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Abstract

Does fiscal discipline restrain government from increasing its budget size? To answer this question, this paper investigates whether Wagner's law is satisfied for two types of states: U.S. states, in which fiscal sovereignty is established, and German states, in which fiscal transfer dependence is high and budget constraints are softened. In U.S. states, we demonstrate that Wagner's law is validated, while some of the balanced budget requirements weaken the validity of the law. In German states, we find an "inverse" law, especially after the bailouts of Bremen and Saarland. The "inverse" law is a new channel of growth in government size, and means that soft budget constraints cause significant negative correlation between government size and output. These results are robust regardless of whether intergovernmental fiscal transfers are taken into account, while they quantitatively change the validity of the law. Our findings imply that the characteristics of fiscal discipline are prime determinants of the channel and degree of growth in government size.

JEL Classification Codes: H72, C23
Keywords: Wagner's law, Fiscal discipline, State government, Balanced budget requirements, Soft budget constraints

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1. Introduction

A number of industrialized economies have experienced substantial public sector growth over the last few centuries. The most prominent theory purporting to explain this long-run growth was proposed by the German political economist Adolph Wagner more than a century ago. His view is now commonly known as Wagner's law of increasing state activity. Many researchers have been interested in the validity of the law, which is a crucial factor for fiscal rigidity and the government debt problem. If the law is strongly supported, then government expenditure or budget size increases at a more rapid rate than economic growth; as a result, government is likely to be forced to abandon a flexible fiscal policy or to borrow excessively. With this background, over the past century, Wagner's law has been intensively tested for many countries and periods. However, earlier empirical works find mixed results for the validity of the law, and there is no general consensus among researchers on the law.[1]

The main purpose of this paper is to analyze how fiscal discipline affects the validity of Wagner's law, and to shed new light on the vast empirical literature. To accomplish this, we focus on two federal states: the United States and Germany. This is because fiscal discipline at the state level is quite different between these two countries, as stated in

[1] The Wagner's law literature is too voluminous to survey here. See, for example, Peacock and Scott (2000) and Durevall and Henrekson (2011) for extensive surveys of the literature.

Bordo et al. (2013) and Potrafke and Reischmann (2015). In U.S. states, in addition to a high degree of expenditure decentralization, tax bases and rates are determined with discretionary powers, and fiscal sovereignty is established. On the other hand, in German states, although the expenditure is restrained by federal law and almost all tax bases and rates are determined by federal law, the state governments have full autonomy in borrowing.[2] More importantly, the U.S. and German federal governments officially follow the no-bailout rule, but in Germany the credibility of the commitment is lacking and the softening of state budget constraints is a serious problem (see, e.g., Rodden 2003).[3]

The present study follows recent contributions by Narayan, Nielsen, and Smyth (2008), Narayan, Prasad, and Singh (2008), and Narayan, Rath, and Narayan (2012), who conduct state-level analyses of Wagner's law. As emphasized in those studies, there are several reasons why one should examine Wagner's law at the state level.[4] Among others,

[2] Following the so-called golden rule, German states are officially allowed to borrow only for investment purposes, but in reality they can simply circumvent the rule. See Qian and Roland (1998) for the relationship between the decentralization of government and the soft budget constraint.

[3] While the German federal government has prudent fiscal policies, state-level fiscal discipline is eroded. The "equivalence of living conditions" clause in the Basic Law compels the federal government to bail out a state that faces a debt crisis. Recent bailout episodes can be seen in the cases of Bremen and Saarland. See Rodden (2003) for more details of soft budget problems in German states.

[4] While almost all researchers investigate the law using national-level data, a recent direction in Wagner's law literature focuses on validity at the subnational or state level. Abizadeh and Yousefi (1988) produced the first paper to employ state-level data to test the law. Abizadeh and Yousefi use time-series data for 10 U.S. states for the period 1950 to 1984, and their results support the law. More recently, applying a panel unit root, panel cointegration, and Granger causality analysis, Narayan, Nielsen, and Smyth (2008) examine the law on the basis of data from Chinese provinces and find mixed results. Narayan, Prasad, and Singh (2008) conduct time-series analysis for the Fiji islands and

important points in their discussion are summarized as follows.

First, given that Wagner did not take account of the influences of wars, a tacit assumption about the law is that the economy is under peacetime conditions. This is related to another leading theory, the so-called displacement effect (also known as the Peacock-Wiseman hypothesis), which can be relevant to the long-run behavior of government size under crises such as wars.[5] Although government expenditures are subject to political and military conflicts, their effects are lower at the state level than at the national level. From this perspective, the use of state-level data fits with Wagner's supposition.

Second, when conducting cross-sectional or panel data analysis, cultural and institutional differences across regions can be troublesome. Compared with national- or federal-level data, the use of state-level data enables us to lessen the effects of such differences across regions. Third, a central (federal) government's expenditures are more likely to be influenced by international economic conditions than are a local government's

vindicate the law. Like Narayan, Nielsen, and Smyth (2008), utilizing panel data techniques, Narayan, Rath, and Narayan (2012) investigate the law for the 15 Indian states and provide strong support of the law.

