WHAT DETERMINES FISCAL POLICY? EVIDENCE FROM GERMAN STATES

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Abstract

This paper explores the factors behind the time path of real spending and revenue in the West German states from 1975 to 2004. The empirical approach stresses robustness and takes into account a large set of economic and political variables. Our results suggest that common economic factors and, to a smaller degree, state-specific economic developments are important determinants of state fiscal performance. In comparison, the influence of political factors is limited both in statistical and quantitative terms. Finally, there is evidence that addressing governance problems and ensuring flexibility in terms of fiscal strategy are important ingredients for any policy aimed at improving fiscal outcomes at the state level.

JEL Code: D72, E62, H62, H63.

Keywords: German Länder, fiscal policy, public spending, public debt, extreme bounds analysis, governance.

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1 Introduction

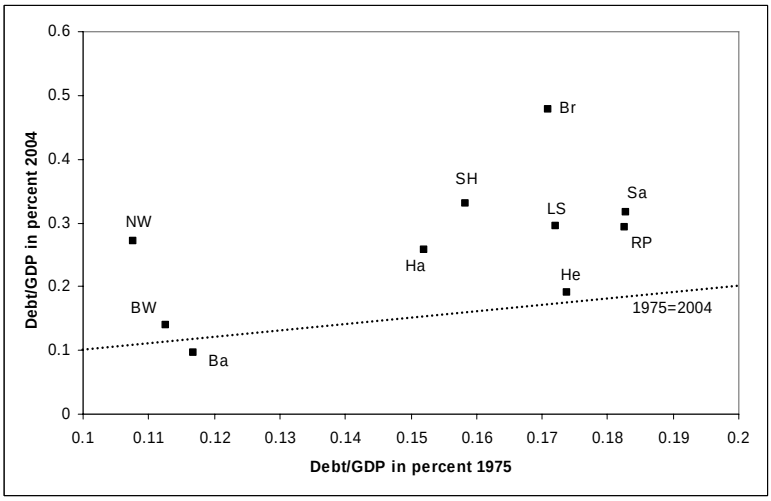
There is considerable interest in the fiscal developments of German Länder or states. State fiscal behavior is an important part of Germany's overall performance under the Stability and Growth Pact and the continuing discussion of the merits of the Finanzausgleich, the German inter-state and federal-to-state redistribution scheme for tax revenue. Lately, the failed attempt of the state of Berlin to obtain emergency funding to cover its excessive deficits has sparked a discussion of the determinants of individual fiscal performance (Konrad and Jochimsen (2007)).

A particular interesting question is to what extent state fiscal behavior reflects idiosyncratic factors within the control of state governments. Seitz (2007) pertains that existing differences in fiscal performance "seem hard to explain through objective state-specific characteristics" (p.9, our translation). One of the reasons could be that states have little leeway on the revenue side, where relevant tax rates are set on the federal level and redistribution tends to equalize effective tax receipts across states. Another reason may be that fiscal policy is mostly driven by common factors that are similar across states and state-specific factors play less of a role, an argument that would apply to spending as well as to revenue. However, while the argument has some intuitive appeal, we know little about its empirical relevance.

At first glance, both common and state-specific factors influence fiscal outcomes. Figure 1 shows both persistence and change in the debt-to-GDP ratios of German States over the 30-year period 1975-2004. One the one hand, almost all states saw their debt levels increase and states with comparatively high debt levels in 1975 also tended to have high debt levels in 2004. On the other hand, some states obviously fared worse than others, seeing their debt levels increase at a higher speed (e.g., Bremen and Saarland), while others kept their debt levels almost constant or even reduced them (e.g., Bavaria, Baden-Wuerttemberg, and Hesse).

A related question is whether the determinants of state fiscal policies are mostly in the economic domain or whether it is politics that really matters. There is a natural link between economic variables capturing the business cycle or structural characteristics of a state and the behavior of its finances. Revenue flows are clearly dependent on real activity, and so may be, through a number of channels, expenditure. However, there is a small but growing literature that argues that, for instance, state-specific election-constraints and government party structures may have at least some—and mostly unwelcome—impact on fiscal performance across states. In addition, common political factors, such as changes in political sentiment at the national level, may play a role.

Figure 1. Debt-GDP Ratios, 1975-2004



Note: Relation of debt to GDP in percent for all states in 1975 (x-axis) and in 2004 (y-axis). Any observation above the dotted line implies an increase in the debt level. The rank correlation between the two periods is 0.45.
Abbreviations: BW=Baden-Wuerttemberg, Ba=Bavaria, Br=Bremen, Ha=Hamburg, He=Hesse, LS=Lower Saxony, NW=North-Rhine-Westphalia, RP=Rhineland-Palatinate, Sa=Saarland, SH=Schleswig-Holstein.

Both questions have potentially important policy implications. Arguably, it would be more difficult to hold states responsible for their fiscal performance, if state-specific policies had no or only very limited influence on fiscal outcomes than otherwise. The more fiscal outcomes are determined by aggregate developments, the smaller is the influence of individual states on their fiscal performance and vice versa. Regarding the balance of economic and political determinants, policy recommendations will differ based on whether the former or the latter dominate. If economic factors dominate, improvements in fiscal performance could come, among other things, through better governance (e.g. lower spending given levels of government services or real activity) or through other non-fiscal policies (e.g. regulatory activity) aimed at improving state economic performance. If, on the other hand, political factors dominate, improving fiscal performance may require changes to the political framework. For instance, a lengthening of the government period may be helpful reducing re-election constraints.

The present paper aims at answering some of these questions by exploring the factors behind the time path of real spending and real revenue for the West Ger-

man states between 1975 and 2004.[1] The empirical approach stresses robustness: in a first step, we identify a baseline model consisting of economic determinants based on cyclical, structural, and fiscal indicators, as well as cross-section and common time fixed effects. In a second step, we consider a large set of possible political arguments, including elections and government changes, the government party composition, political relations between the federal and the state level, voting results, bailouts, as well as various interaction effects. Third, we combine the economic baseline model with significant political factors to a general model of state fiscal behavior, which allows us to decompose the time path of spending and revenues based on their economic, political, common or state-specific determinants.

An important first result stemming from this exercise is that economic factors are the dominant determinant of fiscal performance at the state level. There are clear indications that cyclical indicators move spending and, in particular, revenue procyclically in a quantitatively relevant way. In addition, fiscal decisions are subject to solvency constraints in the sense that past fiscal performance measured by the growth rate of the real debt level has a significant dampening effect on spending growth, but tends to lead to higher revenue. Structural indicators, including measures of population growth and labor market activity, play little or no role on the economic side.

We also find that some political conditions at the state level move fiscal policy statistically—but they hardly matter in a quantitative sense, and the effects are not always as theoretically predicted. For instance, elections seem to have a positive impact on real spending growth. However, the effect appears to be on the small side, and it depends on the debatable condition of excluding so-called Grand Coalition governments formed by the social democratic and conservative party, which significantly reduce spending in election years. There are some scant indications mostly on the revenue side that ideology (e.g., the type of parties in a coalition) and, in some specifications, the political relations between state and federal governments may matter, but the evidence is not very robust. Simulation exercises show that political variables overall contribute little or nothing to the explanation of the evolution of spending and revenue levels over time, which seems almost exclusively determined by economic factors.

A last but crucial result is that common or federal-level factors, in particular aggregated economic variables, seem to be important determinants of state fiscal behavior. Common time fixed effects capture a large part of the time variation of the fiscal variables, and a substantial amount of these common effects can be explained by aggregated economic factors. For instance, the quantitative impact

[1] Our sample includes the states of Baden-Wuerttemberg, Bavaria, Bremen, Hamburg, Hesse, Lower Saxony, North Rhine-Westphalia, Rhineland-Palatinate, Saarland, and Schleswig Holstein.

of aggregated GDP growth on spending is higher than that of state-level GDP and the difference is even more pronounced when it comes to revenues. Arguably, these findings reflect a high correlation of real activity across states as well as the effects of the fiscal redistribution scheme, which further strengthens the link of state revenue to aggregate cyclical developments.

What, then, explains the differences in fiscal performance over time visible in Figure 1? Our results suggest that a number of factors play a role. First, some states show consistently higher propensities to spend then others and are, in addition, prone to spending shocks—which can be interpreted as evidence that differences in governance explain a relevant part of the heterogeneity in debt levels. Another factor is the lack of flexibility in the fiscal strategy. While GDP growth was highly correlated across states, there were persistent differences as well. And because states did not adjust their GDP-elasticities for spending and revenue growth accordingly, this translated into diverging fiscal outcomes. This implies that ensuring flexibility in terms of fiscal strategy and addressing governance problems are important ingredients for any policy aimed at improving fiscal outcomes at the state level.

In what follows, Section 2 provides a short survey of the related literature, Section 3 describes our data set, Section 4 presents the empirical models and results, and Section 5 applies these findings to decompose state fiscal performance over time. Section 6 explains why some states fared better than others and looks for policy conclusions. Finally, Section 7 concludes.

2 Related Literature

A number of papers investigates the political economy of *Länder* fiscal policy in recent years using modern panel data approaches—with mixed results. As far as conventional political business cycle theory is concerned, Galli and Rossi (2002), Rodden (2006), and Margraf (2007) find some support for the idea of election-related opportunistic fiscal policies. Bischoff and Gohout (2006) report opportunistic influences in government tax projections. In contrast, Seitz (2000) and Jochimsen and Nuscheler (2007) do not find election effects. Potrafke (2006) finds evidence for ideological or partisan politics in some subcategories of public spending at the state level, a result that, at the aggregate level, has been rejected by the vast majority of the literature so far.

Going beyond traditional political business cycle arguments, Jochimsen and Nuscheler (2007) and Margraf (2007) show that fiscal behavior may be influenced by the character of the state government, in particular the number of parties involved in a coalition. Finally, Heppke-Falk and Wolff (2007) present evidence that higher

debts and deficits per capita increase the risk of a financial bailout.

