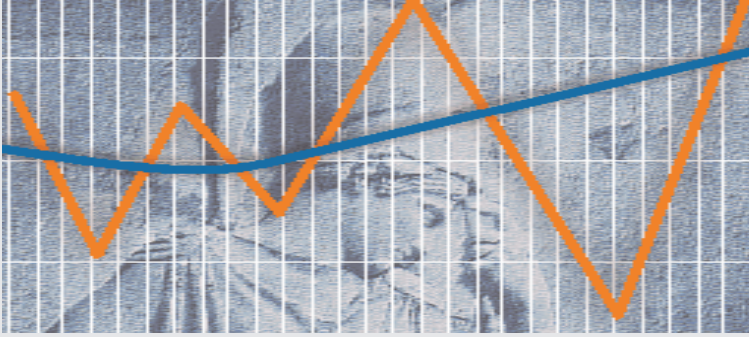

63 ifo Beiträge zur Wirtschaftsforschung

Empirical Studies on Public Debt and Fiscal Transfers

Markus Josef Reischmann

ifo Institut
Leibniz-Institut für Wirtschaftsforschung
an der Universität München e.V.

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Preface

This volume was prepared by Markus Reischmann while he was working at the Ifo Institute. It was completed in June 2015 and accepted as a doctoral thesis by the Department of Economics at the University of Munich in November 2015. It includes five self-contained chapters in the fields of public debt and fiscal transfer schemes.

Chapter 2 shows that the institutional setting of fiscal policy making needs to be considered when assessing the sustainability of fiscal policy. Using data for the U.S. and German state governments, the results of fiscal sustainability tests depend on whether fiscal transfers are taken into account. If fiscal transfers are not included in the primary surplus, the test results do not indicate that the U.S. and German state governments pursued sustainable fiscal policies. Chapter 3 examines whether the municipalities' voting behavior in state elections in a German state influenced the distribution of discretionary grants from the state level to the municipalities. The results show that discretionary grants were awarded to municipalities with many core supporters of the incumbent state government. In Chapter 4, a test on explosive time-series behavior is applied to the Target balances of the German Bundesbank. Target balances describe the claims and liabilities of the individual central banks of the Eurozone vis-à-vis the Eurosystem. The test identifies two explosive periods in the German Target balance after the outbreak of the financial crisis in 2007, and discusses the events that induced the exploding Target balances. Chapter 5 examines whether electoral motives in OECD countries influenced "creative accounting" by the governments as measured by stock-flow adjustments (the difference between budget deficits and the change in public debt). Governments can engage in creative accounting to hide borrowing and sugarcoat the budget balance. The results show that stock-flow adjustments increased before elections. In Germany, stock-flow adjustments chiefly occurred via the creation of off-budget special funds that governments can use to finance public activities outside the core budget. Chapter 6 describes special funds in Germany and elaborates upon the purposes for which special funds were established. It discusses the extent to which the new German debt brake limits the borrowing of special funds and explains how the debt brake can be circumvented by using special funds.

Keywords: Public debt, fiscal sustainability, institutions, fiscal transfers, intergovernmental grants, discretionary grants, fiscal equalization, hidden debt, creative accounting, stock-flow adjustments, electoral motives, political business cycles.

JEL-Codes: C22, C23, D72, E62, H6, H7, P16

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2015

vorgelegt von

Markus Josef Reischmann

Referent: Prof. Dr. Niklas Potrafke
Korreferent: Prof. Dr. Thiess Büttner

Promotionsabschlussberatung: 4. November 2015

To my parents

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Completing my thesis would not have been possible without the support and encouragement of my family, friends, and colleagues accompanying me over the last years.

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My colleagues at the Ifo Center for Public Finance and Political Economy and my fellow doctoral students created a great working atmosphere. I very much appreciate the insightful discussions and exciting activities shared with Christian Breuer, Julian Dieler, Björn Kauder, Marina Riem, and Christoph Schinke, all of whom have become very good friends. I enjoyed our joint conference visits and our daily coffee breaks!

I gratefully acknowledge the Ifo Institute for providing me with an optimal research environment and financial support. I benefitted a great deal from comments and suggestions of participants at conferences and workshops in Cambridge, Charleston, Dresden, Munich, New Orleans, San Antonio, Taormina, and Zurich.

More than anything I thank my parents for their support, faith, and love throughout my whole life.

Markus Reischmann
Munich, June 2015

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Chapter 1

Introduction

In 2007, the U.S. subprime crisis spilled over into Europe, triggering a severe sovereign debt crisis. High and rising public debt endangers the fiscal sustainability of many European countries. Figure 1.1 shows the debt-to-GDP ratios of the Eurozone,[1] the GIIPS countries, and Germany over the period 1995-2014. In the GIIPS countries (Greece, Ireland, Italy, Portugal, and Spain), public debt has increased especially dramatically since 2007.

Prior to the initiation of the Economic and Monetary Union (EMU) and the announcement of the euro on the Madrid Summit in 1995, the public and private sectors of the GIIPS countries faced considerably higher credit interest rates than did the northern European countries. Investors charged a premium to compensate for the risks of inflation and currency devaluation in the GIIPS countries. The introduction of the euro, however, removed the exchange-rate risk, and also signaled stability and mutual protection among the Eurozone countries, making bankruptcies of governments and financial institutions appear less likely. Figure 1.2 shows that until 1998 interest rate differences between the Eurozone countries had almost disappeared (except for Greece that entered the Eurozone in 2001). The public and private sectors in the GIIPS countries took advantage of the low interest rates to engage in excessive borrowing while economic growth prevented increasing debt-to-GDP ratios. After the collapse of the European interbank market in 2007, following the

[1]The sample includes the eleven original Eurozone countries (Austria, Belgium, Finland, France, Germany, Ireland, Italy, Luxembourg, Netherlands, Portugal, and Spain) and Greece (EA12).

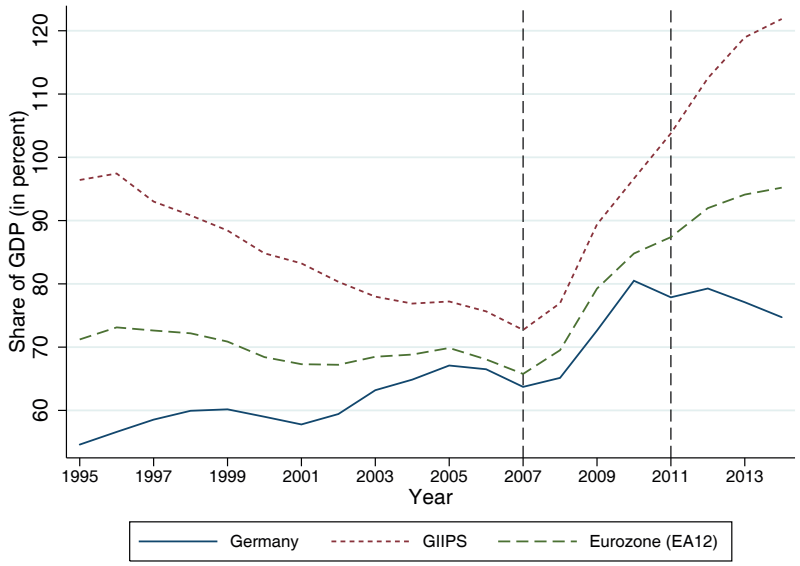

FIG. 1.1: Public debt in the Eurozone

NOTE: Data based on ESA 2010 and former definitions (linked series).
SOURCES: Eurostat, AMECO, own calculations.

outbreak of the U.S. subprime crisis and the teetering of the first commercial banks (e.g., Northern Rock), the period of nearly identical interest rates ended. Interest spreads for the GIIPS countries increased as investors began to fear that governments and banks might not be able to service their maturing debts, particularly after the bankruptcy of the U.S. investment bank Lehman Brothers in 2008 (see Sinn 2014). Capital flows to the GIIPS countries dried out, the credit bubbles burst, and Europe entered into a severe recession. Large and persistent budget deficits, combined with decreasing nominal GDP, gave rise to increasing public debt-to-GDP ratios in many Eurozone countries, a situation exacerbated by credit financed rescue operations for financial institutions. In 2010 the European sovereign debt crisis emerged, when the first countries (Greece, Ireland, and Portugal) started to face refinancing difficulties in the sovereign debt markets.

The rescue operations for the GIIPS by the European Central Bank, the International Monetary Fund, and Eurozone countries, such as the European Financial Stability Facility (EFSF) and the European Stability Mechanism (ESM), acompanied by austerity measures

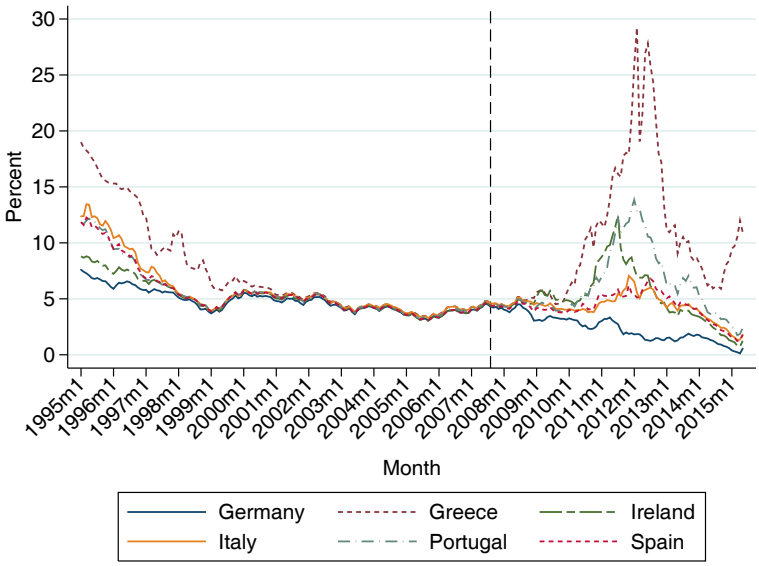

Fig. 1.2: Long-term government bond yields for Germany and the GIIPS countries

Note: Long-term government bond yields are calculated as monthly averages (non-seasonally adjusted data). They refer to central government bond yields on the secondary market, gross of tax, with a residual maturity of around 10 years. Source: Eurostat.

in the GIIPS countries, calmed the financial markets and interest spreads have decreased since 2012. At the end of 2014, however, interest rates for Greek government bonds began to increase again. After the newly elected government had refused to accept the terms of the rescue operations, investors feared a sovereign default and potential exit of Greece from the Eurozone ("Grexit").

The European sovereign debt crisis has led to wide discussions of deeper fiscal integration in the Eurozone. Many experts maintain that a currency union should be accompanied by a fiscal union (see, e.g., Kenen 1969). Without deeper fiscal integration, the Eurozone is vulnerable to economic shocks (see, e.g., Sala-i-Martin and Sachs 1992, Masson 1996, Uhlig 2003). A lack of fiscal coordination has been implicated in many debt crises, such as currently in the Eurozone, which may be interpreted as an emerging federal system. A fiscal transfer system might stabilize country-specific economic shocks and mitigate the

accumulation of debt in individual Eurozone countries.[2] For example, in federal states such as the United States and Germany, fiscal transfers between jurisdictions influence the budgets of the federal and lower-tier governments. In comparing fiscal policies in Florida and Spain, Krugman (2012) describes how fiscal transfers have stabilized budgets in Florida and proposes to also introduce fiscal transfers between European countries. Both, Florida and Spain, had large housing bubbles that burst in 2007. While Spain had to counteract the subsequent increase in public debt with austerity measures, Florida receives a substantial amount of financial support from the federal level via transfers. "If Florida suffers an asymmetric adverse shock, it will receive an automatic compensating transfer from the rest of the country: it pays less into the national budget, but this has no impact on the benefits it receives, and may even increase its benefits if they come from programs like unemployment benefits, food stamps, and Medicaid that expand in the face of economic distress" (Krugman 2012, p. 5).

In Chapter 2, which is based on Potrafke and Reischmann (2015), I show that the institutional setting of fiscal policy making needs to be considered when assessing the sustainability of fiscal policy. Paying fiscal transfers impairs a government's fiscal performance, whereas receiving fiscal transfers appears to improve it. I test whether fiscal policies of the U.S. and German state governments are sustainable and show that the results of fiscal sustainability tests depend on whether fiscal transfers are taken into account. In particular, I examine whether the debt-to-GDP ratio in one period has a positive influence on the primary surplus in the next period (*Bohn-model*: Bohn 1998, 2008). The model implies that governments pursue sustainable fiscal policies when the primary surplus reacts positively to increases in debt because then the intertemporal budget constraint is satisfied. An increase in the primary surplus means that the government takes corrective measures by increasing revenues and/or cutting expenditures to counteract the accumulation of public debt. Including transfers in the state budgets influences inferences regarding fiscal sustainability. If fiscal transfers are not included in the primary surpluses, the test results do not indicate that the U.S. and German state governments pursued sustainable fiscal poli-

[2]Bargain et al. (2013) show that a tax and transfer system and a fiscal equalization mechanism among the Eurozone countries would improve fiscal stabilizers in the Eurozone and reduce the vulnerability of individual countries to income shocks. A small improvement in fiscal stabilization would, however, come along with considerable income redistribution between the countries.

cies. Fiscal transfers were positively related with debt, indicating that intergovernmental transfers have implicitly subsidized debts in the states.

Fiscal transfers are prone to political manipulation. Politicians are likely to influence intergovernmental grants for many reasons. It is conceivable that politicians influence the distribution of grants to favor their home districts or to favor districts where a politician from their own party is in office (party alignment). To increase election prospects, federal and state politicians may award grants to districts with many swing voters. Politicians may, however, also direct grants to their core supporters by favoring districts where the vote share of the own party is large. The model of Cox and McCubbins (1986) describes that politicians award benefits to core supporters when both the expected vote share and uncertainty enter the politicians' calculus. The extent to which politicians can influence grants depends on the policy instruments available to the politician. It is much more difficult to influence grant schemes that follow established formulae than to use discretionary grants. Naturally, for the purpose of an empirical analysis, "one would like to have a grant program over which the incumbent government has full discretionary power" (Johansson 2003, p. 889). In Chapter 3, which is based on Kauder et al. (2015), by exploiting a new dataset for the German state Rhineland-Palatinate, I examine whether the municipalities' voting behavior in state elections influenced discretionary grants from the state level to the municipalities. The results show that discretionary grants were awarded to municipalities with many core supporters of the incumbent state government.

Public capital flows via the Target system can be interpreted as the first rescue program for the GIIPS countries (Sinn 2012, 2014, Sinn and Wollmershäuser 2012). "Target" describes the European transaction settlement system used by the commercial banks of one Eurozone country to make payments to the commercial banks of another Eurozone country via the national central banks and the European Central Bank. Target balances describe the claims and liabilities of the individual central banks of the Eurozone vis-à-vis the Eurosystem. The Target balances show the accumulated deficits and surpluses in each country's balance of payments with other countries in the Eurozone. Figure 1.3 shows the nominal Target claims of Germany and the nominal Target liabilities of the GIIPS countries. Since mid-2007, the national central banks of the GIIPS countries have largely created and lent money to finance balance-of-payments deficits, whereas money creation and lending in the core of

the Eurozone has decreased. The Eurozone's stock of net refinancing credit moved from the European core countries to the GIIPS countries. The German Target claims and the Target liabilities of the GIIPS countries increased dramatically after 2007. In December 2014, for example, the German Bundesbank held nominal Target claims of 461 billion euros. If the Eurozone collapsed, the German Bundesbank's basis for these claims would disappear, and it is likely that the German Bundesbank would sustain a loss. In Chapter 4, which is based on Potrafke and Reischmann (2014), I use the recursive unit root tests on explosive behavior developed by Phillips et al. (2011, 2013) to investigate whether the Target balances of the German Bundesbank are explosive. I identify two explosive periods in the German Target balance and discuss the events that induced the exploding Target balances.

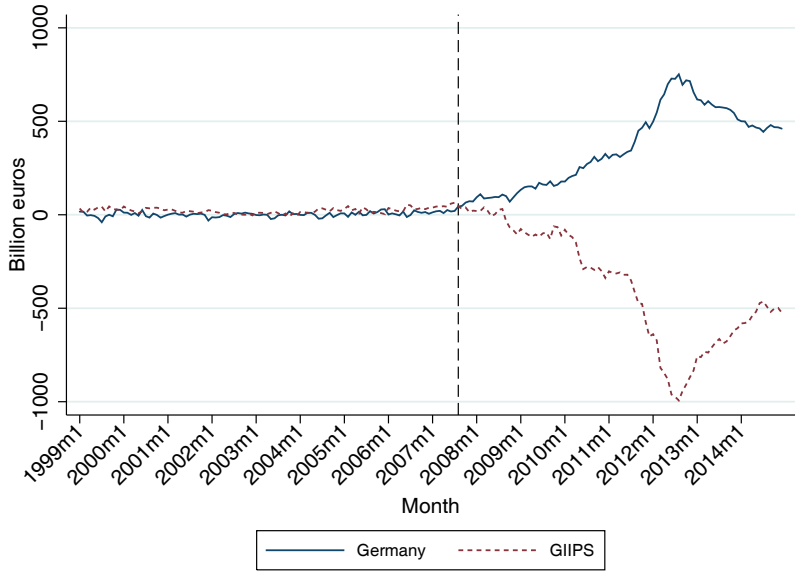

FIG. 1.3: Target balances of Germany and the GIIPS countries

NOTE: Posititve values describe a Target claim. SOURCES: Ifo Institute, own calculations.

The International Monetary Fund (2011, p. 73) warns that "as governments seek to cut their debts and deficits in coming years, they may be tempted to supplement genuine fiscal adjustment with accounting stratagems. This happened during earlier episodes of

adjustment, and there is evidence of a resurgence of the problem." Milesi-Ferretti (2003) suggests using the difference between the change in public debt and the budget deficit (stock-flow adjustment) to measure creative accounting. A positive stock-flow adjustment shows that public debt increased by more than the deficit would imply, whereas a negative stock-flow adjustment shows that public debt increased by less than the deficit would imply. Some components of stock-flow adjustments, such as time of recording effects and valuation effects resulting from changes in the level and structure of prices or the exchange rate, should cancel out over time. "Below-the-line" operations, such as transactions in financial assets, however, can give rise to large and persistent stock-flow adjustments. A positive stock-flow adjustment can result when a government buys financial assets, such as currency and deposits, securities, loans, shares and other equity. A government can, for example, inject equity into public companies so as to shift public expenditures from the budget to public companies that are excluded from the fiscal accounts. A negative stock-flow adjustment results if a government sells financial assets, for example when a public company is privatized (see, e.g., Alt et al. 2014, Buti et al. 2007, von Hagen and Wolff 2006).

Figure 1.4 shows stock-flow adjustments as a share of GDP in the Eurozone, the GIIPS countries, and Germany over the period 1995-2014. European governments engaged in creative accounting to hide borrowing in the run-up and in the early years of the EMU so as to meet the convergence criteria, especially after the Stability and Growth Path (SGP) went into force in 1998 (see, e.g., von Hagen and Wolff 2006, Buti et al. 2007, Beetsma et al. 2009, Alt et al. 2014). The SGP limits the debt-to-GDP ratio to 60% and the deficit to 3%, but the deficit limit receives more attention. Governments thus had an incentive to embellish the deficit figures via creative accounting. Stock-flow adjustments also increased after the outbreak of the financial crisis in 2007. In an effort to bail out troubled financial institutions, governments acquired assets such as shares and securities, provided loans and equity injections to the private sector, and engaged in other off-balance-sheet activities that increased public debt but did not show up in the budget deficits. Stock-flow adjustments also mirror lending in the framework of the EFSF.

In Chapter 5 I describe stock-flow adjustments in 27 OECD countries and discuss the government interventions that gave rise to large stock-flow adjustments. I examine whether

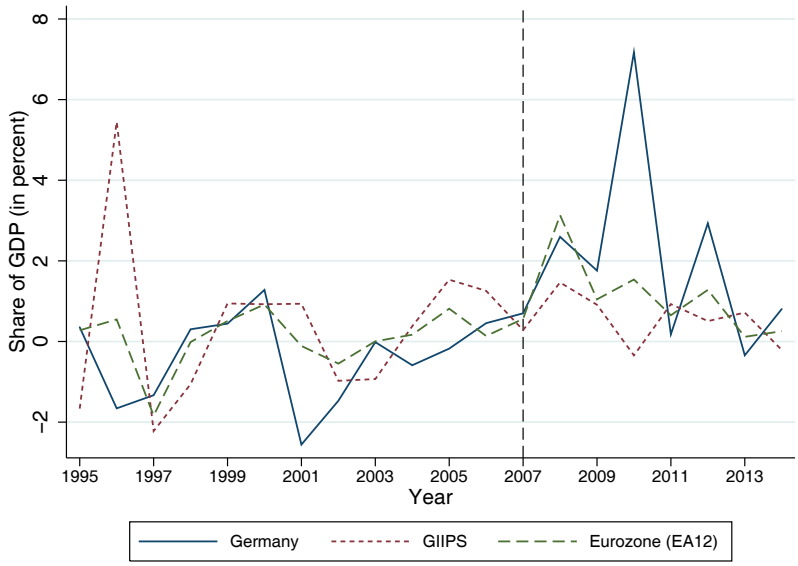

FIG. 1.4: Stock-flow adjustments in the Eurozone

NOTE: Data based on ESA 2010 and former definitions (linked series).
SOURCES: Eurostat, AMECO, own calculations.

electoral motives influenced creative accounting as measured by stock-flow adjustments. Governments may hide deficits to sugarcoat the budget balance before elections ("window dressing"). Governments also have incentives to support or bail out private and public companies before elections by providing equity injections. Governments may hesitate to engage in privatization before elections as they may prefer to maintain stronger influence on the economy. My results show that stock-flow adjustments increased before elections. Governments were particularly likely to engage in creative accounting before regular elections.

In Germany, stock-flow adjustments chiefly occured via the creation of off-budget special funds that governments can use to finance public activities outside the core budget. In Chapter 6, which is based on Reischmann (2014), I describe special funds in Germany and elaborate upon the purposes for which special funds were established. Special funds were specifically used to finance German reunification in 1990. During the financial crisis starting in 2007 the central government and the state governments also established several special

funds to finance economic stimulus packages and rescue operations for financial institutions. For example, the large 2010 stock-flow adjustment in Germany reflects the establishment of two public defeasance structures – Erste Abwicklungsanstalt and FMS-Wertmanagement – and their loans. I discuss the extent to which the new German debt brake limits the borrowing of special funds and explain how the debt brake can be circumvented by using special funds.

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Chapter 2

Fiscal Transfers and Fiscal Sustainability

Abstract*

We examine whether U.S. and German state governments pursue sustainable fiscal policies taking into account fiscal transfers. Using panel data techniques we investigate whether the debt-to-GDP ratio had a positive influence on the primary surplus (Bohn-model). We show that including/excluding fiscal transfers changes the results. If fiscal transfers are not included in the primary surplus, the test results do not indicate that the U.S. and German state governments pursued sustainable fiscal policies. Our results also suggest that fiscal transfers were positively related to debt. These findings indicate that intergovernmental transfers have implicitly subsidized debts.

*The chapter is based on my joint paper with Niklas Potrafke "Fiscal Transfers and Fiscal Sustainability," *Journal of Money, Credit and Banking*, 47, 2015, 975-1005.

2.1 Introduction

A most topical question in public finance is whether governments pursue sustainable fiscal policies. When fiscal policy is shown to be unsustainable, policies should be changed. Governments may, for example, cut spending, increase public revenues, or implement non-budgetary policies that promote economic growth. Empirical tests of fiscal sustainability are also important because they can be used to publicize the government's fiscal policy performance which may thereby influence the government's (re-)election prospects.

The purpose of this paper is to show that the institutional setting of fiscal policy making needs to be considered in fiscal sustainability tests. In federal states such as the United States and Germany, fiscal transfers between jurisdictions influence the budgets of the federal and lower tier governments. Paying fiscal transfers impairs of course a government's fiscal performance, whereas receiving fiscal transfers appears to improve it. It is therefore possible that ignoring fiscal transfer payments in empirical tests of fiscal sustainability gives rise to misleading conclusions. In particular, when a government with a dismal fiscal performance receives a transfer, empirical tests may predict that the government's fiscal policy is sustainable because of the transfer but not because of the government's sound fiscal policy. By using data for the U.S. states and the German states ("Laender"), we show that including fiscal transfers in the state budgets influences the inferences regarding fiscal sustainability.

Debt sustainability in federal states is an important issue because a lack of fiscal coordination has been implicated in many debt crises, such as currently in the Eurozone (if interpreted as an emerging federal system), and historically (e.g., Argentina before 2001). In the light of the European debt crisis a deeper fiscal integration in the Eurozone is widely discussed. Many experts have argued that a currency union should be accompanied by a fiscal union (see, e.g., Kenen 1969, Sala-i-Martin and Sachs 1992, Masson 1996). A fiscal transfer system may stabilize country-specific economic shocks and mitigate the accumulation of debt in individual euro member states. The United States and Germany are good laboratories to study debt sustainability and fiscal coordination because they have well-established federal systems and detailed data are available.

A very prominent test for fiscal sustainability is to examine whether the debt-to-GDP ratio in period $t-1$ has a positive influence on the primary surplus-to-GDP ratio in period t using a fiscal reaction function (*Bohn-model*: Bohn 1998, 2008). Governments pursue sustainable fiscal policies when the debt-to-GDP ratio in period $t-1$ has a positive influence on the primary surplus in period t. An increase in the primary surplus means that the government takes corrective measures by increasing revenues and/or cutting expenditures to counteract the accumulation of public debt. We apply the *Bohn-model* in a panel of U.S. and German state governments.[1] We provide evidence that fiscal transfers are critical for fiscal sustainability in the states. Our findings also indicate that fiscal transfers have implicitly subsidized debts in the states.

2.2 Prior Studies and Research Framework

Several studies have examined fiscal sustainability on the national level.[2] Fiscal sustainability tests are applied by using univariate time series techniques and panel data techniques. Bohn (1998, 2008) examines the sustainability of fiscal policy of the U.S. federal government using univariate time series over the period 1916-1995 and 1793-2003, and finds a positive response of the primary surplus to changes in public debt. Mendoza and Ostry (2008) test the *Bohn-model* in a panel of 22 industrial countries over the period 1980-2005 and in a panel of 34 emerging countries over the period 1990-2005. In both groups, they find a positive response of the primary surplus to changes in public debt. By distinguishing between high-debt and low-debt countries, Mendoza and Ostry (2008) show that countries with moderate debt levels pursued sustainable fiscal policies and countries with debt-to-

[1] Scholars also use unit root tests to examine whether the debt-to-GDP ratio has a unit root and investigate whether public revenues and public expenditures are cointegrated to analyze fiscal sustainability. Bohn (2007) shows that the intertemporal budget constraint, and therefore fiscal sustainability, may be satisfied even if the debt series contains a unit root and even if revenues and expenditures are not cointegrated. The critical values of panel unit root and cointegration tests for bounded variables such as debt-to-GDP ratios also need to be adjusted (Herwartz and Xu 2008, Cavaliere and Xu 2014).

[2] See, e.g., Hamilton and Flavin (1986), Trehan and Walsh (1988, 1991), Wilcox (1989), Quintos (1995), Ahmed and Rogers (1995), Fincke and Greiner (2012), Koester and Priesmeier (2013), Byrne et al. (2011), Prohl and Westerlund (2009), Burret et al. (2013). On theoretical considerations of public debt sustainability, see Bohn (1995, 2007, 2008).

GDP ratios above the sample mean and median of each group did not pursue sustainable fiscal policies. Ghosh et al. (2013) find a cubic reaction function of the primary surplus to public debt in a panel of 23 advanced economies over the period 1970-2007. At low debt levels, debt had no, or even a negative influence on the primary surplus, but when debt rose beyond a certain threshold, the influence of debt on the primary surplus became positive and increased. Very high debt levels had even a negative influence on the primary surplus. Ghosh et al. (2013) emphasize that governments could no longer service public debt at very high levels of debt because "fiscal fatigue" began. "Fiscal fatigue" means that governments are not able any more to increase the primary surplus to counteract the accumulation of public debt at very high debt levels. Claeys et al. (2008) estimate the *Bohn-model* in a panel of the U.S. states over the period 1962-2000, and a panel of the German states over the period 1970-2005. The results show that the U.S. state governments pursued sustainable fiscal policies, while the German state governments did not. Fincke and Greiner (2011) use univariate time series for the West German states over the period 1975-2006 and show that the debt-to-GDP ratio had a positive influence on the primary surplus in all the West German states except Berlin. In a similar vein, Kitterer (2007) and Kitterer and Finken (2006) use univariate time series for the West German states over the period 1971-2004 and for the East German states over the period 1992-2004 and show with the help of univariate unit root tests that only governments in Hesse, North-Rhine Westphalia, and Saxony pursued sustainable fiscal policies. Herzog (2010) tests the *Bohn-model* for Baden-Wuerttemberg and Berlin over the period 1970-2005. The results show that fiscal policy was sustainable in Baden-Wuerttemberg and not sustainable in Berlin.

We investigate whether the debt-to-GDP ratio in period $t-1$ had a positive influence on the primary surplus-to-GDP ratio in period t using a fiscal reaction function (*Bohn-model*). We estimate panel models for the U.S. and German state governments which include fixed state and fixed period effects. We also estimate dynamic panel models because governments may change public revenues and expenditures gradually to adjust the primary surplus to debt. We examine whether public debt had a non-linear influence on the primary surplus.

Proponents of the "fiscal theory of the price level" criticize that the fiscal reaction function might not measure a causal influence of the debt level on the primary surplus because the debt-to-GDP ratio might react to expected primary surpluses (Canzoneri et al. 2001,

Woodford 1998). The primary surplus in period t should, however, by definition not have an influence on debt in period $t-1$ because of the time lag. In any event, we employ a two-step system generalized method of moments (GMM) estimator to deal with the potential reverse causality between the debt level and the primary surplus.

We explicitly take into account fiscal transfers when assessing fiscal sustainability. Our study is closely related to Mahdavi and Westerlund (2011) who employ panel unit root and cointegration tests to investigate fiscal policies of U.S. state and local governments. Mahdavi and Westerlund (2011) explore as to what extent balanced budget rules facilitate fiscal sustainability and arrive at the result that "without federal grants, state and local governments as a group are unable to fund their current operation expenditures using their own-source revenues" (Mahdavi and Westerlund 2011, p. 963).

2.3 Institutional Background

2.3.1 Fiscal Transfer Systems

A typical feature of fiscal federalism in the United States and Germany are fiscal transfer systems which fund the budgets of the lower tier state governments. The institutional design of fiscal federalism, however, differs between the United States and Germany. In the United States the states receive transfers (grants) from the federal level (vertical), while in Germany the transfer payments flow from the federal level to the states (vertical) and between the states (horizontal). The intergovernmental transfers in the United States mostly depend on spending in the states, while the intergovernmental transfers in Germany depend on tax revenues in the states.

The U.S. states receive three types of grants, depending on how much discretionary power the recipient has on using the funds: categorical grants for specific activities, block grants for a wider range of activities, and general purpose grants (Government Accountability Office [GAO] 2012). The individual grants are either based on pre-determined formulae (formula grants) or designed for state-specific projects (project grants). Formula grants

allocate funds based on indicators such as population and per capita income. The states can apply for project grants which allocate funds on a competitive basis (GAO 2009). By paying grants the U.S. federal government reimburses the states for the performance of general government functions (e.g., health, education, public transport, and unemployment compensation) and specific services (e.g., care of prisoners), or in lieu of taxes on federal property. The fiscal transfer system in the United States is *de jure* not intended to equalize fiscal imbalances among the states. Sørensen et al. (2001) describe, however, that federal grants react countercyclically with respect to state-level output fluctuations and provide some insurance against state-specific downturns. By comparing fiscal policies in Florida and Spain, Krugman (2012) describes how fiscal transfers have *de facto* stabilized budgets in Florida and proposes to also introduce fiscal transfers between European countries. Both, Florida and Spain, had large housing bubbles which burst in 2007. While Spain had to counteract the subsequent increase in public debt with austerity measures, Florida received a large financial support from the federal level via transfers. "If Florida suffers an asymmetric adverse shock, it will receive an automatic compensating transfer from the rest of the country: it pays less into the national budget, but this has no impact on the benefits it receives, and may even increase its benefits if they come from programs like unemployment benefits, food stamps, and Medicaid that expand in the face of economic distress" (Krugman 2012, p. 5).

The German fiscal equalization system harmonizes tax revenues across the states. The horizontal transfers redistribute tax revenues from rich states to poor states. States with above average per capita tax revenues pay transfers, while states with below average per capita tax revenues receive transfers. The vertical transfers are additional grants from the federal government to states with low per capita tax revenues. Until 2005 vertical and horizontal transfers adjusted the poor states' income effectively to 99.5% of average tax revenues per capita (Baretti et al. 2002). After a reform of the fiscal equalization scheme in 2005 poor states receive at least 97.5% of average tax revenues per capita (Bundesministerium der Finanzen 2012). Since 1995, the East German states have participated in the system (received transfers), and the volume of payments has increased. In fact, some states are permanent net recipients while others are permanent net payers of transfers. In 1988 the states Bremen and Saarland went to the Supreme Court to demand additional transfers from the federal government. Bremen and Saarland had accumulated high public

debts. The Supreme Court arrived at the conclusion that the two states were unable to reduce their debts by own means. Between 1994 and 2004 the federal government paid additional vertical transfers to reduce debt in Bremen and Saarland (Seitz 2000).

2.3.2 Fiscal Policy on the State Level

The U.S. states have discretionary power in setting tax bases and rates. The U.S. state governments decide upon most major expenditures with only a few exceptions such as pensions and health insurance for old and disabled people (Bordo et al. 2013).[3] The states are generally free in borrowing but need to fulfill balanced-budget-rules (Vermont is an exception). The requirements of the balanced-budget-rules are, however, not equally stringent across the states. "Some balanced budget requirements provide enough flexibility for states to carry over deficits if necessary" (GAO 1993, p. 40). Poterba (1996) describes that almost every U.S. state has the possibility to borrow to balance the budget at least for one fiscal year and that most balanced budget rules cover only a part of the overall budget.[4] Most states do not have formal provisions to enforce the balanced budget rules.

In Germany, federal law determines nearly all tax bases and rates. The state governments have hardly any means to change tax rates. The state governments can, however, influence tax revenues implicitly by, for example, boosting economic performance or increasing tax enforcement activities. The revenues of the VAT, the income tax, and the corporate tax are shared among the federal, state and local governments. The German state governments are restrained by federal law on the expenditure side. The German states have, however, full autonomy in borrowing. Until 2009 the constitutional and statutory provisions of the states allowed borrowing only in the amount of expenditures for investments ("golden rule"). But the state governments found various ways to circumvent or simply ignored the "golden rule" (Rodden 2003). In 2009 the German federal government introduced a new debt brake prohibiting the states to run structural deficits from 2020 onwards.

[3] "The states typically have very limited discretion over the net revenue flow to social insurance funds" (Poterba 1994, p. 800). Consequently, we consider general revenues and general expenditures of the U.S. states which do not include revenues and expenditures of utilities, liquor stores, and insurance trusts.

[4] See also Heun (2014).

2.4 Data and Descriptive Analysis

2.4.1 Public Debt and the Primary Surplus in the U.S. and German States

For the U.S. states we use annual data over the period 1978-2010.[5] For the German states we use annual data over the period 1975-2010.[6] In our baseline specification we use data on the state government level, excluding municipalities. We exclude the municipalities because we want to explicitly investigate fiscal policies of the state governments and analyze how fiscal transfers influence fiscal policy on the state level. We discuss results including municipalities in the robustness tests section. We exclude outliers from our samples. Alaska and Wyoming play a special role among the U.S. states because they have extraordinarily large surpluses because of their high revenues coming from taxes on oil. Hawaii has a unique full-state responsibility for public education among the U.S. states. We thus exclude Alaska, Hawaii, and Wyoming from our panel of the U.S. states (see Bohn and Inman 1996). The city state Berlin plays a special role among the German states. Before 1990, West Berlin was part of the Federal Republic of Germany. In 1990, West and East Berlin were unified and the fiscal data for Berlin thus have a structural break. Data on fiscal transfers to the East German states are only available after 1995 and their debt-to-GDP ratios rose dramatically after the German reunification. We thus only consider the West German states excluding Berlin. The average debt-to-GDP ratio in the U.S. states in our sample is 6.4%. The average debt-to-GDP ratio in the West German states is 19.0%.

