



# Ineffective fiscal rules? The effect of public sector accounting standards on budgets, efficiency, and accountability

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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.

**Keywords** Fiscal rules · Public accounting · Budget transparency · Sustainability · Government efficiency · Accountability · Local government

**JEL Classification** D02 · D73 · H72 · H83

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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.<sup>1</sup> 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 (Fig. 1).

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 cash-based to accruals-based accounting (European Commission 2013). Implementation costs for Germany are estimated at around \$ 3.5 billion<sup>2</sup>, 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

<sup>1</sup> 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.

<sup>2</sup> The cost estimates refer to the introduction of the accrual-based EPSAS.

accounting. In this federal state, all municipalities were obliged to change to accrual accounting.<sup>3</sup>

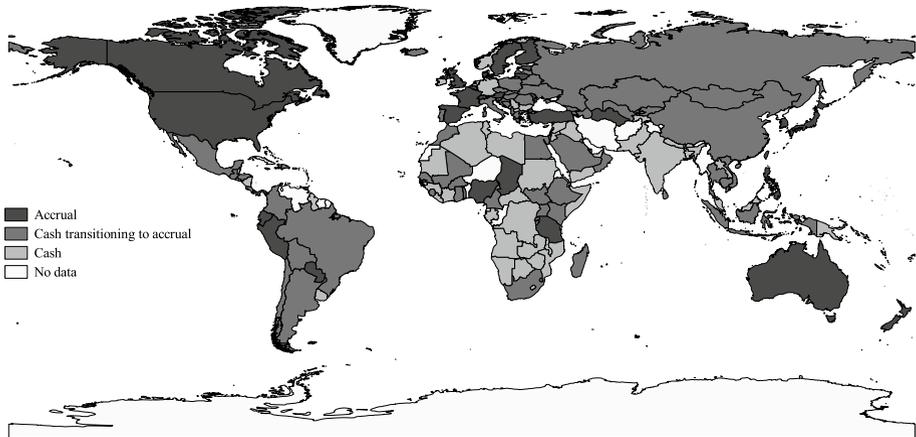
We estimate the effect of public sector accrual accounting on fiscal and political outcomes in a high-income country. Because (budget) institutions are likely to be endogenous (Aghion et al. 2004; Heinemann et al. 2018), we apply difference-in-differences estimation and event studies to a quasi-experimental setting at the local level in Germany.<sup>4</sup> 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 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.<sup>5</sup> 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

<sup>3</sup> 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 3 years, however, accrual accounting overlaps with further policy changes such as withdrawing fiscal supervision (see Christofzik and Kessing 2018).

<sup>4</sup> Asatryan et al. (2018) use a similar strategy.

<sup>5</sup> Tóth (2019) shows that fiscal rules successfully bind the implementing but also later governments.



**Fig. 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

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-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 Fig. 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 Fig. 2, the balance of cash flows affects the liquid assets or the debt level in the balance sheet. The balance of revenues and

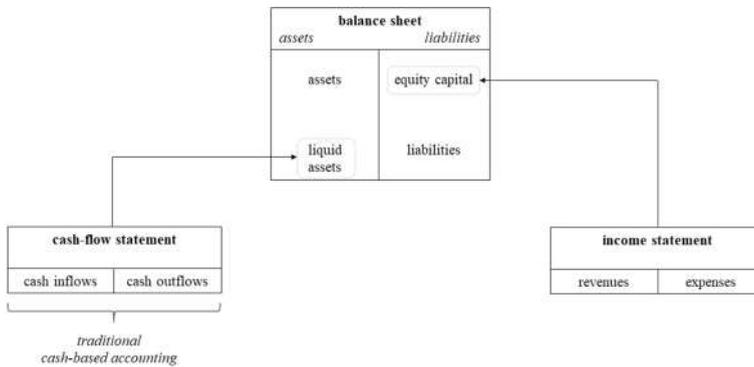
expenses together report complete resource consumption in the period and directly affect equity capital.

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.<sup>6</sup>

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.

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<sup>6</sup> 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.



**Fig. 2** Components of a simplified accrual accounting system.

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

## 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.<sup>7</sup> 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

<sup>7</sup> Traditional cash-based accounting statements do not systematically report the use of resources.

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

Key features of cash-based and accrual 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 (Sect. 2.1) and the pros and cons of public sector accrual accounting (Sect. 2.2)

public entities become available. Anecdotal evidence reports that incentives for outsourcing decrease drastically because public enterprises are treated like core budgets, and vice versa.<sup>8</sup> 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

<sup>8</sup> See, Delmenhorster Kurier, June 30, 2019, “Misstrauische Politiker”, [https://www.weser-kurier.de/region/delmenhorster-kurier\\_artikel,-misstrauische-politiker-\\_arid,1841297.html](https://www.weser-kurier.de/region/delmenhorster-kurier_artikel,-misstrauische-politiker-_arid,1841297.html).

