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Does Accrual Accounting Alter Fiscal Policy Decisions? - Evidence from Germany

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Does Accrual Accounting Alter Fiscal Policy Decisions? - Evidence from Germany

Désirée I. Christofzik*

February 15, 2019

Abstract

Many governments have replaced traditional cash-based accounting with some form of accrual-based accounting system. However, empirical evidence on the effects of the public accounting system on fiscal policy is scarce. Following rules by the federal states, municipalities in Germany have adopted accrual-based accounting systems gradually. By exploiting variations over time and across states I find no evidence for an impact on the overall financial balance. However, my findings suggest that accrual accounting has altered the structure of the budget. Revenues from the sales of non-financial assets have decreased significantly. This supports the hypothesis that municipalities had used these one-off measures before to meet fiscal constraints. Using data on entities controlled by the municipalities, the analysis provides no evidence for repercussions on these public funds, institutions or enterprises.

JEL classification: H83, H71, H72

Keywords: public sector accounting, accrual accounting, local public policy, fiscal rules, stock-flow adjustments

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1 Introduction

Traditionally, the budget and accounting information of governments have been based on the cash principle. Starting in the 1980s, public sector accounting has experienced some fundamental changes. Private sector-style management instruments have been implemented, and in many countries a move towards accrual accounting has taken place. The discussion about accrual standards for public sector accounting has gained renewed interest after the sovereign debt crisis. To increase fiscal transparency, the European Commission currently intends to introduce harmonized, compulsory accrual-based European Public Sector Accounting Standards (EPSAS) for all member states. [[Quelle]] The voluntary switch to accrual accounting has already been actively encouraged and sponsored by the Commission.

Despite the relevance of the topic and the prominent political debate, empirical evidence on the effects of the public accounting system is scarce. There has been little research on the costs and benefits of such reform. To the best of my knowledge, there is no other study that has dealt with the impact on fiscal policy decisions. There are some studies, mainly from the accounting literature, that primarily analyze the effect of accrual-based accounting on the efficiency of the public sector. They are predominantly based on questionnaires or case studies; see Burth and Hilgers (2014) as well as Kuhlmann et al. (2008) who study perceived benefits and consequences for German municipalities, Paulsson (2006) for experiences of the central government in Sweden, Christiaens and Van Peteghem (2007) for the local level in Flanders, and Carlin (2005) for a case study on Australia, among others. A study by van der Hoek (2005) summarizes experiences from the Netherlands. By using expenditure data, Lampe et al. (2015) quantitatively assess the impact on cost efficiency of local governments in the German state of North Rhine-Westphalia in the very short run.

Apart from the objective of getting more transparent and comparable fiscal data, the main achievements expected from this kind of reform are to increase efficiency and inter-generational equity by moving from an input-oriented to an output-oriented system. Moreover, to get a more comprehensive picture, consolidated financial statements have been implemented, including controlled entities. Both aspects are especially relevant when considering the effects of fiscal rules on policy decisions. There is a strand of literature showing that governments find ways to circumvent fiscal constraints as they target specific budgetary positions or data. Governments can do this, for example, by engaging in off-budget activities (von Hagen 1991), hiding fiscal policies in less transparent budgets (Milesi-Ferretti 2004) or by using accounting tricks (Buti et al. 2007).

Evidence for such creative accounting behavior has been found in Europe during the run-up to the monetary union (Milesi-Ferretti and Moriyama 2006) as well as after the introduction of the stability and growth pact and the excessive deficit procedure (von Hagen and Wolff 2006).¹

This paper studies the effect of the accounting system on (i) the overall effect on the financial balance of the core budget, and (ii) the structure of revenues and expenditures as well as (iii) repercussions on entities controlled by the core budget. I exploit the fact that municipalities in Germany have switched gradually and only partially to accrual-based accounting systems. Therefore, I can use variations over time and across German states in a fixed effects panel model with the share of municipalities using accrual accounting as a continuous treatment variable. Additionally, I estimate generalized difference-in-differences models using a proxy for the length of the treatment. The study is conducted at the state level because data on the switching date are not available for all municipalities in Germany. As explained in Section 3.1, the use of state-level information also addresses some concerns regarding the comparability of data.²

The empirical results indicate no impact of the switch to the accrual-based accounting system on the overall financial balance of the core budget. This suggests that the new model has only a limited impact on overall fiscal discipline. However, the findings imply that the structure of the budget changes. I find a significant decline in revenues from the sales of non-financial assets, which is robust across different specifications. One explanation for this finding is the fact that under cash-accounting, it is, in principle, easier to meet the balanced budget rule by selling non-financial assets, see Section 2.1 for more details on the mechanism. The new accounting system therefore seems to have closed a loophole. However, this has not found expression in an improved financial balance. Using data on entities controlled by the municipalities, I find no evidence for repercussions on these public firms.

The study is structured as follows. Section 2 describes the institutional setting and the data. Section 3 explains the identification strategies and the econometric framework. Section 4 presents the results for municipal revenues and expenditures as well as for entities controlled by the municipalities. Finally, Section 5 discusses the findings and concludes.

¹See Burret and Feld (2018) for more literature on the relation between fiscal rules and evasive reactions.

²Other studies using panel data from the German states include Baretti et al. (2002), Baskaran (2012), Buettner (2002), or Stegarescu (2013), among others.

2 Institutional setting and data

2.1 Cash-based accounting versus accrual-based accounting

In principle, there are two different methods used to record accounting transactions, in the private sector as well as in the public sector: cash accounting and accrual accounting. While cash accounting has been traditionally deployed in the public sector, in the private sector it is commonly used only by small businesses. One main difference between the two systems lies in the time at which transactions are recorded. In a cash-based (cameralistic) accounting system, revenues are recorded when cash is received and expenditures are recorded when cash is paid out. The use of resources is difficult to determine, because assets and liabilities are not recorded systematically. In contrast to this, in accrual-based accounting systems revenues are recorded when they are earned, and expenditures are recorded when incurred, independent of whether cash was received or paid out in this period. This system requires the valuation of assets and liabilities and the depreciation of assets has to be taken into account. It may offer a more comprehensive picture of a government's financial situation. However, it is also more complex, requires estimations, and therefore offers room for discretion. Additionally, extended cameralistic accounting systems exist, which complement the cash-based system by adding elements such as the development of assets and debt, captured often at the end of each year; see Cavanagh et al. (2016) for different nuances between pure cash accounting and full accrual accounting.

The aim to better capture resource consumption is addressed by linking the different statements resulting in a balance sheet revealing assets and liabilities. In Germany, the guidelines for the new framework have been developed in close resemblance with the German Commercial Code (HGB) and the principles of orderly bookkeeping and accounting, but have been adjusted for the requirements of the public sector. In the traditional cash-based accounting system, the cash-flow statement is at the center of accounting (Ridder et al. 2005). In the new accounting system with double-entry bookkeeping, this element is complemented by an income statement similar to the one in business accounting. Both the receipts and payments as well as the revenues and expenses are recorded and enter the balance sheet, which reveals the assets and liabilities at year-end. As illustrated in Figure 1 the balance of operations affects equity at the liabilities side of the balance sheet. The balance of cash flows increases liquid assets in case of a surplus or increases short-term debt in case of a deficit (Schwartzing 2010).

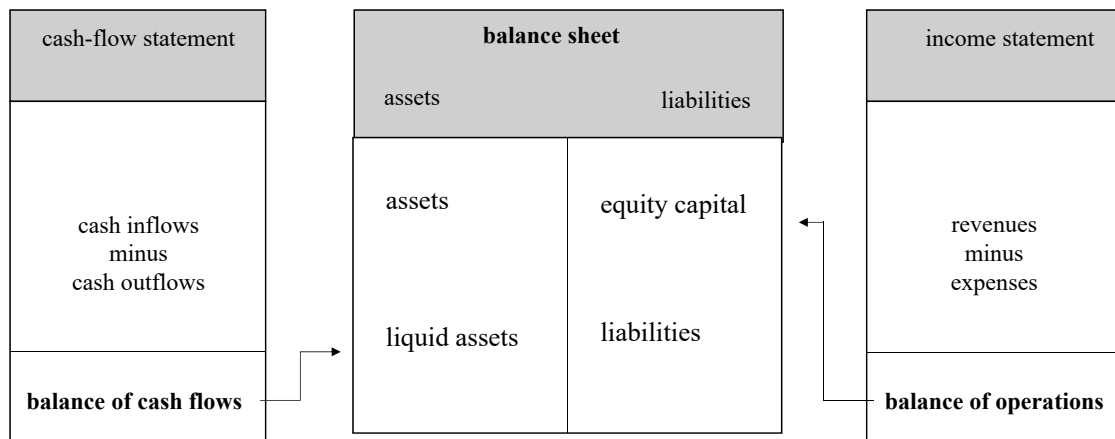


Figure 1: Simplified representation of the three-component system of accrual accounting in Germany

One example for which the difference between the accounting systems becomes obvious is how sales of non-financial assets are treated. Revenues from the sales of these assets are one-off revenues, for example from the sale of land, buildings or machinery. With cash-based accounting, the revenues from the sale of an asset reduce the deficit by the sale price (Schwarting 2010). Therefore, such sales can be used to balance the budget regardless of whether the price is higher or lower than the value of the asset. This can create fiscal illusions in the sense that the sale reduces this year's reported deficit, but only at the expense of a decline in net worth; see Easterly (1999), Irwin (2012) or Irwin (2016). With accrual accounting, the sale of an asset is partially offset by the removal of that asset from the balance sheet at the time of sale. Only gains or losses alter the deficit. As a consequence, it should be less attractive to sell assets. The revenues from the sale of non-financial assets should decrease. However, if accrual accounting increases transparency by showing the whole costs associated with an asset, the switch could also increase incentives to sell assets as depreciations are no longer shown on the balance sheet.

Future pensions for civil servants constitute another prominent example. Such obligations for future spending are included into the liability side of the opening balance sheet and decrease equity capital. These accruals for pensions have, however, no direct effect in the year of the switch in the sense that they have to be fully covered by current income. This is only true for changes in subsequent periods which come along, for example, with new employment, promotions or modified mortality tables (Rechnungshof des Saarlandes 2010). If accruals for pensions already lead up to a

negative equity capital in the opening balance, this can violate the balanced budget rule and lead to stricter fiscal oversight.

Both examples make clear that estimations are crucial in accrual-based accounting systems. This holds true for the valuation of assets, e.g. for buildings or streets for which market-prices are hardly identifiable, but also for long-term liabilities such as pensions, for which many assumptions need to be made. These assumptions, e.g. about the discount rate that is used to calculate the present value of these liabilities, are directly reflected in the financial situation of the government as specified on the balance sheet.

2.2 International comparison of public sector accounting

Traditionally, cash-based accounting systems were used in public administration until a few decades ago. Since then, public sector accounting has experienced some fundamental changes. By and large, traditional concepts have changed to more private sector-style management instruments. Over the past 25 years, a move towards accrual accounting has taken place in many countries. This development started with the New Public Management (NPM) reforms in the 1980s. Among OECD countries, the forerunners were New Zealand, the United States, Poland, Finland, and Australia. They completed the transition at the national government level as early as the 1990s; see OECD/IFAC (2017) for detailed country profiles. The United Kingdom and Canada established accrual accounting in the early 2000s. The main motives stated were to better measure the financial performance of departments, agencies or public entities; to increase efficiency, accountability, and transparency; and to evaluate the complete costs of government activities. The transition to accrual budgeting and accounting was often linked to wider financial management reforms. Figure 2 shows that the majority of European countries has already implemented accrual accounting at the central level.