We propose two alternatives to measure the primary surplus. First, we use the standard definition of the primary surplus: the difference between revenues and primary expenditures (primary surplus 1). Primary expenditures are all expenditures, excluding interest payments. Second, we exclude transfers paid and received by the fiscal transfer system

[5]Standardized data on real GDP in the U.S. states are available since 1977 and we use the GDP deflator to compute real values. In a some of our regressions we include lagged real income and consequently our first year in the sample is 1978 (see Sørensen et al. 2001, Larcinese et al. 2013 who also use data starting in 1978).

[6]Standardized data on revenues and expenditures in the German states are available since 1974. Because we include lagged variables, our first year in the sample is 1975.

from the primary surplus (primary surplus 2).[7] The official revenue and expenditure data include the transfers by the fiscal transfer systems. The state governments cannot, however, directly influence these transfers.

Figures 2.1, 2.2, and 2.3 show the annual primary surplus-to-GDP ratios in the U.S. and West German states. The figures illustrate that the federal transfers in the United States balanced the revenues and primary expenditures of the states while many states would have run large primary deficits without transfers. In West Germany the vertical and horizontal transfers also balanced the revenues and primary surpluses of the states in most periods. In the U.S. states the average primary surplus 1-to-GDP ratio was 0.5% and the average primary surplus 2-to-GDP ratio was -2.4% over the period 1978-2010. In the West German states, the average primary surplus 1-to-GDP ratio over the period 1975-2010 was 0% and the average primary surplus 2-to-GDP ratio was -0.6%.

2.4.2 Correlation Between Public Debt and the Primary Surplus

Figures 2.4 and 2.5 show correlations between the two measures of the primary surplus-to-GDP ratio in period t and the debt-to-GDP ratio in period $t-1$ of the U.S. and German state governments. Public debt was positively correlated with the standard measure of the primary surplus (primary surplus 1) in the U.S. states as well as in the West German states. The correlation coefficient between the debt-to-GDP ratio in period $t-1$ and the primary surplus-to-GDP ratio in period t is 0.42 in the U.S. states and 0.23 in the West German states. By contrast, when excluding the fiscal transfers (primary surplus 2), the debt-to-GDP ratio was negatively correlated with the primary surplus-to-GDP ratio: the correlation coefficient between the debt-to-GDP ratio in period $t-1$ and the primary surplus-to-GDP ratio in period t is -0.05 in the U.S. states and -0.53 in the West German states. The correlations do, however, not take into account the development over time, individual state effects and other covariates, which we consider in the econometric panel data model.

[7]For the U.S. states we use net federal grants, calculated as intergovernmental revenues of the state from the federal government minus intergovernmental expenditures of the state to the federal government (see Sørensen et al. 2001).

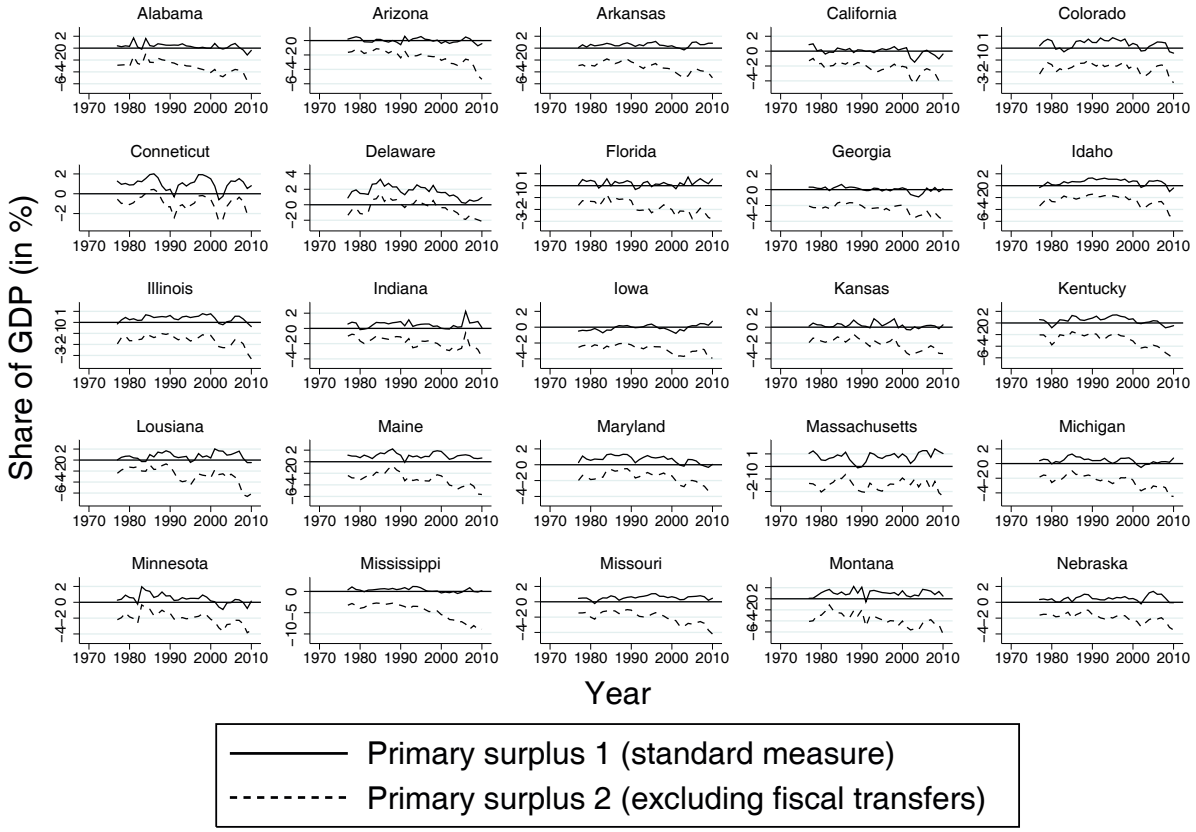

FIG. 2.1: Primary surplus 1 and 2 (U.S. states)

NOTES: Primary surplus 1 denotes the standard measure of the primary surplus, primary surplus 2 denotes the primary surplus excluding fiscal transfers.

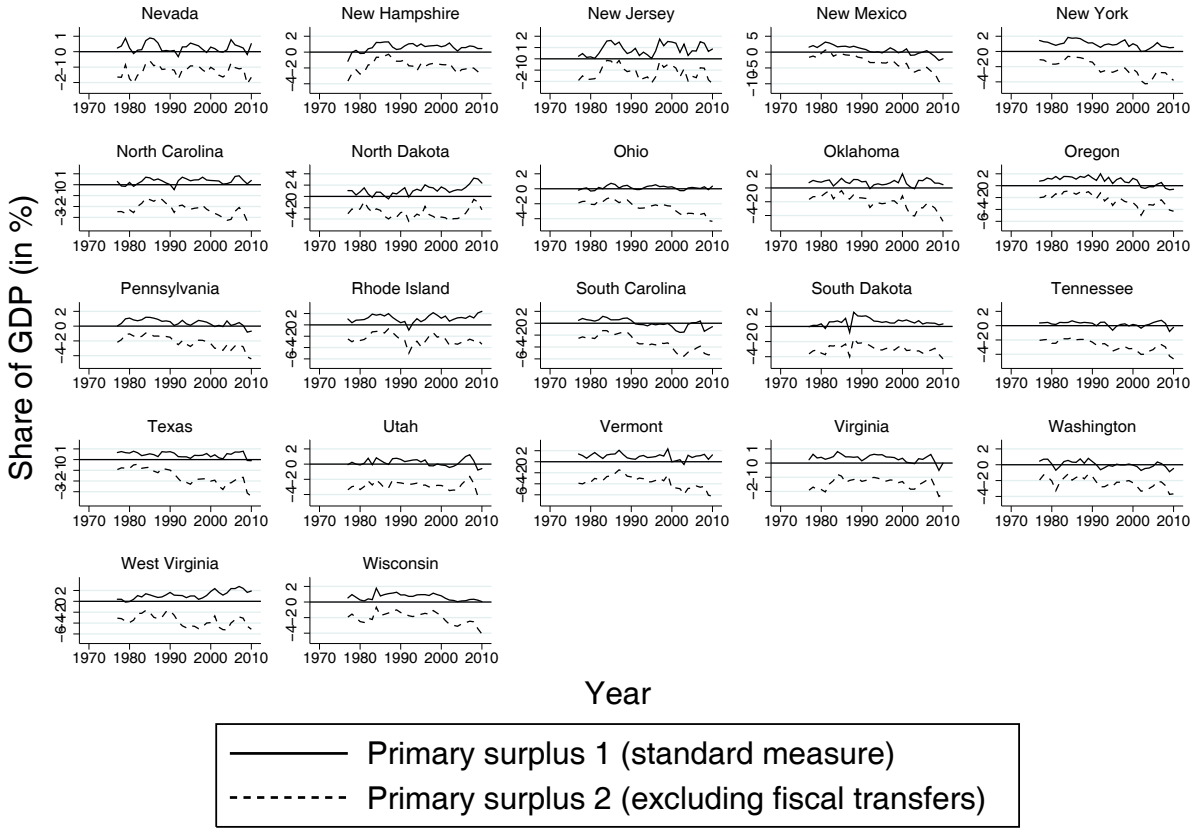

Fig. 2.2: Primary surplus 1 and 2 (U.S. states), continued

Notes: Primary surplus 1 denotes the standard measure of the primary surplus, primary surplus 2 denotes the primary surplus excluding fiscal transfers.

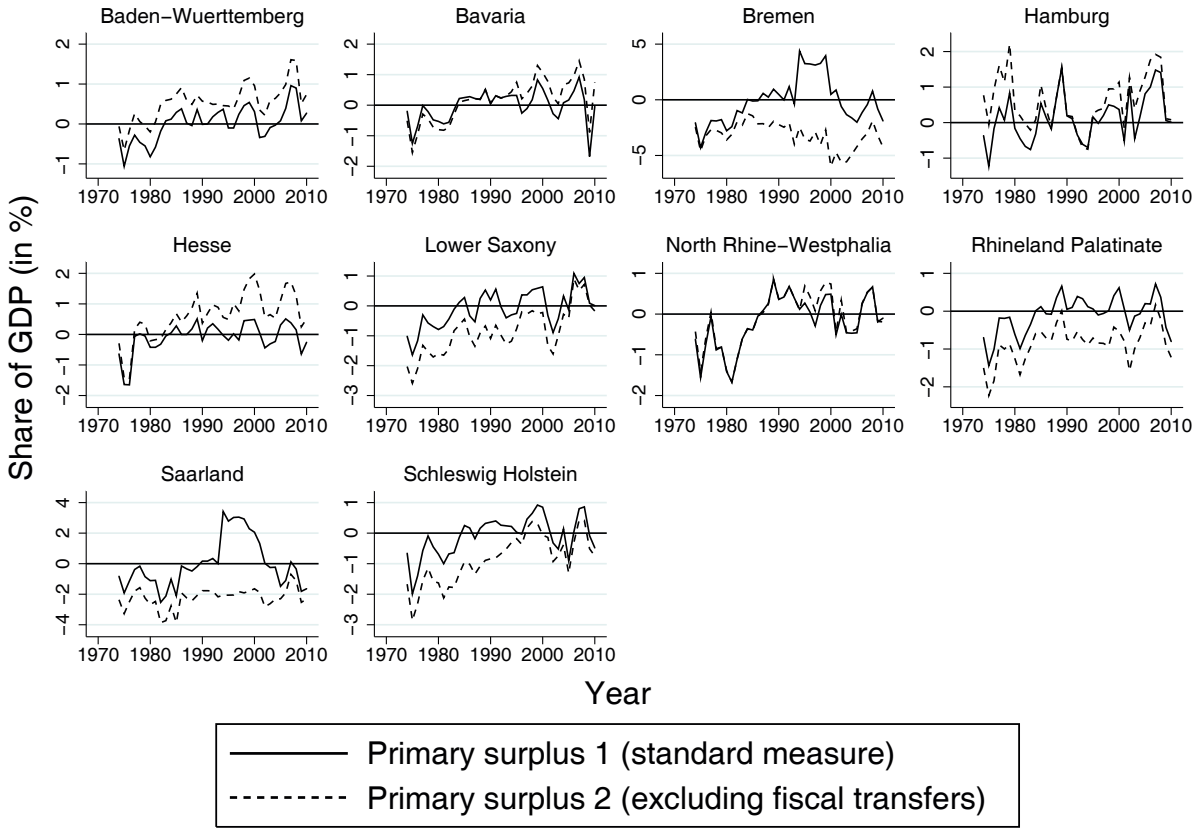

FIG. 2.3: Primary surplus 1 and 2 (West German states)

NOTES: Primary surplus 1 denotes the standard measure of the primary surplus, primary surplus 2 denotes the primary surplus excluding fiscal transfers.

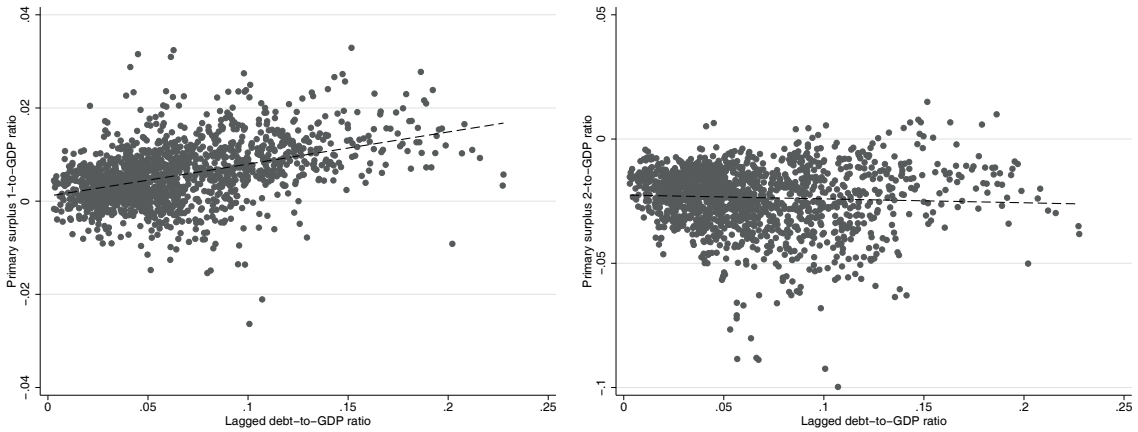

Fig. 2.4: Correlation between debt and primary surplus (U.S. states)

Notes: Left panel: Primary surplus 1-to-GDP ratio and lagged debt-to-GDP ratio; right panel: Primary surplus 2-to-GDP ratio and lagged debt-to-GDP ratio. Annual data for 47 U.S. states (Alaska, Hawaii, Wyoming excluded) over the period 1978-2010. Correlation coefficient between lagged debt-to-GDP-ratio and primary surplus 1-to-GDP ratio (standard measure): 0.42. Correlation coefficient between lagged debt-to-GDP-ratio and primary surplus 2-to-GDP ratio (fiscal transfers excluded): -0.05.

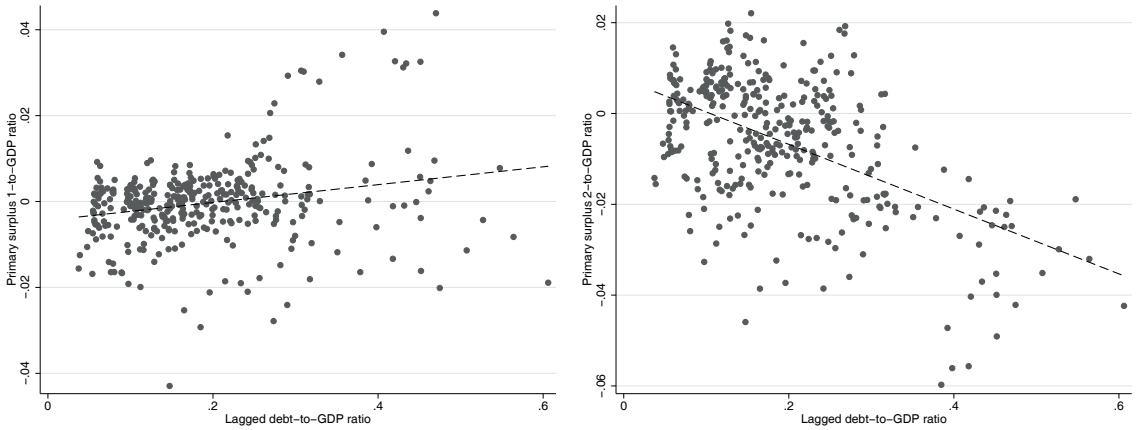

Fig. 2.5: Correlation between debt and primary surplus (West German states)

Notes: Left panel: Primary surplus 1-to-GDP ratio and lagged debt-to-GDP ratio; right panel: Primary surplus 2-to-GDP ratio and lagged debt-to-GDP ratio. Annual data for 10 West German states over the period 1975-2010 (debt over the period 1974-2009). Correlation coefficient between lagged debt-to-GDP-ratio and primary surplus 1-to-GDP ratio (standard measure): 0.23. Correlation coefficient between lagged debt-to-GDP-ratio and primary surplus 2-to-GDP ratio (fiscal transfers excluded): -0.53.

2.5 Econometric Analysis

2.5.1 Empirical Specification

The baseline panel data model has the following form:

$$Primary\ surplus_{ijt} = \alpha_j Public\ debt_{it-1} + \sum_l \beta_{jl} Z_{it} + \eta_i + \epsilon_t + u_{ijt}, \tag{2.1}$$

where the dependent variable $Primary\ surplus_{ijt}$ denotes the primary surplus-to-GDP ratio in state i in period t. We distinguish between two measures of the primary surplus denoted by j. The first measure is the standard definition of the primary surplus (primary surplus 1), the second measure excludes fiscal transfers (primary surplus 2). $Public\ debt_{it-1}$ describes the debt-to-GDP ratio in period $t-1$. The vector Z_{it} includes two variables that control for business cycle fluctuations and temporary government spending. We choose the control variables following Barro's (1979) tax smoothing theory which implies that the determinants of the primary surplus other than debt are a business cycle indicator, $YVAR$, and the level of temporary government spending, $GVAR$. Barro (1986) defines

$$YVAR = (1 - y_t/y_{tT})(g_{tT}/y_t) \text{ and} \tag{2.2}$$

$$GVAR = (g_t - g_{tT})/y_t, \tag{2.3}$$

where y_t and g_t describe the actual values of real GDP and real expenditures,[8] and y_{tT} and g_{tT} the trend values of y_t and g_t.[9] $YVAR$ measures the relative deviation of actual output to trend output weighted by (g_{tT}/y_t). Positive values of $YVAR$ indicate an actual output below the trend (output shortfall). $GVAR$ measures the amount of temporary spending above trend spending. A positive value of $GVAR$ indicates actual expenditures above the trend. Alternatively, Bohn (2008) uses the difference between the actual value and trend value of log real GDP as a proxy for the output gap and the difference between actual and

[8] We calculate the real values using the GDP deflator of every individual state.

[9] We calculate the trend values by using the Hodrick-Prescott filter using a smoothing parameter of 100.

estimated permanent military outlays (relative to GDP) as a proxy for the expenditure gap. In contrast to Barro's approach, a positive output gap in Bohn's approach indicates an output above the trend (output surplus). We use all government expenditures excluding interest payments to compute $GVAR$ and the expenditure gap variable (see Mendoza and Ostry 2008, Ghosh et al. 2013).[10] We expect $YVAR$, $GVAR$, and the expenditure gap variable to have a negative influence on the primary surplus, and the output gap variable to have a positive influence on the primary surplus. If output is below its trend, the primary surplus should decrease. Similarly, if government spending is above its trend, the primary surplus should decrease. η_i describes a fixed state effect, ϵ_t describes a fixed period effect and u_{ijt} describes an error term.

We estimate the baseline model by using OLS with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors – see Huber 1967, White 1980, 1982, and Stock and Watson 2008). Tables 2.1 and 2.2 show descriptive statistics for all variables. Governments may change public revenues and expenditures gradually to adjust the primary surplus to debt (see, e.g., Blanchard 1984). The results excluding the lagged dependent variable may suffer from omitted variable bias. We thus also estimate dynamic panel data models including the lagged dependent variable.

We discuss results including and excluding $YVAR$ and $GVAR$ (or the output gap and expenditure gap variables) for two important reasons. First, defining the expenditure gap variables has been a major issue in related studies. Bohn (1998) uses, for example, univariate data for the United States including the period of the World Wars and needs to account for these extraordinary periods by designing the expenditure gap variable. We include, however, fixed period effects in our panel data model addressing external shocks. Second, we acknowledge that our definition using overall expenditures to compute the expenditure gap variable may give rise to endogeneity concerns. We show that including/excluding the output gap and expenditure gap variables does not change the inferences.

We consider the potential endogeneity of debt because expectations of tomorrow's primary surplus can influence today's debt. Experts have not yet found a suitable external

[10] When the primary surplus 2 is used as dependent variable, we use $YVAR$, $GVAR$, and expenditure gap variables that exclude fiscal transfer expenditures. Inferences do not change when we use $YVAR$, $GVAR$, and expenditure gap variables that include fiscal transfer expenditures.

instrument for debt. We thus have to draw instruments from within our panel and instrument debt by its time lags as suggested by Checherita-Westphal and Rother (2012).[11] We estimate the model by using the two-step system GMM estimator as developed by Arellano and Bover (1995) and Blundell and Bond (1998) and employ the two-step estimator implemented by David Roodman in Stata, including Windmeijer's (2005) finite sample correction. We collapse the instruments and limit the number of lags as suggested by Roodman (2006, 2009).[12]

2.5.2 Results

Fiscal Reaction Functions

Tables 2.3 and 2.4 show the regression results for the U.S. state governments when the standard definition of the primary surplus-to-GDP ratio (primary surplus 1) is used. Table 2.3 shows the results of the OLS regressions. In column (1) we only include fixed state and period effects, in column (2) we include the control variables $YVAR$ and $GVAR$, and in column (3) we include the control variables output gap and expenditure gap. In columns (4) to (6) we include the lagged dependent variable. The results show a positive influence of the debt-to-GDP ratio in period $t-1$ on the primary surplus-to-GDP ratio in period t. The coefficient of the debt-to-GDP ratio in period $t-1$ is statistically significant at the 1%-level. Our result indicates that the primary surplus-to-GDP ratio in period t increased by about 0.05 percentage points when the debt-to-GDP ratio in period $t-1$ increased by one percentage point.[13] In columns (4)-(6) we include the lagged dependent variable. The coefficient of the lagged debt-to-GDP ratio decreases to 0.03 and is statistically significant

[11] See Bazzi and Clemens (2013) on internal instruments and the exclusion restrictions.

[12] We follow Checherita-Westphal and Rother (2012) who instrument debt through its time lags up to the fifth lag. Inferences regarding the lagged debt-to-GDP ratio do not change and the diagnostic statistics of the GMM estimator show that the model is well specified up to a maximum of nine lags.

[13] Bohn (1998) finds a coefficient of the debt-to-GDP ratio for the U.S. federal government of about 0.054 for the period 1916-1995. Bohn (2008) finds a coefficient between 0.094 and 0.121 for the period 1792-2003. Mendoza and Ostry (2008) find a coefficient of the debt-to-GDP ratio in a panel of 22 industrial countries over the period 1980-2005 between 0.020 and 0.038 and in a panel of 34 emerging countries over the period 1980-2005 between 0.035 and 0.107.

Table 2.1: Descriptive statistics (U.S. states)

Variable	Mean	Std. Dev.	Min	Max	Obs.
Debt-to-GDP ratio	0.064	0.039	0.003	0.228	1,551
Primary surplus 1-to-GDP ratio	0.005	0.006	-0.026	0.033	1,551
Primary surplus 2-to-GDP ratio	-0.024	0.013	-0.100	0.015	1,551
YVAR	0.000	0.003	-0.010	0.014	1,551
GVAR	-0.000	0.004	-0.018	0.024	1,551
Output gap	0.000	0.028	-0.112	0.105	1,551
Expenditure gap	-0.000	0.004	-0.018	0.024	1,551
Transfers-to-GDP ratio	0.029	0.011	0.011	0.097	1,551
Population	0.548	0.573	0.049	3.696	1,551
Real per capita income	2.739	0.714	1.344	5.259	1,551
Unemployment rate	0.059	0.020	0.023	0.174	1,551
Population share $5-17$	0.192	0.019	0.154	0.266	1,551
Population share >65	0.124	0.018	0.075	0.185	1,551
Senators per capita	0.880	0.870	0.054	4.065	1,551

Notes: *Population* in 10 million. *Senators per capita* denotes Senators per 10 million inhabitants. *Real per capita income* in 10,000 Dollar. Annual data for 47 U.S. states (Alaska, Hawaii, Wyoming excluded) over the period 1978-2010 (*debt, population, population shares, real per capita income, unemployment rate* and *Senators per capita* over the period 1977-2009). In 1997, the Bureau of Economic Analysis changed the method on how to estimate GDP from the Standard Industrial Classification (SIC) to the North American Industry Classification System (NAICS). On average GDP in the U.S. states decreased by 1% after the change in the estimation procedure. We control for the change in the estimation procedure with fixed time effects. For the years 2001 and 2003 finance data of the local governments are not available. We interpolate the finance data to obtain values for the years 2001 and 2003. Sources: U.S. Bureau of Economic Analysis (GDP, real GDP, personal income), U.S. Census Bureau (debt, revenues, expenditures, interest payments, transfers, population, age structure), U.S. Bureau of Labor Statistics (unemployment rate).

TABLE 2.2: Descriptive statistics (West German states)

Variable	Mean	Std. Dev.	Min	Max	Obs.
Debt-to-GDP ratio	0.190	0.106	0.037	0.606	360
Primary surplus 1-to-GDP ratio	-0.000	0.010	-0.043	0.044	360
Primary surplus 2-to-GDP ratio	-0.006	0.014	-0.060	0.022	360
YVAR	0.000	0.003	-0.012	0.010	360
GVAR	0.000	0.004	-0.014	0.018	360
Output gap	-0.000	0.022	-0.055	0.065	360
Expenditure gap	0.000	0.004	-0.014	0.018	360
Transfers-to-GDP ratio	0.006	0.015	-0.015	0.073	360
Tax power	1.062	0.144	0.825	1.493	360

NOTES: *Tax power* describes the real per capita tax revenues in one state relative to the average real per capita tax revenues in all German states. Annual data for 10 West German states over the period 1975-2010 (debt over the period 1974-2009). We consider credit market debt ("Kreditmarktschulden") which accounts for the largest share on debt, short-term financial instruments ("Kassenkredite"), which have become more important to balance budgets since the year 2000, and liabilities to the public sector. SOURCES: Research Group "Volkswirtschaftliche Gesamtrechnung der Länder" (GDP, real GDP), German Federal Statistical Office (debt, revenues, expenditures, interest payments, tax revenues, transfers, population).

at the 1%-level. The $YVAR$ variable (output shortfall) has the expected negative sign and is statistically significant at the 1%-level in column (2) and at the 5% level in column (5). The output gap variable (output surplus) has the expected positive sign and is statistically significant at the 1%-level in column (3) and at the 5% level in column (6). If output was below its trend, the primary surplus decreased. The $GVAR$ variable and the expenditure gap variable are significant at the 1%-level and have the expected negative sign. If government spending was above its trend, the primary surplus decreased.

Including the lagged dependent variable in our fixed effects regressions gives rise to *Nickell bias* (Nickell 1981). The coefficients might be biased by $1/T$, i.e. 3%. We thus also employ dynamic two-step system GMM estimations. Table 2.4 shows the result of the GMM estimations for the U.S. state governments using the primary surplus 1. In columns (1) to (3) we treat the lagged primary surplus 1-to-GDP ratio as endogenous. The coefficient of the lagged debt-to-GDP ratio is about 0.04 and is statistically significant at the 1%-level. In columns (4) to (6) we treat the lagged primary surplus 1-to-GDP ratio and the lagged debt-to-GDP ratio as endogenous. The coefficient of the lagged debt-to-GDP ratio

Table 2.3: Fiscal reaction functions including fiscal transfers (U.S. states)

Dependent variable: Primary surplus 1-to-GDP ratio (standard measure)						
	(1)	(2)	(3)	(4)	(5)	(6)
L. debt-to-GDP ratio	0.053***	0.055***	0.055***	0.030***	0.031***	0.030***
	(0.014)	(0.015)	(0.015)	(0.008)	(0.010)	(0.010)
YVAR		-0.278***			-0.138**	
		(0.072)			(0.054)	
GVAR		-0.588***			-0.525***	
		(0.038)			(0.038)	
Output gap			0.026***			0.011**
			(0.007)			(0.005)
Expenditure gap			-0.580***			-0.519***
			(0.039)			(0.038)
L. dependent variable				0.577***	0.545***	0.546***
				(0.069)	(0.075)	(0.076)
Fixed time effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed state effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (overall)	0.317	0.424	0.423	0.633	0.713	0.712
Number of states	47	47	47	47	47	47
Number of observations	1,551	1,551	1,551	1,551	1,551	1,551

Notes: OLS with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors) in parentheses; *** , ** and * denote significance at the 1%, 5% and 10% levels. The panel is balanced with samples for 47 U.S. states (Alaska, Hawaii, Wyoming excluded) covering the period 1978-2010.

is statistically significant at the 5% level in column (4) and at the 1% level in columns (5) and (6). Using the standard measure of the primary surplus gives rise to the conclusion that U.S. state governments pursued sustainable fiscal policies. Inferences regarding the debt-to-GDP ratio in period $t-1$ do not change when we include/exclude the output gap and expenditure gap variables.

To evaluate the U.S. states' discretionary fiscal policy we exclude federal transfers to the states from the revenue side (primary surplus 2). Table 2.5 shows the results of the OLS regressions for the U.S. state governments when we use the primary surplus 2. The coefficient of the debt-to-GDP ratio in $t-1$ does not have a statistically significant influence on the primary surplus 2 in period t. The results contrast with the results when the primary surplus includes federal grants. The $YVAR$, $GVAR$, and expenditure gap variables are statistically significant at the 1%-level and have the expected negative sign and the output gap variable is statistically significant at the 1%-level and has the expected positive sign.[14] Compared to the estimation including federal grants the estimated coefficients of the $YVAR$ and output gap variables are larger. Our finding is in line with Sørensen et al. (2001) who describe that federal grants are countercyclical with respect to state-level output fluctuations and provide some insurance against state-specific downturns.

Table 2.6 shows the result of the dynamic two-step system GMM estimations for the U.S. state governments using the primary surplus 2. The coefficient of the lagged debt-to-GDP ratio lacks statistical significance in all specifications. Inferences thus do not change when we treat the lagged debt-to-GDP ratio as endogenous. Without federal grants the results do not show that governments in the U.S. states have pursued sustainable fiscal policies.

Table 2.7 shows the results for the German state governments when the standard definition of the primary-surplus-to-GDP ratio is used (primary surplus 1). The results show a positive influence of the debt-to-GDP ratio in period $t-1$ on the primary surplus-to-GDP ratio in period t. In columns (1) to (3) the coefficient of the debt-to-GDP ratio in $t-1$

[14]The $GVAR$ and expenditure gap variables have coefficients near -1. Given that the primary surplus equals revenues minus primary expenditures, it is conceivable that the regressors essentially cancel out the spending side of the primary surplus and the regressions reduce to explaining revenue responses. As a robustness check we have employed regressions without the $GVAR$ and expenditure gap variables. Inferences do not change when the $GVAR$ and expenditure gap variables are excluded.

Table 2.4: Fiscal reaction functions including fiscal transfers (U.S. states) – GMM

Dependent variable: Primary surplus 1-to-GDP ratio (standard measure)						
	(1)	(2)	(3)	(4)	(5)	(6)
L. debt-to-GDP ratio	0.042***	0.045***	0.045***	0.045**	0.050***	0.050***
	(0.007)	(0.009)	(0.009)	(0.018)	(0.014)	(0.014)
YVAR		-0.229***			-0.253***	
		(0.086)			(0.083)	
GVAR		-0.610***			-0.616***	
		(0.086)			(0.047)	
Output gap			0.020***			0.022***
			(0.007)			(0.007)
Expenditure gap			-0.605***			-0.609***
			(0.054)			(0.046)
L. dependent variable	0.526***	0.412***	0.411***	0.537***	0.418***	0.415***
	(0.061)	(0.072)	(0.071)	(0.060)	(0.047)	(0.046)
Fixed time effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed state effects	Yes	Yes	Yes	Yes	Yes	Yes
L. dep. variable endogenous	Yes	Yes	Yes	Yes	Yes	Yes
L. debt-to-GDP endogenous	No	No	No	Yes	Yes	Yes
AR(1), p-value	0.001	0.001	0.001	0.001	0.001	0.001
AR(1), p-value	0.167	0.124	0.140	0.160	0.111	0.129
Hansen, p-value	0.075	0.061	0.065	0.023	0.364	0.376
Number of instruments	40	42	42	45	47	47
Number of states	47	47	47	47	47	47
Number of observations	1,551	1,551	1,551	1,551	1,551	1,551

Notes: Two-step system GMM with robust standard errors in parantheses; instruments collapsed and limited to the 5th lag; *** , ** and * denote significance at the 1%, 5% and 10% levels. The panel is balanced with samples for 47 U.S. states (Alaska, Hawaii, Wyoming excluded) covering the period 1978-2010.

TABLE 2.5: Fiscal reaction functions excluding fiscal transfers (U.S. states)

Dependent variable: Primary surplus 2-to-GDP ratio (excluding fiscal transfers)						
	(1)	(2)	(3)	(4)	(5)	(6)
L. debt-to-GDP ratio	0.012	0.023	0.024	0.011	0.015	0.014
	(0.027)	(0.025)	(0.026)	(0.008)	(0.009)	(0.009)
YVAR		-0.748***			-0.373***	
		(0.080)			(0.047)	
GVAR		-0.868***			-0.713***	
		(0.040)			(0.035)	
Output gap			0.073***			0.033***
			(0.008)			(0.005)
Expenditure gap			-0.851***			-0.700***
			(0.045)			(0.037)
L. dependent variable				0.758***	0.705***	0.706***
				(0.057)	(0.071)	(0.072)
Fixed time effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed state effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (overall)	0.327	0.388	0.387	0.861	0.889	0.889
Number of states	47	47	47	47	47	47
Number of observations	1,551	1,551	1,551	1,551	1,551	1,551

NOTES: OLS with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors) in parentheses; ***, ** and * denote significance at the 1%, 5% and 10% levels. The panel is balanced with samples for 47 U.S. states (Alaska, Hawaii, Wyoming excluded) covering the period 1978-2010.

Table 2.6: Fiscal reaction functions excluding fiscal transfers (U.S. states) – GMM

Dependent variable: Primary surplus 2-to-GDP ratio (excluding fiscal transfers)						
	(1)	(2)	(3)	(4)	(5)	(6)
L. debt-to-GDP ratio	0.010	0.010	0.009	0.035	0.032	0.030
	(0.012)	(0.018)	(0.018)	(0.023)	(0.032)	(0.032)
YVAR		-0.489***			-0.503***	
		(0.071)			(0.080)	
GVAR		-0.815***			-0.816***	
		(0.045)			(0.044)	
Output gap			0.046***			0.047***
			(0.006)			(0.006)
Expenditure gap			-0.810***			-0.807***
			(0.045)			(0.044)
L. dependent variable	0.722***	0.448***	0.444***	0.719***	0.455***	0.453***
	(0.072)	(0.086)	(0.091)	(0.069)	(0.068)	(0.072)
Fixed time effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed state effects	Yes	Yes	Yes	Yes	Yes	Yes
L. dep. variable endogenous	Yes	Yes	Yes	Yes	Yes	Yes
L. debt-to-GDP endogenous	No	No	No	Yes	Yes	Yes
AR(1), p-value	0.001	0.001	0.001	0.001	0.001	0.001
AR(1), p-value	0.278	0.342	0.398	0.285	0.320	0.378
Hansen, p-value	0.044	0.017	0.017	0.208	0.141	0.162
Number of instruments	40	42	42	45	47	47
Number of states	47	47	47	47	47	47
Number of observations	1,551	1,551	1,551	1,551	1,551	1,551

Notes: Two-step system GMM with robust standard errors in parantheses; instruments collapsed and limited to the 5th lag; *** , ** and * denote significance at the 1%, 5% and 10% levels. The panel is balanced with samples for 47 U.S. states (Alaska, Hawaii, Wyoming excluded) covering the period 1978-2010.

takes values between 0.07 and 0.08 and is statistically significant at the 1%-level. Our result indicates that the primary surplus-to-GDP ratio in period t increased by between 0.07 and 0.08 percentage points when the debt-to-GDP ratio in period $t-1$ increased by one percentage point. In the columns (4) to (6) we include the lagged dependent variable. The estimated coefficient of the lagged debt-to-GDP ratio decreases to values between 0.03 and 0.04 and is significant at the 1%-level in columns (4) and (6) and at the 5% level in column (5). We have also estimated dynamic GMM models for the German states treating the lagged primary surplus-to-GDP ratio and the lagged debt-to-GDP ratio as endogenous. Because of the small number of German states the diagnostic statistics perform poorly in the GMM models (see Roodman 2006, 2009). We thus cannot estimate well-specified GMM models for the German states. Using the standard measure of the primary surplus gives rise to the conclusion that West German state governments pursued sustainable fiscal policies.