[5] The displacement effect is initially found by Peacock and Wiseman (1961), who show that the sudden increase in government expenditure during World War I and World War II does not return to the pre-war levels in the United Kingdom. In other words, Peacock and Wiseman find stepwise increases in UK government size through World Wars I and II. Such a long-run growth in government size makes an analysis of Wagner's law difficult. Using historical data from Italy, Cavicchioli and Pistoresi (2016) find that military spending during wars results in nonlinearities between variables. See also Funashima (2016), who distinguishes between Wagner's law and the displacement effect.

expenditures.

With the exception of Abizadeh and Yousefi (1988), who study 10 U.S. states, our study differs from all others in that state-level data from the United States and Germany are utilized to test the law. Unlike Abizadeh and Yousefi (1988), the present empirical method is based on cointegration analysis and incorporates extended panel data techniques, as in many recent predecessors. Excluding Narayan, Nielsen, and Smyth (2008) and Narayan, Rath, and Narayan (2012), this study is the first to apply the panel cointegration approach to test the law, while almost all previous studies use time-series data.

[Insert Figures 1 and 2]

Further, in contrast to previous studies, we attempt to undertake more elaborate analysis by taking into account the effects of intergovernmental fiscal transfer payments on the validity of the law. As can be seen in Figures 1 and 2, fiscal transfer is negatively correlated with economic development, indicating that fiscal transfer plays a role in horizontal equity across states in the U.S. and German federal system. Fiscal transfer is especially substantial in Germany, and the transfer dependence of the states is high. In this connection, Figures 3 and 4 plot the relationship between fiscal transfer and state

government size in the U.S. and German states. The figures demonstrate that, in both countries, state government size is positively correlated with fiscal transfer, meaning that the latter may be a crucial factor for determining the former. In other words, it is highly probable that if fiscal transfers are ignored in empirical analyses of state-level Wagner's law, some omitted variable bias problems will occur and, consequently, misleading conclusions will be obtained.

[Insert Figures 3 and 4]

Our results uncover that, in both countries, fiscal transfers have non-negligible effects on state government size, and the introduction of fiscal transfers quantitatively changes the validity of the law. This suggests that if fiscal transfers are omitted, then the outcomes are highly likely to be biased. However, the qualitative results are the same regardless of whether fiscal transfers are considered. That is, our results reveal that the law is validated in the U.S. states, but, on the other hand, an "inverse" law is supported in German states. Moreover, we find that the U.S. validity of the law is weakened by some of the balanced budget requirements. The German "inverse" law, a negative correlation between government size and output, is likely to be caused by the soft budget constraints, especially after the bailouts of Bremen and Saarland in 1992. These opposite outcomes

between the U.S. and German states imply that the characteristics of fiscal discipline are relevant to the validity of the law, and that the public sector can grow through different channels. This implication offers new insights into the empirical literature wherein heterogeneous consequences of the law are presented.

The rest of the paper is organized as follows. Section 2 provides the present empirical framework and describes the data. Section 3 presents our empirical results, and Section 4 concludes.

2. Empirical framework and data

2.1. Panel cointegration analysis of Wagner's law for U.S. and German states

As described in Ram (1987), Peacock and Scott (2000), and Durevall and Henrekson (2011), multiple variables have been hitherto supposed to test Wagner's law. Among others, the specification proposed by Musgrave (1969) is commonly used in the empirical papers. In previous analyses, share of government expenditure in GDP is used as a proxy for government size, and real income per capita is used as a proxy for economic development (see, e.g., Mann 1980; Durevall and Henrekson 2011).

Following the bulk of the recent empirical literature regarding Wagner's law, our analysis builds on cointegration analysis to investigate the long-run relationship between

government size and economic development (e.g., Islam 2001; Chang 2002; Iyare and Lorde 2004; Durevall and Henrekson 2011; Kuckuck 2014). Since we use state-level panel data, our basic model can be written as:

$$\ln gs_{it} = \alpha_0 + \alpha_1 \ln ypc_{it} + \varepsilon_{it}$$

where gs is share of state government expenditure in GDP (state government size), ypc is real GDP per capita, and subscripts i and t are the cross-section of states and time, respectively. Note that GDP is the total value of goods and services produced within a state. If Wagner's law holds, then the coefficient α_1 should be significantly larger than zero.

As mentioned in our introduction, the present study considers the potential effects of fiscal transfer payments on the validity of state-level Wagner's law (i.e., the cointegrating relationship between gs and ypc).[6] To this end, by introducing the third variable, we also consider the modified specification:

$$\ln gs_{it} = \alpha_0 + \alpha_1 \ln ypc_{it} + \alpha_2 tray_{it} + \varepsilon_{it}$$

where $tray$ denotes share of state fiscal transfers in GDP.[7] The coefficient α_2 should be significantly positive if fiscal transfers have positive effects on state government size.

[6] In the Wagner's law literature, all studies conduct cointegration analysis in a bivariate system. One notable exception is Chow et al. (2002), who emphasize the importance of controlling the effects of a third variable on the cointegrating relationship between government size and economic development.
[7] As described later, net state fiscal transfers can be negative in Germany, and $\ln tray$ is undefined.