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 appropriate 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.<sup>9</sup> 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

<sup>9</sup> 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>.

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 approximately 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 6 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.<sup>10</sup> 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 their cash-flow statements on an annual basis (see Fig. 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 5 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

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<sup>10</sup> 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.

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.<sup>11</sup>

## 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.<sup>12</sup> Twelve different 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.

#### 4.1.1 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.

<sup>11</sup> 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 Augsburgische 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&NavID=1901.67&mNavID=1901.1&object=tx%7C1901.416.1&kat=&kuo=1&sub=0>.

<sup>12</sup> 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.

In our dataset, per capita expenditures are in three main categories<sup>13</sup> (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).<sup>14</sup>

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 annual municipality tax income to the county budget.<sup>15</sup> 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 3430 (\$ 3860) 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 5 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.<sup>16</sup> 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.

<sup>13</sup> 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.

<sup>14</sup> 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.

<sup>15</sup> County governments do not raise own taxes. County rates, however, do not occur in consolidated city counties.

<sup>16</sup> Data on debt of all local government enterprises is not available as panel dataset in the period of observation.

**Table 2** Descriptive statistics

	Obs.	Mean	SD	Min	Max
<i>Sustainable budgeting</i>					
Staff expenditure (per capita)	2112	286.21	298.99	12.86	1244.56
Administrative expenditure (per capita)	2112	211.72	157.84	0.01	1205.66
Investment expenditure (per capita)	2112	139.70	143.48	8.77	954.09
Sales of non-financial assets (per capita)	2016	21.66	51.71	- 0.60	1076.44
Sales of financial assets (per capita)	2,016	4.30	42.15	- 0.55	1574.81
County rate contributions (per capita)	1562	342.35	87.19	25.81	1064.96
County rate (%)	1562	46.48	3.86	33.50	59.85
Public debt core budget (per capita)	2112	564.19	662.30	0.38	3343.30
Public debt public enterprises (per capita)	2112	140.89	360.60	0.00	2,332.89
<i>Efficiency</i>					
Technical efficiency	2001	89.75	16.65	11.45	100.00
Accidents on county roads (per 1,000 capita)	1632	0.55	0.33	0.00	2.12
<i>Accountability</i>					
Voter turnout in county council elections	384	62.09	9.22	29.00	82.30
<i>Accounting standard</i>					
Accrual accounting (yes = 1)	2112	0.13	0.34	0.00	1.00
<i>Control variables</i>					
Population (log)	2112	11.59	0.53	10.54	14.20
Old-young population dependency ratio	2112	50.72	3.67	38.40	60.80
Population share of foreigners	2112	7.77	4.11	2.10	25.87
GDP (Euro 1,000 per capita)	2112	32.67	15.15	14.43	122.30
CSU seat share council	2112	43.61	8.60	0.00	60.00
CSU head of county government	2112	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

#### 4.1.2 Government efficiency

There are proposed effects of accrual accounting for government efficiency and counter-arguments. Accrual accounting may increase 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 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.<sup>17</sup> 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.<sup>18</sup>

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, 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 1000 capita on county roads on average (see Table 2).

### 4.1.3 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

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<sup>17</sup> DEA report the maximum efficiency score of 1. We multiply all efficiency scores by 100 and report the maximum efficiency score as 100.

<sup>18</sup> 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 Koethenburger 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.

covers the election years 1996, 2002, 2008 and 2014. Turnout in counties range from 29 to 82% 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 Sect. 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.<sup>19</sup> 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:

$$y_{it} = \alpha_i + \delta_t + \beta(\text{Accrual}_{it}) + X'_{it}\gamma + \epsilon_{it} \quad (1)$$

where  $y_{it}$  describes outcome  $y$  in county  $i$  in year  $t$ .  $\alpha_i$  and  $\delta_t$  are county and year fixed effects,  $X'_{it}$  is a vector of control variables, and  $\epsilon_{it}$  denotes the error term. The coefficient of interest is  $\beta$  referring to the dummy variable  $\text{Accrual}_{it}$  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

<sup>19</sup> 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.

share of counties with accrual accounting gradually increased to 35% between 2005 and 2012. There is no temporal clustering. The map in Fig. 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 Tables A13 and A14 in the Online Appendix).

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.<sup>20</sup> First, we estimate survival 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.