While a number of factors may be in play, differences in model specification are likely to explain some of the differences in findings. The literature uses different samples and various estimation techniques. For instance, some papers look at the period 1970-2000s, applying sophisticated dynamic panel estimators, while others focus on a subsample and use simple OLS approaches.[2] However, at least since Sala-I-Martin (1997), it is well known that variable selection is among the most important influences in empirical frameworks with a large number of potential explanatory variables, both on the economic and the political side, and little common theoretical ground to restrict the empirical framework.

Our main contribution to this debate is to systematically consider a wide range of economic and political variables and evaluate their relative importance in a robust empirical framework. Like the literature so far, the approach encompasses a number of tests based on political economy considerations, but general idea is to describe in full the determinants of fiscal policy at the state level.

3 Data

To describe the fiscal behavior of German states in full, we focus on the real growth in spending and revenue of both the central (i.e., state government) and the local (i.e., municipal) level. Central and local fiscal decisions are intertwined in various ways, and the allocation of fiscal responsibilities varies across states—which suggests an aggregate perspective.[3]

In addition, we consider about 70 economic and political variables linked to the development of state finances, resulting in a panel covering the years 1975 to 2004 and 10 German states. We exclude East German states and Berlin, which offer a significantly shorter time span of observations and are subject to various specific post-unification conditions. Our average empirical models include 290 observations. We will discuss the data in some detail below.

Standard stationarity tests indicate that the relevant fiscal variables as well as their potential economic determinants are, as a rule, non-stationary and show no

[2]Seitz (sample: 70-96), Rodden (75-93), Jochimsen and Nuscheler (60-05), and Margraf (71-05; excluding Bremen) employ dynamic panel methods, with Seitz and Rodden relying on OLS, Jochimsen and Nuscheler on a Least Squares Dummy Variable estimator (LSDV), and Margraf on a GMM approach. Bischoff and Gohout (92-02) estimate a random effects OLS model, Galli and Rossi (74-94; including Berlin) a fixed effects GLS model, and Heppke-Falk and Wolff (93-05) a fixed effects instrumental variable regression. Potrafke (74-04) estimates a SUR model.

[3]For lack of better alternatives we use state specific GDP-deflators to produce series of real spending and revenues.

systematic cointegration relationships, suggesting an empirical approach based on first differences or growth rates (see Appendix A). This holds for the various indicators of real activity (e.g., real GDP, unemployment), structural measures (e.g., population, sectoral composition), as well as for the dependent variables. For easier interpretation, (annual) growth rates are used were applicable.

A striking feature of many state variables is their comovement, making it crucial to consider federal (or common) variables in the empirical model as well. For instance, indicators of real activity tend to be highly correlated across states, pointing to a high degree of cross-sectional integration. In principle, certain political factors, for instance, a change in the party composition of federal government, could also have national repercussions. We will take this into account by adding common time fixed effects or, alternatively measures of aggregated economic activity as well as common political variables to the empirical model.

3.1 Economic Variables

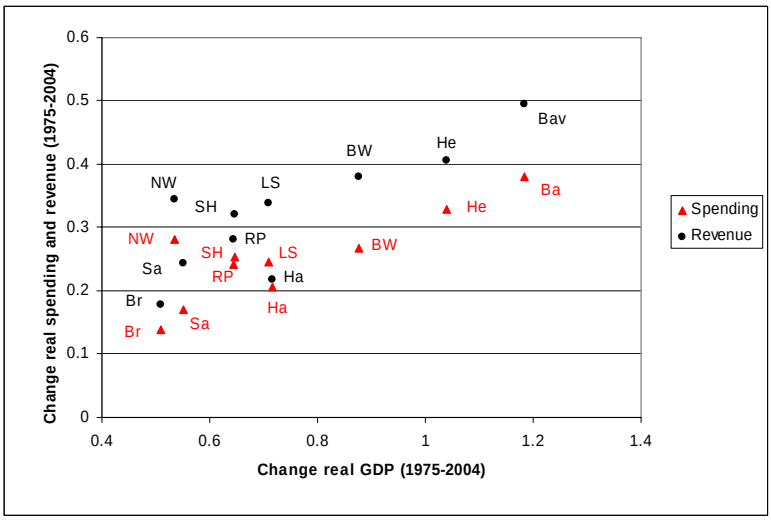
Indicators of economic developments at the state and federal level that could potentially shape state fiscal behavior fall into three broad categories. Measures of *cyclical or growth* activity include real GDP growth, growth in unemployment and employment, and the real interest rate. Figure 2 shows that real GDP growth and the change in real spending and revenue over the full 1975-2004 period are positively correlated, which supports the notion that this group of variables may indeed be a relevant determinant of fiscal behavior.

Measures of *structural* economic development include population growth, population density, the share of industrial production in overall output, as well as variables that capture the size of states, for instance, the level of real GDP, geographic size, urbanity, average population level, or the presence of foreign borders. In addition, there is reason to consider other exogenous factors at the federal level such as the occurrence of common oil price hikes (in the form of an impulse dummy variable), possible effects of German unification (as impulse dummy), or otherwise unspecified common longer-term developments (as a linear trend).

Finally, past *fiscal performance* may, and perhaps should, have repercussions on present expenditure and revenue decisions. For instance, state governments under a binding intertemporal budget constraint could be expected to adjust contemporary fiscal policies in light of past growth rates of the their real debt level.

Tables A1 and A2 in Appendix B present descriptions and descriptive statistics for all economic and political variables (see below) discussed. Data sources are described in Table A3.

Figure 2. Real GDP Growth and Real Spending and Revenue Growth, 1975-2004



Note: Annual average change in real GDP levels (x-axis) and the average annual change in real spending and revenue levels between 1975 and 2004 in percent.
Abbreviations: BW=Baden-Wuerttemberg, Ba=Bavaria, Br=Bremen, Ha=Hamburg, He=Hesse, LS=Lower Saxony, NW=North-Rhine-Westphalia, RP=Rhineland-Palatinate, Sa=Saarland, SH=Schleswig-Holstein.

3.2 Political variables

We consider a wide range of political variables covering the structure of state governments, political relations between the federal and the state level, voting results at the state and federal level, the party composition of state governments, elections and changes in state governments, and the bailouts of certain state governments during the 1990s. In addition, we look at interaction effects of elections and changes in state governments with pre- and post-change government party compositions.

The *structure of state governments* may shape fiscal behavior through a variety of channels, such as the differences in political dynamics depending on coalition form or the political standing of the Minister of Finance. The relevant group of variables includes the number of parties in a government coalition, the number of ministries, the share of ministries held by the party of the Prime Minister, and the similarity of party affiliation of the Prime Minister and the Minister of Finance.

Political relations between the federal and the state level could be influential because Germany's constitutions allows a majority of state governments to interact with the federal government across a wide area of policy fields through the Bundesrat (or Senate). This is particularly relevant for fiscal policy, as the Bundesrat holds veto power over any federal law intervening in state finances, for example, by implying changes in state-level expenditures. To capture some of the relevant political constellations, we construct variables that capture similarities in a state government's party composition with that of the federal government as well as potential conflicts between the political majority within the Bundesrat and federal government (based on the the party affiliation of Prime Ministers).

Changing political moods captured by party *voting results* may also influence fiscal policy, for instance, if certain parties were associated with particular spending programs. Due to Bundesrat-federal government interaction and also because voting trends at the federal level may be indicative of overall political tendencies, both federal and state level voting results will be considered. Following similar arguments, there is reason to include variables measuring the *party composition of state governments* like the presence of a Grand Coalition between the social democrats (SPD) and the conservative party (CDU[4])—the two parties dominating German post-war politics.

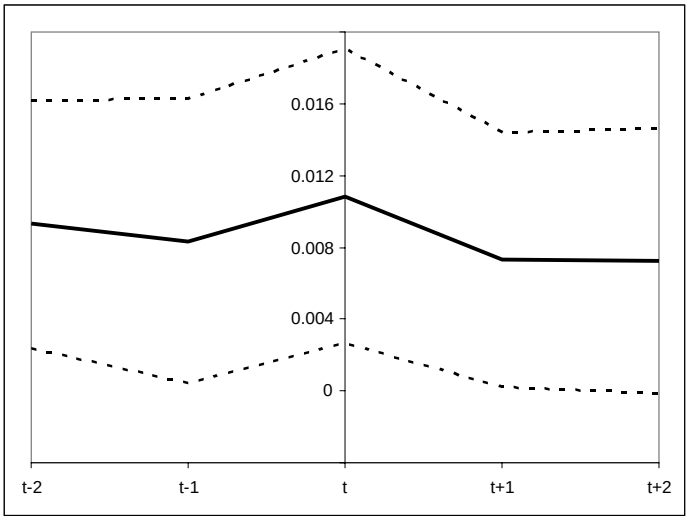
Standard political business cycle theory suggests that *elections* may play a role in fiscal policy by, among other things, creating incentives for increasing spending and lowering revenue prior to a ballot. On the other hand, there could be reason to implement fiscal policy changes just after an election—a necessary expenditure cut, say—to exploit the political cycle. Figure 3 shows that average state real spending growth was indeed somewhat higher in election periods and tended to be just slightly lower in post- than in pre-election periods. The question is, whether this finding can be reproduced in a more robust empirical setup.

Along the same line, any political *change* may shape fiscal policy, for instance, the substitution of the Prime Minister or a reshuffle of the governing party coalition. In addition, because the party composition of governments could influence the way elections or political changes impact fiscal policy, we also consider *interaction effects*.

Lastly, we construct a set of variables indicating the occurrence of fiscal *bailouts*. During the 1990s, two German states (Bremen and Saarland) obtained emergency financing through the Finanzausgleich inter-state redistribution scheme for tax revenue and from the federal government. These variables should help answer the question whether these bailouts had lasting effects on the fiscal behavior of the beneficiaries or the other states in the sample.

[4]The conservative party is represented by the CSU in Bavaria, but by the CDU elsewhere. In what follows, we will use the CDU synonymously for both.