As documented in Potrafke and Reischmann (2015), although intergovernmental fiscal transfers are implemented to fund the budgets of state and local governments in the federal systems of both the United States and Germany, a key difference in fiscal transfer systems exists between the two countries. In the United States, the transfer payments are only vertical, and the federal government transfers to the states. However, in Germany, horizontal transfers between the states are performed in addition to vertical transfers. Hence, the U.S. payments are basically positive, whereas the German payments can be negative in rich states.[8]

2.2. Datasets

All datasets are taken from Potrafke and Reischmann (2015). For the U.S. states, our annual data cover the period from 1977 to 2010 for 47 states; the data exclude Alaska, Wyoming, and Hawaii. For the German states, our annual data cover the period from 1975 to 2010 for the 10 West German states, excluding Berlin.[9]

For gs and $tray$, we use the state-level data that include municipalities. Moreover, in order to focus on the state government behavior, we also use data that exclude

[8] Baretti et al. (2002) focus on the German federal fiscal system and demonstrate that it is likely that the equalizing transfers reduce the tax revenue of the states.

[9] Following Potrafke and Reischmann (2015), these three U.S. states are excluded because they are outliers. Likewise, Berlin is not included in our sample. Further, the East German states cannot be examined because of the lack of fiscal transfer data before 1995.

municipalities. Figure 5 shows the scatter diagram of ypc and gs for the U.S. states, including municipalities. A similar scatter diagram for West German states is plotted in Figure 6. Although the individual state effects and other various factors are not controlled in these figures, one can see no evident correlation between state government size and real output per capita in the U.S. states, while negative correlation can be seen in the case of West German states.

[Insert Figures 5 and 6]

3. Empirical results

3.1. Panel unit root tests

Prior to panel cointegration analyses, the first task is to check whether our variables contain a panel unit root. For the U.S. states, our datasets include five variables: ypc, gs (including municipalities), gs (excluding municipalities), $tray$ (including municipalities), and $tray$ (excluding municipalities). For West German states, they include four variables: ypc , gs (including municipalities), gs (excluding municipalities), and $tray$. For these variables in levels and in first differences, we first perform two panel unit root tests: the tests from Levin et al. (2002) and Im et al. (2003).

In the former test, homogeneity in the autoregressive coefficient across cross-sections is assumed; the latter test allows for heterogeneity.

[Insert Table 1]

Table 1 reports the results. From the Im et al. (2003) test results, the null hypothesis of the unit roots for all variables cannot be rejected, suggesting that each variable is panel nonstationary and has at least one panel unit root. On the other hand, one can confirm strong rejections for all the variables in both tests when series are taken in first differences. We therefore determine that all of our underlying variables appear to be integrated of order 1 ($I(1)$).

3.2. Panel cointegration tests

In the next step, the panel cointegration tests proposed by Pedroni (1999) are conducted to examine whether there is a panel cointegrating relation in the bivariate and trivariate systems: ($\ln gs,\ \ln ypc$) and ($\ln gs,\ \ln ypc,\ tray$). We run four within-group tests and three between-group tests.

[Insert Table 2]

The outcomes are reported in Table 2. From Panel (A) of Table 2, in which the results

of the bivariate case are shown, one can find that the null hypothesis of no cointegration is rejected in both the United States and Germany, on the whole. In particular, almost all results of the ADF-statistic test reject the null hypothesis at the 1% significance level. This suggests that there is a panel cointegrating relationship in our bivariate system. The results of the trivariate system are reported in Panel (B) of Table 2. As with the two-variable case, the results suggest the presence of a panel cointegrating relationship in our three-variable system.

3.3. Panel cointegrating vector estimations

Now we present estimation results of the cointegrating vector. In order to estimate the vector, we utilize two methods: the fully modified ordinary least squares (hereafter FMOLS) and dynamic ordinary least squares (hereafter DOLS) methods. In what follows, while we report the results when lag and lead lengths of the DOLS equation are assumed to be unity, the results when their lengths are two are almost the same.

The estimation results are reported in Table 3. Panel (A) of Table 3 shows the results of the bivariate system, which indicate that the coefficients of $\ln ypc$ estimated by FMOLS and DOLS are positive and significant at the 1% significance level in the U.S. case. In contrast, those of the German case are negative and significant at the 1%

significance level, while their absolute values are vastly larger than in the U.S. case. These findings provide support for Wagner's law in the U.S. states, but no support in the German states.[10]

[Insert Table 3]

Panel (B) of Table 3 shows the results of the trivariate system. In both countries, all of the estimated coefficients of $tray$ are positive, and almost of them are statistically significant.[11] This implies that fiscal transfers have positive effects on state government size. However, the qualitative validity of Wagner's law is robust in the sense that the signs of the coefficients of $\ln ypc$ do not depend on whether $tray$ is taken into account. Hence, we can conclude that Wagner's law is strongly validated in the U.S. states, whereas it does not hold in the German states.

From the standpoint of fiscal discipline, in the U.S. states, balanced budget rules at the state level can be relevant to the law. With the exception of Vermont, U.S. state governments are obliged to follow various balanced budget requirements. It is possible that some balanced budget rules urge policymakers to coordinate expenditures with the

[10] See Koester and Priesmeier (2013) for the national-level relationship between Wagner's law and the sustainability of public finances in Germany.
[11] In Germany, the transfer dependence of municipalities is higher than that of states. For this reason, the positive effects of fiscal transfers might be statistically significant only when municipalities are included.

degree of economic growth in the long run, although the rules are not stringent in the short run, as stated in Poterba (1996) and Potrafke and Reischmann (2015).

