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Abstract

International organizations have encouraged national governments to switch from traditional cash-based to business-like accrual accounting, on the presumption that long-run benefits may outweigh substantial implementation and operating costs. We use a quasi-experimental setting to evaluate whether changing public sector accounting standards is justified. Some local governments in the German federal state of Bavaria introduced accrual accounting while others retained cash-based accounting. Difference-in-differences and event-study results do not show that (capital) expenditures, public debt, voter turnout, or government efficiency developed differently after changes in accounting standards. Operating costs of administration, however, increase under accrual accounting.

JEL Code: D02, D73, H72, H83
Keywords: Fiscal rules, public accounting, budget transparency, sustainability, government efficiency, accountability, local government

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"Majorities rule often nicely,
If still concerned with public goods;
But even with all voting wisely
Irrational cycles swamp the books."
Bernholz (1980)

1 Introduction

Two different accounting standards are used for reporting in the public sector: traditional cash-based accounting and business-like accrual-based accounting. Pure cash accounting statements do not report assets, liabilities, or depreciation. Business-like accrual accounting statements, by contrast, provide intertemporal fiscal information by complementing the cash-based information with resource-based information. International organizations such as the OECD, the International Monetary Fund (IMF), and the European Union (EU), have advocated public sector accrual accounting, with the intention of enhancing budget transparency, efficiency, and accountability of decision makers. The European Commission have urged EU members and candidate states to adopt the business-like accounting system in their public sector.[1] Increasing numbers of countries around the globe have replaced traditional cash-accounting with business-like accrual accounting. By 2018, 119 out of some 200 national governments around the world were using some form of full or modified accrual accounting or have plans for transitioning from cash-based to accrual-based standards (figure 1).

[Figure 1 about here]

Accrual accounting does not come for free. The main obstacle to adopting public accrual accounting is high implementations costs, resulting from expensive valuations of assets and liabilities. France, for example, spent some $ 1.7 billion to switch from

[1]The European Commission proposes a harmonized accrual accounting regime (EPSAS) for all EU member states assuming that "[t]he appropriateness of the accruals principle is indisputable" (European Commission, 2013, p. 5). The underlying assumption is that harmonized public accrual accounting among the EU members may strengthen confidence in the financial stability in the European Union and facilitates fiscal surveillance in order to avoid future sovereign debt crisis (Council of the European Union, 2011; European Commission, 2013). A majority of EU member states have already implemented full accrual-based public accounting or plan to do so. See also Cavanagh *et al.* (2016) for the IMF, and OECD and IFAC (2017) for the OECD.

cash-based to accruals-based accounting (European Commission, 2013). Implementation costs for Germany are estimated at around $ 3.5 billion[2], without taking permanent higher operating costs into account (German SAI, 2017). Surprisingly, there has been little research into whether accrual accounting improves public finances. Surveys among governments yield subjective impressions (Kuhlmann *et al.*, 2008; Andriani *et al.*, 2010; Burth and Hilgers, 2014; Moretti, 2016, among others). Khan and Mayes (2009) discuss technical details. Carlin (2005) and Christensen (2007) report no research on effects of accrual accounting based on objective budget outcomes. Two recent studies examine the effect of the public accounting system on fiscal policy outcomes in Germany. Christofzik (2019) uses state-level aggregates and does not find that switching accounting standards had affected financial balances. Her findings suggest that accrual accounting somewhat altered the composition of revenues. Raffer (2019) investigates municipalities in the German federal state of Baden-Württemberg and finds that investment expenditure decreases under accrual accounting. In this federal state, all municipalities were obliged to change to accrual accounting.[3]

We estimate the effect of public sector accrual accounting on fiscal and political outcomes in a high-income country. Because (budget) institutions are likely to be endogenous (Aghion *et al.*, 2004; Heinemann *et al.*, 2018), we apply difference-in-differences estimation and event studies to a quasi-experimental setting at the local level in Germany.[4] Some local governments in the federal state of Bavaria gradually switched to accrual accounting between 2005 and 2012, but a substantial number of local governments retained cash-based accounting, making for an interesting case of institutional competition at the community level (Bernholz, 2008). We investigate the extent to which budgeting, efficiency, and accountability changes under accrual accounting. The results do not show that switching counties develop differently from counties with cash-based accounting neither before nor after implementing accrual accounting. We find no significant impact on expenditures, public debt, government efficiency, nor on voter participation even after eight and more years after implementation. Local governments seem to sell fewer non-financial assets but more financial assets under accrual accounting. Rural counties somewhat reduce outsourcing after implementing

[2]The cost estimates refer to the introduction of the accrual-based EPSAS.

[3]Lampe *et al.* (2015) use a stochastic frontier approach and show that accrual accounting comes with initial gains in cost efficiency which diminish rapidly. In their setting of German local governments in the state of North Rhine-Westphalia in the very short run over three years, however, accrual accounting overlaps with further policy changes such as withdrawing fiscal supervision (see Christofzik and Kessing, 2018).

[4]Asatryan *et al.* (2018) use a similar strategy.

accrual accounting. Operating costs to run the administration steadily increase under accrual accounting. Our findings therefore do not support proposals of international organizations such as the OECD, IMF or EU that public sector accrual accounting outperforms cash-based accounting. We thus question the standard expected benefit-cost evaluation of switching accounting standards. Politicians do not seem to take advantage of accruals-based information and adjust their behavior accordingly, at least when the levels of development and transparency are already high.

Our paper contributes to the discussion of fiscal rules. Fiscal rules are usually designed to limit government spending and to enhance sustainable budgeting. Empirical evidence suggests that this kind of political self-constraining works well.[5] Following the seminal contributions by Alt and Lowry (1994); Poterba (1996); Von Hagen and Harden (1995); Alesina and Perotti (1999) and Alesina *et al.* (1999), follow-up studies have shown that budget institutions contribute to sound public finances. For example, balanced-budget rules (Bohn and Inman, 1996; Asatryan *et al.*, 2018), deficit reduction rules (Grembi *et al.*, 2016), Swiss-style debt brakes (Burret and Feld, 2018), checks and balances in the budgeting process (Fabrizio and Mody, 2006), supervision by fiscal overseers (Christofzik and Kessing, 2018), or budget transparency (Benito and Bastida, 2009) reduce debt and the likelihood of sovereign debt crises. Debrun *et al.* (2008); Krogstrup and Wälti (2008); Dabla-Norris *et al.* (2010); Blume and Voigt (2013); Dove (2016), and the meta-regression by Heinemann *et al.* (2018) report very similar results. Previous studies therefore favor fiscal rules as a policy against unsustainable budgeting. Our empirical findings, by contrast, suggest that not all fiscal rules and improvements in financial reporting have a clear beneficial impact on budget outcomes. This is in line with theoretical papers by Halac and Yared (2014) and Landon and Smith (2017) showing that the same fiscal rules may well produce different outcomes and vary substantially in effectiveness and efficiency. We conclude that the literature on fiscal rules is in need of qualification.

Literature in public choice has a long tradition of investigating which institutions and legal systems provide efficiency and democracy (Bernholz, 1993). Previous research has shown that governments may well use "creative accounting" tricks to circumvent fiscal rules (Von Hagen, 1991; Milesi-Ferretti, 2004), and to decrease budget deficits or public debt without changing government net worth (Easterly, 1999). In particular, creative accounting increases before regular elections (Reischmann, 2016), before a country joined the European Monetary Union (EMU) (Dafflon and Rossi, 1999; Milesi-

[5] Tóth (2019) shows that fiscal rules successfully bind the implementing but also later governments.

Ferretti and Moriyama, 2006), and after the introduction of the European Stability and Growth Pact (SGP) to sugarcoat the budget balance requirements (Von Hagen and Wolff, 2006; Buti *et al.*, 2007; Beetsma *et al.*, 2009; Alt *et al.*, 2014). Our study is one of the first that does not view accounting as a dependent variable but as an explanatory variable. We examine whether accounting affects government budgeting, efficiency, and accountability. We contribute to the literature by studying whether and how institutions may map into incentives for decision makers and may prevent fiscal manipulation.

2 Public sector accounting standards

2.1 Key features of cash-based and accrual accounting

Technically, traditional cash-based accounting consists of a cash flow statement. Accrual accounting is more complex and complements the cash-based view with a resource-based view reported in an income statement on revenues and expenses (see figure 2). Accrual accounting links the surplus or deficit of the cash flow and income statements in a balance sheet on assets, liabilities and equity. As illustrated in figure 2, the balance of cash flows affects the liquid assets or the debt level in the balance sheet. The balance of revenues and expenses together report complete resource consumption in the period and directly affect equity capital.

[Figure 2 about here]

Besides the pure components, accrual accounting differs from cash-based accounting in two main dimensions: (1) the timing of transactions and (2) information on assets and liabilities. First, cash-based accounting records transactions when cash is received or paid out, but not consumption of already purchased resources. Accrual accounting income statements, by contrast, record all kinds of resource consumption (revenues and expenses) in real time. For example, traditional cash-based accounting reports production costs for public roads when cash is paid out, but does not directly mirror liabilities and subsequent deterioration, while income statements under accrual accounting also mirror annual depreciation. Second, accrual accounting balance sheets take assets and liabilities into account. Conventional cash-based statements do not report government assets and liabilities. Changes in revenues and expenses, for example

caused by the depreciation of assets or future pension liabilities, also do not show up in traditional cash-based accounting systems. Thus, public sector accrual accounting not only provides information on complete resource consumption but also on equity capital. Moreover, accruals-based reports often come as consolidated statements including for the core administration and public enterprises.[6]

Accrual accounting is not a completely new concept. Bringing business-like accounting standards to the public sector was one of the main issues raised by the New Public Management movement in the 1980s. National governments in Australia, Canada, the United States, and New Zealand already started to adopt public sector accrual accounting in the 1990s or around the turn of the millennium. Among OECD countries, 82 % of national governments implemented accrual accounting or have plans to do so (OECD and IFAC, 2017). Similar adoption rates apply to the local level: in 75 % of all OECD countries, local governments use full accrual accounting. A growing number of low-income countries around the world is also following the trend of switching accounting standards and implemented reports on an accrual base or have plans to do so in the future. Changes in accounting standards usually are accompanied by debates about the pros and cons; we discuss the main arguments in the next section. A summary of the main key features of cash-based and accrual-based accounting and the pros and cons of public sector accrual accounting are shown in table 1.

[Table 1 about here]

[6]The difference of the two accounting systems and its components becomes more obvious by discussing some examples: If an investment good (e.g., non-financial asset) is acquired (a), cash-based accounting reports only the cash outflow in the period when cash is paid out. Under accrual accounting, however, the balance sheet reports the decrease of liquid financial assets (or an increase of debt (liabilities)) at the price of the purchased asset, but also the increase of non-financial assets at the value of the purchased asset. Equity capital, however, does not change if the price equals the value of the purchased asset. This is similar if non-financial assets such as land properties, buildings or machineries are sold (b). While cash-based accounting only reports the cash inflow in the cash flow statement, the balance sheet of accrual accounting takes the rise of liquid assets on the one hand and the decline in the value of non-financial assets on the other hand into account. In the case of borrowing (c), cash-based accounting records again only the inflow of cash in the cash flow statement. Accrual accounting, by contrast, reports the rise of liquid assets (due to cash inflow) and the rise of liabilities. Moreover, future interest costs of the credit are considered in the income statement as expenses (d). The income statement also reports an increase in expenses when capital assets depreciate (e). If the balance of revenues and expenses is negative, equity capital is decreasing in the balance sheet. Table A1 in the appendix gives a numerical example.

