscal rules decrease deficits only in unitary countries. Due to higher legal autonomy of local and regional governments in federal countries, a rule-based framework is not supposed to help here. Instead, Foremny sees higher tax autonomy as effective measure against large deficits at the subnational level. The author constructs an FRSI-based measure by aggregating the EC's index values for all subnational fiscal rules which can have an impact on the budget balance. Quite recently, also De Biase and Dougherty (2022) took advantage of the FRSI for European subnational governments and analyzed the impact of balanced budget rules, debt and expenditure rules on a broad set of fiscal variables with a standard two-way fixed effects regression. In line with previous findings, the results suggest that BBRs are useful for improving the budget balance, do not reduce indebtedness, and are equally neutral with regard to the cyclicality of fiscal policy. Also Asatryan et al. (2018) study the effects of BBRs in 132 countries between 1945-2015. However, the authors focus on national level rules implemented

in the constitution and find strong evidence for reduced probability of a sovereign debt crisis if these rules are in existence.[20]

Rodden (2002) investigates a dataset of 43 OECD developing and developed countries over a period of ten years (1986-1996). He applies the first difference GMM Arellano and Bond (1991) estimator and finds that long-term balanced budgets among subnational governments occur when the central government imposes certain borrowing restrictions or when subnational governments have both far-going taxation and borrowing autonomy. Furthermore, Rodden provides empirical evidence for the negative impact of large VFIs on the budget balance. One limitation of this work is the lack of a consistent indicator for fiscal rules. Rodden's borrowing autonomy indicator itself is a fitted value of a regression based on theoretical assumptions. Using a sample of 43 countries for a period of 1982-2000, Plekhanov and Singh (2006) implement a two-stage IV approach and analyze which specific institutional design of borrowing constraints prevents large subnational deficits. The authors conclude that the specific framework is of minor relevance compared to other characteristics of multi-level fiscal relations such as the existence of bailouts or a bailout history, the degree of VFIs, or the quality of fiscal reporting. Plekhanov and Singh's classification of fiscal rules is based on dummies indicating the mode of implementation (self-imposed, centrally imposed, etc.).[21]

Another set of studies focuses on single countries and analyzes local government microdata. For example, Borge and Hopland (2020) implement a first difference GMM for Norwegian municipal budget data. Their results suggest that a reform to the BBR that was supposed to lift controls from complying municipalities led to fiscal adjustments especially among those which had had deficits in the past. The relaxation of the Italian Domestic Stability Pact (DSP), which consisted mainly in a limit to the budget deficit, for municipalities with less than 5,000 inhabitants in 2005 led to three studies which exploit the population threshold effect with quasi-experimental identification strategies. Grembi et al. (2016) find that relaxing fiscal rules triggers deficits and lowers taxes. The results of Bonfatti and Forni (2019) imply lower capital spending prior to elections after the reform. And the findings of Venturini (2020) imply changes in the municipal expenditure composition due to the reform in 2005. In addition, Bartolini and Santolini (2009) analyze the reaction of current expenditures to the initial implementation of the DSP in 1999 with a panel model. Results suggest that the introduction reduced the level of public spending and altered the opportunistic behavior of politicians in pre-electoral years.

Focusing on the United States, Eliason and Lutz (2018) concentrate on local governments in the US-State Colorado. With the help of a synthetic control approach

[20]The studies of Von Hagen (2006), Debrun et al. (2008), Hallerberg et al. (2007), Hallerberg et al. (2009), and Reuter (2017) focus on the central or general government, too. Rodden et al. (2003) provide a collection of case studies

[21]Earlier empirical publications of Von Hagen and Eichengreen (1996), Fornasari et al. (2010), Jin and Zou (2002) use dummies for the presence of controls and therefore do not account for variation over time (Plekhanov and Singh, 2006)

for local fiscal data aggregated on the state level they do not find evidence that fiscal rules alter budget outcomes. This seems to be different for municipal default risk in US history. Findings of Dove (2016) suggest that debt limits and convincing no-bailout clauses (hard budget constraints) actually limited the risk of local government defaults. Implementing panel regressions on local government budget data, Mullins (2004) and Mullins and Joyce (1996) present results which suggest that the existence of tax and expenditure rules for local governments lead to recompositions in the revenue basket.

In sum, several empirical studies have been published over the last decades which imply different impacts of fiscal rules for subnational and local governments. As Heinemann et al. (2018) point out, existing empirical evidence indicates a discipline-enhancing effect of numerical fiscal rules. However, based on their meta regression the authors also come to the conclusion that fiscal rules as such are not exogenous. In consequence, identification strategies need to account for this endogeneity to limit the risk of biased results. This makes instrumental variable approaches for non-dynamic and dynamic panel data (like GMM) or quasi-experimental setups superior to standard panal data analysis which only accounts for unobserved time-consistent as well as unit-overarching co-founders. The work we present in this study is based on a dynamic panel model and implements – like Foremny (2014) – several LSDVC models. An additional GMM model is estimated as robustness check. In terms of the dependent veriable, our work differs from Foremny (2014) and Kotia and Lledó (2016) since we refrain from any higher aggregation of the complex FRSI values. Foremny (2014), Plekhanov and Singh (2006), and Rodden (2002) operate with the rather broad notion of borrowing restrictions or regimes. Sticking with the FRSI for specific rule types on the local (and not the subnational) level allows us to isolate the effect of different fiscal rules like BBR, DR, and ER on municipalities, cities, etc.

2.3 Local Fiscal Rules

Within the European Union, the local government level is exposed to a dense web of numerical fiscal rules. Following the European Commission's FRSI, in 2016, close to 22 percent of all existing rules referred to the local level (see Figure 2.1), only 7.9 percent to the regional level, and 10.5 percent to the central level. In addition, 50.9 percent regulated the general government with potential local level breakdowns. However, precicely defined local government numerical rules as a derivative from general government rules are rare. In 2016, the by far most important rule type on the local level was the BBR, followed by DRs and ERs. Revenue rules were not in place.

Over time, the number of fiscal rules on the local level is clearly increasing (Figure 2.2). This indicates the gain in importance which fiscal rules as a tool against the deficit bias experience. In our sample of 19 EU member states, the number of

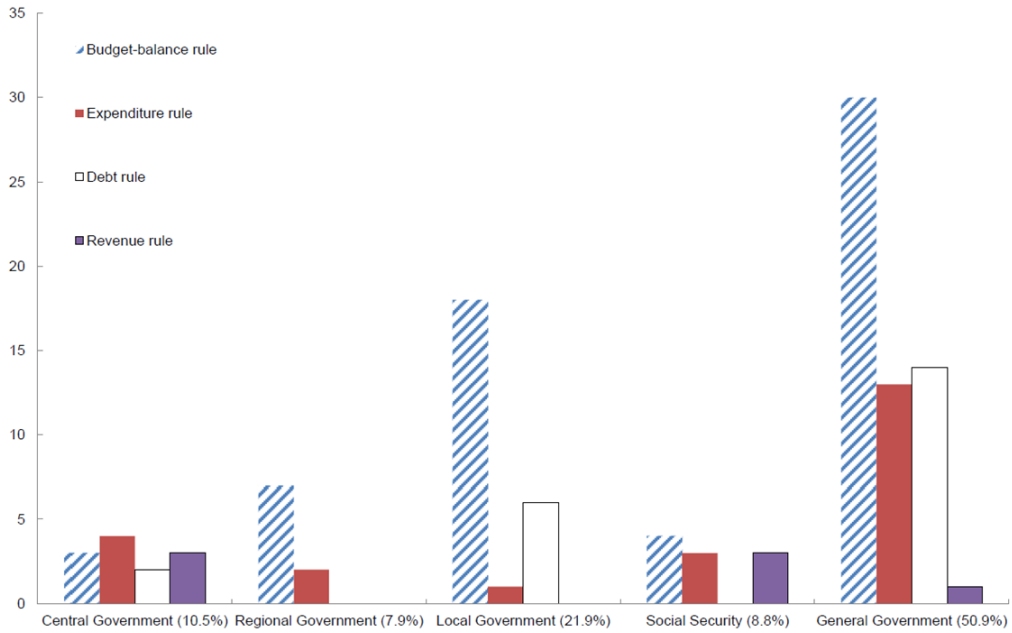


Figure 2.1: Number of numerical fiscal rules in European Union member countries in the year 2016 (Taken from: European Commission 2018b).

numerical fiscal rules increased from 6 in 1995 to 26 in 2015. While the number of BBRs more than tripled, the number of DRs increased more than fourfold (albeit starting from a lower level). Although the number of ERs on the local level also increased, it remained on a moderate level.

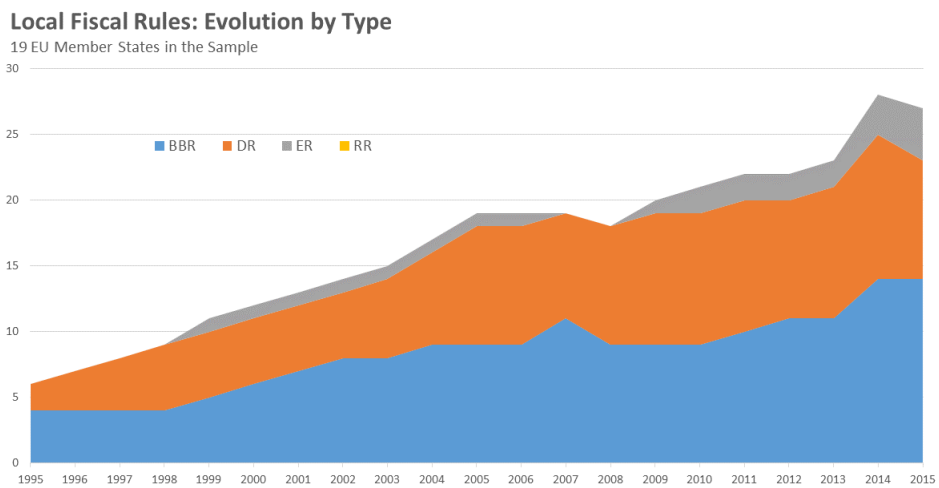


Figure 2.2: Development of the number of different fiscal rules over time (1995-2015) for all 19 sample countries. For the EU28 see Appendix 2.A, Fig. 2.A.1. (Data: European Commission Fiscal Rules Strength Index).

For the general and the subnational level, previous research has shown that not only the number of numerical fiscal rules within the European Union has increased over

time but also the level of institutional implementation (De Biase and Dougherty, 2022). The latter is mirrored by the EC FRSI database for all EU member countries. The EC FRSI is a highly aggregated composite indicator based on the characteristics of fiscal rules (European Commission, 2018b) which aggregates five criteria of institutional implementation. These are (1) the statutory base of the rule (constitution, legal act, coalition agreement, political commitment), (2) the room for setting or revising objectives, (3) the nature of the body in charge of monitoring respect and enforcement of the rule, (4) enforcement mechanisms (ranging from automatic correction and sanction down to absence of ex-ante defined actions), and (5) media visibility of the rule. The composite FRSI is calculated for each existing rule by aggregating assigned scores for each criterion (ranging from 1 to 3 or 4) with a random weights technique. A rule-overarching national FRSI is obtained by aggregating the rule-specific index values by country.

In our work, we employ the FRSI for single rules applicable on the local level as explanatory variable of interest and not the FRSI version that combines all existing rules to one aggregate value. The maximum value assigned to a numerical fiscal rule within the EC FRSI database across all government levels between 1990 and 2015 was ten, indicating the maximum of institutional implementation with regards to the above-mentioned criteria, the minimum positive value was 3.3. However, the variable used in our estimation only covers the local level. Here, the sample maximum over the entire period of analysis is 9.43 and the minimum positive value 5.15.

The average rule strengths of the BBR and the DR imposed on local level governments show considerable variation within the period of interest (1997-2015). We refrain from integrating the expenditure rule in Figure 2.3 because there is no ER over the entire period of analysis (see Figure 2.2). Whereas the sample average rule strength for local government BBRs (BBR FRSI) varies around a level of seven and followed a decreasing path until 2006, it is increasing thereafter. This development indicates a relation to the global financial crisis starting in 2007. That is, after the onset of the crisis, most central governments which already had imposed a BBR on their local governments improved on institutional implementation while most of the newly implemented BBRs after 2006 showed above-average strength. The average rule strength for debt rules (DR FRSI) shows an increasing tendency throughout the entire period of interest. Similar to the BBR FRSI development, also the DR FRSI shows its strongest increases after the years 2010/11. This may be seen as indication that post-crisis EU fiscal regulation like the Six Pack of 2011 was channelled down to local governments.

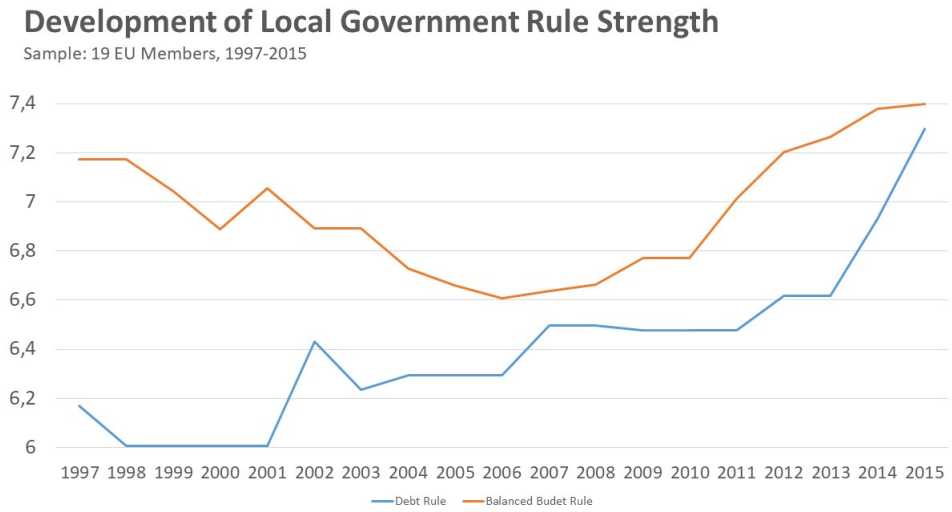


Figure 2.3: Average rule strength over all local government rules of a certain type in the sample of 19 EU member countries (Data: European Commission Fiscal Rules Strength Index).

The impact of the vertical fiscal imbalances on the primary balance of the local level can be regarded as stylized fact within the field of multilevel fiscal relations saying that rising VFIs are associated with a deteriorating primary balance. Von Hagen and Eichengreen (1996) show that fiscal restrictions are indeed most often found in countries with high levels of VFIs. Following Kotia and Lledó (2016) and Eyraud and Lusinyan (2013) we calculate the national VFIs for our sample as share of subnational spending not financed through own revenues:

$$VFI_{it} = 1 - \frac{OwnRevenue_{it}}{OwnSpending_{it}} \tag{2.1}$$

Whereas own revenue corresponds to total local level revenues minus transfers received from higher level governments, own spending is total local level expenditure minus transfers paid to other government levels. As Figure 2.4 shows, the median VFI development after the fiscal crisis for the 19 sample countries appears to be associated with increasing primary deficits on the local level. This finding is broadly in line with Kotia and Lledó (2016). In recent years, intergovernmental fiscal frameworks are characterized by an asymmetric development of expenditure and revenue decentralization leading to an increase in VFIs (Bloechliger and Vamalle, 2012). This development indicates the necessity to control for VFIs in any fiscal reaction function which aims at isolating the effect of fiscal rule strength.