The $YVAR$ and output gap variables do not turn out to be statistically significant at conventional levels. The design of the German fiscal equalization scheme may well explain why the $YVAR$ and output gap variables do not have a statistically significant influence on the primary surplus. Periods of output shortfalls in a state are associated with decreasing tax revenues. When the tax revenues decrease in a transfer paying state its transfer payment obligation decreases. When the tax revenues decrease in a transfer receiving state, the transfers received increase. The German fiscal equalization scheme thus provides insurance against decreasing tax revenues to the states. The $GVAR$ and expenditure gap variables are statistically significant at the 1%-level and have the expected negative sign. If government spending is above its trend, the primary surplus decreases.

To evaluate the German states' discretionary fiscal policy we exclude vertical and horizontal transfers via the fiscal equalization scheme from the primary surplus (primary surplus 2). Table 2.8 shows the results for the West German state governments when we use the primary surplus 2. The coefficient of the debt-to-GDP ratio in $t-1$ does not have a statistically significant influence on the primary surplus 2-to-GDP ratio in period t. The results contrast with the results when the primary surplus includes fiscal equalization transfers. Using the primary surplus 2-to-GDP ratio as dependent variable, the $YVAR$ variable has the expected negative sign and is statistically significant at the 10%-level

Table 2.7: Fiscal reaction functions including fiscal transfers (West German states)

Dependent variable: Primary surplus 1-to-GDP ratio (standard measure)						
Variable	(1)	(2)	(3)	(4)	(5)	(6)
Lagged debt-to-GDP ratio	0.079***	0.072***	0.072***	0.040***	0.034**	0.035***
	(0.016)	(0.014)	(0.013)	(0.011)	(0.011)	(0.010)
YVAR		0.330			-0.313	
		(0.187)			(0.208)	
GVAR		-0.636***			-0.702***	
		(0.147)			(0.072)	
Output gap			-0.055			0.027
			(0.034)			(0.027)
Expenditure gap			-649***			-0.679***
			(0.143)			(0.063)
Lagged dependent variable				0.677***	0.685***	0.679***
				(0.028)	(0.032)	(0.029)
Fixed time effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed state effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (overall)	0.233	0.291	0.293	0.621	0.692	0.689
Number of states	10	10	10	10	10	10
Number of observations	360	360	360	360	360	360

Notes: OLS with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors) in parentheses; *** , ** and * denote significance at the 1%, 5% and 10% levels. The panel is balanced with samples for the 10 West German states covering the period 1975-2010.

TABLE 2.8: Fiscal reaction functions excluding fiscal transfers (West German states)

Dependent variable: Primary surlus 2-to-GDP ratio (excluding fiscal transfers)						
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged debt-to-GDP ratio	-0.007	-0.016	-0.016	0.003	-0.005	-0.005
	(0.014)	(0.014)	(0.013)	(0.008)	(0.008)	(0.008)
YVAR		-0.516*			-0.636**	
		(0.248)			(0.225)	
GVAR		-0.998***			-0.821***	
		(0.111)			(0.076)	
Output gap			-0.052			0.071*
			(0.040)			(0.033)
Expenditure gap			-0.955***			-0.773***
			(0.079)			(0.052)
Lagged dependent variable				0.634***	0.583***	0.581***
				(0.043)	(0.050)	(0.049)
Fixed time effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed state effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (overall)	0.194	0.323	0.321	0.866	0.885	0.883
Number of states	10	10	10	10	10	10
Number of observations	360	360	360	360	360	360

NOTES: OLS with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors) in parentheses; *** , ** and * denote significance at the 1%, 5% and 10% levels. The panel is balanced with samples for the 10 West German states covering the period 1975-2010.

(column 2). The output gap variable has the expected positive sign but does not turn out to be statistically significant at conventional levels (column 3). The $GVAR$ and the expenditure gap variables are statistically significant at the 1%-level and have the expected negative sign. Inferences do not change when we include the lagged dependent variable. The output gap variable, however, turns out to be statistically significant at the 10%-level when we include the lagged dependent variable and has the expected positive sign (column 6). Adjusting the primary balances of the states for fiscal transfers we do not find that governments in the West German states have pursued sustainable fiscal policies.

Have Fiscal Transfers Subsidized Debts in the States?

Our findings indicate that intergovernmental transfers in the United States and Germany have implicitly subsidized debts in the states. To be sure, federal transfers are not explicitly contingent on state debts, neither in the United States nor in Germany. Taking difference across our otherwise identical regressions including and excluding transfers, one may infer that transfers depend positively on the lagged debt-to-GDP ratio. Figure 2.6 shows the correlations between the transfers-to-GDP ratio in period t and the lagged debt-to-GDP ratio in period $t-1$ in the U.S. states. The correlation coefficient between the transfers-to-GDP ratios and the lagged debt-to-GDP ratio is 0.30. Figure 2.7 shows the correlations between the transfers-to-GDP ratio in period t and the debt-to-GDP ratio in period $t-1$ in the West German states. The correlation coefficient between the transfers-to-GDP ratio and the lagged debt-to-GDP ratio is 0.67.

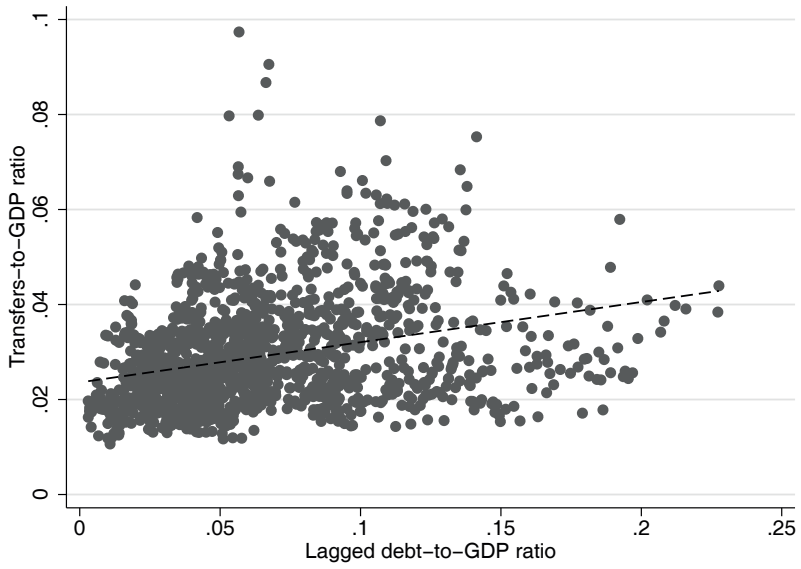

Fig. 2.6: Correlation between debt and transfers (U.S. states)

Notes: Annual data for 47 U.S. states (Alaska, Hawaii, Wyoming excluded) over the period 1978-2010. Correlation coefficient between lagged debt-to-GDP ratio and transfers-to-GDP ratio: 0.30.

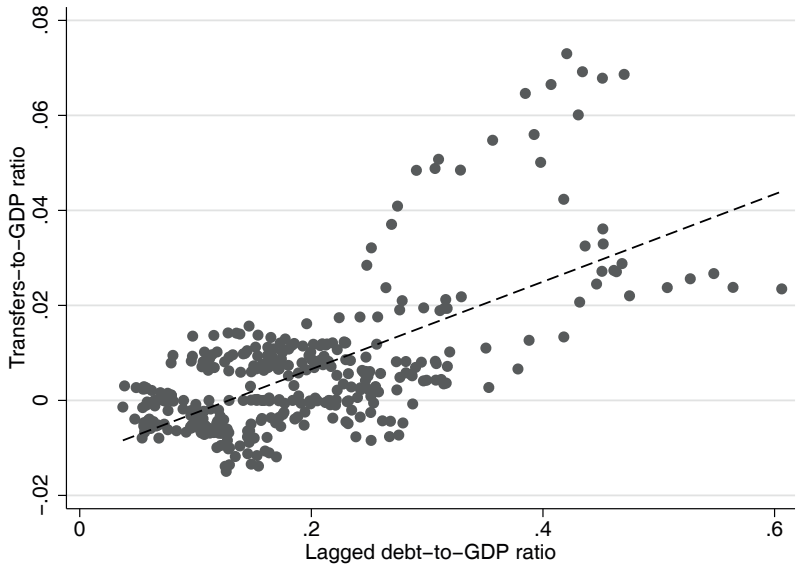

FIG. 2.7: Correlation between debt and transfers (West German states)

NOTES: Annual data for 10 West German states over the period 1975-2010. Correlation coefficient between lagged debt-to-GDP ratio and transfers-to-GDP ratio: 0.67.

We have run regressions of the transfer-to-GDP ratio (the difference between primary surplus 1 and 2) on the lagged debt-to-GDP ratio including the control variables $YVAR$/output gap and $GVAR$/expenditure gap:

$$Transfers_{it} = \alpha Public\ debt_{it-1} + \sum_{l} \beta_l Z_{it} + \eta_i + \epsilon_t + u_{it} \tag{2.4}$$

Table 2.9 shows the regression results for the U.S. state governments. We estimate our model including and excluding the lagged dependent variable. In column (1) we only include fixed period and fixed state effects and find a positive coefficient of the lagged debt-to-GDP ratio on transfers. The result indicates that the transfers-to-GDP ratio in period t increased by about 0.04 percentage points when the debt-to-GDP ratio in period $t-1$ increased by one percentage point. The coefficient of the lagged debt-to-GDP ratio is significant at the 5%-level. In column (2) we include the $YVAR$ variable (output shortfall) because Sørensen et al. (2001) show that federal grants react countercyclically with respect to state-level output fluctuations. The $YVAR$ variable is significant at the

1%-level and has the expected positive sign: When a state experienced an output shortfall, transfers increased. We also include the $GVAR$ variable to control for temporary government spending because transfers in the United States are mainly conditional on spending. In column (3) we include the output gap variable and the expenditure variable. The coefficient of the lagged debt-to-GDP ratio does not turn out to be statistically significant at conventional levels when we include the $YVAR$, $GVAR$, output gap and expenditure variables. In columns (4) to (6) we include the lagged dependent variable. The estimated coefficient of the lagged debt-to-GDP ratio decreases to 0.006 and is significant at the 5%-level when we only include fixed time effects and fixed state effects (column 4). The coefficient of the lagged debt-to-GDP ratio does not turn out to be statistically significant at conventional levels when we control for output fluctuations and temporary government spending (columns 5 and 6).

Table 2.10 shows the regression results for the German state governments. The coefficient of the lagged debt-to-GDP ratio is statistically significant at the 1% level in columns (1) to (3) and at the 5% level in columns (4) to (6). The coefficient of the $YVAR$ variable has a positive sign and is significant at the 1%-level in column (2). The output gap variable has a negative sign and is statistically significant at the 5%-level in column (3). The $YVAR$ and output gap variables describe the effect of the German fiscal equalization system because business cycle fluctuations are correlated with tax revenues. States with increasing tax revenues receive less transfers, while states with decreasing tax revenues receive more transfers. The $GVAR$ and the expenditure gap variables (excluding fiscal transfers) do not turn out to be statistically significant in columns (2) and (3). In contrast to the United States, transfers in Germany are not conditional on expenditures. Inferences regarding the lagged debt-to-GDP ratio do not change when we include the lagged dependent variable. The $GVAR$ and expenditure gap variables are statistically significant at the 10% level and have a negative sign when we include the lagged dependent variable (columns 5 and 6).

In our regression models shown in Tables 2.9 and 2.10 we just included the explanatory variables of the fiscal reaction function. We re-estimate the model including explanatory variables that are likely to influence transfers in the United States and Germany. Because the fiscal transfer systems in the United States and Germany differ, we employ two different models for the U.S. states and the German states.

TABLE 2.9: Debt and transfers (U.S. states) – baseline model with explanatory variables of fiscal reaction function

Dependent variable: Net transfers-to-GDP ratio						
	(1)	(2)	(3)	(4)	(5)	(6)
L. debt-to-GDP ratio	0.041**	0.032	0.031	0.006**	0.003	0.003
	(0.020)	(0.019)	(0.020)	(0.003)	(0.003)	(0.003)
YVAR		-0.470***			0.230***	
		(0.076)			(0.041)	
GVAR		0.281***			0.190***	
		(0.040)			(0.023)	
Output gap			-0.046***			-0.021***
			(0.007)			(0.004)
Expenditure gap			0.270***			0.183***
			(0.041)			(0.024)
L. dependent variable				0.895***	0.872***	0.873***
				(0.019)	(0.026)	(0.026)
Fixed time effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed state effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (overall)	0.293	0.298	0.297	0.956	0.959	0.958
Number of states	47	47	47	47	47	47
Number of observations	1,551	1,551	1,551	1,551	1,551	1,551

NOTES: OLS with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors) in parentheses; *** , ** and * denote significance at the 1%, 5% and 10% levels. The panel is balanced with samples for 47 U.S. states (Alaska, Hawaii, Wyoming excluded) covering the period 1978-2010.

Table 2.10: Debt and transfers (West German states) – baseline model with explanatory variables of fiscal reaction function

Dependent variable: Net Transfers-to-GDP ratio						
	(1)	(2)	(3)	(4)	(5)	(6)
Lagged debt-to-GDP ratio	0.086***	0.087***	0.087***	0.022**	0.021**	0.020**
	(0.017)	(0.018)	(0.018)	(0.008)	(0.008)	(0.008)
YVAR		0.856***			0.177*	
		(0.245)			(0.085)	
GVAR		0.316			-0.079*	
		(0.242)			(0.039)	
Output gap			-0.108**			-0.028*
			(0.045)			(0.013)
Expenditure gap			-0.259			-0.087*
			(0.198)			(0.040)
Lagged dependent variable				0.885***	0.885***	0.886***
				(0.015)	(0.019)	(0.019)
Fixed time effects	Yes	Yes	Yes	Yes	Yes	Yes
Fixed state effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2 (overall)	0.584	0.591	0.589	0.956	0.957	0.957
Number of states	10	10	10	10	10	10
Number of observations	360	360	360	360	360	360

Notes: OLS with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors) in parentheses; *** , ** and * denote significance at the 1%, 5% and 10% levels. The panel is balanced with samples for the 10 West German states covering the period 1975-2010.

For the U.S. states we control for the main indicators of the U.S. transfer system following Larcinese et al. (2013): population, the share of young inhabitants (age 5-17), the share of old inhabitants (age above 65), real per capita personal income, the unemployment rate, and senators per capita. We include the explanatory variables in period $t-1$ because many transfer projects for period t are determined in period $t-1$. We estimate the model including and excluding the lagged dependent variable.

Table 2.11 shows the results for the U.S. states. In column (1) the estimated coefficient of the lagged debt-to-GDP ratio is positive and statistically significant at the 5%-level. When the debt-to-GDP ratio increased by one percentage point, the transfers-to-GDP ratio increased by about 0.04 percentage points. When we include the lagged dependent variable the estimated coefficient of the lagged debt-to-GDP ratio is positive and statistically significant at the 1%-level (column 2). The coefficient of the lagged debt-to-GDP ratio is smaller when we include the lagged dependent variable. When the debt-to-GDP ratio increased by one percentage point, the transfers-to-GDP ratio increased by 0.008 percentage points. The regression model including the lagged dependent variable in column (2) is our preferred specification because federal grants regarding several policy fields may be relatively persistent over time (see Lee and Oppenheimer 1999, p. 172). The effects of the control variables are in line with Larcinese et al. (2013). The coefficient of the population size has a negative sign and is statistically significant at the 10%-level. The coefficient of the share of young inhabitants has a negative sign and is statistically significant at the 5%-level. The coefficient of the per capita income variable has a negative sign and is statistically significant at the 10%-level. States with low per capita incomes receive, for example, more public welfare grants. The coefficient of the unemployment rate has a positive sign and is statistically significant at the 10%-level. States with high unemployment rates receive, for example, more grants for the employment security administration. We also estimate the model using five year averages. In column (3) the coefficient of the lagged debt-to-GDP ratio is positive and statistically significant at the 10%-level. When we include the lagged dependent variable the coefficient of the lagged debt-to-GDP ratio does not turn out to be statistically significant at conventional levels (column 4).

To explain transfers in the German states we include the variable *Tax power* describing the real per capita tax revenues in state i relative to the average real per capita tax revenues

Table 2.11: Debt and transfers (U.S. states)

Dependent variable: Net transfers-to-GDP ratio				
	Annual data		5-year averages	
	(1)	(2)	(3)	(4)
Lagged debt-to-GDP ratio	0.037**	0.008***	0.035*	0.012
	(0.016)	(0.003)	(0.019)	(0.018)
Lagged population	-0.004	-0.001*	-0.004	-0.002
	(0.003)	(0.001)	(0.003)	(0.002)
Lagged population share 5-17	-0.188*	-0.030**	-0.178*	-0.092*
	(0.064)	(0.014)	(0.076)	(0.040)
Lagged population share ¿65	0.150	0.002	0.053	-0.149
	(0.107)	(0.024)	(0.143)	((0.109)
Lagged per capita personal income	-0.008***	-0.001*	-0.005	-0.001
	(0.003)	(0.001)	(0.004)	(0.003)
Lagged unemployment rate	0.014	0.011*	-0.042	-0.046
	(0.020)	(0.006)	(0.034)	(0.029)
Lagged Sentators per capita	0.010***	0.001	0.003	-0.005
	(0.002)	(0.001)	(0.004)	(0.004)
Lagged dependent variable		0.872***		0.744***
		(0.025)		(0.161)
Fixed time effects	Yes	Yes	Yes	Yes
Fixed state effects	Yes	Yes	Yes	Yes
R^2 (overall)	0.428	0.953	0.353	0.598
Number of states	47	47	47	47
Number of observations	1,551	1,551	235	235

Notes: OLS with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors) in parentheses; *** , ** and * denote significance at the 1%, 5% and 10% levels. The panel is balanced with samples for 47 U.S. states (Alaska, Hawaii, Wyoming excluded) covering the period 1978-2010.

in all German states in period t. We include a time dummy variable which assumes the value one for the states Bremen and Saarland over the period 1994-2004 to control for the extra transfers Bremen and Saarland received following a judgment of the Supreme Court (see Section 2.3.1). We estimate our model including and excluding the lagged dependent variable.

Table 2.12 shows the results for the West German states. In column (1) the estimated coefficient of the lagged debt-to-GDP ratio is positive and statistically significant at the 5%-level. When the debt-to-GDP ratio increased by one percentage point, the transfers-to-GDP ratio increased by about 0.04 percentage points. The coefficient of the *Tax power* variable has a negative sign and is statistically significant at the 1%-level. States with high per capita tax revenues receive less transfers or have to pay transfers, states with low per capita tax revenues receive more transfers. The time dummy variable for the states Bremen and Saarland over the period 1994-2004 is statistically significant at the 1%-level and has a positive sign. The states Bremen and Saarland received more transfers over the period 1994-2004. In column (2) we include the lagged dependent variable. The coefficient of the lagged debt-to-GDP ratio is positive and statistically significant at the 5%-level. The coefficient of the lagged debt-to-GDP ratio is smaller when we include the lagged dependent variable. When the debt-to-GDP ratio increased by one percentage point, the transfers-to-GDP ratio increased by 0.03 percentage points. The coefficient of the *Tax power* variable does not turn out to be statistically significant when we include the lagged dependent variable. The regression model without the lagged dependent variable in column (1), however, describes our preferred specification for the West German states. Transfers are calculated in every individual period. We also estimate the model using five year averages. The coefficient of the lagged debt-to-GDP ratio does not turn out to be statistically significant at conventional levels (columns 3 and 4).

What may explain the positive correlation between lagged debt and intergovernmental transfers? Since debt is not an explicit determinant of transfers, one may wonder how rules for transfers have evolved over time to benefit indebted states and implicitly subsidizing debts. We indeed interpret our findings showing that the fiscal transfers in the United States and Germany provide the states with incentives to increase spending and are not incentive compatible. Designing an incentive compatible fiscal transfer system would

Table 2.12: Debt and transfers (West German states)

Dependent variable: Net transfers-to-GDP ratio				
	Annual data		5-year averages	
	(1)	(2)	(3)	(4)
Lagged debt-to-GDP ratio	0.039**	0.031**	0.044	0.014
	(0.015)	(0.010)	(0.028)	(0.032)
Lagged tax power	-0.047***	-0.002	-0.044**	0.033
	(0.009)	(0.012)	(0.017)	(0.025)
Dummy 1994-2004 (Saarland, Bremen)	0.032***	0.011***	0.022***	0.025***
	(0.005)	(0.001)	(0.004)	(0.002)
Lagged dependent variable		0.662***		0.450***
		(0.059)		(0.059)
Fixed time effects	Yes	Yes	Yes	Yes
Fixed state effects	Yes	Yes	Yes	Yes
R^2 (overall)	0.915	0.957	0.886	0.933
Number of states	10	10	10	10
Number of observations	360	360	60	60

Notes: OLS with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors) in parentheses; *** , ** and * denote significance at the 1%, 5% and 10% levels. The panel is balanced with samples for the 10 West German states covering the period 1975-2010.

require that politicians cut transfers. Politicians in states which receive a great amount of fiscal transfers are however not likely to re-design the transfer system. Politicians at the federal level fear to lose votes by cutting transfers, especially by voters from states which receive a great amount of transfers. In Germany, politicians from donating states such as Bavaria and Hesse wish to reform the fiscal equalization scheme, but do not have political majorities.

2.5.3 Robustness Tests

Public debt may have a non-linear influence on the primary surplus.[15] We account for possible nonlinearities and thus distinguish between reactions of the primary surplus to debt at different levels of debt by including a linear, a quadratic and a cubic term of the debt-to-GDP ratio in the fiscal reaction function. For the U.S. states the quadratic and cubic terms of the lagged debt-to-GDP ratio do not turn out to be statistically significant neither when we use the primary surplus 1 nor when we use the primary surplus 2 as the dependent variable. For the West German states the coefficient of the quadratic term of the lagged debt-to-GDP ratio has a positive sign and is statistically significant at the 10%-level and the coefficient of the cubic terms of the debt-to-GDP ratio has a negative sign and is statistically significant at the 10%-level when we use the primary surplus 1 as the dependent variable. The marginal response of the primary surplus to changes in the debt-to-GDP ratio seems to increase when the debt-to-GDP ratio increases. At very high debt-to-GDP ratios (about more than 48%), however, the influence on the primary surplus on lagged debt decreased.[16] Using the primary surplus 2 the quadratic and cubic terms of the debt-to-GDP ratio do not turn out to be statistically significant.

We estimate the models including municipal budgets. Local governments are creations of

[15]Bohn (1998) finds an increasing marginal response of the primary surplus to changes in the debt-to-GDP ratio for the U.S. federal government. Ghosh et al. (2013) find a cubic reaction function of the primary surplus-to-GDP ratio in period t to the debt-to-GDP ratio in period $t-1$ in a panel of 23 advanced economies over the period 1970-2007. Checherita-Westphal and Rother (2012) find a quadratic reaction function of economic growth to the debt-to-GDP ratio in a panel of 12 euro area countries over the period 1970-2008.

[16]In our sample we have only six observations with debt-to-GDP ratios above 48%.

the states and bondholders and rating agencies tend to hold states responsible for troubled municipalities. Municipal debts in the United States are substantial and greater than state debts in many cases. The average debt-to-GDP ratio of the U.S. state and local governments in our sample is 15.0%. The average debt-to-GDP ratio of the West German state including municipalities in our sample is 24.4%. For the U.S. state and municipal governments the lagged debt-to-GDP ratio had a positive influence on the primary surplus 1. The coefficient is about 0.03 when we do not include the lagged dependent variable and about 0.02 when we include the lagged dependent variable. Using the primary surplus 2 as dependent variable the coefficient of the lagged debt-to-GDP ratio is significant at the 10%-level in three out of our 12 specifications and takes a value of about 0.01. The lagged-debt-to-GDP ratio had a positive and statistically significant influence at the 10%-level on the net transfer-to-GDP ratio when we include fixed time effects and fixed period effects. When we include the explanatory variables of the fiscal reaction function the estimated coefficient of the lagged debt-to-GDP ratio does not turn out to be statistically significant at conventional levels. When we include the explanatory variables that are likely to influence transfers in the United States the estimated coefficient of the lagged debt-to-GDP ratio is statistically significant at the 10%-level when we include the lagged dependent variable. Inferences regarding our results for the West German state governments do not change when we include municipal budgets.

Fiscal institutions may influence the primary surpluses in the U.S. states.[17] Because we have included fixed state effects in our baseline model, we did not include variables describing fiscal institutions which do not vary over time. We estimate the fiscal reaction function for the U.S. states without fixed state effects and included variables measuring fiscal institutions (Poterba and Rueben 1999). We include a balanced-budget-rule dummy variable which assumes the value one for states which may not carry over a deficit into the next fiscal year or biennium, and the value zero for states which may carry over a deficit.[18] We also consider whether a state has a tax or expenditure limit (TEL).[19] TELs limit the

[17]For a survey on fiscal institutions in the U.S. states, see Besley and Case (2003).

[18]We use data on balanced budget rules from the Advisory Commission on Intergovernmental Relations (1987) and the National Conference of State Legislatures (2010a).

[19]We use data on tax and expenditure limits from Poterba and Rueben (1999) and the National Conference of State Legislatures (2010b).

growth rate of expenditures or revenues on indicators such as the growth rate of personal income (Poterba and Rueben 1999). Including the variables measuring fiscal institutions does not change the inferences regarding the debt-to-GDP ratio.

In Germany, federal law determines social security expenditures to a large extent (Seitz 2000). We compute the primary surplus 1 (standard definition) and the primary surplus 2 (excluding transfers) excluding social security expenditures. Inferences regarding the lagged debt-to-GDP-ratio do not change.

We test whether inferences change when including/excluding individual states (jackknife tests). When we exclude New Mexico, the estimated coefficient of the lagged debt-to-GDP ratio turns out to be statistically significant at the 10%-level in columns (2) and (3) and at the 5%-level in columns (4) to (6) in Table 2.5. When we exclude Montana, the estimated coefficient of the lagged debt-to-GDP ratio turns out to be statistically significant at the 10%-level in columns (4) to (6) in Table 2.5 and column (1) in Table 2.6. When we exclude Bremen, the estimated coefficient of the lagged debt-to-GDP ratio does not turn out to be statistically significant at conventional levels in columns (4) to (6) in Table 2.10. When we exclude Bremen or Saarland, the estimated coefficient of the lagged debt-to-GDP ratio does not turn out to be statistically significant at conventional levels in columns (1) and (2) in Table 2.12.

2.6 Conclusion

We test whether the fiscal behavior of the U.S. and German states is sustainable and show that the results of standard fiscal sustainability tests depend on whether fiscal transfers are taken into account. In particular, we examine whether the debt-to-GDP-ratio had a positive influence on the primary surplus (*Bohn-model*) and distinguish between different measures of the primary surplus. If fiscal transfers are not included in the primary surplus, the test results do not indicate that the U.S. and German state governments pursued sustainable fiscal policies. We also show that fiscal transfers were positively related with debt, indicating that intergovernmental transfers have implicitly subsidized debts in the states. Our findings are compatible with findings of empirical studies employing vector error-

correction models to investigate how fiscal transfers influence fiscal performance. Buettner and Wildasin (2006) and Buettner (2009) use data for German and U.S. municipalities and show that fiscal transfers give rise to fiscal adjustment.

From our analysis we derive policy implications which would also apply to the design of a European fiscal union: fiscal transfers schemes need to be incentive compatible and politically sustainable. It appears that transfers sugarcoat the budgets of governments that do not attempt to keep their budgets balanced. Fiscal transfers therefore provide perverse incentives. Buettner (2006) arrives at the result that German municipalities reduce their tax rates if they receive more transfers. Beetsma and Bovenberg (2001) show that a monetary union should not come along with a fiscal union in which international transfers stabilize country-specific shocks when the fiscal discipline among the member states is low.

The German fiscal equalization scheme in particular reduces the incentives of the states to increase their own tax revenues. When the tax revenue increases in a state that receives fiscal transfers, the transfers received decrease. By contrast, when the tax revenue increases in a state that pays fiscal transfers, the transfers paid increase. Baretti, Huber, and Lichtblau (2001) portray three examples on how the German fiscal equalization scheme reduces the incentives of the states to increase their own tax revenues. First, empirical evidence shows that the fiscal equalization scheme reduces the states' tax enforcement efficiency (see also Baretti, Huber, and Lichtblau 2002, Herwartz and Theilen 2014). Second, the fiscal transfers constrain government activities to enhance economic growth (e.g. infrastructure investments). The state has to bear the cost of the investment but the additional tax revenues resulting from higher economic growth are absorbed by the equalization scheme. Third, fiscal equalization schemes distort the states' incentives to attract companies to increase tax revenues. An important issue for future research is to design incentive compatible fiscal transfer systems.

When fiscal policies of federal states are shown to be only sustainable when fiscal transfers are assumed to be also forthcoming in the future, the question arises to which extent governments paying fiscal transfers are willing and able to proceed paying. The issue then is not whether fiscal policy is sustainable but whether fiscal transfer schemes are politically sustainable.

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Chapter 3

Do Politicians Gratify Core Supporters? Evidence from a Discretionary Grant Program

Abstract*

We investigate whether politicians award intergovernmental grants to core supporters. Our new dataset contains information on discretionary project grants from a German state government to municipalities over the period 2008-2011. The results show that discretionary grants were awarded to municipalities with many core supporters of the incumbent state government. Discretionary grants per capita increased by about 1.4 percent when the vote share of the incumbent party in the state election increased by one percentage point. We propose to trim discretionary project grants to the benefit of formula-based grants.

*The chapter is based on joint work with Björn Kauder and Niklas Potrafke.

3.1 Introduction

Politicians are likely to influence intergovernmental grants for many reasons. It is conceivable that politicians influence the distribution of grants to favor their home towns or to favor municipalities where a politician from their own party is in office (party alignment). To increase election prospects, federal and state politicians may award grants to municipalities with many swing voters. Politicians may, however, also direct grants to their core supporters by favoring municipalities where the vote share of the own party is large. The model of Cox and McCubbins (1986) describes that politicians award benefits to core supporters when both the expected vote share and uncertainty enter the politicians' calculus. An intriguing question therefore is whether redistribution to core constituencies is actually transpired by grants in municipalities. The extent to which politicians influence grants depends on the policy instruments available to the politician. It is much more difficult to influence grant schemes that follow established formulae than to use discretionary grants. Naturally, for the purpose of an empirical analysis, "one would like to have a grant program over which the incumbent government has full discretionary power" (Johansson 2003, p. 889). Data on the German state Rhineland-Palatinate allows us to investigate the distribution of discretionary project grants directed by the state government to the municipalities.

Grant distribution by the government in Rhineland-Palatinate was a widely discussed issue in the media. In 2007, for example, the municipality Bad Bergzabern decided to support a private investor financially to convert an outbuilding of a historic castle into a (privately owned) hotel – justified with the negative externalities of a ruinous building next to a landmark in the historic center of the city. For that purpose of urban renewal, the municipality later received discretionary grants worth 1.875 million euros (251 euros per capita). It leaked out that the administration office to which the state government delegated the handling of grant applications had serious misgivings about the economic efficiency of the investment. Being subject to the ministries' directives, however, the administration eventually promoted the grant. In Rhineland-Palatinate the state government has the greatest leeway in awarding grants for urban renewal of all German states (Rechnungshof Rheinland-Pfalz 2011).

Investigating how grants were distributed in the state Rhineland-Palatinate is a worthwhile endeavor for two more reasons: firstly, the state consists of more municipalities (2,306) than any other German state, which allows exploiting wide-scale variation. Secondly, the incumbent party (Social Democratic Party – SPD) has been in office since 1991, which means that the government has networks and a sound knowledge of distributing grants. By exploiting a new dataset, we examine whether municipalities' voting behavior in state elections influenced discretionary grants from the state level to the municipalities in Rhineland-Palatinate. Our results show that grants were awarded especially to municipalities with many core supporters of the state incumbent party.

3.2 Prior Studies and Our Hypothesis

Experts investigate whether electoral and other political motives influence how politicians distribute intergovernmental grants.[1] The model of Weingast et al. (1981) describes that, when deciding on projects to be directed to individual electoral districts, political representatives favor projects in their own district. Such pork-barrel spending gives rise to inefficiencies.[2] When the same party controls a jurisdiction's legislature and the legislature of the next-higher level of government (partisan alignment), the jurisdiction may also receive more grants (see, e.g., Sengupta 2011).[3]

[1]Intergovernmental grants may also be influenced by direct democracy (Feld and Schaltegger 2005), voter turnout (Martin 2003), lobbying by local politicians (Borck and Owings 2003), the electoral geography of districts (Chen 2010), and legislative representation (Knight 2008). See Curto-Grau et al. (2012) on the distribution of spending in semi-democratic Spain. Grants may in turn "mobilize" voters and thus give rise to higher voter turnout (Ansolabehere and Snyder 2006, Vicente 2014).

[2]For studies investigating a home-district or home-town bias, see Jennes and Persyn (2015) for Belgium, Stratmann and Baur (2002) and Maaser and Stratmann (2013) for Germany, Sjahrir et al. (2015) for Indonesia, Carozzi and Repetto (2014) for Italy, Horiuchi and Saito (2003) for Japan, Fiva and Halse (2014) for Norway, Anderson and Tollison (1991), Ansolabehere et al. (2002), Atlas et al. (1995), and Knight (2002 and 2004) for the United States, and Hodler and Raschky (2014) for developing countries.

[3]On the effects of partisan alignment, see Worthington and Dollery (1998) for Australia, Brollo and Nannicini (2012) for Brazil, Cadot et al. (2006) for France, Kemmerling and Stephan (2002) for Germany, Arulampalam et al. (2009) for India, Bracco et al. (2015) for Italy, Veiga and Pinho (2007) for Portugal, Curto-Grau et al. (2014), Solé-Ollé (2013), and Solé-Ollé and Sorribas-Navarro (2008) for Spain, and Albouy (2013), Geys and Vermeir (2014), Gist and Hill (1984), Grossman (1994), and Levitt and Snyder (1995) for the United States.

An issue in the extant literature is whether politicians should focus on core supporters or on swing voters to maximize election prospects.[4] In Lindbeck and Weibull's (1987, 1993) and Dixit and Londregan's (1996, 1998) "swing-voter model", two parties (or two blocs of parties) maximize their vote shares by tactically redistributing grants to election districts with many swing voters, i.e. voters that are indifferent between the two parties ("cut-point voters"), to win the election. Because the number of swing voters is difficult to measure, empirical studies often use the closeness of an election as a proxy for the number of swing voters, assuming a symmetric and single-peaked distribution of preferences. Many empirical studies corroborate the swing-voter model.[5]

In Cox and McCubbins' (1986) "core-supporter model", by contrast, politicians can invest in support groups, in swing groups, and in opposition groups. Investing in support groups is less risky than investing in swing groups because politicians may well assess how their core supporters react (to grants), whereas swing voters are unattached to politicians by definition. Risk-averse politicians will thus – in terms of an expected-vote calculus – "tend to over-invest in their closest supporters" (distribute grants primarily to constituencies with many core supporters), "just as risk-averse investors will tend to over-invest in low-risk securities" (p. 385). Empirical studies typically use the vote share of a party as a proxy for the number of core supporters and find mixed evidence. U.S. congressional districts where the number of voters of the incumbent federal government was high obtained more federal domestic assistance program grants (Levitt and Snyder 1995) and a larger share of discretionary project-grant funding (Stratmann and Wojnilower 2015). In Québec, electoral districts with many core supporters of the incumbent provincial government received more spending on roads (Joanis 2011). In France, transportation infrastructure investments were shown to be higher in districts with a large vote share of the incumbent national government (Cadot et al. 2006). Studies on local investment programs in Swedish municipalities and infrastructure investments in Spanish regions did not, however, find evidence that governments gratify core supporters (Dahlberg and Johansson 2002, Castells

[4]On the personality traits of core supporters and swing voters, see Aidt and Rauh (2015).