2.2 Pros and cons of public sector accrual accounting

All arguments favoring public sector accrual accounting over cash-based accounting (for an overview, see Carlin, 2005; Christensen, 2007) come down to one key argument: transparency. Transparency increase information, which is key for democratic societies (Bernholz, 1993). Accrual accounting statements include income statements and balance sheets, and therefore provide more comprehensive information than cash-only statements. This, in turn, may enable and empower decision makers for more sustainable budgeting (i.e., intergenerational equity), increase efficiency, and give rise to accountability in elections. The main argument against accrual accounting is that income statements and balance sheets are based on time-consuming and often arbitrary estimates of values of public assets for which market values are usually not available. Thus, while accrual accounting may provide more information, the information may not be reliable. We now discuss the pros and cons in more detail, starting with potential benefits.

Accrual accounting statements provide much more information than cash-based statements, which can enable more sustainable budgeting decisions. Accrual accounting reports multiannual flows of resources and reveals future benefits of assets and non-cash costs hidden under conventional cash-based public sector accounting, mainly depreciation costs.[7] Accrual accounting balance sheets thus show the entire intertemporal resource formation and consumption of the government and reflect the scope and quality of the public capital stock more transparently. Accrual accounting reveals the allocation of public resources over time, which may give rise to greater intergenerational equity and sustainable budgeting because under- and overinvestment is reduced. For example, consuming public capital stock because of too little investment in roads or schools is invisible under cash-based accounting but in principle is mirrored in accrual accounting statements. Accrual accounting also avoids overinvestment because follow-up costs and intergenerational consequences of current decisions are made more visible. Another benefit relates to privatization and outsourcing. If public core administrations use the same accounting standards as public enterprises, integrated or consolidated financial statements covering the universe of public entities become available. Anecdotal evidence reports that incentives for outsourcing decrease drastically because public enterprises are treated like core budgets, and vice versa.[8]

[7] Traditional cash-based accounting statements do not systematically report the use of resources.

[8] See, Delmenhorster Kurier, June 30, 2019, "Misstrauische Politiker", `https://www.weser-kurier.de/region/delmenhorster-kurier_artikel,-misstrauische-politiker-_arid,1841297.html`.

Accrual accounting may thus prevent politicians from engaging in opaque and costly off-budget activities to reduce deficits and debt of the core administration, for example by outsourcing to public enterprises.

Efficiency is argued to increase under accrual accounting. For example, real-time information on capital and valuation of assets provided under accrual accounting should allow for more efficient allocation of public resources. Accrual-based budgets reveal priorities for road or school maintenance, for example, which can facilitate targeting public investment and lead to a higher quality of public assets. Accrual accounting can also prevent public decision makers from selling assets below market value. Sales of non-financial assets such as land properties, buildings or machinery can reduce deficits or public debt by the sale price, while accrual accounting also reports the decline in net worth by the value of the asset (see Easterly, 1999) (see table A1).

Transparency increases accountability of public decision makers. Reliable intertemporal fiscal information enhances management capabilities and responsibilities. Accrual accounting may also prevent politicians from timing manipulation ("creative accounting") to finance or reduce budget deficits, as resource consumption is recorded when it is due (*income statement*), while cash-based accounting records transactions only when cash is received or paid out (*cash-flow statement*). For example, sale-and-lease-back contracts may reduce budget deficits in the short-run but often have little budgetary effect and are not worthwhile in a long-term perspective. Hiring civil servants creates pension liabilities that are rather opaque under traditional cash-based accounting, but become transparent in balance sheets of accrual-based statements. Finally, public finances become more comparable to private-sector finances under accrual accounting. Voters may therefore become better informed and more interested in politics.

There are, however, arguments against public sector accrual accounting. Accounting standards developed for businesses may well be appropiate for market-based transactions but not in a public sector context. Profit and loss statements, balance sheets and other accrual accounting tools are designed for profit-seeking organizations. The public sector is non-profit and in principle has social-welfare objectives. Technical problems also arise. Valuating public assets is challenging because publicly provided goods such as local public roads, police stations, or womens shelters are not allocated via markets. Assumptions must be made to value long-term liabilities (e.g., pensions) or assets without market prices. Identifying returns on investments of public infrastructure or consumption is almost impossible. Thus, in a public sector context, the accuracy of

accrual accounting can be spurious. There are transition problems, including inconsistent and contradictory statements, time consuming asset valuation, internal resistance by the administration, and requirements for new IT systems, staff training and external support services.[9] For such reasons, implementation costs are substantial. OECD and IFAC (2017) estimate that switching a central governments account from cash-based to accruals costs some 0.05 % of gross domestic product (GDP). In addition, permanent follow-up costs of accrual accounting can be underestimated (Carlin, 2006).

Altogether, theoretical predictions on the effect of switching the accounting standards on fiscal outcomes, government efficiency and accountability are ambiguous. There are reasons for believing that accrual accounting improves the performance of the public sector; increasing transparency of assets and liabilities seems the most prominent argument. However, practitioners and scholars question whether accrual accounting is appropriate for the public sector, which is non-profit. Therefore, it is an empirical matter whether accrual accounting is beneficial.

3 Institutional background

Examining the effect of budget accounting standards is impossible at the national government level because national governments are not comparable in size and functions. Moreover, accrual accounting also often comes with further New Public Management tools; effects of multiple reforms overlap. We use a quasi-experiment at the local level in the German state of Bavaria that allows us to isolate the effects of accrual accounting. Between 2005 and 2012, around one third of county governments gradually switched to accrual accounting, with the remainder keeping cash-based accounting. County governments that did not switch are an ideal control group for governments changing accounting standards within the same German state. Institutions and responsibilities of county governments differ somewhat among German states. In Bavaria, responsibilities or other institutions do not change, accounting standards are the only difference across both groups.

Germany has two layers of local government similar to the US: municipalities (*Gemeinden*), and counties (*Landkreise*). The 96 counties in the German state of Bavaria approx-

[9] See, e.g., Boehme *et al.* (2013), and Selb-Live.de, November 29, 2018, "Aus dem Stadtrat notiert - Rückumstellung des Rechnungswesens", `http://www.hochfranken-live.de/index.php/aus-dem-rathaus/6300-aus-dem-stadtrat-notiert-31.html`.

imately correspond to US counties in population size (135,000 inhabitants on average in 2016). Consolidated city-counties (*kreisfreie Städte*) combine responsibilities of counties and municipalities like in the US. Our study treats counties and consolidated city-counties as county governments. German county governments are mainly responsible for social care and youth welfare, but also for building and maintaining county roads, the development of the local economy by granting subsidies, county hospitals and schools, household waste collection, and specific administrative tasks such as drivers licenses, car registrations or building permits (see Roesel, 2017). Powers are shared between a directly elected head of a county administration (*Landrat*) and the county council (*Kreistag*). In Bavaria, the Landrat and county council elections are usually held simultaneously every six years. The county council decides on the budget proposed by the Landrat. Counties do not directly levy taxes but raise tax-like contributions from municipalities tax revenues (by the so-called "county rate") and receive grants from the state government. Bavarian counties (including consolidated city-counties) spent some $ 30 billion (Euro 25 billion) in 2016, which is around 4.3 % of Bavarian GDP.

Local governments in Germany traditionally use cash-based accounting. In 1999 German states agreed on New Public Management guidelines including implementing accrual accounting elements for local governments. Reform laws passed all state parliaments between 2004 and 2009. Almost all German states implemented mandatory accrual accounting for local governments. Three German states including Bavaria, however, allowed local governments to choose between cash-based and accrual accounting.[10] Because tasks and responsibilities of local governments vary across German states, we use only Bavaria. The governing party in Bavaria, the conservative right-wing Christian-Social-Union (CSU), believed that the cost-benefit-ratio of implementing accrual-based accounting standards may not pay off for all local governments. The left-wing political opposition in the Bavarian parliament voted against the new law, criticizing allowing local governments to select their accounting standards. The Social Democrats (SPD), as largest oppositional party in parliament favored mandatory accrual accounting. The new Bavarian budgetary law passed the Bavarian parliament in November 2006 and came into force in January 2007. By switching to accrual accounting, local governments in Bavaria must balance their resource-based accounting statements, while governments keeping cash-based accounting must simply balance

[10]The states of Bavaria and Thuringia allow local governments to choose between accrual-based and traditional cash-based accounting. In the state of Schleswig-Holstein, local governments can select full accrual-based or cash-based accounting extended by some accrual accounting elements. All county governments have switched to accrual accounting. In Thuringia, four out of 23 county governments changed accounting standards.

their cash-flow statements on an annual basis (see figure 2). According to the new budgetary law, county governments that start with accrual-based budgeting and accounting have to present their first full consolidated financial statement five years after implementing accrual-based budgeting.

Three county governments were allowed to experiment with accrual accounting before 2007. Between 2005 and 2012, 35 % of the 96 Bavarian county governments introduced accrual accounting; 65 % kept cash-based accounting. Local governments that decided to switch to accrual accounting expected gains from transparency, generational equity, and improved management capabilities based on business-like tools; whereas governments that kept traditional accounting report that they did not believe that accrual-based accounting is superior to the cash-based rule (see Boehme *et al.*, 2013). The county government and administration or a council committee (selected members of the elected county council) usually discussed the benefits and costs of switching accounting standards. If the county government or any other group in the council proposed to implement accrual accounting, the final decision was taken by the majority on the county councils. Anecdotal evidence does not report large public discussions within counties.[11]

4 Methods

4.1 Data

We use annual data on different performance measures for the 96 county governments of the German state of Bavaria over the time period 1995 to 2016.[12] Twelve differ-

[11] See Pressestelle Landratsamt Bamberg, December 21, 2004, "Landkreis Bamberg entscheidet sich für die Doppik; Einstimmiger Grundsatzbeschluss des Kreistages", https://www.landkreis-bamberg.de/showobject.phtml?object=tx,1633.10.1&ModID=7&FID=1633.5682.1; Stadt Regensburg, March 21/29, 2007, "Vorlage - VO/07/2212/020: Umstellung der Haushaltsführung von der kameralistischen auf die doppelte kommunale Buchführung", https://srv19.regensburg.de/bi/vo020.asp?VOLFDNR=2121; Pressestelle Landkreis Würzburg, March 04, 2009, "Landkreis führt Doppik ein", https://www.landkreis-wuerzburg.de/Auf-einen-Klick/Pressebereich/Landkreis-f%C3%BChrt-Doppik-ein.php?object=tx,2680.5.1&ModID=7&FID=1755.226.1&NavID=2680.127&La=1; Die Augsburger Zeitung, November 13, 2009, "Pro Augsburg gibt Doppik nicht auf", https://www.daz-augsburg.de/pro-augsburg-gibt-doppik-nicht-auf/; Landkreis Schwandorf, March 14, 2011, "11. Sitzung des Kreisausschusses: Bericht zum neuen Kommunalen Haushaltsrecht", https://landkreis-schwandorf.de/index.phtml?La=1&sNavID=1901.67&mNavID=1901.1&object=tx%7C1901.416.1&kat=&kuo=1&sub=0.

[12] Data on accounting standards are from the Bavarian State Parliament (Bayerischer Landtag, Drs. 17/12909). All other data are obtained from the State Statistical Office of Bavaria.

ent outcome variables cover the main dimensions expected to differ under accrual accounting: sustainable budgeting, efficiency, and accountability. Nine budget-related variables represent our main outcomes of interest. Three further variables cover possible changes that are beyond budgets.

Fiscal outcomes

Accrual accounting may provide transparency, which, in turn, has been shown to increase sustainable budgeting (Benito and Bastida, 2009). One could therefore expect public debt to decrease, and resources to be shifted from current operating expenditures to investment expenditures such as the construction of public schools and streets. All assets have to be valued and reported in financial statements of county governments that switched to accrual accounting. Therefore, incentives to sell non-financial assets to balance the budget may decrease as the simultaneous decline in net worth become visible in accrual-based statements.