Figure 3. Real Spending Growth Around Election Years, 1975-2004



Note: Average real spending growth in election years t and two years before and after an election. Dotted lines show 95% confidence interval.

4 Model and Results

4.1 Preliminaries

Based on the time series properties of the data discussed in Section 3, we opt for a Feasible Generalized Least Square (FGLS) approach in the empirical application. The FGLS estimator robustly deals with possible problems of autocorrelation and heteroscedasticity, while avoiding some of the problems associated with dynamic panel estimators. Even though dynamic models can be valuable tools in the presence of strong persistence in explanatory variables, their validity crucially depends on the availability of strong instruments. What is more, including a lagged endogenous variable may make it difficult to identify the economic forces driving the possible persistence of the endogenous variable. For instance, the observed inertia (if any) in real expenditure or revenue growth rates may well be due to inertia in relevant determinants such as real GDP and interest rates. The FGLS models estimated below show a robust relation between expenditure or revenue growth and their economic determinants and little or no residual

autocorrelation.[5]

Our empirical strategy follows three steps: first, we establish a baseline model for real expenditure and revenue growth based on economic determinants alone; second, we identify political variables that, in addition, have empirical impact; third, we integrate both economic and political factors in a general model of fiscal behavior. The general model allows a discussion of the relative strength of economic and political determinants of fiscal behavior and is used for a decomposition of the evolution of the fiscal position of German states in Section 5. A variety of robustness checks will be discussed, including alternative estimators and model selection techniques.

4.2 Results

4.2.1 Economic Baseline Model

The search for a economic baseline model starts with the complete set of cyclical, structural, and fiscal performance variables discussed above, as well as one-period lagged values of these variables. We then narrow the model down by dropping variables with a p-value larger than 0.1. The procedure is applied separately to spending and revenue, resulting in two separate economic baseline models, which we then complement by cross-section and time fixed effects.

Tables 1 and 2 present the resulting models for real spending and revenue growth after eliminating non-significant current or lagged economic variables.[6] In the case of spending, the baseline model in column (1) includes as explanatory variables lagged real GDP growth at the state level ($\Delta gdp(lag)$), lagged real GDP growth at the federal level ($\Delta bund\_gdp(lag)$), the change of the real interest rate at the federal level ($\Delta interest$), lagged state population growth ($\Delta population(lag)$), state unemployment growth ($\Delta unemployed$), the lagged growth rate of the real debt level ($\Delta debt(lag)$), as well as a dummy variable capturing the oil price hikes of the 1970s (oil), and a linear trend ($trend$). The model also includes a dummy controlling for technical changes in national accounting methods in 1998 ($dummy$).

[5]Note that this holds irrespective of the inclusion of other fiscal variables such as lagged real debt growth. Dynamic models will be estimated as a robustness check.

[6]The full set of economic variables entering the general model (not shown; results available on request) is listed in the upper panel of Table 2. The variables that do not show a significant impact either in their lagged or current form include $\Delta urbanity$ (change of percentage of population living in urban areas), $ratio\_frontier$ (percentage of state border with other countries), $area$ (state size), and $\Delta density$ (change in population density).

Table 1. Baseline model: economic determinants of spending

Δspending	(1)		(2)		(3)		(4)	
	β	p	β	p	β	p	β	p
Δgdp(lag)	0.2391	0.008	0.2842	0.005	0.1499	0.099	0.1637	0.097
Δbund_gdp(lag)	0.3509	0.003	0.2843	0.032				
Δinterest	0.0034	0.012	0.0032	0.016				
Δpopulation(lag)	0.3203	0.082	0.3740	0.071	0.3781	0.208	0.6111	0.209
Δunemployed	-0.0408	0.000	-0.0413	0.000	-0.0186	0.136	-0.0196	0.120
Δdebt(lag)	-0.0524	0.073	-0.0666	0.029	-0.0526	0.095	-0.0674	0.047
oil	0.0224	0.000	0.0224	0.000				
dummy(=1998)	-0.1097	0.000	-0.1093	0.000				
trend	-0.0005	0.003	-0.0006	0.001				
Bavaria			0.0002	0.963			0.0013	0.738
Bremen			0.0032	0.570			0.0042	0.502
Hamburg			0.0040	0.536			0.0028	0.671
Hesse			0.0009	0.857			0.0018	0.666
Lower Saxony			0.0011	0.838			0.0013	0.763
N. Rhine-Westph.			0.0049	0.294			0.0049	0.251
Rhine. Palatinate			0.0012	0.802			0.0013	0.751
Saarland			0.0011	0.819			0.0022	0.685
Schles.-Holst.			0.0018	0.702			0.0020	0.625
1976					-0.0305	0.278	-0.0309	0.276
1977					-0.0403	0.150	-0.0415	0.142
1978					-0.0189	0.505	-0.0216	0.453
1979					-0.0035	0.902	-0.0063	0.830
1980					-0.0126	0.661	-0.0159	0.584
1981					-0.0414	0.124	-0.0443	0.106
1982					-0.0626	0.020	-0.0651	0.017
1983					-0.0558	0.040	-0.0577	0.036
1984					-0.0500	0.072	-0.0524	0.063
1985					-0.0223	0.419	-0.0245	0.380
1986					-0.0329	0.247	-0.0356	0.216
1987					-0.0326	0.245	-0.0362	0.205
1988					-0.0412	0.149	-0.0443	0.128
1989					-0.0316	0.270	-0.0361	0.220
1990					-0.0265	0.362	-0.0326	0.283
1991					-0.0294	0.328	-0.0376	0.246
1992					-0.0238	0.404	-0.0304	0.313
1993					-0.0473	0.089	-0.0532	0.069
1994					-0.0532	0.063	-0.0580	0.052
1995					-0.0414	0.147	-0.0460	0.118
1996					-0.0523	0.068	-0.0566	0.055
1997					-0.0643	0.021	-0.0680	0.018
1998					-0.1526	0.000	-0.1565	0.000
1999					-0.0394	0.167	-0.0434	0.137
2000					-0.0330	0.256	-0.0374	0.209
2001					-0.0446	0.116	-0.0489	0.092
2002					-0.0570	0.041	-0.0608	0.033
2003					-0.0440	0.113	-0.0476	0.094
2004					-0.0645	0.021	-0.0676	0.018
Cons	0.0134	0.020	0.0139	0.044	0.0503	0.073	0.0517	0.071

Table 2. Baseline model: economic determinants of revenue

Δrevenue	(1)		(2)		(3)		(4)	
	β	p	β	p	β	p	β	p
Δgdp	0.3981	0.001	0.3465	0.012	0.4449	0.000	0.3875	0.004
Δbund_gdp	0.6816	0.000	0.7366	0.000				
Δbund_gdp(lag)	0.3116	0.027	0.3141	0.025				
Δinterest	-0.0067	0.002	-0.0065	0.002				
Δinterest(lag)	-0.0028	0.089	-0.0026	0.105				
Δdebt(lag)	0.0796	0.046	0.0883	0.036	0.0870	0.026	0.0988	0.020
Δunemployed(lag)	0.0206	0.028	0.0200	0.034	-0.0282	0.065	-0.0286	0.063
unification(=1990)	-0.0355	0.000	-0.0354	0.000				
dummy(=1998)	-0.0771	0.000	-0.0769	0.000				
trend	-0.0006	0.001	-0.0006	0.001				
Bavaria			0.0023	0.535			0.0012	0.673
Bremen			-0.0042	0.649			-0.0038	0.629
Hamburg			-0.0047	0.326			-0.0044	0.409
Hesse			0.0002	0.970			0.0001	0.971
Lower Saxony			-0.0004	0.907			-0.0005	0.892
N. Rhine-Westph.			0.0000	0.999			-0.0002	0.950
Rhine. Palatinate			-0.0005	0.907			-0.0008	0.791
Saarland			-0.0011	0.866			-0.0015	0.758
Schles.-Holst.			-0.0006	0.846			-0.0014	0.657
1977					-0.0113	0.506	-0.0122	0.477
1978					-0.0376	0.020	-0.0376	0.020
1979					-0.0400	0.021	-0.0396	0.023
1980					-0.0336	0.068	-0.0348	0.062
1981					-0.0859	0.000	-0.0880	0.000
1982					-0.0530	0.000	-0.0557	0.000
1983					-0.0407	0.002	-0.0419	0.001
1984					-0.0383	0.004	-0.0385	0.004
1985					-0.0310	0.059	-0.0319	0.054
1986					-0.0486	0.002	-0.0489	0.002
1987					-0.0451	0.012	-0.0459	0.011
1988					-0.0365	0.024	-0.0365	0.024
1989					-0.0242	0.164	-0.0240	0.167
1990					-0.0754	0.000	-0.0737	0.000
1991					-0.0307	0.082	-0.0296	0.094
1992					-0.0272	0.157	-0.0282	0.146
1993					-0.0405	0.029	-0.0436	0.023
1994					-0.0432	0.003	-0.0441	0.003
1995					-0.0568	0.000	-0.0575	0.000
1996					-0.0448	0.013	-0.0461	0.011
1997					-0.0745	0.000	-0.0756	0.000
1998					-0.1260	0.000	-0.1268	0.000
1999					-0.0332	0.064	-0.0339	0.060
2000					-0.0505	0.005	-0.0503	0.005
2001					-0.1018	0.000	-0.1030	0.000
2002					-0.0805	0.000	-0.0821	0.000
2003					-0.0646	0.000	-0.0665	0.000
2004					-0.0458	0.003	-0.0467	0.002
Cons	-0.0065	0.342	-0.0071	0.302	0.0494	0.004	0.0512	0.004

A number of results deserve commenting. First, expenditure growth seems to be procyclical. Lagged real GDP growth at the federal and state level has a significant positive and state-level unemployment growth has a significant negative impact on spending. To the extent that real interest rate changes also follow the business cycle, the estimated positive (albeit only marginally significant) coefficient points in the same direction. In addition, of course, higher interest rate expenditures will also play a role.