[5]See, e.g., Case (2001) for Albania, Litschig (2012) for Brasil, Cadot et al. (2006) for France, Banful (2011) for Ghana, Arulampalam et al. (2009) for India, Helland and Sørensen (2009) for Norway, Veiga and Pinho (2007) for Portugal, Solé-Ollé (2013) for Spain, Johansson (2003) for Sweden, and Wright (1974) for the United States.

and Solé-Ollé 2005). Following the related studies, we examine whether the state government in Rhineland-Palatinate distributed discretionary grants to municipalities with many core supporters. Were grants per capita higher in municipalities where the state's incumbent party had a large share of the votes? We test this hypothesis based on state election outcomes.

3.3 Institutional Background

3.3.1 The State and Municipalities of Rhineland-Palatinate

The state Rhineland-Palatinate is an intriguing subject for studying the distribution of grants for three reasons. Firstly, the state government is in charge of a discretionary grant system that distributes money from the state level to the municipalities. Secondly, Rhineland-Palatinate is the state with the largest number of municipalities (2,306) in Germany, which differ in several characteristics such as population (varying from 11 to 197,640 inhabitants), fiscal capacity, and political preferences. Thirdly, the state incumbent party has been in power since 1991. An issue therefore is whether the incumbent party has institutionalized the grant system for gratifying core constituencies.

The municipalities are responsible for many policy fields such as individual parts of social security, schooling, housing, cultural policy, and refuse management. About a third of the average budget of municipalities in Rhineland-Palatinate stems from grants from the state level. The remaining parts of the average budget include tax revenues, other revenues, and grants from other levels than the state level. The local business tax and the property taxes are the most important autonomous taxes, while the municipalities also obtain shares from the (federal) income tax and the (federal) sales tax.

There are four types of municipalities, which differ in the extent of their policy autonomy: 12 county-independent cities ("kreisfreie Städte"), 8 large cities that are not county-independent ("große kreisangehörige Städte"), 28 municipalities of intermediate size ("ver-

bandsfreie Gemeinden"), and 2,258 small municipalities ("Ortsgemeinden").[6] Small municipalities form associations ("Verbandsgemeinden"), which are responsible for individual policy fields concerning several small municipalities.

3.3.2 The Voting System

State elections take place every five years. Voters cast two votes in a personalized proportional representation system. The first vote determines which candidate is to obtain the direct mandate in one of the 51 constituencies with a relative majority. The second vote determines how many seats the individual parties receive in parliament. Each party that received at least 5 percent of the second votes obtains a number of the 101 seats in the parliament that corresponds to the party's second vote share.[7] Candidates voted into the parliament with the first vote (direct mandate) receive their seats first. Candidates from party lists receive the remaining seats. When the number of direct mandates exceeds the party's second vote share, the party obtains excess mandates. The other parties then obtain equalizing mandates to balance the power relations, which can enlarge the parliament.

3.3.3 The Political Party Landscape

Two major political parties characterize the political spectrum in Rhineland-Palatinate: the Social Democratic Party (SPD) and the Christian Democratic Union (CDU). All state prime ministers until 1991 were members of the CDU, while all state prime ministers as of 1991 were members of the SPD. The much smaller Free Democratic Party (FDP) played an important role as coalition partner for both SPD and CDU. In our legislative period of interest (2006-2011), the SPD formed a government without a coalition partner based on a majority of 52 percent of seats in parliament after a landslide victory in the 2006 state election. In the 2011 state election, the SPD lost many votes – maybe because the grant

[6]County-independent cities have additional responsibilities as compared to cities that are part of a county. On city size and the demand for local public goods see Buettner and Holm-Hadulla (2013).

[7]Candidates obtain a direct mandate even if their party failed to reach the 5 percent clause.

distribution was widely discussed in the media (see introduction) – and has since then for the first time formed a coalition with the Greens (Bündnis 90/Die Grünen).

3.3.4 The Grant System

The municipalities in Rhineland-Palatinate obtain two kinds of grants from the state-run fiscal equalization scheme: discretionary project grants and formula-based equalizing grants. The discretionary and earmarked project grants ("Zweckzuweisungen") include grants for urban renewal, investments in common welfare (investments that do not receive funding from any other grant program), culture, sport and tourism, schooling, rural renewal, infrastructure investments, industrial and commercial areas, and water and waste management.[8] Table 3.1 describes the project grants in greater detail. All types of municipalities (and also counties and associations of municipalities) are eligible to apply for project grants; some types of project grants, however, are directed only to individual types of municipalities. Figure 3.1 shows the individual project grants as average shares of the total volume of project grants for the years 2008-2011. Grants for urban renewal, investments in common welfare, and culture have the largest shares of total project grants. The state government has a strong discretionary power in distributing project grants. To receive a project grant, a municipality applies to the state ministry in charge. An administration office ("Aufsichts- und Dienstleistungsdirektion") – headed until 2011 by a former state politician from the incumbent party – then considers the application in terms of the formal requirements, necessity, and economic efficiency of the project. The ministry finally decides on whether to approve the grant – in certain cases without consulting the administration office. Usually project grants are matching grants, making co-financing necessary for municipalities to obtain a grant.

[8]The municipalities also obtain other project grants that we do not include: grants for daycare facilities for children (the government does not have much discretionary power on distributing these grants) and grants for hospitals and grants for the state capital for investments in common welfare (data are not available).

TABLE 3.1: Description of project grants

Areas elegible for funding	Description
Urban renewal	Urban renewal
Investments in common welfare	Investments in common welfare that do not receive funding from any other grant program
Culture	Theaters, orchestras, culture projects, conservatories, libraries, museums, cultural monuments
Sports and tourism	Sport, leisure and tourism facilities; health resorts
Schooling	School building and initial equipment
Rural renewal	Rural renewal
Infrastructure investments	Construction, reconstruction, and renovation of streets, bridges, parking areas, and rail tracks; public transport
Industrial and commercial areas	Development and renovation of industrial and commercial areas
Water and waste management	Water supply and distribution, waste management, electricity industry, energy efficiency, energy supply, soil protection
No discretionary power or no data available	
Daycare facilities for children	Personnel costs of daycare facilities for children
Hospitals	Hospitals
Investments in common welfare (state capital)	Investments in common welfare (state capital)

NOTE: Composition according to §18 Landesfinanzausgleichsgesetz Rheinland-Pfalz.

The non-earmarked equalizing grants ("Schlüsselzuweisungen B2") are formula-based and support municipalities with a fiscal need that exceeds their fiscal capacity. Six indicators determine the fiscal need. Population density enters fiscal need negatively, whereas the other five indicators enter fiscal need positively: population, social security expenditure, number of pupils, number of stationing forces, and the municipality's function as a central place providing public goods for adjacent municipalities. The fiscal capacity consists of

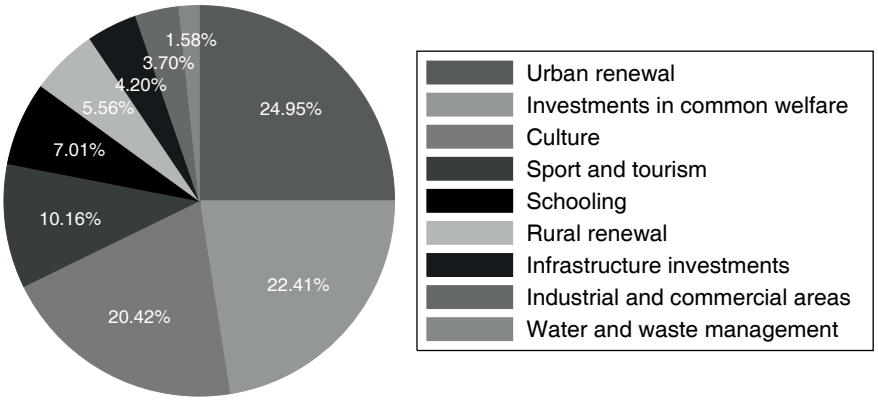

Fig. 3.1: Average shares of discretionary project grants, 2008-2011

Sources: Statistical Office Rhineland-Palatinate, own illustration.

normalized tax revenues and includes a grant that guarantees a minimum level of fiscal capacity.[9] The equalization system balances 50 percent of the difference between fiscal need and a weighted fiscal capacity (if positive; a detailed description is provided in the appendix). The state government is hardly able to manipulate the equalizing grants because detailed rules describe how grants are distributed. All types of municipalities and also counties receive equalizing grants. Small municipalities do not directly receive equalizing grants, as grants flow to associations of municipalities, which, however, have to pass them through to small municipalities that serve as a central place or have stationing forces.

There are also other grants (that we do not include because they are numerically of minor importance): a per-capita lump-sum grant, formula-based grants for specific burdens such as the transport of school pupils, and a non-earmarked investment grant (the municipalities

[9]Tax revenues include property taxes, the local business tax (both normalized with standardized tax rates), the share of the federal income tax, the share of the federal sales tax, and compensatory payments. See Bucovetsky and Smart (2006), Buettner (2006 and 2009), Buettner and Wildasin (2006), and Smart (2007) on how fiscal equalization grants influence tax policy and fiscal adjustment.

do not have to prove whether they use this investment grant – which is computed in the same way as equalizing grants – for investment purposes).

3.4 Empirical Analysis

3.4.1 Data and Descriptive Statistics

We use data on discretionary project grants for the years 2008-2011 compiled by the Ministry of the Interior, Sport, and Infrastructure Rhineland-Palatinate for the first time in 2012. Data on formula-based equalizing grants (2008-2011) and on other variables (2007-2010) come from the Statistical Office Rhineland-Palatinate. We use a time lag of one year between grants and explanatory variables because the distribution of grants generally depends on the fiscal variables of the previous year. We use election results from the state election administrator, which are available on the municipality level. We exclude outliers from our analysis: 14 municipalities that had negative average project grants because they had to repay grants and four municipalities that had project grants of above 800 euros per capita. For one municipality with only 11 inhabitants the election results are not available due to election secrecy. The sample includes 2,287 municipalities. Table 3.2 presents the description of our variables. The descriptive statistics in Table 3.3 show that project grants per capita were 29.81 euros on average, whereas equalizing grants per capita were only 6.53 euros (the large discrepancy arises because we consider grants on the municipal level, while a large share of equalizing grants flows to counties and associations of municipalities that we do not consider in our analysis).

Figure 3.2 illustrates the second vote share of the incumbent SPD in the 2006 state election in the individual municipalities. There are heartlands of the SPD all over Rhineland-Palatinate, except in the rural northwest of the state. Figure 3.3 shows quite some variation in the distribution of project grants per capita (2008-2011), but no distinct regional pattern. Figure 3.4 illustrates that equalizing grants per capita (2008-2011) were large in the northwest and the southwest of the state, and along the river Rhine.

Table 3.2: Description of variables

Variable	Description
Project grants	Project grants (per capita) in euros
Equalizing grants	Equalizing grants (per capita) in euros
Vote share incumbent	Vote share of the incumbent SPD in the state election (in %)
Vote share incumbent, local	Vote share of the SPD in local council elections (in %)
Mayor	Dummy variable equals one for mayors of the SPD
Vote share CDU/ FDP/ Greens	Vote share of the CDU, FDP or Greens in the state election (in %)
Vote share difference	Absolute vote share difference between the incumbent SPD and the other main parties altogether (CDU, FDP, Greens) in the state election (in pp)
Vote share difference, local	Absolute vote share difference between the SPD and the other main parties altogether (CDU, FDP, Greens) in local council elections (in pp)
Incumbent representatives	Number of the state incumbent party's members of parliament born in the municipality divided by the total population of that municipality (in %)
Fiscal capacity	Tax revenues of the municipality (per capita) in euros: property taxes, local business tax (both normalized with standardized tax rates), share of federal income tax, share of federal sales tax, compensatory payments; includes a grant that guarantees a minimum level of fiscal capacity
Population	Number of inhabitants
Population density	Number of inhabitants per square kilometer
Social expenditure	Social security expenditure (per capita) in euros
Share of pupils	Share of pupils in the total population (in %); number of pupils weighted with 0.5 for regular schools and 1.5 for special schools
Stationing forces	Ratio of foreign stationing forces' relatives and non-barracked soldiers to the population (in %)
Central place	Ratio of the weighted population of the surrounding area of a central place to the population of the central place (in %)
Municipality 1	Dummy variable equals one for small municipalities
Municipality 2	Dummy variable equals one for municipalities of intermediate size
Municipality 3	Dummy variable equals one for large cities that are not county-independent
Municipality 4	Dummy variable equals one for county-independent cities
Share of young population	Share of inhabitants younger than 18 (in %)
Share of old population	Share of inhabitants older than 59 (in %)
Share of unemployed	Share of unemployed in the total population (in %)
Region	Dummy variables equal one for municipalities in the individual region (East, West, Center, Palatinate; reference category: Rhine-Hesse)

Sources: Ministry of the Interior, Sport, and Infrastructure Rhineland-Palatinate (Project grants), Statistical Office Rhineland-Palatinate (Equalizing grants, Fiscal capacity, Population, Area, Social expenditure, Pupils, Stationing forces, Central place, Municipality 1-4), State election administrator Rhineland-Palatinate (Vote shares, Vote share differences), own calculation (Mayor, Incumbent representatives, Region), Census (Share of young and old population), German employment office (Unemployment).

TABLE 3.3: Descriptive statistics

Variable	Mean	Std. Dev.	Min.	Max.	Obs.
Project grants (per capita)	29.81	57.01	0	710.42	2,287
Equalizing grants (per capita)	6.53	20.86	0	270.08	2,287
Vote share incumbent (in %)	45.21	10.50	0	76.10	2,287
Vote share incumbent (in %), local	10.34	16.66	0	70.40	2,287
Mayor	0.30	0.44	0	1	2,287
Vote share CDU (in %)	33.62	11.99	3.20	100.00	2,287
Vote share FDP (in %)	8.67	4.30	0	45.50	2,287
Vote share Greens (in %)	3.86	2.40	0	20.90	2,287
Vote share difference (in pp)	17.61	13.24	0	100.00	2,287
Vote share difference (in pp), local	9.14	15.15	0	77.85	2,287
Incumbent representatives (in %)	0.00	0.00	0	0.16	2,287
Fiscal capacity (per capita)	620.27	235.20	559.74	6,182.16	2,287
Population	1,766.73	7,562.42	15.25	19,6317.50	2,287
Population density	150.19	163.63	7.16	2,048.87	2,287
Social expenditure (per capita)	1.50	21.00	0	361.67	2,287
Share of pupils (in %)	0.04	0.48	0	7.50	2,287
Stationing forces (in %)	1.42	7.61	0	237.38	2,287
Central place (in %)	1.20	4.26	0	72.30	2,287
Municipality 1	0.98	0.14	0	1	2,287
Municipality 2	0.01	0.11	0	1	2,287
Municipality 3	0.00	0.06	0	1	2,287
Municipality 4	0.01	0.07	0	1	2,287
Share of young population (in %)	17.65	3.08	0	33.79	2,287
Share of old population (in %)	25.20	4.44	5.09	52.91	2,287
Share of unemployed (in %)	2.22	0.91	0	9.10	2,287
East	0.35	0.48	0	1	2,287
West	0.22	0.42	0	1	2,287
Center	0.15	0.36	0	1	2,287
Palatinate	0.22	0.41	0	1	2,287
Rhine-Hesse	0.06	0.24	0	1	2,287

NOTES: Grants, fiscal capacity, and social expenditure measured in euros. The mean values of social expenditure and share of pupils are rather low, because these variables assume the value zero for individual types of municipalities that are not responsible for social expenditure or pupils. The value of stationing forces exceeds 100% when there are more stationing forces than inhabitants in a municipality (stationing forces are not considered as part of the population).

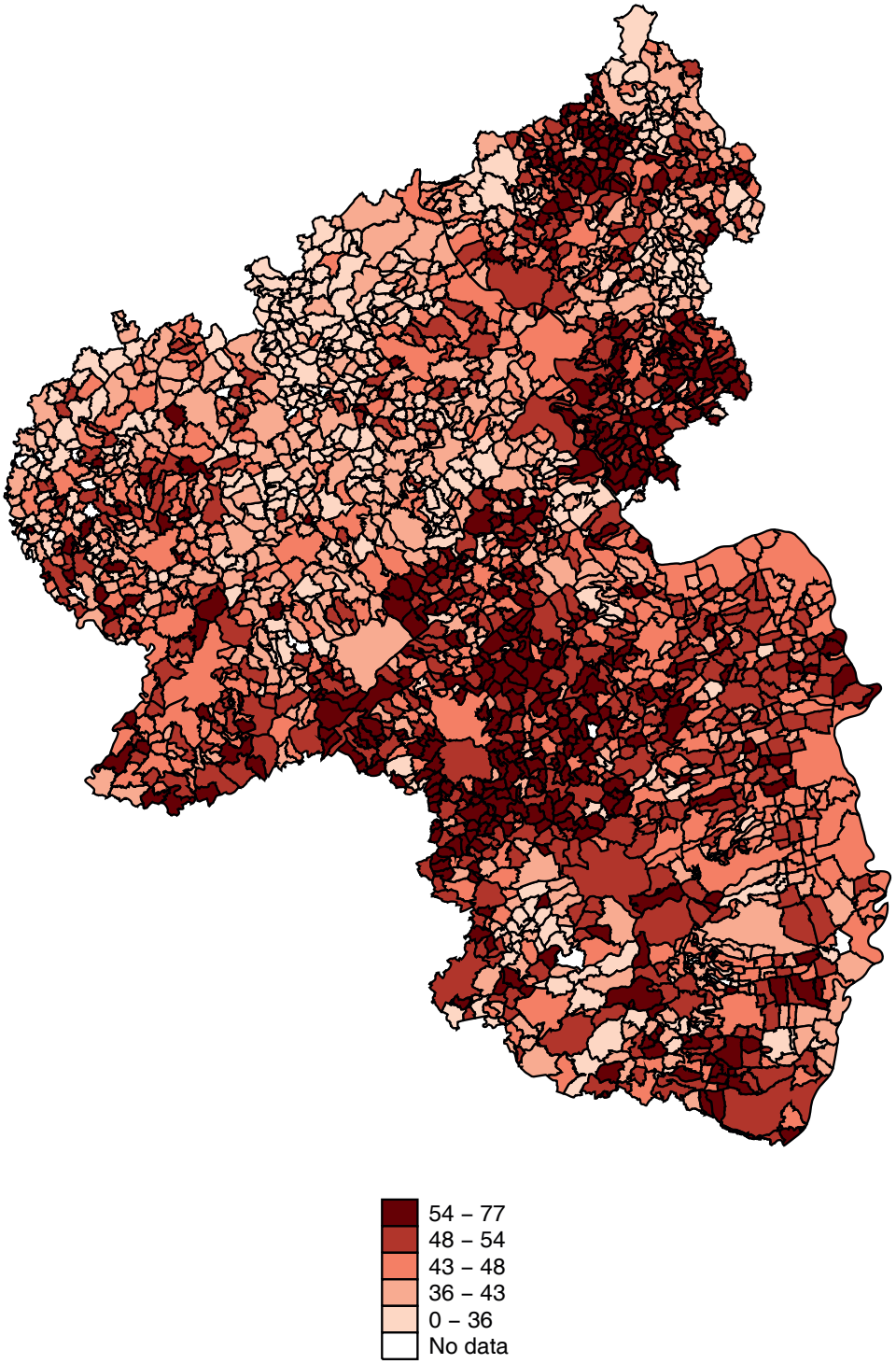

Fig. 3.2: Vote share of the incumbent SPD in the 2006 state election (in percent)

Sources: State election administrator, Statistical Office Rhineland-Palatinate, own illustration.

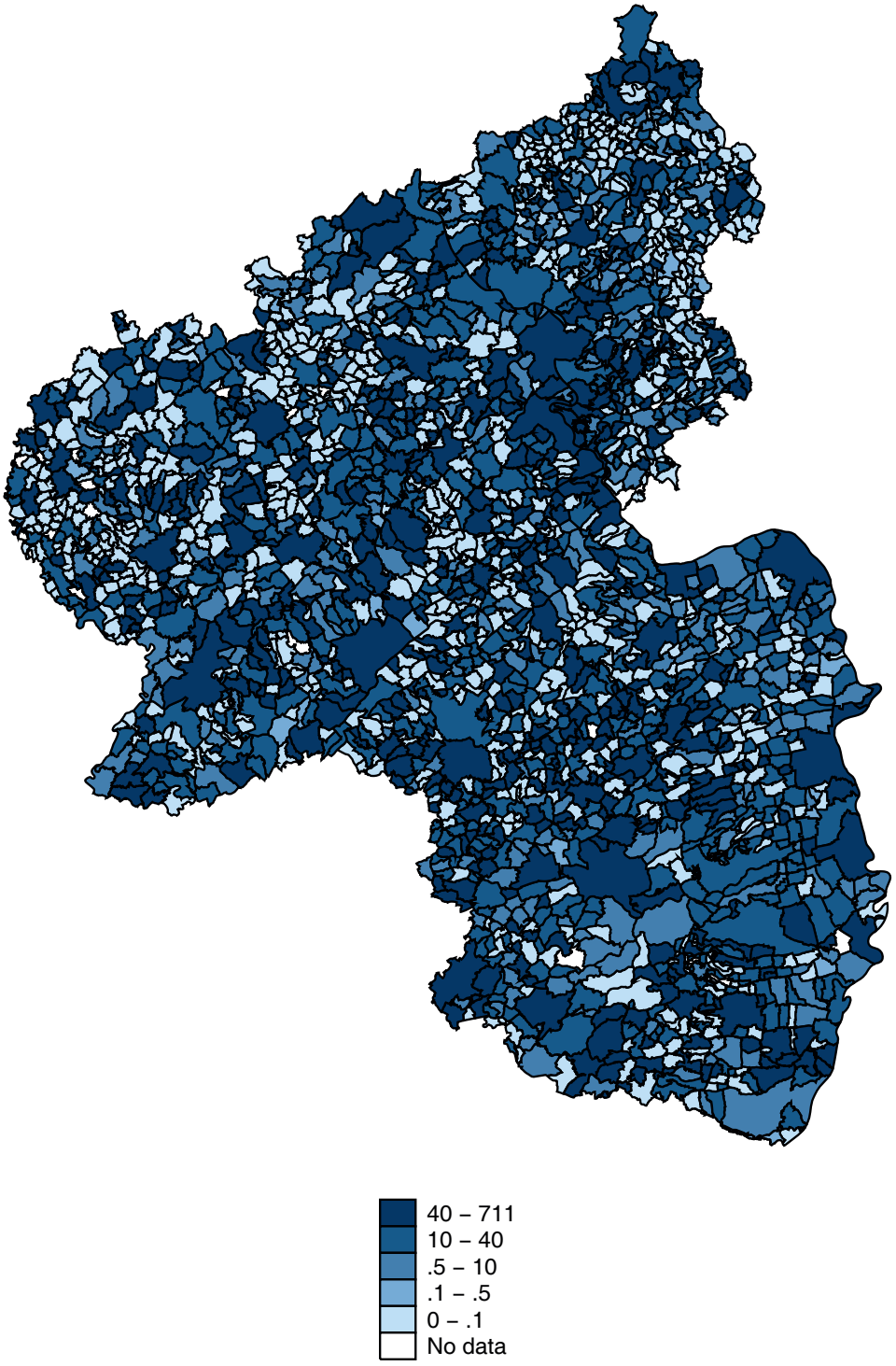

FIG. 3.3: Regional distribution of discretionary project grants (per capita), 2008-2011

NOTE: Grants measured in euros. SOURCES: Ministry of the Interior, Sport, and Infrastructure Rhineland-Palatinate, own illustration.

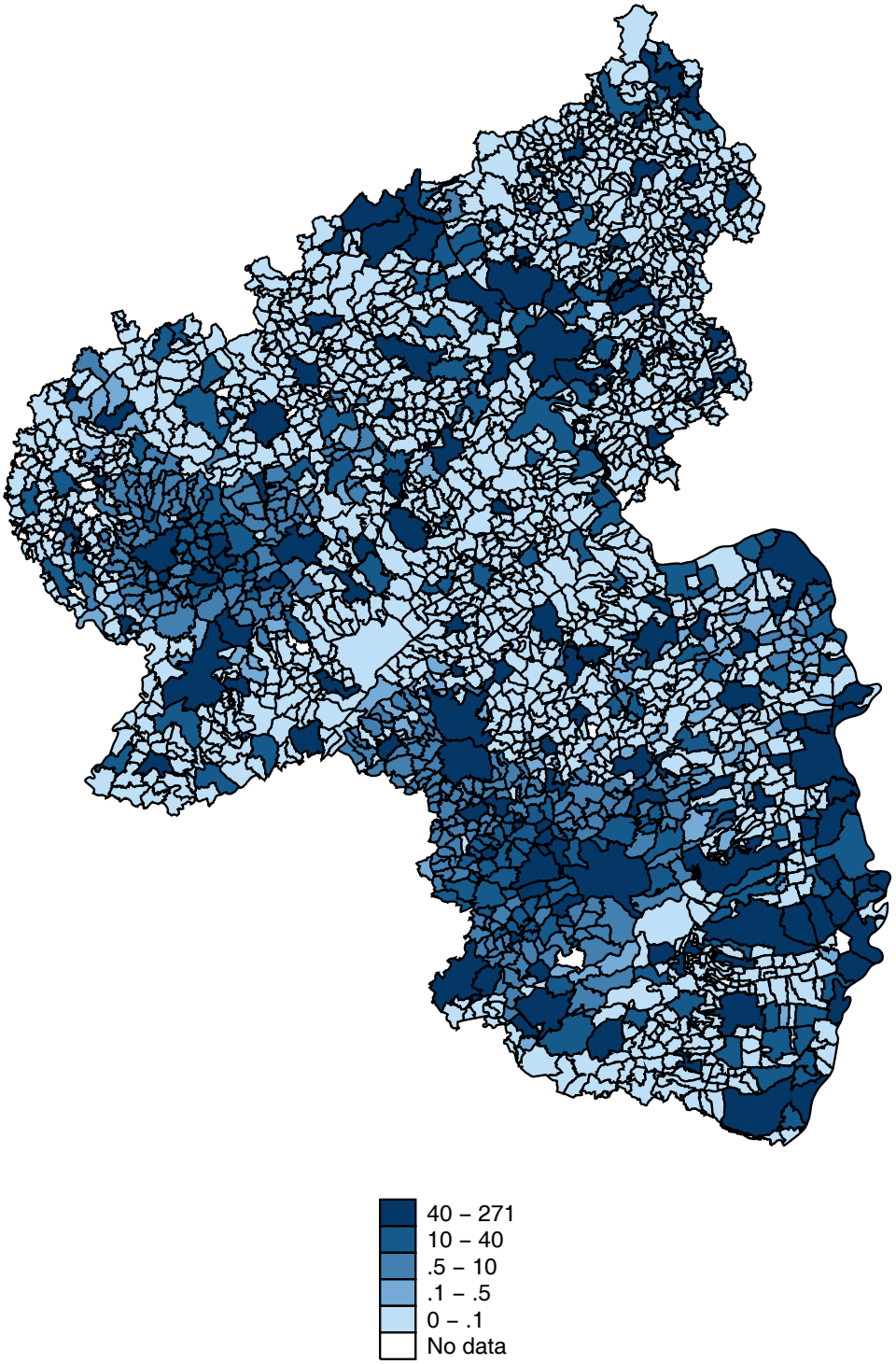

Fig. 3.4: Regional distribution of formula-based equalizing grants (per capita), 2008-2011

Note: Grants measured in euros. Sources: Statistical Office Rhineland-Palatinate, own illustration.

Figure 3.5 shows the average discretionary project grants per capita (2008-2011) and the vote share of the incumbent SPD in the 2006 state election. The correlation coefficient between the project grants per capita and the incumbent vote share is 0.05. When we consider the average equalizing grants per capita (2008-2011) and the vote share of the incumbent SPD in the 2006 state election (Figure 3.6), the correlation coefficient is -0.01.

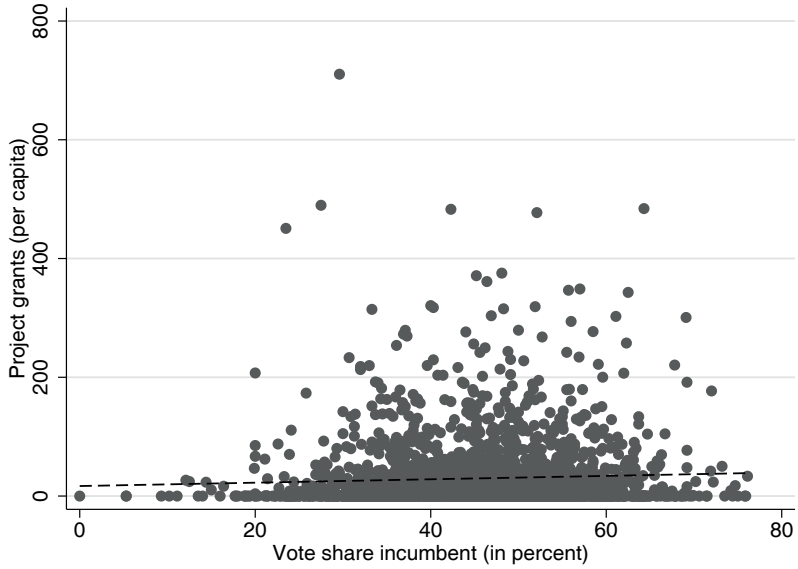

FIG. 3.5: Discretionary project grants 2008-2011 (per capita) and vote share of the incumbent SPD in the 2006 state election (in percent)

NOTE: Grants measured in euros. SOURCES: State election administrator, Ministry of the Interior, Sport, and Infrastructure Rhineland-Palatinate, own illustration.

To arrive at more precise inferences about the nexus between incumbent vote share and grants we follow the approach of Boone et al. (2014, pp. 404-407). The left part of Figure 3.7 shows the result of a non-parametric regression of discretionary project grants per capita on the vote share of the incumbent party, using kernel-weighted local polynomial smoothing; the right part shows a semi-parametric regression including all our (parametric) control variables. The increasing function in both panels suggests that the state government directed discretionary grants to core supporters. By contrast, there is no graphical evidence supporting the swing-voter model. In Figure 3.8 we turn to formula-based equalizing

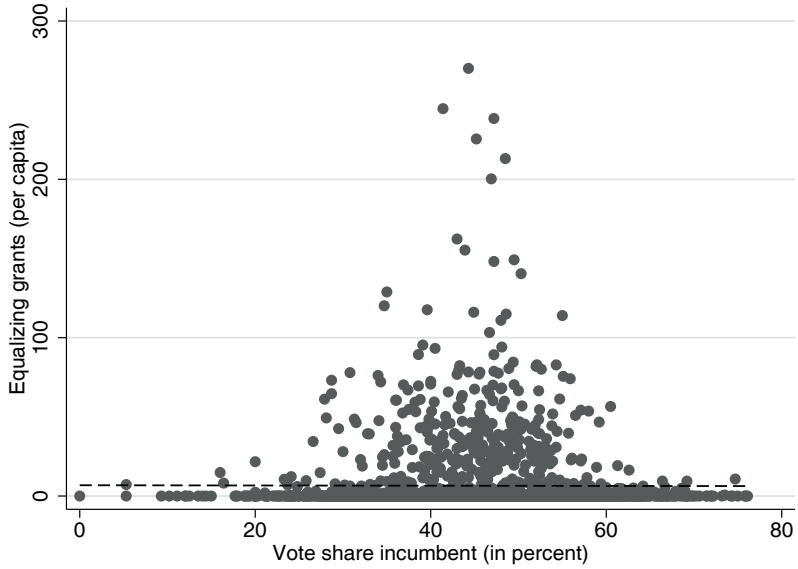

Fig. 3.6: Formula based equalizing grants 2008-2011 (per capita) and vote share of the incumbent SPD in the 2006 state election (in percent)

Note: Grants measured in euros. Sources: Statistical Office Rhineland-Palatinate, own illustration.

grants. The non-parametric regression in the left panel suggests that equalizing grants were distributed to municipalities where the vote share of the incumbent party was close to 50 percent (swing-voter model). The semi-parametric regression in the right panel including all our (parametric) control variables, however, does not show a hump-shaped relationship between the incumbent vote share and equalizing grants per capita. In any event, there is no evidence that the government awarded equalizing grants to core supporters.

Because of the graphical evidence we proceed with testing empirically whether the state government awarded discretionary project grants to core supporters. We refer to the swing-voter model and to formula-based equalizing grants in Sections 3.4.4 and 3.4.5.

3.4.2 Empirical Strategy

We estimate our baseline model averaging the dependent variable (discretionary project grants) over the years 2008-2011 and all explanatory variables over the years 2007-2010

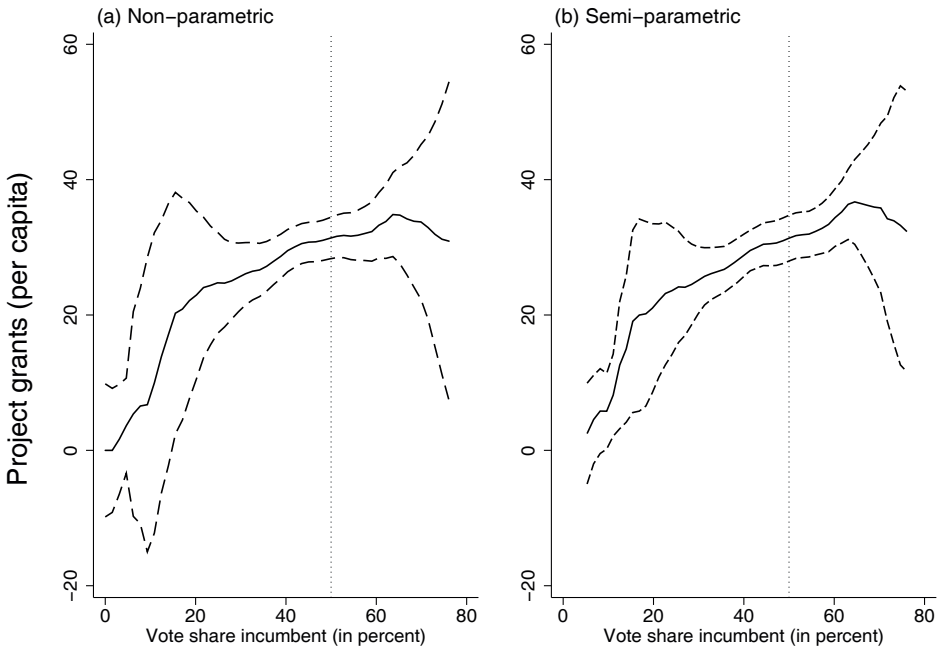

FIG. 3.7: Discretionary project grants 2008-2011 (per capita) and vote share of the incumbent SPD in the 2006 state election (in percent) – non-parametric regressions (no control variables) and semi-parametric regressions (including control variables)

NOTES: Grants measured in euros. Dashed lines describe 5% confidence intervals (standard errors are bootstrapped with 100 replications). The weighted local polynomial estimates are calculated with the Epanechnikov kernel function with a rule-of-thumb bandwidth estimator. The parametric components are differenced out using the Yatchew method. SOURCES: State election administrator, Ministry of the Interior, Sport, and Infrastructure Rhineland-Palatinate, own illustration.