In order to capture the effects of fiscal stringency stemming from balanced budget rules, we identify regional differences in balanced budget requirements across the U.S. states. To do this, as in Mahdavi and Westerlund (2011, Table 1), we use the following five measures of the degree of fiscal stringency.[12]

The first measure is the ACIR fiscal stringency index (*ACIR-FSI*), which is based on the assessment of the Advisory Commission on Intergovernmental Relations. *ACIR-FSI* represents the extent to which "a state has a constitutional or statutory no-deficit-carryover provision," and its values are between 0 and 10. The remaining four measures are *BBR*2, *BBR*5, *BBR*7, and *BBR*9. All of them take 1 when a certain balanced budget requirement is in place, and 0 otherwise. A state where *BBR*2 is equal to 1 is forced to "balance the budget based on own-source revenues alone." In a state where *BBR*5 is equal to 1, "a limit is in place on the amount of debt." In a state where *BBR*7 is equal to 1, there exists "a control on supplementary appropriations" and "the opportunity to rebudget" is limited. In a state where *BBR*9 is equal to 1, "no deficit may be carried over to the next fiscal year or biennium."

[12] For details of the measures, see Mahdavi and Westerlund (2011).

Utilizing these five measures of balanced budget rules to split our observations, Table 4 explores the effects of balanced budget requirements on the validity of Wagner's law in U.S. states. Regarding *ACIR-FSI*, we follow Mahdavi and Westerlund (2011) and divide the sample into two groups; in one group *ACIR-FSI* is not lower than 8, and in the other group it is not lower than 6.

[Insert Table 4]

Focusing first on the results of $\ln ypc$ in the case of *ACIR-FSI*, regardless of whether municipalities are included, there are no systematic differences in outcomes. Further, it is suggested that *BBR*5 does not create a large difference in the coefficients of $\ln ypc$. On the other hand, one can find that the balanced budget requirements of *BBR*2 and *BBR*7 yield smaller estimated values of α_1. Only in the case where municipalities are excluded does *BBR*9 substantially lower the coefficients of $\ln ypc$. These outcomes imply that some of the balanced budget requirements are effective for restraining the growth of government budget and size.

In the German states, we find a significantly negative correlation between $\ln ypc$ and $gs,$ suggesting an "inverse" Wagner's law. In terms of the characteristics of fiscal discipline, one possible explanation for the "inverse" law would stem from the soft budget

problems of the German states. If the credibility and commitment of the German federal government's no-bailout rule are lacking, then there would be an incentive for the state government to borrow excessively. Given that the softening of state budget constraints has a greater influence on poor or low-growth states than on rich or high-growth states, slack economic development in the long run would heighten government size.

To test this hypothesis formally, we estimate the cointegrating vector by dividing the German sample into two subsample periods: 1975–1992 and 1993–2010. The reason for adopting these subsamples is related to the famous bailouts of Bremen and Saarland in 1992 (see, e.g., Rodden 2003). It is quite probable that their bailouts have significantly softened German state budget constraints.

[Insert Table 5]

Table 5 reports the results of the estimation. Comparing the subsample outcomes, one can detect remarkable changes of the estimated coefficients of $\ln ypc$ between the two subsamples. Regardless of whether municipalities are included, the difference is really remarkable in both the bivariate and trivariate systems.[13] Comparing the former

[13] When excluding municipalities, the coefficient of $tray$ for 1993–2010 is significantly negative. This result arguably comes from the fiscal consolidation of the Maastricht Treaty as well as the bailout of Bremen and Saarland. In other words, for the purpose of fiscal consolidation, the state governments are forced to cut expenditures even when transfers increase.

subsample of 1975–1992 to the full sample results, the estimated values of α_1 are shifted toward zero, meaning that real output per capita has a limited impact on government size. On the other hand, with the latter subsample of 1993–2010, substantially lower estimated values of α_1 are exhibited. This result supports the view that the "inverse" Wagner's law is more validated after the bailouts of Bremen and Saarland in 1992. Thus, Table 5 provides strong confirmation of the hypothesis that the German "inverse" law appears to be primarily explained by the softening of state budget constraints.

4. Conclusion

In this paper, we examined Wagner's law for U.S. and German states, which have different characteristics of fiscal discipline. This study sheds new light on the voluminous previous empirical works on Wagner's law in the following respects. First, to the best of our knowledge, the present study is first attempt to investigate the law for U.S. and German states, with the exception of Abizadeh and Yousefi (1988), who study 10 U.S. states. Second, our study differs from all predecessors that investigate the law at the state level in that fiscal transfers are taken into account. Third, although almost all previous studies use time-series data, this is the first to use the panel cointegration approach to test the law, except for Narayan, Nielsen, and Smyth (2008) and Narayan, Rath, and Narayan

(2012).

Our main findings are summarized as follows. First, we show that significant effects of fiscal transfers on state government size are shown in most samples of the two countries. While state-level data are useful to test the law, as mentioned earlier, this outcome provides an important suggestion that fiscal transfers should be taken into account when exploring Wagner's law at the state or subnational level. Second, we demonstrate that characteristics of fiscal discipline are relevant to the validity of the law and that the qualitative results are the same regardless of whether fiscal transfers are considered. In other words, we provide strong evidence to support the law in U.S. states and the "inverse" law in German states. For the U.S. results, it is suggested that some of the balanced budget requirements weaken the validity of the law.