Second, structural elements hardly matter. Only higher population growth is, after a one-year lag, associated with higher state spending, perhaps reflecting the need to scale the provision of publicly provided goods and services such as schooling and other infrastructure to population size. But the estimated coefficient is only significant at the 9 percent level.

Third, there are signs that spending decisions are subject to solvency constraints in the sense that the growth rate of the real debt level lagged one period has a marginally significant negative effect on real spending. In other words, state expenditure does not evolve independently of the overall fiscal situation.

Turning to revenue, it is interesting to note that the baseline model, after eliminating insignificant variables, contains a similar set of determinants as the expenditure case (Table 2, column (1)).[7] These include Δgdp, $\Delta bund\_gdp$ and its lag, $\Delta interest$ and its lag, $\Delta debt(lag)$, $\Delta unemployed(lag)$, $dummy$ and $trend$. Finally, $unification$, an impulse-dummy controlling for effects of the German unification, plays a significant role. The significant positive reaction of real revenue growth to GDP is hardly surprising. Interestingly, interest rates have a negative effect on revenue. One interpretation is that interest rates are negatively related to asset prices and, thus, to revenue stemming from corporate and income taxation.

Standard Hausman tests imply that the baseline models may benefit from adding cross-section and period fixed effects.[8] Thus, Tables 1 and 2 in columns (2)-(4) also provide results for augmented models with fixed effects. With the possible exception of North Rhine-Westphalia in the spending model, the fixed cross-section effects matter neither statistically nor economically. However, the period fixed effects are often significant, and their inclusion impacts the results for the state-specific economic variables in the spending model. While these variables continue to produce p-values at least bordering significance, only debt remains significant at conventional levels in column (4) of Table 1. The picture changes, however, once we allow for political variables and eliminate insignificant period effects (see below).

[7] Results for the model including the full set of current and lagged economic variables available on request.

[8] Test results available on request.

In the revenue model, GDP growth as well debt seem unaffected by the inclusion of common period fixed effects, while unemployment becomes statistically less important.

Note that $\Delta interest$, $\Delta bund\_gdp$, as well as the time dummies and the trend variable are common across states and, therefore, excluded from the column (3) and (4) models that include period fixed effects.

4.2.2 Adding Political Variables

In a second step, the economic baseline models are expanded to include political arguments as additional explanatory variables. To get a first idea which political factors may influence fiscal behavior in addition to the economic forces at work, we added—one at a time—each of the 55 political variables listed in Table A2 to the baseline models with cross-section and time period fixed effects. Tables 3 and 4 (upper panels) report the significantly estimated coefficients of the added variables for spending and revenue, respectively.[9]

The results allow for the possibility that politics matter for state fiscal behavior—albeit not always as conventional theory would suggest. Looking at spending, first, the number of parties in a government coalition ($coal\_size$) seems to have a positive and marginally significant impact, which seems to be in line with the idea that fiscal discipline suffers when political responsibility is shared (Roubini and Sachs (1988), Alesina and Perotti (1994), Persson and Tabellini (1999)). It is less clear, however, why a change in government resulting in a coalition of the conservative CDU and market-oriented, liberal FDP ($change\_gov\_CDU\_FDP$) may to lead to higher real expenditure growth. Similarly, higher spending under a conservative-liberal coalition overall (CDU_FDP_gov) seems to be at odds with the classical idea of partisan politics put forward by Hibbs (1977).[10] Also the stipulation by Nordhaus (1975) of opportunistic spending in election years is at odds with lower election year expenditures under a Grand Coalition government ($election\_grand\_coal$). On the other hand, real spending is higher in election years under governments *other* than Grand Coalitions, perhaps because, for ideological reasons outside the Nordhaus model, both parties in a Grand Coalition government prefer the present arrangement to end. Interestingly, and also distinctively not in line with the Nordhaus model, we find that expenditure growth is lower in the year following state elections ($lag\_election$). A possible explanation is that fiscal consolidation efforts are concentrated in the post-election period. Finally, there are indications (marginally significant) that expenditure followed a less expansionary path in the state of Saarland after the bailout ($bailout\_Saar$).

[9] We will comment on the findings excluding fixed effects (lower panels) below.

[10] Both variables are not significant at conventional levels, though.

Table 3. Political determinants of spending

	β	p	with economic model	with fixed effects
coal_size	0.0038	0.054	yes	yes
CDU_FDP_gov	0.0051	0.085	yes	yes
lag_election	-0.0045	0.032	yes	yes
bailout_saar	-0.0120	0.064	yes	yes
change_gov_CDU_FDP	0.0142	0.200	yes	yes
election_grand_coal	-0.0326	0.008	yes	yes
Δ_bund_FDP_vote	0.0176	0.009	yes	no
SPD_FDP_gov	0.0050	0.075	yes	no
change_mp	0.0098	0.049	yes	no
lag_election	-0.0055	0.013	yes	no
bailout_Saar	-0.0093	0.062	yes	no
election_grand_coal	-0.0268	0.032	yes	no
change_gov_CDU_alone	0.0121	0.071	yes	no
lag_election_CDU_FDP	-0.0112	0.088	yes	no
lag_election_SPD_alone	-0.0071	0.075	yes	no

Table 4. Political determinants of revenue

	β	p	with economic model	with fixed effects
ΔCDU_vote	0.0394	0.066	yes	yes
grand_coal	-0.0152	0.028	yes	yes
ampel_gov	0.0604	0.010	yes	yes
preelect_grand_coal	-0.0288	0.025	yes	yes
SPD_bund_land	-0.0080	0.012	yes	no
ΔCDU_vote	0.0369	0.096	yes	no
ampel_gov	0.0636	0.012	yes	no
bailout	-0.0089	0.090	yes	no
preelect_grand_coal	-0.0258	0.049	yes	no
preelect_SPD_Green	0.0150	0.048	yes	no
lag_election_CDU_alone	0.0100	0.015	yes	no
lag_election_SPD_Green	-0.0148	0.057	yes	no
bund_SPD_FDP_gov	-0.0074	0.084	yes	no
Δbund_CDU_vote	-0.0550	0.061	yes	no

The results pertaining to revenue growth are also open to interpretation, but it would seem that variables describing government ideology or party composition are more relevant than election-related or partisan factors. For instance, Grand Coalitions seem to be associated with periods of lower revenue growth ($grand\_coal$), including before elections ($prelect\_grand\_coal$). On the other hand, a higher number of votes for the conservative party (ΔCDU_vote), seem to be associated with a positive revenue effect at marginal significance levels. This also holds for a three party coalition consisting of social democrats, liberals, and the Green Party ($ampel\_gov$).

4.2.3 General Model

Finally, we expand the economic baseline models by including all political variables identified above. This leaves us with large models including up to 10 variables plus fixed effects, of which not all are significant. After eliminating non-significant variables and fixed effects using standard information criteria, we arrive at the general specifications presented in Table 5 for real spending growth and in Table 6 for real revenue growth.

The results confirm that state-specific economic factors help determine real spending and revenue growth. Looking at the expenditure side first, quantitatively, a one percentage point increase of lagged real GDP growth leads to about 0.2 percentage points higher spending growth. At about 0.03, the estimated impact for a similar decrease in unemployment growth is somewhat lower, and higher real debt growth of one percentage point reduces spending growth by about 0.1 percentage points— also not an irrelevant number. Population growth, with a coefficient estimate of about 0.8, has the strongest effect on spending growth, but Table A2 shows that $\Delta population$ is a sluggishly moving time series with a comparatively low standard deviation over the sample period. Regarding revenue, a one percent increase in lagged real GDP growth leads to higher revenue growth of almost 0.6 percentage points, or about thrice the impact on expenditure growth, while the impact of changes in real debt growth are of a similar magnitude.

Turning to the political determinants, not all of the variables identified in the previous section are significant at conventional levels when entered simultaneously, and their quantitative effect is small compared to the economic variables. Spending growth increases by about 0.02 percentage points after government changes resulting in a conservative-liberal coalition government, decreases by about 0.05 percentage points in election years under a Grand Coalition, and is about 0.006 percentage points lower in post-election years than otherwise. In addition, spending growth in the state of Saarland is estimated to have been about 0.02 percentage points lower after the bailout in the early 1990s. As to revenue, we find that coalitions involving the social democrats, liberals, and the Green Party enjoyed

about 0.05 percentage points higher revenue growth than other governments, while Grand Coalition governments saw their revenue growth reduced in pre-election years. In addition, revenue growth was higher in state-periods during which the conservative vote share was increasing.

While these results remain hard to interpret consistently, it would seem that fiscal spending is more sensitive to election-related factors, while fiscal revenue tend to be mostly influenced by partisan elements.

Table 5. General model: spending

	β	p
Δgdp(lag)	0.2190	0.001
Δpopulation(lag)	0.8416	0.000
Δunemployed	-0.0275	0.001
Δdebt(lag)	-0.1098	0.000
lag_election	-0.0055	0.004
bailout_Saar	-0.0150	0.011
change_gov_CDU_FDP	0.0196	0.000
election_grand_coal	-0.0456	0.000
1975	0.0622	0.022
1976	0.0205	0.000
1978	0.0183	0.000
1979	0.0358	0.000
1980	0.0260	0.000
1982	-0.0172	0.001
1983	-0.0098	0.051
1985	0.0181	0.000
1993	-0.0106	0.041
1994	-0.0141	0.017
1996	-0.0139	0.002
1997	-0.0222	0.000
1998	-0.1137	0.000
2002	-0.0182	0.000
2004	-0.0201	0.000
Bremen	0.0097	0.025
N. Rhine-Westph.	0.0054	0.019
Saarland	0.0076	0.030
Cons	0.0112	0.000

Table 6. General model: revenue

	β	p
Δgdp	0.5611	0.000
Δdebt(lag)	0.1268	0.000
ΔCDU_vote	0.0420	0.037
ampel_gov	0.0465	0.032
preelect_grand_coal	-0.0297	0.021
1975	-0.0762	0.011
1979	-0.0127	0.037
1981	-0.0518	0.000
1982	-0.0322	0.000
1983	-0.0221	0.001
1984	-0.0193	0.002
1986	-0.0213	0.001
1987	-0.0156	0.012
1990	-0.0447	0.000
1994	-0.0233	0.000
1995	-0.0232	0.001
1996	-0.0154	0.022
1997	-0.0436	0.000
1998	-0.1019	0.000
2000	-0.0202	0.002
2001	-0.0663	0.000
2002	-0.0463	0.000
2003	-0.0410	0.000
2004	-0.0223	0.001
Cons	0.0165	0.000

Importantly, Tables 5 and 6 also reveal that common period fixed effects might have been a crucial factor for the development of state fiscal behavior. In the spending model, the size and sign pattern of the estimated period effects suggests that common (or federal-level) developments helped shaping the time path of expenditure across states—a suspicion that we will follow-up on further below. The results for revenue growth point in a similar direction, even though in this case the negative sign on all estimated time fixed effects could be indicating that common factors are not be the only force at work.