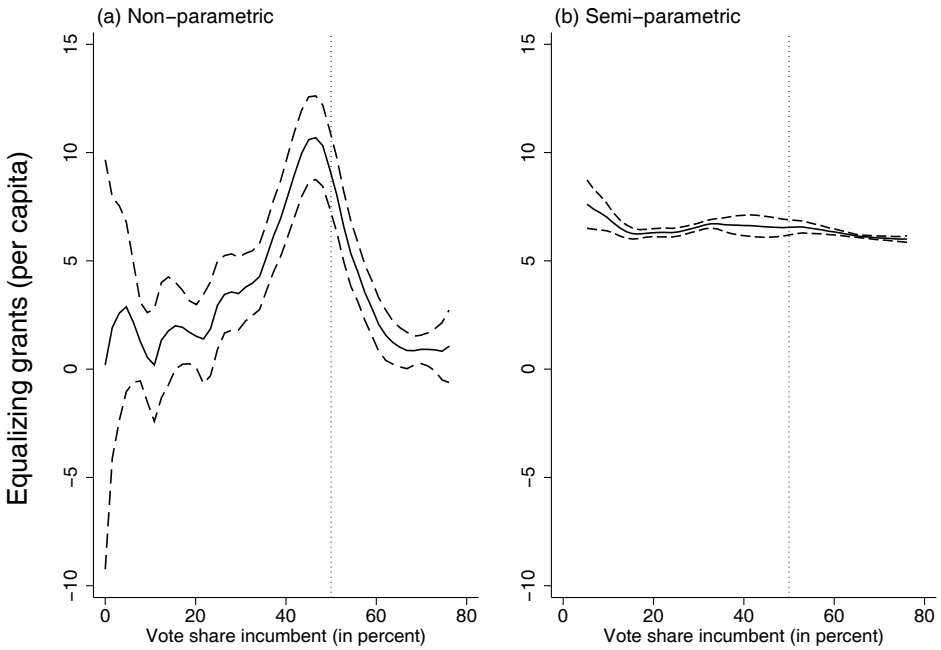

Fig. 3.8: Formula-based equalizing grants 2008-2011 (per capita) and vote share of the incumbent SPD in the 2006 state election (in percent) – non-parametric regressions (no control variables) and semi-parametric regressions (including control variables)

Note:Grants measured in euros. Dashed lines describe 5% confidence intervals (standard errors are bootstrapped with 100 replications). The weighted local polynomial estimates are calculated with the Epanechnikov kernel function with a rule-of-thumb bandwidth estimator. The parametric components are differenced out using the Yatchew method. Sources: State election administrator, Statistical Office Rhineland-Palatinate, own illustration.

to account for the unsteady nature of grants and the lag structure in the distribution of grants (using a different lag would not affect the main explanatory variable, which is based on the 2006 state election). We do not estimate fixed-effects panel-data models because we would like to include time-invariant explanatory variables – particularly the results from the last state election – and thus cannot include fixed municipality effects. We refer to the results of random-effects panel-data models in the section on robustness tests. Since the dependent variable is left-censored, we estimate a Tobit model. The baseline regression model has the following form:

$$\begin{aligned} ln\ Project\ Grants_i = \alpha + \beta\, Vote\ share\ incumbent_i + \gamma Incumbent\ representatives_i \\ + \delta ln\ Fiscal\ capacity_i + \sum_j \epsilon_j Fiscal\ need_{ij} \\ + \sum_k \xi_k Demographics_{ik} + \eta Share\ of\ unemployed_i + \sum_l \theta_l Region_{il} + u_i \\ with\ i = 1, ..., 2287; j = 1, ..., 9; k = 1, 2; l = 1, ..., 4, \end{aligned} \tag{3.1}$$

where the dependent variable *Project Grants*$_i$ describes the average project grants per capita (discretionary) in municipality i over the years 2008-2011.[10]

We examine whether the incumbent state government awarded more grants to municipalities with many core supporters, proxied by the vote share of the incumbent state government. The variable *Vote share incumbent*$_i$ describes the second vote share of the incumbent SPD in percent (see Section 3.3.2) in the state election 2006 in municipality i.

Politicians may influence how grants are distributed by other means than favoring core supporters (see Section 3.2). It is conceivable that a home bias influences how grants are distributed. The variable *Incumbent representatives*$_i$ measures the number of the state incumbent party's members of parliament born in municipality i divided by the total population of that municipality (in percent; inferences regarding the vote share of the incumbent do not change when we refer to the electoral district where the individual

[10]Before taking the natural logarithm of *Project grants*$_i$ we add one euro to the variable to circumvent problems in taking the natural logarithm of zero (see, for example, Knight 2004).

politician was elected as "home"). We refer to the results of (i) testing the partisan alignment of the state and local level as measured by local council elections and the party affiliation of the mayor and (ii) testing the swing-voter model in the section on robustness tests.[11]

We include control variables based on the indicators that determine the fiscal capacity and fiscal need of a municipality in the fiscal equalization scheme. The variable *Fiscal capacity*$_i$ describes normalized tax revenues per capita and includes a grant that guarantees a minimum level of fiscal capacity (see Section 3.3.4 and appendix). To describe fiscal need, we use six indicators that correspond to the indicators in the fiscal equalization scheme, and also include dummy variables for the different types of municipalities. *Population*$_i$ measures the number of inhabitants and *Population density*$_i$ measures the number of inhabitants per square kilometer. *Social expenditure*$_i$ is the social security expenditure per capita, which is only calculated for counties and county-independent cities. *Share of pupils*$_i$ is the share of pupils in the total population (in percent), where pupils in regular schools are weighted with the factor 0.5 and pupils in special schools with the factor 1.5. The number of pupils is not calculated for small municipalities. *Stationing forces*$_i$ is the ratio of foreign stationing forces' relatives and non-barracked soldiers to the population (in percent). The state Rhineland-Palatinate designates municipalities as a central place when they function as a regional center providing public goods to adjacent municipalities. The variable *Central place*$_i$ describes the ratio of the weighted population of the region of a central place to the population of the central place (in percent; see appendix). *Municipality 1*$_i$ is a dummy variable for small municipalities, *Municipality 2*$_i$ for municipalities of intermediate size, and *Municipality 3*$_i$ for large cities that are not county-independent (reference category: county-independent cities).

Other control variables that are likely to influence how grants are distributed are also included. We include two demographic control variables: *Share of young population*$_i$ for the share of inhabitants under 18 (in percent) and *Share of old population*$_i$ for the share of inhabitants above 59 (in percent). The share of young population also serves as a proxy

[11] See Ade and Freier (2013) and Foremny et al. (2014) on the nexus between mayor elections and local council elections. Egger and Koethenbuerger (2012) examine whether local politicians that are party members differ in how they gratify voters from local politicians that are not affiliated with a party.

for the share of pupils, because the number of pupils used in the fiscal equalization scheme is not calculated for small municipalities. We include the variable *Share of unemployed*$_i$ measuring the share of unemployed in the total population (in percent), because the actual social security expenditure used in the fiscal equalization scheme is calculated only for counties and county-independent cities. Governments may direct grants disproportionately to individual regions. *Region*$_{il}$ describes four dummy variables for the regions where the individual municipalities are located (East, West, Center, Palatinate; reference category: Rhine-Hesse). u_i describes an error term. We estimate a Tobit model with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors – see Huber 1967, White 1980; inferences do not change when we cluster standard errors on the level of associations of municipalities).

3.4.3 Regression Results

Table 3.4 presents the marginal effects for the censored mean of our Tobit model with discretionary project grants per capita (2008-2011) as dependent variable. The first column shows the results when we include only the variable *Vote share incumbent*. In columns (2) and (3) we add control variables. In discussing the results, we focus on column (4), which is the estimate of our preferred specification that includes all control variables.

The marginal effect of *Vote share incumbent* attains statistical significance at the 1% level. The result indicates that project grants per capita increased by about 1.4 percent when the vote share of the state incumbent party increased by one percentage point. In other words, project grants per capita increased by about 14.9 percent when the vote share of the incumbent party increased by one standard deviation. The result thus suggests that project grants were awarded to core supporters of the state incumbent party. A municipality also received more project grants per capita the more state incumbent party members of parliament were born in the municipality (relative to the population), indicating a home bias; the effect of *Incumbent representatives* is statistically significant at the 1% level.

Municipalities with a large population received more project grants per capita than municipalities with a small population. The coefficient of *Population* is statistically significant

at the 1% level. The numerical meaning of the effect is that when the population increased by one percent, project grants per capita increased by 0.6 percent. When the variable *Population density* increased by one percent, project grants per capita decreased by 0.2 percent (statistically significant at the 10% level). Municipalities with high social expenditure per capita received more project grants per capita (significant at the 5% level). Central places also obtained more project grants per capita; the coefficient of the variable *Central place* attains statistical significance at the 1% level. Small municipalities (*Municipality 1*), municipalities of intermediate size (*Municipality 2*), and large cities that are not county-independent (*Municipality 3*) received notably more project grants per capita than county-independent cities (significant at the 5% level), which is indeed intended by the legislator as large cities obtain more formula-based grants. Combined with the effect of increasing project grants per capita when the population increases, the effects of the dummy variables describing the types of municipalities purport that project grants per capita decreased with the next-larger types of municipalities, but that project grants per capita increased in the population within every type of municipality. Municipalities in the region Palatinate received more project grants per capita than municipalities in the region Rhine-Hesse (reference category). The effects of the variables *Share of pupils*, *Stationing forces*, *Share of young population*, *Share of old population*, *Share of unemployed*, *Region East*, *Region West*, and *Region Center* do not turn out to be statistically significant in any specification. In particular, *Fiscal capacity* lacks statistical significance, purporting that project grants neither flowed to decidedly indigent municipalities nor to municipalities eminently capable of co-financing.

3.4.4 Robustness Tests

We submitted all of our results to rigorous robustness tests using different specifications of our regressions and different samples. None of these robustness tests indicates any severe fragility of our results. For the individual robustness tests related to the incumbent vote share, Table 3.5 presents the coefficient estimates of that variable when project grants per capita or equalizing grants per capita are the dependent variable, based on the specification with all control variables (column 4 in Table 3.4).

TABLE 3.4: Regression results (project grants)

Dependent variable: ln Project grants (per capita) – discretionary				
	(1)	(2)	(3)	(4)
Vote share incumbent (in %)	0.0193***	0.0154***	0.0153***	0.0142***
	(4.51)	(3.60)	(3.59)	(3.19)
Incumbent representatives (in %)			10.17***	10.39***
			(4.60)	(4.58)
ln Fiscal capacity (per capita)		-0.134	-0.134	-0.0120
		(-0.61)	(-0.61)	(-0.05)
ln Population		0.663***	0.662***	0.597***
		(11.63)	(11.62)	(10.05)
ln Population density		-0.275***	-0.275***	-0.154**
		(-3.81)	(-3.81)	(-1.97)
ln Social expenditure (per capita)		0.847	0.835	1.374**
		(1.59)	(1.60)	(2.34)
Share of pupils (in %)		-0.0502	-0.0479	-0.0485
		(-0.37)	(-0.36)	(-0.29)
Stationing forces (in %)		0.00158	0.00164	-0.00175
		(0.26)	(0.27)	(-0.32)
Central place (in %)		0.0374***	0.0365***	0.0371***
		(4.67)	(4.60)	(4.19)
Municipality 1		5.188*	5.141*	8.300**
		(1.66)	(1.67)	(2.39)
Municipality 2		4.798	4.754	7.771**
		(1.53)	(1.54)	(2.24)
Municipality 3		4.348	4.300	7.577**
		(1.39)	(1.39)	(2.16)
Share of young population (in %)				-0.0165
				(-0.87)
Share of old population (in %)				0.0143
				(1.18)
Share of unemployed (in %)				-0.0560
				(-1.09)
East				0.0.994
				(0.59)
West				-0.260
				(-1.53)
Center				0.218
				(1.19)
Palatinate				0.431***
				(2.62)
Observations	2287	2287	2287	2287
Pseudo R^2	0.00272	0.0369	0.0371	0.0421

NOTES: Grants, fiscal capacity, and social expenditure measured in euros. Dependent variable averaged of the years 2008-2011. All explanatory variables averaged over the years 2007-2010; Tobit model with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors); z-statistics in parentheses; *** , ** and * denote significance at the 1%, 5% and 10% levels.

In our baseline model we used a Tobit estimator, taking the left-censored nature of the dependent variable into account. Inferences do not change when we estimate OLS or negative binomial models. We also employed panel-data models. Since we would like to include time-invariant explanatory variables, we can only run a random-effects model. Independent of whether we include fixed year effects or not, the results confirm that project grants per capita were higher in municipalities with a large vote share of the state incumbent party.

The four types of municipalities in Rhineland-Palatinate differ in their extent of policy autonomy. Inferences do not change when we only estimate the model for small municipalities (*Municipality 1*). Estimating the model for the other types of municipalities alone is not meaningful because sample sizes are too small.

Politicians may well influence the distribution of grants to gratify their fellow party members (party-alignment model). We tested whether inferences change when we use the SPD vote share in the local council elections, instead of the SPD vote share in the state election, as an explanatory variable. The results do not show that state politicians awarded more grants per capita to municipalities with a large SPD vote share in the local council elections. When we include the SPD vote share in the state election *and* the SPD vote share in the local council elections in one specification, the results corroborate that project grants per capita were higher in municipalities where the incumbent SPD had a large vote share in the state election, but not in municipalities where the SPD had a large vote share in the local council elections.

We also included a dummy variable *Mayor* that assumes the value one if the mayor of a municipality is from the state incumbent party. Data on the party affiliation of the mayor are, however, not available for many small municipalities. When we include the mayor variable the number of observations thus goes down to 1,265. The coefficient of the mayor variable lacks statistical significance, independent of whether we include the SPD vote share in the state election or not. The results still show that project grants per capita were higher in municipalities with many core supporters of the state incumbent.

We replaced the vote share of the SPD by the vote shares of the CDU, the FDP, and the Greens. This robustness test does not give rise for any concern either: project grants

TABLE 3.5: Regression results, robustness tests (core supporter) – marginal effects

Dependent variable: ln Project grants (per capita) – discretionary				
	Coefficient (t/z-stat.) of incumbent vote share in state election (in %)		Coefficient (t-stat.) of incumbent vote share in local council elections (in %)	
OLS	0.01247***	(3.28)		
Negative binomial	0.01489***	(3.42)		
Random-effects panel	0.00518**	(2.48)		
Tobit, small municipalities	0.01399***	(3.16)		
Tobit, local council elections			0.000329	(0.12)
Tobit, state and local council elections	0.01450***	(3.18)	-0.00137	(-0.48)
Tobit, mayor dummy			0.000379	(0.00)
Tobit, state elections and mayor dummy	0.02038***	(2.91)	-0.16345	(-1.27)
Tobit, vote share CDU	-0.01050**	(-2.52)		
Tobit, vote share FDP	-0.01610	(-1.45)		
Tobit, vote share Greens	-0.02320	(-1.21)		

NOTES: Grants measured in euros. Models with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors); *** , ** and * denote significance at the 1%, 5% and 10% levels.

per capita decreased when the CDU's vote share increased, whereas the effects of the vote shares of the FDP and the Greens do not turn out to be statistically significant.

We tested whether project grants per capita were also higher in swing municipalities, the clear graphical evidence against this hypothesis in Figure 3.7 notwithstanding. The regressions in Table 3.6 using the absolute difference between the SPD vote share and the vote share of the other main parties altogether (CDU, FDP, and Greens) as the main explanatory variable corroborate the graphical evidence and do not show that project grants per capita were higher in municipalities with many swing voters. This is robust to using different regression techniques, and also to considering only small municipalities or local council elections. Testing the swing-voter model with the closeness of an election instead of the number of swing voters relies on the assumption of a symmetric and single-peaked distribution of preferences (see Section 3.2). If, however, preferences are skewed

Table 3.6: Regression results, robustness tests (swing voter) – marginal effects

Dependent variable: ln Project grants (per capita) – discretionary				
	Coefficient (t/z-stat.) of incumbent vote share in state election (in %)		Coefficient (t-stat.) of incumbent vote share in local council elections (in %)	
Tobit	-0.00367	(-1.04)		
Tobit, vote share difference plus 5 pp	-0.00119	(-0.34)		
Tobit, vote share difference plus 10 pp	0.00195	(0.60)		
OLS	-0.00208	(-0.70)		
Negative binomial	-0.00382	(-1.09)		
Random-effects panel	0.00022	(0.13)		
Tobit, small municipalities	-0.00366	(-1.04)		
Tobit, local council elections			0.00378	(1.39)
Tobit, state and local council elections	-0.00400	(-1.13)	0.00410	(1.49)

Notes: Grants measured in euros. Models with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors); *** , ** and * denote significance at the 1%, 5% and 10% levels. It follows from simple calculations that one has to add 5 or 10 percentage points to the vote share difference before calculating its absolute value to describe that the number of swing voters is highest where the incumbent SPD is 5 or 10 percentage points weaker than the other main parties altogether.

to the right, which is likely the case in Germany, the number of swing voters is highest where the incumbent SPD is somewhat weaker than the other main parties altogether. The results do however not show that grants were directed to municipalities where the SPD obtained 5 or 10 percentage points fewer votes than the other main parties. We do thus still not find evidence for the swing-voter model.

3.4.5 Formula-Based Equalizing Grants

In emerging and developing countries, politicians have been shown to manipulate formula-based grants (see, e.g., Litschig 2012 and Banful 2011). We are convinced that formula-based grants are not manipulated in Germany; the graphical evidence in Figure 3.8, however, requires elaborating further on these grants. Two ways of manipulating formula-based

equalizing grants spring to mind. Firstly, the state government may manipulate grants by not applying the formula correctly. The horizontal line in the right panel of Figure 3.8 already indicates that grants are not manipulated, at least not according to municipalities' political preferences: the semi-parametric regression accounts for the components of the formula that is applied to calculate the grants, and there is no correlation between the vote share of the incumbent party and equalizing grants per capita. Also the regressions in the upper part of Table 3.7 do not show that municipalities' political preferences influenced the level of equalizing grants per capita (the small and marginally significant effect for the swing-voter model notwithstanding).

Secondly, it is conceivable that the formula for equalizing grants was designed such that individual municipalities benefit. The left panel of Figure 3.8 and the results in the lower part of Table 3.7 – both not controlling for the components of the formula – indeed indicate that municipalities with many swing voters (but not municipalities with many core supporters) obtained higher equalizing grants per capita. We do not, however, interpret this as evidence for some government to have manipulated the formula in order to woo swing voters. We rather advance a different argument for why municipalities received higher grants per capita where elections were close. In cities, elections are often close, whereas in smaller municipalities landslide victories for individual parties are quite common. Cities, however, also obtain larger per-capita grants, e.g. because they serve as central places providing public goods for adjacent municipalities. Larger grants for cities are also justified to compensate for congestion externalities, because the empirical literature shows that cities have a higher level of productivity compared to the countryside (see, e.g., Sveikauskas 1975). Comparing Rhineland-Palatinate to other states, we also do not see an indication of cities to be overemphasized in the formula. The hump-shaped relationship indeed vanishes when excluding central places from Figure 3.8 (not shown). We do therefore not interpret the higher level of equalizing grants in municipalities with close elections as a causal effect.

Table 3.7: Regression results, robustness tests – marginal effects

Dependent variable: ln Equalizing grants (per capita) – formula based				
	Coefficient (z-stat.) of vote share incumbent in state election (in %)		Coefficient (z-stat.) of vote share diffeence in state elections (in %)	
Including control variables				
Tobit, core supporter	0.00188	(1.30)		
Tobit, swing voter			0.00197*	(1.81)
Excluding control variables				
Tobit, core supporter	0.00350	(1.57)		
Tobit, swing voter			-0.12511***	(6.11)

Notes: Grants measured in euros. Models with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors); *** , ** and * denote significance at the 1%, 5% and 10% levels.

3.5 Conclusion

We investigate whether politicians award intergovernmental grants to core supporters. Our new dataset contains information on discretionary project grants from a German state government to municipalities over the period 2008-2011. The results show that discretionary grants were awarded to municipalities with many core supporters of the incumbent state government. Grants per capita increased by about 1.4 percent when the vote share of the incumbent party in the state election increased by one percentage point.

We are agnostic about why grants were distributed to core-supporter municipalities. The incumbent party in Rhineland-Palatinate may have manipulated the grant distribution to gratify their core supporters, corroborating the core-supporter hypothesis advanced by Cox and McCubbins (1986). The government did not publish any information on grant distribution for many years. Lax disclosure requirements may have served as a gateway to manipulating grants. It is, however, also conceivable that municipalities with a population that espouses social-democratic attitudes were more adamant in applying for project grants, or simply applied for more eligible projects than other municipalities

(including projects more in line with the political preferences of the state government). To be sure, this would still indicate that grants flowed disproportionately to municipalities with many core supporters of the state incumbent party.

We propose to trim discretionary project grants to the benefit of formula-based grants. Discretionary project grants are justified for only two reasons: (i) the state government is better informed about local preferences than local governments or faces stronger incentives to satisfy these preferences; (ii) local public goods and services exert spill-over effects to future periods (investments) or to other municipalities, which are not internalized by local politicians that are myopic or not interested in the well-being of other jurisdictions. For most discretionary project grants, neither of these reasons applies: local politicians are in close contact with citizens and are thus, in most cases, better informed of local needs than state politicians; there is also no case for believing that state politicians cater to voters' preferences more than local politicians do, as voters may impose sanctions on politicians at both levels of government by voting for alternative candidates/parties. Spill-over effects of local public goods or services may, in some cases, support discretionary project grants at first sight; well-aligned grants are, however, hard to calculate as quantifying spill-over effects is a most difficult task, a reasoning that applies for both spill-over effects benefitting other municipalities and spill-over effects benefitting the municipality in question in the future. To some extent the fiscal equalization scheme already incorporates spill-over effects accruing to other municipalities by acknowledging a municipality's function as a central place. When the benefits of public goods spill over to future periods, general grants with an obligation to invest some share may be a better choice than project grants. In any event, one needs to trade off potential upsides against the drawbacks of discretionary project grants, which include – compared to formula-based grants – reduced municipal autonomy, less transparency, more bureaucratic government, and, finally, incentives for manipulations based on political color.

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Appendix

The equalizing grants (E) support a municipality i with fiscal need (N) exceeding fiscal capacity (C). The fiscal capacity is multiplied with a weighting factor (x) depending on the municipality type. The equalization system balances 50 percent of the difference between fiscal need and fiscal capacity (if positive):

$$E_i = \max\{0.5 \cdot (N_i - x_i \cdot C_i); 0\} \tag{3.2}$$

Six indicators determine the fiscal need:

- population (n) multiplied with a weighting factor (x),
- population density (area in square kilometers (K) per capita) below the state average,
- social security expenditure (G^S) per capita exceeding the state average,
- number of pupils in regular schools (n^{RS}) and special schools (n^{SS}),
- number of stationing forces (n^F),
- the municipality's function as a central place providing public goods for inhabitants (n^C) of adjacent municipalities multiplied with a weighting factor depending on the proximity of the municipality: near (includes the central place), intermediate, regional.

To express fiscal need in euros, the sum of the indicators is multiplied by a basic amount (BA) in euros which depends on the funds approved for the total volume of equalizing grants:

$$N_i = BA \cdot (x_i \cdot n_i + \max\left\{(\frac{K_i}{n_i} - \frac{K}{n}) \cdot 0.002 \cdot n_i; 0\right\} + \max\left\{\frac{\frac{G_i^S}{n_i} - \frac{\bar{G}^S}{n}}{\frac{\bar{G}^S}{n}} \cdot 0.002 \cdot n_i; 0\right\}$$
$$+0.5 \cdot n_i^{RS} + 1.5 \cdot n_i^{SS} + 0.35 \cdot n_i^{F} + 0.0385 \cdot n_i^{C,\text{near}} + 0.011 \cdot n_i^{C,\text{inter}} + 0.0033 \cdot n_i^{C,\text{regional}}) \tag{3.3}$$

The fiscal capacity (C) of municipality i consists of normalized tax revenues (R) and includes a grant (A) that guarantees a minimum level (a) of fiscal capacity (76.24% of the average tax revenues ($\bar{R}$) per capita in Rhineland-Palatinate).

Tax revenues include property taxes (R^P) and the local business tax (R^B), which are both normalized with standardized tax rates ($\bar{t}^P$ and $\bar{t}^B$), the municipality's share of the federal income tax (R^I), the municipality's share of the federal sales tax (R^S), and compensatory payments (R^C):

$$C_i = R_i + A_i \tag{3.4}$$

$$A_i = \max\left\{(a \cdot \frac{\bar{R}}{n} - \frac{\bar{R}_i}{n_i} \cdot n_i; 0\right\} \tag{3.5}$$

$$R_i = \bar{t}^P \cdot \frac{R_i^P}{t_i^P} + \bar{t}^B \cdot \frac{R_i^B}{t_i^B} + R_i^S + R_i^C \tag{3.6}$$

Chapter 4

Explosive Target Balances of the German Bundesbank

Abstract*

Using the recursive unit root test by Phillips et al. (2011) we show that the Target balances of the German Bundesbank have been explosive from the beginning of 2009 to the beginning of 2013. By implementing a full-allotment policy and reducing the required minimum quality of collaterals in October 2008, the European Central Bank (ECB) refinanced credits in the GIIPS countries (Greece, Ireland, Italy, Portugal and Spain) to a large extent. Private capital flowed out of the GIIPS countries, and the German Target claims increased significantly. Using the new test to identify multiple explosive periods by Phillips et al. (2013) we find that the German Target claims also became explosive in autumn 2007 when the interbank market broke down for the first time.

*The chapter is based on my joint paper with Niklas Potrafke "Explosive Target Balances of the German Bundesbank," *Economic Modelling*, 42, 2014, 439-444.

4.1 Introduction

A topical issue throughout the euro crisis has been central banks' Target balances, "an accounting system hidden in remote corners of the balance sheets of Eurozone's National Central Banks" (Sinn and Wollmershäuser 2012, p. 468). "Target"[1] describes the European transaction settlement system that the commercial banks of one Eurozone country use to make payments to the commercial banks of another Eurozone country via the national central banks and the European Central Bank (ECB). Target balances describe the claims and liabilities of the individual central banks of the Eurozone vis-à-vis the Eurosystem. The Target balances show the accumulated deficits and surpluses in each country's balance of payments with other countries in the Eurozone.

Since mid-2007 the national central banks of the GIIPS countries have largely created and lent money to finance balance-of-payments deficits, while money creation and lending in the core of the Eurozone have decreased. The Eurozone's stock of net refinancing credit moved from the European core countries to the GIIPS countries. The reallocation of refinancing credit describes a public capital flow via the ECB system and can be interpreted as the first euro rescue programme (Sinn 2012a, 2014, Sinn and Wollmershäuser 2012).[2] Hans-Werner Sinn first drew attention to the increasing Target imbalances in the Eurozone in spring 2011 and has since explored why Target imbalances threaten financial stability (see, e.g., Sinn 2012a). In February 2012, Jens Weidmann, the president of the German Bundesbank, described his concerns about the Target imbalances to Mario Draghi, the president of the ECB, and called for a collateralization of the German Target claims.[3]

In March 2014, for example, the German Bundesbank held nominal Target claims of 470 billion euros. If the Eurozone collapsed, the German Bundesbank's basis for these claims would disappear, and the German Bundesbank would probably sustain a loss. Given that the German Bundesbank would request a recapitalization, it is conceivable that the German federal government would have to increase taxes or decrease public pensions to finance the

[1] Trans-European Automated Real-Time Gross Settlement Express Transfer.

[2] Steinkamp and Westermann (2012) describe the Target liabilities of the national central banks as senior lending by the markets similar to the rescue packages from the IMF and the EU (e.g., EFSM/ESM).

[3] See Ruhkamp (2012).

Bundesbank's loss. Alternatively, German government debt would increase (Sinn 2012a, b, 2013). Target balances are thus part of the hidden government debt.

Scholars have investigated whether governments pursue sustainable fiscal policies by testing for stationarity of the real debt level or the debt-to-GDP ratio (e.g., Hamilton and Flavin 1986, Kremers 1988, Wilcox 1989).[4] When the real debt level or the debt-to-GDP ratio contains a unit root, and is thus shown to be nonstationary, experts describe fiscal policies as unsustainable. Scholars also use unit root tests to examine the sustainability of external debt and current account deficits (e.g., Wickens and Uctum 1993). Sustainability tests have as of yet ignored hidden government debt such as the Target balances.

Phillips et al. (2011) have introduced a new recursive unit root test on explosive behavior (*PWY test*), especially to identify asset price bubbles.[5] We use the recursive unit root test by Phillips et al. (2011) to investigate whether the Target balances of the German Bundesbank are explosive.[6] We identify explosive periods in the German Target balance and discuss the events that induced the exploding Target balances. As a robustness test we also employ the new unit root test to identify multiple explosive periods by Phillips et al (2013).

4.2 Hidden Debt

Many studies elaborating on government debt and fiscal sustainability deal with non-contingent explicit debt, i.e. obligations that are based on a particular law or contract and must be served in any event, as recorded in the government's accounting system. But governments also have implicit liabilities, i.e. "moral" payment obligations of the government,

[4]See also Chen (2014) and Liu et al. (2014). Other approaches to test for fiscal sustainability include cointegration analysis of expenditures and revenues (see, e.g., Trehan and Walsh 1988) and fiscal reaction functions (see, e.g., Bohn 1998, 2008). For an application of the *Bohn-model* see, e.g., Potrafke and Reischmann (2014). On theoretical considerations of public debt sustainability see, e.g., Bohn (1995, 2007).

[5]See Guerkaynak (2008) for a survey of early econometric tests of asset price bubbles.

[6]Yoon (2012a, b) has employed the *PWY test* to elaborate on explosive public debt and budget deficit in the United States.

which arise as a result of public expectations, pressure from interest groups and the role of the state in the society (Polackova 1998). Examples of implicit liabilities include future public pension payment obligations (see, e.g., Auerbach 2009, Oksanen 2005). Explicit and implicit government liabilities may be non-contingent or contingent. Non-contingent (or direct) liabilities give rise to a payment obligation in any event. Contingent liabilities are only realized if a particular event occurs (see, e.g., Giammarioli et al. 2007, Polackova 1998, Polackova Brixi and Schick 2002). Contingent explicit liabilities, contingent implicit liabilities, and non-contingent implicit liabilities that are not recorded in the government's accounting system describe hidden debt, which poses a risk to the sustainability of public finances (Hartwig Lojsch et al. 2011).

The Target claims of the German Bundesbank are a contingent implicit liability of the German government. If Germany exits the Eurozone, the remaining Eurozone member countries would hardly be willing to repay the German Target credit and the German Bundesbank would lose its Target claims. If a country with a large Target liability (like any of the GIIPS countries) exits the Eurozone and is not able to honor the liability, the remaining Eurozone countries would have to bear the loss according to their share in the ECB's capital. Germany would have to bear a share of 27% of the loss. The capital share, however, is endogenous and depends on how many countries leave the Eurozone. If the Eurozone collapsed, the German Bundesbank would lose its entire Target claims (see Cour-Thimann 2013, Homburg 2012).[7] The Target claims are an implicit liability because the German government would have the "moral" obligation to recapitalize the German Bundesbank in case of a loss of the Target claims (Kooths and van Roye 2012, Sinn 2013). Against the background of the large German Target claims, it is conceivable that German government debt would increase (Sinn 2012a, 2012b, 2013).[8]

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[7]De Grauwe and Ji (2012) do not believe that the German Bundesbank will experience a loss if the Target debtor countries do not repay their Target liabilities. De Grauwe and Ji (2012) argue that all money in the Eurozone is fiat money, which has a value independent of the corresponding national central bank's assets. In contrast, Sinn (2012b, 2013) maintains that the Target claims do indeed pose a financial risk to the German Bundesbank.

[8]In July 2012 the rating agency Moody's emphasized the contingent liabilities from the Target claims of the German Bundesbank when considering a downgrading of Germany: "The second and interrelated driver of the change in outlook to negative is the increase in contingent liabilities that is associated with even the most benign scenario of a continuation of European leaders' reactive and gradualist approach to policymaking. [...] As the largest euro area country, Germany bears a significant share of these contingent

4.3 Data

We use monthly data on the German Target balance compiled by the Ifo Institute. We deflate the nominal values by using the Harmonized Index of Consumer Prices (HICP) of the Eurozone. Figure 4.1 shows the real German Target balance (in prices of 2005) from January 1999 to March 2014. The real German Target claims have increased from 20 billion euros in January 1999 to 398 billion euros in March 2014. The German Target claims started to increase in the second half of 2007 when tension in the European interbank market emerged for the first time. Credit flows from the core Eurozone countries into the GIIPS countries decreased and the national central banks of the GIIPS countries had to create money to finance imports. Consequently, the Target liabilities of the GIIPS countries and the German Target claims increased (Sinn 2012a). In October 2008 the financial crisis broke out after the collapse of the investment bank Lehman Brothers. The German Target claims increased further in May 2010, when the sovereign debt crisis in the Eurozone emerged, and in July 2011, when Italy and Spain started to face refinancing difficulties in the sovereign debt markets.

Since August 2012 the Target claims have gradually declined following Mario Draghi's announcement that "the ECB is ready to do whatever it takes to preserve the euro" (ECB 2012) and the ECB had started to implement new measures to support troubled Eurozone countries (Cour-Thimann 2013). In September 2012 the ECB announced the modalities of the Outright Monetary Transaction (OMT) scheme for buying government bonds to restore confidence in the GIIPS countries. In January 2013 repayments from the three-year longer-term refinancing operations (LTRO) started and reduced the outstanding amount of liquidity of the banks in the Eurozone (see Cour-Thimann 2013). In April 2013 the real German Target claims slightly increased again in the wake of Cyprus' refinancing problems. Since May 2013 the real German Target claims have decreased. The decrease of the German Target claims indicates that private capital flowed out of Germany in the second half of 2012 and particularly in 2013. The GIIPS countries and Cyprus received intergovernmental fiscal rescue credit. The ECB and the rescue fund ESM promised to

liabilities. The contingent liabilities stem from bilateral loans, the EFSF, the European Central Bank (ECB) via the holdings in the Securities Market Programme (SMP) and the Target 2 balances, and – once established – the European Stability Mechanism (ESM)" (Moody's 2012).

buy government bonds of countries with refinancing problems. The OMT and the ESM calmed the markets and private capital flowed back into the GIIPS countries and Cyprus (Sinn 2014).

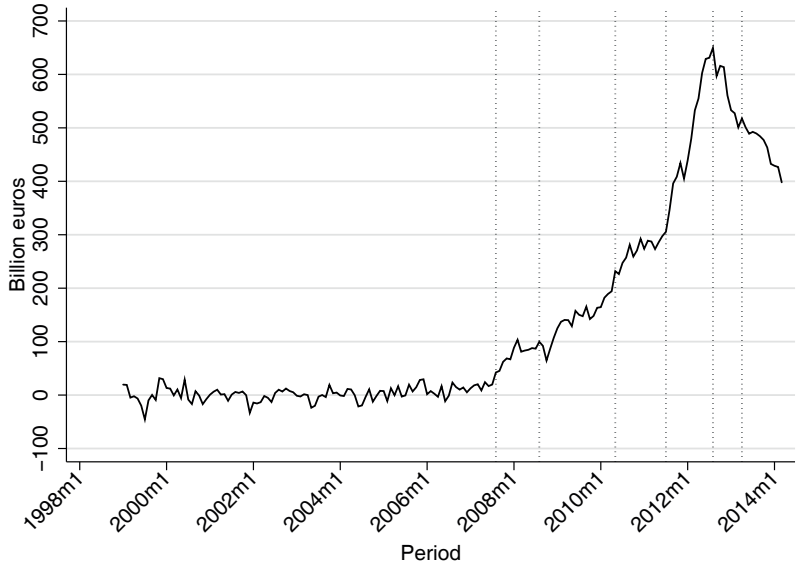

FIG. 4.1: Real German Target balance

NOTES: Posititve values of the Target balance describe a Target claim. Real values (in prices of 2005) were calculated with the Harmonized Index of Consumer Prices (HICP) of the euro area. SOURCES: Ifo Institute, Eurostat, own calculations.