The implementation process, however, differed not only with respect to the timing of its adoption, but also its administrative level. In some countries such as Sweden, accrual accounting reforms have been implemented primarily at the municipal level; other countries such as New Zealand imposed them in a more centralist way (Christiaens et al. 2015). This explains why accounting systems also differ within countries, as depicted in Figure 3.

There is a great diversity of bookkeeping systems used by different levels of government within a country. Among the European countries the type of the bookkeeping

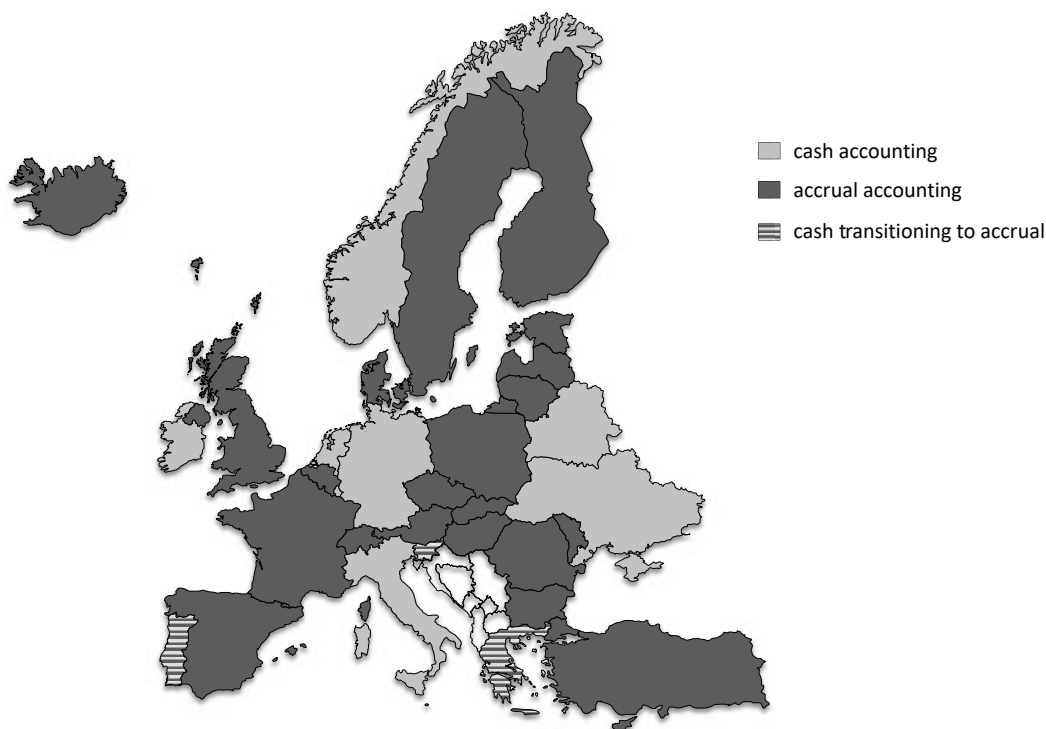


Figure 2: Public sector accounting at the central level. Data sources: OECD/IFAC (2017) and Cavanagh et al. (2016)

systems also varies between the different sub-sectors of government (Ernst & Young 2012). Table 1 depicts an accounting maturity score reflecting how close the different levels are to the accrual International Public Sector Accounting Standards (IPSAS). The IPSAS are based on IFRS/IAS, which are international business accounting rules. A survey conducted by PwC (2014) on behalf of Eurostat shows that for example in France, the UK and Sweden, the different governmental sectors use public sector accounting systems that are very close to IPSAS. The cash-based system used at the federal level in Germany differs substantially from these general business accounting standards. The proximity to a hypothetical IPSAS-based (accrual) accounting benchmark was substantially higher for the local level in Germany. On the one hand, the fact that the score was still much lower than in other countries is due to the fact that the local level implemented accrual accounting gradually (see Section 2.3). For those municipalities which have already switched to accrual accounting, the study finds a score of 0.78. On the other hand, the standards for accrual accounting in Germany are based on the German Commercial Code and not the international business accounting rules resulting, for example, in different valuation provisions; see Adam (2014) or Federal Ministry of Finance (2016) for differences between the two systems.

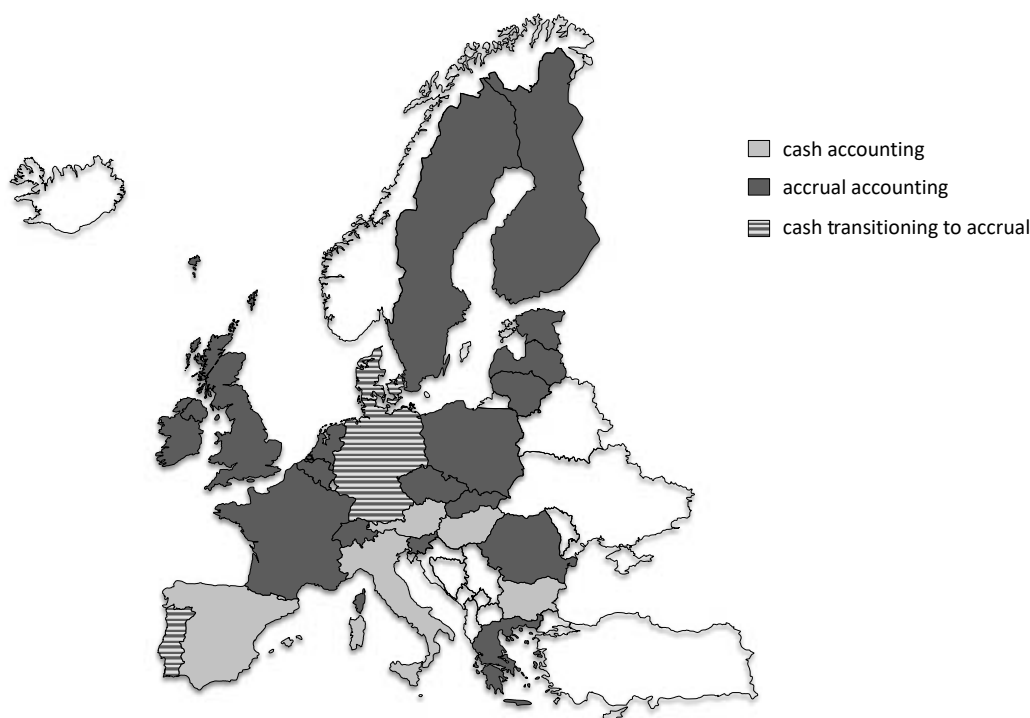


Figure 3: Public sector accounting at the local level. Data sources: Bellanca et al. (2015) and Ernst & Young (2012)

The discussion about accrual standards for public sector accounting has gained renewed interest after the sovereign debt crisis. As a consequence of the crisis, a new set of rules for economic and fiscal surveillance has been adopted by the European Parliament and the Council (the so-called Six-Pack). One part of these measures was a directive dealing with the budgetary framework of member states. Aside from the recommendation that public sector accounting in the member states should be designed in a way that the necessary accrual data can be generated, it committed the Commission to assess the suitability of the accrual IPSAS for the member states (Bundesrechnungshof 2017).

The result was an assessment report which the Commission delivered in 2013. The key conclusion of this report is that there is a strong need for harmonized, accrual-based public sector accounting systems in the member states and that IPSAS would make a suitable reference framework for developing European Public Sector Accounting Standards (EPSAS). Accordingly, the Commission plans to make such standards obligatory at all levels of government in the European Union member states. In Germany, the Federal Council as well as the Federal Parliament have expressed doubts on the suitability of this plan (Federation/Länder EPSAS Working Group 2017). The

Table 1: Accounting maturity by country and government sector

Country	Government sector			
	Central	State	Local	Social fund
Austria	0.73	0.12	0.12	0.61
Belgium	0.67	0.67	0.73	0.60
Bulgaria	0.56	-	0.56	0.63
Croatia	0.34	-	0.34	0.55
Cyprus	0.14	-	0.75	0.17
Czech Republic	0.75	-	0.75	0.77
Denmark	0.72	-	0.65	0.58
Estonia	0.92	-	0.92	0.86
Finland	0.72	-	0.90	0.92
France	0.89	-	0.84	0.92
Germany	0.22	0.29	0.58	0.42
Greece	0.12	-	0.12	0.12
Hungary	0.66	-	0.66	0.55
Ireland	0.54	-	0.71	0.57
Italy	0.31	-	0.30	0.14
Latvia	0.73	-	0.73	0.55
Lithuania	0.88	-	0.88	0.72
Luxembourg	0.19	-	0.31	0.15
Malta	0.22	-	0.94	-
Netherlands	0.31	-	0.58	0.78
Poland	0.66	-	0.66	0.68
Portugal	0.55	-	0.80	0.70
Romania	0.63	-	0.63	0.38
Slovakia	0.75	-	0.75	0.34
Slovenia	0.62	-	0.62	0.19
Spain	0.70	0.61	0.68	0.58
Sweden	0.81	-	0.81	0.71
UK	0.96	-	0.95	-

Data source: PwC (2014, Table 4). The accounting maturity score reflects an estimated proximity to a hypothetical IPSAS-based (accrual) accounting benchmark derived from responses to a questionnaire. Government sectors that have already implemented accrual accounting should obtain a high score.

main points of criticism are the unclear benefit-cost ratio, the vague legal basis for the legislative proposal, and the inconclusive suitability of the international business accounting rules for public sector accounting. The German Federal Audit Office states that alternative, potentially less extensive and costly ways to improve transparency and comparability among the member states have not been considered by Eurostat and the European Commission. Moreover, it fears additional scope for discretion, even reducing transparency. Additionally, the fact that the voluntary switch to accrual accounting is encouraged and sponsored by the Commission before member states have made a decision has been criticized, as well as the prominent role of private sector audit firms during the decision making process (Bundesrechnungshof 2017).

2.3 Phasing-in of accrual accounting in German municipalities

The German federal system comprises three tiers. Aside from the federal level and sixteen states (*Länder*), the local level is subdivided into over 11,000 municipalities and municipal associations, as of 2016.³ Three of the sixteen states are commonly known as city-states: Berlin, Hamburg, and Bremen, which is in fact an association of two cities. Those three states were excluded from the analysis. In the remaining 13 states, the state parliaments can decide on the accounting system for the respective local level. However, municipalities have a constitutionally guaranteed right of self-government, see Christofzik and Kessing (2018).

In 1999, the Interior Ministers of the German states agreed to reform communal budget law. For the Federal Government and the states, the option to either use cash-based or accrual-based systems was enacted into law (*Haushaltsgrundsätze- modernisierungsgesetz*) in 2010. Previously, accrual principles could only be used as a complement. Apart from the city-states, only the state government of Hesse implemented accrual accounting and presented an opening balance sheet in 2009. North Rhine-Westphalia plans to switch to accrual accounting. The federal level plans to adhere to an extended cash-accounting system.

While the Federal Government and most of the states are sticking to an extended cash-based accounting system, almost two thirds of municipalities had adopted accrual accounting by 2016, following regulations by their respective state. In 2000, the German states agreed on some basic points for a municipal accounting system and published a proposal for an outline of the regulations in 2003. Subsequently, each of the states enacted its own rules for its municipalities to reform the cash-based (cameralistic) accounting system. The regulations that are set out in the respective local government codes (*Gemeindeordnung*) vary between states but do not differ between municipalities within the same state. In particular, the rules differ with respect to the transition period or the extent to which accrual accounting was instructed.⁴ Figure 4 summarizes the phasing-in periods for the different states.