Figures 2.5 and 2.6 depict the country-wise development of the main explanatory variable of interest, the BBR FRSI, and the dependent variable of our analysis, the local level primary balance aggregated at the national level. As can be seen in Figure 2.5, there is a set of countries (Czech Republic, Denmark, UK, Greece, Hungary and Slovenia) in which the EC FRSI does not report a distinct BBR for the local

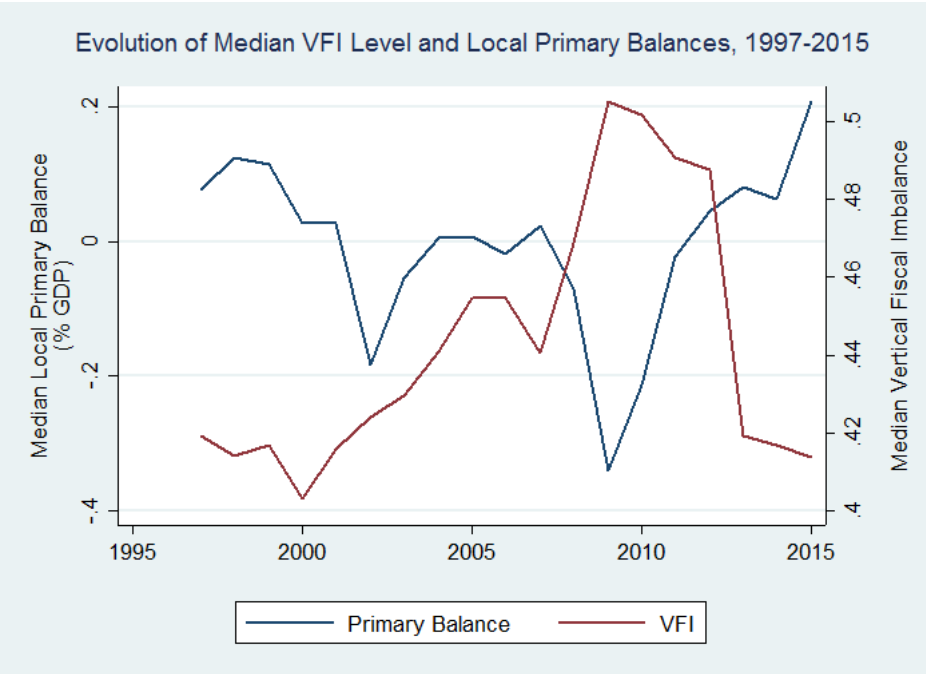


Figure 2.4: Development of the median local level VFI and the median local level aggregate primary balance (as percentage of GDP) in the set of 19 EU member countries (Data: Eurostat Government Finance Statistics and OECD Fiscal Decentralization Database).

level. That, however, does not mean that there is no general government BBR with a local level breakdown. Since it does not become clear from the EC FRSI database in which cases a general government BBR comprises a distinct numerical rule for local governments we do not consider general government numerical rules in our analysis. This prevents us from misinterpreting a general government rule whenever there is no distinct local level breakdown.[22]

[22]In the Netherlands, for example, there is a general government BBR (the so called "EMU deficit ceiling") which has only very limited impact on local governments' decision making (Raffer, 2019).

Figure 2.5: Development of the balanced budget rule strength over time (1997-2015) by sample country (Data: European Commission Fiscal Rules Strength Index.)

Figure 2.6: Development of the primary balance as percentage of GDP over time (1997-2015) by sample country (Data: Eurostat Government Finance Database.)

2.4 Hypotheses, Model, Data

On the basis of the reviewed literature (see above) we arrive at five distinct research hypotheses which we test with the fiscal reaction function presented below. They are as follows:

- **H 1:** The strength of fiscal rules on the local level has a mitigating effect on primary deficits. That is, it improves local governments' fiscal discipline.
- **H 2:** Due to its direct connection to the primary balance, the BBR is the most important numerical rule for a sound primary balance.
- **H 3:** It is not the primitive existence of a numerical fiscal rule but its institutional implementation which drives the discipline-enhancing effect on local governments.
- **H 4:** High VFIs deteriorate the fiscal discipline on the local level.
- **H 5:** The impact of local level numerical fiscal rules decreases with increasing VFIs.

For the empirical analysis of these hypotheses we estimate a dynamic fiscal reaction function in the tradition of Bohn (1998), Debrun et al. (2008), and Kotia and Lledó (2016). Debrun et al. point out that the most natural way to assess the impact of numerical rules on fiscal discipline is to implement the respective fiscal rule into a fiscal reaction function – which can be interpreted as a model of fiscal behavior – and check whether the estimated coefficient is meaningful and significant. In this spirit, we formulate the following baseline model:

$$y_{it} = \alpha + \beta_1 y_{it-1} + \beta_2 bbr_{it} + \beta_3 vfi_{it} + \beta_4 bbr_{it} * vfi_{it} + \gamma X_{it} + \eta_i + \rho_t + \epsilon_{it} \quad (2.2)$$

$$i = 1, ..., N; t = 1, ..., T$$

The model describes the response of the sum of local governments' primary balances y of country i in year t as percentage of national GDP to its own one period lagged values y_{it-1} as well as to further independent variables. Integrating y_{it-1} accounts for the persistent behavior of the primary balance (Kotia and Lledó, 2016, Vanneste and Geminne, 2020) and enables consistency in estimating other parameters of interest (Bond, 2002). Further independent variables are strength levels of balanced budget rules (BBR FRSI), bbr_{it}, the level of vertical fiscal imbalances (VFI), vfi_{it}, an interaction term of the latter two, and a vector X_{it} of control variables. This vector comprises fiscal rule strength indicators for further numerical rules (debt, DR, and expenditure, ER), the output gap accounting for cyclical fluctuations and the

share of population older than 65 which proxies the local governments' spending needs.[23]

The country fixed effects η_i account for unobserved time-invariant characteristics of the country which may impact on the local primary balance and the time fixed effects ρ_t cover unobserved macro-developments like common shocks affecting all countries simultaneously. A prominent example for the latter is the global financial crisis. Accounting for fixed effects in the dynamic fiscal reaction function may push the estimates closer to a causal interpretation.

In order to assess the robustness of the results, we manipulate the baseline specification (equation 2.2) in several ways. First, we estimate it with and without the interaction term. Second, we drop the two additional fiscal rules (DR and EP), and third, we gradually add a set of further control variables. This set comprises commonly used political indicators: the Herfindahl Index to account for political fragmentation and an ideology indicator, both for the national parliament, as well as an election dummy for national elections and a measurement for expenditure decentralization, which is the share of local level expenditure in general government expenditure.[24] Kotia and Lledó (2016) use the Herfindahl Index and the election dummy in a similar empirical setting as external instruments in a first difference GMM specification for the subcentral government. In our setting, the correlation structure of these two policy variables with the independent and the dependent variables as well as the error term does limit their applicability as instruments. Hence, we add them as additional controls to the baseline LSDVC model in order to evaluate if and how the coefficients of interest react.

In order to disentangle the effect of institutional implementation of a BBR from its mere existence on the local level we estimate the LSDVC baseline model by applying two different notions of the variable bbr_{it} :

$$bbr_{it} = \begin{cases} bbr_{it,FRSI} = FRSI \\ bbr_{it,dummy} = 0/1 \end{cases} \tag{2.3}$$

Whereas $bbr_{it,FRSI}$ is the rule-specific BBR FRSI as explained in the previous section, $bbr_{it,dummy}$ is a dummy variable which takes on the value 1 if there is a BBR in a given year and 0 otherwise. Hence, the latter only displays unit values of existence and ignores variation over time. Consequently, the coefficient of this dummy measures the impact of the pure existence of a BBR irrespective of rule strength variation.

[23]Data stems from the European Commission's Fiscal Rule Database, Eurostat and the OECD Fiscal Decentralization Database. For summary statistics of all employed variables, see Table 2.A.2 in the Appendix 2.A.

[24]Expenditure decentralization is based on data from Eurostat Government Finance Statistics and the political economy variables come from the Database of Political Institutions, provided by the Inter-American Development Bank.

With regards to our testable hypotheses, **H1** hinges on significant β_2 and $\gamma_{1/2}$ coefficients of the respective numeric fiscal rule in equation 2.2. **H2** can be tested by comparing the strength and significance of these three coefficients. **H3** is testable by comparing the β_2 coefficient of the baseline model with the β_2 coefficient of the additional specification with $bbr_{it,dummy}$ instead of the $bbr_{it,FRSI}$. **H4** is linked to the coefficient of the VFI variable, β_3, and **H5** to the coefficient β_4 of the interaction term once this term has been added.

Our fully balanced panel dataset comprises annual data for 19 countries[25] and a period from 1997 to 2015; consequently it includes seven post-crisis years. This is similar to Kotia and Lledó (2016) whose dataset covers a period until 2012. However, having a dataset with three more post-crisis years is a specific advantage since it can be reasonably assumed that new, crisis-induced regulation, such as the EU Fiscal Compact of 2012, took some years to find its way into local level regulation within the member states. The most important data sources for this study are the European Commission's Fiscal Rule Strength dataset and the Eurostat Government Finance Statistics.

2.5 Estimation Strategy

For the estimation of the fiscal reaction function (equation 2.2), we estimate our model with the bias-corrected Least Squares Dummy Variable (LSDVC) approach similar to Kotia and Lledó (2016). We refrain from estimating a standard FE regression with country and time fixed effects since this method suffers from inconsistent estimators in the case of a dynamic modelling and a small to modest panel size (small N/small T). Nickel (1981) showed that the least-squares dummy variable (LSDV) estimator is not consistent for finite T in autoregressive panel-data models (Bruno, 2005). In order to overcome the small sample bias and the inconsistency introduced by the lagged dependent variable we make use of Nickel's bias correction for the LSDV estimator. The best results in terms of initializing bias correction at a rate of 0(1/T) came from the Arellano and Bond (1991) estimator. For inference, we used a bootstrap with 1000 repetitions in order to estimate the variance-covariance matrix.

Through this procedure we were able to rule out the bias resulting from the dynamic nature of equation 2.2 in relation with the implementation of fixed effects as well as the small panel. However, the issue of endogeneity of our fiscal rules indicator potentially prevails since it might suffer from reversed causality arising whenever high local level primary deficits incentivized a sample-country to strengthen fiscal rules. Simultaneity bias may be another source of endogeneity. This issue is at least partly alleviated since most countries chose subnational borrowing controls before

[25]The sample countries are Austria, Belgium, Czech Republic, Denmark, UK, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, and Sweden. We neglect small EU member States as well as those which joined the European Union after 2005.

the period under consideration and therefore the local level primary balance could not directly affect the choice. This argument is also put forward by Plekhanov and Singh (2006). Several empirical studies (e.g. Kotia and Lledó 2016 and Foremny 2014) apply instrumental variable estimation. Kotia and Lledó make use of external instruments drawn from the central government level. They assume in accordance with Foremny that since in Europe the decision for local level fiscal rules are made at the central government level, political characteristics at the national level may be used to proxy the centre's fiscal attitudes towards general government fiscal discipline. Because they suggest that the central government's fiscal attitudes are correlated to rule strength but not to the local government primary balance or its unexplained residual, Kotia and Lledó employ the Herfindahl Index and an election dummy as external instruments for their FD GMM model.

In our work, we do not use these political variables as external instruments for two reasons: First, we have doubts concerning their validity and, second, they do not reveal the necessary correlation structure with y_{it}, bbr_{it} and ϵ_{it} of our model. Whereas the second reason is a straightforward empirical issue, their non-correlation with our model variables also does not come as a surprise either. It is an open question why a dummy for national elections should have an effect on local level rule strength but not on the local level primary balance. The same counts for a variable of central parliament fractionalization and other proxies for the central government's attitudes towards fiscal discipline. As Plekhanov and Singh (2006) point out, Rodden (2002) provided empirical support for a relation of political cohesion of the national government (as proxied by, e.g., the Herfindahl Index) and subnational fiscal outcomes. Johannson (2003) showed with Swedish municipal data that federal grants can be used as tactical instruments in a national election campaign, which makes a corresponding election dummy potentially correlated to subnational revenues, and consequently to all downstream fiscal indicators like the primary balance. Both results weaken the validity of these variables as external instruments in a FD GMM model. In addition, central government fiscal attitudes have further potential transmission channels into local government fiscal outcomes such as tax sharing arrangements or the decentralization of public expenditures, to name just two examples. These arguments speak against using central government political variables as instruments for local government fiscal rules since their independence of the potential outcome is conceptually questionable.

In addition, the endogeneity issue of local government fiscal rules might even be of less relevance as long as they are implemented by the central level. Bonfatti and Forni (2019) state that the pure fact that the municipal fiscal rule has been enforced by the central government reduces the endogeneity problem noticeably.

However, in order to deal with the potential endogeneity problem in our fiscal reaction function we add an Arellano and Bond (1991) first difference GMM as robustness check but use only the lags of the dependent and independent variables as instruments. Higher-order lags of the BBR variable instrument the BBR and

therefore may account for reversed causality that appears whenever a high local level primary balance incentivizes the central government to impose stricter fiscal rules for local level jurisdictions (similar to Plekhanov and Singh 2006). To avoid over-fitting we restrict the lag order to the 3-5 lags and use the collapse option as suggested by Roodman (2009). This keeps the number of instruments relatively low. Nevertheless, since the number of instruments is still larger than the number of groups (countries in our sample), results need to be interpreted with caution and just serve as one additional but weak indication of robustness of our baseline estimation.

2.6 Results

The LSDVC estimation of our baseline model (see Models 1 to 4 in Table 2.1) yield significant coefficients for the BBR FRSI, the VFI, and the output gap with the local level primary balance as dependent variable. Hypothesis one (**H1**) states that higher fiscal rule strength for the different existing rule types has a mitigating effect on the aggregate local government primary balance. As the results of Model 1 (and 3) show, this can only be claimed for the BBR which has a positive and significant coefficient meaning that a higher level of the BBR FRSI is related to a higher level of the primary balance (e.g. higher surplus or lower deficit). Neither the DR nor the ER show significant coefficients. This brings us to our first central finding: For the local governments in our sample of 19 EU member countries the BBR correlates with fiscal discipline whereas other rule types do not. This might furthermore indicate that the results of those empirical studies applying a FRSI aggregation of different rule types may be driven by the BBR. The general finding also supports our hypothesis two (**H2**) stating that the BBR is more important for a sound primary balance then numerical debt or expenditure rules. The reason for that is certainly the direct link of the BBR to the primary balance; compared to that debt regulation has only an indirect impact and expenditure regulation is hardly applied within our sample.

In hypothesis three (**H3**) we state that it is the institutional implementation of a rule and not its pure existence in intergovernmental fiscal relations which drives the effect. By comparing the β_2 of Models 1 to 4 in which the BBR reflects the EC FRSI for the BBR for local governments with the β_2 of Models 5 to 8 in which the BBR is just a dummy variable (see Table 2.2), it becomes rather obvious that it is the institutional implementation of a rule that counts. The non-significant BBR coefficients in models 5 to 8 suggest that it is not sufficient to have a not or just weakly enforced rule. This result is fully in line with previous findings and sheds some light on BBRs which are part of the national regulatory system but not linked to monitoring and sanctioning mechanisms (Asatryan et al., 2018, Kopitz and Symansky, 1998).