4.4 Empirical Analysis

4.4.1 Empirical Specification

We employ the recursive unit root test proposed by Phillips et al. (2011) to examine explosive behaviour in the real German Target balance. Phillips et al. (2011) use sequential right-tailed augmented Dickey-Fuller (ADF) tests applied to subsamples with increasing

observations (*PWY test*).[9] Our regression model takes the following form:

$$y_t = \alpha + \delta y_{t-1} + \sum_{i=1}^{k} \phi_i \Delta y_{t-i} + \epsilon_t, \text{for } t = 1, ..., [rT], \tag{4.1}$$

where y_t denotes the real Target balance in period t, α is an intercept, ϵ_t describes an error term, and k is the lag order. We follow Phillips et al. (2011) and do not include a time trend.[10] In our baseline model, we estimate Equation 4.1 recursively by gradually enlarging the subsamples with one additional observation. r describes the fraction of the total number of observations T we use in each subsample. In the first subsample we employ a fraction $r_0 = 0.2$ of the total number of observations T = 183. The window size of the subsamples r_w expands from r_0 to 1. $r_w = r_0$ thus describes the first subsample (37 observations) and $r_w = 1$ describes the total sample (183 observations). We fix the starting point r_1 of each subsample at 0, so that the end point of each subsample r_2 equals r_w and changes from r_0 to 1 (see Phillips et al. 2013). From Equation 4.1 we obtain the ADF test statistic ADF_0^{r2}. $SADF(r_0)$ is the maximum of ADF_0^{r2} over $r_2 \in [r_0, 1]$:

$$SADF(r_0) = sup_{r_2 \in [r_0,1]} \{ADF_0^{r_2}\} \tag{4.2}$$

We test $H_0 : \delta = 1$ against the explosive alternative $H_1 : \delta > 1$. We reject H_0 when the $SADF(r_0)$ test statistic is larger than the right-tailed critical values provided by Phillips et al. (2013). To select the optimum lag length we use a sequential testing procedure as proposed by Campbell and Perron (1991). Starting with ten lags we exclude lags that do not turn out to be statistically significant until the last included lag is significant at the 5%

[9] Homm and Breitung (2012) evaluate alternative tests for explosive behaviour and show that the *PWY test* is suitable to investigate explosive behaviour. Homm and and Breitung (2012) also show that the *PWY test* is more robust against multiple breaks than the other tests considered. On the size and power properties of the *PWY test*, see Phillips et al. (2014).

[10] Phillips et al. (2014: 319) explain: "The empirical regression of the right-tailed unit root test given in Diba and Grossman (1988) is R2 [including a constant and a trend]. This regression has both a constant as well as a deterministic trend. Since the presence of either of these two terms is empirically unrealistic when $\rho > 1$, regression R2 is not suitable for right-tailed unit root testing. By contrast, regression R1 [including a constant and no trend] is empirically more realistic and PWY implemented a right-tailed unit root test using this regression formulation."

level and obtain an optimum lag length of four.[11] In our baseline specification we use the same lag length for each subsample. Inferences do not change when we select the optimum lag length separately for each subsample.

4.4.2 Results

Table 4.1 shows the values of the ADF_0^1 and $SADF(r_0)$ test statistics when we use 0 to 10 lags. ADF_0^1 corresponds to the standard ADF test over the full sample. When we apply the standard ADF test, the test statistics show that the real German Target claims have been explosive when using zero to two lags.We can reject the null hypothesis $H_0 : \delta = 1$ at the 5% significance level. When using three to ten lags, however,we cannot reject the null hypothesis $H_0 : \delta = 1$ (column 2). Standard unit root tests have difficulties in detecting periodically collapsing bubbles (Evans 1991, Phillips et al. 2011). The $SADF(r_0)$ test statistics show that the real German Target claims have been explosive: we can reject the null hypothesis $H_0 : \delta = 1$ at the 1% significance level for all lag lengths (column 3).

To determine when the real German Target balance became explosive we follow Phillips et al. (2011) and compare the $ADF_0^{r_2}$ test statistics of the subsamples with their corresponding right-tailed critical values. We calculate the right-tailed critical values of the ADF test for every subsample using the formula $cv = ln(ln(rT))/100$ (Phillips et al., 2011). The critical values range between 0.013 and 0.016 (rT ranges between 37 and 183). The critical values are close to the 4% significance critical value of the standard ADF test provided by Phillips et al. (2011).[12] Our results indicate that the real German Target balance became explosive for the first time in January 2009 and exuberance peaked in June 2012. In March 2013, the real German Target balance was no longer explosive. In April 2013 the real German Target balance became explosive again. Since September 2013 the real German Target balance has not been explosive any more (see Figure 4.2).

[11]The Akaike Information Criterion and the Schwarz Bayesian Information Criterion also select an optimum lag length of four. Ng and Perron (1995) show that the lag selection based on sequential tests has less size distortion and similar power compared to information-based rules.

[12]The 4% critical value for the ADF test estimated by Phillips et al. (2011) is 0.01.

Table 4.1: ADF_0^1 and $SADF(r_0)$ test statistics for the real German Target balance

(1)	(2)	(3)
Lags	Test statistics	
	ADF_0^1	$SADF(r_0)$
10	-0.643	5.251***
9	-0.844	4.671***
8	-0.714	4.368***
7	-0.916	4.328***
6	-0.980	5.076***
5	-0.723	5.400***
4	-0.698	5.014***
3	-0.662	4.910***
2	-0.210**	5.908***
1	-0.003**	5.591***
0	0.004**	4.716***
Upper tail critical values		
1%	0.62	1.86
5%	-0.07	1.30
10%	-0.42	0.97

Notes: ADF_0^1 and $SADF(r_0)$ test statistics for the real German Target balance for lag orders 0-10. The table also reports the corresponding critical values of the ADF_0^1 test taken from Fuller (1996) for 250 observations and of the $SADF(r_0)$ test taken from Phillips et al. (2013) for 200 observations. The sample period is January 1999-March 2014. *** and ** denote significance at the 1% and 5% levels.

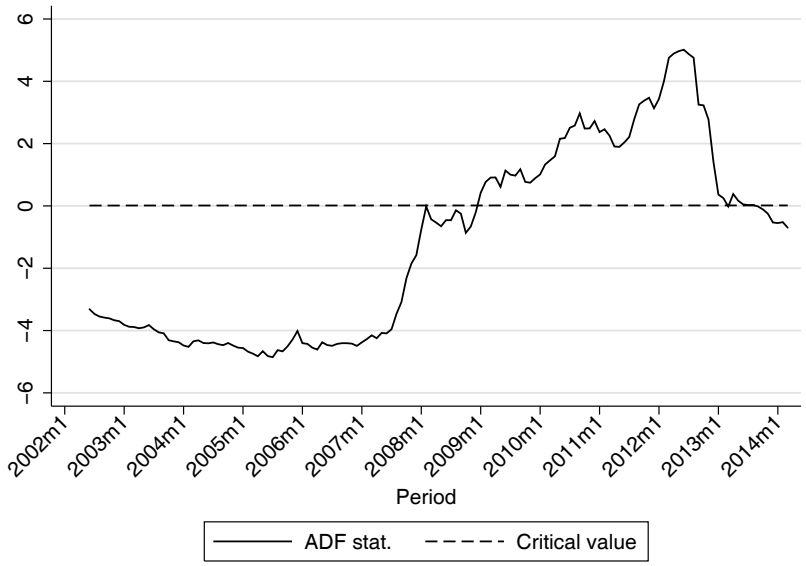

FIG. 4.2: $ADF_0^{r_2}$ test statistics for the real German Target balance

NOTES: Time series of $ADF_0^{r_2}$ test statistics for the real German Target balance from June 2002 to March 2014. The $ADF_0^{r_2}$ test statistics were obtaines from forward recursive regressions ($r_0 = 0.2$) with four lags. The first observation is in January 1999.

4.4.3 Robustness Tests

We have also employed the *PWY test* using rolling regressions with a fixed window width.We have run each regression on a subsample of $r_w = 40\%$ of the full sample (i.e., 73 observations) and with the initialization date rolling forward. The test based on forward rolling regressions indicates that the real German Target balance became explosive in December 2008.[13] We also find explosive behaviour in the real German Target balance in December 2007. Using rolling regressions, we do not find explosive behaviour in the real German Target balance since January 2013 (see Figure 4.3).

The *PWY test* is especially effective for time series with a single explosive period. If a time series includes more than one explosive period, the *PWY test* may fail to identify

[13]Alternativelywe usemoving subsamples of 30% and 50% of the whole sample (55 and 92 observations) and obtain very similar results (see also Table 4.2).

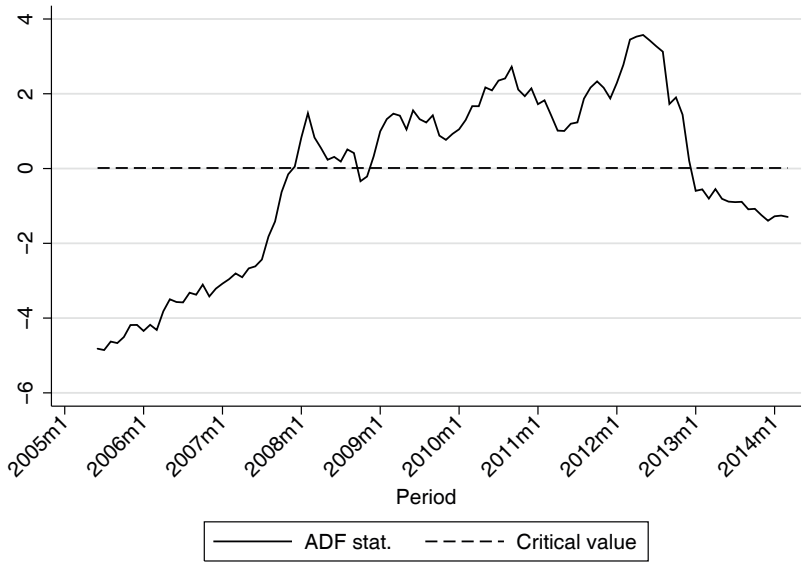

Fig. 4.3: $ADF_0^{r_2}$ test statistics for the real German Target balance (rolling regressions)

Notes: Time series of $ADF_0^{r_2}$ test statistics for the real German Target balance from June 2005 to March 2014. The $ADF_0^{r_2}$ test statistics were obtained from rolling window regressions (73 observations in each regression) with four lags. The first observation is in January 1999.

the existence of explosive periods (Phillips et al. 2013). To deal with multiple periods of exuberance, Phillips et al. (2013) propose a rolling window regression procedure (*PSY test*) which uses recursive right-tailed ADF tests with flexible window widths.[14] The *PSY test* performs a SADF test on backwards expanding subsamples with the end point of each subsample fixed at r_2 and the start point r_1 varies from 0 to $r_2 - r_0$. The backward SADF statistic (BSADF) describes the maximum value of the ADF statistic over the interval from r_1 to r_2:

$$BSADF_{r_2}(r_0) = sup_{r_1 \in [0, r_2 - r_0]} \left\{ ADF_{r_1}^{r_2} \right\} \tag{4.3}$$

To determine the explosive periods we compare the BSADF statistics with the critical values of the SADF test. We use the 95% SADF critical value sequence, which we obtained

[14]Etienne et al. (2014) apply the *PSY test* to identify price bubbles in agricultural futures markets.

from Monte Carlo simulations with 2,000 replications (Phillips et al. 2013).[15] We find two explosive periods: October 2007 to September 2008 and January 2009 to December 2012 (see Figure 4.4). The *PWY test* with increasing observations does not identify the explosive period from October 2007 to September 2008. Our findings are in line with Phillips et al. (2013) who show that the *PWY test* with increasing observations may fail to find explosive periods in samples with multiple explosive periods. Table 4.2 shows the explosive periods which we obtained in our different test procedures.

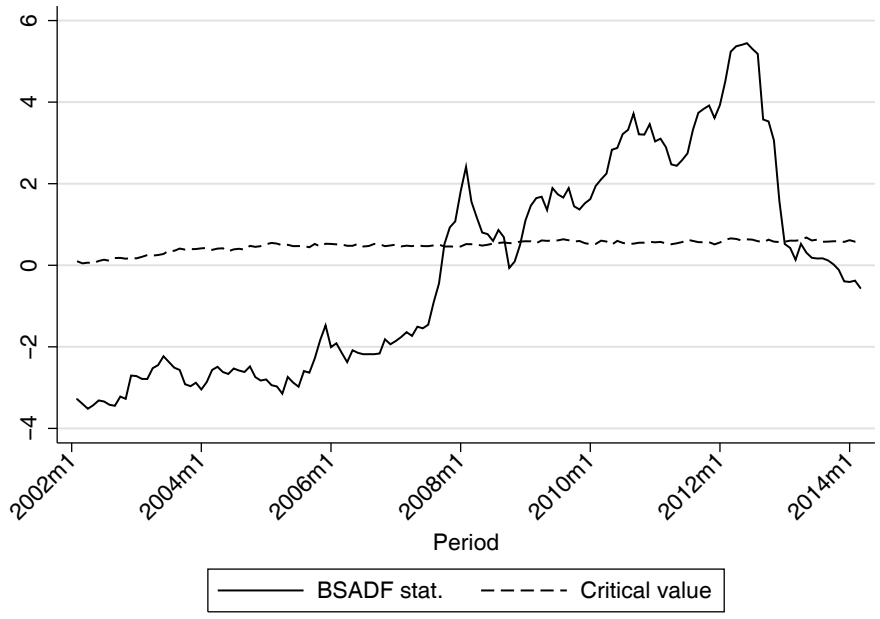

FIG. 4.4: $BSADF_{r_2}(r_{r_0})$ test statistics for the real German Target balance

NOTES: Time series of $BSADF_{r_2}(r_{r_0})$ test statistics for the real German Target balance from February 2002 to March 2014. The $BSADF_{r_2}(r_{r_0})$ test statistics were obtaines from rolling window regressions with flexible window widths and four lags. The first observation is in January 1999.

[15] We obtain the critical value for the *PSY test* using Monte Carlo simulations under the null hypothesis of no explosiveness, assuming normally distributed errors. We generate 2000 series of random walks and employ the *PSY test* on each series. We use the 95% quantiles of the test statistics as the 95% critical values.

Table 4.2: Explosive periods of the real German Target balance

(1)	(2)	(3)	(4)	(5)
PWY test	PWY test (rolling regressions)			PSY test
	30%	40%	50%	
	2007m11-2008m9	2007m12-2008m9	2008m1-2008m9	2007m10-2008m9
2009m1-2013m2	2008m12-2012m11	2008m12-2012m12	2008m12-2012m12	2009m1-2012m12
2013m4-2013m8				

Notes: Explosive periods of the real German Target balance using four lags. Column (1) shows the result of the recursive *PWY test* with increasing observations. Columns (2)–(4) show the results for the *PWY test* with rolling window regressions with fixed window widths of 30%, 40% and 50% of the whole sample (55, 73 and 92 observations in each regression). Column (5) shows the results for the *PSY test* with rolling window regressions with flexible window widths.

4.5 Conclusion

Using the new unit root tests by Phillips et al. (2011) and Phillips et al. (2013) we show that the Target balances of the German Bundesbank became explosive in autumn 2007 and at the beginning of 2009. In autumn 2007 the interbank market broke down for the first time, the first commercial banks (e.g., Northern Rock) began to teeter, and interbank risk premia for the GIIPS countries rose sharply. The German Target claims increased sharply because credit flows from the core Eurozone countries into the GIIPS countries decreased and the national central banks of the GIIPS countries had to create money to finance imports. In October 2008 the ECB implemented a full-allotment policy to facilitate bank lending after the outbreak of the financial crisis and the collapse of the interbankmarket. The ECB provided any amount of credit to the commercial banks when the commercial banks were able to offer adequate collateral. The ECB also reduced the required minimum quality of collaterals from A- to BBB- in autumn 2008 to enable the commercial banks to use the full-allotment facility, undercutting market conditions.[16] The

[16]Since 2010 the ECB has even suspended a minimum credit rating for debt instruments issued or guaranteed by crisis countries (see Eberl and Weber 2014).

commercial banks of the GIIPS countries used the extra refinancing credit to replace the flow of credit from abroad that had financed the current account deficits and to redeem their maturing stocks of interbank credit. The net payment orders from the GIIPS countries to Germany that resulted fromthe extra refinancing credit induced the exploding Target balances (Sinn 2012a, 2012b, Sinn and Wollmershäuser 2012).

The real German Target claims have decreased since autumn 2012 because intergovernmental fiscal rescue credit was being paid out to the crisis countries and the OMT and the ESM had calmed the markets. Private capital flowed back into the crisis countries. According to our findings the explosive period of the real German Target balance ended at the beginning of 2013. One issue is whether the decreasing Target claims of the German Bundesbank and the decreasing Target liabilities of the GIIPS countries indicate that governments are pursuing sustainable fiscal policies. When the Target claims of the German Bundesbank decrease, German hidden government debt decreases. The decreasing Target liabilities of the GIIPS countries imply that capital is flowing back to the GIIPS countries. In Spain, however, the new capital was mainly invested in newly issued government bonds (Westermann, 2013). Public debt in Spain increased (see Figure 4.5). Increasing public debt gives rise to new risks to fiscal sustainability in the GIIPS countries.

In March 2013, the European Union and the International Monetary Fund put together a rescue package for Cyprus. The rescue package included a levy on bank deposits. When creditors do not trust in bank deposits in the crisis countries, capital is likely to flee from the crisis countries, and the German Target claims are likely to increase (Boysen-Hogrefe 2013). Consequently, in April 2013 the real German Target claims increased again. In May 2013 the real German Target claims continued to decrease. When fiscal policies in the crisis countries are not sustainable new European rescue packages might be needed. New rescue packages pose a risk to the sustainability of public finances in Germany.

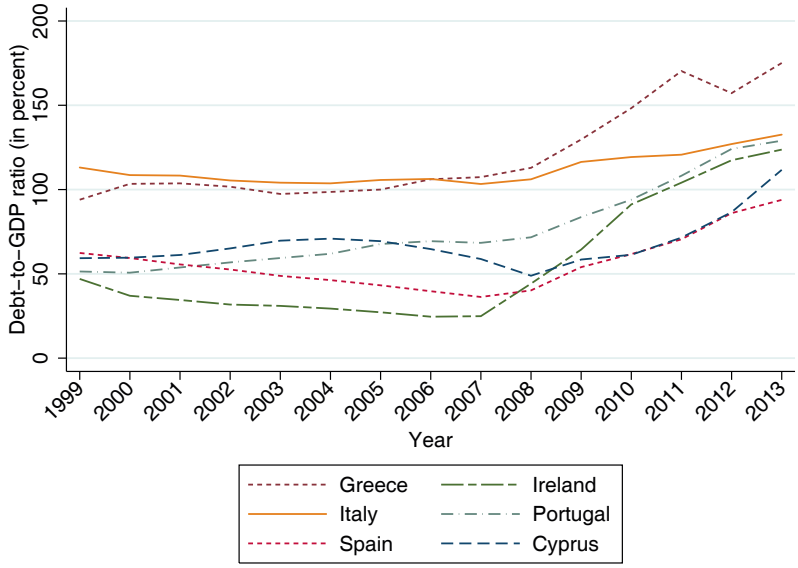

Fig. 4.5: Public debt in the GIIPS countries and Cyprus

Sources: Eurostat, own calculations.

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Chapter 5

Creative Accounting and Electoral Motives: Evidence from OECD Countries

Abstract*

Using an unbalanced panel of 27 OECD countries over the period 1970-2011, I examine whether electoral motives influenced creative accounting. Government engage in "below-the-line" operations, such as transactions in financial assets, that do not show up in the deficit figures but give rise to changes in debt. I use the difference between the change in public debt and the deficit (stock-flow adjustment) to measure creative accounting. The results suggest that governments strategically engaged in creative accounting before regular elections so as to sugarcoat the budget balance. I also provide an overview of government interventions that gave rise to large stock-flow adjustments.

*The chapter is based on my paper "Creative Accounting and Electoral Motives: Evidence from OECD Countries," *Journal of Comparative Economics* (forthcoming).

5.1 Introduction

Governments can engage in "creative accounting" to hide borrowing and sugarcoat the budget balance. Milesi-Ferretti (2003, p. 390) suggests using "the difference between budget deficits and the change in public debt" to measure creative accounting. Stock-flow adjustments describe the difference between deficits and the change in debt. A positive stock-flow adjustment shows that public debt increased by more than the deficit would imply, whereas a negative stock-flow adjustment shows that public debt increased by less than the deficit would imply. Some components of stock-flow adjustments, such as time-of-recording effects and valuation effects, should cancel out over time. "Below-the-line" operations, such as transactions in financial assets, however, can result in large and persistent stock-flow adjustments.[1] For example, a positive stock-flow adjustment occurs when a government uses equity injections into public companies to shift public expenditures out of the budget to public companies that are excluded from the fiscal accounts. Analogously, a negative stock-flow adjustment will occur when a government privatizes a public company.

I examine whether electoral motives influenced creative accounting as measured by stock-flow adjustments. Governments may hide deficits so as to sugarcoat the budget balance before elections. Governments also have incentives to support or bail out private and public companies before elections by providing equity injections. Governments may hesitate to engage in privatization before elections in an effort to maintain a stronger influence on the economy. Substantial equity injections from governments to private or public companies are recorded in many pre-election or election years. For example, in 2007 Eurostat reclassified the 2005 equity injections by the Portuguese government into two public hospitals as capital transfers because Eurostat was not convinced that the government had acted as a private shareholder and doubted the profitability of the investment (Eurostat 2007). A similar case happened in 2002 when the Portuguese government provided equity injections to seven public enterprises (including Metro Lisboa). 2002 and 2005 were election years in Portugal (see also Alt et al. 2014). In 2012 Eurostat reclassified the equity injections from the Irish government to the state owned banks Allied Irish Banks and Irish Life &

[1] See also Eurostat (2014, p. 2): "[...] the change in the stock of debt does not originate only from the deficit but is impacted, for example, by loans granted by government or its equity injections into corporations, which do not appear in the deficit figures (except if treated as capital transfers)."

Permanent from a transaction in financial assets to a capital transfer, ex-post increasing the deficit in 2011 (an election year) by 3.7 percentage points (Carswell 2012).[2]

Using an unbalanced panel of 27 OECD countries over the period 1970-2011, I show that stock-flow adjustments increased before elections. Governments were particularly likely to engage in creative accounting before regular elections.

5.2 Definition of Stock-Flow Adjustments

The government's budget identity describes that the change in debt in period t equals the deficit in period t (see, e.g., Barro 1979, Bohn 2007):[3]

$$B_t - B_{t-1} = D_t = G_t - R_t, \tag{5.1}$$

where B_{t-1} denotes debt at the begining of period t, B_t denotes debt at the end of period t, D_t denotes the deficit in period t, G_t denotes expenditures (including interest payments) in period t, and R_t denotes revenues in period t. The debt level in period t is thus equal to the initial debt level in period $t - n$ plus the accumulated deficits:

$$B_t = B_{t-n} + \sum_{i=0}^{n-1} D_{t-i} \tag{5.2}$$

[2]Other examples of election or pre-election years coinciding with large stock-flow adjustments include Belgium, whose government in 2007 injected capital into BAM (an Antwerp transport infrastructure project); Estonia, whose government in both 2006 and 2007 injected capital into Eesti Vedelkütusevaru Agentuur (an Estonian oil stockpiling company); the Spanish government's 2007 capital injections in ICO (an export insurance); the Finnish government's 2007 capital injections into Finnair Plc and Sponda Plc (a real estate investment company); and the U.K. government's 2005 injections of capital in the NGDF nuclear fund (Eurostat 2008).

[3]The values of the variables can be nominal, real, or deflated by a scale variables (e.g., GDP), provided an appropriate measure of the interest rate. Using nominal values, the nominal interest rate applies, using real values, the real interest rate applies, and using GDP ratios, the real (nominal) interest rate minus the real (nominal) growth rate of GDP applies (Bohn 2007).

Descriptive statistics show, however, that Equation 5.2 does not always hold. The difference between the change in debt and the deficit is called a stock-flow adjustment (SFA) or a debt-deficit adjustment (von Hagen and Wolff 2006). If the stock-flow adjustment is positive, public debt increases by more than the budget deficit in period t would imply:

$$B_t - B_{t-1} = D_t + SFA_t \tag{5.3}$$

Eurostat (ESA 1995) defines government debt as the total consolidated gross debt at nominal value in the following categories of government liabilities: Currency and deposits, securities other than shares excluding financial derivatives, and loans. Stock-flow adjustments thus consist of four main components (Eurostat 2014):[4]

(1) Transactions in financial assets: The deficit is defined as the government's net borrowing, that is, the difference between revenues and expenditures excluding financial transactions (net concept). When computing the debt level, government assets are not netted from the liabilities (gross concept). Transactions in financial assets can thus give rise to increasing or decreasing public debt but do not affect the deficit ("below the line" operations). For example, if a government issues debt and stores the receipts as a bank deposit, gross debt increases but the transaction has no effect on the deficit. A positive stock flow-adjustment can result when a government buys financial assets (e.g., equity injections into public or private companies); a negative stock-flow adjustment can result when a government sells financial assets (e.g., privatizations of public companies).

(2) Transactions in liabilities: Certain types of liabilities are recorded as stock-flow adjustments because they are excluded from the Eurostat government debt definition, such as liabilities in financial derivatives. The net incurrence of these types of liabilities enters

[4]Time-of-recording effects can also give rise to stock-flow adjustments. Expenditures and revenues are recorded at the time the underlying transaction takes place even if the effective cash flow has not yet occurred (accrual accounting). Changes in debt are recorded when the effective cash payments or receipts occur (cash concept). If expenditures or revenues are recorded but the effective cash flow has not yet occurred, the deficit deviates from the change in debt. For example, positive stock-flow adjustments can result from the issuance of zero-coupon bonds or the reimbursement of taxes. Negative stock-flow adjustments can result from interest accrued from zero-coupon bonds or the collection of excessive taxes that will have to be reimbursed later.

negatively in the stock-flow adjustment because they are only recorded in the deficit but not in the debt level.

(3) Valuation effects: Valuation effects describe changes in the value of debt resulting from changes in the level and structure of prices or the exchange rate. A revaluation of debt denominated in a foreign currency changes the face value of the debt without having an impact on the budget deficit. Exchange rate depreciations can lead to positive stock-flow adjustments; exchange rate appreciations can lead to negative stock-flow adjustments.

(4) Volume effects: Volume effects result from changes in sector classifications and other volume changes in financial liabilities that arise from the reclassification of units inside or outside general government and other cases of debt reductions that are not recorded in the deficit (e.g., debt reliefs).

Stock-flow adjustments can thus be expressed as:[5]

$$SFA_t = \sum_{j=1}^{7} x_{jt}^{FA} - \sum_{j=4}^{6} x_{jt}^{L} + \sum_{j=1}^{3} \Delta val_{x_{jt}}^{L} + \sum_{j=1}^{3} \Delta val_{x_{jt}}^{L} + \epsilon_t, \tag{5.4}$$

where x_{jt}^{FA} denotes transactions in financial assets, x_{jt}^{L} denotes transactions in liabilities, $\Delta val_{x_{jt}}$ denotes valuation effects, $\Delta val_{x_{jt}}$ denotes volume effects, ϵ_t denotes statistical discrepancies, and j denotes the different types of financial assets and liabilities.[6]

Stock-flow adjustments are prevalent in public finance statistics because of accounting issues. Stock-flow adjustments should, however, not generate a systemic bias between the stock of debt and the sum of all deficits over time. "Large and persistent stock-

[5]Seiferling (2013) describes stock-flow adjustments measured as the difference between the deficit and the change in debt as a partial stock-flow adjustment and computes a total stock-flow adjustment taking the difference between total flows (budget deficit, transactions in financial assets, transactions in liabilities, valuation effects and volume effects) and changes in debt. For the purpose of my analysis I rely on the definition of (partial) stock-flow adjustments as expressed in Equations 5.3 and 5.4 because I examine whether governments use the four main components of stock-flow adjustments to sugarcoat the budget balance rather than looking at statistical discrepancies.

[6]Currency and deposits ($j = 1$), securities other than shares excluding financial derivatives ($j = 2$), loans ($j = 3$), shares and other equity including financial derivatives ($j = 4$), insurance technical reserves ($j = 5$), other accounts receivable/payable ($j = 6$) and monetary gold and special drawing rights ($j = 7$).

flow adjustments (especially if they always have a negative impact on debt developments) should give cause for concern, as they may be the result of the inappropriate recording of budgetary operations and can lead to large ex-post upward revisions of deficit levels" (European Commission 2003, p. 82). Large and persistent stock flow adjustments can result from transactions in financial assets such as equity injections into public and private companies or privatizations of public companies (von Hagen and Wolff 2006, Weber 2012). Governments can also use transactions in financial assets to hide borrowing. Ongoing subsidies for (public) companies become a way of creative accounting when they are treated as equity injections or transaction in shares and other equity not reported in the deficit. If the public company then provides government services, the government has shifted public expenditures out of the budget and to public companies excluded from the fiscal accounts. Some positive stock-flow adjustments resulting from the acquisition of financial assets, however, do not indicate hiding borrowing, for example, if a government uses budget surpluses to accrue reserves in a pension insurance fund or a sovereign wealth fund (see also von Hagen and Wolff 2006).

5.3 Prior Studies and Research Framework

Governments can manipulate financial data to sugarcoat the budget balance, an issue that is well known and has been described as "creative accounting" (Milesi-Ferretti 2003), "accounting fudges" (Dafflon and Rossi 1999), "fiscal adjustment illusion" (Easterly et al. 1999), "fiscal gimmickry" (Koen and van den Nord 2005) or "cooking the books" (Laughland and Paul 1997). Milesi-Ferretti (2003) suggests using stock-flow adjustments, defined as the difference between the budget deficit and the change in public debt, to measure creative accounting. Von Hagen and Wolff (2006, p. 3270) arrive at the conclusion that governments "systematically use stock-flow adjustments to lower deficits." European governments particularly engaged in creative accounting to hide borrowing after the introduction of the Stability and Growth Pact (SGP) in 1998 (see, e.g., von Hagen and Wolff 2006, Buti et al. 2007, Beetsma et al. 2009, Alt et al. 2014). The SGP limits the debt-to-GDP ratio to 60% and the deficit to 3%, but the deficit limit receives more attention. Governments thus had an incentive to embellish the deficit figures via creative accounting.

Experts examine which determinants influence stock-flow adjustments. Stock-flow adjustments have been large during financial crises (Weber 2012, Seiferling 2013). To support and bail out troubled financial institutions, governments purchased assets, provided loans and equity to financial institutions and engaged in other off-balance-sheet activities that increased public debt but did not show up in the budget deficit. Currency devaluations that increased stock-flow adjustments particularly occurred in emerging countries (Weber 2012). Inflation increased stock-flow adjustments (Campos et al. 2006, Weber 2012, Seiferling 2013). Stock-flow adjustments were higher during economic downturns (Alt et al. 2014). Greater transparency of the budgeting process, defined as the insight of the public into government structures and functions, fiscal policy intentions, public sector accounts and projections, reduces the incentives for creative accounting.[7] Governments with low fiscal transparency tend to invest more in equities that produce low returns (Seiferling and Tareq 2015). Greater fiscal transparency should also increase the quality of fiscal data and thus decrease stock-flow adjustments resulting from measurement issues (Alt et al. 2014).

Political business cycle theories describe how politicians opportunistically manipulate fiscal policy before elections, assuming adaptive (Nordhaus 1975) or rational expectations (Rogoff and Sibert 1988, Rogoff 1990) of the economic actors.[8] In the approaches assuming adaptive expectations, opportunistic politicians can fool naive voters and stimulate the economy immediately before each election. In the approaches assuming rational expectations, the incumbent government exploits its information advantage over the voters to signal economic competence before elections. Shi and Svensson (2006) show that politicians may behave opportunistically even if most voters know the government's policy, but some voters are uninformed. Empirical studies suggest that the incumbent government benefits from favorable economic conditions (see, e.g., Hibbs 2006 for a literature survey).[9]

Following the theories of opportunistic political budget cycles I expect stock-flow adjustments to increase before elections. To signal economic competence before elections, the

[7] On fiscal transparency see Alt and Lassen (2006a, 2006b) and Lassen (2010).

[8] On empirical evidence for political business cycles see, e.g., Alt et al. (2006a), de Haan and Klomp (2013), de Haan and Sturm (1994), Klomp and de Haan (2013), Mechtel and Potrafke (2013), Mink and de Haan (2006), Potrafke (2010a, 2012), Shi and Svensson (2006), Wehner (2013).

[9] On a theoretical model where the probability of winning an election depends on economic performance see Aizenman and Powell (1998).

incumbent governments can engage in creative accounting measures to hide deficits so as to sugarcoat the budget balance ("window dressing"). Governments also have incentives to support or bail out private and public companies before elections by providing equity injections and loans. Governments may hesitate to engage in privatization before elections in an effort to maintain a stronger influence on the economy. Two previous studies test for political business cycles in stock-flow adjustments. Using a panel of 12 European countries over the period 1994-2004, Buti et al. (2007) show that stock-flow adjustments were larger in election years. Using a panel of Eurozone countries over the period 1990-2007, Alt et al. (2014) show that stock-flow adjustments were lower when governments had more years left in office until the next election. The results suggest that governments are less prone to manipulate fiscal data in the early years of a term.

I contribute to the literature on creative accounting and stock-flow adjustments in the following ways: First, I extend the existing studies by using a larger dataset of 27 OECD countries over the period 1970-2011. Second, I employ a different empirical strategy. Elections may not be exogenous to fiscal policy because (unobserved) variables, such as crises or social unrest, can influence the timing of elections and fiscal policy (see Shi and Svensson 2006). For example, during the financial crisis that began in 2007, early elections were called in Greece, Portugal, and Italy, while bank bailouts gave rise to large stock-flow adjustments. I thus distinguish between regular and early elections. The timing of regular elections is predetermined by the constitution and should be independent of fiscal policy. Third, I provide an overview of government interventions that gave rise to large stock-flow adjustments. My paper is one of the first to examine stock-flow adjustments during the financial crisis that started in 2007, a period during which stock-flow adjustments were particularly large.

5.4 Data and Descriptive Statistics

I use data on 27 OECD countries over the period 1970-2011. I use data on revenues, expenditures, debt, and GDP from the AMECO database of the European Commission,

which is based on Eurostat data.[10] The data apply to consolidated general government (central, state, and local governments, and the social security system). Using data from the AMECO database ensures a high level of comparability in terms of data definition and institutional coverage.

Table 5.1 compares the 2011 debt level of the individual OECD countries in my sample with the accumulated deficits as described in Equation 5.2, that is, the sum of the debt level in the initial year and all budget deficits between the initial year and 2011 as a share of 2011 GDP (in percent). Stock-flow adjustments are persistent and the difference between the stock of debt and the accumulated deficits is large for many countries. For example, in Japan, the stock of debt as a share of GDP is about 113 percentage points higher than the budget data would suggest. When calculating the budget balance of the general government, the Japanese System of National Accounts (SNA) includes surpluses in the social security funds, even though these surpluses can be viewed as debt owed to future beneficiaries, and excludes the financial balances of public corporations (Wright 1999). "The exclusion of the substantial surpluses on the social security fund, and the inclusion of public corporations' deficits therefore has a marked effect on the financial balance of General Government so defined. The resulting fiscal deficit is therefore much larger and more persistent than that of General Government measured according to the conventions of SNA" (Wright 1999, p. 352).[11] Low or even negative stock-flow adjustments, as recorded in Italy, Turkey, and some eastern European countries such as Hungary, Poland, and Slovakia, may result from the sale of financial assets and large privatization processes. In Finland, Luxembourg, and Norway, the sum of all deficits is negative, implying that the debt level should be negative. Governments in Finland, Luxembourg, and Norway thus seem to have used budget surpluses to accumulate assets instead of paying back debt (see also von Hagen and Wolff 2006, Seiferling 2013). Table 5.6 in the appendix describes episodes of large stock-flow adjustments and corresponding government intervention in the individual countries.

[10] I use data under the ESA 1995 definition because under the ESA 1995 definition longer time series are available than under the ESA 2010 definition.

[11] The Japanese public pension fund also accumulated financial assets to a large extent (Abbas et al. 2014).