Finally, cross-section fixed effects also play a role for spending behavior in selected states. While we do not find significant state fixed effects on the revenue side, real spending growth was significantly higher in the Saarland, Bremen, and North Rhine-Westphalia compared to the average state in the sample. The results imply that spending growth was between about 0.005 and 0.01 percentage points per

annum higher than elsewhere. Accumulated over the sample period and keeping everything else constant, this amounts to expenditure levels between about 15 and 30 percent higher than in the average state at the end of the sample period.

4.2.4 Going Beyond Fixed Effects

The role fixed time effects play in the determination of expenditure and revenue invites further scrutiny—in particular, it would be interesting to learn whether the factors driving fiscal behavior picked up by the time fixed effects can be associated with common economic or common political factors. To shed light on this question, we repeat the exercise above without fixed effects and including common economic and political variables instead.

The starting point are the economic baseline models (1) in Tables 1 and 2 that, while excluding fixed effects, allow for a common linear trend and selected dummy variables. Adding political variables with a significant impact on revenue and spending as listed in Tables 3 and 4 (lower panels) and eliminating variables based on standard information criteria yields alternative general models for expenditure and revenue. The results are presented in Tables 7 and 8.

Not surprisingly, the alternative general models include a larger number of economic and political variables. For spending, now aggregate (or federal) GDP growth ($\Delta bund\_gdp(lag)$) and interest rate changes ($\Delta interest$) matter, which further stresses the business cycle component in real expenditure growth. As to the political determinants, the additional variables include changes in the Prime Minister position ($change\_mp$) as well as the change in liberal votes at the federal level ($\Delta bund\_FDP\_vote$) and $lag\_election\_CDU\_FDP$, albeit both only at the 10 percent level. At the same time, $change\_gov\_CDU\_FDP$ and $election\_grand\_coal$ cease to play a significant role.[11]

For the alternative revenue model, we find that additional business cycle-related variables enter the frame, including $\Delta unemployed(lag)$, aggregate GDP growth ($\Delta bund\_gdp$, $\Delta bund\_gdp(lag)$) and the change in the common interest rate ($\Delta interest$, $\Delta interest(lag)$). In addition, a number of political variables, not present in the fixed effects model in Table 8, matter. These include measures related to elections ($prelect\_SPD\_Green$, $lag\_election\_CDU\_alone$) and the coincidence of left-wing government participation at the federal and state level (SPD_bund_land), which tends to be associated with lower revenue growth. This also holds in periods of increasing votes for the conservative party at the federal level ($\Delta bund\_CDU\_vote$).

[11] The stronger showing of some state-level political variables could hint at common underlying political trends. See below.

Table 7. General model without fixed effects: spending

	β	p
Δgdp(lag)	0.2220	0.012
Δunemployed	-0.0394	0.000
Δdebt(lag)	-0.0766	0.009
Δbund_gdp(lag)	0.3555	0.002
Δinterest	0.0032	0.017
change_mp	0.0096	0.044
lag_election	-0.0040	0.072
bailout_Saar	-0.0122	0.010
election_grand_coal	-0.0329	0.008
lag_election_CDU_FDP	-0.0110	0.086
Δbund_FDP_vote	0.0160	0.015
oil	0.0230	0.000
dummy(=1998)	-0.1102	0.000
trend	-0.0004	0.013
Cons	0.0142	0.010

Table 8. General model without fixed effects: revenue

	β	p
Δgdp	0.3485	0.004
Δunemployed(lag)	0.0285	0.003
Δdebt(lag)	0.1067	0.007
Δbund_gdp	0.6984	0.000
Δbund_gdp(lag)	0.4381	0.001
Δinterest	-0.0060	0.006
Δinterest(lag)	-0.0029	0.075
SPD_bund_land	-0.0091	0.003
ΔCDU_vote	0.0354	0.100
ampel_gov	0.0554	0.009
preelect_grand_coal	-0.0284	0.028
preelect_SPD_Green	0.0177	0.020
lag_election_CDU_alone	0.0079	0.050
Δbund_CDU_vote	-0.0615	0.031
unification(=1990)	-0.0373	0.000
dummy(=1998)	-0.0822	0.000
trend	-0.0005	0.015
Cons	-0.0132	0.053

Among other things, the alternative general model results show that the common federal business cycle is more important for the cyclicality of fiscal behavior than state-level developments. For spending, the quantitative impact of $\Delta bund\_gdp(lag)$ exceeds that of $\Delta gdp(lag)$ by more than 0.1 percentage points. One reason will be the high degree of correlation between state-level developments and, thus, between state-level and aggregate GDP growth. The difference is even more pronounced when it comes to revenues, were the impact of $\Delta bund\_gdp$ exceeds the impact of state-specific GDP growth by a factor larger than two and, in addition, enters significantly in lagged form. Plausibly, this result is due to the fact that tax bases are similar and the inter-state fiscal redistribution scheme of the *Finanzausgleich* which further strengthens the link of tax revenue to aggregate cyclical developments.

The exclusion fixed time effects further complicates the interpretation of the results for the political variables in the model, but it would seem that the stronger showing of some state-level variables could be caused by common trends. For instance, the increase in relevance of election-related variables on the revenue model indicates a certain degree of coordination of election dates. And one of the factors behind the influence of federal voting trends may be that, during the sample period, ideological changes tended to be correlated across states—a development picked up by the common fixed time effects in the previous model.

Most importantly, however, the results suggest that common economic factors are behind the time fixed effects in the general models. The quantitative impact of aggregate GDP growth on both spending and revenue relative to state-specific GDP growth has already been noted. At the same time, the federal-level political variables relevant in Tables 7 and 8 remain of smaller quantitative importance comparable to or smaller than state-level political variables.

4.2.5 Robustness

As a first robustness check, we re-estimate the general model using a *dynamic panel framework* with an Arellano-Bond estimator. We find broadly similar results with somewhat larger coefficients for the state-specific economic variables. However, the lagged spending and revenue variables tend to come out insignificant across a number of instrument specifications, which suggests the FGLS results presented above provide reliable estimates.[12]

We also find only very limited evidence of *heterogeneity* in the estimated general models. For revenue, based on conventional Chow tests, we cannot reject the hypothesis that the coefficients for the economic or political determinants in

[12]Our simulation results in Section 5 are very robust to changes in the estimator. Additional results available on request.

the general models in Tables 7 and 8 are similar across states for real revenue. For spending, there are indications of heterogeneity with regard to the impact of $\Delta gdp(lag)$. For instance, we find that, compared to the average state, changes in real GDP have a slightly smaller procyclical impact on real spending growth in Bavaria, but a larger impact in Baden-Wuerttemberg. In addition, the reaction to $lag\_election$ somewhat differs across states. Overall, however, the panel approach seems to fit the data well.

A final robustness test addresses variable selection. *Extreme Bounds Analysis* (EBA) proposed by Sala-I-Martin (1997) is a means to test whether the economic and political variables to be included in the general model are indeed robustly connected with our fiscal variables. The principle idea of an EBA is to test explanatory variables by running a large number of regressions with varying combinations of alternative exogenous determinants. The estimated models have the form

$$y = \beta \cdot x + \alpha \cdot z + \gamma \cdot c + \varepsilon, \tag{1}$$

where y is the endogenous variable (either real revenue or real spending growth), x is the economic or political variable of interest, z represents a vector of other economic or political variables, c is a given and unchanging vector of controls, and ε is an error term. For each of the about 70 economic and political variables in our data we run a series of regressions where z contains one variable or any possible combination of two variables out of the remaining set of explanatory variables (contemporaneous or lagged). This leads to over two thousand regressions for each variable x. Appendix D reports the EBA results with time and country fixed effects as controls c and the results with $trend$, $dummy$, oil and $unification$ as controls c.

The EBA-based general models are very similar to the models discussed earlier. To get to a general model, we included all variables robustly connected with revenue and expenditure growth as well the corresponding control variables and again applied standard information criteria to narrow the resulting models down—according the the EBA analysis. As to spending, the specification in Table A5 (Appendix E) resembles Table 5 with the main exceptions being that population growth and changes in unemployment no longer are selected into the model.[13] The EBA-based results for revenue shown in Table A6 include two additional variables compared to Table 6, but these changes are hardly fundamental.[14] And both EBA-based models agree with the earlier findings that the quantitative impact of the economics determinants dominate that of political variables.

[13]In addition, GDP growth also enters lagged, only one (marginally significant) state fixed effect is included, and $bailout\_Saar$ is missing compared to Table 5.

[14]Additional variables in Table 12 are SPD_bund_land and $\Delta unemployed(lag)$.

5 Decomposing State Fiscal Performance Over Time

The previous section suggests that economic as well as political factors at the state and federal level shape fiscal policy decisions overall, and it will be interesting to learn more about what this implies for state fiscal performance over time.