Third, and most important, we find the German "inverse" law, especially after the bailouts of Bremen and Saarland. This finding points to a new channel of growth in government size: soft budget constraints can cause significant negative correlation between government size and economic development.

Although the relationship between Wagner's law and fiscal discipline appears to be overlooked in previous empirical works, our results suggest that it is essential to take into account characteristics of fiscal discipline when evaluating the law. This suggestion offers

new insights into the empirical literature wherein mixed results on the validity of the law are presented.

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Table 1: The results of panel unit root tests

	The United States		Germany	
	Levin et al. (2002)	Im et al. (2003)	Levin et al. (2002)	Im et al. (2003)
Variables	Statistic	Statistic	Statistic	Statistic
ln *ypc*	5.846	5.297	-2.305 **	0.145
Δ ln *ypc*	-23.039 ***	-21.823 ***	-14.261 ***	-12.584 ***
Including municipalities				
ln *gs*	-0.034	1.804	-0.650	1.904
Δ ln *gs*	-27.943 ***	-28.568 ***	-13.875 ***	-13.749 ***
tray	10.596	8.335	-0.109	-0.440
Δ *tray*	-14.363 ***	-18.433 ***	-20.306 ***	-18.400 ***
Excluding municipalities				
ln *gs*	-0.378	2.602	-0.527	1.719
Δ ln *gs*	-32.728 ***	-32.444 ***	-13.708 ***	-15.987 ***
tray	12.605	11.848	-0.109	-0.440
Δ *tray*	-16.338 ***	-21.137 ***	-20.306 ***	-18.400 ***

Notes: *, **, and *** represent rejection of the null hypothesis at the 10%, 5%, and 1% significance levels, respectively.

Table 2: The results of Pedroni cointegration tests

	Panel (Within-dimension)				Group (Between-dimension)		
	v-Stat	rho-Stat	PP-Stat	ADF-Stat	rho-Stat	PP-Stat	ADF-Stat
(A)Two variables							
The United States							
Including municipalities	17.729***	-1.927**	-4.285***	-5.838***	0.899	-3.548***	-5.475***
Excluding municipalities	11.022***	-1.928**	-4.835***	-5.951***	0.381	-5.681***	-6.067***
Germany							
Including municipalities	-0.471	0.177	-0.455	-1.561*	1.256	0.333	-1.453*
Excluding municipalities	-0.047	-0.630	-2.137***	-2.690***	0.143	-2.409***	-4.186***
(B)Three variables							
The United States							
Including municipalities	9.734***	1.081	-1.351**	-2.658***	3.129	-1.595*	-4.202***
Excluding municipalities	5.911***	-0.592	-3.593***	-4.996***	1.652	-4.287***	-6.248***
Germany							
Including municipalities	-0.030	-0.158	-1.369	-3.902***	0.985	-0.837	-3.496***
Excluding municipalities	1.095	-1.675**	-3.822***	-4.721***	-0.102	-3.147***	-4.477***

Notes: *, **, and *** represent rejection of the null hypothesis of no cointegration at the 10%, 5%, and 1% significance levels, respectively.

Table 3: The results of FMOLS and DOLS

	FMOLS		DOLS	
	ln *ypc*	*tray*	ln *ypc*	*tray*
(A)Two variables				
The United States				
Including municipalities	0.362***		0.339***	
	(0.014)		(0.014)	
Excluding municipalities	0.460***		0.437***	
	(0.015)		(0.016)	
Germany				
Including municipalities	-0.660***		-0.729***	
	(0.029)		(0.036)	
Excluding municipalities	-0.529***		-0.586***	
	(0.025)		(0.029)	
(B)Three variables				
The United States				
Including municipalities	0.222***	5.991***	0.214***	4.131***
	(0.017)	(0.459)	(0.025)	(0.697)
Excluding municipalities	0.190***	10.455***	0.191***	9.150***
	(0.017)	(0.483)	(0.028)	(0.869)
Germany				
Including municipalities	-0.625***	7.538***	-0.683***	9.468***
	(0.030)	(1.754)	(0.037)	(2.150)
Excluding municipalities	-0.573***	1.803	-0.652***	1.924
	(0.023)	(1.284)	(0.028)	(1.440)

Notes: The values in parentheses are the standard error. *, **, and *** represent rejection of the null hypothesis at the 10%, 5%, and 1% significance levels, respectively.