TABLE 5.1: Difference between debt and accumulated deficits

Country	Initial year	Debt in initial year	Debt in 2011	Sum of deficits	Difference (sum of SFAs)
		A	B	C	$B - C$
Austria	1976	28	73	58	15
Belgium	1970	60	99	84	15
Canada	1976	42	87	61	26
Czech Republic	1996	12	39	46	-7
Denmark	1972	12	46	0	46
Estonia	1996	7	6	0	6
Finland	1975	7	49	-32	81
France	1978	21	86	66	20
Germany	1971	18	80	63	17
Greece	1988	60	170	150	20
Hungary	1996	68	73	88	-15
Iceland	2005	26	99	55	44
Ireland	1985	99	104	79	25
Italy	1980	55	121	131	-10
Japan	1981	55	230	117	113
Luxembourg	1990	5	19	-21	40
Netherlands	1976	43	66	56	10
Norway	1998	25	28	-118	136
Poland	1996	41	52	64	-12
Portugal	1977	24	108	100	8
Slovakia	1996	30	44	59	-15
Slovenia	1996	21	47	53	-6
Spain	1995	65	70	37	33
Sweden	1993	69	39	36	3
Turkey	2006	44	38	55	-17
United Kingdom	1971	73	88	88	0
United States	1970	44	107	112	-5

NOTE: Values expressed as a share of GDP (in percent). SOURCES: AMECO, own calculations.

Figure 5.1 shows the average stock-flow adjustments as a share of GDP in pre-election years, election years, and other years that are neither pre-election years nor election years. Voters may well consider the pre-election year budget deficit when deciding on whom to vote for because data for the election year may not yet be available, especially if elections take place early in the year. I consider parliamentary elections for countries with parliamentary political systems and presidential elections for countries with presidential systems. The average stock-flow adjustment to GDP ratio in pre-election years was 1.62%, the average stock-flow adjustment to GDP ratio in election years was 1.72%, and the average stock-flow adjustment to GDP ratio in the other years was 0.91%.

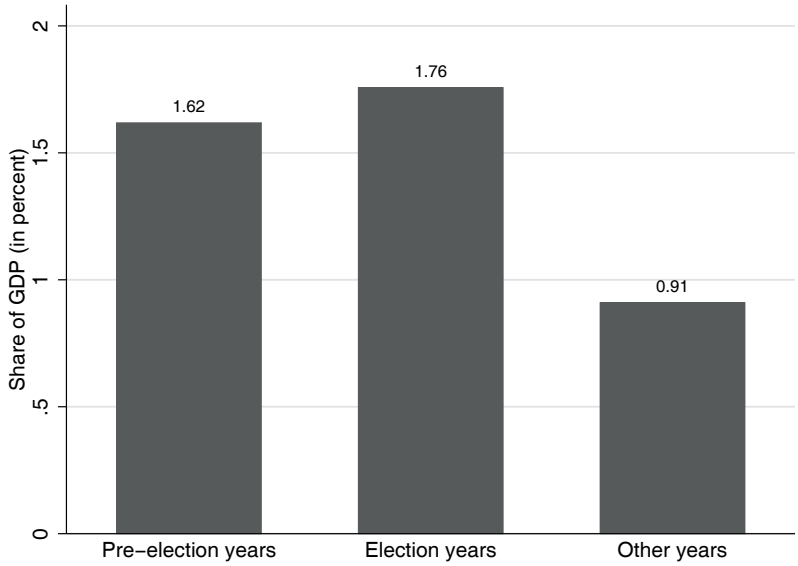

Fig. 5.1: Average stock-flow adjustments in pre-election years and election years

Notes: The number of observations is 712 (201 pre-election years, 191 election years, 320 other years). Unbalanced panel for 27 OECD countries covering the period 1970-2011. Sources: AMECO, own calculations.

I have decomposed stock-flow adjustments in its single components. Data for the single components are, however, not available for all countries in my sample and only for years after 1994. Transactions in financial assets account for about 98% and adjustments (transactions in liabilities, valuation effects, and volume effects) account for about 2% of average

stock-flow adjustments (see Table 5.7 in the appendix). Transactions in financial assets can be decomposed in currency and deposits (35%), securities other than shares (20%), loans (12%), shares and other equity (15%), and other financial assets (19%). Figure 5.2 shows the development of average acquisitions of financial assets, average adjustments, and average statistical discrepancies over the period 1995-2011. Average adjustments and statistical discrepancies were relatively stationary over time.[12] Transactions in financial assets strongly increased over the period 1997-2008.

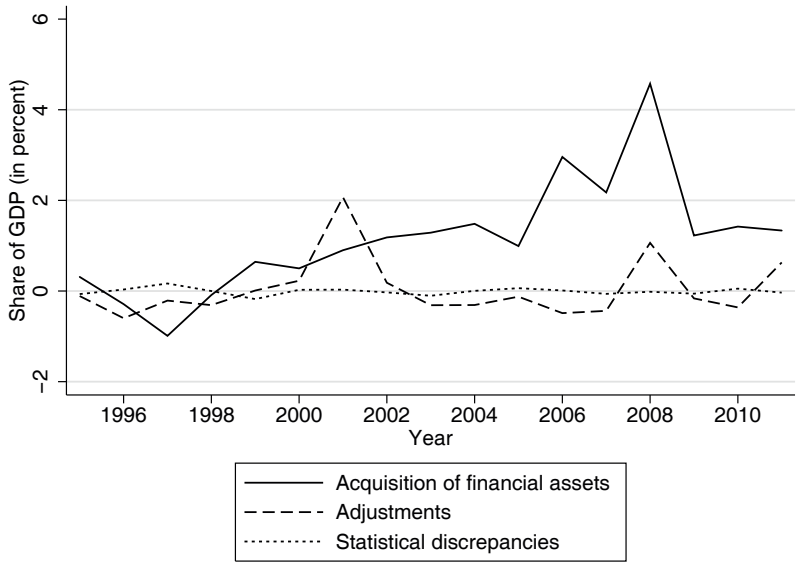

FIG. 5.2: Average composition of stock-flow adjustments

NOTES: The sample includes Belgium, Czech Republic, France, Hungary, Luxembourg, the Netherlands, Portugal, Spain, and the UK over the period 1995-2011; Poland and Slovenia over the period 2000-2011; Estonia and Turkey over the period 2001-2011; Austria, Denmark, Finland, Germany, Greece, Ireland, Italy, Norway, Slovakia, and Sweden over the period 2002-2011; and Iceland over the period 2005-2011. SOURCES: Eurostat, own calculations.

Stock-flow adjustments were particularly large during the financial crisis that started in 2007. In many countries, stock-flow adjustments reflect the acquisition of financial assets

[12]The increase in adjustments in 2001 was caused by a large appreciation of debt denominated in foreign currency in Turkey, the increase in adjustments in 2008 was caused by Iceland and Norway.

during the financial crisis. Figure 5.3 shows the annual stock-flow adjustment and the net acquisition of financial assets in the years 1980-2011 for the 20 countries in my sample for which data on the acquisition of financial assets are available.[13] Belgium, for example, purchased securities from and provided equity injections to the private banks Fortis, Dexia, KBC, and Ethias in 2008. Denmark and Ireland took the precautionary measure of reinforcing cash reserves by issuing bonds or taking loans (recorded as government debt) in 2008. Ireland took the further step of injecting equity into financial institutions in 2009. The Netherlands gave loans and provided equity injections to the private banks Fortis and ABN Amro in 2008. Germany purchased securities via the special purpose vehicle Financial Market Stabilization Fund in 2008. Germany's high net acquisition of financial assets in 2010 reflects the establishment of two public defeasance structures (Erste Abwicklungsanstalt and FMS-Wertmanagement) and their loans (see also Reischmann 2014).

5.5 Empirical Analysis

5.5.1 Empirical Specification

The baseline panel data model has the following form:

$$\begin{aligned}\Delta \textit{Stock-flow adjustment}_{it} = \alpha \textit{Election}_{it} + \beta \textit{Election in next year}_{it} \\ + \sum_{l} \gamma_l X_{it} + \sum_{k} \theta_k \Delta Z_{it} + \eta_i + \epsilon_t + u_{it},\end{aligned} \tag{5.5}$$

where the dependent variable $\Delta \textit{Stock-flow adjustment}_{it}$ denotes the percentage point change in stock-flow adjustments relative to GDP (in percent) in country i in period t. The variable $\textit{Election}_{it}$ assumes the value 1 if an election takes place in country i in year t and 0 otherwise. The variable $\textit{Election in next year}_{it}$ assumes the value 1 if an election takes

[13] To calculate the net acquisition of financial assets, I use the annual change in the difference between gross and net debt because government assets are netted from gross debt to calculate net debt (see Weber 2012). I use data on gross and net debt from the IMF World Economic Outlook.

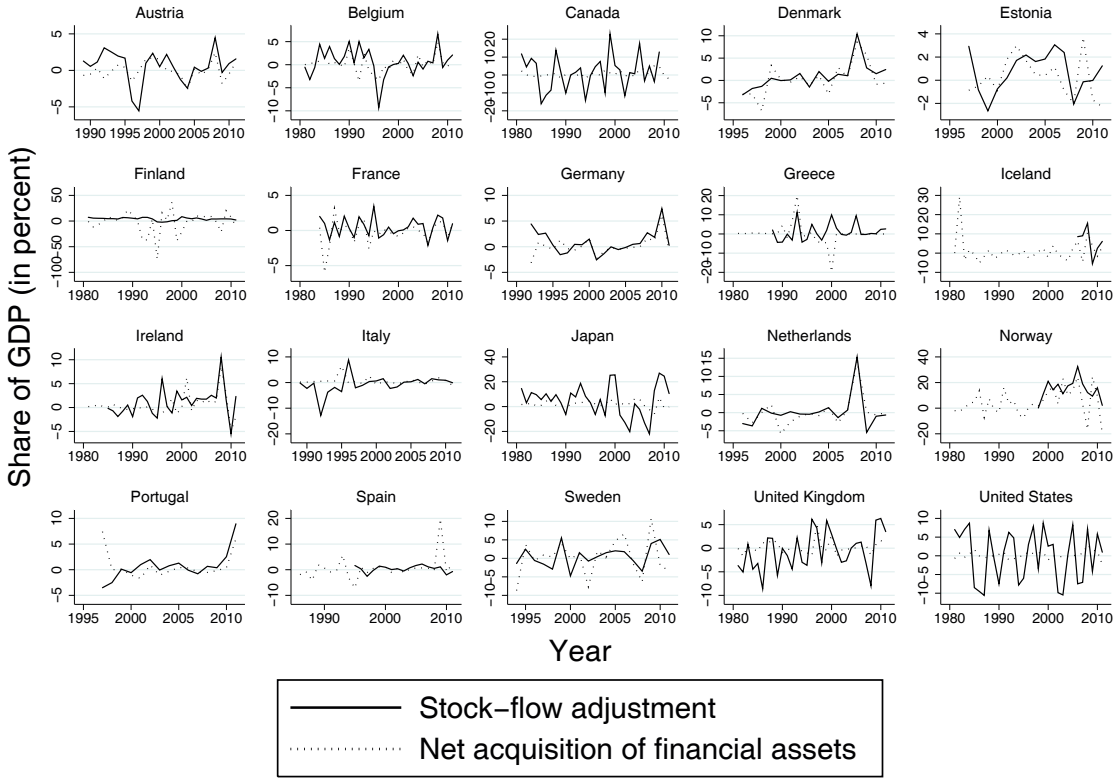

FIG. 5.3: Stock-flow adjustments and transactions in financial assets

NOTES: Data on transactions in financial assets are available for only 20 of the countries in my sample.
SOURCES: AMECO, IMF World Economic Outlook, own calculations.

place in country i in year $t+1$ and 0 otherwise. I also distinguish between regular elections and early elections/snap elections. Distinguishing between regular and early elections mitigates the potential endogeneity of the $Election_{it}$ and $Election\ in\ next\ year_{it}$ variables (see Section 5.3). The variable $Regular\ election_{it}$ assumes the value 1 if a regular election takes place in country i in year t and 0 otherwise. The variable $Early\ election_{it}$ assumes the value 1 if an early election takes place in country i in year t and 0 otherwise. The variable $Regular\ election\ in\ next\ year_{it}$ assumes the value 1 if a regular election takes place in country i in year $t+1$ and 0 otherwise. The variable $Early\ election\ in\ next\ year_{it}$ assumes the value 1 if an early election takes place in country i in year $t+1$ and 0 otherwise. I expect governments to strategically use stock-flow adjustments before regular elections but not before early elections because governments may not have enough time to strategically react to early elections.

The vector X includes index and dummy control variables. I examine whether political ideology influences stock-flow adjustments. Left-wing governments may try to gain more influence over the economy, for example, by acquiring company shares. Right-wing governments may be more likely to engage in privatization and deregulation (see, e.g., Bortolotti et al. 2003, Bortolotti and Pinotti 2008, Belloc et al. 2014, Potrafke 2010b). The index *Left* takes values between 1 and 5. The index assumes the value 1 if the share of the governing right-wing parties in terms of seats in the cabinet and in parliament is larger than two-thirds, and 2 if it is between one-third and two-thirds. The index assumes the value 3 if the share of center parties is 50%, or if the left-wing and right-wing parties form a coalition government. The index is symmetric and assumes the value 4 if the share of the governing left-wing parties in terms of seats in the cabinet and in parliament is larger than two-thirds, and 5 if it is between one-third and two-thirds (see Potrafke 2009, 2011, Brech and Potrafke 2014).

To control for political constraints on the executive power which can moderate politically-driven fiscal policy manipulations I include the *POLCONIII Index* (Henisz 2002). The *POLCONIII Index* is a structurally-derived internationally comparable measure of political constraints that result from political institutions and the preferences of political agents. The dummy variable *Banking crisis* takes the value 1 for years in which a country has experienced a banking crisis because stock-flow adjustments tend to be particularly large

during banking crises. The dummy variable *Balanced budget rule* assumes the value 1 for years in which a balanced budget rule is in place. Budget balance rules can be specified as overall balance, structural or cyclically adjusted balance, and balance "over the cycle." The Balanced budget rule variable also covers "golden rules," which target the overall balance net of capital expenditures (Kinda et al. 2013). I expect a positive influence of the variable *Balanced budget rule* on stock-flow adjustments. Countries with balanced budget rules might have a stronger incentive to engage in creative accounting for the purpose of hiding deficits. The dummy variable *Debt rule* assumes the value 1 for years in which a debt rule is in place. Debt rules set an explicit limit or target for public debt in percent of GDP (Kinda et al. 2013). I expect a negative influence of the *Debt rule* variable on stock-flow adjustments. The increase of public debt, either measured in the deficit or the stock-flow adjustment, should be lower in countries with debt rules.

The vector Z includes other control variables. To control for business cycle fluctuations I include the variable *Output gap*. I use the difference between the actual value and trend value of log real GDP to calculate the *Output gap* variable (Bohn 2008).[14] A positive output gap indicates an output above the trend (output surplus). The variable *Inflation* denotes the percentage change in average consumer prices.

The question arises as to whether stock-flow adjustments can always be attributed to fiscal policy or whether they might in some cases be due to expansionary monetary policy leading to depreciation and thus a rise in the value of debt denominated in foreign currency.[15] To control for exchange rate valuation effects I include the variable *Valuation effect*. I calculate the *Valuation effect* variable multiplying public debt denoted in a foreign currency as a share of GDP by the real effective exchange rate. A positive change in the *Valuation effect* variable signals exchange rate depreciation. Data on debt denoted in a foreign currency is, however, not available for all countries and all years in my sample.[16]

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[14] I calculate the trend values by using the Hodrick-Prescott filter using a smoothing parameter of 100.

[15] On political business cycle and partisan effects in monetary policy, see, e.g., Dreher and Vaubel (2009) and Belke and Potrafke (2012).

[16] Eurostat data on stock-flow adjustments caused by valuation effects are available for only 23 of the countries in my sample and only for years after 1995. Average stock-flow adjustments caused by valuation effects were particularly large in Hungary (0.95%) and Iceland (1.09%). Most other countries did not experience large currency revaluations.

Table 5.2: Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max	Obs.	Data source
Stock-flow adjustment	1.337	5.329	-21.96	32.43	685	AMECO, own calculations
Election	0.285	0.452	0	1	685	Own calculations
Regular election	0.164	0.370	0	1	685	Own calculations
Early election	0.121	0.327	0	1	685	Own calculations
Years left in current term	1.762	1.282	0	4	669	World Bank Database of Political Institutions
Left	2.855	0.862	1	4	667	Potrafke (2009), own calculations
Political constraints	0.456	0.123	0.120	0.720	667	Henisz (2002)
Balanced budget rule	0.579	0.494	0	1	667	Kinda et al. (2013)
Debt rule	0.517	0.500	0	1	667	Kinda et al. (2013)
Banking crisis	0.144	0.351	0	1	667	Laeven and Valencia (2012)
Output gap	0.186	2.743	-10.232	14.124	667	AMECO, own calculations
Inflation	4.194	4.011	-1.706	29.300	667	Reinhard and Rogoff (2011), IMF World Economic Outlook
Valuation effect	0.040	0.412	-2.151	2.383	187	OECD

Notes: Unbalanced panel for 27 OECD countries covering the period 1970-2011. The variables *Stock-flow adjustment*, *Net acquisition of financial assets*, and *Valuation effect* are scaled as a share of GDP (in percent). The variables *Inflation* and *Output gap* are expressed in percent.

I do not include a time-invariant fiscal transparency index in my regressions because I am using longer time series than previous studies and fiscal transparency may well have changed over these longer time periods. η_i describes a fixed state effect to control for state-specific characteristics. ϵ_t describes a fixed period effect to control for shocks that are common to all the countries in my sample. u_{it} describes the error term. I estimate the baseline model by using OLS with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors; see Huber 1967, White 1980, 1982, Stock and Watson 2008). Table 5.2 shows descriptive statistics for all variables.

5.5.2 Results

Table 5.3 shows the regression results for the baseline panel data model. In columns (1) and (2) I use the *Election* and *Election in next year* variables as the main explanatory

variables. In column (1) I only include fixed state and fixed period effects and in column (2) I add control variables. In columns (3) and (4) I distinguish between regular and early elections. In column (5) I add the *Valuation effect* variable.

The coefficient of the variable *Election* has a positive sign but does not turn out to be statistically significant at conventional levels in columns (1) and (2). The coefficient of the variable *Election in next year* has a positive sign and is statistically significant at the 5% level in columns (1) and (2). The results suggest that stock-flow adjustments increased by about 2 percentage points in years before elections. The coefficient of the variable *Regular election* has a positive sign but does not turn out to be statistically significant in columns (3) to (5). The coefficient of the variable *Regular election in next year* has a positive sign and is statistically significant at the 1% level in columns (3) and (4) and at the 10% level in column (3). Stock-flow adjustments increased by about 2–2.5 percentage points in years before regular elections. The coefficients of the variable *Early election* has a positive sign but does not turn out to be statistically significant in columns (3)-(5). The coefficient of the variable *Early election in next year* has a positive sign but does not turn out to be statistically significant at conventional levels in columns (3) and (4). In column (5) the coefficient of the *Early election in next year* variable has a negative sign and is statistically significant at the 5% level.

The coefficient of the *Left* variable has a negative sign and is statistically significant at the 10% level in columns (2) and (4). The results suggest that stock-flow adjustments were lower under left-wing governments. The coefficient of the *Political constraints* variable has a negative sign and is statistically significant at the 10% level in columns (2) and (4). The results suggest that political constraints mitigate increases in stock-flow adjustments. The coefficient of the *Banking crisis* dummy does not turn out to be statistically significant. The effect of banking crises may well be absorbed by the fixed time effects because banking crisis often occur at the same time in several countries. The coefficient of the *Debt rule* variable has the expected negative sign and is statistically significant in column (5). The coefficient of the variable *Inflation* has a positive sign and is statistically significant at the 1% level in columns (2) and (4). The coefficients of the variables *Balanced budget rule*, *Output gap*, and *Valuation effect* do not turn out to be statistically significant.

Table 5.3: Regression results (elections)

Dependent variable: Δ Stock-flow adjustments as a share of GDP					
	(1)	(2)	(3)	(4)	(5)
Election	0.952	1.028			
	(1.48)	(1.58)			
Election in next year	2.051**	2.124**			
	(2.59)	(2.52)			
Regular election			0.676	0.816	0.356
			(0.82)	(0.98)	(0.27)
Regular election in next year			2.101**	2.273***	2.536*
			(2.76)	(2.89)	(1.95)
Early election			1.363*	1.352*	1.248
			(1.75)	(1.73)	(0.95)
Early election in next year			2.020	1.957	-1.987**
			(1.60)	(1.45)	(-2.20)
Left		-0.329*		-0.329*	-0.0870
		(-1.74)		(-1.80)	(-0.48)
Political constraints		-2.191*		-2.145*	-2.899
		(-1.84)		(-1.77)	(-0.70)
Balanced budget rule		-0.177		-0.168	0.969
		(-0.18)		(-0.17)	(1.04)
Debt rule		-0.356		-0.352	-2.407*
		(-0.36)		(-0.35)	(-2.07)
Banking crisis		0.339		0.339	-2.237
		(0.35)		(0.35)	(-1.58)
Output gap		-0.0173		-0.0157	0.316***
		(-0.16)		(-0.15)	(3.12)
Inflation		0.454**		0.454**	0.0580
		(2.61)		(2.60)	(0.11)
Valuation effect					0.563
					(1.66)
Fixed time effects	Yes	Yes	Yes	Yes	Yes
Fixed state effects	Yes	Yes	Yes	Yes	Yes
R^2 (overall)	0.146	0.168	0.147	0.169	0.248
Number of countries	27	27	27	27	27
Number of observations	685	667	685	667	187

Notes: OLS with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors) in parentheses; *** , ** and * denote significance at the 1%, 5% and 10% levels. Unbalanced panel for 27 OECD countries covering the period 1970-2011.

5.5.3 Alternative Specifications and Robustness Tests

Following Alt et al. (2014), I count the years until the next to test for political business cycles. The panel data model has the following form:

$$\begin{aligned}\Delta \textit{Stock-flow adjustment}_{it} = \delta\, \textit{Years left in current term}_{it} \\ + \sum_{l} \gamma_l X_{it} + \sum_{k} \theta_k \Delta Z_{it} + \eta_i + \epsilon_t + u_{it},\end{aligned} \tag{5.6}$$

where the variable *Years left in current term*$_{it}$ assumes the value 0 if an election takes place in country i in year t and the value $n-k$, $k \in [1, n]$, in year k after an election year, where n denotes the length of the term. In countries where early elections can be called, the variable is set to the *de jure* term limit or schedule of elections and resets to 0 when an early election is called (Beck et al. 2001, Keefer 2012).

Table 5.4 shows the regression results for the alternative specification. In column (1) I only include fixed state and fixed period effects. In column (2) I include further control variables and in column (3) I add the *Valuation effect* variable. The coefficient of the *Years left in current term* variable has the expected negative sign and is statistically significant at the 10% level in columns (1) and (2). The results are in line with Alt et al. (2014): stock-flow adjustments increased at the end of the term. In column (3) the coefficient of the *Years left in current term* variable does not turn out to be significant at conventional levels.

Creative accounting as a way of "window dressing" before elections requires that governments believe that voters care about and dislike deficits. In the 1970s and 1980s, however, voters in most countries were less concerned about deficits than in the 1990s and 2000s. Government debt was much lower and Keynesian thinking was very popular. Governments thus may have found it politically attractive to show deficits to signal their economic policy competence. I split the sample into a pre- and post-1992 period. In 1992 the Maastricht Treaty was signed and deficits were officially disapproved at least in Europe. Table 5.5 shows the regression results. Using the pre-1992 period the coefficients of the *Election in next year* and the *Regular election in next year* variables have a positive sing and are

Table 5.4: Regression results (years left in current term)

Dependent variable: Δ Stock-flow adjustments as a share of GDP			
	(1)	(2)	(3)
Years left in current term	-0.453*	-0.506*	-0.335
	(-1.84)	(-1.97)	(-1.20)
Left		-0.311	-0.125
		(-1.69)	(-0.68)
Political constraints		-2.528*	0.166
		(-1.85)	(0.05)
Balanced budget rule		-0.0522	1.066
		(-0.05)	(1.37)
Debt rule		-0.726	-2.376*
		(-0.67)	(-1.92)
Banking crisis		0.263	-1.103
		(0.25)	(-0.83)
Output gap		-0.0398	0.259**
		(-0.38)	(2.51)
Inflation		0.448***	0.153
		(2.80)	(0.27)
Valuation effect			0.446
			(0.94)
Fixed time effects	Yes	Yes	Yes
Fixed state effects	Yes	Yes	Yes
R^2 (overall)	0.134	0.157	0.209
Number of countries	27	27	17
Number of observations	669	654	187

Notes: OLS with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors) in parentheses; *** , ** and * denote significance at the 1%, 5% and 10% levels. Unbalanced panel for 27 OECD countries covering the period 1970-2011.

TABLE 5.5: Alternative time periods

Dependent variable: Δ Stock-flow adjustments as a share of GDP			
Sample	Coefficient (t-stat.) of *Election in next year*	Coefficient (t-stat.) of *Regular election in next year*	Coefficient (t-stat.) of *Years left in current term*
Pre-1992	1.890*	2.015*	-0.468
	(0.90)	(1.13)	(-0.36)
Post-1992	2.280*	2.313**	-0.575*
	(2.05)	(2.19)	(-1.72)
Excl. 2008-2011	2.744***	2.320***	-0.526**
	(2.93)	(3.54)	(-2.14)

NOTES: OLS with standard errors robust to heteroskedasticity (Huber/White/sandwich standard errors) in parentheses; *** , ** and * denote significance at the 1%, 5% and 10% levels. Unbalanced panel for 27 OECD countries covering the period 1970-2011.

statistically significant at the 10% level. The coefficient of the *Years left in current term* variable does not turn out to be statistically significant. Using the post-1992 period, the coefficient of the *Election in next year* variable has a positive sign and is statistically significant at the 10% level. The coefficient of the *Regular election in next year* variable has a positive sign and is statistically significant at the 5% level. The coefficient of the *Years left in current term* variable has a negative sign and is statistically significant at the 10% level. Bank rescue packages have resulted in a strong increase in stock-flow adjustments since 2008. Inferences do not change when I exclude the crisis years 2008-2011 from my sample. Table 5.5 shows the results for the different time periods.

I have replaced the dependent variable in my regression models by the individual components of stock-flow adjustments. I do not find an individual component that drives my results. Note that the data availability of the individual components is limited (see Section 5.4). Governments may well a combination of several components of stock-flow adjustments rather than an individual component to hide deficits before elections. I also tested whether financial crises other than banking crises influenced stock-flow adjustments. Reinhard and Rogoff (2009, 2011) provide data on banking crises, currency crashes, sovereign domestic or external default (or restructuring), inflation crises, and stock market crashes for the years until 2010. No country in my sample experienced a sovereign domestic or external default over the considered time period. Inflation crises and stock market crashes did not have a

statistically significant influence on stock-flow adjustments. Currency crashes did have a statistically significant negative influence on stock-flow adjustments. The result depends, however, on the inclusion/exclusion of Canada, Iceland, or the United Kingdom, which experienced currency crises in 2008 and had negative stock-flow adjustments in the same year.

5.6 Conclusion

I investigate whether electoral motives induce creative accounting using a panel of 27 OECD countries over the period 1970-2011. I use the difference between the change in public debt and the deficit (stock-flow adjustment) to measure creative accounting. Not only the deficit causes changes in public debt, but also other government interventions that do not show up in the deficit figures, such as, for example, loans granted by the government, equity injections into private and public companies, or receipts from the privatization of public companies. The results show that stock-flow adjustments increased before elections. I also distinguish between regular and early elections. The results suggest that governments strategically used stock-flow adjustments before regular elections so as to sugarcoat the budget balance.

Stock-flow adjustments are persistent and the difference between the stock of debt and the accumulated deficits is large for many of the countries in my sample. I discuss government interventions that give rise to large stock-flow adjustments. Some countries also show low or even negative stock-flow adjustments, which may result from the sale of financial assets (e.g., Italy, Hungary, Poland, Turkey, and Slovakia). Finland, Luxembourg, and Norway appear to have used budget surpluses to accumulate assets instead of paying back debt. Stock-flow adjustments were particularly large during the financial crisis that started in 2007. To address the financial crisis and bail out financial institutions, governments bought financial assets, such as currency, deposits, securities, and loans, and injected equity into financial institutions.

Understanding the coherence between public debt and the budget deficit is indispensable for evaluating a government's fiscal performance. Borrowing in hidden accounts poses a

risk to the sustainability of public finances. The International Monetary Fund (2011, p. 73) points out that "as governments seek to cut their debts and deficits in coming years, they may be tempted to supplement genuine fiscal adjustment with accounting stratagems. This happened during earlier episodes of adjustment, and there is evidence of a resurgence of the problem." Closely monitoring stock-flow adjustments can reveal data-quality problems and instances of creative accounting.

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Appendix

Table 5.6: Episodes of large stock-flow adjustments

Country	Year	SFA	Events	References
Austria	1997	-5.5	One-time payment from a state enterprise (the Postsparkasse) in return for assuming pension liabilities; Reclassification of state enterprises with substantial debt (e.g., Asfinag) from government to corporate sector.	Easterly et al. (1999)
	2008	4.5	Financial crisis (accumulation of currency and deposits).	Eurostat (2009)
Belgium	1996	-9.3	Booking operation (three-day swaps of Treasury certificates by technically independent social funds within the Belgian government) designed to show a declining debt level and, therefore, qualifying for EMU membership.	Dafflon and Rossi (1999), Laughland and Paul (1997)
	2008	6.7	Equity injections in private banks (Fortis, Dexia, KBC, Ethias); Purchase of securities issued by a financial institution.	Eurostat (2009)
Canada	1985	-16	Privatizations.	Padova (2005)
Czech Republic	2002	-2.0	Privatizations.	Eurostat (2006)
	2003	-4.7	Debt cancellation.	Eurostat (2006)
	2004	1.7	Equity injections in CEPS a.s.	Eurostat (2008)
Denmark	2008	10.4	Reinforcement of cash reserves by issuing bonds or taking loans (recorded as government debt).	Eurostat (2009)
Estonia	2002	1.7	Equity injections in Riigi Kinnisvara, a real estate company.	Eurostat (2007)
	2006	3.1	Equity injections in Eesti Vedelkütusevaru Agentuur (Estonian oil stockpiling company)	Eurostat (2008)
	2008	-2.1	Sale of reserve assets.	Eurostat (2009)
Finland	1992	7.3	Banking crisis associated with currency crisis (Markka).	Von Hagen and Wolff (2006)
	2000	8.5	Exceptional dividend of the fully state-owned bank Leonia on eve of its merger with Sampo.	Koen and van den Nord (2005)
	2007	3.9	Equity injection in Finnair Plc and Sponda Plc.	Eurostat (2008)
	2008	4.2	Lending activities of employment pension institutions.	Eurostat (2009)
France	1995	3.5	Equity injections into Charbonnages de France.	Koen and van den Nord (2005)
	2003	1.8	Equity injections in France Telecom.	Eurostat (2007)

Table continues on next page

Table 5.6: (continued)

Country	Year	SFA	Events	References
	2006	-2.1	Enhanced liquidity management by the Treasury aiming at reducing the increase in debt.	Eurostat (2009)
	2008	2.2	Financial crisis.	Laeven and Valencia (2012)
Germany	1992	4.4	German Unity Fund established to finance the reunification.	Reischmann (2014)
	1997	-1.2	Disposal of the states Telekom shares; Reclassification of public hospitals from the government sector to the corporate sector, taking their debts out of general government debt; Unification-related debt of the privatization agency "Treuhand" not part of general government budget performance any more.	Easterly et al. (1999), Dafflon and Rossi (1999), Koen and van den Nord (2005)
	2008	2.7	Purchases of securities by special purpose vehicles (Financial Market Stabilization Fund).	Eurostat (2009)
	2009	1.8	Equity injections in financial institutions.	Eurostat (2011)
	2010	7.4	Establishment of two public defeasance structures ("FMS Wertmanagement", "Erste Abwicklungsanstalt") and their loans.	Eurostat (2011), Reischmann (2014)
Greece	1993	11.3	Debt of the Greek government at the Bank of Greece was officially recorded as public debt.	Von Hagen and Wolff (2006)
	1996	5.0	Equity injections in state-owned entities and enterprises.	Koen and van den Noord (2005)
	1998	-3.2	Privatizations (Hellenic Telecommunications Organization, Hellenic Petroleum, Water Supply Co., two subsidiaries of Olympic Airways); Sales of shares in the Bank of Greece.	Easterly et al. (1999)
	2000	9.9	Revaluation of foreign-currency-denominated liabilities; Understatement of military expenditures.	Buti et al. (2007), Alt et al. (2007), Koen and van den Nord (2005)
	2005	9.5	Equity injections in ATE Bank.	Eurostat (2007)
Iceland	2011	6	Financial crisis.	Laeven and Valencia (2012)

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Table 5.6: (continued)

Country	Year	SFA	Events	References
Ireland	2008	10.6	Reinforcement of cash reserves by issuing bonds or taking loans (recorded as government debt).	Eurostat (2009), Laeven and Valencia (2012)
	2009	1.7	Capital injections in private banks, in the form of purchase of preference shares by National Asset Management Agency (NAMA).	Eurostat (2010)
	2011	2.3	Equity injections in Irish Life & Permanent and Allied Irish Banks.	Alt et al. (2014), Eurostat (2012)
Italy	1996	8.8	Reclassification of the national railway's debt.	Easterly et al. (1999)
	1997	-2.0	Privatization of the highway management network Autostrade and the Airline Alitalia.	Easterly et al. (1999)
Japan	2007	-22	Privatization of Japan Post.	
Luxembourg	2008	10.9	Equity injections in private banks.	Eurostat (2009)
Netherlands	2008	15.3	Equity injections in private banks (Fortis, ABN Amro); Loans to financial institutions in the context of the current financial crisis.	Eurostat (2009), Eurostat (2011)
	2009	-5.4	Repayment of short -term loans by a financial institution; Large privatization process.	Eurostat (2011), Eurostat (2013)
Poland	2005	2.7	Equity injection in GAZ-System.	Eurostat (2008)
Portugal	2002	2.0	Subsidies to seven public enterprises (including Metro Lisboa); Equity injections in public hospitals.	Alt et al. (2014), Koen and van den Nord (2005)
	2011	9.0	Transfers of pension funds from banks to the state was not used to reduce government debt but kept as deposits; Disbursements of loans granted by the EU (under the EFSM), the euro-area member states (under the EFSF), and the IMF.	Eurostat (2012)
Slovakia	1999	9.6	Banking crisis	Laeven and Valencia (2012)
	2006	-0.2	Privatizations	Eurostat (2007)
Slovenia	2009	5.7	Financial crisis	Laeven and Valencia (2012)

Table continues on next page

TABLE 5.6: (continued)

Country	Year	SFA	Events	References
Spain	1997	-2.6	Privatization of Endesa (the country's main electricity group); Privatization receipts from the sale of part of Repsol treated above the line; Capital gains receipts associated with the sale of the final trance of Telefonica.	Dafflon and Rossi (1999), Koen and van den Nord (2005)
	2007	1.1	Equity injection in ICO (export insurance).	Eurostat (2008)
Sweden	1993	-8.1	Withdrawal of the remaining funds in the Working Life Fund.	Koen and van den Nord (2005)
	2010	5.1	Financial crisis	Laeven and Valencia (2012)
United Kingdom	2005	1.0	Equity injection in NGDF nuclear fund.	Eurostat (2008)
	2009	6.0	Equity injections.	Eurostat (2011)
	2010	6.3	Financial crisis.	Laeven and Valencia (2012)
United States	1987	-10.6	Privatization of Conrail (railroad company).	Kosar (2006)

NOTES: SFA denotes stock-flow adjusmtments as a share of GDP (in percent).

Table 5.7: Decomposition of stock-flow adjustments

Variable	Mean	Std. Dev.	Min	Max
Stock-flow adjustment	1.517	4.942	-12.5	34.4
Transactions in financial assets	1.493	4.243	-10.2	34.8
Currency and deposits	0.529	2.144	-11.8	11.8
Securities other than shares	0.296	2.040	-13.9	24.7
Loans	0.185	2.100	-20.1	14.4
Shares and other equity	0.217	2.715	-13.3	21.8
Other financial assets	0.288	0.643	-2.3	3.9
Adjustments	0.036	2.010	-4.5	23.3
Valuation effect	0.165	1.916	-5.8	25.7
Statistical discrepancies	-0.013	0.309	-1.9	1.6

Notes: The number of observations is 304. The sample includes Belgium, Czech Republic, France, Hungary, Luxembourg, the Netherlands, Portugal, Spain, and the UK over the period 1995-2011; Poland and Slovenia over the period 2000-2011; Estonia and Turkey over the period 2001-2011; Austria, Denmark, Finland, Germany, Greece, Ireland, Italy, Norway, Slovakia, and Sweden over the period 2002-2011; and Iceland over the period 2005-2011. Source: Eurostat.