Hypotheses 4 and 5 (**H4** and **H5**) take the VFI into account. Referring to empirical literature on the impact of VFIs on local or subnational fiscal discipline,

Dep. Var. Pim. Bal./GDP	(1)	(2)	(3)	(4)
Y_{t-1}	0.520***	0.522***	0.518***	0.519***
	(0.05)	(0.049)	(0.05)	(0.05)
BBR_{FRSI}	0.018*	0.014	0.047**	0.041*
	(0.011)	(0.010)	(0.023)	(0.022)
DR	-0.013		-0.014	
	(0.011)		(0.011)	
ER	-0.013		-0.012	
	(0.015)		(0.015)	
VFI	-0.008***	-0.008***	-0.006**	-0.007***
	(0.002)	(0.002)	(0.003)	(0.003)
BBR_{FRSI}*VFI			-0.0006	-0.0006
			(0.0005)	(0.0004)
Output Gap	-0.015**	-0.016**	-0.014*	-0.015**
	(0.008)	(0.008)	(0.008)	(0.008)
Pop. over 65	0.014	0.007	0.019	0.012
	(0.036)	(0.035)	(0.036)	(0.035)
Obs.	361	361	361	361

Table 2.1: LSDVC: Estimates with FRSI for BBR as well as DR and ER. Variance-covariance matrix and inference based on bootstrap (1000 rep.). Correction of the bias is at the rate 0(1/T). Bias correction initialization was conducted by the Arellano Bond (1991) First Difference GMM estimator. Standard errors in parantheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

we hypothesize that high VFIs not only deteriorate the budget outcomes of local governments but also weaken the impact of numerical fiscal rules. The respective estimates of Models 1 to 4 support the fourth hypothesis but cannot explain the fifth. The coefficient of the VFI variable is negative and significant, meaning that a higher VFI and therefore transfer dependency of local governments is significantly linked to a lower primary balance. The theoretical reasoning is based on the deficit bias due to common pool and moral hazard problems as outlined in section 2.2. The coefficient of the interaction term ($BBR_{FRSI} * VFI$), however, remains insignificant.

The empirical results related to the hypotheses one to four are robust over a broad set of different specifications. In Models 9 to 12 (see Table 2.A.3 in the Appendix 2.A) we gradually add the central level policy variables (the Herfindahl Index (HHI) for political fragmentation, election years and ideology of the central government) as well as a variable for expenditure decentralization to our baseline specification without the interaction term (Model 1 in Table 2.1) and arrive at rather similar results for the central explanatory variables of interest. Among the added explanatory variables

Dep. Var. Pim. Bal./GDP	(5)	(6)	(7)	(8)
Y_{t-1}	0.514***	0.52***	0.513***	0.520***
	(0.05)	(0.05)	(0.051)	(0.05)
BBR_{dummy}	0.102	0.069	0.148	0.127
	(0.073)	(0.071)	(0.142)	(0.137)
DR	-0.106		-0.106	
	(0.074)		(0.075)	
ER	-0.096		-0.089	
	(0.103)		(0.105)	
VFI	-0.008***	-0.008***	-0.007***	-0.008***
	(0.002)	(0.002)	(0.003)	(0.003)
BBR_{dummy}*VFI			-0.0002	-0.0002
			(0.0004)	(0.0004)
Output Gap	-0.015*	-0.016**	-0.015*	-0.016**
	(0.008)	(0.008)	(0.008)	(0.008)
Pop. over 65	0.015	0.006	0.017	0.009
	(0.036)	(0.035)	(0.036)	(0.035)
Obs.	361	361	361	361

Table 2.2: LSDVC: Estimates with rule existence dummy for the BBR and FRSI for DR and ER. Variance-covariance matrix and inference based on bootstrap (1000 rep.). Correction of the bias is at the rate 0(1/T). Bias correction initialization was conducted by the Arellano Bond (1991) First Difference GMM estimator. Standard errors in parantheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

only the coefficient of election years is significant. Its negative sign means that the primary balance is lower in election years. Hence, in our sample of 19 EU member countries we observe a lower aggregate local government surplus or a higher aggregate deficit in those years in which national elections take place. This is well in line with theoretical predictions (opportunistic business cycles) or empirical research which shows that incumbent politicians tend to show their competence in election years by benefiting their electorate with additional expenditure programs (see e.g. Persson and Tabellini 1997, Jochimsen and Nuscheler 2011, Bonfatti and Forni 2019).

In order to prove the robustness of these results and, what might be even more important, to get a more precise understanding of the endogeneity that may bias our LSDVC results we additionally estimated the baseline specification (Model 3 in Table 2.1) as FD GMM model with internal instruments. Results are displayed in Table 2.A.4 in the Appendix 2.A. The estimates support our central findings. In this alternative estimation, the coefficients increase considerably in size; the significance of the BBR_{FRSI} and the output gap remain. Now also the interaction

term $BBR_{FRSI} * VFI$ is significant at the five-percent level. However, we cannot dismiss the null hypothesis of the Sargan Test (validity of instruments) and the results of the Arellano-Bond test point to serially correlated errors. In addition, these results are not overly robust against changing the lag structure of the internal instruments. Hence, the FD GMM results need to be interpreted with caution.

Although our results are robust over different specifications and estimation techniques limitations remain. Our first difference GMM approach to rule out endogeneity resulting from simultaneity bias and/or reversed causality does not rely on external instruments and the alternatively used internal instruments bear the risk of low validity. However, since our central findings are in line with previous results we believe that this shortcoming is of minor relevance. This conclusion is further supported by Bonfatti and Forni (2019) who claim that central government enforcement of local fiscal rules noticeably reduces the endogeneity problem, which supports the usage of the LSDVC framework.

2.7 Conclusion

Central governments impose numerical fiscal rules on subnational governments in order to reduce their deficit bias. Usually, they constrain municipal, county- and/or provincial fiscal policy by defining a summary indicator of fiscal performance plus target values like a balanced budget for the primary balance. Although these rules have become increasingly popular in the past decades there remains a gap in cross-country empirical literature trying to isolate the effect of these rules on subnational fiscal discipline. Whereas previous publications in this field operate with a rule-overarching notion of rule strength for subnational governments, we add the perspective of distinct rule types for local level governments and do not consider state or regional governments within federations.

We estimate a dynamic fiscal reaction function within a LSDVC framework and find a robust and positive coefficient for the BBR strength with the aggregate local level primary balance as dependent variable. Coefficients for other rule types (DR and ER) remain insignificant. This leads us to the conclusion that in terms of fostering fiscal discipline on the local level the balanced budget rule is most important. By comparing fiscal rule strength in terms of implementation with the pure existence of a balanced budget rule, we find – in line with the literature – that it is not enough to implement it in intergovernmental fiscal relations. Instead, strong enforcement mechanisms are necessary for its success. In addition, we find that a rising share of higher-level transfers to local governments (as measured by the vertical fiscal imbalance) is significantly linked to deteriorating local budget balances. The main results of our analysis are supported by several robustness checks and an alternative FD GMM estimation of our baseline specification which deals with the general risk of endogeneity of fiscal institutions. However, as most local fiscal rules are set by central

governments the endogeneity problem is probably smaller in our setting in which we focus on local budgets and do not consider situations in which rules and fiscal outcomes are determined at the same level. Nonetheless, more work in this direction is necessary. Quasi-experimental identification strategies are a promising avenue for further research since they can properly deal with endogeneity problems but do not rely on strong assumptions with respect to the required exogeneity of instruments. In addition, one could think of differentiating between unitary and federal states or of accounting for national bailout histories and resulting expectations.

Although our findings are in line with previous results, our major contributions to existing literature are, first, the central relevance of the balanced budget rule compared to other rules, second, the importance of a proper implementation of this rule, and, third, the narrow focus on local (instead of subnational) governments only. Looking at these new core results the following policy recommendations can be drawn. If governments want to strengthen fiscal discipline, they should not only focus on the national or the regional level but on the local level, too. As the balanced budget rule seems to be superior to other fiscal rules in supporting fiscal discipline, it should be implemented with higher priority. The superiority to debt rules may be especially relevant in times of fiscal crises as these drive public debts and require fiscal discipline at the same time.

2.A Appendix

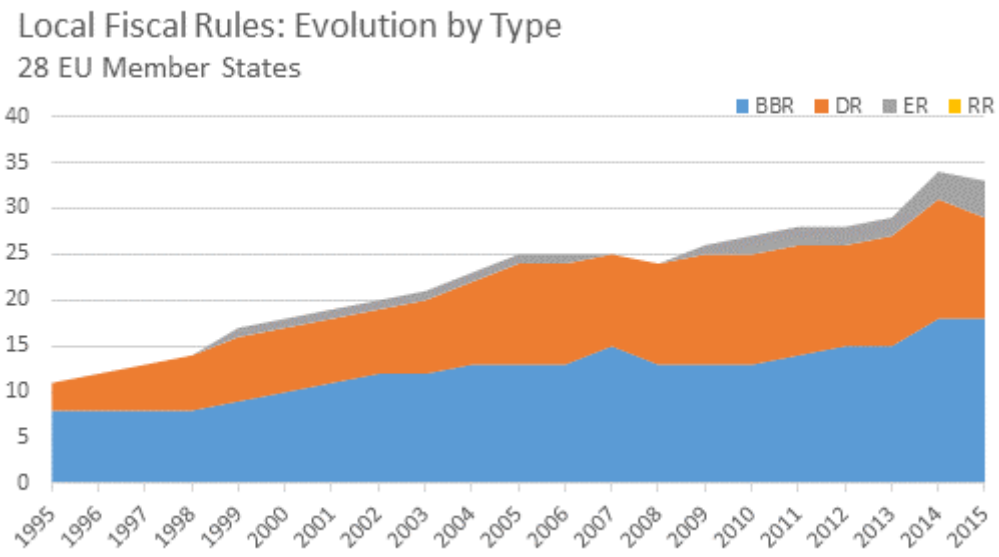


Figure 2.A.1: Number of numerical fiscal rules in European Union member countries in the year 2016 (Source: European Commission, 2018b)

Type of Rule	Rule defined/expressed
Balanced Budget Rule	A ceiling on the budget deficit, where the limit can be zero (a balanced budget), a maximum permissible deficit or a surplus. Expressed in nominal terms or as a percentage of GDP, in structural (cyclically adjusted) or primary balance or non-commodity terms. Encompass current only or current and capital or current and capital and off-budget items. Applies to submitted or adopted or realized budget. Deficit carry-over permitted or not permitted.
Borrowing and Debt Rule	The borrowing and debt rule covers a range of constraints on government recourse to debt financing. It may impose limits to new borrowing (a ceiling), on the issuance of new debt, on financing resources (e.g. Central Bank or external), gross or net debt levels (in nominal terms or as a percentage of GDP or revenue), debt service or to type of expenditure. The latter is a special case (and a variant of the budget balance rule), called the golden rule, where borrowing is restricted to investment purposes.
Expenditure Rule	Limits to the growth in expenditure, expressed in nominal or real terms, or a ceiling on total expenditure or type of expenditure.
Revenue Rule	Regulations on revenue (e.g. tax burden as a percentage of GDP) or applied to certain tax revenues (e.g. property tax revenue increases or property tax rates) or a specification of the uses to which forecasted or windfall revenues can be put, e.g. debt reduction purposes, or placed in a rainy day fund for future use.

Table 2.A.1: Typology of fiscal rules, following Turley et al. (2021, p.25).

	Obs.	Mean	Std. Dev.	Min	Max
Prim. Balance (perc. of GDP)	361	-0.004	0.373	-1.305	2.553
BBR	361	3.336	3.549	0	9.43
DR	361	1.816	2.941	0	8.18
ER	361	0.451	1.740	0	8.55
Vertical Fiscal Imbalance	361	46.381	16.305	-2.023	79.139
Output Gap	361	-0.375	2.919	-15.81	6.992
Population older than 65	361	16.135	2.435	10.569	22.363
Herfindal Index	361	0.295	0.101	0.097	0.504
Election Dummy	361	0.272	0.445	0	1
Ideology	361	1.956	1.026	0	3
Expenditure Decentralization	361	25.015	13.377	5.116	65.29

Table 2.A.2: Provided descriptive numbers represent 19 countries for the period 1997-2015. Note that not in each year a fiscal rule type was implemented in each country.

DepVar: Primary Balance/GDP	(9)	(10)	(11)	(12)
Y_{t-1}	0.52***	0.521***	0.524***	0.522***
	(0.049)	(0.05)	(0.049)	(0.05)
BBR	0.022**	0.022**	0.022**	0.022**
	(0.011)	(0.011)	(0.011)	(0.011)
DR	-0.016	-0.016	-0.016	-0.016
	(0.012)	(0.012)	(0.012)	(0.012)
ER	-0.014	-0.012	-0.014	-0.013
	(0.015)	(0.016)	(0.016)	(0.016)
VFI	-0.011***	-0.011***	-0.011***	-0.010***
	(0.003)	(0.003)	(0.003)	(0.003)
Output Gap	-0.015*	-0.015*	-0.015*	-0.016*
	(0.008)	(0.008)	(0.008)	(0.008)
Population over 65	0.004	0.006	0.007	0.007
	(0.036)	(0.037)	(0.037)	(0.038)
Expend. Dec.	0.009	0.009	0.009	0.009
	(0.006)	(0.006)	(0.006)	(0.006)
HHI		0.17	0.174	0.177
		(0.402)	(0.401)	(0.404)
Election			-0.059*	-0.058*
			(0.034)	(0.033)
Ideology				-0.004
				(0.018)
Number of Observations	361	361	361	361

Table 2.A.3: LSDVC Estimates – Robustness Checks. BBR, DR, and ER stem from the EC FRSI and represent rule strength. Variance-covariance matrix for estimates and inference is based on bootstrap (1000 repititions). The correction of the bias is at the rate 0(1/T). For bias correction the initialization was conducted by the Arellano Bond (1991) First Difference GMM estimator. Standard errors in parantheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

	(1) Primary Balance
Y_{t-1}	0.34*
	(0.217)
BBR	0.181**
	(0.091)
VFI	-0.015
	(0.012)
BBR*VFI	-0.004**
	(-0.002)
Output Gap	-0.043*
	(0.024)
Population over 65	0.041
	(0.072)
DR	0.072
	(0.092)
ER	0.055
	(0.117)
N	323
$Instruments$	39
$AB(1)$	0.109
$AB(2)$	0.555
$Sargan$	0.023

Table 2.A.4: Difference-GMM Results as Robustness Check. BBR, DR, and ER stem from the EC FRSI and represent rule strength. AB(1) and AB(2) are autocorrelation tests (Arellano-Bond test of order 1 and 2) displayed are PR>z values. The Sargan test of overidentified restrictions has the H0 of validity of instruments – displayed: Pr>chi2. Note: Value is close to 0.05 sig. level and may indicate a limited validity of instruments. Standard errors in parantheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Chapter 3

Shifts in Local Governments' Corporatization Intensity: Evidence from German Cities

3.1 Introduction[26]

Local governments employ a variety of organizational arrangements to provide public services (Elliott and Salamon, 2002). Among these, municipal corporations provide a middle-ground strategy that moves in-house production toward more market-based forms without proceeding to contracting-out or full privatization (Bel and Fageda, 2010, Bilodeau et al., 2007). These single- or multi-purpose public corporations are organized through different combinations of public and private participation, managed by an executive board appointed by local government officials, and operate under private rather than public law (Voorn et al., 2017). Scholarly literature has recognized this as "corporatization" (Grossi and Reichard, 2008), with examples in several countries (Bergh et al., 2019, Bernier et al., 2022, Cepiku et al., 2016, Ferran and Puey, 2016, Friedländer et al., 2021, Gradus et al., 2014, Tavares, 2017).