To shed further light on the determinants of fiscal behavior, we propose a simple decomposition exercise. The principle idea is to construct counterfactual time paths of real spending and revenue levels based on the general models discussed in Section 4.2.3, taken the levels at the beginning of the sample period as given and focusing on one particular channel at a time. For instance, to single out the impact of state-specific economic factors on the time path of real spending in a particular state, we produce an index with a starting value of 100 that changes in line with actual observations for GDP, population, unemployment, and debt, weighted by the respective coefficients presented in Table 5. The resulting series illustrates the counterfactual development of that state's real expenditure levels over the sample period *if* only state-specific economic factors had played a role. The same procedure can illustrate the role of idiosyncratic political factors, as well as the specific relevance of common time effects factors and state fixed effects. Finally, there are the residual factors to consider. In addition to the state-by-state results, we also produce (GDP-weighted) aggregate decompositions. Appendix C discusses the procedure in more detail.

5.1 Results

Figure 4 presents the results for real spending levels. Focusing, first, on the aggregate, common developments captured by time fixed effects are clearly the dominating force, suggesting a spending path closely resembling actual fiscal developments. In contrast, the counterfactual time paths based on state-specific economic factors show considerably smaller, and those based on state fixed effects or political and residual factors hardly show any resemblance with actual developments.

The relative strong influence of common factors on expenditure growth during the sample period does not necessarily imply that states were not responsible for fiscal outcomes. For instance, one interpretation of this result could be that states acted deliberately in a coordinated fashion when changing expenditure flows. But these findings should certainly be kept in mind when considering the scope of individual states to shape their fiscal performance.

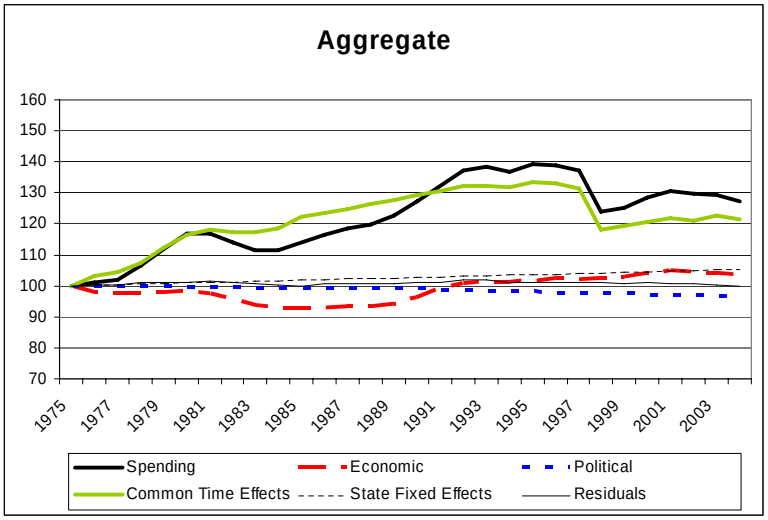
The picture is somewhat more differentiated when we turn to aggregated real revenue. While common fixed effects closely track changes in actual revenue levels, state-specific economic factors seem to explain much of the overall trend over

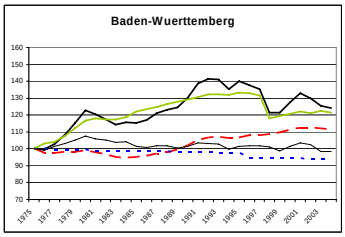
the sample period. State-specific political factors, on the other hand, contribute almost nothing to the time path of real revenue, and neither do the residuals from the estimated model. The implication is that state-specific real economic activity plays a more important role for the explanation of state fiscal behavior on the revenue than on the spending side.

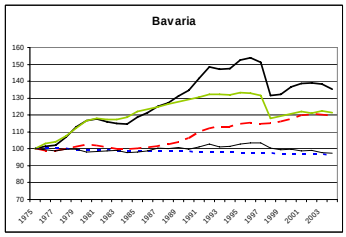
Given the importance of common or fixed time effects in particular for spending, we further decompose these effects based on the empirical model allowing for common political and economic variables (see Tables 7 and 8). Figures 6 and 7 present the results for the aggregate, while state-by-state results can be found in Appendix C. The figures clearly illustrate that common economic factors matter most for the overall trend of spending and revenue, while common political factors remain mostly irrelevant. This also implies that the coordination of fiscal action across states was not so much a political phenomenon but triggered, for instance, by the shared aggregate business cycle.

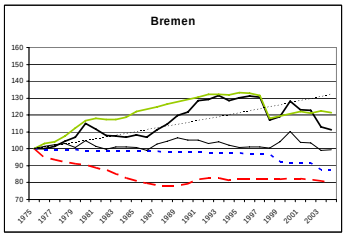
A final question is how sensitive the decomposition results are to a change in specification? As a robustness check, we repeat the above exercise for the EBA-based general models with fixed effects and without fixed effects (see Figures A3-A6 in Appendix E). There are two interesting observations. First, the change in specification brought about by the EBA selection procedure tends to heighten the impact of state-specific economic factors compared to the results in Figures 4 and 5. At the same time, however, there is little or no change regarding the relative unimportance of state-specific political factors. What is more, when using the EBA-based model without fixed effects to disentangle common economic from common political factors, we still find common economic factors to be by far more important in determining expenditure and revenue growth than state-specific economic factors.

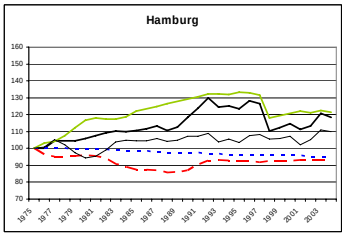
Figure 4. Spending (general model)

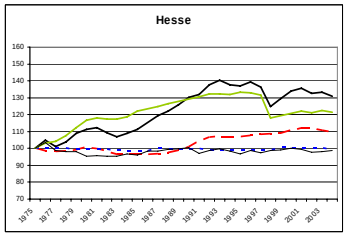


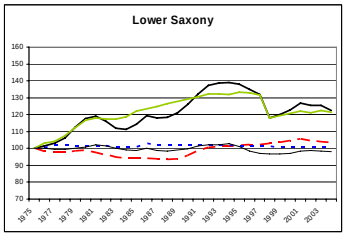


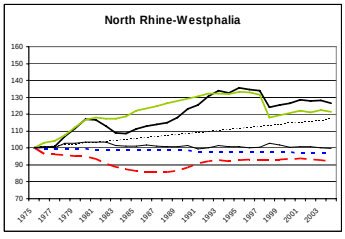


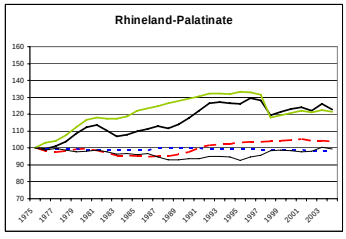


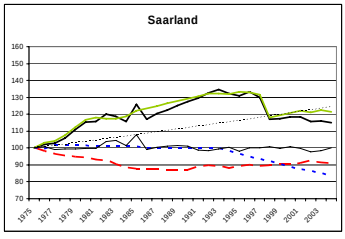












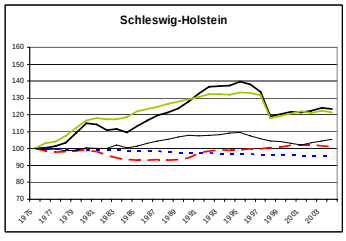
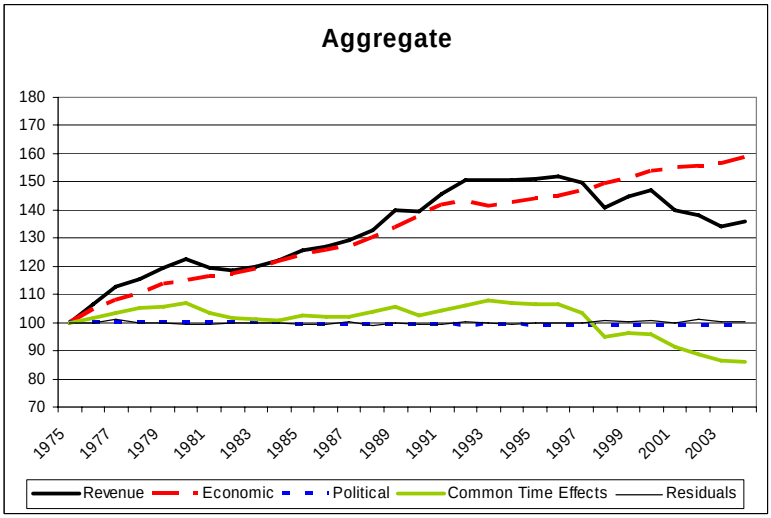
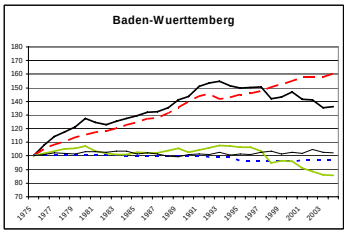
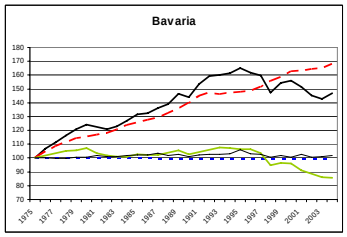
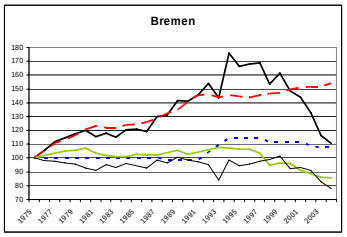


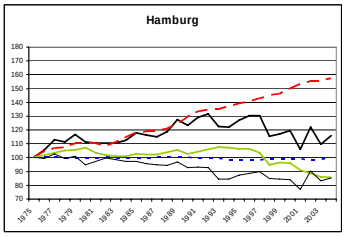
Figure 5. Revenue (general model)