In our dataset, per capita expenditures are in three main categories[13] (staff, administrative material and services, and investment expenditure). Sources for short-term revenues to balance the budget (the county rate, per capita sales of financial and non-financial assets), and public debt per capita (core budget, public enterprises) cover fiscal outcomes of county governments and allow examining whether accounting standards affect budgeting. Table 2 shows descriptive statistics for county-year observations from 1995 to 2016. On average, counties spent Euro 285 ($ 320) per capita on staff and Euro 210 ($ 240) per capita on administrative material and services. Investment expenditure accounted for Euro 140 per capita ($ 160).[14]

Sales of assets can be used to increase revenues in the short term, for example to balance the budget of the cash-flow statement. Per capita sales of non-financial and financial assets are on average Euro 22 ($ 25) and Euro 4 ($ 5) respectively. The main income source for rural counties, however, is the county rate. The county rate defines a percentage contribution (tax levy) of municipalities within the county from the an-

[13]The collection of these expenditure categories are hardly affected by different accounting standards. Spurious statistical effects can be ruled out to large extent. By contrast, other expenditure categories as well as total expenditures might be biased by artificial statistical breaks. The State Statistical Office of Bavaria confirmed that our fiscal performance categories are comparable between cash-based and accrual-based accounting statements.

[14]Investment expenditures include the acquisition of land, facilities, and movable fixed assets as well as construction expenditures. This article also discusses whether accrual accounting affects local government decisions on total construction expenditure and investments in schools or county streets in the results section.

nual municipality tax income to the county budget.[15] The percentage contribution is determined by the county council each year. We use the determined percentage contribution and the resulting per capita contribution of the county rate. The average county rate is 46 %, that is Euro 340 ($ 385) per capita.

Public debt in core budgets amounts to around Euro 565 ($ 635) per capita on average, and ranges from almost zero debt per capita to a maximum of Euro 3,430 ($ 3,860) per capita. Local governments also outsource tasks to local public enterprises (*Kommunale Eigenbetriebe*). Outsourcing costly tasks to local public enterprises is attractive for local governments, by reducing debt in statements of the core administration. Budgets and debt of local public enterprises, however, must be included in the full consolidated financial statement of local governments five years after switching to accrual accounting standards. To rule out an outsourcing bias, we account for both debt in core budgets and in public enterprises. Note, however, that debt figures only include public enterprises directly controlled by the local government. Debt figures do not include, for example, funds for public housing.[16] The average debt level of the county governments enterprises is Euro 140 ($ 160) per capita. As public debt of both the core budget and public enterprises become more transparent and must be balanced in the consolidated statement, one could therefore expect public debt to decrease in counties using accrual accounting.

[Table 2 about here]

Government efficiency

There are proposed effects of accrual accounting for government efficiency and counterarguments. Accrual accounting may increases government efficiency because financial transparency and output-oriented management capabilities improve. However, increasing costs to run the administration may rather decrease efficiency of governments that switch to accrual accounting. County governments are efficient in a technical sense when they produce a given amount of outputs using a minimum of inputs. We estimate technical efficiency via a pooled nonparametric data envelopment analysis (DEA) approach using data between 1996 and 2016 (see Farrell, 1957; Charnes *et al.*, 1978; Banker *et al.*, 1984). DEA generates an efficiency frontier from multiple inputs

[15] County governments do not raise own taxes. County rates, however, do not occur in consolidated city counties.

[16] Data on debt of all local government enterprises is not available as panel dataset in the period of observation.

and outputs and computes an efficiency score for each county-year observation. Efficiency scores report relative positions with respect to the frontier. The most efficient county-year observation defines the frontier and receives an efficiency score of 100.[17] Observations of county governments with efficiency scores below 100 are technically inefficient, i.e., governments should be able to produce the same amount of outputs with less inputs.[18]

Table A2 in the online appendix provides descriptive statistics for input and output variables used in the DEA analysis. We use total government expenditures as input factor, which reflects the costs of producing output and public services that are included in the DEA. The six output variables reflect the multitude of county government services. The number of building permits and registered vehicles represents administrative performance. The length of county roads proxies for public infrastructure. School age population (6 to 17 years) reflects county tasks for school infrastructure, public transport for pupils and youth welfare, all provided by county governments. The number of beds in hospitals indicates hospital policies in the county. Total population proxies for general administration tasks and long-term development of a county. Performing DEA analyses yields average efficiency scores of county governments of around 90 in the period 1996 to 2016 (see table 2). Efficiency scores vary substantially and range from 11 to the maximum value of 100. The results are in line with recent studies on the efficiency of German county governments (see, for example, Fritzsche, 2018).

Technical efficiency scores mainly focus on the quantity of outputs rather than on quality. Assessment of the efficiency of county governments, however, should also include the quality of public service provision (see Balaguer-Coll *et al.*, 2007). A main task of Bavarian counties is building and maintaining county roads. If resources are allocated more efficiently under accrual accounting, one would expect better quantity and quality of county roads to result in less congestion and fewer accidents. Accidents on county roads have been used as indicator of the quality of county infrastructure (see Kalb, 2014; Fritzsche, 2018). If accrual accounting improves the quality of local roads,

[17] DEA report the maximum efficiency score of 1. We multiply all efficiency scores by 100 and report the maximum efficiency score as 100.

[18] The calculations of the efficiency scores are based on an input-orientation rather than an output-oriented model. This approach seems appropriate because county governments have large autonomy in expenditure decisions (input factors). A decrease or increase in input factors such as expenditures (given a constant output) seems always possible (for example by raising the county rate to finance expenditures), whereas a change in the amount of outputs and services is not always feasible. Scholars have shown that per capita public expenditures or legislative tasks may depend on the size and density of the population (see, for example, Breunig and Rocaboy, 2008; Holcombe and Williams, 2008; Egger and Koethenbuerger, 2010). Efficiency scores therefore rely on the assumption of variable returns to scale. Inferences of our results hardly change by using constant returns to scale.

this may well translate into fewer accidents. We include data on accident rates on county roads as a proxy for the quality of governments expenditure decisions. There were around 0.55 accidents per 1,000 capita on county roads on average (see table 2).

Accountability

Advocates of accrual accounting standards maintain that transparency can increase accountability of politicians. It has been shown that communication and information increase citizen participation (e.g. Lassen, 2005; Ebdon and Franklin, 2006). We use voter turnout in county elections as a proxy for voters interest in county politics. County managers and county councils are usually elected at the same day. One may expect that voter turnout increases after switching to accrual accounting standards. Data on voter turnout covers the election years 1996, 2002, 2008 and 2014. Turnout in counties range from 29 percent to 82 percent between 1996 and 2014 (see table 2).

4.2 Empirical strategy

We take advantage of Bavarian county governments having introduced accrual accounting at different points of time. The main assumption to identify causal effects of accrual accounting is that counties that switched to accrual accounting would have evolved in a similar way as counties with cash-based accounting if they had *not* changed accounting standards. Twelve empirical baseline difference-in-differences regressions using OLS formalize this assumption. Each model explains one of the twelve performance variables (nine budget outcomes, two efficiency measures, and voter turnout) with a dummy taking on the value of one for governments using accrual accounting, and zero otherwise (before adopting accrual accounting or never adopting accrual accounting). In around 13 % of all observations, governments use accrual accounting (see table 2). All models control for time-invariant differences across counties (county fixed effects), temporal shocks and time trends (year fixed effects), as well as for economic and demographic effects. Control variables are GDP per capita, total population (log), the share of foreigners, and the old-young dependency ratio (population below the age of 15 and above 65 over the working-age population between 15 and 65). We control for the seat share of the CSU in the county council and a dummy that takes the value of one if the head of the county government is of the CSU, and zero otherwise. The CSU is by far the main and dominating party, usually relying on absolute majorities in the state parliament during our period of investigation. In the year before

the first switch to accrual accounting, around two third of all counties had a CSU head of government, and the CSU held 124 out of 180 seats in the state parliament (legislation period 2003-2008). Therefore, the CSU implemented the new budgetary law as the governing party with absolute majority in the Bavarian state parliament (see section 3). Other parties played only a minor role. The CSU dummy therefore measures not only a conservative ideology but also alignment with the state government.[19] Standard errors are clustered at the county level. Against the institutional homogeneity of county governments in Bavaria, these specifications allow isolating the effect of accrual accounting. Our baseline difference-in-differences regression equation takes the form:

$$y_{it} = \alpha_i + \delta_t + \beta(Accrual_{it}) + X'_{it}\gamma + \epsilon_{it} \tag{1}$$

where y_{it} describes outcome y in county i in year t. α_i and δ_t are county and year fixed effects, X'_{it} is a vector of control variables, and ϵ_{it} denotes the error term. The coefficient of interest is β referring to the dummy variable $Accrual_{it}$ which takes on the value of one if a county i uses accrual accounting in year t, and zero otherwise. One main concern might be that sorting into different accounting standards is not exogenous. If counties applying accrual accounting already perform better than other counties, both may follow different trends and correlations might be spurious. Figure 3 provides some "eye-ball evidence" against temporal or spatial self-selection concerns. The upper figure shows that the share of counties with accrual accounting gradually increased to 35 % between 2005 and 2012. There is no temporal clustering. The map in figure 3 indicates some spatial clustering, especially in the north-west of Bavaria. Results do not change when we add district (*Regierungsbezirk*) and district-year fixed effects (see table A13 and table A14 in the online appendix).

[Figure 3 about here]

Pre-reform characteristics do not predict the selection into accounting standards. Table 3 shows that socio-economic, political and fiscal outcomes in the pre-reform period are not correlated with switching to accrual accounting.[20] First, we estimate survival

[19]The SPD was the second largest party in the Bavarian parliament during our period of observation and clearly preferred mandatory accrual accounting in the parliamentary debate. We have also tested the SPD seat share and SPD head of government as additional control variables. Inferences regarding our main results, however, do not change.

[20]Inferences hardly change when we include *Regierungsbezirk*-year fixed effects instead of year fixed effects (see, table A13 for cox and probit regressions with district-year fixed effects; table A14 for the

models with switching accounting standards as the failure event using cox regressions (columns (1)-(3)). Socio-economic, political and fiscal outcomes do not significantly alter the hazard rate. Second, we use probit models to estimate the probability of switching accounting standards where we take average outcomes of the years 1996 to 2004, that is the time period before counties were allowed to switch to accrual accounting (columns (4)-(5)). Again, neither socio-economic outcomes such as population variables or GDP per capita, nor political outcomes such as party seat shares or fiscal outcomes such as total expenditures or public debt, significantly predict whether a county decides to switch to accrual-based accounting. Additionally, table A3 in the online appendix shows that mean values in socio-economic, political and fiscal pre-reform characteristics do not differ among counties that switched later to accrual accounting and counties that retained cash-based accounting.

[Table 3 about here]

Parallel pre-reform trends of switching and non-switching counties can be tested empirically by extending the twelve empirical models to event study regressions. In event study regressions, dummies for each year before and after switching to accrual budgeting replace the baseline dummy variable for accrual accounting. Three dummies measure the years before the treatment ($\leq$4, 3, and 2 years before switching), and eight dummies measure years after switching to accrual-based budgeting (1, ..., 7, and $\geq$8 years after switching). The year before switching to accrual accounting serves as the base category. There is large variation in the event study dummy variables because counties switched at different points of time between 2005 and 2012. The event-study design allows establishing whether accrual accounting counties performed differently than cash-based counties after, but also before, switching accounting standards. Our event-study regressions take the form:

$$y_{it} = \alpha_i + \gamma_t + \sum_{j=c}^{C} \beta_j (Accrual_{it}^{j}) + X_{it}'\gamma + \epsilon_{it} \tag{2}$$

where y_{it} describes outcome y in county i in year t. α_i and δ_t are county and year fixed effects, X_{it}' is a vector of control variables following equation (1), and ϵ_{it} denotes the

difference-in-differences results and figures A1 and A2 for the event-study results in the online appendix). Bavarian counties are grouped into seven administrative districts (*Regierungsbezirke*); interactions among heads of government could be somewhat more intense within districts. We found a statistically significant effect of CSU heads of government on the cox regression but not in the probit estimations.

error term. $\sum \beta_j$ refers to the vector of coefficients of interest. $Accrual_{it}^{j}$ takes on the value of one if a county i uses accrual accounting in $(t + j)$ years, and zero otherwise. j ranges from $c = -4$ and less to $C = +8$ and more, excluding -1 (base category).