The proliferation of corporatization is often reflected against the backdrop of the liberalization and privatization initiatives first launched in North America and from the mid-1990s also in the European Union (EU) and its member states (Grossi and Reichard, 2008, Voorn et al., 2017). Situated between the extremes of "make" and "buy", this form of service delivery was touted as a panacea to address "an actual or perceived crisis of legitimacy, responsiveness and efficiency in government" (Thynne and Wettenhall, 2004, p. 609) and needs to be attributed to the so-called New Public Management movement in public administration (Hood, 1995). It held the prospect of benefiting from more flexible private law, away from what is referred to as the "corset" of the bureaucratic public sector, while retaining democratically important control rights (Grossi and Reichard, 2008, Tavares and Camões, 2007).

This initial enthusiasm for corporatization among local governments, however, gave rise to a more critical normative debate about the capacity and legitimacy of the public sector to operate economically (Haque, 2001, Voorn et al., 2017). Arguments against the public sector's ability to do so included the lack of competitive pressure, the following limited incentives to effectively use resources, and the issue of increasing costs due to more intense oversight of publicly-owned companies. Moreover, the rise of corporatization is naturally accompanied by the loss of municipal discretion, which accelerates with the operator's autonomy in an increasingly intricate web of directly- and indirectly-owned shareholdings, consisting of both formal rules and informal methods of organization. It potentially favors profit maximization over public interest and supports blame shifting in the form of "shadow budgets" as well as the risk of "bureau-shaping", which caused concerns, particularly in Germany, about

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cities' increasingly "neoliberal" orientation (Becker et al., 2015, Grossi and Reichard, 2008, Kilian et al., 2006, Schröter et al., 2019, Theuvsen and Zschache, 2011). In response to growing fragmentation and opacity, many local governments installed self-regulatory mechanisms, albeit with limited proven effectiveness (Papenfuß and Schmidt, 2021). Similarly, while some researchers considered corporatization to be a pertinent trend (Ferry et al., 2018, Gradus et al., 2014) and held that efficiency expectations had been met (Torsteinsen, 2019), international experience points to signs of disenchantment, leading to company closures and re-patriation within the menu of publicly provided services (Andrews, 2022, Andrews et al., 2022, Camões and Rodrigues, 2021, Friedländer et al., 2021).

Despite the contentious history of corporatization as a public management reform strategy, surprisingly little robust evidence surrounding its driving forces has surfaced over time. It has also been claimed that scholarly attempts to approach service delivery choices have been somewhat one-dimensional and do not adequately reflect the theoretical debate oscillating between economic incentives and accountability or legitimacy concerns (e. g. Lamothe et al., 2008). Empirical studies seeking to explain production choices predominantly rely on the longstanding transaction cost framework (TCF). Since cost-saving pressure is a permanent phenomenon in many local governments, the economic TCF with its central claim of cost minimization provides a valuable theory to explain service delivery decisions. Despite its continued strength, however, its strict imperative on economic efficiency does not sufficiently account for the political decision makers' need to maintain legitimacy by adhering to their normative contexts (Epstein and O'Halloran, 1999, Sullivan et al., 2013). Normative pressures underlying re-election motives and their behavioral implications are, in turn, what the political TCF centers around. In fact, extant research on government production decisions points to the synergistic value of adding political aspects to the economic TCF, especially for understanding ambiguous environments (e.g., North, 1990, Frant, 1996). This evidence suggests an explanatory power for the context of corporatization.

In particular, corporatization and thus (partial) decoupling from the bureaucratic "corset" can be motivated by a variety of self-serving and even contradictory incentives that potentially go beyond the pursuit of economic efficiency. This ambidexterity inherent in corporatization can be captured by factoring in political to standard economic transaction costs. So far, political transaction costs have not yet been extensively explored in the field of corporatization (see Camões and Rodrigues, 2021, Rodrigues et al., 2012, Tavares and Camões, 2007). Rodrigues et al. (2012) and Tavares and Camões (2007) studied the role of political transaction costs in the creation of Portuguese municipal corporations; Camões and Rodrigues (2021) did the same for their termination.

Relatedly, empirical research has neglected the role of declining transparency, which is one of the most pressing issues with regards to control and accountability claims under structural differentiation (Papenfuß and Schmidt, 2021, Schröter et al.,

2019). Moreover, while existing longitudinal studies cover municipal corporations within a range of different state structures and reforms in Canada (Bernier et al., 2022), Denmark (Gradus et al., 2014, Schoute et al., 2018), England (Andrews et al., 2020, Andrews, 2022), Germany (Lindlbauer et al., 2016, Stiel, 2022), Portugal (Tavares and Camões, 2007, 2010), and Spain (Alonso et al., 2022, Bel and Fageda, 2010), again underscoring the prevalence of corporatization, all use the corporatized entity (in direct public ownership) as the unit of analysis (binary capture) and thereby do not factor in subtle shifts in deeper ownership structures including first- and lower-tier subsidiaries. In this way, they miss recording critical decision points for or against intensified corporatization, mirrored in the purchase and disposal of shares. However, focusing on such subtleties would allow for more sensitive testing of the validity of theoretical arguments as a function of ownership level.

Motivated by these deficits in corporatization research, this study asks: Why do local governments create and reform public service companies, given the uncertain economic benefits and potential damage to service transparency and accountability? To this end, we map local governments' corporatization not only in directly owned entities but also in most first- and lower-tier subsidiaries and explore its determinants in the context of the 20-year theoretical debate on economic and political incentives, and countervailing reform. We also trace developments in Germany, a case representing a large and prosperous European economy with a distinct trajectory that has likely been reflected in local government decision making (Pollitt, 2006, Schröter et al., 2019). Thus far, German corporatization research has been chiefly theoretical or premised on specific sectors and limited datasets (Daiser and Wirtz, 2021, Edeling et al., 2003, Kilian et al., 2006, Lindlbauer et al., 2016, Linhos, 2006, Papenfuß, 2012, Stiel, 2022, Trapp and Bolay, 2003).

We extend existing literature in three ways: First, this study advances the understanding of corporatization through an innovative measure: We apply a continuous, comprehensive index of corporatization intensity in a city calculated using 680 investment reports from 34 cities in Germany's largest state, North Rhine-Westphalia (NRW), published between 1998 and 2017. In total, the index incorporates 11,062 year-corporatized entity combinations, integrating all major and most minor first- and lower-tier subsidiaries, and allows the description of intricate developments of corporatization. This has the obvious advantage of opening the prospect of considering corporatization intensity and separating direct and indirect ownership. From this, we learn that recent corporatization at the local level is not merely limited to creating public companies with direct municipal ownership but is instead driven by the development of increasingly complex subsidiary structures of indirect ownership. Relatedly, our results indicate that the impact of potential drivers is critically dependent on the proximity of the corporatized entity to the local government and thus on analytical depth.

Second, this measurement approach allows for more nuanced theorizing of corporatization. By combining economic with political transaction cost arguments

and testing them along ownership structures, we add this aspect to the discussion of public organizing in private law settings. Thus, we advocate for an integrative approach to understanding corporatization in its intricacy and ambiguity. Although some results are puzzling, political transaction cost arguments may be particularly suited to explain shifts toward lower-tier subsidiaries.

Third, we take advantage of panel data, which is relatively novel in corporatization research. By applying a two-way fixed effects regression within a 20-year panel dataset, we propose more robust estimates than those presented in most previous studies. Our central findings are that the local government's fiscal situation and the local mayor's economic orientation have a significant, albeit not unambiguous impact on corporatization. Moreover, following our results, the implementation of transparency-enhancing reforms is significantly related to lower corporatization intensity.

This article is structured as follows: In section 3.2, we embed the empirical phenomenon of corporatization into a theoretical background that combines economic as well as political transaction cost theory and allows us to derive testable research hypotheses. Section 3.3 provides detailed information about data and method. In section 3.4 we present descriptive and estimation results before we discuss these in section 3.5. Section 3.6 concludes.

3.2 Theoretical Background

We first position corporatization in the larger landscape of New Public Management (NPM) oriented reforms. We then build on economic and political transaction cost scholarship to derive a series of testable hypotheses about factors leading local governments to adjust their corporatization intensity (understood as the scope of corporatization). We also consider assertions about increasingly branched structures of directly and indirectly-owned German municipal corporations (Friedländer et al., 2021), arguing that the validity of theoretical arguments is sensitive to the analyzed depth of the ownership structure, that is, whether or not first and lower-tier subsidiaries of corporations are considered.

3.2.1 New Public Management and Corporatization

The administrative reform debates of the 1980s and 1990s were characterized by the economization of the public sector. The NPM agenda, with its management-oriented mode of governance, had a lasting influence on public administration, even though it was adopted inconsistently across countries (Proeller and Siegel, 2021, Hood, 1995). In Germany, a strongly federalist, legalistic country known for its distinct Weberian Rechtstaat tradition marked by principles of transparency, accountability, and impartiality, reform approaches endorsing private-sector elements like the corporatization of public service provision were viewed with at least some

skepticism while others, such as the United Kingdom, embraced a more market-oriented stance (e.g., Kuhlmann, 2009, Pollitt and Bouckaert, 2017).

The debate on the erosion of public-private distinction raised the concern that the associated structural differentiation would entail cultural differentiation by shifting institutional boundaries and actor constellations toward multiple – and to some extent even incompatible – norms, values, and attitudes (Haque, 2001). While some saw this as a promising path to lean, adaptive, and innovative administration (Skelcher and Smith, 2015, Tremml, 2021), others feared a loss of publicness in public services linked to important democratic foundations (Andrews et al., 2011, Berge and Torsteinsen, 2022, Voorn et al., 2017). Once converted to private law, local governments can only exert indirect influence over companies through incorporation, assemblies, boards, and the appointment of board members, with the extent of formal influence depending upon the scale of the stakes. The governance structure is multi-layered, comprising the mayor or a representative, city council delegates, and external shareholders (mixed-owned entities) who bring to the table their own modus vivendi. Thus, a tendency to associate corporatization with weakened centralized control and increased transaction costs becomes inevitable (Grossi and Reichard, 2008).

3.2.2 Extended Transaction Cost Explanations

A prominent argument for corporatized service provision of the time, as reflected in the economic TCF, was the pursuit of efficiency given the tight budgets over the last few decades (Amirkhanyan et al., 2007). The TCF suggests that any form of exchange is related to comparative costs, which impair efficiency. The most appropriate mode of service delivery is the one that economizes public service delivery by minimizing the transaction costs resulting from planning, (re-)negotiating, and managing relative to production costs (Petersen et al., 2019). Indeed, high transaction costs might be tolerated if they enable large savings in production costs and the net effect is beneficial (Williamson, 1989). But still, according to this idea it is more efficient to limit the need for interaction between two or more units involved in a joint task at every level of production costs.

For local government decision-makers this may have opposite implications. On the one hand, internal regulation could entail lower transaction or regulatory costs than external regulation involving managing multiple stakeholders with diverging logic or incentives (Fiss and Zajac, 2004). On the other hand, higher administration costs could accrue compared to out-of-house delivery due to extensive internal red tape. Given the degree of hierarchical control, however, the internal costs can offset the cost of external monitoring (Williamson, 1989).

However, the TCF has been criticized because its purely material understanding of costs ignores normative aspects induced by the political environment which co-shape production decisions (e.g., Dixit, 1998, North, 1990, Epstein and O'Halloran, 1999).

Individuals indeed are expected to pursue legitimacy within their field by rearranging organizational environments ("bureau-shaping") (Bergh et al., 2019, Dunleavy, 1991), seeking not necessarily productive efficiency but allocative efficiency (Frant, 1996).

Against this background, the transaction cost approach has been broadened to include political aspects, as not only economic trade but also political interaction is costly, and these considerations ultimately affect production decisions. Political transaction costs are those costs that can hurt the legislator's credibility and make re-election less likely. Decisions on production modes must be made considering that re-election is "the sine qua non of a public official" (Epstein and O'Halloran, 1999, p. 5) and weighing the risk of displeasing constituents (Christensen and Pallesen, 2001, Frant, 1996). As a result, decision-makers may tend to favor a particular profile of corporatized services that are not necessarily the most economical. Its effects have been investigated for directly-owned municipal companies. Tavares and Camões (2007) studied Portuguese municipalities and found that, especially in times of heterogeneous preferences, shifts to corporatized entities increased, minimizing political transaction costs. In a similar setting, Rodrigues et al. (2012) confirm that political legitimacy concerns were crucial in transfer decisions. Evidence of the presence of effects in altering levels of ownership, however, remains scant.

In particular, economic efficiency arguments seem less plausible in the case of indirect municipal ownership of lower-tier subsidiaries of corporatized entities, which are often associated with large operator autonomy (Voorn et al., 2017). While they may yield efficiency at the firm level, conceived from a central control understanding, these distant entities are likely prone to inefficiencies because oversight becomes ever more intricate, and add another layer of compromises, delays and risks inherent in joint working (Vangen, 2017). Simultaneously, the parent company steps in as an additional actor between the principal and the agent, resulting in even less discretionary power for the local government (Egeberg and Trondal, 2009). Depending on the governance structure of these sub-subsidiaries, corporate decisions may be made by the parent company's board, but the formal proximity to the local government inevitably diminishes (Stiel, 2022, Trapp and Bolay, 2003). Thus, if arguments in favor of transferring public service provisions into private law to increase economic efficiency no longer apply as clearly in the case of indirectly-owned companies, other motives may underlie a transfer decision. Following the logic of the TCF, we argue that political legitimacy is a potential driver for increasing the intensity of corporatization towards indirect municipal ownership. We discuss this basic assumption in terms of three aspects of local government and examine at which level of ownership, if any, they show an effect: Fiscal burden, the economic orientation of decision-makers, and transparency-enhancing reform measures. All three aspects are frequently associated with production decisions in the reviewed literature but, so far, have received no empirical investigation as drivers of corporatization intensity concerning different tiers of public ownership.

For decades, cities across Europe, including many in Germany, have suffered from extensive debt and fiscal pressure (e.g., Freier and Grass, 2013). From a TCF standpoint cities have a stronger urge to seek efficiency in times of austerity. Whether this actually leads to hived-off service delivery remains somewhat ambiguous (e.g., Andrews et al., 2020, Bel and Fageda, 2010, Brown and Potoski, 2003, Schoute et al., 2018). We pursue the argument of Andrews et al. (2020) saying that high levels of fiscal pressure incentivize local governments to transfer activities to (new) corporate entities. Moving public services to the jurisdiction of private law allows greater flexibility in circumventing legal constraints on state-imposed debt limits and in accessing financial resources compared to "the rigidity of the public purse" (Schröter et al., 2019). Taking out loans, fixing wages, and generating extra revenue can relieve municipal coffers to bridge periods of austerity (Tavares, 2017).