³Four large states (Baden-Wuerttemberg, Bavaria, Hesse and North Rhine-Westphalia) feature administrative districts (*Regierungsbezirke*), an additional mid-level division between states and counties mostly concerned with administrative tasks on a regional level. Some states, especially those with relatively small municipalities (e.g. Rhineland-Palatinate, Baden-Wuerttemberg, Bavaria, among others) exhibit additional municipal associations between the county and the municipal level.

⁴Additionally, for example, rules differ with respect to the valuation of assets.

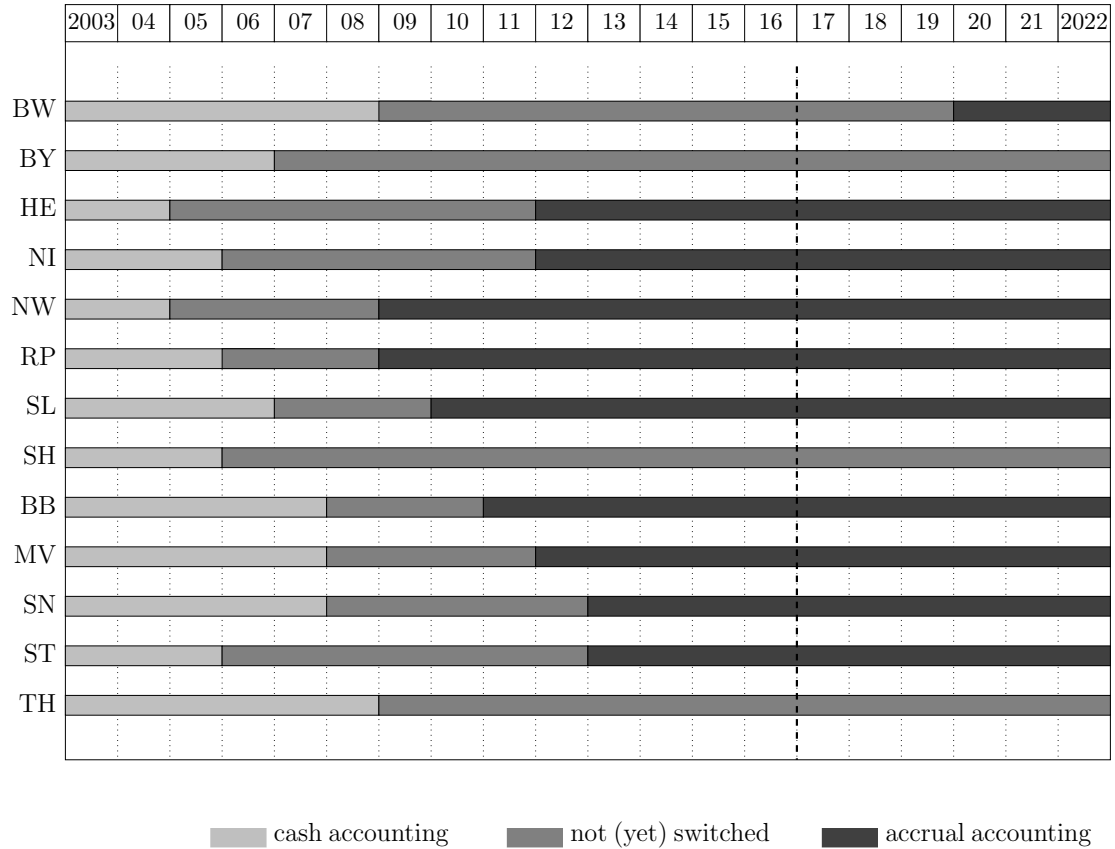


Figure 4: Phasing-in of accrual accounting in German municipalities between the years 2003 and 2022. BW-Baden-Wuerttemberg, BY-Bavaria, HE-Hesse, NI-Lower Saxony, NW-North Rhine-Westphalia, RP-Rhineland-Palatinate, SL-Saarland, SH-Schleswig-Holstein, BB-Brandenburg, MV-Mecklenburg-Vorpommern, SN-Saxony, ST-Saxony-Anhalt, TH-Thuringia.

For example, the most populous state, North Rhine-Westphalia, was one of the first states to enact these reforms by law. All its local governments had to introduce the new budgetary control and reporting framework between 2005 and 2009. In contrast, Bavaria, the second most populous state, enacted the reforms in 2007 and allowed its municipalities to either keep a cash-based accounting system, complemented by some accrual elements, or to fully implement accrual accounting. Up to now, most Bavarian municipalities opted for the extended version of cash-based accounting. Fewer than 5% of them have implemented accrual accounting. Only in the state of Thuringia is the percentage of municipalities which decided against cameralistic accounting lower. Municipalities in nine of the thirteen non-city states had completely switched to accrual accounting by 2016.

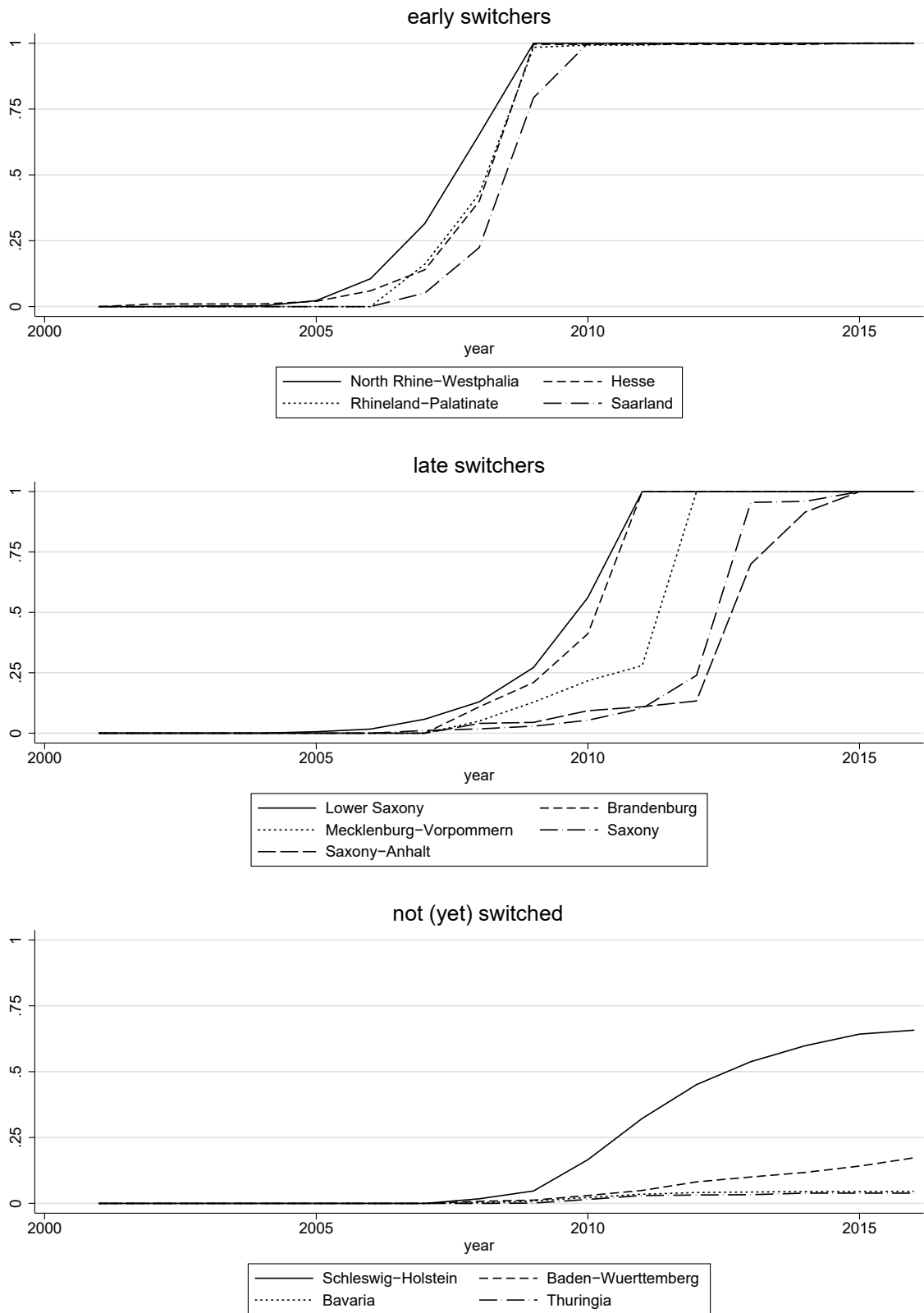


Figure 5: Share of municipalities with accrual accounting (2000–2016)

One can roughly distinguish between three groups of states: (i) the early switchers, (ii) the late switchers, and (iii) the states in which municipalities have not (yet) switched completely to accrual accounting. Figure 5 shows the share of municipalities which implemented accrual accounting.⁵

In North Rhine-Westphalia, Hesse, Rhineland-Palatinate, and Saarland, the vast majority of municipalities had switched to accrual accounting before 2010.⁶ Municipalities in five more states had completed the switch by 2015 (late switchers). The other states either opted for a very long transition period (Baden-Wuerttemberg) or decided against a mandatory switch to accrual accounting (Schleswig-Holstein, Bavaria, Thuringia). Figure A3.1 in the Appendix shows the regional dispersion across states. While the early switchers are all located in the Western part of Germany, the third group is based for the most part in the south. Most of the states in East Germany are late switchers. This is, however, not the only systematic difference between the groups (see Section 3.1).

2.4 Data and descriptive statistics

The balanced panel data set covers all 13 non-city states in Germany over 26 years (1991–2016) since the German reunification.⁷ The share of municipalities that has implemented accrual accounting was extracted from Statistische Ämter des Bundes und der Länder (2016) and completed by own investigations, especially for the early switchers in North Rhine-Westphalia, Hesse, Saarland, and Rhineland-Palatinate. Revenues and expenditures were derived from a special evaluation provided by the Federal Statistical Office (*Jahresrechnungssstatistik*). They refer to the municipal core budgets without extra budgets and were deflated using the GDP deflator (2016=100). For 2016, financial data was extracted from the financial cash statistics (*Kassenstatistik*).

Nominal and real GDP on state level were provided by the Working Group on National Accounting by the German States (*Arbeitskreis Volkswirtschaftliche Gesamtrechnung der Länder*). The unemployment rate was obtained from the Federal Employment Agency. Data on debt and population were derived from the Federal Statistical

⁵Some municipalities had already implemented accrual accounting before the official transition period, during a test phase.

⁶In Hesse, it was first optional for the municipalities to switch to accrual accounting. However, until 2009 only two municipalities opted for keeping cash-based accounting. The state then decided to make the switch mandatory for the remaining two municipalities by 2015.

⁷Revenue and expenditure data for one state, Saxony, are incomplete for the year 1991.

Office. The census in 2011 translated into a break in the population data. Therefore, I circumvent the structural break by prolonging the population series backwards using growth rates. In addition, I collected information on public funds, institutions and enterprises with commercial accounting owned or controlled by municipalities from the annual balance sheet statistics (*Jahresabschlussstatistik der kaufmännisch buchenden öffentlichen Fonds, Einrichtungen und Unternehmen*) provided by the Federal Statistical Office for the shorter time frame of 2000–2015. Table A3.1 in the Appendix provides descriptive statistics of the data set.