5 Results

5.1 Baseline

Table 4 reports the baseline results for all fiscal outcome variables which are of main interest in our study.[21] Turning to expenditures first, administrative spending on material and services increase, while expenditure on staff and investment decrease. The difference-in-differences estimates do not meet the conventional levels of statistical significance, but are close to (t-value of 1.99 in the case of administrative expenditure). Similar to total investment expenditures, coefficients for construction expenditures in different categories such as schools or streets show a negative sign but do also not turn out to be statistically significant (see table A5 in the online appendix). Public debt and the per capita county rate do also decrease on average. However, again, effects are also not statistically significant at the 10 % level. However, the structure of revenues from sales of assets changes after implementing accrual accounting. Politicians seem to sell fewer non-financial assets under accrual accounting. Revenues from sales of non-financial assets decrease by around Euro 8 ($ 9) per capita on average, whereas revenues from sales of financial assets increase by around Euro 6 ($ 7) per capita. Among budget outcomes, however, increasing revenues from sales of financial assets such as bonds, investment funds or financial derivatives are the only statistically significant finding among our baseline results. The effect is statistically significant at the 10 % level. Our results are fully in line with Christofzik (2019) in showing that accrual accounting reduces investment expenditures and sales of non-financial assets but increases administrative spending. However, our results suggest that a reduction in sales of non-financial assets seems to be offset by increases in sales of financial assets. Therefore, accrual accounting seems to affect the composition of revenues.

[Table 4 about here]

[21] Table A4 in the online appendix shows the results for our control variables.

We also do not observe statistically significant effects of accrual accounting on non-budget outcomes. Table 5 shows that neither traffic accidents on county roads nor voter turnout in county elections change significantly after accrual accounting was implemented.[22] Accrual-based budgets do not seem to improve the transparency of public activities and to attract some marginal non-voters. If accrual accounting increases the quality in the provision of public goods, we had expected that accidents on county roads would decrease. A substantial part of accidents on county roads is caused by bad quality of the road surface. Road accidents therefore mirror the quality of local roads but we do not observe statistically significant effects of accrual accounting. Finally, effects on DEA technical efficiency are also not statistically significant at any conventional level in our baseline difference-in-difference results. Thus, we do not find that accrual accounting improves the way in which local governments translate inputs into outputs.

[Table 5 about here]

5.2 Event studies

County governments in Bavaria have to publish their first full consolidated financial statements five years after implementing accrual accounting. It may well take several years that transparency maps into policy changes. Pooled effects over the entire post-switching period may mask that effects fade in slowly. We therefore estimate event studies showing how effects of accrual accounting on our fiscal and non-fiscal outcome variables evolve over time after and before counties introduced accrual accounting. Each dot in figures 4 and 5 represent one coefficient, vertical bars are 90% confidence intervals. Note that all estimates include year and county fixed effects and, similar to our baseline specification, control for population, age structure, foreigners, GDP per capita, party council seat shares and the party affiliation of the head of county government.[23] The base category is the last year before accrual accounting was introduced (year: -1).

Again, we first turn to fiscal policies representing our main outcome variables of interest (figure 4). Pre-reform trends look promising: counties switching to accrual accounting do not deviate from counties using cash-based accounting before changing ac-

[22] Results do not change for time lags of voter turnout. See table A6 in the online appendix.
[23] The online appendix provide full event study regression outputs in tables A7 and A8.

counting standards. Both changing and not-changing counties follow common trends in pre-switching years as represented by dots on the left-hand side of the dashed vertical lines. As an exception, investment expenditure increases shortly before switching to accrual accounting. That might be due to an anticipation effect of county governments, which could decide to invest more before implementing accrual-based accounting standards. This is plausible as the investment decision that policy makers face differ under the two accounting systems: using cash-based accounting, the question is whether one can afford the investment in *this year* as only the cash outflow is reported; whereas under accrual accounting the question is whether one can also afford the investment in the *years to come*, that is including future depreciation costs.[24]

[Figure 4 about here]

Post-reform coefficients plotted on the right-hand side of the dashed vertical lines report the effects of accrual accounting over time. The event-study findings shown in figures 4 and 5 corroborate our baseline findings. First, staff and investment expenditures tend to decrease after accrual accounting is implemented, but the effects are not statistically significant. Second, public debt does not seem to change at all. Even eight years (and more) after changing accounting standards, counties using accrual accounting do not perform differently in terms of borrowing than their counterparts keeping cash-based accounting. The same holds true for the efficiency and accountability measures (see figure 5). Technical efficiency steadily increases after introducing accrual accounting, but effects are never statistically significant at the 10 % level.

[Figure 5 about here]

However, figure 4 also shows that changes in accounting standards may well map into outcomes. First, effects on operating costs of accrual accounting increase steadily over time. Figure 4 shows that administrative expenditures increase in years after county governments started to publish full consolidated financial statements. Six and more years after switching, counties using accrual accounting spend significantly more on administrative expenditures than counties using cash-based accounting. Second, sales of non-financial assets decrease immediately after introducing accrual-based accounting. The effect is statistically significant in six out of the seven years after switching

[24] Another minor exception is that road accidents are somewhat lower some two years before switching (10% significance level). See table A8 in the online appendix.

accounting standards. Revenues from sales of financial assets, by contrast, significantly increase some six years after changing to accrual accounting. Both effects are in line with our baseline point estimates, which may indicate that outsourcing and selling public property below market values become less attractive under accrual accounting. Under cash-based accounting, policy makers can sell public property (even below market value and without asset valuation) to balance their annual cash-flow statement. This is not possible under accrual accounting, where the reduction in assets does not help to balance the income statement (see figure 2). Finally, we observe that revenues from county rate contributions decrease significantly (at the 10 % significance level) after counties switched to accrual accounting after some six to seven years.

5.3 Robustness

Our main findings hold in several robustness and heterogeneity tests. Excluding control variables (table A9 in the online appendix), or including further control variables such as unemployment rates and dummies for flood events in 2002 and 2013 (table A10) barely change the results.[25] When we exclude consolidated city-counties from the sample (table A11), however, our findings suggest less outsourcing to public enterprises under accrual accounting: in rural counties, debt levels of core public enterprises decrease by some Euro 28 ($ 31) per capita after the introduction of accrual accounting, whereas debt levels in the core administration increase to a similar amount. We also split the dataset at the median of GDP per capita county ranking in 2005 to assess heterogeneous effects on poor and rich counties (table A12). Effects of accounting standards may well depend on wealth and the level of development. Not all regions in Bavaria are as wealthy as the capital Munich. The poorest counties in Bavaria had a GDP per capita comparable to Slovenia, Portugal or Saudi Arabia as of 2016. However, estimates in poor counties are not statistically significant in any of the fiscal or non-fiscal outcome variables (table A12 in the online appendix). In richer counties, by contrast, revenues from sales of non-financial assets such as land properties, buildings or machineries as well as the percentage county rate decrease after implementing accrual accounting (for both variables, the effect is statistically significant at the 10 % level). Despite many coefficients that differ between both samples, point estimates showing increases in administrative expenditures are very similar but not statistically

[25] We do not use unemployment rates as a baseline control variable because we do not observe unemployment rates for the entire period under investigation. Dummies for flood events are one in 2002 and 2013 when a county government declared emergency alert, and zero otherwise.

significant. Thus, if anything, accrual accounting matters more to rich than to poor administrations.

6 Discussion

Our results suggest that accounting standards do not have a large impact on the performance of governments. Public sector accrual accounting mainly targets investment expenditure and sustainable budgeting. Investment expenditure hardly changes after counties adopt accrual accounting. There are no significant differences even eight years after switching accounting standards. Similar findings apply to public debt. We find neither differences for the core budget, nor for outsourced budgets to public enterprises in our full sample. Rural county governments, however, somewhat shift debt from public enterprises to the core administration after introducing accrual accounting. This may indicate that accrual-based accounting prevents politicians from engaging in outsourcing in rural areas.

A major element of the case for public sector accrual accounting over cash-based accounting is efficiency. Our findings do not support this case at any conventional level of statistical significance.

Overall, accrual accounting hardly maps into superior budget and efficiency outcomes compared to cash-based accounting. One reason could be a lack of new public management skills of current public managers and political decision makers, who cannot make any use of the additional information and lack management capabilities. Another explanation might be that cash-based accounting already provides sufficient information to make effective budget and investment decisions. Many local governments, for example, added elements of valuating and monitoring their assets and debt under cash-based accounting. Voter turnout in county elections does not change with the introduction of accrual accounting. Even if accrual accounting enhances budget transparency, effects are not translated into greater accountability or increasing interest by the general public. The marginal voter does not seem to value accrual accounting. This could also be a reason why we do not observe an impact of accrual accounting. Voters do not seem to use the information provided by accrual accounting to evaluate the performance of politicians. Therefore, politicians do not have an incentive to change their behavior.

Our results show that adopting accrual accounting somewhat changes the structure of revenues of county governments, corroborating findings of Christofzik (2019). Revenues from sales of non-financial assets decrease after counties adopting accrual accounting, but this reduction is somewhat compensated for by increasing revenues from sales of financial assets. The findings are more pronounced among richer than among poorer counties. Sales of non-financial assets require time-consuming asset valuation after adopting accrual accounting and become visible as losses in the resource-based accruals income statements. This might prevent public decision makers from selling non-financial assets such as land properties and buildings to balance cash-flow statements.

Finally, accrual accounting comes with implementation costs but also with permanent additional costs (Carlin, 2006). Government expenditures for materials and services increase around six years after implementing accrual accounting. [26] That is exactly the time when county governments have to present their first full consolidated financial statements after implementing accrual-based budgets. Higher administrative costs mirror the implementation costs of the full consolidated financial statements and reflect increasing budgeting complexity under accrual accounting leading to additional consulting services, staff training, and permanent software updates. These additional operating costs are not matched by benefits in other spending categories and efficiency gains are not found to be significantly different from zero.[27]

[26] Anecdotal evidence reports, for example, that introducing accrual accounting gave rise to transition problems including inconsistent and contradictory statements, time consuming asset valuation, costly expenses for new IT systems, staff training and external support services. Some counties even report severe mistakes in creating the new balance sheets and asset valuations due to overloading of the staff. After 2012 no further counties decided to implement accrual accounting in Bavaria. Quite the contrary, some local governments are discussing to switch back to cash-based accounting. See Süddeutsche Zeitung, April 9, 2015, "Sinn und Unsinn Befürworter der Doppik", https://www.sueddeutsche.de/muenchen/landkreismuenchen/befuerworter-der-doppik-sinn-und-unsinn-1.2427815; Süddeutsche Zeitung, April 9, 2015, "Pioniere mit Problemen", https://www.sueddeutsche.de/muenchen/landkreismuenchen/vorreiter-gemeinde-pioniere-mit-problemen-1.2427817; Nordbayerischer Kurier, May 16, 2015, "Bayreuth: Buchhalterpanne kostet 1,5 Millionen Euro", https://www.kurier.de/inhalt.stadt-beginnt-mit-aufarbeitung-der-falschen-bilanz-bayreuth-\buchhalterpanne-kostet-1-5-millionen-euro.221eeee7-9a0b-4d48-83e8-f92fdb2dd729.html; Selb-Live.de, November 29, 2018, "Aus dem Stadtrat notiert - Rückumstellung des Rechnungswesens", http://www.hochfranken-live.de/index.php/aus-dem-rathaus/6300-aus-dem-stadtrat-notiert-31.html.