However, there are conceptual differences between temporary and constant fiscal hardship. Temporary fiscal hardship is primarily linked to fiscal variables with high volatility induced by business cycle fluctuations, such as business tax revenues or short-term debt (Boettcher et al., 2019). The latter must be repaid within one year and is usually used to keep the municipal cash flow running, especially in times of crisis. Therefore, it is closely tied to the local government's core budget. As such cyclical but also unexpected natural or human-made crises can occur, indebted local governments are incentivized to increase efficiency by corporatizing public services but prefer to keep their economic assets for (re)development at arm's length (Schröter et al., 2019). Short-term fiscal hardship may therefore prompt local governments to intensify more accessible direct ownership corporatization. In terms of the economic TCF, these aspects lead cities in acute fiscal distress to favor direct over indirect ownership.

Constant fiscal hardship, in turn, is linked to less volatile fiscal variables like demography-related expenditure needs or long-term debt with maturities greater than 12 months. These follow a different logic because they are often investment-related, structural and not easily reversed in a positive direction. Highly indebted local governments can transfer and hide portions of their financial activities (including debts) particularly to entities that are more hidden at lower ownership levels (Herrmann, 2012). However, once a corporatized entity is indirectly-owned by the government, this leads to additional transactions and increases the need for costly coordination and oversight, counteracting expectations of more economically cost-efficient task performance through private law (Sørensen, 2007). While indirect ownership is not ultimately attractive from the perspective of economic transaction costs, from the perspective of the political transaction costs, delegating tasks to indirect ownership may be explained by the desire for political benefits achieved by (cosmetically) eking out municipal coffers. Brender (2003) and others show that a mayor's re-election probabilities are indeed linked to the local government's fiscal performance. Thus, prosperity is signaled to constituents, potentially improving re-election prospects

(Christensen and Pallesen, 2001). In light of this, the following hypotheses are proposed:

Hypothesis 1a: *Constant fiscal hardship is positively related to corporatization, especially to indirect ownership.*

Hypothesis 1b: *Temporary fiscal hardship is positively related to corporatization, especially to direct ownership.*

Although mayors in European countries constitutionally hold different voting rights in the decision-making council, they function as its ex-officio chair and can provide impetus and set agendas (Wollmann, 2004), thereby driving reform and policy change (Damanpour, 1991).

Consequently, it can be assumed that mayors with economic spirit and capabilities will lead the organization toward arrangements outside the bureaucratic corset like corporatization, as they may find it difficult to make public service provision more efficient due to inflexible rules and routines, a tendency toward risk avoidance, or institutional closure (Gupta et al., 2014, Hartley et al., 2013). This spirit may be reinforced by years spent in the private sector or business-related education, as experience provides the impetus and knowledge to deal with uncertainties surrounding the creation and maintenance of new entities, alleviating transaction costs (Brudney et al., 2005, Cabral, 2017, Noordegraaf et al., 2005). This explanation is certainly stronger for direct ownership when economic-minded mayors seek monetary cost-cutting solutions. It has less explanatory power in the case of indirect ownership where potentially higher transaction costs through more intense coordination accrue.

In addition to private sector experience and business-related education, the mayor's party affiliation also provides insight into their attitude toward market-oriented public service delivery. Research on partisanship often employs a left-right contrast, stating that bourgeois parties tend to be less hesitant about marketization (e.g., Petersen et al., 2015), but there is limited empirical backing supporting this claim regarding production choices (Bhatti et al., 2009). We argue that conservative mayors may bring greater business expertise and satisfy their political camp by increasing municipal economic activity even towards indirect ownership, thus fitting their normative context (Andrews, 2022, North, 1990). In doing so, they may also give strategic leeway to private partners' affairs or position loyal management staff to serve as an extended arm of personal interests (Schröter et al., 2019, Stiel, 2022), potentially reducing political transaction costs. Given these reasons, we examine the relevance of economically oriented mayors in the intensification of corporatization. The aggregation of these arguments results in the following hypothesis:

Hypothesis 2: *The more pronounced the incumbent mayor's economic orientation the more intense the corporatization at direct ownership levels.*

The rise of corporatization, with its potential influx of business logic into the public sector, entailed critical transparency and accountability deficits and prompted

institutional responses aimed at countering "shadow budgeting" or "bureau-shaping". One instance is the self-regulatory public corporate governance code established in German cities and elsewhere (Papenfuß and Schmidt, 2021) which represents the adoption of monitoring practices. Papenfuß and Schmidt (2021) testify to their intended effect of strengthening accountability. Another example is implementing the consolidated statement in local government's financial reporting as part of Germany's NPM-related local government accrual accounting reform. This statement provides the complete picture of the financial situation of the core budget and the budgets of all public companies and therefore enhances transparency. Wedlin and Sahlin (2017) highlight a shift in the discourse toward transparency, which follows the logic of an enhanced "audit society", instilling "new norms and values by which external regulatory mechanisms transform the conduct of organizations and individuals (...)" (p. 115).

From an economic TCF perspective, deeper insights into corporate behavior are associated with higher monitoring costs, but these may be offset by higher levels of information and reduced uncertainty (Brown and Potoski, 2003, Williamson, 1996). From a political TCF perspective, increased transparency in the event of deviation from altering norms is associated with the risk of escalating political transaction costs. Avoiding these costs may make legislators withdraw, especially from lower levels of corporatization.

Reforms are likely to enhance transparency if the related reporting mechanisms provide more comprehensive insights into corporatization practices and local government budgets (Santis et al., 2019). This is why they have the potential to prevent organizations from allocating liabilities to corporations and from avoiding evaluation in an attempt to decouple from the "bureaucratic corset" (Grossi and Reichard, 2008), and thus, from deviating from legitimate norms (Schröter et al., 2019). Consequently, evidence of the effectiveness of these self-regulatory reforms, particularly on companies that can hide at lower ownership levels, would suggest that they lose their instrumental political purpose of "self-interest seeking with guile" (Williamson, 1975, p. 6) and that normative pressure does inform these delivery decisions. We thus propose the following hypothesis:

Hypothesis 3: *Introducing transparency-promoting policy reforms adversely affects especially lower levels of corporatization.*

3.3 Data and Method

To validate the hypotheses, NRW cities of 50,000 to 500,000 inhabitants (as of 2017) were selected. NRW was chosen for several reasons. First, it has the highest number of cities with more than 50,000 inhabitants of all German states. Simultaneously, the focus was put on one federal state to ensure legal and institutional homogeneity within the dataset. For comparability, cities with a population above 500,000 were

not included for their unique administrative and ownership structures. Second, many NRW cities have long suffered from high fiscal pressure (Freier and Grass, 2013), rendering them appropriate for analyzing the relevance of the budgetary situation. Third, this state's local law is more restrictive of direct mayoral influence on corporatized entities than most other German states. The effects of the NRW mayors' economic inclinations, if identified, can therefore be transferred to other states in which the mayor has greater power.

Data on each city's corporatized service provision was collected manually from 680 annual investment reports across 34 cities over 20 years (1998-2017) (for a complete list of cities as well as their geographical distribution see Appendix 3.A, Table 3.A.3 and Figure 3.A.3). Of the 72 NRW cities that met the population size criterion, 34 still had all reports available in their archives. A comparison of means and empirical distributions shows that the sample cities do not differ systematically from non-sample cities in size or debt per capita (see Appendix 3.A, Figure 3.A.1). The retrieved data comprises investment shares of companies of which the city is a full of partial direct owner as well as all subsidiary companies and subsidiaries of the subsidiaries. Thus, most companies directly or indirectly affiliated with each local government are mapped and their development is tracked for over 20 years. Corporatized entities where a city holds less than ten percent of the investment share are not part of the index since many investment reports do not include such low-relevance companies.

3.3.1 Dependent Variables

Investment shares were used to calculate an index of corporatization intensity following Trapp and Bolay (2003) (Figure 3.1). For instance, if a city owns 75 percent of a corporatized company, the index increases by 0.75. If the company has a 100 percent-owend subsidiary, the index again increases by 0.75 (= 0.75 times 1), and so on. For index calculation, all shares a city holds in its different corporatized companies and their subsidiaries in a specific year are summed up. In our sample, the resulting values range between 0.52 and 23.97 and critically depend on whether we integrated subsidiaries in a specific index version or not.

As larger cities usually have more corporatized entities, their index is naturally higher; therefore, it was weighted by population size (average per city from 1998-2017). This index is our dependent variable. Within the period of interest, certain cities had developed complex corporatization structures with six or more subsidiary levels. Our index is a straightforward way to capture this complexity.

To provide a comprehensive picture, different index versions were developed. The three base indices depend on the corporatized companies' proximity to the local government. Index 1 includes those entities in which the city has full or partial direct ownership. Index 2 adds the first-tier subsidiaries of directly owned companies to index 1. Index 3 integrates all existing subsidiary levels. For each of these three

indices, we differentiate two ownership levels in which the city directly or indirectly holds more than 25 percent and secures a blocking minority or more than 10 percent, representing the most comprehensive notion of the municipal group. For example, the index with direct ownership of more than 25 percent includes only those corporations in which the city directly holds more than 25 percent and, therefore, enjoys the power to veto company decisions. By contrast, the index that reflects the city's entire corporatization structure includes all directly owned corporations as well as all first and lower-tier subsidiaries with ownership of more than 10 percent. We use the three base indices (direct, direct plus subsidiaries of tier one, and entire municipal group) with ownership levels of at least 10 percent to depict the development of corporatization intensity over time. For the subsequent panel regression analysis, we employ indices representing direct ownership versus the entire municipal group for share levels of at least 10 percent and 25 percent because we believe that comparing the extremes in corporate structures will bring the most nuanced results. In total, we employ five index versions. The upper panel of Table 3.1 lists descriptive statistics for all of them.

3.3.2 Independent Variables

Based on a comprehensive review of the scholarly literature on local decision-making behavior in general and corporatization in particular, we derived 14 potential independent drivers to be added to the panel. Data was collected from our own research or the federal and NRW Offices of Statistics.

We use four variables to explain the financial state of the core budget and to account for fiscal hardship: one for revenue, one for expenditure, and two for the debt of differing maturity. Long-term debt comprises all debt held by public or private banks plus local government bonds excluding the non-investive short-term debts a government takes on to cope with temporary liquidity constraints. The latter is a

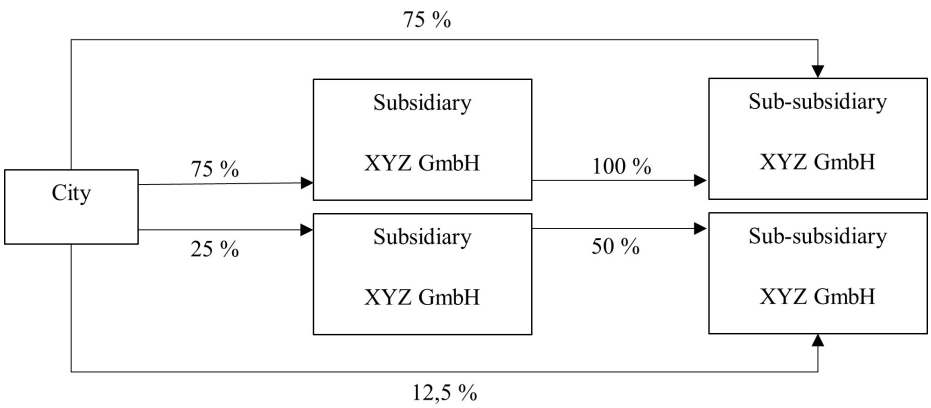


Figure 3.1: Examples of calculated corporatization intensity derived from Trapp and Bolay (2003, p.22).

common indicator of immediate fiscal stress (Boettcher et al., 2019) whereas high long-term debts imply general fiscal hardship (Deutsche Bundesbank, 2021). Business tax is the most relevant source of local tax revenues. It fluctuates with the business cycle and is, therefore, another variable linked to short-term fiscal stress. In contrast, youth share is considered a stable and relevant indicator of expenditure needs.[27] German local governments are responsible for several expensive youth-related public services which they are obligated to provide. Compared to the actual youth-related public expenditure, the advantage of using this variable is that it represents actual expenditure needs rather than just the money spent (which may be insufficient). In general, it is more closely related to long-term fiscal hardship. All budget-related variables are measured in levels.

Three variables measure the mayors' economic orientation potentially leading toward alternative ways of organizing. One is the mayors' education, depicted by a dummy that is 1 if a mayor possessed business-related education and 0 otherwise. Another dummy mirrors private sector work experience gained before the election (1 if yes, 0 otherwise) which might indicate a business orientation (Brudney et al., 2005). Finally, the mayors' party affiliation dummy indicates whether they are members of a leftist (1) or a conservative (0) party.

The hypothesis of a negative impact of reforms on enhancing transparency in corporatization was operationalized using three further dummies representing three local policy reforms introduced in NRW. These reforms were potentially directional in terms of formal restrictions and cultural expectations. In line with national and EU-wide standardizing tendencies, NRW adopted a mandate for accrual accounting at the municipal level in 2009. Corresponding legislation required local governments to publish consolidated statements, which combine the financial reporting of all corporations with the government's core budget, from 2010 onward (Land Nordrhein-Westfalen, 2004). Despite this legal mandate, there has been compliance inertia in some NRW local governments[28] since smaller municipalities with few qualified personnel eschewed the effort to prepare these statements (Eckstein, 2019). Almost simultaneously, some local governments established self-regulatory public corporate governance codes, similar to those in other EU countries (Papenfuß and Schmidt, 2021). The enactment of a strengthening pact from 2011 onwards provided extensive aid for over-indebted NRW cities, which in turn had to submit regular and transparency-enhancing evaluation reports (Holtkamp and Fuhrmann, 2014). The dummies took the value of 1 for years when the reform was in effect and 0 for preceding years.

Table 3.2 gives an overview of our hypotheses, related variables, and the expected effects on cities' corporatization intensities. We control for city size with total

[27]Youth share: Ratio of the number of people under 20 years of age to those between 20 and 65 years of age.

[28]In 2019 (after the period of interest), the state parliament made this requirement optional for cities where the municipal group is of less budgetary relevance (Koerner and Littkemann, 2020)

	mean	sd	min	max
Dependent Variables				
Index (10 percent/direct)	4.033	1.998	0.864	9.650
Index (10 percent/direct + indirect$_1$)	6.761	3.278	0.864	19.61
Index (10 percent/direct + indirect$_{all}$)	7.752	4.101	0.864	23.97
Index (25 percent/direct)	3.828	1.970	0.515	9.409
Index (25 percent/direct + indirect$_{all}$)	7.231	3.917	0.864	23.12
Independent Continuous Variables				
Long-term debt (pc)	12.50	6.210	0	33.57
Youth share	33.00	2.599	26.01	39.85
Short-term debt (pc)	8.333	12.32	0	75.07
Business tax revenue (pc)	4.449	2.118	0.343	18.01
Personnel expenditure	78.85	91.41	17.27	645.1
Limited contract share	4.698	3.004	0	21.33
Independent Dummy and Count Variables				
Consolidated statement	0.125	0.331	0	1
Strengthening pact	0.094	0.292	0	1
Pub. Corp. Gov. Code	0.104	0.306	0	1
Election year	0.200	0.400	0	1
Educ. mayor	0.150	0.357	0	1
Priv. sector exp. mayor	0.265	0.442	0	1
Party mayor	0.438	0.497	0	1
Party council	0.346	0.476	0	1

Table 3.1: Descriptive statistics of the model variables. Long-term debt, short-term debt, and business tax revenue per capita are measured at 100 Euros; total personnel expenditure is measured in Mio. Euros; and limited contract/youth share is a percentage. To give an impression of index values as sum of shares, the descriptive numbers of the dependent variables are not population weighted. The index versions "direkt + indirect$_{all}$" represent the entire municipal group at different levels of onwership. All data stem from either own research or the NRW and Federal Offices of Statistics.

personnel expenditures and for current organizational instability with the limited contract share.[29] Since we assume that the corporatization of a public service is a complex procedure that takes time, one year lagged versions of all explanatory variables were used. This has the additional advantage that it limits the risks of reversed causality. To account for potential election cycle influences, we included a dichotomous variable for local government elections and a dummy that indicated whether the city council is dominated by a more leftist or conservative majority (Garmann, 2017).