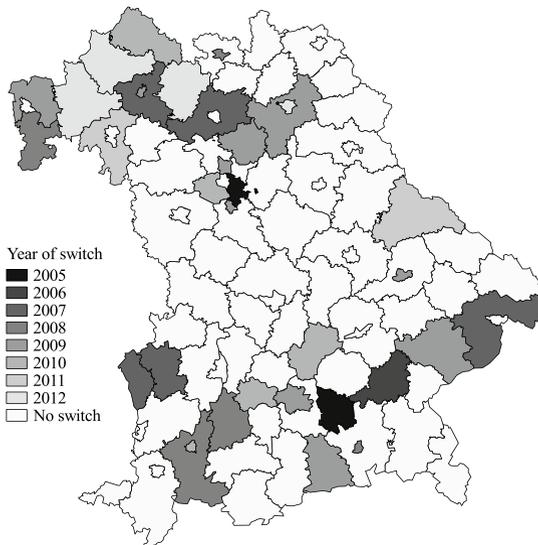
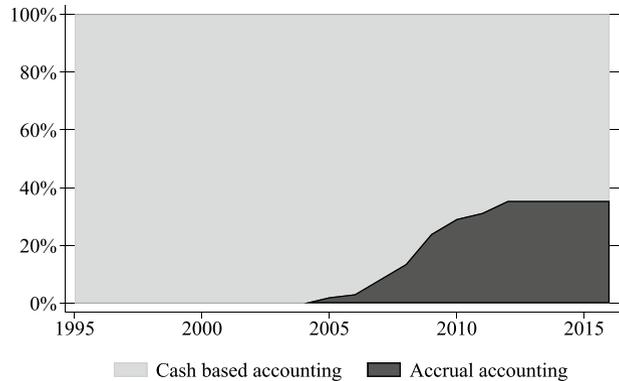
Parallel pre-reform trends of switching and non-switching counties can be tested empirically by extending the twelve empirical models to event study regressions. In event study regressions, dummies for each year before and after switching to accrual budgeting replace the baseline dummy variable for accrual 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:

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

where  $y_{it}$  describes outcome  $y$  in county  $i$  in year  $t$ .  $\alpha_i$  and  $\delta_t$  are county and year fixed effects,  $X'_{it}$  is a vector of control variables following Eq. (1), and  $\epsilon_{it}$  denotes the 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).

<sup>20</sup> 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 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.

**Fig. 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



## 5 Results

### 5.1 Baseline

Table 4 reports the baseline results for all fiscal outcome variables which are of main interest in our study.<sup>21</sup> 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%

<sup>21</sup> Table A4 in the Online Appendix shows the results for our control variables.

**Table 3** Previous development does not predict switching to accrual accounting

	Cox			Probit		
	(1)	(2)	(3)	(4)	(5)	(6)
City county	0.40 (0.81)	0.46 (0.84)	1.08 (1.44)	0.47 (0.59)	0.48 (0.58)	- 0.39 (1.70)
Population (log)	0.26 (0.45)	0.25 (0.48)	0.34 (0.56)	0.19 (0.34)	0.17 (0.34)	0.08 (0.43)
Old-young population dependency ratio	- 0.02 (0.05)	- 0.03 (0.05)	- 0.03 (0.05)	- 0.05 (0.05)	- 0.05 (0.05)	- 0.05 (0.05)
Population share of foreigners	0.05 (0.08)	0.06 (0.08)	0.06 (0.08)	0.03 (0.06)	0.03 (0.06)	0.02 (0.06)
GDP (Euro 1000 per capita)	- 0.02 (0.02)	- 0.02 (0.02)	- 0.01 (0.02)	- 0.02 (0.02)	- 0.02 (0.02)	- 0.02 (0.02)
CSU seat share council		0.01 (0.03)	0.01 (0.03)		0.01 (0.02)	0.01 (0.02)
CSU head of county government		0.59 (0.40)	0.55 (0.42)		- 0.14 (0.36)	- 0.11 (0.36)
Expenditure (Euro 1000 per capita)			- 0.44 (0.91)			0.08 (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: \*\*\* $p < 0.01$ ; \*\* $p < 0.05$ ; \* $p < 0.1$  (no significant values to report)

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.