[27] We show that observable pre-reform characteristics do not predict the selection into treatment (see section 4.2). Even more, event study results corroborate that the common trends assumption in our outcome variables hold (see section 5.2). One may still argue that unobserved characteristics such as the motivation of the head of the county administration and the members of the county council influence the selection into treatment decision and the government performance as more motivated decision makers more likely use the new management tools provided by accrual-based financial statements. The benefits

7 Conclusion

Our results suggest that public sector accounting standards do not matter much for the performance of local governments in high-income countries. Our findings question whether switching public sector accounting from cash-based to accrual-based standards is warranted in developed countries.

More generally, we have shown that fiscal rules do not always translate into preferable outcomes. Sound public accounting and budgeting are certainly important preconditions for the effectiveness of fiscal rules, but our results suggest that accounting standards themselves do not significantly affect public finance and government performance. Our data are drawn from a low corruption environment with monitoring by the media and public. The scope for benefit from improvements in transparency is greater in low-income countries where corruption may be prevalent. Further research is needed to investigate whether effects of accounting standards depend on the institutional context and the level of development.

An important next research step includes examining whether inferences change in the very long run when governments are used to accrual-based accounting for several years. Results may depend on specific public management skills of decision makers and on the institutional context. Reforms at other levels of government (for example, at the municipality, the state or the national level) can also be studied. Exploiting temporal and spatial differences in accounting standards across subnational governments appears to be a promising avenue.

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of accrual accounting might then be overestimated due to an omitted variable bias. Our results, however, do not show significant effects which suggest that unobserved characteristics cause an overestimation of benefits. Thus, our results do not seem to be biased.

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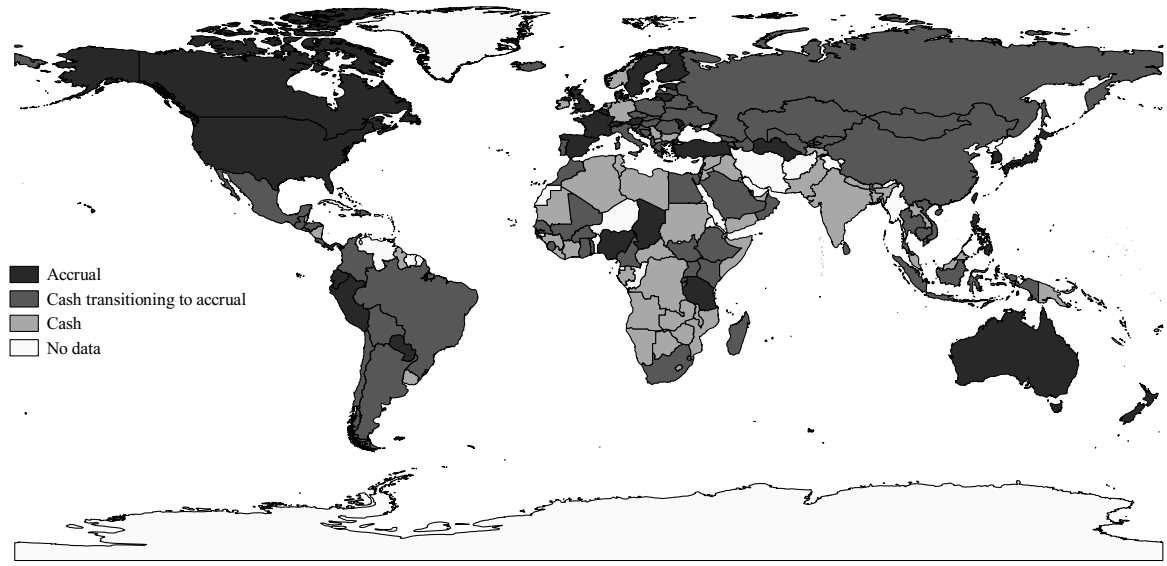
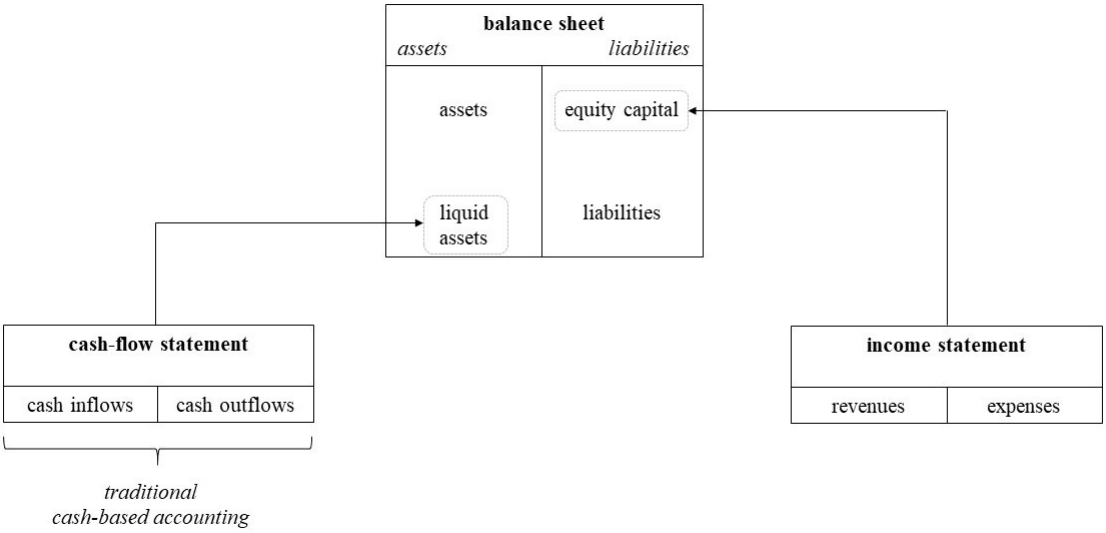
Figure 1: Accounting standards of national governments



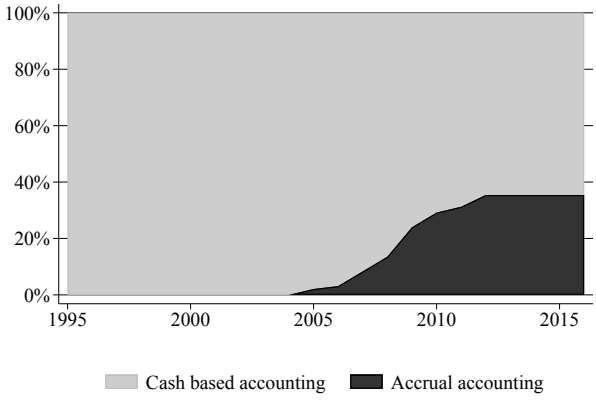
Source: Deloitte (2015); PwC (2015); OECD and IFAC (2017); IFAC and CIPFA (2018).
Notes: The map reports the current public-sector accounting standard (cash or accrual) at the national government level around the world as of 2018. The map also indicates countries which are in a transition from cash-based to a full accrual-based reporting system or have plans to do so in the next years.

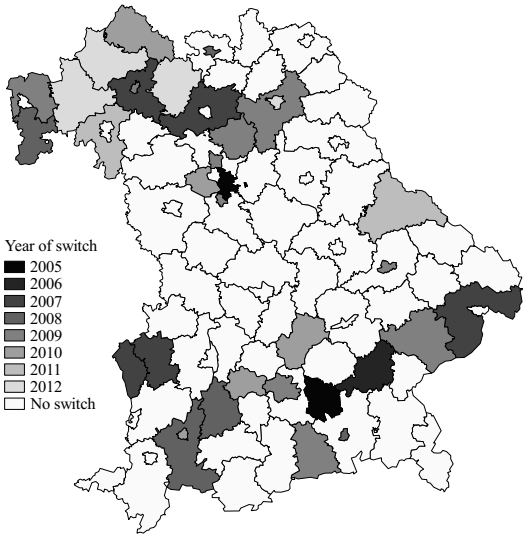
Figure 2: Components of a simplified accrual accounting system



Source: see Lueder (2001), p.37.
Notes: The figure shows a simplified three-component accounting system.

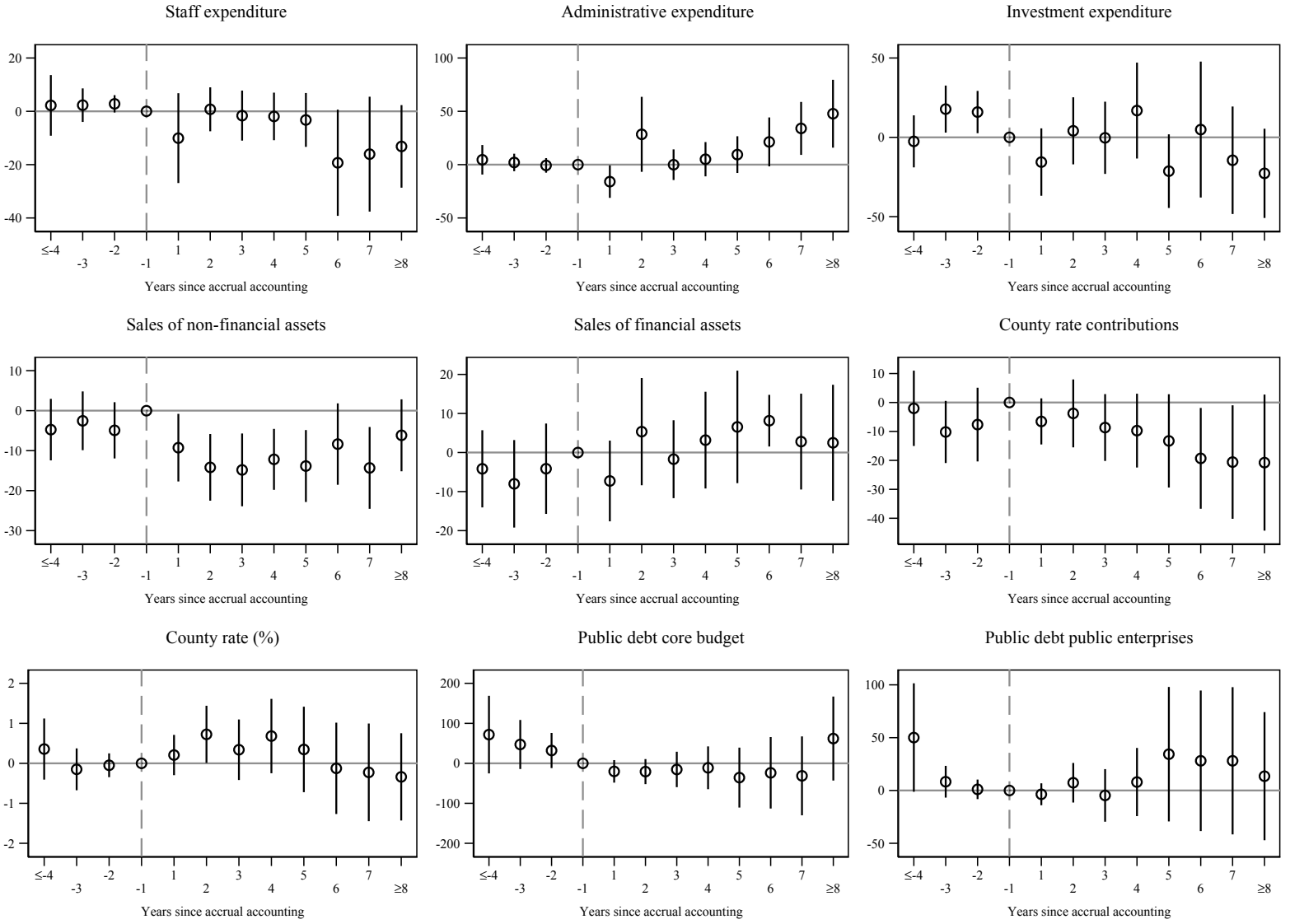
Figure 3: Accounting standards in Bavarian county governments