[29]Personnel expenditure is superior to the number of inhabitants since the latter time series shows an artificial jump related to the adjustment of population numbers after the German census in 2011.

Hypothesis	Variable	Expected effect	Level of corporatization
H1a	Long-term debt p.c.	+	esp. indirect corp.
	Youth share	+	esp. indirect corp.
H1b	Short-term debt p.c.	+	esp. direct corp.
	Business tax revenue p.c.	-	esp. direct corp.
H2	Education mayor	+	esp. direct corp.
	Private sector experience mayor	+	esp. direct corp.
	Party affiliation mayor	-	esp. direct corp.
H3	Consolidated Statement	-	esp. indirect corp.
	Public Corporate Governance Code	-	esp. indirect corp.
	Strengthening Pact	-	esp. indirect corp.

Table 3.2: Overview of hypotheses, variables, and expected effects on cities' corporatization intensities. "Plus" indicates an expected positive effect, whereas "minus" indicates an expected negative effect.

3.3.3 Methodology

Our empirical analysis is based on a two-way panel regression with city and time-fixed effects. We checked for multi-collinearity (O'Brien, 2007, see Table 3.A.2 in the Appendix 3.A) and implemented Driscoll and Kraay (1998) standard errors since correcting cross-sectional correlation (De Hoyos and Sarafidis, 2006) was necessary following a Pesaran CD test indicating the existence of neighboring effects (Hoechle, 2007). Driscoll and Kraay's standard errors account for this. The baseline regression model is:

$$Y_{it} = \alpha + \beta_{0+b} X_{itb} + \beta_{10+c} Q_{itc} + \eta_i + \rho_t + \epsilon_{it} \tag{3.1}$$

$$i = 1, ..., N; t = 1, ..., T; b = 1, ..., B, c = 1, ..., C$$

The model describes the response of corporatization intensity Y of the city i in year t to two sets of explanatory variables: B relevant model variables X_{itb} that are related to the hypotheses (Table 3.2) and C control variables in the vector Q_{itc}. The city-fixed effects η_i account for the city's unobserved time-invariant characteristics, which may impact corporatization intensity. For example, the general industrial composition, spatial proximity to the national border or large cities, area, surface structure, or centralization of districts with the related size and cost of infrastructure. The year fixed effects ρ_t cover observed and unobserved macro-developments, such as common shocks affecting all cities simultaneously; for example, the 2008 financial crisis and the related strengthening of budget rules. ϵ_{it} is the unexplained residual. Accounting for fixed effects may push estimates closer to a causal interpretation; to avoid reverse temporal causality, all variables entered the regression function in first lags. The baseline estimation covers the entire period (1998-2017). As a robustness check, we re-estimate the model for a limited period (2008-2017).

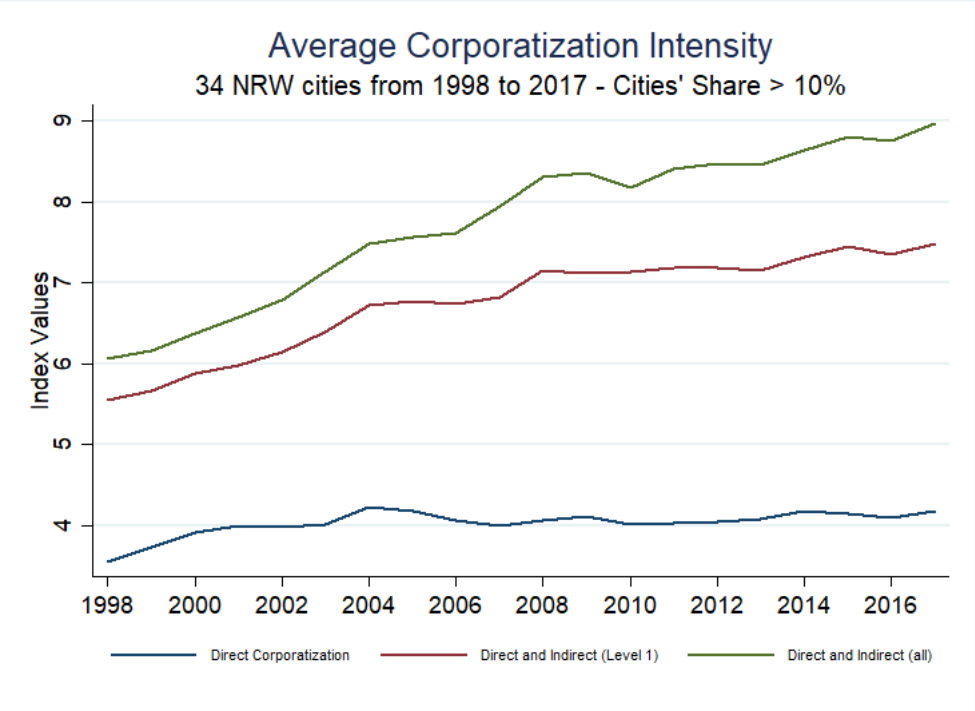


Figure 3.2: Average corporatization intensity on three different levels: Direct corporatization (government holds shares of the entity – bottom line), direct and indirect corporatization of tier one (government holds shares of an entity which holds shares of another entity – middle line), and direct and indirect corporatization on all tiers (entire multilevel corporatization structure – top line).

3.4 Results

Figure 3.2 displays the development of three average corporatization indices for 34 NRW cities from 1998 to 2017. All three indices include corporatized entities with cities holding at least 10 percent. Index 1 covers only direct ownership (blue line), index 2 adds first-tier subsidiaries (subsidiaries of directly owned companies, red line), and index 3 captures the municipal group in its entirety (by adding all lower-tier subsidiaries to index 2, green line).

The descriptive analysis reveals an ascending corporatization intensity in all three displayed subsidiary levels.[30] The longitudinal increase in index 1 was modest compared to the other two indices: After an upturn from 1998 to 2004, the intensity remained relatively constant. As index 3 also includes those direct corporatizations of index 1, its increase can be traced to alterations in the highly branched sub-levels of indirectly owned corporations. However, some nuances were observed. The overall increase slowed down in the years following the 2008 financial crisis. By 2010, the overall index dynamics returned to their pre-crisis pattern.

In the second step, a two-way fixed-effects panel regression for four specifications differing in the dependent variable was implemented (Table 3.3). Models 1 and 2 analyze the potential drivers of the corporatization of directly owned entities

[30]The observed ascending corporatization intensity is largely driven by activities in the service sectors supply, transport, and waste management (see Figure 3.A.2 in the Appendix 3.A).

where the city holds more than 10 percent or at least 25 percent, while models 3 and 4 capture corporatization intensity within the entire municipal group, again differentiating between ownership levels of more than 10 percent and more than 25 percent. All explanatory variables entered the regression in their first lag.

For many variables, effect signs, significance levels, or both differ in terms of direct ownership as compared to the complete municipal group. For example, the point estimate of lagged long-term debt per capita is significant only for models 1 and 2. That is, from 1999-2017, a higher level of long-term debt of 100 Euros per capita in the previous year's core budget is associated with a lower level of corporatization intensity, represented by a population-adjusted index that is 0.052 points lower for an ownership level of at least 10 percent, while not affecting corporatization intensity within the complete municipal group. A higher level of short-term debt per capita as an indicator of immediate fiscal crisis and a higher level of the youth share as an indicator of expenditure needs produce significant negative point estimates only for the entire municipal group (models 3 and 4). The coefficient of the consolidated statement dummy indicates that the implementation of the reform is significantly related to a lower level of corporatization intensity over the entire municipal group one year later. Contrarily, no significance for directly owned entities is observed. The point estimates for implementing a public corporate governance code imply the opposite. Additionally, the incumbent mayor's party produces ambiguous point estimates regarding the corporatization of directly versus indirectly owned entities. Although a switch from a conservative to a leftist mayor in year t-1 is related to lower level of corporatization intensity regarding directly owned entities in year t, it is also linked to significantly higher corporatization intensity at lower-tier subsidiary levels. The election of a mayor with a business-related education coincides with higher corporatization intensity among directly owned companies one year later. Point estimates are consistent over all models and significant for directly and indirectly owned entities for business tax revenue per capita (negative), the strengthening pact (negative), limited contract share (positive), personnel expenditures (negative), and the mayor's private sector experience (negative).

To check for robustness, we re-estimated models 1 to 4 (Table 3.3) for a limited period (2008-2017). Results differ slightly from the estimation for the entire period. The limited period only starts with the global financial crisis and covers the subsequent government debt crisis as well as the recovery period. From 2008-2017, all reforms enhancing transparency were implemented. The point estimates support the negative coefficient of lagged personnel expenditure related to directly owned entities (Appendix 3.A, Table 3.A.1). They also support the coefficient of the youth share, the negative and significant estimate for the consolidated statement, the strengthening pact, and the mayor's characteristics. All point estimates for long-term debt are insignificant from 2008 onward whereas lagged short-term debt produces a significantly positive coefficient regarding the corporatization of directly owned entities. Lagged council ideology has a positive/significant point estimate, whereas

		Direct Ownership		Complete Municipal Group	
		Model 1 (10%)	Model 2 (25%)	Model 3 (10%)	Model 4 (25%)
H1a	L.Lt.debt	**-0.052*** (0.012)**	**-0.050*** (0.012)**	0.027 (0.019)	0.023 (0.017)
	L.Youth share	-0.038 (0.030)	-0.043 (0.032)	**-0.111* (0.056)**	-0.089 (0.060)
H1b	L.St.debt	-0.006 (0.011)	-0.004 (0.010)	**-0.025* (0.013)**	**-0.024* (0.012)**
	L.B.Tax.rev	**-0.050*** (0.016)**	**-0.049*** (0.015)**	-0.041 (0.027)	**-0.048* (0.025)**
H2	L.Party mayor	**-0.357** (0.135)**	**-0.359*** (0.117)**	**0.542*** (0.173)**	**0.522*** (0.171)**
	L.Educ. mayor	**0.190** (0.081)**	**0.237** (0.085)**	-0.057 (0.246)	0.146 (0.231)
	L.P.sec.exp.mayor	**-0.420** (0.196)**	**-0.388* (0.191)**	**-0.542*** (0.182)**	**-0.470** (0.198)**
H3	L.Cons. statement	-0.192 (0.199)	-0.198 (0.200)	**-0.494* (0.242)**	**-0.697** (0.249)**
	L.Strength pact	**-0.365*** (0.125)**	**-0.346*** (0.115)**	**-0.808** (0.348)**	**-0.634* (0.310)**
	L.P.C.G.Code	0.158 (0.173)	0.123 (0.164)	**0.795** (0.352)**	**0.847** (0.356)**
Controls	L.Pers. exp.	**-0.002** (0.001)**	**-0.002* (0.001)**	**-0.003* (0.002)**	-0.002 (0.002)
	L.Election	0.046 (0.093)	0.045 (0.071)	0.101 (0.123)	0.111 (0.111)
	L.Party council	-0.108 (0.109)	-0.107 (0.123)	**-1.046** (0.426)**	**-1.175** (0.463)**
	L.Lim. contract	**0.041*** (0.007)**	**0.035*** (0.006)**	**0.136*** (0.037)**	**0.132*** (0.033)**
Time/City FE		YES	YES	YES	YES
Observations		646	646	646	646
Groups		34	34	34	34
R-square (within)		0.1546	0.1485	0.3819	0.3401

Table 3.3: Two-way FE regression with Driscoll-Kraay's standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

	Variable	Expected sign	Point estimates direct ownership		Point estimates entire group	
			1998-2017	2008-17	1998-2017	2008-17
H1a	Lt. debt	+	-			
	Youth share	+		-	(-)	-
H1b	St. debt	+		+	-	
	B.tax	-	-		(-)	
H2	Educ. mayor	+	+	+		(-)
	P.sec.exp.mayor	+	-	-	-	-
	Party mayor	-	-		+	+
H3	Cons. statement	-		-	-	-
	P.C.G.Code	-		(-)	+	
	Strength. pact	-	-	-	-	-

Table 3.4: Summary of hypotheses, expected, and estimated significant point estimates in all models. A sign is reported without parentheses if corresponding results are significant over the 10 percent and 25 percent ownership level, that is, either in model 1 and 2 or in model 3 and 4. A sign in parentheses refers to a point estimate which is only in one of the two ownership levels (i. e., model 1 or 2, model 3 or 4) significant. Signs are presented for the entire period (1998-2017) and for the limited period (2008-2017), which is to be understood as a robustness check.

the negative/significant estimate on the complete municipal group remains stable. Additionally, election years play a role after 2008. Although re-estimation for the limited time period produced different significance levels of certain potential drivers, there were no sign switches for the significant point estimates in the short versus the long panel. Hence, the robustness check strengthens the results of our full-period estimations.

3.5 Discussion

Apart from temporal downturns, there has been a steady increase in corporatization since 1998. Gradus et al. (2014) observe a similar pattern for Dutch municipal refuse collection companies; we extend this discussion with the insight that the most significant dynamic occurred within the complex corporate governance structures of indirect ownership.

Major organizational turnover was revealed at the lower levels, making it increasingly costly to make centrally rigorous assessments of the need for legitimate change under accountability requirements. This pattern suggests extensive efforts to maneuver outside the bureaucratic corset without moving into full privatization. Apart from illustrating a country's ambivalent market attitude, this may also exemplify an attempt to find an alternative and balanced strategy after amassing negative experiences with private contractors that may have damaged legitimacy or caused a hole in the municipal coffers (e.g., Hefetz and Warner, 2004, Voorn et al., 2021). It also indicates ambidextrous motives for corporatization and in search of its drivers justifies taking the perspective of the extended TCF.

Table 3.4 summarizes our hypotheses as well as expected and estimated significant effects across all models. In sum, the results support H1a and H1b only partially. However, they demonstrate that a deteriorating economic situation with a dip in public revenues is generally associated with higher levels of corporatization intensity. When the only way to keep up with payments is a higher level of short-term debts, cities seem to reach out to the closest corporatized entities and increase their corporatization (at least, since 2009) at the cost of corporatization across the municipal group. However, in times of higher levels of long-term debt, our results caution that cities tend to limit direct corporatization. In sum, this indicates that the fiscal situation drives municipal corporatization. Understanding business cycle-dependent business tax revenues and short-term debts as appropriate indicators of immediate fiscal stress, the findings confirm the assumption that cities use corporatization as a rational tool for monetary cost reduction in times of fiscal stress (Andrews et al., 2020), especially among directly owned entities, which is consistent with the theoretical reasoning regarding economic TCF as an explanatory framework for production decisions as presented above.