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

**Table 4** Baseline results (I)—fiscal outcomes

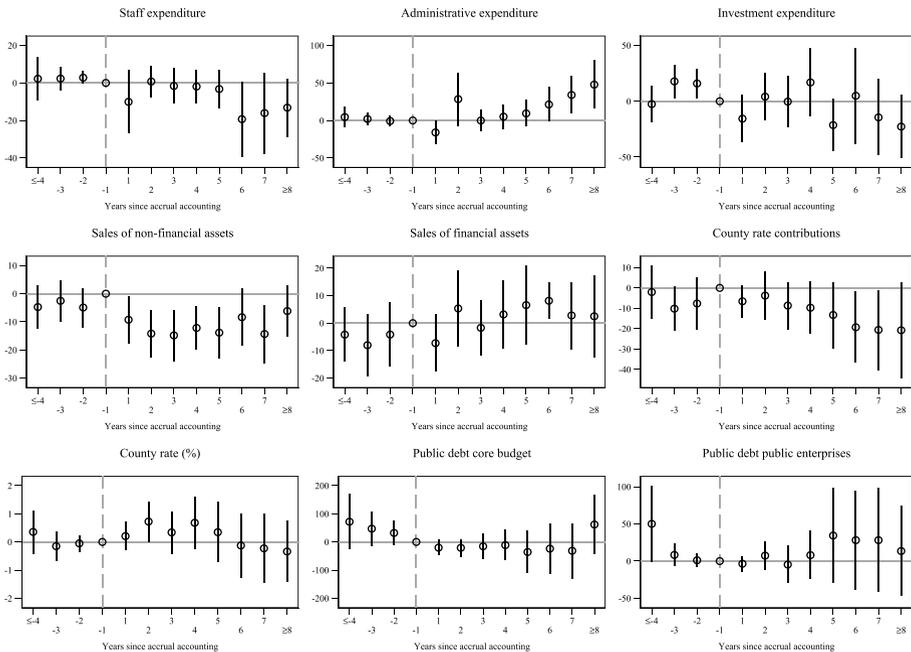
	Expenditure			Revenues			Public debt		
	Staff	Administrative	Investment	Sales of non-financial assets	Sales of financial assets	County rate contributions	County rate (%)	Core budget	Public enterprises
Accrual accounting	- 9.40 (7.73)	11.57 (8.94)	- 7.57 (10.80)	- 7.58 (4.68)	5.91 * (3.14)	- 8.81 (6.74)	0.01 (0.45)	- 67.92 (60.43)	- 24.08 (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 (0.49)	0.05 (0.04)	– 0.09 (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 (no significant values to report)

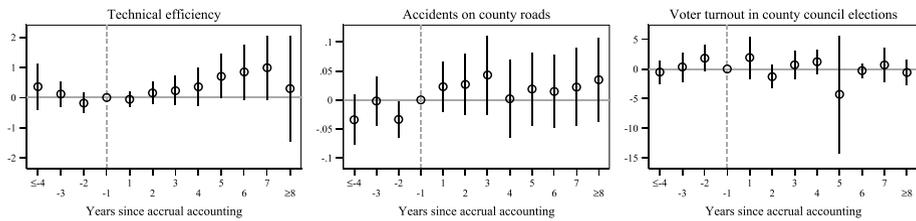


**Fig. 4** Event study results (I)—fiscal outcomes.

*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 1 year before the introduction of accrual accounting; 1 denotes the first year of implementing accrual accounting

turnout in county elections change significantly after accrual accounting was implemented.<sup>22</sup> Accrual-based budgets do not seem to improve the transparency of public

<sup>22</sup> Results do not change for time lags of voter turnout. See Table A6 in the Online Appendix.



**Fig. 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 1 year before the introduction of accrual accounting; 1 denotes the first year of implementing accrual accounting. Technical efficiency multiplied by 100

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.

## 5.2 Event studies

County governments in Bavaria have to publish their first full consolidated financial statements 5 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 Figs. 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.<sup>23</sup> 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 (Fig. 4). Pre-reform trends look promising: counties switching to accrual accounting do not deviate from counties using cash-based accounting before changing accounting 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*

<sup>23</sup> The Online Appendix provide full event study regression outputs in Tables A7 and A8.

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.<sup>24</sup>

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 Figs. 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 8 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 Fig. 5). Technical efficiency steadily increases after introducing accrual accounting, but effects are never statistically significant at the 10% level.

However, Fig. 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 7 years after switching accounting standards. Revenues from sales of financial assets, by contrast, significantly increase some 6 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 Fig. 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 6 to 7 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.<sup>25</sup> 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

<sup>24</sup> Another minor exception is that road accidents are somewhat lower some 2 years before switching (10% significance level). See Table A8 in the Online Appendix.

<sup>25</sup> 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.

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 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 8 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 6 years after implementing accrual accounting.<sup>26</sup> 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.<sup>27</sup>

## 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

<sup>26</sup> 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>.

<sup>27</sup> We show that observable pre-reform characteristics do not predict the selection into treatment (see Sect. 4.2). Even more, event study results corroborate that the common trends assumption in our outcome variables hold (see Sect. 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 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.

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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