3 Econometric framework

3.1 Identification strategy

To study the effect of the accounting system on the decisions of municipalities, I use variation over time and across states. The study is conducted at the state level due to the lack of appropriate data at the municipal level. On the one hand, data on municipal revenues and expenditures are not available for all German municipalities over a longer time period. On the other hand, comparing data from different accounting systems can be problematic. The Federal Statistical Office, however, reclassifies the data reported by the states in order to enhance comparability. A further drawback of the lack of data is the fact that the only information available is the number of municipalities which have already implemented accrual accounting. If the phasing-in varies, for example, between small and large municipalities, this distorts the explanatory power of the treatment variable. I address these challenges by using different estimation strategies: (i) a fixed effects panel model with the share of municipalities using accrual accounting as a continuous treatment variable, and (ii) a strategy based on a generalized difference-in-differences approach with a proxy for the intensity of accrual accounting as continuous treatment variable.

The identifying assumption in the fixed effects estimation is that no time-variant factors simultaneously affect the right-hand and the left-hand side of the regression. When looking at the developments of different key variables before the decision to implement accrual accounting, as summarized in Figure 6 and Tables A3.2-A3.4 in the Appendix, this may be a problematic assumption. While the developments of particular expenditure and revenue categories show no systematic differences, this is not the case for municipal debt. Early switchers incurred a comparatively high level

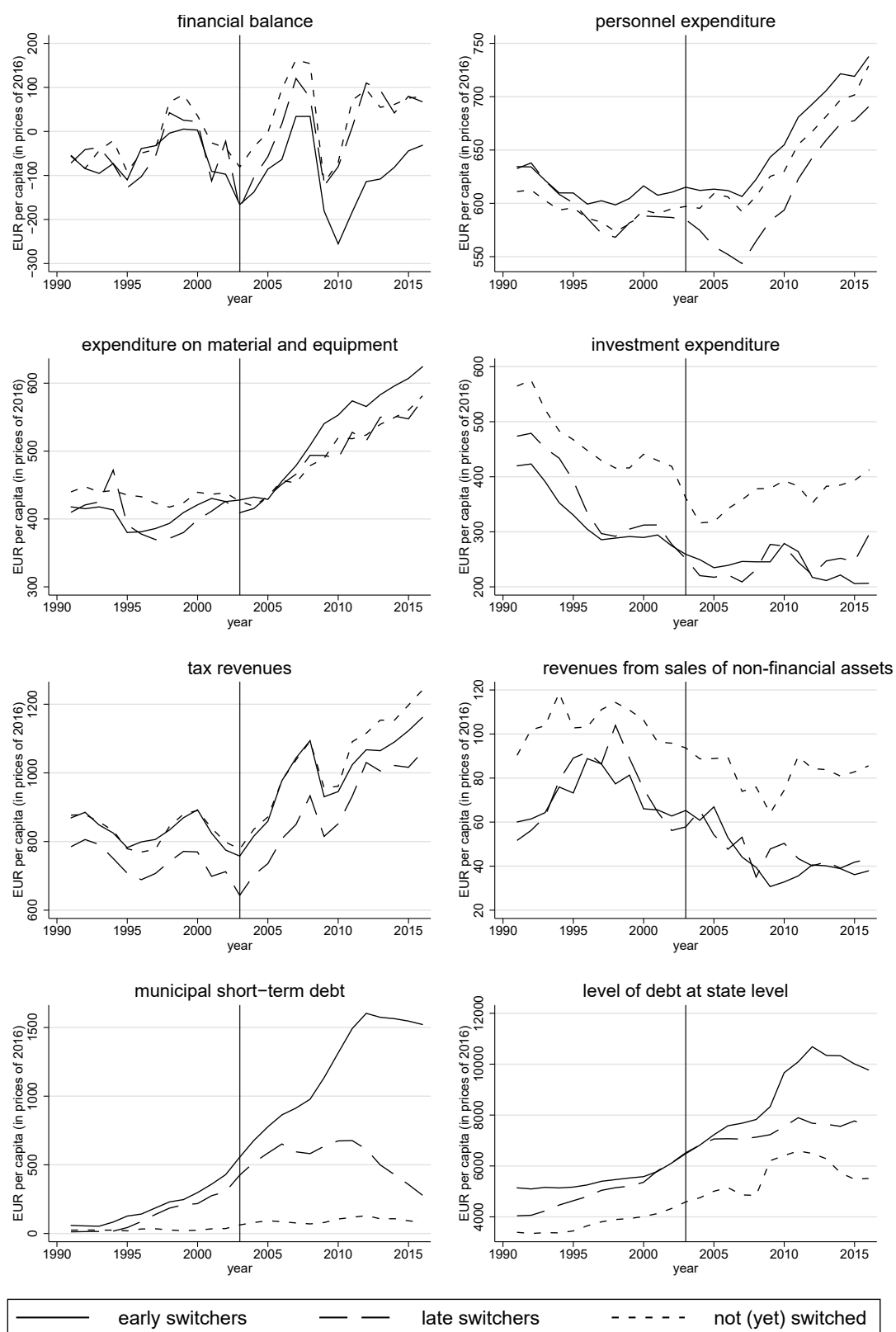


Figure 6: Development of key variables (1992–2016)

of short-term debt. The tense fiscal situation may have guided the decision of the states to oblige their municipalities to switch to the new accounting system earlier, while this probably had no priority for states with municipalities with low levels of debt. To address this, I include the predetermined level of municipal short-term debt together with year fixed effects into my estimations. In the absence of manipulative sorting, point estimates should remain similar and accuracy should increase (Grembi et al. 2016).

As a first approach, I estimate a fixed effects panel model with the share of municipalities using accrual accounting in year t as a continuous treatment variable. The dependent variable $y_{i,t}$ is either the financial balance of the core budget⁸ or different revenue and expenditure categories per capita in prices of 2016. Additionally, I estimate the same specification with setting the budget balance and the expenditure and revenue in relation to nominal GDP to test for functional form sensitivity. When using data from entities controlled by the municipalities, the dependent variables in Section 4.2 are the number of funds, institutions and enterprises per 100.000 inhabitants as well as the balance sheet total, the liabilities and the additions to tangible fixed assets per capita (in prices of 2016).

I allow for different time fixed effects for the East German states. The different development between West and East German states is illustrated in Figures A3.2 and A3.3 and in the Appendix. The different trends in the 1990s are especially obvious. Additionally, I add state-specific time trends. Hence, the model includes state-specific intercepts, separate year fixed effects for East and West Germany, state-specific time trends as well as the predetermined covariate interacted with time fixed effects. **Accordingly**, I estimate models of the following form for revenues and expenditures in state i :

$$y_{i,t} = \alpha_i + \gamma_{i,t} \times east + \chi trend_i + \beta share_{i,t} + \delta_k x_{k,i,t} + \varepsilon_{i,t}, \quad (1)$$

where α_i are state fixed effects, $\gamma_{i,t} \times east$ are separate year fixed effects for East and West German municipalities, $\chi trend_i$ are state-specific time trends, $share_{i,t}$ is the share of municipalities with accrual accounting in year t ; β is my parameter of interest. I extend this estimation by including the growth rate of real GDP as well as the level of debt at the state level as control variables which are unlikely to be directly influenced by municipal decisions. In a further step I add the (predetermined) mean

⁸The financial balance is defined as the difference between revenues and expenditures adjusted for internal offsetting items.

level of municipal short-term debt in the years 2000 to 2002, i.e. before the decision to implement accrual accounting was made, together with year fixed effects. $\delta_k x_{k,i,t}$ is a vector of the control variables as well as the predetermined variable interacted with time fixed effects, and β_k the corresponding parameter vector to be estimated.

A potential problem could be that the data is not fully comparable during the transition period. To study whether I find only statistical artifacts by comparing states which predominantly report data in accordance with cash-based accounting systems with states reporting data mainly in accordance with accrual-based systems, I conduct a complementary, second analysis. In these estimations, I only include states in which the municipalities have completely switched to accrual accounting. Variation between those states is obtained by constructing a measure for the intensity or length of the treatment. Using this measure for intensity, I run generalized difference-in-differences models similar to the approach used by Acemoglu et al. (2004). The proxy for intensity is obtained by summing up all shares between the years 2006 and 2014. By doing so I end up with an index ranging from 2.04 to 7.08 for all nine states which had completed the switch by 2015. This index is interacted with 1 for the years 2015 and 2016, and with 0 for the years 2006 and earlier.⁹ I exclude all states that had not completed the switch by 2015. This reduces my degrees of freedom, but I circumvent potential data problems. The approach rests on the quite strong identifying assumption that states would have evolved identically in the absence of the switch to accrual accounting, and that the effect of accrual accounting intensifies over time. As I have to rely mostly on flow data, the assumption is that the effect on inflows and outflows in 2015 and 2016, i.e. after all municipalities implemented accrual accounting, is stronger for those states in which municipalities used accrual accounting for a longer time-span. The benefit is that I do not have to compare data from different accounting systems and re-classifications should therefore be less of a concern.

4 Results

4.1 Effects on municipal revenues and expenditures

Table 2 presents the main results from the fixed effects panel model with the share of municipalities that implemented accrual accounting as treatment variable. The depen-

⁹The results are qualitatively similar when additionally excluding the years 2004 and 2005, in which a few municipalities had already implemented accrual accounting.

Table 2: Main Results: Fixed effects panel model

	Specification					
	Euro per capita in prices of 2016			In % of nominal GDP		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel I: financial balance	-8.777 (-0.21)	-1.674 (-0.05)	-39.57 (-0.83)	0.0257 (0.23)	0.0257 (0.22)	-0.100 (-0.65)
Panel II: revenues from sale of non-financial assets	-20.45*** (-3.18)	-19.39*** (-3.20)	-24.11*** (-5.03)	-0.0762*** (-3.32)	-0.0752*** (-3.36)	-0.0942*** (-4.95)
Panel III: investment expenditure	-52.30* (-1.97)	-44.35 (-1.62)	-43.26 (-1.69)	-0.238** (-2.35)	-0.218* (-2.05)	-0.215* (-2.16)
Panel IV: expenditure on material and equipment	46.17* (2.13)	44.60** (2.55)	65.32*** (3.28)	0.142* (1.82)	0.120* (1.96)	0.194** (2.61)
state f.e.	yes	yes	yes	yes	yes	yes
year f.e. \times east	yes	yes	yes	yes	yes	yes
state-specific time trends	yes	yes	yes	yes	yes	yes
controls	no	yes	yes	no	yes	yes
pre-determined short-term debt \times year f.e.	no	no	yes	no	no	yes

Notes: The table reports results from panel OLS regressions with the share of municipalities with accrual accounting as treatment variable. The dependent variables are the financial balance, revenues or expenditures per capita in prices of 2016 in Specifications (1)-(3), and the financial balance, revenues or expenditures in percentage of nominal GDP in Specifications (4)-(6). The control variables included in Specifications (2), (3), (5), and (6) are the growth rate of real GDP and the level of debt at the state level. In Specifications (3) and (6) the mean level of municipal short-term debt in the years 2000 to 2002 is included as pre-determined variables and interacted with year fixed effects. Standard errors are clustered at the state level. Period: 1991-2016.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

dent variable in Panel I is the financial balance. The effect is statistically insignificant across all specifications, regardless of whether the per capita values in Columns (1)-(3) or the relation to nominal GDP in Columns (4)-(6) are chosen as functional form. Panel II summarizes the results in case the revenues from sales of non-financial assets is the dependent variable. The estimations yield an effect which is statistically significantly different from zero at the 0.01 level. The estimated average treatment effects on yearly revenues in case of a full implementation of accrual accounting range between €19.35 and €24.11 per capita, or 0.08% and 0.09% of nominal GDP. This corresponds to a share of about 0.3 to 0.4 of the average revenues from sales of non-financial assets in the years 2003 to 2005.