In addition, there is some - but limited - support for the existing debt shift critique concerning political profiling (Herrmann, 2012) since a higher level of long-term debt is associated with lower levels of corporatization among directly owned entities but, simultaneously, a higher level of corporate activity in the entire municipal group. Although the latter result is insignificant, the coefficient signs at least hint at the potential transfer of long-term burdens from the core budget to deeper municipal group levels.

As one of the most intensely discussed corporatization drivers, fiscal pressure behaves differently depending on the level of ownership, encouraging the pursuit of nuanced theorizing on corporatization. This may be the most relevant understanding as regards the ongoing scholarly discussion.

Expectations could not be confirmed concerning the mayors' economic orientation, meaning there is no unambiguous support for hypothesis two. This limited support may also be due to institutional restrictions (e.g., NRW's veto players). Once a leftist mayor replaces a more conservative predecessor, corporatization slows among directly-owned entities but picks up across the entire municipal group. This puzzling effect affirms the importance of including lower levels of subsidiaries in the analysis and may be explained by Tavares and Camões (2010) who consider corporatization a "middle ground" strategy. They show that in Portugal, left-wing local governments have opted for municipal corporations and not full privatization, considering the former's better fit with their ideological framework, thus still backing up the political TCF's aspect of the high-power incentive of re-election (Frant, 1996). From this standpoint, strategic expansion within lower-tier subsidiary levels – in the case of mixed-ownership – may also aim to push back the powers of private partners in corporate operations. However, the replacement of a mayor without any private sector experience by a mayor with such experience is associated with lower levels of

corporatization intensity. Interestingly, business-related education has the opposite effect on directly owned entities. While it seems to support a mayor's positive attitude toward out-of-house production (Noordegraaf et al., 2005), private sector experience does not. A potential explanation is the incumbents' disillusionment with business logic and a concomitant shift in claims to legitimacy, as already indicated by their distancing themselves from the private sector by entering the public sector (Brudney et al., 2005).

Two of the transparency measures examined (consolidated statements and the strengthening pact with its reporting mechanisms) had a dampening effect in line with our third hypothesis. This reinforces arguments for effective normative control in the form of a proliferating "audit society" (Wedlin and Sahlin, 2017). It also highlights previous attempts to evade unwanted insights into corporatized operations, potentially motivated by the shift of financial activities out of the core budget – a phenomenon to which our results only point cautiously but which has been addressed by earlier publications (Herrmann, 2012). While this may be an effective means to directly relieve municipal coffers, it is unlikely to be premised on austere efficiency motives, which in turn underpins the relevance of alternative TCF explanations such as legislators seeking allocative efficiency favoring re-election. It also stimulates research to examine more closely the interplay between shifting transparency and transaction costs in service provision for which public corporate governance codes, once adopted even more widely, offer a major empirical opportunity. With regards to our results their adoption seems to reduce corporatization among directly-owned firms but to spur it when it comes to the creation of new first and lower-tier subsidiaries. This is not in line with our third hypothesis but may be explained by the fact that public corporate governance codes not only increase transparency but also professionalize the modes of steering, consequently decrease transaction costs related to more distant public companies, and ultimately render this form of corporatization more attractive.

Should the illustrated upward trend in corporatization intensity persist and bring about a "field-level change" in European public administration (Voorn, 2021, p. 1) despite increased regulation, it can be assumed that corporatization will be established as a viable means more aligned with national standards of good governance. However, should the trend reverse as intensified evaluations become the norm, corporatization in its current form may prove unsuitable as a democratically legitimate mode of service provision. A deeper analysis is critical to determine whether the trend and its drivers can be attributed to specific business sectors while others may experience unexpected ex-post economic or political transaction costs leading to inefficiencies, company closures, or disposal of shares.

We suggest our findings are generalizable to other states and countries, especially those in which local governments enjoy sufficient freedom of self-governance. First, this is because corporatization is an international phenomenon that follows similar logics and spurs similar discussions in Germany and beyond. Second, although many

NRW cities have suffered from fiscal hardship in the past, similar fiscal patterns are also found in other countries. Third, neither the accrual accounting reform nor local government rescue programs demanding greater transparency are exclusive to NRW. Finally, the mayors' influence in corporatized entities is more restricted by the NRW local law than in other German states. Consequently, stronger impacts than those witnessed in NRW may exist elsewhere.

We enrich previous research in several regards; however, some limitations should be acknowledged. The economic versus political efficiency/rationality dichotomy and its underlying simplified decision schemata should be treated with caution. Organizational actions may appear blatantly economically inefficient, but may well be utilitarian and rationally motivated. Moreover, consistent with the two-stage model of innovation, proposed by Tolbert and Zucker (1983), it may be that the economic efficiency motives drive the early initiators of corporatization; once the corporatized entity is institutionalized, shifts in its depth and intensity may well stem from legitimacy concerns or vice versa. In-depth process tracing of single cases could help to clarify multi-layered decision patterns. Similarly, as with all theoretical constructs, the TCF's validity is not absolute. While the TCF premises public sector reform on an internally consistent sequence of (bounded) rational decisions yielding cost- or allocative efficiency, others suggest it to be a not-so-straightforward process of sense-making (Thornton et al., 2012). In other words, while this study represents a contribution to forming a more integrative theory, synergies need further elaboration and refinement to fit the corporatization puzzle along structural and temporal dynamics.

Although our panel comprises enough data points for a fully-fledged fixed-effects regression analysis of corporatization drivers, future research should expand to larger datasets with more cities and case settings. Additionally, while our index has ample explanatory power for the phenomenon of corporatization, its decline does not ultimately imply repatriation. This may also be the consequence of externalizing services to other delivery modes. Since the index is also based on shares, it does account for gradual shifts in formal autonomy; however, actual or perceived autonomy may vary (Krause and Van Thiel, 2019, Stiel, 2022). Research could employ vignette studies to examine high-power incentives more profoundly.

Furthermore, our index does not incorporate company size. It therefore neglects the fact that one big corporation may have a far more significant financial impact on the local government budget than numerous minor companies. The majority of investment reports did not contain the necessary raw data. However, such a weighting scheme would enhance the explanatory power of the index, especially concerning fiscal variables, and, given an improved future data landscape, serves as a promising outlet for research.

Regression models can potentially suffer from omitted variable bias; thus, corporatization intensity may be related to additional unobserved time-varying factors. For example, we recommend testing the effects of the city treasurer's characteristics along

with those of the mayor. In fact, our findings illustrate that dualistic systems cannot be understood solely through the mayor's role. Future studies on corporatization that attempt to capture local decision-making must consider the city council as another key authority. To avoid oversimplification, it should be noted that the council's political majority only served as a control variable in our analysis. Other parameters, such as party coalitions and the degree of party fragmentation could add further value to the picture.

Additionally, prospective longitudinal analyses should compare federal states or countries with different reform trajectories and, since our index conflates all services, pay more attention to the kinds of functions delivered through corporations. TCF provides important information about transaction attributes such as asset specificity, complexity, and frequency (Williamson, 1996) or the level of trustworthiness (e.g., Dyer and Chu, 2003) that assist in decision-making for or against corporatization. TCF also predicts that asset specificity, performance measurability or contracting problems vary by task dimension. While we have provided initial descriptive information on service types in the Appendix 3.A, research should engage with the TCF more deeply on these topics. Most importantly, however, future cross-case research should factor in deep structures of corporatization, because dynamics may vary widely.

Additional data on contracting out or full privatization could be employed to connect the extent and motives of corporatization with alternate modes of out-of-house service provision. Such evidence could settle the debate on the "publicness" of public services by providing an empirically reliable basis for decision-making.

The debate becomes relevant at times of crisis as state aid for ailing companies gains extra weight. The impact of the 2008 financial crisis on overall corporatization dynamics and more recent events related to COVID-19 or the turmoil in energy markets after the Russian invasion in Ukraine have revived the question of whether municipal companies are too vulnerable to (market) fluctuations and are as a result incapable of taking on essential responsibility for public service provision. Considering this nexus, does enhanced corporatization make cities more or less prone to crises? What does this imply for the "political mix of actions" when securing municipal liquidity to strengthen long-term resilience that feeds back into legitimacy? These are advanced questions worth exploring in future research.

3.6 Conclusion

This study illuminates discourse-determining drivers of the development of local government corporatization over 20 years, using a new dataset of 34 cities in Germany's largest state North Rhine-Westphalia. The panel data allows for constructing a longitudinal index that accounts for both intensity and depth of corporatization, providing a fine-grained measure of ownership. It thus contributes to a nuanced

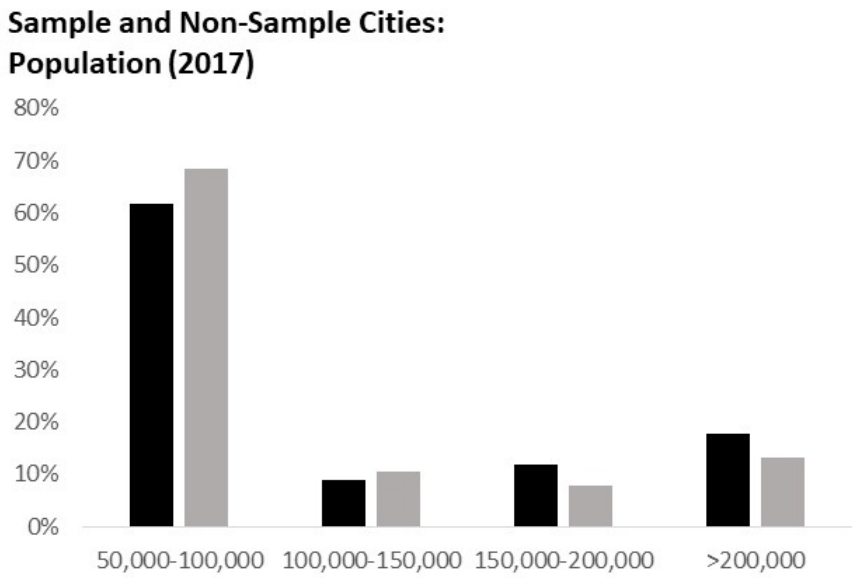
perspective on the corporatization debate, highlighting that over the past 15 years, more complex corporate structures rather than directly owned public companies have driven corporatization. This offers important insights into the pattern behind corporatization, demonstrating its ambidexterity of economic and political incentives, underscoring the value of applying the extended TCF.

Counter-intuitively, the economic orientation of local political decision-makers was not a straightforward predictor of corporatization. Loss of publicness induced transparency-enhancing reforms, however, proved effective because their implementation is clearly associated with lower levels of corporatization intensity. Corporatization manifests as more than a rational auxiliary of austere cost-reduction. Local governments also create and/or reform public service companies because normative forces appear to be at play; however, triggers vary depending on the level of corporatization.

Theoretical explanations for corporatization should be differentiated accordingly. Considering this, future analyses must factor in subtle shifts in public ownership beyond the companies' mere creation or closure since, as has become clear, incentives tend to alter with the decrease in formal discretion of core administration and the increase in legal operator autonomy. The fact that the gradual decoupling through intensified corporatization is accompanied by, in part, countervailing incentives to instrumentalize private law should prompt researchers to investigate further the delicate tension in which corporatizing local governments find themselves.

This makes corporatization a unique research objective calling for increased scholarly attention, not least to examine the government's volatile role and positioning in service provision. Through the lens of instrumental rationality, the political TCF proves to be a useful complement to the ubiquitous economic scholarship, while broader syntheses of theoretical strands can help to further clarify corporatization in its complexity and ambiguity.

3.A Appendix



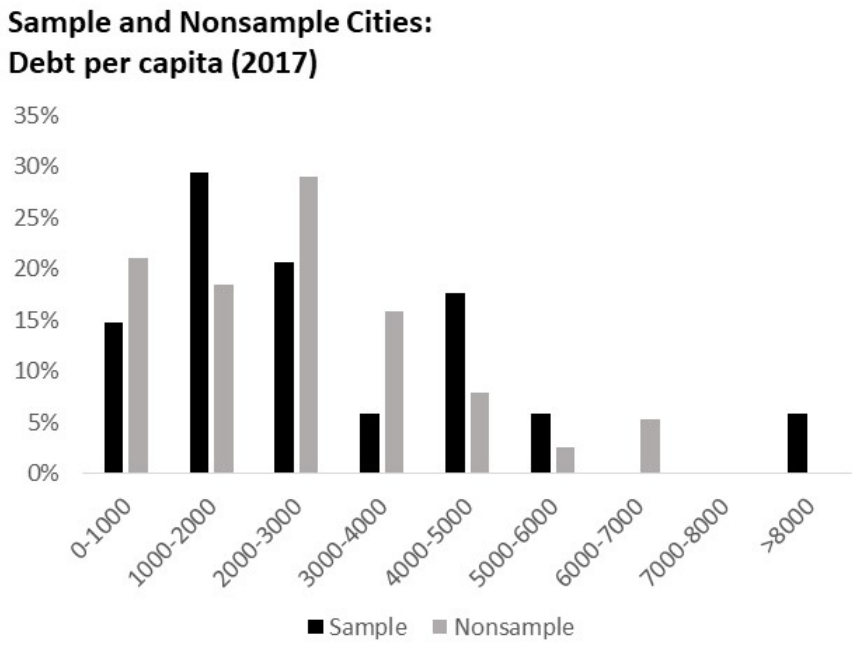


Figure 3.A.1: There are 72 cities with between 50,000 and 500,000 inhabitants in NRW. The figure compares the 34 sample cities and 38 non-sample cities by main characteristics measured in 2017. Presented are the shares of sample/non-sample cities which can be attributed to a certain population or debt p.c. category. Overall means in population: sample = 123,386; non-sample = 113,973 / in debt per capita: sample = 2914; non-sample = 2539. Data: Office of Statistics NRW and Wegweiser Kommune.

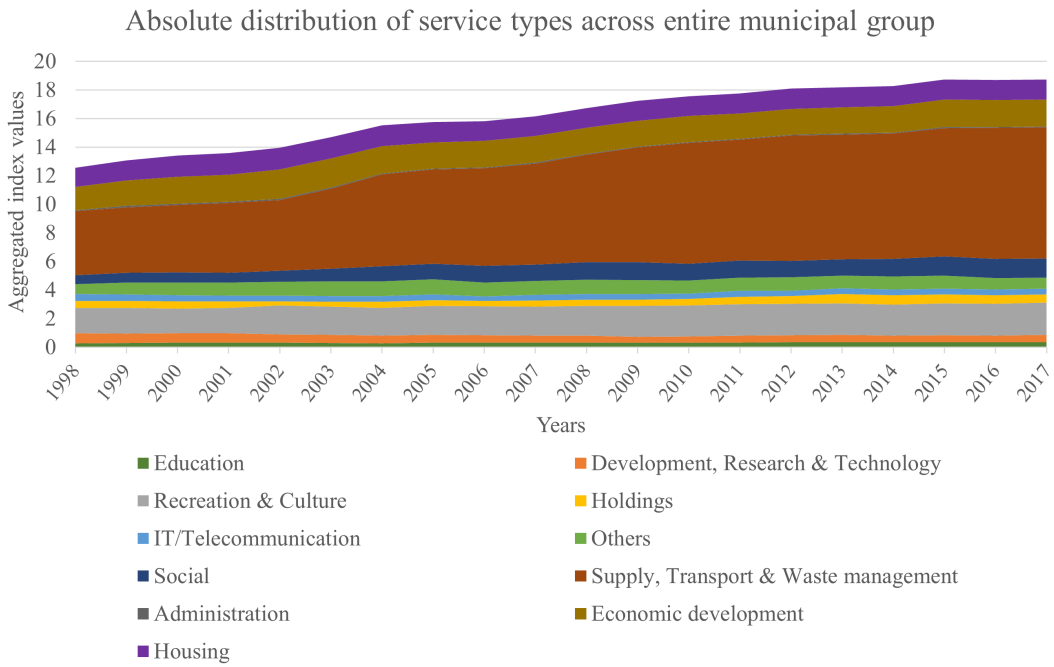


Figure 3.A.2: The absolute distribution of corporatization intensity according to service types, based on population-weighted index data.