Table 4: Effects of balanced budget requirements in the United States

	FMOLS		DOLS	
	ln *ypc*	*tray*	ln *ypc*	*tray*
Including municipalities				
ACIR-FSI≥8	0.228***	5.274***	0.212***	3.285***
	(0.020)	(0.574)	(0.029)	(0.880)
ACIR-FSI≤6	0.207***	7.866***	0.218***	6.342***
	(0.031)	(0.711)	(0.052)	(1.033)
BBR 2=1	0.132***	4.750***	0.144**	1.312
	(0.047)	(1.294)	(0.072)	(2.043)
BBR 2=0	0.247***	6.326***	0.233***	4.893***
	(0.018)	(0.467)	(0.025)	(0.693)
BBR 5=1	0.247***	5.488***	0.236***	3.741***
	(0.022)	(0.712)	(0.028)	(0.987)
BBR 5=0	0.203***	6.397***	0.196***	4.446***
	(0.025)	(0.599)	(0.040)	(0.977)
BBR 7=1	0.147***	7.162***	0.116**	5.948***
	(0.031)	(0.774)	(0.046)	(1.230)
BBR 7=0	0.265***	5.328***	0.269***	3.101***
	(0.020)	(0.571)	(0.030)	(0.842)
BBR 9=1	0.187***	6.869***	0.218***	4.571**
	(0.055)	(1.303)	(0.082)	(1.959)
BBR 9=0	0.230***	5.811***	0.213***	4.040***
	(0.017)	(0.485)	(0.025)	(0.738)
Excluding municipalities				
ACIR-FSI≥8	0.196***	9.385***	0.194***	7.961***
	(0.022)	(0.598)	(0.035)	(1.104)
ACIR-FSI≤6	0.173***	13.256***	0.184***	12.261***
	(0.026)	(0.773)	(0.046)	(1.234)
BBR 2=1	0.063	10.935***	0.101	7.387***
	(0.047)	(1.107)	(0.084)	(2.028)
BBR 2=0	0.224***	10.325***	0.216***	9.627***
	(0.018)	(0.535)	(0.027)	(0.958)
BBR 5=1	0.227***	8.750***	0.227***	6.930***
	(0.021)	(0.664)	(0.028)	(1.058)
BBR 5=0	0.160***	11.833***	0.162***	10.944***
	(0.026)	(0.689)	(0.045)	(1.317)
BBR 7=1	0.109***	11.527***	0.096*	11.033***
	(0.035)	(0.918)	(0.058)	(1.752)
BBR 7=0	0.235***	9.848***	0.245***	8.084***
	(0.019)	(0.549)	(0.029)	(0.931)
BBR 9=1	0.093*	12.196***	0.147	10.270***
	(0.055)	(1.017)	(0.098)	(1.854)
BBR 9=0	0.210***	10.098***	0.200***	8.921***
	(0.018)	(0.543)	(0.027)	(0.975)

Notes: The values in parentheses are the standard error. *, **, and *** represent rejection of the null hypothesis at the 10%, 5%, and 1% significance levels, respectively.

Table 5: Effects of bailouts of Bremen and Saarland in Germany

	FMOLS		DOLS	
	ln *ypc*	*tray*	ln *ypc*	*tray*
(A)Two variables				
Including municipalities				
1975-1992	-0.326***		-0.365***	
	(0.017)		(0.020)	
1993-2010	-1.223***		-1.373***	
	(0.070)		(0.088)	
Excluding municipalities				
1975-1992	-0.328***		-0.361***	
	(0.022)		(0.024)	
1993-2010	-0.912***		-1.010***	
	(0.051)		(0.060)	
(B)Three variables				
Including municipalities				
1975-1992	-0.323***	2.434	-0.349***	-1.918
	(0.023)	(2.191)	(0.061)	(4.971)
1993-2010	-1.290***	-2.507	-1.241***	0.142
	(0.071)	(1.776)	(0.124)	(2.894)
Excluding municipalities				
1975-1992	-0.346***	9.096***	-0.343***	9.465
	(0.027)	(2.627)	(0.072)	(6.330)
1993-2010	-0.954***	-5.175***	-0.885***	-4.571**
	(0.054)	(1.284)	(0.103)	(2.184)

Notes: The values in parentheses are the standard error. *, **, and *** represent rejection of the null hypothesis at the 10%, 5%, and 1% significance levels, respectively.

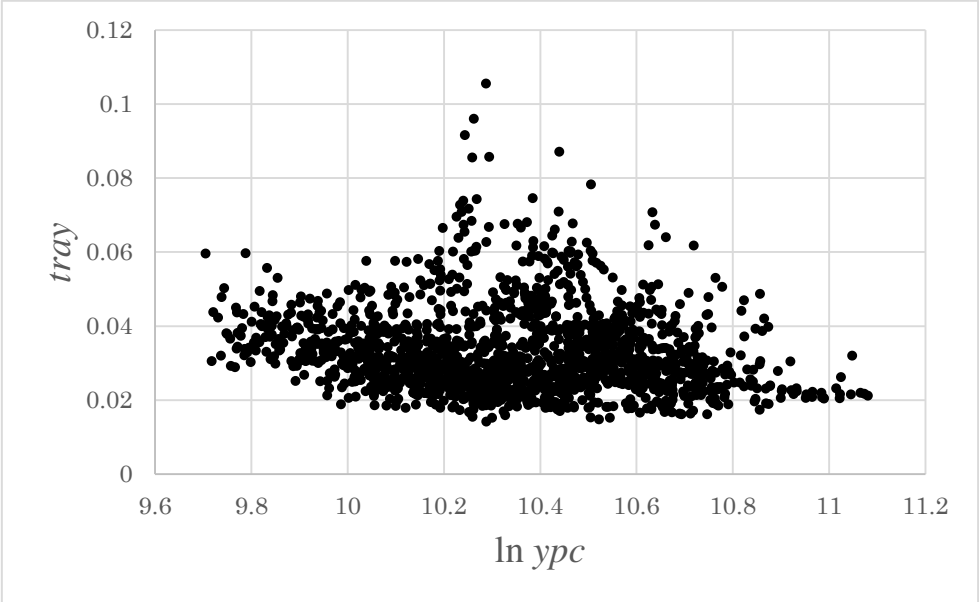

Fig. 1 Economic development and fiscal transfers in the U.S. states

Notes: ypc is real GDP per capita and $tray$ is share of state fiscal transfers in GDP. Data are taken from Potrafke and Reischmann (2015).