The results of Panel III and Panel IV indicate reverse effects. On the one hand there is a negative impact on investment expenditure, although results are only at most statistically significantly different from zero at the 0.10 level. On the other hand, expenditure on material and equipment increases. Part of this may also be due to a reclassification of what type of expenditure is recorded as investment. The positive

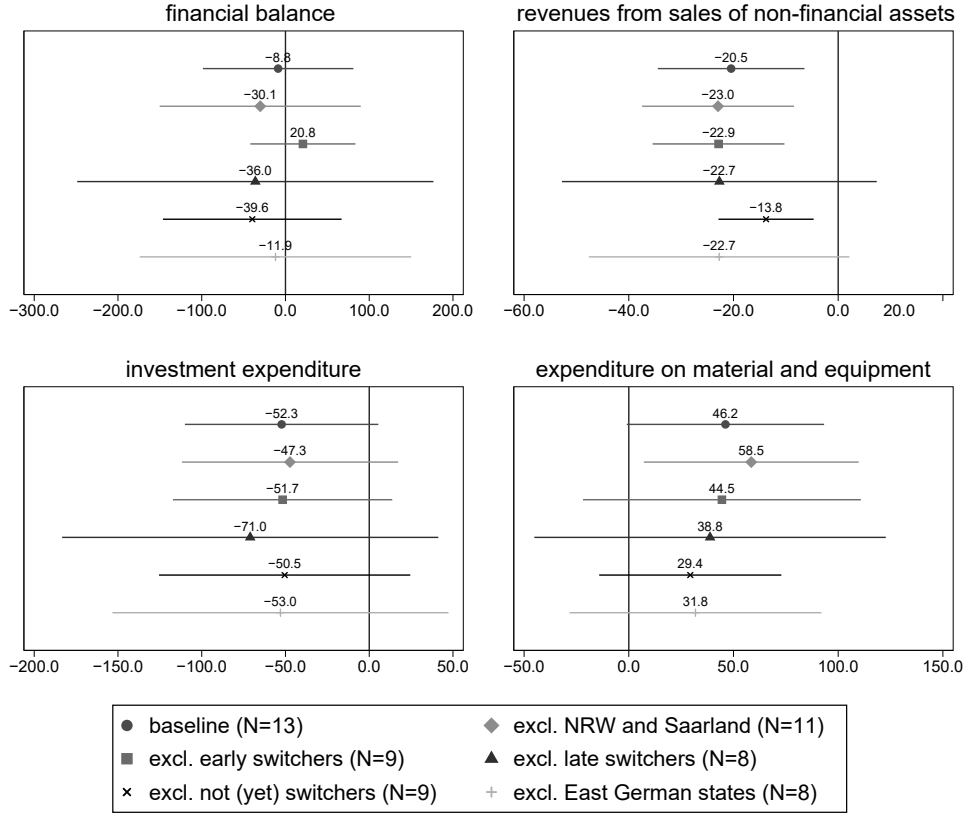


Figure 7: Robustness check: Exclusion of states. The panels show coefficients and 95% confidence intervals of estimations with state fixed effects, separate year fixed effects for West and East Germany, and state-specific time trends.

effect of the implementation on expenditure on material and equipment could also be driven by the cost of the switch itself.

As a first robustness check I exclude groups of states from the estimations. First, the implementation of accrual accounting was accompanied by special rules changing the oversight procedures for municipalities in North Rhine-Westphalia and Saarland; see Christofzik and Kessing (2018). Results also hold when excluding those two states, see Figure 7. Additionally, I exclude the different switching groups, respectively, as well as East German states. The direction of effects is unaffected. It is remarkable that in case of the revenues from the sales of non-financial assets, point estimates are quite similar across these tests.

Table A3.5 in the Appendix includes regression results for further revenue and expenditure data as well as for municipal debt. Neither of the estimations for total revenue or for total expenditure yield significant results. Compatible with the insignificant results for the financial balance, the level of short-term debt seems to be

Table 3: Main Results: Intensity of the treatment

	Specification					
	Euro per capita in prices of 2016			In % of nominal GDP		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel I: financial balance	47.46 (0.68)	49.15 (0.69)	44.42 (0.71)	0.285 (0.76)	0.282 (0.76)	0.259 (0.79)
Panel II: revenues from sale of non-financial assets	-8.125** (-2.71)	-7.305** (-2.73)	-7.693* (-2.28)	-0.0319 (-1.29)	-0.0305 (-1.27)	-0.0321 (-1.17)
Panel III: investment expenditure	-55.80 (-1.58)	-50.81 (-1.85)	-47.02* (-2.02)	-0.343 (-1.65)	-0.322 (-1.82)	-0.301* (-2.24)
Panel IV: expenditure on material and equipment	-6.060 (-0.28)	-10.62 (-0.45)	-10.75 (-0.41)	-0.0866 (-1.02)	-0.105 (-1.19)	-0.105 (-1.15)
Panel D1: municipal investment loans	165.3 (0.82)	145.2 (0.63)	143.3 (0.74)	0.792 (0.90)	0.718 (0.71)	0.718 (0.81)
Panel D2: municipal short-term debt	145.4 (0.83)	138.5 (0.88)	141.0 (0.95)	0.385 (0.69)	0.354 (0.68)	0.365 (0.77)
state f.e.	yes	yes	yes	yes	yes	yes
year f.e. \times east	yes	yes	yes	yes	yes	yes
state-specific time trends	yes	yes	yes	yes	yes	yes
controls	no	yes	yes	no	yes	yes
pre-determined short-term debt \times year f.e.	no	no	yes	no	no	yes

Notes: The table reports results from panel OLS regressions with the intensity of accrual accounting as treatment variable. The dependent variables are the financial balance, revenues or expenditures, and the level of municipal debt per capita in prices of 2016 in Specifications (1)-(3), and the financial balance, revenues or expenditures, and the level of municipal debt in percentage of nominal GDP in Specifications (4)-(6). The control variables included in Specifications (2), (3), (5), and (6) are the growth rate of real GDP and the level of debt at the state level. In Specifications (3) and (6) the mean level of municipal short-term debt in the years 2000 to 2002 is included as pre-determined variables and interacted with year fixed effects. Standard errors are clustered at the state level. Period: 1991-2016, without the transition period 2007-2014. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

unaffected. The empirical evidence suggests a positive effect on personnel expenditure which is, however, not robust with regard to the functional form. In the specifications with the different revenue categories (tax revenues, revenues from fees, revenues from economic activities) all coefficients are statistically insignificant.

Table 3 summarizes the effects of the approach based on the difference-in-differences strategy. The treatment variable is a score for the intensity or length of accrual accounting. The continuous treatment variable is obtained by summing up all shares between 2006 and 2014. In this approach, I exclude all observations between the years 2006 and 2015, and the four states that had not switched by 2015. The advantage of this approach is that I do not have to compare data between the two accounting systems. Despite the quite severe assumption in this approach that the effect intensifies

over time, the fundamental results still hold. The empirical evidence suggests no impact on the financial balance, and the effect on the revenues from the sale of non-financial assets is negative. It is statistically different from zero in the per capita specifications. If the index increases by one, which is the case if all municipalities in one state implement accrual accounting in one additional year, the annual revenues from the sale of non-financial assets decrease by about €8 per capita. The sign of the point estimate for investment expenditure is still negative, but insignificant. The result for expenditure on material and equipment from the first approach cannot be confirmed. Especially for this expenditure category, the assumption that treatment intensifies over time is questionable. Costs associated with the switch itself, e.g. for software, should occur early on instead of becoming larger.

In addition to the data on cash inflows and cash outflows, I estimate models with the level of municipal debt as dependent variable. I do not find statistically significant effects, neither for municipal investment loans nor for short-term debt. This supports the findings which I obtain for the financial balance.

4.2 Consequences for enterprises controlled by municipalities

One aim of the reform was to create consolidated statements that also include entities controlled by the municipalities. Beginning in the 1980s a considerable share of public activity by German municipalities has been outsourced. A widespread fear is that governments use such entities to avoid restrictions in connection with fiscal rules (von Hagen 1991). In some German states, more than half of municipal debt is accounted for by municipal funds, institutions and enterprises. They are recognized as such if municipalities are direct or indirect shareholders with more than 50% of the capital or voting rights. Most of these enterprises operate in the sectors of real estate and housing, water supply, waste and water disposal, and energy supply, see GCEE (2017) in Chapter 6.

I consider data on the number of funds, institutions and enterprises per 100,000 inhabitants, the balance sheet total of these firms, the liabilities and the "additions to tangible fixed assets". The latter are used to approximate investment of these enterprises (GCEE 2017). Figure 8 plots the development of these variables exposing the positive trend.

Results are consolidated in Table 4. Only one of these specifications yields statistically significant estimates. In the estimations with the intensity of accrual accounting as treatment variable, there is a positive effect on the balance sheet total. As data is

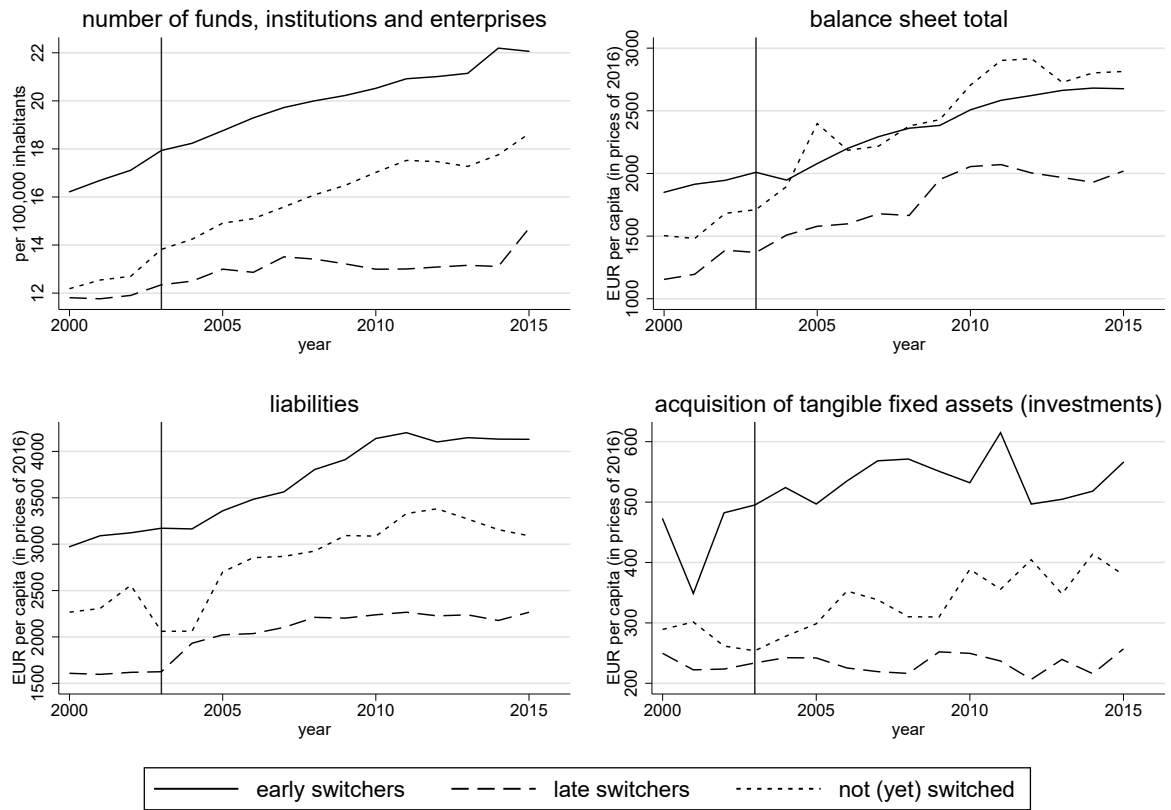


Figure 8: Development in publicly controlled firms (2000–2015)

only available until 2015 this result, however, rests on only one post-treatment observation. In total, these findings suggest that there are no systematic repercussions of the switch on these publicly owned firms. Another explanation is that there is only a long-term impact as the consolidated statements have to be prepared a few years after the switch of the core budget.