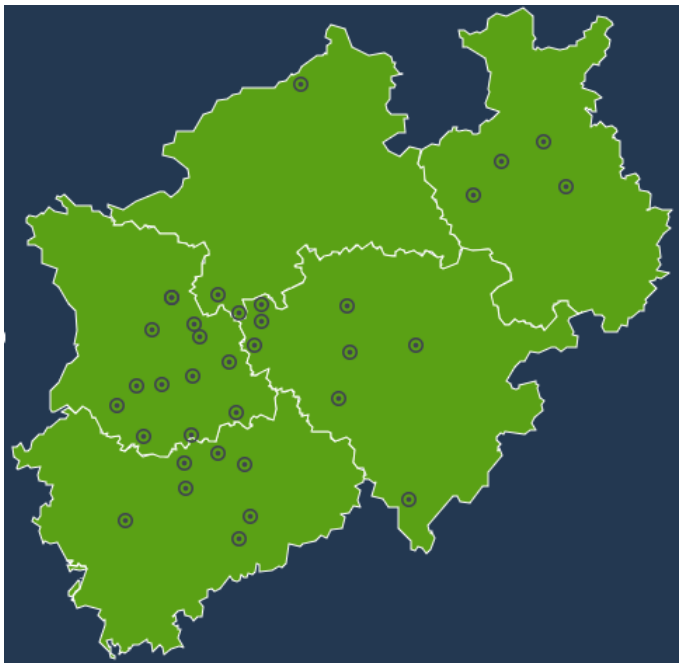


Figure 3.A.3: The geographical distribution of all sample cities over North Rhine-Westphalia.

		Direct Ownership		Complete Municipal Group	
		Model 1 (10%)	Model 2 (25%)	Model 3 (10%)	Model 4 (25%)
H1a	L.Long-term debt	0.008 (0.01)	0.01 (0.01)	0.021 (0.016)	0.026 (0.015)
	L.Youth share	**-0.066***** **(0.016)**	**-0.071***** **(0.015)**	**-0.137*** **(0.062)**	**-0.122*** **(0.065)**
H1b	L.Short-term debt	**0.025**** **(0.009)**	**0.021*** **(0.01)**	-0.003 (0.023)	-0.011 (0.023)
	L.Business Tax.rev	0.002 (0.021)	0.006 (0.023)	-0.008 (0.049)	-0.015 (0.052)
H2	L.Party mayor	0.079 (0.100)	0.064 (0.104)	**0.394***** **(0.094)**	**0.464***** **(0.097)**
	L.Education mayor	**0.214*** **(0.096)**	**0.200*** **(0.097)**	-0.274 (0.149)	**-0.314*** **(0.165)**
	L.Pr.sec.exp. mayor	**-0.151*** **(0.081)**	**-0.145*** **(0.076)**	**-0.495**** **(0.187)**	**-0.432**** **(0.179)**
H3	L.Cons.. statement	**-0.222*** **(0.112)**	**-0.241*** **(0.113)**	**-0.547**** **(0.230)**	**-0.680**** **(0.251)**
	L.Strength. pact	**-0.257***** **(0.063)**	**-0.240***** **(0.059)**	**-0.609***** **(0.177)**	**-0.505**** **(0.162)**
	L.P.C.G.Code	**-0.141*** **(0.069)**	-0.121 (0.07)	0.283 (0.243)	0.399 (0.257)
Controls	L.Personnel exp.	**-0.001*** **(0.0005)**	**-0.001*** **(0.0005)**	0.0003 (0.0008)	0.0001 (0.001)
	L.Election	0.035 (0.041)	0.032 (0.053)	**0.098***** **(0.013)**	**0.096***** **(0.012)**
	L.Party council	**0.353**** **(0.131)**	**0.357**** **(0.132)**	**-0.962**** **(0.374)**	**-0.958*** **(0.438)**
	L.Limited contract	0.028 (0.021)	0.028 (0.022)	0.076 (0.057)	0.094 (0.058)
Time/City FE		YES	YES	YES	YES
Observations		306	306	306	306
Groups		34	34	34	34
R-square (within)		0.1350	0.1332	0.1856	0.1824

Table 3.A.1: Two-way FE Regression with D.-K.'s-robust standard errors in parentheses analogous to models 1 to 4 in Table 3.3 but with a limited panel period (2008-2017) as a robustness check. *** p<0.01, ** p<0.05, * p<0.1

Independent Variables	**Variance Inflation Factor (VIF)**
Long-term debt	1.14
Short-term debt	1.89
Business Tax.rev	1.15
Youth share	1.53
Party mayor	1.47
Education mayor	1.20
Private sector experience mayor	1.13
Consolid. statement	1.36
Strengthening pact	1.75
Publ.Corp.Gov.Code	1.36
Personnel exp.	1.22
Election	1.01
Party council	1.64
Limited contract share	1,98
Mean VIF	1.35

Table 3.A.2: Evaluation of multicollinearity among regressors with the Variance Inflation Factor (VIF). A VIF above 10 would indicate multicollinearity (O'Brien, 2007).

No.	City
1	Arnsberg
2	Bad Salzuflen
3	Bergisch Gladbach
4	Bielefeld
5	Bochum
6	Bonn
7	Detmold
8	Dinslaken
9	Dormagen
10	Düren
11	Frechen
12	Gelsenkirchen
13	Gladbeck
14	Grevenbroich
15	Gütersloh
16	Hattingen
17	Herne
18	Iserlohn
19	Leverkusen
20	Lüdenscheid
21	Meerbusch
22	Moenchengladbach
23	Moers
24	Mülheim/Ruhr
25	Oberhausen
26	Pulheim
27	Ratingen
28	Rheine
29	Siegen
30	Solingen
31	Troisdorf
32	Unna
33	Velbert
34	Willich

Table 3.A.3: List of analyzed North Rhine-Westphalian cities.

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Summary of Results

This dissertation consists of three independent empirical analyses which help to understand current approaches to increase efficiency across local governments and to stabilize their budgets. While Chapter 1 provides insights into the technicalities and effects of the accrual accounting reform on local budget figures, Chapter 2 evaluates the effectiveness of local government numerical fiscal rules. Chapter 3 gives an overview of local government corporatization and tests its potential drivers.

In **Chapter 1**, I analyze the effects of the accrual accounting reform on the local government level. In particular, I am interested in the reaction of investment expenditure and revenue derived from asset sales to the aforementioned reform implementation. I exploit the cumulative reform trajectory of the local level in the German state Baden-Württemberg with the help of municipal microdata from the years 2005 to 2016. The identification strategy of this observational study is based on different matching techniques combined with the conditional Difference-in-Difference estimator. Results suggest a robust negative average treatment effect on reform municipalities' investment expenditures for assets like buildings or roads. Results for revenues from asset sales remain weak but cautiously indicate a dampening effect for movable and financial assets.

In **Chapter 2** we investigate the impact of numerical fiscal rules on the aggregate local government budget deficit. Our focus lies on the balanced budget rule and we pay special attention to the role of rule design and transfer dependency. Using panel data covering 19 EU member states over a period of 19 years (1997-2015), we estimate a fiscal reaction function within a bias-corrected least square dummy variable (LSDVC) framework. Results suggest a discipline-enhancing effect of the balanced budget rule. Point estimates for related debt and expenditure rules remain insignificant. We can show that it is not the implementation of a plain rule that matters but rather its institutional design. Finally, within our empirical setting higher transfer dependency of local governments is related to higher aggregate budget deficits.

In **Chapter 3** we test several potential drivers of local government corporatization which is a widespread form of public service delivery outside the core administration. We use an index for corporatization intensity of 34 cities in the German state North Rhine-Westphalia over a period of 20 years (1998-2017). We collected the data

for this index from 680 annual investment reports. The resulting panel dataset comprises more years than any other study in this field so far. In addition, we are able to disentangle corporatization to directly-owned companies from corporatization to first- and lower-tier subsidiaries. The results from a standard two-way fixed effects regression suggest that well-known drivers behave differently depending on the analyzed level of corporatization. Furthermore, point estimates indicate that corporatization intensity reacts to local fiscal hardship, the economic orientation of the mayor, and transparency-enhancing local government reforms. We show that increasing corporatization intensity over the past two decades was not based on the creation of additional directly-owned firms but rather on increasingly complex subsidiary structures.

Zusammenfassung

Die vorliegende Dissertation besteht aus drei voneinander unabhängigen empirischen Analysen. Sie dienen dazu, die Auswirkungen von vieldiskutierten Reformansätzen für eine höhere Effizienz in der kommunalen Dienstleistungserbringung sowie zur Stabilisierung der Gemeindehaushalte besser zu verstehen. Während Kapitel 1 einen vertieften Einblick in die deutsche Doppik-Reform auf lokaler Ebene bietet und ihre Auswirkung auf zentrale Haushaltskennzahlen bewertet, analysiert Kapitel 2 die Effektivität numerischer Fiskalregeln für Kommunen. Kapitel 3 bietet einen Überblick über das Thema kommunaler Ausgliederungen in Form öffentlicher Unternehmen und testet potenzielle Treiber dieses Phänomens auf ihre Wirkung.

In **Kapitel 1** analysiere ich die Effekte der in den vergangenen Jahrzehnten umgesetzten Doppik-Reform auf lokaler Ebene in Deutschland mit besonderem Blick auf die Entwicklung der Investitionsausgaben sowie der Einnahmen aus dem Verkauf von vermögensrelevanten Sachanlagegütern. Die Reform zielte darauf, durch die Einführung der doppelten Buchführung in den Gemeinden Haushaltsinformationen zu generieren, die besser geeignet für eine wirkungsorientierte Steuerung sind als bisherige kamerale Informationen, die vor allem den Cashflow abbilden. Für die Analyse nutze ich das kumulative Übergangsmuster der Kommunen im Bundesland Baden-Württemberg, die die Reform nicht zu einem Stichtag, sondern über einen Zeitraum von mehreren Jahren eingeführt haben. Mit Hilfe lokaler Mikrodaten für den Zeitraum 2005 bis 2016 implementiere ich verschiedene Matching-Ansätze in Kombination mit dem konditionalen Difference-in-Difference-Schätzer. Die Ergebnisse dieser empirischen Auswertung deuten auf einen robusten negativen durchschnittlichen Effekt auf die Reformgemeinden ("Average Treatment Effect on the Treated") hinsichtlich ihrer Investitionsausgaben für langlebige Sachanlagegüter wie öffentliche Gebäude und Straßen hin. Die Effekte hinsichtlich der Einnahmen aus dem Verkauf von Kapitalgütern sind weniger robust und deuten vorsichtig darauf hin, dass die Einführung der Doppik-Reform mittelfristig zu geringeren Einnahmen in den Reformkommunen geführt hat.

In **Kapitel 2** untersuchen wir den Einfluss von Fiskalregeln auf das aggregierte lokale Budgetdefizit. Unser Fokus liegt dabei insbesondere auf Regeln, die den Haushaltsausgleich vorschreiben, so genannten "Balanced Budget Rules (BBR)". Besondere Aufmerksamkeit kommt zudem der Rolle der institutionellen Ausgestaltung

dieser Regeln sowie der Abhängigkeit von finanziellen Zuwendungen und Zuschüssen höherer staatlicher Ebenen zu. Auf Basis von Paneldaten aus 19 Mitgliedsstaaten der Europäischen Union über einen Zeitraum von 19 Jahren (1997-2015) implementieren wir eine fiskalische Reaktionsfunktion mit Hilfe des LSDVC-Schätzers. Die Ergebnisse deuten darauf hin, dass die BBR die haushalterische Disziplin der Kommunen erhöht. Die Schätzergebnisse für weitere Fiskalregeln sind nicht signifikant. Darüber hinaus können wir zeigen, dass das institutionelle Design einer Fiskalregel eine herausgehobene Rolle für ihre Wirkung spielt. Zudem deuten die Ergebnisse darauf hin, dass eine stärkere Abhängigkeit der lokalen Ebene von Finanztransfers mit höheren aggregierten Budgetdefiziten verbunden ist.

In **Kapitel 3** testen wir schließlich verschiedene potenzielle Treiber des Phänomens kommunaler Auslagerungen in öffentliche Unternehmen, was eine verbreitete Form der öffentlichen Dienstleistungserbringung außerhalb der Kernverwaltung darstellt. Dafür nutzen wir einen Index der Auslagerungsintensität für 34 Städte im Bundesland Nordrhein-Westfalen über einen Zeitraum von 20 Jahren (1998-2017). Die dafür notwendigen Daten haben wir aus 680 kommunalen Beteiligungsberichten extrahiert. Daraus haben wir einen Paneldatensatz gebildet, der mehr Jahre umfasst als jede andere bislang in diesem Feld veröffentlichte Studie. Zudem können wir damit zwischen direkten Auslagerungen und Auslagerungen in Tochter- und Enkelgesellschaften bereits existierender öffentlicher Unternehmen unterscheiden. Die Ergebnisse einer Fixed-Effects-Regression deuten darauf hin, dass die potenziellen Treiber unterschiedliche Effekte in Abhängigkeit von der analysierten Auslagerungsebene haben. Zudem können wir zeigen, dass die kommunale Auslagerungsintensität auf fiskalisch angespannte Situationen, die ökonomische Orientierung der Bürgermeister*innen sowie transparenzfördernde Reformen reagiert. Ein wesentliches Ergebnis ist es darüber hinaus, dass der seit den 1990er Jahren zu beobachtende Anstieg in der Auslagerungsintensität in den vergangenen beiden Jahrzehnten nicht auf die Gründung zusätzlicher öffentlicher Unternehmen in direkter städtischer Eignerschaft zurückgeführt werden kann, sondern vielmehr auf zunehmend komplexe Strukturen im Konzern Kommune.

Erklärung zu Selbständigkeit und Hilfsmitteln

Hiermit erkäre ich, dass ich die Dissertation selbständig und nur unter der Verwendung der angegebenen Hilfen und Hilfsmittel angefertigt habe. Die Arbeit wurde nicht schon einmal in einem früheren Promotionsverfahren angenommen oder als ungenügend beurteilt.

Hilfen und Hilfsmittel:

- Software: Microsoft Office, Stata, R, MiKTex
- Literatur: siehe Literaturverzeichnis

Ich bezeuge durch meine Unterschrift, dass meine Angaben über die bei der Abfassung meiner Dissertation benutzten Hilfsmittel, über die mir zuteil gewordene Hilfe sowie über frühere Begutachtungen meiner Dissertation in jeder Hinsicht der Wahrheit entsprechen.

Berlin, den 3. Januar 2023

Christian Raffer