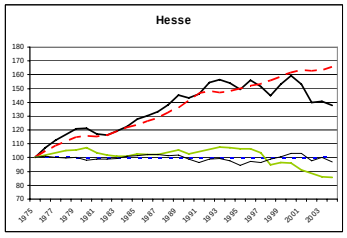


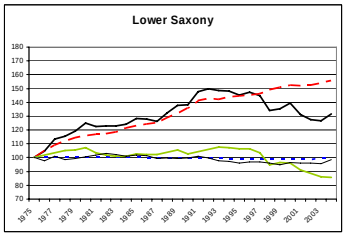


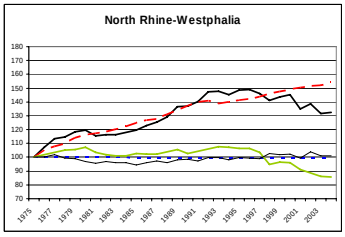


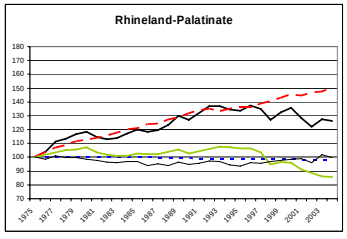


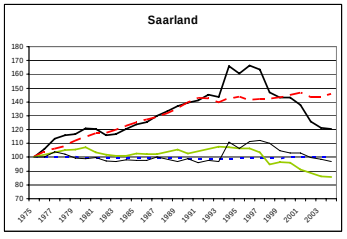












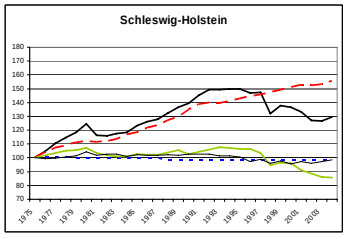


Figure 6. Spending (general model without fixed effects)

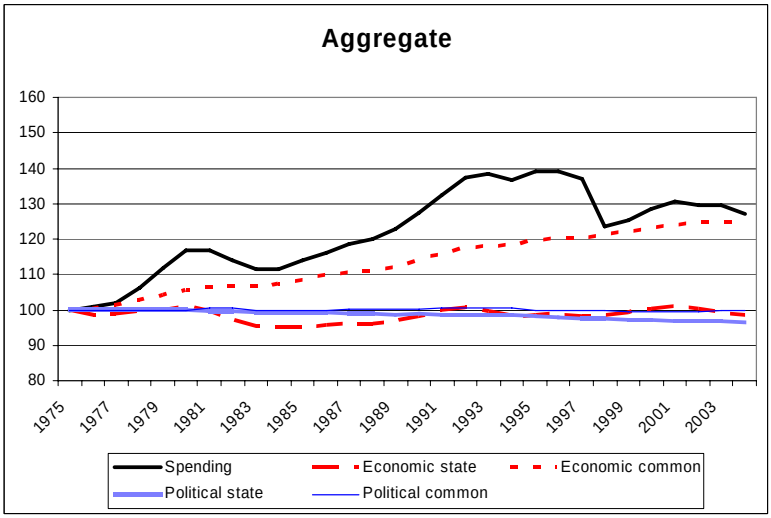
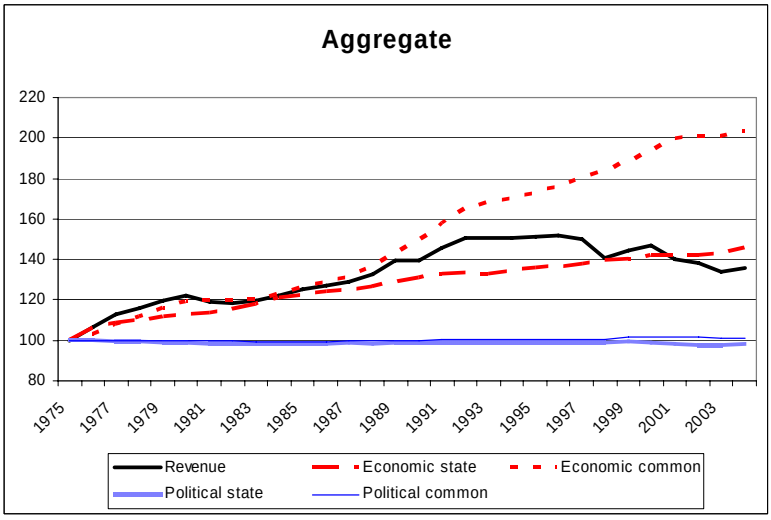


Figure 7. Revenue (general model without fixed effects)



6 Why Did Some States Fare Better Than Others?

The results so far pose an interesting puzzle: while the determinants of fiscal policies appear to be rather similar across states, states' fiscal performance is not. Figure 1 depicts a common upward trend in the development of debt, but also divergence (see Section 1). For example, Bavaria, Baden-Wuerttemberg, and Hesse show very moderate increases in their debt-to-GDP levels (or, indeed, none at all), while others like Bremen and Saarland, saw their debt levels increase steeply during the 1975-2004 period.[15] The question is, then, why some states fared better than others.

Part of the explanation will be differences in governance. Two of our empirical results point in this direction. First, governance deficits are a likely factor behind the significant cross-section fixed effects for some states in the spending model. This is in line with standard theories of political economy arguing that bureaucracies, if unchecked, aim at growing the public budget beyond the social optimum (Niskanen (1971)).[16] Second, the fact that the residual component plays a relatively larger role in some states also suggests governance plays a role. As Leibenstein (1966) demonstrated, administrative slack (or "X-inefficiency") will increase the level of spending for any level of public services provided. As a consequence, deficits in governance can result in a permanent increase of the expenditure level and a one-time reduction of spending growth. While the evidence is indirect, it is interesting to note that Bremen and Saarland feature prominently in both areas discussed. Saarland and Bremen are also the only states where political factors are at least of some importance for the development of expenditure (Figure 4).[17]

Table 9 illustrates that governance problems may have a relevant dimension. The table groups states by average debt-to-GDP ratios over the sample period into "low" (Baden-Wuerttemberg, Bavaria, and Hesse), "high" (Bremen and Saarland), and "middle" debt states (all others). On the revenue side, we find that high debt states had slower actual revenue growth over the 1975-2004 period than either middle or low debt states, and that a large part of this shortfall can be attributed to residuals factors as estimated in the general model (see Table 6). Residual factors imply about 11 percentage points lower revenue growth in high debt states

[15] Bremen and Saarland also show the highest average debt-to-GDP ratio in our sample period.

[16] Alternatively, but less plausibly, one could argue for a constant *preference* for higher spending growth in these states.

[17] Interestingly, these factors work in an unexpected direction: in both states political forces contributed to lower spending growth toward the end of the sample period. In the case of Bremen, political factors are also related to higher revenue growth in this period (Figure 5).

compared to middle debt states and about 14 percentage points compared to low debt states. This is a significant part of the overall difference in revenue growth of about 14 and 25 percentage points, respectively.[18] On the spending side, fixed state effects are mostly present in high debt states, implying higher spending growth of about 27 percentage points compared to middle debt states and of about 28 percentage points compared to low debt states, on average. Residual factors play a minor role in this case, but point into a similar direction.

Table 9. Real revenue and spending change 1975-2004 in percent by debt group and as implied by selected determinants

	Low	Middle	High
Actual revenue change	41.56	31.24	17.05
Change implied by residuals	*1.41*	*-0.29*	*-11.70*
Change implied by state fixed effects	-	-	-
Change implied by GDP growth	*48.34*	*30.14*	*26.68*
Actual spending change	30.80	24.91	14.12
Change implied by residuals	*-1.44*	*0.95*	*0.34*
Change implied by state fixed effects	*0.00*	*8.52*	*28.10*
Change implied by GDP growth	*16.25*	*10.10*	*9.47*

Note: Actual changes 1975-2004 for actual revenue and spending and predicted changes based on selected determinants from the general models estimated in Tables 5 and 6. The predicted changes are computed akin to the simulation exercises in the previous section. The debt groups are defined as "Low": Baden-Wuerttemberg, Bavaria, and Hesse; "Middle": Hamburg, Lower Saxony, North Rhine-Westphalia, Rhineland-Palatinate, and Schleswig-Holstein; and "High: Bremen and Saarland. Group data are time-variant weighted averages, which weights based on real spending and revenue levels, respectively.

In addition to governance, fiscal strategy plays an important role in explaining differing fiscal performances: similar policies can lead to vastly different outcomes in the face of divergent economic developments.[19] Table 9 shows that real revenue growth linked to real GDP growth in low debt states by far exceeds revenue growth of other states. Given that the estimated GDP-elasticity of revenue

[18]Note that revenue and spending growth implied by the determinants listed in Table 9 do not sum to the observed actual changes. The list of determinants is intentionally incomplete and the simulation techniques used imply rescaling all series to 100 in 1975.

[19]Note that we can exclude reverse causality running from growth to fiscal policy. For instance, estimating the general models for real revenue and spending growth with real GDP growth suitably instrumented by real investment growth and common period fixed effects yields coefficients similar to the ones reported in Tables 5 and 6. Additional results available on request. Also note that state-level GDP enters the general model for spending with a one-period lag.

growth are the same, this means that during the sample period low debt states profited from higher average GDP growth. High GDP growth also implied higher spending growth in low debt states compared to middle, and high debt states. However, because the given estimated GDP-elasticity for revenue exceeds that for spending (see Tables 5 and 6), these differences are small compared to revenue growth.

The mismatch between fiscal strategy and economic growth in the high debt states is quantitatively relevant. During 1975-2004, high debt states saw GDP-induced revenue growth that was about 3 and 22 percentage points lower than in middle and low debt states, respectively. At the same time, GDP-induced spending growth in high debt states was only 1/2 a percentage point lower than in middle debt states and about 6 percentage points higher than in low debt states.

For illustrative purposes, consider the thought experiment of changing the fiscal strategy given the actual time path of state GDP. Had the high debt states followed a counterfactual fiscal strategy with the elasticity of spending vis-à-vis state GDP at half of its actual value, GDP-induced spending growth would have been about 4.5 percent. This would have implied an increase in the difference to low debt states to about 10 percentage points. And increasing the GDP-elasticity of revenue by half of its actual value would have boosted GDP-induced revenue growth to about 42 percent, an outcome very close to the 48 percent computed for low debt states.