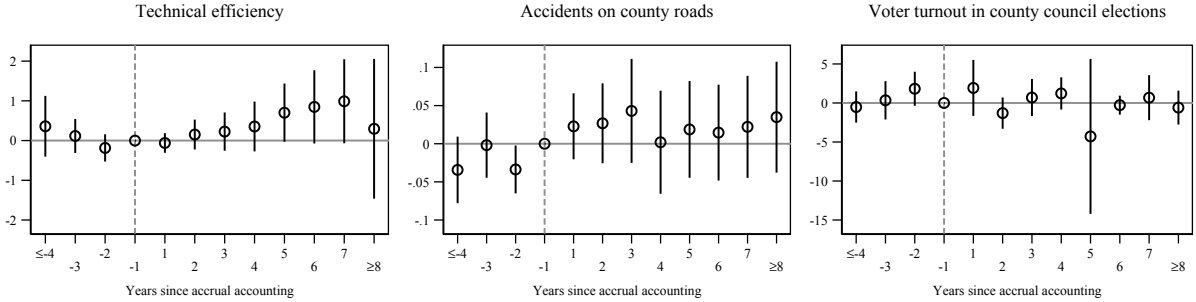
Notes: The upper figure shows the cumulative share of accounting standards in the 96 counties of the German state of Bavaria between 1995 and 2016. The map shows regional adoption patterns. 34 gray shaded counties switched from cash-based to accrual accounting between 2005 and 2012 (the darker the shade intensity the earlier the switch). 62 white-shaded counties keep cash-based accounting.

Figure 4: Event study results (I) – fiscal outcomes



Notes: Dots represent point estimates from event study estimations, bars are 90% confidence intervals (equivalent to *p $<$ 0.1). -1 on the x-axis is the base category and denotes one year before the introduction of accrual accounting; 1 denotes the first year of implementing accrual accounting.

Figure 5: Event study results (II) – non-fiscal outcomes



Notes: Dots represent point estimates from event study estimations, bars are 90% confidence intervals (equivalent to *p $<$ 0.1). -1 on the x-axis is the base category and denotes one year before the introduction of accrual accounting; 1 denotes the first year of implementing accrual accounting. Technical efficiency multiplied by 100.

Table 1: Key features and pros and cons of cash-based and accrual-based accounting

Key features of cash-based and accural accounting	
Cash-based accounting	Accrual-based accounting
records transactions when cash is received or paid out	records transactions when they occur
real transactions are not covered	complements cash-flow by a resource-based view (revenues and expenses)
does not report balance sheets including assets, liabilities and depreciation	records assets and liabilities
	consolidated statements include budgets of the core administration and public enterprises
Pros and cons of public sector accrual accounting	
Pros	Cons
accrual accounting statements provide more information	business accounting standards ill-fitting in a public sector context
increased transparency is expected to map into sustainable budgeting, efficiency and accountability	evaluation of public goods for accrual accounting is time consuming and often arbitrary estimation
	substantial implementation costs of accrual accounting

Notes: The table summarizes key features of cash-based and accrual-based accounting (section 2.1) and the pros and cons of public sector accrual accounting (section 2.2).

Table 2: Descriptive statistics

	Obs.	Mean	SD	Min	Max
Sustainable budgeting					
Staff expenditure (per capita)	2,112	286.21	298.99	12.86	1,244.56
Administrative expenditure (per capita)	2,112	211.72	157.84	0.01	1,205.66
Investment expenditure (per capita)	2,112	139.70	143.48	8.77	954.09
Sales of non-financial assets (per capita)	2,016	21.66	51.71	-0.60	1,076.44
Sales of financial assets (per capita)	2,016	4.30	42.15	-0.55	1,574.81
County rate contributions (per capita)	1,562	342.35	87.19	25.81	1,064.96
County rate (%)	1,562	46.48	3.86	33.50	59.85
Public debt core budget (per capita)	2,112	564.19	662.30	0.38	3,343.30
Public debt public enterprises (per capita)	2,112	140.89	360.60	0.00	2,332.89
Efficiency					
Technical efficiency	2,001	89.75	16.65	11.45	100.00
Accidents on county roads (per 1,000 capita)	1,632	0.55	0.33	0.00	2.12
Accountability					
Voter turnout in county council elections	384	62.09	9.22	29.00	82.30
Accounting standard					
Accrual accounting (yes = 1)	2,112	0.13	0.34	0.00	1.00
Control variables					
Population (log)	2,112	11.59	0.53	10.54	14.20
Old-young population dependency ratio	2,112	50.72	3.67	38.40	60.80
Population share of foreigners	2,112	7.77	4.11	2.10	25.87
GDP (Euro 1,000 per capita)	2,112	32.67	15.15	14.43	122.30
CSU seat share council	2,112	43.61	8.60	0.00	60.00
CSU head of county government	2,112	0.64	0.48	0.00	1.00

Notes: The table reports descriptive statistics of the dataset. The 96 counties of the German state of Bavaria are the unit of observation; data span the period from 1995 to 2016. Technical efficiency multiplied by 100, start in 1996. Data for accidents on county roads starts in 2000. County rates for 71 rural counties.

Table 3: Previous development does not predict switching to acrual accounting

	Cox			Probit		
	(1)	(2)	(3)	(4)	(5)	(6)
City county	0.40	0.46	1.08	0.47	0.48	-0.39
	(0.81)	(0.84)	(1.44)	(0.59)	(0.58)	(1.70)
Population (log)	0.26	0.25	0.34	0.19	0.17	0.08
	(0.45)	(0.48)	(0.56)	(0.34)	(0.34)	(0.43)
Old-young population dependency ratio	-0.02	-0.03	-0.03	-0.05	-0.05	-0.05
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Population share of foreigners	0.05	0.06	0.06	0.03	0.03	0.02
	(0.08)	(0.08)	(0.08)	(0.06)	(0.06)	(0.06)
GDP (Euro 1,000 per capita)	-0.02	-0.02	-0.01	-0.02	-0.02	-0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
CSU seat share council		0.01	0.01		0.01	0.01
		(0.03)	(0.03)		(0.02)	(0.02)
CSU head of county government		0.59	0.55		-0.14	-0.11
		(0.40)	(0.42)		(0.36)	(0.36)
Expenditure (Euro 1,000 per capita)			-0.44			0.08
			(0.91)			(0.90)
Public debt core budget (per capita)			0.00			0.00
			(0.00)			(0.00)
Public debt public enterprises (per capita)			-0.00			0.00
			(0.00)			(0.00)
Pseudo R^2	0.01	0.02	0.03	0.03	0.04	0.05
Observations	1869	1869	1869	96	96	96

Notes: The table reports the results of three cox regressions (columns (1)-(3)) and three probit regressions (columns (4)-(6)) where the 96 counties of Bavaria are the units of observations. The cox regressions estimate a survival model with the introduction of accrual accounting as the failure event. In the probit regressions the dependent variable is a dummy which is one if the country will switch to accrual accounting and zero otherwise. We average over the years 1996 to 2004, before the first counties switched to accrual accounting. Significance levels: ***p < 0.01; **p < 0.05; *p < 0.1.

Table 4: Baseline results (I) – fiscal outcomes

	Expenditure			Revenues				Public debt	
	Staff	Administrative	Investment	Sales of non-financial assets	Sales of financial assets	County rate contributions	County rate (%)	Core budget	Public enterprises
Accrual accounting	-9.40	11.57	-7.57	-7.58	5.91*	-8.81	0.01	-67.92	-24.08
	(7.73)	(8.94)	(10.80)	(4.68)	(3.14)	(6.74)	(0.45)	(60.43)	(30.86)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.16	0.13	0.10	0.05	0.01	0.67	0.56	0.19	0.04
Observations	2112	2112	2112	2016	2016	1562	1562	2112	2112

Notes: The table reports difference-in-differences estimates. Significance levels (standard errors clustered at the county level): ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1.

Table 5: Baseline results (II) – non-fiscal outcomes

	Technical efficiency	Accidents on county roads	Voter turnout
Accrual accounting	0.14	0.05	-0.09
	(0.49)	(0.04)	(0.81)
County fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes
Within R^2	0.08	0.11	0.82
Observations	2001	1632	384

Notes: The table reports difference-in-differences estimates. Significance levels (standard errors clustered at the county level): ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1. Technical efficiency multiplied by 100.

Online Appendix (for online publication only)

Table A1: Components of cash-based and accrual accounting

	Cash-based accounting	**Accrual accounting**		
Components	cash-flow statement (cash inflows, cash outflows)	cash-flow statement (cash inflows, cash outflows)	balance sheet (assets, liabilities, equity)	income statement (revenues, expenses)
Examples				
(a) sale of investment good: (market value: 10.000 sales value: 10.000)	financial cash inflow (+10.000)	financial cash inflow (+10.000)	non-financial asset (-10.000); financial asset (+10.000)	
(b) sale of investment good: (market value: 10.000 sales value: 12.000)	financial cash inflow (+12.000)	financial cash inflow (+12.000)	non-financial asset (-10.000); financial asset (+12.000); equity (+2.000)	revenues (+2.000)
(c) sale of investment good: (market value: 10.000 sales value: 8.000)	financial cash inflow (+8.000)	financial cash inflow (+8.000)	non-financial asset (-10.000); financial asset (+8.000); equity (-2.000)	expenses (-2.000)

Notes: The table shows a simplified three-component accounting system. While cash-based accounting consists only of the cash flow statement and accounts for cash inflows and outflows, the accrual accounting system consists of three parts. Similar to cash-based accounting, the cash flow statement covers cash inflows and outflows. Additionally, the balance sheet reports assets, liabilities and equity, and the income statement covers revenues and expenses. Furthermore, the table displays three examples to illustrate the differences between the accounting systems. All three examples (a-c) deal with the sale of an investment good. If an investment good is sold, cash-based accounting reports only the cash inflow, independent of the market and sales value. Under accrual accounting, however, the balance sheet reports the increase of liquid financial assets (at the sales value), but also the decrease of non-financial assets (at the market value). If the price equals the value of the sold assets, equity capital does not change (a). If the investment good is sold at a higher price than its market value, the revenues are reported in the income statement, which increases equity capital (b). If, in contrast, the investment good is sold under its market value, expenses are reported and the equity capital decreases (c).

Table A2: Descriptive statistics for DEA inputs and outputs

	Obs.	Mean	SD	Min	Max
Outputs					
County population (total, in 1000)	2,112	129.38	135.62	37.64	1,464.30
School age population (age 6 to 17)	2,112	16,172.28	13,143.39	3,891.00	135,446.00
Building permits	2,112	940.52	915.83	46.00	10,530.00
Length of county roads (km)	2,112	195.38	149.19	0.70	598.10
Registered vehicles	2,016	91,562.49	81,172.74	23,333.00	812,545.00
Beds in hospitals	2,102	831.67	1,329.14	20.00	13,398.00
Inputs					
Expenditure (Euro, in million)	2,112	193,045.46	564,741.84	43,405.09	6,615,576.00

Notes: The table reports descriptive statistics of the DEA input and output dataset. The 96 counties of the German state of Bavaria are the unit of observation; data span the period from 1996 to 2016. Length of county roads are imputed for the years 1996 to 1998 with values from 1999.