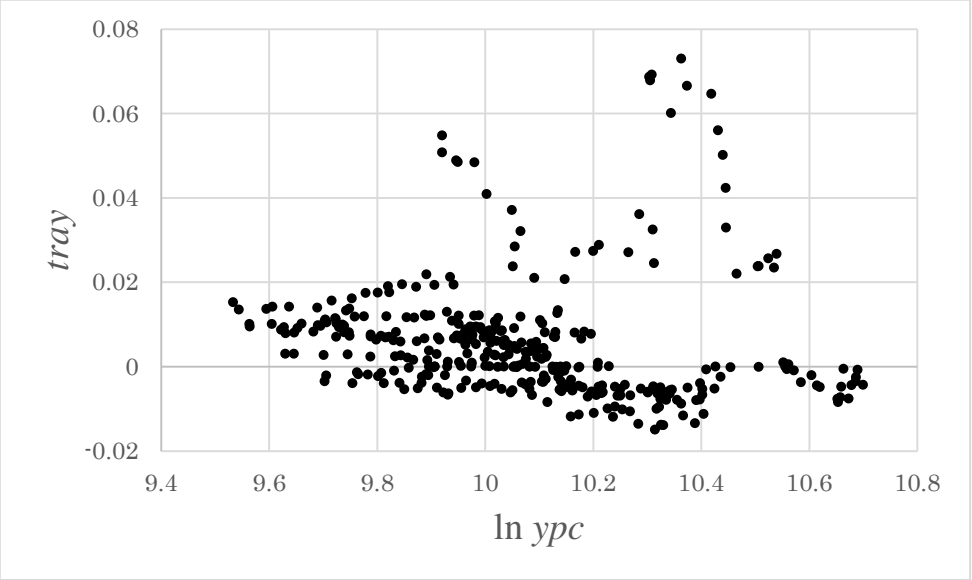

Fig. 2 Economic development and fiscal transfers in the German states

Notes: ypc is real GDP per capita and $tray$ is share of state fiscal transfers in GDP. Data are taken from Potrafke and Reischmann (2015).

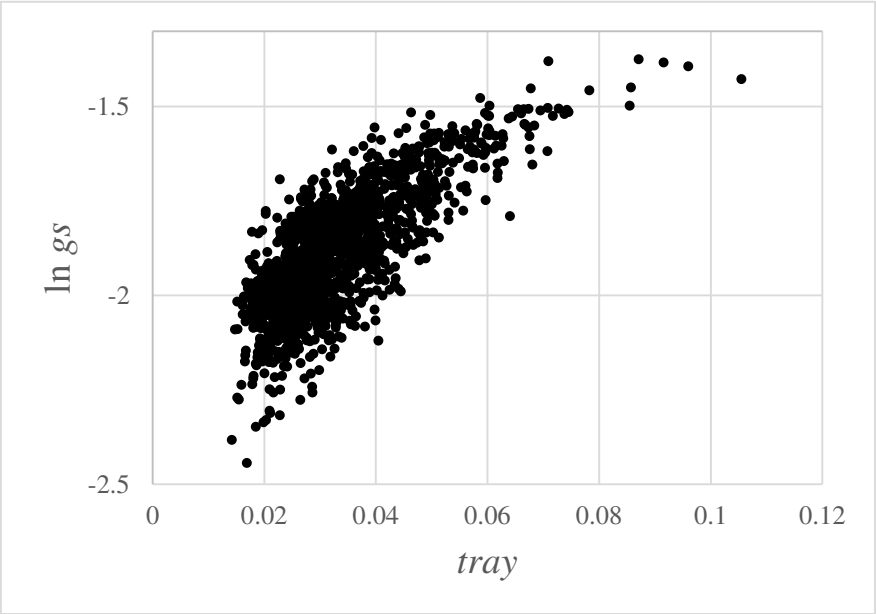

Fig. 3 Fiscal transfers and government size in the U.S. states

Notes: $tray$ is share of state fiscal transfers in GDP and gs is share of state government expenditure in GDP (state government size). Data are taken from Potrafke and Reischmann (2015).