Table 4: Results: Municipal public funds, institutions and enterprises

	Specification					
	Share of municipalities			Intensity of treatment		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel I: number	28.75 (0.85)	12.33 (0.38)	19.65 (0.54)	-68.36 (-0.71)	-47.53 (-0.62)	-15.29 (-0.24)
Panel II: balance sheet total	364.2 (1.08)	513.1 (1.40)	519.8 (1.35)	514.2** (2.82)	424.0** (3.22)	519.8*** (4.19)
Panel III: liabilities	36.39 (0.17)	47.53 (0.23)	109.1 (0.46)	-52.30 (-0.32)	-99.25 (-0.49)	29.52 (0.16)
Panel IV: additions to tangible fixed assets	25.46 (0.65)	29.08 (0.73)	25.19 (0.54)	-6.757 (-0.12)	-43.95 (-0.70)	-16.45 (-0.18)
state f.e.	yes	yes	yes	yes	yes	yes
year f.e. \times east	yes	yes	yes	yes	yes	yes
state-specific time trends	yes	yes	yes	yes	yes	yes
controls	no	yes	yes	no	yes	yes
pre-determined short-term debt \times year f.e.	no	no	yes	no	no	yes

Notes: The table reports results from panel OLS regressions with the share of municipalities with accrual accounting as treatment variable in Columns (1)-(3), and the intensity of accrual accounting as treatment variable in Columns (4)-(6). The dependent variables are the number of funds, institutions and enterprises per 100.000 inhabitants, and the balance sheet total, the liabilities and the 'additions to tangible fixed assets' per capita in prices of 2016. The control variables included in Specifications (2), (3), (5), and (6) are the growth rate of real GDP and the level of debt at the state level. In Specifications (3) and (6) the mean level of municipal short-term debt in the years 2000 to 2002 is included as pre-determined variables and interacted with year fixed effects. Standard errors are clustered at the state level. Period: 2000-2015. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5 Discussion and conclusion

The analysis provides first empirical evidence on the impact of accrual accounting on fiscal policy decisions. By using data on German municipalities that implemented accrual-based accounting systems gradually and only partially, I find no evidence for an effect on the financial balance of the core budget. This finding suggests that overall, the new steering model had only a limited impact on overall fiscal discipline. One explanation could be that the effect is underestimated because also the "not (yet) switchers" decided to implement at least some accrual elements. My results, however, also hold when excluding these states. A natural refinement would be to use municipal data to study the mechanisms in more detail.

I find a robust and statistically significant effect on the revenues from sales of non-financial assets. This may be due to the fact that municipalities could use these revenues to balance their budget under the old regulations, and this possibility was

used to escape sanctions associated with breaking the balanced budget rule. With accrual accounting, it is harder to circumvent fiscal restraints in this way. This explanation is in line with the findings of Costello et al. (2016) that U.S. states with strict balanced budget rules use asset sales when facing deficits. However, it would be hasty to conclude that accrual accounting increases the effectiveness of fiscal restraints in general. It may well be that municipalities just find other ways to circumvent these constraints. The numerous assumptions that are necessary under accrual accounting are likely to provide enough space for creative accounting.

References

- Acemoglu, D., D. H. Autor, and D. Lyle (2004). Women, War, and Wages: The Effect of Female Labor Supply on the Wage Structure at Midcentury. *Journal of Political Economy* 112(3), 497–551.
- Adam, B. (2014). Gutachtliche Stellungnahme zu Abweichungen der IPSASs/EPASs von kommunalem Haushaltsrecht und Einschätzung des resultierenden Umstellungsaufwands. Im Auftrag der Bertelsmann Stiftung, des Deutschen Städtetages, des Deutschen Städte- und Gemeindebunds, des Deutschen Landkreistags und der Kommunalen Gemeinschaftsstelle für Verwaltungsmanagement, Berlin.
- Baretti, C., B. Huber, and K. Lichtblau (2002). A Tax on Tax Revenue: The Incentive Effects of Equalizing Transfers: Evidence from Germany. *International Tax and Public Finance* 9(6), 631–649.
- Baskaran, T. (2012). Soft Budget Constraints and Strategic Interactions in Subnational Borrowing: Evidence from the German States, 1975–2005. *Journal of Urban Economics* 71(1), 114–127.
- Bellanca, S., L. Cultrera, and G. Vermeylen (2015). Analysis of Public Accounting Systems in the European Union. *Research in World Economy* 6(3), 23–35.
- Buettner, T. (2002). Fiscal federalism and interstate risk sharing: Empirical evidence from Germany. *Economics Letters* 74(2), 195–202.
- Bundesrechnungshof (2017). Bericht nach § 99 BHO über die angestrebte Einführung harmonisierter Rechnungsführungsgrundsätze für den öffentlichen Sektor (EPAS) in den Mitgliedstaaten der Europäischen Union. Sonderbericht vom 15.11.2017, Bonn.
- Burret, H. T. and L. P. Feld (2018). (Un-)intended effects of fiscal rules. *European Journal of Political Economy* 52, 166–191.
- Burth, A. and D. Hilgers (2014). Cui bono? Depicting the benefits of the new municipal budgeting and accounting regime in Germany. *Journal of Business Economics* 84(4), 531–570.
- Buti, M., J. N. Martins, and A. Turrini (2007). From Deficits to Debt and Back: Political Incentives under Numerical Fiscal Rules. *CESifo Economic Studies* 53(1), 115–152.
- Carlin, T. M. (2005). Debating the Impact of Accrual Accounting and Reporting in the Public Sector. *Financial Accountability & Management* 21(3), 309–336.
- Cavanagh, J., S. Flynn, and D. Moretti (2016). *Implementing Accrual Accounting in the Public Sector*. Number 16 in Technical Notes and Manuals. International Monetary Fund.

- Christiaens, J. and V. Van Peteghem (2007). Governmental Accounting Reform: Evolution of the Implementation in Flemish Municipalities. *Financial Accountability & Management* 23(4), 375–399.
- Christiaens, J., C. Vanhee, F. Manes-Rossi, N. Aversano, and P. van Cauwenberge (2015). The effect of IPSAS on reforming governmental financial reporting: An international comparison. *International Review of Administrative Sciences* 81(1), 158–177.
- Christofzik, D. I. and S. G. Kessing (2018). Does fiscal oversight matter? *Journal of Urban Economics* 105, 70–87.
- Costello, A. M., R. Petacchi, and J. P. Weber (2016). The Impact of Balanced Budget Restrictions on States’ Fiscal Actions. *The Accounting Review* 92(1), 51–71.
- Easterly, W. (1999). When is fiscal adjustment an illusion? Policy Research Working Paper No. 2109, The World Bank.
- Ernst & Young (2012). Overview and comparison of public accounting and auditing practices in the 27 EU Member States. Prepared for Eurostat, Final Report.
- Federal Ministry of Finance (2016). International Public Sector Accounting Standards vs. Standards staatlicher Doppik. Monthly Report August 2016, 22-29, Berlin.
- Federation/Länder EPSAS Working Group (2017). Position paper. Technical report, Berlin.
- GCEE (2017). *Towards a Forward-Looking Economic Policy. Annual Report 2017/18*. German Council of Economic Experts, Wiesbaden.
- Grembi, V., T. Nannicini, and U. Troiano (2016). Do Fiscal Rules Matter? *American Economic Journal: Applied Economics* 8(3), 1–30.
- Irwin, T. (2012). Accounting Devices and Fiscal Illusions. IMF Staff Discussion Notes 12/02, International Monetary Fund.
- Irwin, T. C. (2016). Dispelling fiscal illusions: How much progress have governments made in getting assets and liabilities on balance sheet? *Public Money & Management* 36(3), 219–226.
- Kuhlmann, S., J. Bogumil, and S. Grohs (2008). Evaluating Administrative Modernization in German Local Governments: Success or Failure of the “New Steering Model”? *Public Administration Review* 68(5), 851–863.
- Lampe, H. W., D. Hilgers, and C. Ihl (2015). Does Accrual Accounting Improve Municipalities’ Efficiency? Evidence from Germany. *Applied Economics* 47(40-42), 4349–4363.
- Milesi-Ferretti, G. M. (2004). Good, bad or ugly? On the effects of fiscal rules with creative accounting. *Journal of Public Economics* 88(1), 377–394.
- Milesi-Ferretti, G. M. and K. Moriyama (2006). Fiscal adjustment in EU countries: A balance sheet approach. *Journal of Banking & Finance* 30(12), 3281–3298.
- OECD/IFAC (2017). *Accrual Practices and Reform Experiences in OECD Countries*. Paris: OECD Publishing.
- Paulsson, G. (2006). Accrual Accounting in the Public Sector: Experiences From the Central Government in Sweden. *Financial Accountability & Management* 22(1), 47–62.
- PwC (2014). Collection of information related to the potential impact, including costs, of implementing accrual accounting in the public sector and technical analysis of the suitability of individual IPSAS standards. PwC study to inform the impact assessment of EPSAS implementation, Brussels.

- Rechnungshof des Saarlandes (2010). Die Bildung von Pensionsrückstellungen für Beamte in den Kommunen des Landes. Beratende Äußerung gegenüber dem Landtag und der Landesregierung gemäß § 88 Abs. 2 Landeshaushaltsordnung (LHO), Saarbrücken.
- Ridder, H.-G., H.-J. Bruns, and F. Spier (2005). Analysis of Public Management Change Processes: The Case of Local Government Accounting Reforms in Germany. *Public Administration* 83(2), 443–471.
- Schwarting, G. (2010). *Der kommunale Haushalt: Haushaltssteuerung - Doppik - Finanzpolitik* (4th ed.). Berlin: Erich Schmidt Verlag GmbH & Co. KG.
- Statistische Ämter des Bundes und der Länder (2016). *Kulturfinanzbericht 2016*. Wiesbaden: Statistisches Bundesamt.
- Stegarescu, D. (2013). Does Expenditure Composition Influence the Debt Level? Evidence from German Federal States. Discussion Papers 52/2013, Deutsche Bundesbank.
- van der Hoek, M. P. (2005). From Cash to Accrual Budgeting and Accounting in the Public Sector: The Dutch Experience. *Public Budgeting & Finance* 25(1), 32–45.
- von Hagen, J. (1991). A note on the empirical effectiveness of formal fiscal restraints. *Journal of Public Economics* 44(2), 199–210.
- von Hagen, J. and G. B. Wolff (2006). What do deficits tell us about debt? Empirical evidence on creative accounting with fiscal rules in the EU. *Journal of Banking & Finance* 30(12), 3259–3279.