Table A3: Pre-reform characteristics (2004)

	Mean cash-based accounting	Mean accrual accounting	Diff.	SD	Obs
City county	0.24	0.29	-0.05	0.09	96
Population (log)	11.54	11.65	-0.11	0.11	96
Old-young population dependency ratio	50.14	49.04	1.10	0.72	96
Population share of foreigners	7.33	8.26	-0.94	0.87	96
GDP (Euro 1,000 per capita)	30.64	31.05	-0.40	2.88	96
CSU seat share council	44.65	45.59	-0.94	1.84	96
CSU head of county government	0.66	0.66	0.00	0.09	96
Expenditure (Euro 1,000 per capita)	1.19	1.33	-0.14	0.20	96
Public debt core budget (per capita)	551.14	704.36	-153.22	144.59	96
Public debt public enterprises (per capita)	124.42	199.56	-75.15	75.26	96

Notes: The table compares pre-reform characteristics of switching counties to counties keeping cash-based accounting. Significance levels: ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1.

Table A4: Baseline results

	Expenditure			Revenues				Public debt				
	Staff	Administrative	Investment	Sales of non-financial assets	Sales of financial assets	County rate contributions	County rate (%)	Core budget	Public enterprises	Technical efficiency	Accidents on county roads	Voter turnout
Accrual accounting	-9.40	11.57	-7.57	-7.58	5.91*	-8.81	0.01	-67.92	-24.08	0.14	0.05	-0.09
	(7.73)	(8.94)	(10.80)	(4.68)	(3.14)	(6.74)	(0.45)	(60.43)	(30.86)	(0.49)	(0.04)	(0.81)
Population (log)	-109.56	23.52	230.85*	-71.15	-10.58	202.46**	-5.15	-1,041.23	-20.43	3.26	0.57	-0.72
	(81.55)	(76.41)	(125.89)	(66.93)	(50.98)	(78.23)	(4.94)	(743.43)	(506.57)	(6.15)	(0.44)	(4.09)
Old-young population dependency ratio	2.98**	-0.38	3.07*	0.64	0.40	3.10*	-0.06	6.45	-1.37	-0.22	0.01*	-0.04
	(1.16)	(1.10)	(1.66)	(0.75)	(0.52)	(1.69)	(0.09)	(7.66)	(4.24)	(0.18)	(0.00)	(0.15)
Population share of foreigners	1.95	-3.46	-7.79	1.57	-1.70	6.39	0.35	60.08**	-4.76	-0.04	0.01	-0.22
	(3.20)	(3.45)	(6.68)	(3.00)	(1.89)	(5.30)	(0.25)	(26.01)	(18.43)	(0.27)	(0.02)	(0.26)
GDP (EURO 1,000 per capita)	0.75	0.84	-1.11	0.28	-0.55**	5.75*	-0.09	-16.20***	-4.11	-0.05	0.00**	-0.06
	(0.66)	(0.80)	(1.00)	(0.59)	(0.22)	(2.94)	(0.09)	(5.39)	(3.41)	(0.05)	(0.00)	(0.04)
CSU seat share	0.32	0.58	1.59	0.46	-0.01	-0.49	-0.02	-0.34	1.54	-0.04	-0.00	0.02
	(0.50)	(0.37)	(1.08)	(0.35)	(0.13)	(0.43)	(0.03)	(3.44)	(2.46)	(0.05)	(0.00)	(0.03)
CSU head of county government	1.03	-3.25	-2.98	0.32	-1.40	-4.22	-0.28	-10.74	-26.24	-0.65	0.03	-0.39
	(5.22)	(6.77)	(8.43)	(3.21)	(1.51)	(4.18)	(0.35)	(29.68)	(21.60)	(0.47)	(0.03)	(0.31)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.16	0.13	0.10	0.05	0.01	0.67	0.56	0.19	0.04	0.08	0.11	0.82
Observations	2112	2112	2112	2016	2016	1562	1562	2112	2112	2001	1632	384

Notes: The table replicates the results from tables 4 and 5 but shows all control variables.
Significance levels: ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1. Technical efficiency multiplied by 100.

Table A5: Construction expenditure

	Construction expenditure		
	All	Schools	Streets
Accrual accounting	-6.32	-8.40	-4.18
	(8.50)	(6.26)	(3.09)
County fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes
Within R^2	0.12	0.12	0.06
Observations	2112	2112	2112

Notes: The table reports difference-in-differences estimates. Significance levels (standard errors clustered at the county level): ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1.

Table A6: Time lags for effects on voter turnout

	Voter turnout		
	Time lag: 1 year	Time lag: 2 years	Time lag: 3 years
Accrual accounting	0.01	0.54	0.86
	(0.80)	(0.62)	(0.62)
County fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes
Within R^2	0.82	0.83	0.87
Observations	384	384	288

Notes: The table reports difference-in-differences estimates where we lag voter turnout as dependent variable by 1, 2, or 3 years. Significance levels (standard errors clustered at the county level): ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1.

Table A7: Event study regression output (I) – fiscal outcomes

	Expenditure			Revenues				Public debt	
	Staff	Administrative	Investment	Sales of non-financial assets	Sales of financial assets	County rate contributions	County rate (%)	Core budget	Public enterprises
Year: $\leq$ -4	2.22	4.55	-2.54	-4.74	-4.17	-2.02	0.36	71.83	50.10
	(6.85)	(8.34)	(9.87)	(4.63)	(5.95)	(7.81)	(0.46)	(58.44)	(30.89)
Year: -3	2.31	2.03	17.78**	-2.54	-8.01	-10.19	-0.15	47.12	8.29
	(3.79)	(4.94)	(8.92)	(4.42)	(6.75)	(6.44)	(0.31)	(36.94)	(9.04)
Year: -2	2.80	-0.73	15.94**	-4.92	-4.15	-7.63	-0.05	32.10	1.08
	(1.96)	(4.11)	(8.02)	(4.23)	(6.97)	(7.64)	(0.18)	(26.44)	(5.57)
Year: -1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)	(.)
Year: 1	-10.06	-15.93*	-15.59	-9.25*	-7.29	-6.54	0.21	-20.13	-3.60
	(10.14)	(9.16)	(12.78)	(5.09)	(6.22)	(4.78)	(0.30)	(16.97)	(6.25)
Year: 2	0.75	28.42	4.11	-14.18***	5.35	-3.77	0.72*	-20.71	7.33
	(4.96)	(21.18)	(12.72)	(5.02)	(8.27)	(7.04)	(0.43)	(18.85)	(11.28)
Year: 3	-1.61	-0.08	-0.30	-14.81***	-1.71	-8.66	0.34	-15.35	-4.69
	(5.65)	(8.64)	(13.70)	(5.48)	(6.01)	(6.93)	(0.45)	(26.66)	(14.98)
Year: 4	-1.92	5.07	16.86	-12.18***	3.18	-9.72	0.68	-11.21	8.00
	(5.37)	(9.68)	(18.20)	(4.59)	(7.46)	(7.65)	(0.56)	(32.20)	(19.42)
Year: 5	-3.23	9.40	-21.31	-13.85**	6.56	-13.27	0.35	-35.69	34.36
	(6.08)	(10.37)	(13.96)	(5.41)	(8.67)	(9.66)	(0.64)	(45.12)	(38.32)
Year: 6	-19.29	21.32	4.90	-8.35	8.15**	-19.30*	-0.13	-23.71	28.12
	(11.99)	(13.80)	(25.79)	(6.13)	(3.98)	(10.45)	(0.68)	(53.79)	(40.05)
Year: 7	-16.07	33.98**	-14.45	-14.32**	2.80	-20.58*	-0.23	-31.33	28.10
	(12.97)	(14.95)	(20.39)	(6.16)	(7.39)	(11.76)	(0.73)	(59.39)	(41.95)
Year: $\geq$ 8	-13.16	47.74**	-22.69	-6.16	2.50	-20.77	-0.34	61.96	13.53
	(9.33)	(19.17)	(16.92)	(5.41)	(8.94)	(14.10)	(0.65)	(63.21)	(36.50)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.16	0.16	0.10	0.05	0.02	0.68	0.56	0.19	0.04
Observations	2112	2112	2112	2016	2016	1562	1562	2112	2112

Notes: The table reports the event study estimates corresponding with Figure 4. Significance levels: ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1.

Table A8: Event study regression output (II) – non-fiscal outcomes

	Technical efficiency	Accidents on county roads	Voter turnout
Year: $\leq$ -4	0.36	-0.03	-0.52
	(0.46)	(0.03)	(1.20)
Year: -3	0.12	-0.00	0.34
	(0.26)	(0.03)	(1.48)
Year: -2	-0.18	-0.03*	1.82
	(0.21)	(0.02)	(1.32)
Year: -1	0.00	0.00	0.00
	(.)	(.)	(.)
Year: 1	-0.06	0.02	1.93
	(0.15)	(0.03)	(2.16)
Year: 2	0.15	0.03	-1.30
	(0.23)	(0.03)	(1.21)
Year: 3	0.23	0.04	0.70
	(0.29)	(0.04)	(1.43)
Year: 4	0.35	0.00	1.22
	(0.38)	(0.04)	(1.24)
Year: 5	0.70	0.02	-4.28
	(0.44)	(0.04)	(5.98)
Year: 6	0.85	0.01	-0.28
	(0.55)	(0.04)	(0.73)
Year: 7	0.99	0.02	0.68
	(0.64)	(0.04)	(1.74)
Year: $\geq$ 8	0.30	0.03	-0.59
	(1.06)	(0.04)	(1.31)
County fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes
Within R^2	0.08	0.11	0.84
Observations	2001	1632	384

Notes: The table reports the event study estimates corresponding with Figure 5. Significance levels: ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1. Technical efficiency multiplied by 100.

Table A9: Excluding control variables

	Expenditure			Revenues				Public debt				
	Staff	Administrative	Investment	Sales of non-financial assets	Sales of financial assets	County rate contributions	County rate (%)	Core budget	Public enterprises	Technical efficiency	Accidents on county roads	Voter turnout
Accrual accounting	-7.79	11.36	-1.44	-7.51	6.78*	-12.23	-0.05	-67.78	-23.64	-0.06	0.05	-0.06
	(7.26)	(9.27)	(11.01)	(5.08)	(3.75)	(8.97)	(0.47)	(69.03)	(32.17)	(0.47)	(0.04)	(0.90)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	No	No	No	No	No	No	No	No	No	No	No	No
Within R^2	0.13	0.12	0.07	0.04	0.01	0.61	0.55	0.08	0.03	0.05	0.08	0.82
Observations	2112	2112	2112	2016	2016	1562	1562	2112	2112	2001	1632	384

Notes: The table reports difference-in-differences estimates where we exclude control variables. Significance levels (standard errors clustered at the county level): ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1. Technical efficiency multiplied by 100.

Table A10: Baseline results controling for unemployment and flood in 2002 and 2013

	Expenditure			Revenues				Public debt				
	Staff	Administrative	Investment	Sales of non-financial assets	Sales of financial assets	County rate contributions	County rate (%)	Core budget	Public enterprises	Technical efficiency	Accidents on county roads	Voter turnout
Accrual accounting	-5.81	10.32	-8.60	-9.90*	6.53*	-7.10	0.26	-58.84	-16.29	0.18	0.05	-0.08
	(6.26)	(7.56)	(10.55)	(5.55)	(3.34)	(6.28)	(0.44)	(53.85)	(24.68)	(0.43)	(0.04)	(0.88)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.16	0.13	0.09	0.06	0.02	0.64	0.55	0.22	0.04	0.08	0.11	0.72
Observations	1728	1728	1728	1728	1728	1278	1278	1728	1728	1714	1536	288

Notes: The table replicates the regressions from tables 4 and 5 controlling for the unemployment rate and a dummy, which is 1 in the year a country was affected by a flood and zero otherwise. Significance levels: ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1. Technical efficiency multiplied by 100.