Chapter 6

Public Borrowing via Special Funds and the German Debt Brake

Abstract*

Governments can finance public activities outside the core budget by creating off-budget special funds. The German central and state governments had incentives to create special funds with borrowing authorizations because the German debt rule did not restrict the borrowing of special funds until 2009. I describe special funds in Germany and show for which purposes special funds were established. Governments specifically used special funds to finance German reunification in 1990 and support measures for financial institutions and economic stimulus packages during the financial crisis that started in 2007. I discuss the extent to which the new German debt brake limits the borrowing of special funds and show that governments still can circumvent the debt brake by using special funds.

*The chapter is based on my paper "Staatsverschuldung in Extrahaushalten: Historischer Überblick und Implikationen für die Schuldenbremse in Deutschland," *Perspektiven der Wirtschaftspolitik*, 15, 2014, 171-181.

6.1 Introduction

Creating off-budget special funds for financing public activities outside the core budget impairs the transparent disclosure of the government's budgetary operations. Special funds thus often describe an "unknown budget" (Kilian 1993, p. 59). The increase of German public debt was well above the deficit of the core budgets in several years because governments used off-budget special funds for borrowing. I describe off-balance special funds in Germany since 1949 and show for which purposes governments established special funds. Governments specifically used special funds to finance German reunification in 1990. The German Unity Fund ("Fonds Deutsche Einheit") was created to financially support the local authorities in the former German Democratic Republic (GDR) and to foster investments in eastern German infrastructure. The Debt Processing Fund ("Kreditabwicklungsfonds") took over public debt of the former GDR. The liabilities of the Debt Processing Fund together with the liabilities of the privatization agency "Treuhand" and debts of building companies and social institutions of the former GDR were transferred to the Redemption Fund for Inherited Liabilities ("Erblastentilgungsfonds"). During the financial crisis starting in 2007 governments also established several special funds. The Financial Market Stabilization Fund ("Sonderfonds Finanzmarktstabilisierung"/ "Finanzmarktstabilisierungsfonds") and the Restructuring Fund ("Restrukturierungsfonds") helped to stabilize the financial markets by financially supporting troubled financial institutions. The Investment and Repayment Fund ("Investitions- und Tilgungsfonds") financed the economic stimulus package "Konjunkturpakte II". The state governments have also launched several special funds for supporting the state banks and financing economic stimulus packages since the outbreak of the financial crisis.

Before 2009 the German debt rule ("golden rule") exempted special funds from the borrowing limits (paragraph 2 of the former Article 115 of the Basic Law). The central government and the state governments thus had incentives to use special funds for borrowing (see also Feld 2010). The new debt brake, which was adopted in 2009, rectified this loophole (paragraph 3 of the Article 109 and paragraph 2 of the Article 115 of the Basic Law). Governments can, however, still fully utilize the residual borrowing authorizations of special funds that already existed before December 31, 2010 (sentence 2 of paragraph 1 of the Article 143d of the Basic Law). I discuss whether the new debt brake solves the

problem of circumventing the debt rule by borrowing in special funds; and which options the central government and state governments still have to use special funds for borrowing.

6.2 Debt, Deficit and Borrowing

The government's budget identity describes that the change in debt in period t equals the deficit (expenditure minus revenue) and the net borrowing in period t:[1]

$$B_t - B_{t-1} = D_t = NB_t, \tag{6.1}$$

$$D_t = G_t - R_t, \tag{6.2}$$

where B_{t-1} denotes debt at the begining of period t, B_t denotes debt at the end of period t, D_t denotes the deficit in period t, NB_t denotes net borrowing in period t, G_t denotes expenditure (including interest payments) in period t, and R_t denotes revenue in period t. Descriptive statistics show, however, that Equation 6.1 does not always hold. The change in debt can deviate from the deficit and net borrowing. Figure 6.1 shows the change in debt, the deficit and the net borrowing of the German general government (the central government, the states, the municipalities, and the social security system) as a share of GDP for the years 1950 to 2012.

The difference between the deficit and borrowing results because the government's financial transactions to cover the deficit do not only include borrowing, but also withdrawals from reserves, internal loans (temporarily using reserves that were collected for another purpose), surpluses from previous years, and seignorage. Net borrowing can even be positive when there is a budget surplus if internal loans are repaid, reserves are accumulated or deficits from previous years are covered. The difference between the change in debt and the deficit is called stock-flow adjustment (SFA) or debt-deficit adjustment (von Hagen and Wolff 2006).[2] If the stock-flow adjustment is positive, public debt increases by more than the

[1] On the government budget constraint, see, e.g., Barro (1979) and Bohn (2007).

[2] The European Commission (2003, p. 82) defines stock flow adjustments as follows: "These result

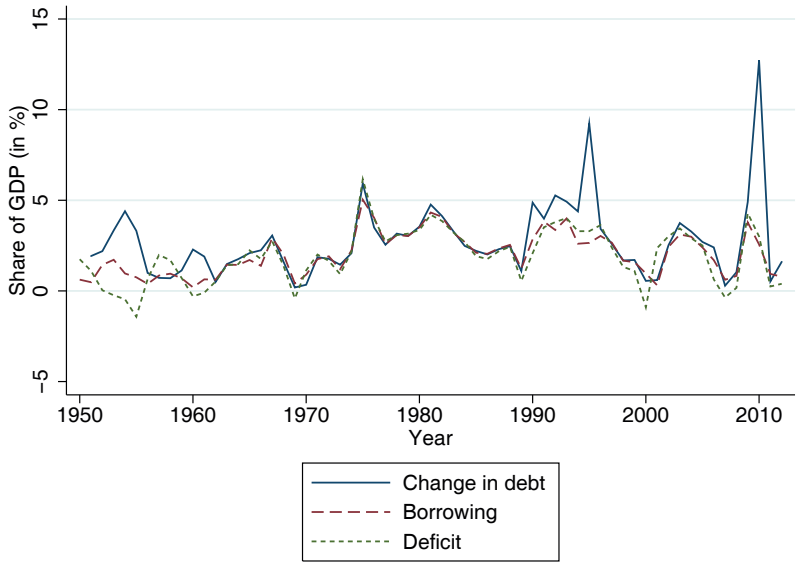

FIG. 6.1: Deficit, borrowing, and change in debt of the German general government

SOURCES: Federal Statistical Office, own calculations.

budget deficit would imply:

$$B_t - B_{t-1} = D_t + SFA_t \tag{6.3}$$

Figure 6.1 shows that the increase in debt was larger than the deficits of the core budgets particularly during three periods: In the first years of the Federal Republic of Germany (1950-1955), in the years following German reunification (1990-1995), and during the financial crisis in 2010. The difference between the deficit and the change in debt can largely be explained by the borrowing of special funds, public institutions and public companies that do not show up in the deficit figures of the core budget.

primarily from financial operations, for example, debt issuance policy to manage public debt, privatisation receipts, impact of exchange rate changes on foreign denominated debt. In general, these should tend to cancel out over time. However, large and persistent stock-flows (especially if they always have a negative impact on debt developments) should give cause for concern, as they may be the result of the inappropriate recording of budgetary operations and can lead to large ex post upward revisions of deficit levels."

6.3 Special Funds

6.3.1 Definition

Since 2011 the German Federal Statistical Office describes the financial statistics in the so called "shell concept" (see Figure 6.2). The inner shell contains the central governments, the state government, the municipalities, and the social security system. The second shell contains off-balance special funds ("Sondervermögen") that are also called extra budgets.

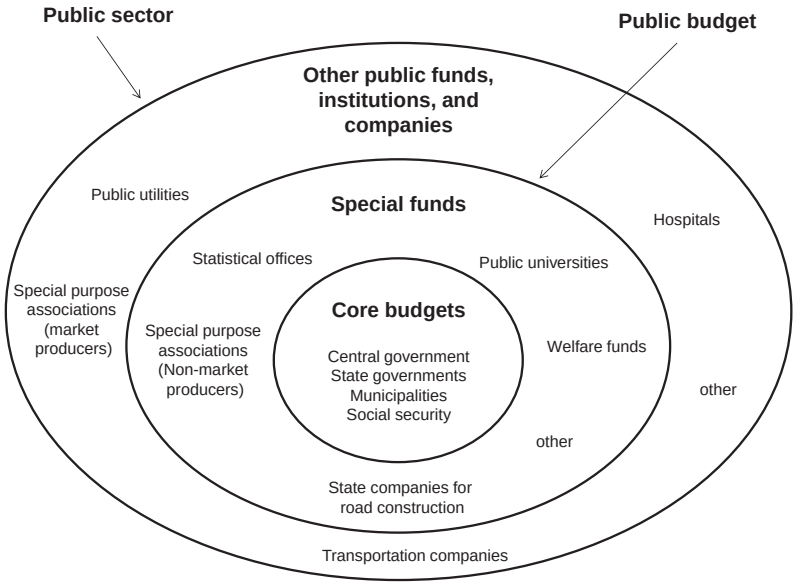

Fig. 6.2: Shell concept of financial statistics

Sources: Federal Statistical Office, own illustration.

Special funds are public funds, institutions and companies that belong to the public sector according to the Eurostat definition ESA 95/2010 (Federal Statistical Office 2012). Special funds are institutional units that are controlled and predominantly financed by the government. Special funds are legally dependent parts of national property that originate by law and should fulfill special tasks issued by the government (No. 2.1 VV-BHO). When creat-

ing special funds strict rules have to be met because special funds describe an exception from the budgetary unity (sentence 1 of paragraph 1 of the Article 110 of the Basic Law) that prevents a fragmentation of the public budget. A special fund is justified if it can perform a certain task more efficiently than the core budget (Federal Court of Auditors 2011). Only transfers from a special fund have to be reported on the revenue side of the core budget, while transfers to a special fund have to be reported on the expenditure side of the core budget (§26 BHO/LHO). By creating special funds the central government, the state governments, and the municipalities can borrow outside their core budgets. Special funds are thus also called "shadow budgets". Figure 6.3 shows debt in special funds of the central government, the state governments and the municipalities.[3]

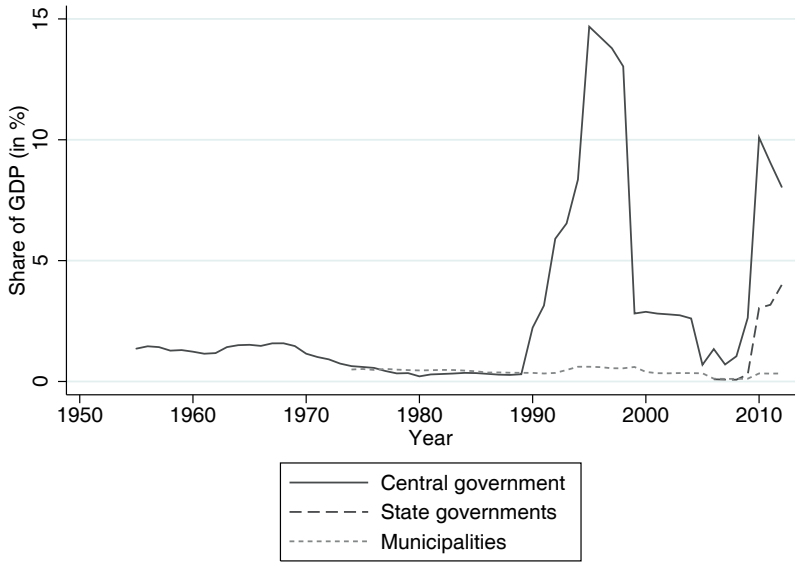

FIG. 6.3: Debt of special funds

SOURCES: Federal Statistical Office, own calculations.

[3]The Federal Statistical Office reports the liabilities of the special funds of the central government since 1949. The liabilities of certain special funds of the state governments are reported since 2006. The liabilities of municipal special purpose associations are reported since 1974, and the liabilities of other municipal special funds since 2009.

The third shell contains other public funds, institutions, and enterprises with a level of equity financing above 50%, i.e. more than 50% of production costs are covered by revenues. These units are considered as market producers and not special funds. On December 31, 2012, German public sector debt amounted to 2,697.7 billion euros (101.14% of GDP). Core budget debt was 1,738.2 billion euros (65.2% of GDP), special funds debt totalled 330.1 billion euros (12.4% of GDP) and debt of other public funds, institutions, and enterprises amounted to 629.4 billion euros (23.6% of GDP). Figure 6.4 shows how debt was distributed between the central government, the state governments and the municipalities.

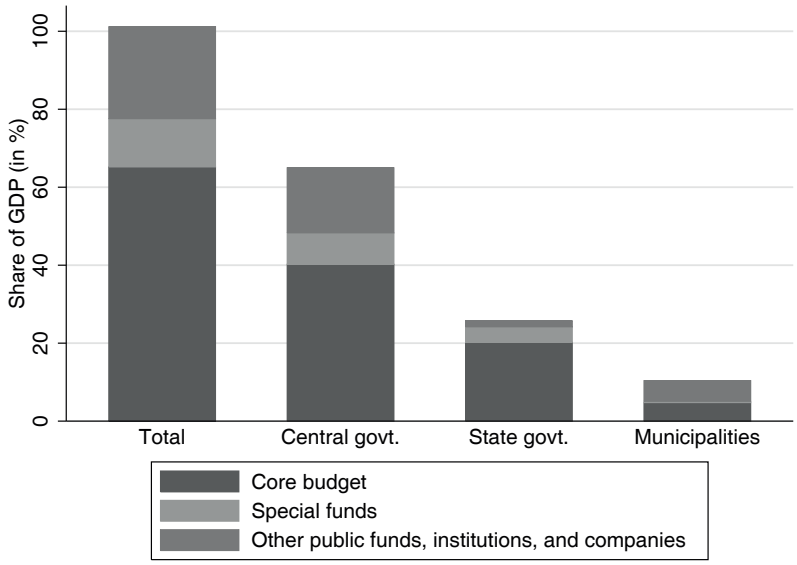

Fig. 6.4: Composition of public sector debt

Sources: Federal Statistical Office, own calculations.

6.3.2 Historical Overview

Federal Government Special Funds

ERP and Equalization of Burdens Fund The first special funds of the Federal Republic of Germany were the ERP (European Recovery Program) Special Fund and the Equalization of Burdens Fund ("Lastenausgleichsfonds"). The ERP was launched after World War II based on the Marshall Plan. Under the Marshall Plan the US government reimbursed US companies the value of their exported goods to Germany in dollars. German importers had to pay the corresponding value of the goods received in deutschmarks into an account at the German Central Bank (until 1957 Bank of the German States). The owner of the bank account was the US government. In 1949 the US and Germany agreed to administrate the bank account of about six billion deutschmarks using the ERP Special Fund. To promote the German economy, the ERP Fund fund provided loans to German companies on a revolving basis (Dietz 2001). The financial institution "Kreditanstalt für Wiederaufbau" was founded to manage the ERP Fund. The volume of the ERP Fund described the external debt of the German central government and the liabilities of the ERP Fund were settled via the central government budget (KfW 2012). The London Debt Agreement in 1953 halved the German external debt position, while the liabilities of the ERP Fund were forgiven by up to one billion dollar (Abelshauser 2011, Ministry of Economics 2001). After the rebuilding phase the ERP was also used to promote the economy (as of 1961 it was also used for development assistance and as of 1967 for communal investors involved in economic stimulus programmes) and investments in the states of the former GDR (Ministry of Economics 2001, Dietz 2001). The liabilities of the ERP Fund (about 14.4. billion euros) were transferred to the central government budget in 2007. Since then the ERP Fund cannot borrow any longer.

The Equalization of Burdens Fund was established in 1949 to offset the harsh conditions caused by the war and the post-war period, especially those of displaced people, emigrants and people affected by the war and currency devaluation. The liabilities of the Equalization of Burdens Fund (about 1.5 billion euros) were transferred to the central government budget in 1980. In the years 1950-1990 only minor special funds were created.

German Reunification The German Unity Fund ("Fonds Deutsche Einheit") and the Debt Processing Fund ("Kreditabwicklungsfonds") were established to finance German reunification. Special funds were considered appropriate instruments for financing German reunification because the costs of the reunification were not be borne by a single government level alone (Kuntze 2010). By using special funds the debt rule ("golden rule") that restricted borrowing to the investment volume could also be circumvented. The German Unity Fund ("Fonds Deutsche Einheit") was created to financially support local authorities in the former GDR and to foster investments in eastern German infrastructure with a view to aligning living conditions in eastern and western Germany. Between 1990 and 1993 the fund received financial resources of about 82.2 billion euros. The resources mainly came from the credit market (48.2 billion euros). Additionally the fund received resources from the central government (25.4 billion euros) and the western German state governments (8.2 billion euros). The support for the eastern German states by the German Unity Fund ended in 1995 when the eastern German states were included in the German fiscal equalization scheme. Since 1995 the fund only pays interest and resettles loans. The fund receives money from the central government to cover its credit costs and also received payments from the western German states up until 1994 (Dietz 2001). The liabilities of the fund (about 38.7 billion euros) were transferred in the central government budget in 2005.

The Debt Processing Fund ("Kreditabwicklungsfonds") overtook the public debt of the former GDR. For privatizing the state owned companies of the former GDR the "Treuhand" agency was established. The liabilities of the "Treuhand" agency (104.8 billion euros) and the Debt Processing Fund (52.7 billion euros) were transferred to the Redemption Fund for Inherited Liabilities ("Erblastentilgungsfonds") on January 1, 1995. The Redemption Fund for Inherited Liabilities in 1994 assumed the liabilities of building companies (15.9 billion euros) and the liabilities of social institutions of the former GDR, such as schools, cultural institutions and youth clubs (4.3 billion euro) in 1997. In total the Redemption Fund for Inherited Liabilities undertook liabilities of around 177.7 billion euros (Dietz 2001). The increase in debt was much larger than borrowing in 1995 because the liabilities of the "Treuhand" agency (about 137 billion euros) were accounted for in German public debt.[4] In 1999 the remaining liabilities of the Redemption Fund for Inherited Liabilities

[4]The debt restructuring of the "Treuhand" agency was classified as an extraordinary transaction by Eurostat und thus not included in the Maastricht deficit (Münster 1997).

(about 137 billion euros) were transferred to the central government budget. The last loans of the Redemption Fund for Inherited Liabilities were settled in 2011. At the end of 2012 the remaining other liabilities of the Redemption Fund for Inherited Liabilities amounted to around 1.5 billion euros. The Federal Court of Auditors (2013) has called for a closure of the Redemption Fund for Inherited Liabilities.

Financial Crisis Following the outbreak of the financial crisis in 2007 several special funds were established to stabilize the financial markets and foster the economy. Special funds could quickly provide supply measures to counteract the financial and economic crisis. The Financial Market Stabilization Fund ("Sonderfonds Finanzmarktstabilisierung"/ "Finanzmarktstabilisierungsfonds") was created to overcome liquidity problems and strengthen the equity of credit institutions, insurance companies and pension funds. Debt of the Financial Market Stabilization Funds quickly increased from 8.2 billion euros to 29 billion euros between 2008 and 2010. In 2009 the Investment and Repayment Fund ("Investitions- und Tilgungsfonds") was established to finance the economic stimulus package "Konjunkturpakte II". The measures of the economic stimulus package included state and municipal investment programmes and the car allowance rebate scheme for stimulating demand for cars ("Abwrackprämie"). The liabilities of the Investment and Repayment Funds increased from 7.5 billion euros to 14.0 billion euros between 2009 and 2010 (Ministry of Finance 2011, Federal Court of Auditors 2011). The Federal Court of Auditors (2009) has made the criticism that economic stimulus measures could also have been financed out of the central government budget. Creating the Investment and Repayment Fund with its own borrowing authorization impaired the transparency of central government budgetary operations.

The sharp increase in public debt in 2010 can partly be explained by the borrowing of the Financial Market Stabilization Fund and the Investment and Repayment Fund. Additionally, the public defeasance structure "FMS Wertmanagement" was established in 2010 to assume the risky assets of the Hypo Real Estate. The debt of the "FMS Wertmanagement" amounted to around 192 billion euros in 2010. "FMS Wertmanagement"'s taking over of central government budget liabilities largely explains why the debt increase was considerably greater than borrowing in 2010. To stabilize the financial market, in De-

cember 2010 additionally the Restructuring Fund ("Restrukturierungsfonds") was created. The Restructuring Fund can acquire shares in financial institutions, take over the assets of troubling financial institutions, and provide equity injections and guarantees to financial institutions (Ministry of Finance 2013). In December 31, 2012, the Financial Market Stabilization Fund held debt of about 20.5 billion euros, the "FMS Wertmanagement" had debt of around 161.5 billion euros and the Investment and Repayment Fund had debt of about 21.3 billion euros. The Restructuring Funds has not been used and thus had no debt.

Other Special Funds The Federal Statistical Office (2013) counts about 50 central government special funds. Among these is the Federal Railways Fund ("Bundeseisenbahnvermögen") that administers the officials of the Deutsche Bahn, pays pensions, carries on the social security schemes for former officials of the German Federal Railway and administers properties (Federal Court of Auditors 2013). In 2010 the Post Office Pension Fund ("Bundes-Pensions-Service für Post und Telekommunikation e.V.") was established to pay defined benefit obligations to retired officials and their survivors of the Deutsche Bundespost and its successors. In 2010 the Energy and Climate Fund was created to supports the increase in renewable energies as a share of energy consumption to 35% in 2020 by financing building refurbishments and research and development in new energies and storage technologies. In 2010 the Energy and Climate Fund's expenditure totalled 0.8 billion euros, and annual expenditure increased to 3.3 billion euros in 2013. For financing the fund receives the proceeds of auctions from the CO2 emission trade that previously went to the central government budget. The Energy and Climate Fund also receives liquidity credits from the central government budget. The Federal Court of Auditors (2011) criticizes that it is not obvious that spinning off the resources from the central government budget to the Energy and Climate Fund leads to more efficient management, and stresses that the control by the parliament would be facilitated if all expenditure and revenues were to be disclosed in the central government accounts.

Interim Conclusion Table 6.1 shows the largest special funds of the central government in the years 1949-2012. Special funds were specifically created to finance extraordinary

events such as the economic recovery after World War II, German reunification, and the stabilizing of the financial markets and the economy during the financial crisis. Special funds were largely created when the Christian Democratic Union (CDU) formed the central government. Whether only extraordinary events gave rise to the establishment of special funds, or whether right-wing government are also more eager to create special funds than left-wing governments, remains an open question.[5]

State Government Special Funds

The special funds of the state government include public universities with their own accounting, statistical offices, road construction companies, and construction companies (Federal Statistical Office 2012). During the financial crisis starting in 2007 the states launched several funds to support the state banks and finance economic stimulus packages. These include the public defeasance structure "Erste Abwicklungsanstalt" that settled the state bank WestLB in North-Rhine Westphalia, the Investment and Repayment Fund North-Rhine Westphalia ("Zukunftsinvestitions- und Tilgungsfonds Nordrhein-Westfalen"), the "HSH Finanzfonds AöR" that provided equity injections to the state bank HSH Nordbank in Hamburg and Schleswig-Holstein, the "Garantie Portfolio Baden-Württemberg GmbH & Co. KG (GPBW)" that provided guarantees to the state bank LBBW in Baden-Württemberg, the Communal Funds for Balancing Revenue Shortfalls ("Kommunale Fonds zum Ausgleich konjunkturbedingter Mindereinnahmen") in Mecklenburg-Vorpommern, and the Future Initiative II Special Fund ("Zukunftsinitiative II") in the Saarland.

Municipal Special Funds

The special funds of the municipalities mainly include special purpose associations ("Zweckverbände"). Municipalities can form special purpose associations to jointly provide public services such as sewerage, waste disposal, and schooling.

[5]See, e.g., Kauder und Potrafke (2013), Kauder et al. (2014), and Potrafke (2011, 2012, 2013) on the nexus between political ideology and fiscal policy.

Table 6.1: Major special funds of the central government

Special fund	Establishment	Debt in year of establishment	Closure	Debt in year of closure	Debt 2012
ERP Special Fund	1949	3.1 bn euro (6.2% of GDP)	2007	14.4 bn euro (0.6% of GDP)	
Equalization of Burdens Fund	1949	0	1980 1980	1.5 bn euro (0.2% of GDP)	
Compensation Fund "Coal"	1974	0	1999	2.0 bn euro (0.1% of GDP)	
German Unity Fund	1990	10.1 bn euro (0.8% of GDP)	2005	38.7 bn euro (1.7% of GDP)	
Debt Processing Fund	1991	14.5 bn euro (0.9% of GDP)	1994	52.7 bn euro (3.0% of GDP)	
Federal Railways Fund	1994	36.4 bn euro (2.0% of GDP)	1999	39.5 bn euro (2.0% of GDP)	
Redemption Fund for Inherited Liabilities	1995	168.0 bn euro (9.1% of GDP)	1999		1.5 bn euro (0.1% of GDP)
Compensation Fund	1996	5.0 bn euro (0.3% of GDP)	2010	0	
Post Office Pension Fund	2001	15.5 bn euro (0.7% of GDP)			11.4 bn euro (0.4% of GDP)
Financial Market Stabilization Fund	2008	8.2 bn euro (0.3% of GDP)			20.5 bn euro (0.8% of GDP)
Investment and Repayment Fund	2009	7.5 bn euro (0.3% of GDP)			21.3 bn euro (0.8% of GDP)
FMS Wertmanagement	2010	192.0 bn euro (7.7% of GDP)			161.5 bn euro (6.1% of GDP)
Restructuring Funds	2010	0			0
Energy and Climate Fund	2010	0			0

Sources: Abelshauser (2004), Ministry of Finance (2011), Federal Court of Auditors (2011, 2013), Dietz (2001), Federal Statistical Office (2012).

6.4 Special Funds and the Debt Brake

One of the main weaknesses of the old German debt brake ("golden rule") was the general possibility of exempting off-budget special funds from the borrowing rules (paragraph 2 of the former Article 115 of the Basic Law). The central government and the state governments thus had incentives to borrow via special funds (see also Feld 2010). The new debt brake (paragraph 3 of Article 109 and paragraph 2 of Article 115 of the Basic Law), which was adopted in 2009, rectifies this loophole at the central government level by rescinding the corresponding paragraph exempting special funds. In principal, the central government cannot circumvent the debt brake by creating special funds any longer (German Bundesbank 2011). Special funds that existed before December 31, 2010, however, are not covered by the new debt rule (sentences 1 and 2 of paragraph 1 of Article 143d of the Basic Law). Governments can fully utilise the residual borrowing authorizations of these "old special funds". The German Council of Economic Experts (2012) has also stressed that the debt brake only covers the cyclically adjusted budget balances of the central government and the state governments exempting old special funds. The exemption of old special funds from the debt brake was justified by stating that the old special funds could be integrated into the new debt regime (German Bundestag 2009). There is, however, no convincing reason why old special funds cannot be covered by the new debt brake (Pinkl 2012). Exempting the borrowing of old special funds from the debt brake conflicts with the new debt brake's aim to improve the institutional arrangements for long-term sustainability in adherence with the budgetary rules of the European Stability and Growth Pact (German Bundestag 2009). When calculating the Maastricht deficit, all special funds are considered and there is no distinction between old and new special funds (European Community 2002).

On December 31, 2010, three central government special funds had a borrowing authorization: The Financial Market Stabilization Fund, the Restructuring Fund and the Investment and Repayment Fund (Reimer 2010, Kube 2010). The other special funds of the central government do not have borrowing authorizations. The Investment and Repayment Fund has a borrowing authorization of 25.2 billion euros. As of January, 1, 2012, the Investment and Repayment Fund no longer provides financial support. The Investment and Repayment Fund has thus only paid interest and repaid liabilities since 2012. The Financial Market Stabilization Fund initially had a borrowing authorization of 70 billion euros.

Following a law dated March 1, 2012 ("Zweiten Gesetz zur Umsetzung eines Maßnahmenpakets zur Stabilisierung des Finanzmarktes"), the borrowing authorization was extended to 100 billion euros. The Financial Market Stabilization Fund can borrow to cover provided guarantees, to acquire risky assets, to provide equity injections to financial institutions, and to acquire shares from financial institutions. The Financial Market Stabilization Fund also can provide guarantees of up to 400 billion euros. Financial institutions can apply for support from the Financial Market Stabilization Fund until December 31, 2014 (Federal Court of Auditors 2013). The central government, however, plans to prolong the application period until the end of 2015 (Federal Court of Auditors 2014). The expenditures of the Financial Market Stabilization Fund other than financial transactions are covered by the debt brake (Article 1 No. 14b 2. FMStFG). Financial transactions include the acquisition of share, loan repayments to the public sector, and providing loans (§3 of Article 115 – Law from August 10, 2009 (BGBl. I pp. 2702-2704)). The Restructuring Fund's borrowing authorization totals the amount that the borrowing authorization of the Financial Market Stabilization Fund has not been used (§12 paragraph 6 sentences 1 and 2 RestrFG). The borrowing authorization of the Restructuring Fund is, however, restricted to 20 billion euros. The Restructuring Fund can also provide guarantees of 100 billion euros for stabilizing financial institutions. The Restructuring Fund was constructed as a permanent institution without a time limit (Ministry of Finance 2013).

The new debt brake solves the problem of borrowing via special funds at the central government level (except for old special funds). The state governments can, however, still use special funds for borrowing as long as they do not restrict the borrowing of special funds in their state constitutions (Kuntze 2010). Until now only the state Rhineland-Palatinate has introduced a debt rule that also covers special funds (Ciaglia and Heinemann 2012, Steinbach and Rönicke 2013). A clear prohibition of borrowing for old special funds and a forgoing of creating new special fund with borrowing authorizations would describe a future-proof rule for preventing circumventing the debt brake by using special funds (see also German Council of Economic Experts 2011). Clear time limits should also be set for existing special funds (Korioth 2009, 2010). At the central government level, for example, the instruments of the Financial Market Stabilization Fund are limited until 2014, but have already been extended twice in the last years and will also probably be extended in 2015 (Federal Court of Auditors 2014).

6.5 Conclusion

The historical overview shows that special funds in Germany have been specifically established to finance extraordinary events: the economic recovery period after World War II, German reunification, and the stabilizing of the financial markets and the economy during the financial crisis that started in 2008. Financing the recovery period after World War II by using special funds ensured the autonomy of the support measures from the central government budget. Using special funds to finance German reunification was a way of circumventing the existing debt rule. During the financial crisis financial support measures were quickly provided by creating special funds.

Until 2009 the central government and the state governments had incentives to circumvent the existing debt rule by using special funds, because special fund borrowing was exempted from the debt rule. Under the new debt brake, the central government in principal cannot use special funds to circumvent the debt brake. Old special funds that already existed prior to 2010, however, are exempted from the debt brake. The central government thus can still extend the allowed borrowing by perpetuating existing old special funds (see also Feld 2010). Some of the old special funds still have significant borrowing authorizations. The state governments can create special funds with borrowing authorizations to circumvent the debt brake as long as they do not include special funds in their debt rules. Further potential ways of circumventing the debt brake arise if expenditure is transferred from the core budgets to special funds or revenues from special funds are transferred to the core budgets (German Council of Economic Experts 2011). Strictly prohibiting new borrowing by special funds and introducing time limits for existing special funds could increase the effectiveness of the debt brake.

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Chapter 7

Concluding Remarks

The European debt crisis poses a major challenge to the euro and Europe's economic and political integration. In many Eurozone countries public debt has increased dramatically after the outbreak of the financial crisis in 2007. Consequently, in 2010 the GIIPS countries started to face refinancing difficulties in the sovereign debt markets as investors feared sovereign defaults. The European Central Bank, the International Monetary Fund, and other Eurozone countries had to launch large scale rescue operations for the GIIPS countries that calmed the financial markets. The GIIPS countries had to adopt severe austerity measures to reduce their large budget deficits.

Without deeper fiscal integration the Eurozone is vulnerable to economic shocks and a lack of fiscal coordination has been implicated in many debt crises. A fiscal transfer system may stabilize country-specific economic shocks. The United States and Germany are good laboratories to study debt sustainability and fiscal coordination because they have well established federal systems and detailed data are available. Chapter 2 shows that the results of fiscal sustainability tests depend on whether fiscal transfers are taken into account. If fiscal transfers are not included in the primary surpluses, the test results do not indicate that the U.S. and German state governments pursued sustainable fiscal policies. Fiscal transfers were positively related with debt, indicating that intergovernmental transfers have implicitly subsidized debts in the states. The policy implications from Chapter 2 would also apply to the design of a European fiscal union. Fiscal transfer schemes need to

be incentive compatible and politically sustainable. It appears that transfers sugarcoat the budgets of governments that do not attempt to keep their budgets balanced. When fiscal policies of federal states are shown to be only sustainable when fiscal transfers are assumed to be also forthcoming in the future, the question arises to which extent governments paying fiscal transfers are willing and able to proceed paying. The issue then is not only whether fiscal policy is sustainable but whether fiscal transfer schemes are politically sustainable.

Fiscal transfer schemes typically include discretionary and formula-based grants. Discretionary grants are prone to political manipulation. Using data on discretionary project grants from a German state government to municipalities, the results in Chapter 3 show that discretionary projects grants were awarded to municipalities with many core supporters of the incumbent state government. Formula-based grants, however, appear not to be manipulated. Politicians should trim discretionary grants from upper-level (federal or state) governments to lower-level (local) governments to the benefit of formula-based grants. Discretionary grants are justified for only two reasons: (i) the upper-level government is better informed about local preferences than local governments or faces stronger incentives to satisfy these preferences, and (ii) the provision of local public goods and services has spill-over effects to future periods (investments) or to other jurisdictions, which are not internalized by local politicians that are myopic or not interested in the well-being of other jurisdictions. For most discretionary project grants, neither of these reasons applies: Local politicians, being in close contact with citizens, are usually far more aware of local needs than are upper-level politicians; there is also no case for believing that state-level politicians cater to voters' preferences more than local politicians do, as voters may impose sanctions on politicians at both levels of government by voting for alternative candidates/parties. Spill-over effects of local public goods or services may, in some cases, initially appear to support the use of discretionary grants; well-aligned grants, however, are hard to calculate as quantifying spill-over effects, either into the future or into another jurisdiction, is a very difficult task. When the benefits of public goods spill over to future periods, general grants accompanied by an obligation to invest some share may be a better choice than discretionary project grants. In any event, one has to trade off potential upsides of discretionary grants against their downsides, which include – compared to formula-based grants – reduced local autonomy, less transparency, more bureaucracy, and, finally, incentives for manipulations based on political bent.

Governments may be tempted to supplement genuine fiscal adjustment with creative accounting seeking to improve their debt and deficit figures. Off-budget borrowing to finance public activities outside the core budget lessens the transparency of the government's budgetary operations and endangers the sustainability of public finances. Creative accounting can be measured using stock-flow adjustments, i.e. differences between budget deficits and changes in public debt that primarily result from transactions in financial assets ("below-the-line" operations). The results in Chapter 5 show that stock-flow adjustments increased before elections using a sample of OECD countries. Prior to elections, governments may be tempted to hide deficits so as to sugarcoat the budget balance. Governments also have incentives to support or bail out private and public companies by injecting them with equity before elections. Closely monitoring stock-flow adjustments can reveal data-quality problems and instances of creative accounting.

Fiscal rules, such as the Stability and Growth Pact, aim at constraining a government's fiscal policy. Governments can, however, circumvent such rules by reverting to creative accounting. Prior to 2009, the German debt rule did not restrict borrowing by special funds, and thus the central German government had incentives to create off-budget special funds authorized to borrow outside the core budget. Under the new German debt brake, the central government, at least in principal, can no longer use special funds to circumvent the debt brake (see Chapter 6). Special funds that were created before 2010, however, are exempt from the debt brake. The central government thus still can extend the allowed borrowing by perpetuating existing old special funds which in some cases still have significant borrowing authorizations. The state governments can circumvent the debt brake by creating special funds with borrowing authorizations as long as they do not include special funds in their debt rules. A strict prohibition against new borrowing by off-budget special funds and introducing time limits for existing special funds would go some distance toward increasing the effectiveness of debt brakes and enhancing fiscal sustainability.

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