A Additional Tables

Table A3.1: Summary Statistics (1991–2016)

Variable	Mean	Std. Dev.	Min.	Max.
Population	5,842,895.19	4,830,984.5	989,035	18,079,686
Share of municipalities w/ accrual accounting	0.2	0.37	0	1
Intensity/length of accrual accounting	3.616	2.467	0.15	7.075
Located in East Germany	0.38	0.49	0	1
<i>Economic development</i>				
Nominal GDP per capita	24,735.37	7,484.68	6,581.11	43,924.12
Real GDP (2010=100)	93.42	10.79	52.32	114.7
Unemployment rate	11.14	4.67	3.7	22.1
<i>Municipal expenditures^a</i>				
Total expenditure	2,412.67	300.69	1,745.98	3,313.69
Personnel expenditure	657.47	91.13	511.78	1,017.60
Expenditure on material and equipment	470.18	88.85	291.91	750.58
Interest expenditure	69.24	28.56	7.44	142.32
Transfer expenditure	756.82	222	240.36	1444.40
Investment expenditure	383.45	164.52	140.96	954.65
Purchase of assets	14.45	17.84	0.23	146.83
<i>Municipal revenues^a</i>				
Total revenues	2,381.88	312.51	1,634.76	3,369.30
Tax revenues	735.31	294.43	91.38	1,476.09
Revenues from fees	225.34	80.41	78.90	437.49
Revenues from economic activities	118.53	24.17	49.26	289.97
Other current revenues (esp. grants from the state)	982.39	270.44	539.67	1,625.92
Revenues from sales of non-financial assets	67.95	35.32	10.84	164.34
<i>Debt^a</i>				
Municipal investment loans	1,309.73	407.73	248.8	2,295.90
Municipal short-term debt	318.66	458.59	8.09	2,168.54
Level of debt at state level	5,819.38	2,891.53	29.96	14,471.06
<i>Municipal public funds, institutions and enterprises^b</i>				
Number of funds, institutions and enterprises	979.13	666.71	229	2967
Balance sheet total ^a	2,569.93	886.89	783.72	5,824.26
Liabilities ^a	3,300.8	987.24	1,098.11	5,921.71
Additions to tangible fixed assets (investments) ^a	400.66	189	128.37	1,239.2

Notes: ^aPer capita in prices of 2016. ^bData for 2000–2015

Table A3.2: Pretreatment characteristics of the switching groups (1)

Specification									
Pretreatment characteristics					Pretreatment trends				
Means		Differences between groups			Linear trend		Differences between groups		
early switchers	(1)	late switchers	not (yet) switchers	(3)	(4)	(5)	(6)	late switchers <i>minus</i> early switchers	not (yet) switchers <i>minus</i> early switchers
		<i>minus</i>	<i>minus</i>						
		(2)	(3)						
<i>A. Population and economic development</i>									
population	7,309,783.00 [3,497,521.69]	1,045,531.559 (3,657,921.27)	1,128,174.258 (4,164,508.61)	11,327.50 [6,011.03]	24,447.792* (11,770.31)	36,303.434* (17,730.92)			
nominal GDP per capita	26,759.99 [1,998.438]	-1,516.754 (2,629.565)	448.503 (2,719.162)	521.04 [98.696]	-111.670 (146.197)	29.239 (177.036)			
unemployment rate	8.94 [0.603]	1.207 (0.746)	-1.658 (1.078)	-0.59 [0.066]	0.145 (0.132)	0.105 (0.090)			
<i>B. Expenditure</i>									
total expenditure	2,201.35 [178.131]	130.188 (232.397)	48.021 (198.810)	13.51 [7.276]	4.249 (10.758)	11.253 (18.012)			
personnel expenditure	611.48 [28.631]	0.083 (36.868)	-26.509 (31.156)	2.672 [3.279]	-0.210 (3.906)	3.162 (3.606)			
expenditure on material and equipment	425.62 [43.714]	21.173 (52.534)	0.941 (46.367)	8.52 [2.851]	3.833 (3.659)	-2.471 (3.703)			
investment expenditure	286.18 [39.174]	67.629 (61.401)	125.986** (62.290)	-2.516 [4.678]	-3.858 (7.906)	5.907 (10.478)			
transfer expenditures	725.93 [80.813]	32.829 (91.847)	-63.745 (95.997)	7.067 [5.922]	4.169 (9.552)	2.008 (7.410)			
purchase of assets	13.30 [3.590]	4.095 (10.779)	12.103 (9.016)	0.444 [1.088]	0.259 (1.473)	1.667 (1.975)			
number of states	4	5	4	4	5	4			

Notes: This table describes characteristics and trends of the different switching groups before the implementation of accrual accounting was made. Pretreatment levels refer to the three years 2000 to 2002. Column (1) shows the average for the early switchers. Columns (2)-(3) compare means in the other switching groups with the average in column (1). Pretreatment trends refer to the five years 1998 to 2002. Column (4) shows the mean linear trend for the early switchers. Columns (5)-(6) compare trends in the other switching groups with the average trend in column (4). A dummy variable for whether the state is located in East Germany is included. Standard errors are reported in parentheses and clustered at the state level; standard deviations are reported in brackets. All financial data are in prices of 2016 and per capita.

Table A3.3: Pretreatment characteristics of the switching groups (2)

Specification									
Pretreatment characteristics						Pretreatment trends			
Means		Differences between groups		Linear trend		Differences between groups			
		late switchers	not (yet) switchers			late switchers	not (yet) switchers		
		<i>minus</i>	<i>minus</i>			<i>minus</i>	<i>minus</i>		
early switchers		early switchers	early switchers	early switchers		early switchers	early switchers		
(1)		(2)	(3)	(4)		(5)	(6)		
<i>C. Revenue</i>									
total revenues	2,139.87 [199.061]	155.047 (249.611)	100.019 (222.110)	-14.71 [2.907]		3.581 (6.323)	8.493 (11.684)		
tax revenues	830.63 [91.374]	-41.676 (106.297)	-8.699 (106.176)	-16.17 [3.206]		2.386 (3.355)	3.197 (3.356)		
revenues from fees	235.57 [59.872]	40.710 (64.030)	6.586 (61.339)	-6.63 [2.908]		-1.876 (3.450)	-1.951 (3.207)		
revenues from economic activities	120.35 [11.529]	10.248 (19.078)	24.644 (24.629)	3.58 [1.832]		6.756* (3.739)	5.300 (7.334)		
transfer revenues	702.92 [29.115]	88.253** (43.446)	7.065 (57.536)	8.85 [0.929]		4.812 (2.842)	-4.919 (2.920)		
revenues from sales of non-financial assets	64.79 [9.893]	21.942 (20.298)	27.604* (16.145)	-4.50 [1.719]		-4.924 (3.335)	-1.503 (3.415)		
number of states	4	5	4	4		5	4	4	

Notes: This table describes characteristics and trends of the different switching groups before the implementation of accrual accounting was made. Pretreatment levels refer to the three years 2000 to 2002. Column (1) shows the average for the early switchers. Columns (2)-(3) compare means in the other switching groups with the average in column (1). Pretreatment trends refer to the five years 1998 to 2002. Column (4) shows the mean linear trend for the early switchers. Columns (5)-(6) compare trends in the other switching groups with the average trend in column (4). A dummy variable for whether the state is located in East Germany is included. Standard errors are reported in parentheses and clustered at the state level; standard deviations are reported in brackets. All financial data are in prices of 2016 and per capita.

Table A3.4: Pretreatment characteristics of the switching groups (3)

	Specification					
	Pretreatment characteristics			Pretreatment trends		
	Means	Differences between groups		Linear trend	Differences between groups	
		late switchers	not (yet) switchers		late switchers	not (yet) switchers
		<i>minus</i>	<i>minus</i>		<i>minus</i>	<i>minus</i>
early switchers		early switchers	early switchers	early switchers	early switchers	early switchers
(1)	(2)	(3)	(4)	(5)	(6)	(6)
<i>D. Debt</i>						
municipal short-term debt	361.90 [118.271]	-177.288 (134.867)	-303.376** (120.348)	50.94 [20.433]	-30.184 (22.249)	-44.205* (20.661)
level of debt at state level	5,829.36 [470.467]	-893.093 (1,022.440)	-1,391.494 (1,302.494)	155.87 [57.961]	-16.238 (125.151)	-10.156 (87.845)
<i>E. Municipal public funds, institutions and enterprises</i>						
number of firms	950.667 [311.814]	141.817 (378.464)	149.172 (496.998)	39.875 [19.083]	-19.746 (23.636)	-12.085 (22.663)
balance sheet total	1,903.06 [72.715]	-629.863*** (193.199)	-356.375 (366.538)	47.934 [61.720]	74.516 (65.561)	39.161 (73.462)
liabilities	3,062.05 [189.570]	-814.114 (594.044)	-898.467 (593.613)	74.940 [43.837]	24.480 (107.847)	38.358 (127.655)
additions to tangible fixed assets	434.457 [82.148]	-181.143** (86.182)	-157.443* (92.266)	4.980 [16.022]	-9.777 (18.504)	-21.505 (16.664)
number of states	4	5	4	4	5	4

Notes: This table describes characteristics and trends of the different switching groups before the implementation of accrual accounting was made. Pretreatment levels refer to the three years 2000 to 2002. Column (1) shows the average for the early switchers. Columns (2)-(3) compare means in the other switching groups with the average in column (1). Pretreatment trends refer to the five years 1998 to 2002. Column (4) shows the mean linear trend for the early switchers. Columns (5)-(6) compare trends in the other switching groups with the average trend in column (4). A dummy variable for whether the state is located in East Germany is included. Standard errors are reported in parentheses and clustered at the state level; standard deviations are reported in brackets. All financial data are in prices of 2016 and per capita.

Table A3.5: Effects on revenues, expenditure, and debt

	Specification					
	Euro per capita in prices of 2016			In % of nominal GDP		
	(1)	(2)	(3)	(4)	(5)	(6)
Panel R1: total revenues	-27.04 (-0.54)	-8.442 (-0.18)	27.09 (0.48)	-0.0739 (-0.52)	-0.124 (-0.74)	0.0164 (0.08)
Panel R2: tax revenues	-15.77 (-0.77)	-3.982 (-0.30)	-12.58 (-0.86)	-0.0113 (-0.24)	-0.00448 (-0.11)	-0.0291 (-0.69)
Panel R3: revenues from fees	-18.67 (-1.56)	-18.10 (-1.43)	-6.160 (-0.43)	-0.0859 (-1.75)	-0.0924 (-1.74)	-0.0552 (-0.85)
Panel R4: revenues from economic activities	7.127 (0.70)	5.982 (0.54)	0.0735 (0.01)	0.00547 (0.16)	-0.00236 (-0.06)	-0.0184 (-0.52)
Panel E1: total expenditure	-18.27 (-0.37)	-6.768 (-0.13)	66.66 (1.03)	-0.0995 (-0.58)	-0.149 (-0.75)	0.117 (0.41)
Panel E2: personnel expenditure	18.07* (1.98)	18.45* (1.82)	27.08** (2.61)	0.0405 (0.96)	0.0120 (0.21)	0.0555 (0.91)
Panel E3: transfer expenditures	-48.35* (-1.83)	-46.08* (-1.84)	-8.681 (-0.35)	-0.0996 (-0.87)	-0.127 (-1.18)	0.000340 (0.00)
Panel D1: municipal investment loans	190.9 (0.90)	139.1 (0.72)	-22.24 (-0.11)	0.516 (0.72)	0.316 (0.49)	-0.249 (-0.35)
Panel D2: municipal short-term debt	116.8 (1.07)	96.80 (0.83)	59.14 (0.53)	0.169 (0.50)	0.110 (0.30)	0.0502 (0.14)
state f.e.	yes	yes	yes	yes	yes	yes
year f.e. \times east	yes	yes	yes	yes	yes	yes
state-specific time trends	yes	yes	yes	yes	yes	yes
controls	no	yes	yes	no	yes	yes
pre-determined short-term debt \times year f.e.	no	no	yes	no	no	yes