Table A11: Excluding city-counties

	Expenditure			Revenues				Public debt				
	Staff	Administrative	Investment	Sales of non-financial assets	Sales of financial assets	County rate contributions	County rate (%)	Core budget	Public enterprises	Technical efficiency	Accidents on county roads	Voter turnout
Accrual accounting	1.54	4.66	-6.25	0.62	2.71	-8.81	0.01	31.68	-28.09*	0.70	0.07	-0.71
	(1.74)	(5.76)	(6.87)	(0.95)	(1.68)	(6.74)	(0.45)	(22.66)	(15.34)	(0.46)	(0.05)	(1.08)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.54	0.15	0.13	0.03	0.03	0.67	0.56	0.09	0.06	0.11	0.17	0.81
Observations	1562	1562	1562	1491	1491	1562	1562	1562	1562	1480	1207	284

Notes: The table reports difference-in-differences estimates where we exclude city-counties *(Kreisfreie Städte)*. Significance levels (standard errors clustered at the county level): ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1. Technical efficiency multiplied by 100.

Table A12: Poor and rich counties

	Expenditure			Revenues				Public debt				
	Staff	Administrative	Investment	Sales of non-financial assets	Sales of financial assets	County rate contributions	County rate (%)	Core budget	Public enterprises	Technical efficiency	Accidents on county roads	Voter turnout
A: GDP per capita 2005 below state median (poor)												
Accrual accounting	-4.23	10.95	-1.95	0.06	7.14	4.13	0.89	-11.10	-1.94	-0.62	0.01	0.37
	(9.98)	(12.95)	(17.45)	(4.21)	(5.69)	(7.43)	(0.64)	(77.47)	(25.99)	(0.60)	(0.05)	(1.50)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.18	0.17	0.11	0.07	0.02	0.81	0.63	0.13	0.08	0.26	0.15	0.76
Observations	1034	1034	1034	987	987	770	770	1034	1034	973	799	188
B: GDP per capita 2005 above state median (rich)												
Accrual accounting	-16.66	9.32	-13.44	-14.85*	8.76	-17.83	-0.99*	-128.70	-68.56	0.20	0.08	-0.13
	(10.72)	(10.84)	(12.09)	(8.76)	(5.35)	(10.56)	(0.54)	(102.77)	(53.32)	(0.64)	(0.06)	(0.59)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.22	0.14	0.12	0.06	0.05	0.63	0.52	0.25	0.05	0.16	0.11	0.92
Observations	1078	1078	1078	1029	1029	792	792	1078	1078	1028	833	196

Notes: The table reports difference-in-differences estimates for two subsamples of our dataset (poor and rich counties). Significance levels (standard errors clustered at the county level): ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1. Technical efficiency multiplied by 100.

Table A13: Cox and probit regression including fixed effects

	Cox			Probit		
	(1)	(2)	(3)	(4)	(5)	(6)
City county	0.35	0.15	1.09	0.65	0.67	0.09
	(0.98)	(0.93)	(1.27)	(0.79)	(0.79)	(1.91)
Population (log)	0.35	0.37	0.52	0.21	0.18	0.11
	(0.41)	(0.40)	(0.47)	(0.37)	(0.38)	(0.48)
Old-young population dependency ratio	0.01	-0.03	-0.03	-0.08	-0.08	-0.09
	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Population share of foreigners	0.09	0.13	0.16	0.02	0.03	0.00
	(0.10)	(0.10)	(0.10)	(0.08)	(0.08)	(0.08)
GDP (Euro 1,000 per capita)	-0.03	-0.02	-0.03	-0.03	-0.03	-0.03
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
CSU seat share council		0.04	0.04		0.03	0.03
		(0.03)	(0.03)		(0.03)	(0.02)
CSU head of county government		0.88**	0.81*		-0.22	-0.20
		(0.42)	(0.45)		(0.42)	(0.42)
Expenditure (Euro 1,000 per capita)			-0.05			-0.09
			(0.35)			(0.97)
Public debt core budget (per capita)			-0.00			0.00
			(0.00)			(0.00)
Public debt public enterprises (per capita)			-0.00			0.00
			(0.00)			(0.00)
District-year fixed effects	Yes	Yes	Yes			
District fixed effects				Yes	Yes	Yes
Pseudo R^2	0.18	0.21	0.21	0.14	0.16	0.17
Observations	1869	1869	1869	96	96	96

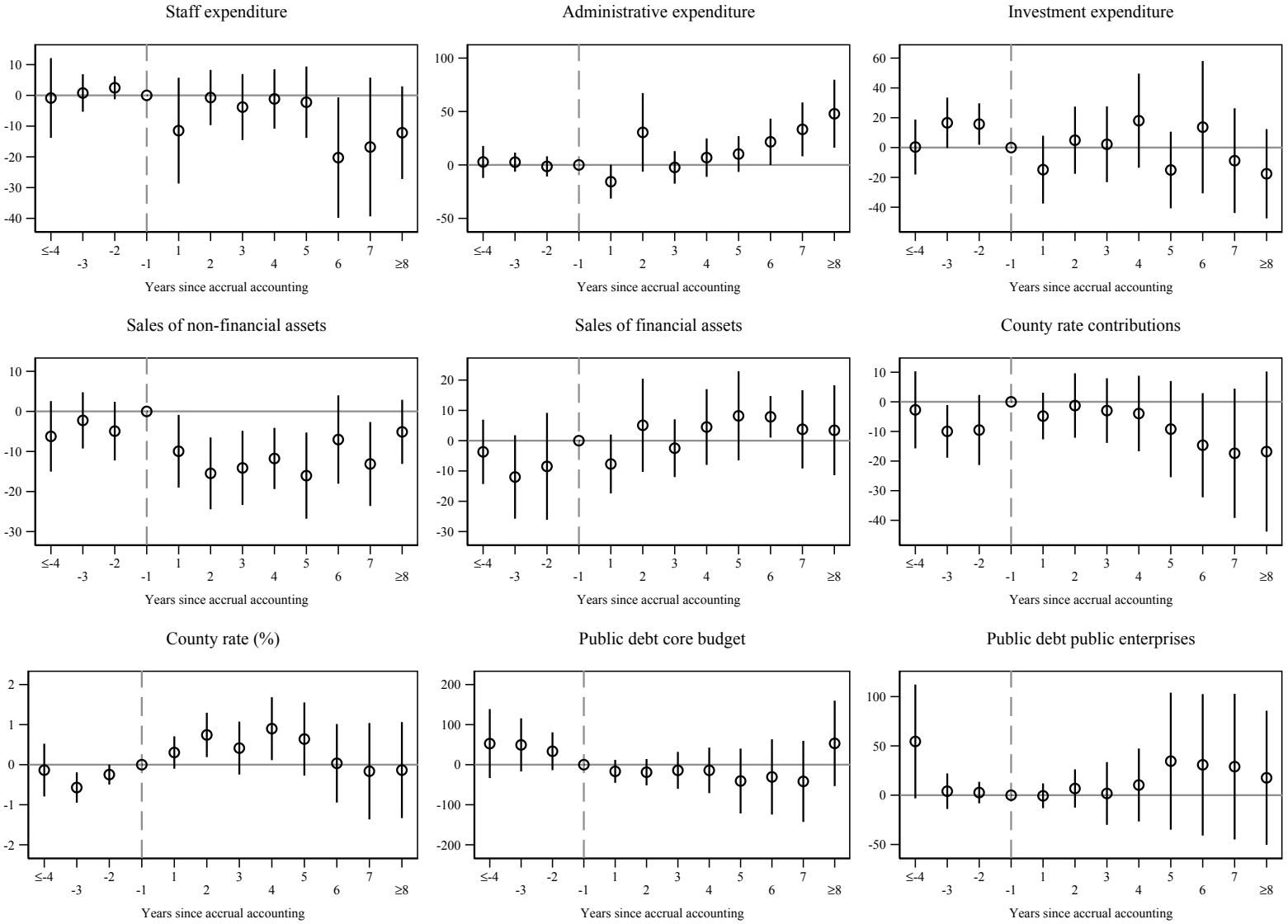
Notes: The table replicates the regressions from table 3 with district-year fixed effects for the cox regressions in columns (1)-(3) and district fixed effects for the probit regressions in columns (4)-(6). Significance levels: ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1.

Table A14: Baseline results including district-year fixed effects

	Expenditure			Revenues				Public debt				
	Staff	Administrative	Investment	Sales of non-financial assets	Sales of financial assets	County rate contributions	County rate (%)	Core budget	Public enterprises	Technical efficiency	Accidents on county roads	Voter turnout
Accrual accounting	-7.77	13.45	-6.36	-6.67	6.71*	-4.32	0.53	-56.19	-23.22	0.13	0.04	-0.06
	(7.64)	(9.97)	(11.32)	(5.30)	(3.86)	(8.45)	(0.46)	(60.35)	(35.71)	(0.58)	(0.04)	(0.87)
County fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.22	0.20	0.17	0.12	0.07	0.71	0.66	0.23	0.08	0.13	0.15	0.84
Observations	2112	2112	2112	2016	2016	1562	1562	2112	2112	2001	1632	384

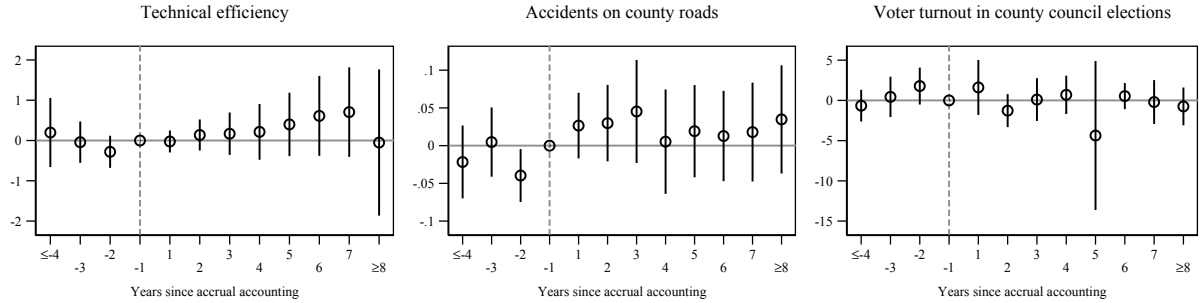
Notes: The table reports difference-in-differences estimates. The table replicates the regressions from tables 4 and 5 including district-year fixed effects. Significance levels: ***p $<$ 0.01; **p $<$ 0.05; *p $<$ 0.1. Technical efficiency multiplied by 100.

Figure A1: Event study results (I) – fiscal outcomes including district-year fixed effects



Notes: Dots represent point estimates from event study estimations where we include district-year fixed effects, bars are 90% confidence intervals (equivalent to *p $<$ 0.1). -1 on the x-axis is the base category and denotes one year before the introduction of accrual accounting; 1 denotes the first year of implementing accrual accounting.

Figure A2: Event study results (II) – non-fiscal outcomes including district-year fixed effects



Notes: Dots represent point estimates from event study estimations where we include district-year fixed effects, bars are 90% confidence intervals (equivalent to *p $<$ 0.1). -1 on the x-axis is the base category and denotes one year before the introduction of accrual accounting; 1 denotes the first year of implementing accrual accounting. Technical efficiency multiplied by 100.