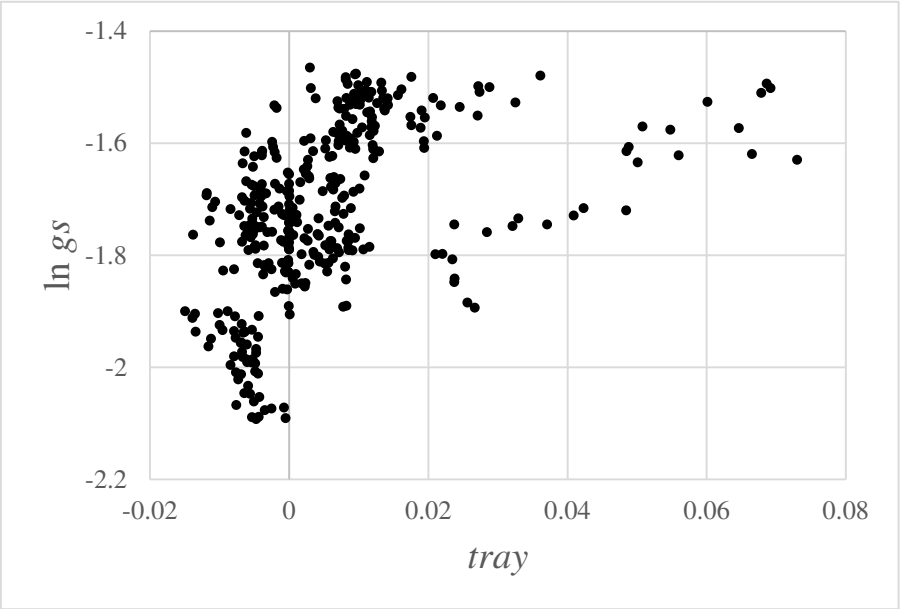

Fig. 4 Fiscal transfers and government size in the German states

Notes: $tray$ is share of state fiscal transfers in GDP and gs is share of state government expenditure in GDP (state government size). Data are taken from Potrafke and Reischmann (2015).

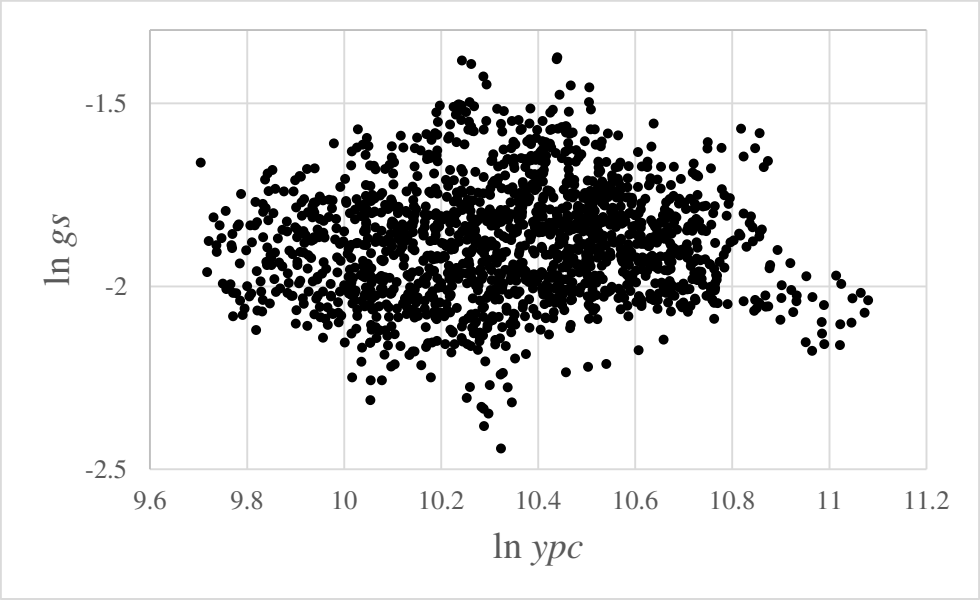

Fig. 5 Economic development and government size in the U.S. states

Notes: ypc is real GDP per capita and gs is share of state government expenditure in GDP (state government size). Data are taken from Potrafke and Reischmann (2015).

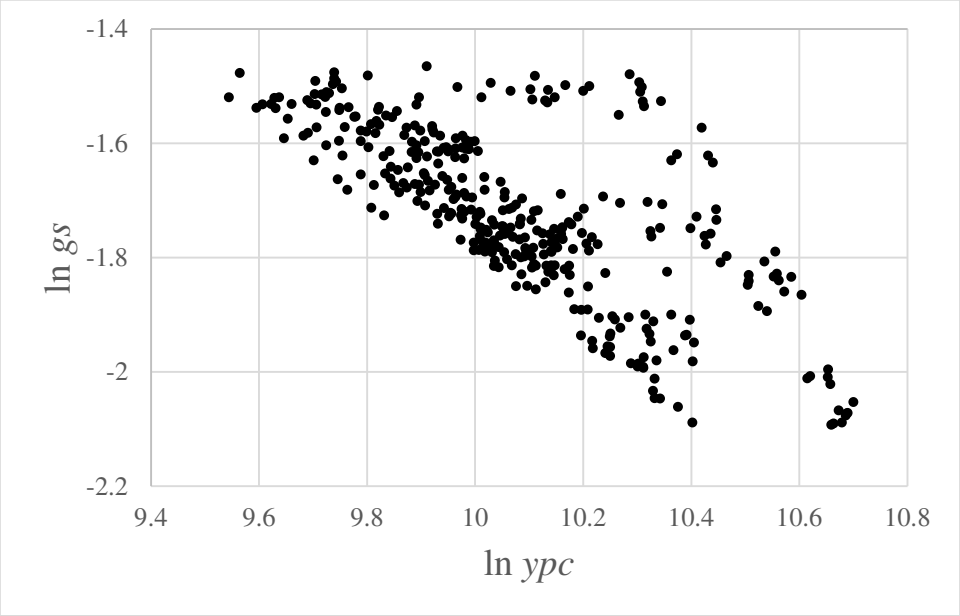

Fig. 6 Economic development and government size in the German states

Notes: ypc is real GDP per capita and gs is share of state government expenditure in GDP (state government size). Data are taken from Potrafke and Reischmann (2015).