Notes: The table reports results from panel OLS regressions with the share of municipalities with accrual accounting as treatment variable. The dependent variables are revenue or expenditure categories or the level of municipal debt per capita in prices of 2016 in Specifications (1)-(3), and revenue or expenditure categories or the level of municipal debt in percentage of nominal GDP in Specifications (4)-(6). The control variables included in Specifications (2), (3), (5), and (6) are the growth rate of real GDP and the level of debt at the state level. In Specifications (3) and (6) the mean level of municipal short-term debt in the years 2000 to 2002 is included as pre-determined variables and interacted with year fixed effects. Standard errors are clustered at the state level. Period: 1991-2016. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

B Additional Figures

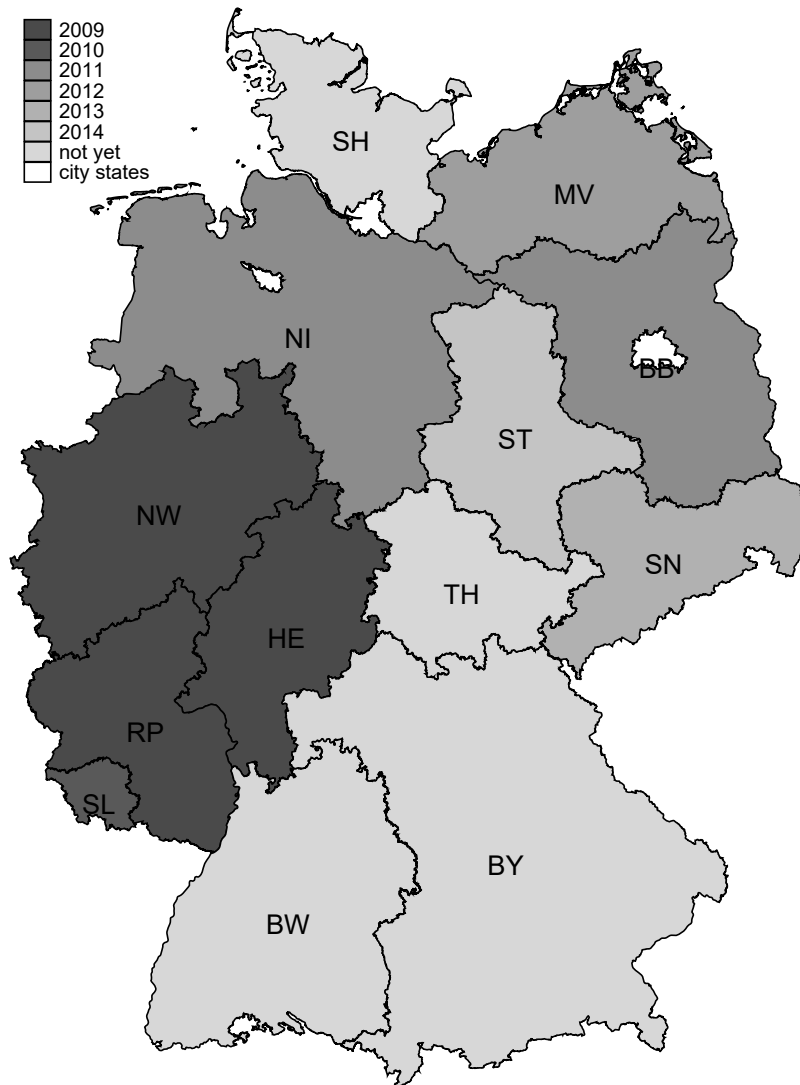


Figure A3.1: Regional dispersion of accrual accounting in German municipalities. The map indicates the year in which at least 90% of municipalities located in the respective state finished the switch to accrual accounting. BW-Baden-Wuerttemberg, BY-Bavaria, HE-Hesse, NI-Lower Saxony, NW-North Rhine-Westphalia, RP-Rhineland-Palatinate, SL-Saarland, SH-Schleswig-Holstein, BB-Brandenburg, MV-Mecklenburg-Vorpommern, SN-Saxony, ST-Saxony-Anhalt, TH-Thuringia.

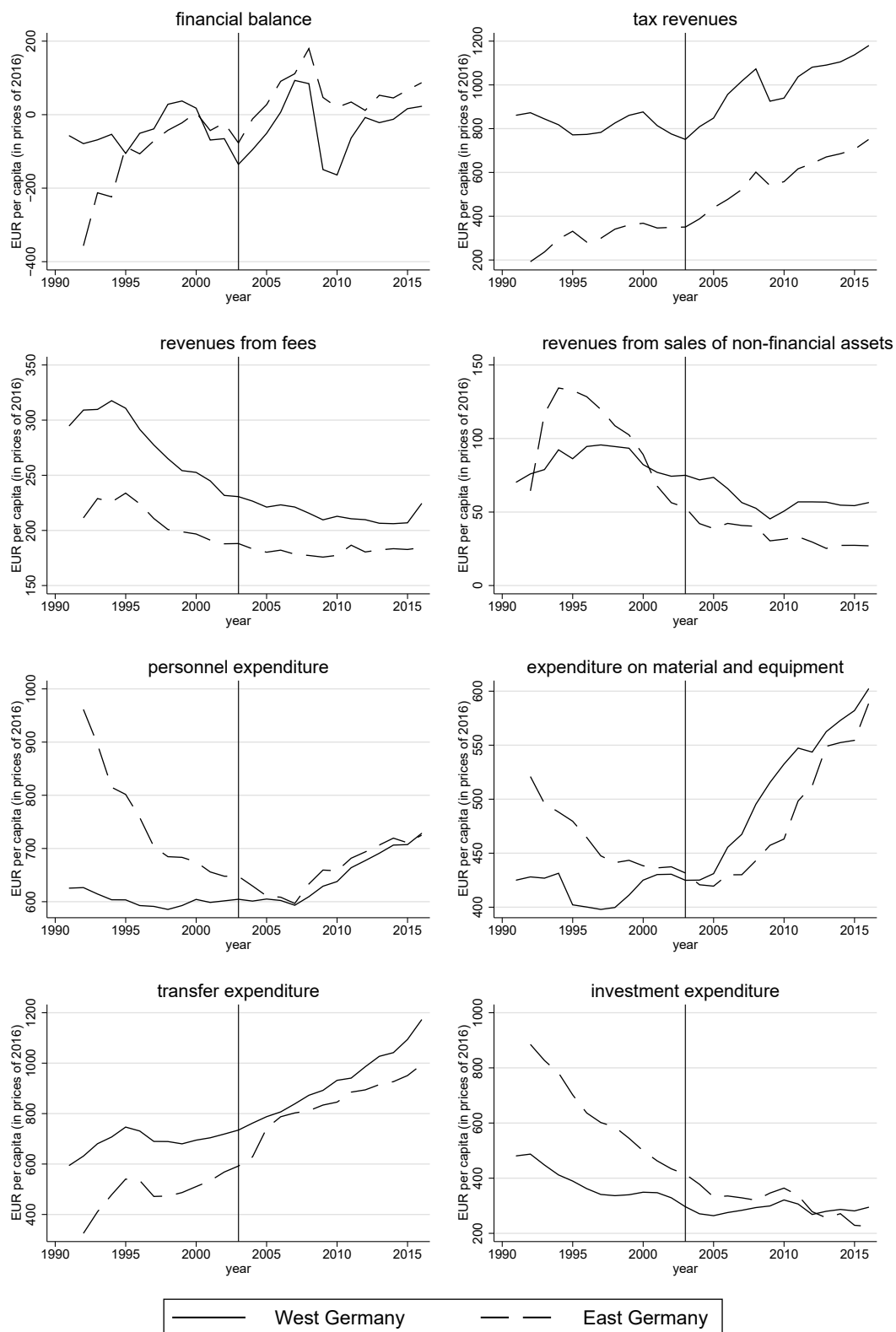


Figure A3.2: Municipal revenues and expenditures in East and West Germany (1992–2016)

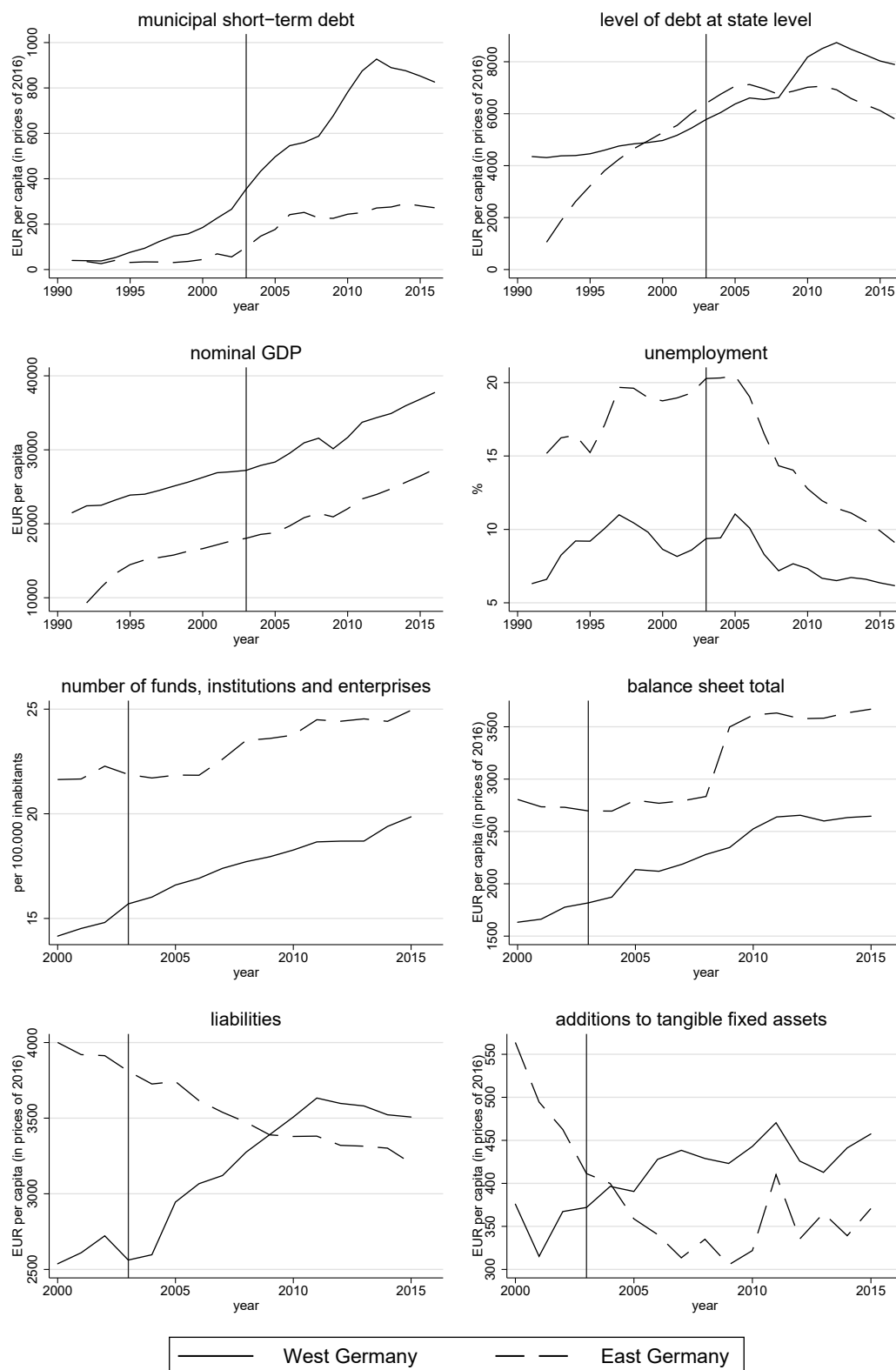


Figure A3.3: Key economic variables in East and West Germany (1992–2016)