These findings hold important policy conclusions. First, addressing governance problems would be helpful in improving states' fiscal performance. The evidence discussed here is indicative in nature, but it points to otherwise unexplained systematic differences in fiscal behavior that are large enough to warrant further scrutiny. Second, flexibility in terms of fiscal strategy is important. It seems clear that high debt states suffered from a lack of flexibility in terms of fiscal strategy. Their debt-to-GDP ratio would have been lower, if they had deviated from the strategy of coupling spending behavior and GDP growth to the same extent as states with lower debt levels and tied revenue growth more tightly to GDP growth than these states. A corollary of this result is that, to the extent that state governments lack this kind of flexibility because their fiscal behavior is pre-determined at the federal level, such constraints need to be lifted.[20]

[20]Differences in non-fiscal economic policies may contribute to fiscal success. Arguably states influence regional real activity through a variety of regulatory measures, which, in turn, shape revenue and spending growth. Of course, fiscal policies other than changes in the overall revenue or spending levels may also play a role in this regard—for instance, the allocation of spending to different budget items. The analysis of fiscal behavior at lower levels of aggregation is clearly an area for further research.

7 Conclusions

A lively debate has ensued on the fiscal developments of German Länder or state finances and their possible determinants. While some argue that differences in fiscal behavior are hard to explain by state-specific characteristics, others suggest that political-economy models may be helpful in this respect. However, so far surprisingly little is known about the relative importance of the various determinants of fiscal behavior at the state level. Attempting to fill this void, this paper explores the factors behind the time path of real state spending and revenue from 1975 to 2004. The empirical approach stresses robustness and considers a large set of economic and political variables.

A number of results are worth mentioning. First, common economic factors are an important determinant of state fiscal performance. In particular, we find that common period fixed effects are the quantitatively and statistically dominant factor driving fiscal outcomes over time, and much of this shared behavior stems from aggregate real GDP growth. In other words, the common business cycle is a key determinant of fiscal policy (even) at the state level. This finding applies to fiscal policy overall, but it is especially strong on the spending side. Second, that said, state-specific economic developments are also relevant. Specifically, indicators of state cyclical real activity and states' overall fiscal standing (measured by lagged real debt growth) influence spending and, to an even larger degree, revenue developments. On the other hand, structural indicators play little or no role. Lastly, the influence of political factors, common and state-specific, is limited both in statistical and quantitative terms. There are, for example, some indications of opportunistic election-oriented spending behavior, but the effect is conditional on certain party constellations and hardly relevant quantitatively.

An interesting puzzle suggested by these results is that the determinants of fiscal policies appear to be rather similar across states, but fiscal performance is not. During 1975-2004, some states such as Bavaria, Baden-Wuerttemberg, or Hesse showed no or very moderate increases in their debt-to-GDP levels, while others, such as Bremen and Saarland, saw their debt levels increase steeply.

Our results show that a number of factors may have played a role — with important policy conclusions. There is, for instance, support for Seitz (2007), who suspects that governance differences help in explaining the heterogeneity of debt levels. In particular, some states have consistently higher propensities to spend then others and tend to suffer from otherwise hard-to-explain shocks to their spending levels. Another factor explaining different fiscal outcomes is the lack of flexibility in fiscal strategy in the face of diverging economic developments. We find, for example, that the failure of some states to downward adjust their propensity to spend in light of a their relatively weak GDP growth performance contributed to their comparatively dismal fiscal performance. This suggests that

addressing governance problems and ensuring flexibility in terms of fiscal strategy are important ingredients for any policy aimed at improving fiscal outcomes at the state level.

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Appendix

A. Time Series Characteristics

Several panel unit root tests exist. These test can be classified in two groups: tests for a common unit root for the panel and tests for an individual unit root for the cross-sections. Because of a lack of power of these tests, tests from both groups are used to increase reliability of the results, with the Breitung test (Breitung (2000)) representing the common and the Fisher test (Maddala and Wu (1999) and Choi (2001)) representing the individual unit root test. The results indicate, that the level of the economic variables and that of political variables describing the percentage of votes a party gets are non-stationary, while the growth rates are.

With variables in levels being non-stationary, the possibility of a cointegration relationship has to be considered. Cointegration tests for panels have been introduced by Pedroni (1999). However, results indicate that neither revenue nor spending are cointegrated with basic economic variables. Consequently, the estimation is done in growth rates.

Test statistics available on request.

B. Data Descriptions

Table A1. Description of Variables

Variable	Description
	Economic variables
Δspending	real spending (growth rates)
Δrevenue	real revenue (growth rates)
Δgdp	real GDP (growth rates)
Δbund_gdp	real GDP Germany (growth rates)
Δinterest	real interest rate Germany (first difference)
Δunemployed	number of unemployed (growth rates)
Δemployed	number of employed (growth rates)
Δpopulation	population (growth rates)
Δdebt	real debt (capitalmarket) (growth rates)
Δratio_industry	ratio of industrial sector of total value added (first difference)
Δurbanity	ratio of population in cities with more than 100 000 residents (compared to state population)
ratio_frontier	ratio of frontier with foreign countries (compared to frontier of Germany)
area	area
Δdensity	area per population (first difference)
	Structure of state governments
coal_size	number of parties in government
treasury	dummy, 1 if minister of finance and prime minister are in the same party
minist	number of ministries
minist_ratio	number of ministries held by party of prime minister
	Relations between federal and state level
SPD_bund_land	dummy, 1 if SPD in Länder government and federal government
CDU_bund_land	dummy, 1 if CDU in Länder government and federal government
FDP_bund_land	dummy, 1 if FDP in Länder government and federal government
Gruene_bund_land	dummy, 1 if Green Party in Länder government and federal government
br_bund	dummy, 1 if party of chancellor has the majority in the Bundesrat
br_land	dummy, 1 if party of prime minister has the majority in the Bundesrat
br_bund_land	dummy, 1 if party of chancellor and prime minister has the majority in the Bundesrat
	Voting results state and federal level
ΔSPD_vote	percentage of votes for SPD (growth rates)
ΔCDU_vote	percentage of votes for CDU (growth rates)
ΔFDP_vote	percentage of votes for FDP (growth rates)
ΔGruene_vote	percentage of votes for Green Party (growth rates)
Δbund_SPD_vote	percentage of votes for SPD - federal election (growth rates)
Δbund_CDU_vote	percentage of votes for CDU - federal election (growth rates)
Δbund_FDP_vote	percentage of votes for FDP - federal election (growth rates)
Δbund_Gruene_vote	percentage of votes for Green Party - federal election (growth rates)
	Party composition of state and federal governments
SPD_Green_gov	dummy, 1 if coaltion with SPD and Green Party
SPD_FDP_gov	dummy, 1 if coaltion with SPD and FDP
CDU_FDP_gov	dummy, 1 if coaltion with CDU and FDP
ampel_gov	dummy, 1 if coalition with SPD, FDP and Green Party (traffic light coalition)
grand_coal	dummy, 1 if big coalition
bund_SPD_FDP_gov	dummy, 1 if federal coaltion with SPD and FDP
bund_CDU_FDP_gov	dummy, 1 if federal coalition with CDU and FDP
	Changes in state government
change_gov	dummy, 1 if change of parties in government
change_gov_aggr	cumulative sum of changes of the government
change_mp	dummy, 1 if change of the prime minister
preelect	dummy, 1 if year before election
election	dummy, 1 if year of election
lagelection	dummy, 1 if year after election

Table A1. Description of Variables (continued)

Variable	Description
	Bailout
bailout	dummy, 1 for 1994-2004 for Bremen and Saarland (financial support from the other Länder)
bailout_hb	dummy, 1 for 1994-2004 for Bremen (financial support from the other Länder)
bailout_saar	dummy, 1 for 1994-2004 for Saarland (financial support from the other Länder)
	Interaction effects of changes in state governments
change_gov_coalition	dummy, 1 if *coalition* after change of government
preelect_coalition	dummy, 1 if *coalition* in year before an election
election_coalition	dummy, 1 if *coalition* in year of election
lagelection_coalition	dummy, 1 if *coalition* in year after an election

Table A2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Δspending	292	0.0079	0.0330	-0.1298	0.0884
Δrevenue	292	0.0091	0.0423	-0.1238	0.2227
Δgdp	340	0.0196	0.0207	-0.0485	0.0723
Δbund_gdp	340	0.0223	0.0168	-0.0087	0.0526
Δinterest	330	-0.0223	0.8736	-1.3137	1.9926
Δunemployed	328	0.0798	0.2362	-0.6109	1.0093
Δemployed	340	0.0024	0.0193	-0.0660	0.0682
Δpopulation	340	0.0021	0.0063	-0.0139	0.0230
Δratio_industry	340	-0.0050	0.0078	-0.0322	0.0173
Δdebt	340	0.0435	0.0465	-0.1302	0.2582
Δurbanity	340	-0.0001	0.0085	-0.0289	0.0918
ratio_frontier	350	0.2654	0.1983	0.0000	0.6147
area	350	24845.59	21494.83	404.23	70549.19
Δdensity	340	-0.0001	0.0069	-0.0235	0.0404
coal_size	350	1.4429	0.5254	1	3
treasury	350	0.9571	0.2028	0	1
minist	350	9.1686	1.7288	6	14
minist_ratio	350	0.8958	0.1417	0.5	1
SPD_bund_land	350	0.2629	0.4408	0	1
CDU_bund_land	350	0.1771	0.3823	0	1
FDP_bund_land	350	0.2171	0.4129	0	1
Gruene_bund_land	350	0.0429	0.2028	0	1
br_bund	350	0.3714	0.4839	0	1
br_land	350	0.6029	0.4900	0	1
br_bund_land	350	0.1943	0.3962	0	1
ΔSPD_vote	340	-0.0046	0.0641	-0.3814	0.2827
ΔCDU_vote	340	-0.0003	0.0698	-0.3863	0.5886
ΔFDP_vote	340	-0.0076	0.2225	-1.0275	0.9163
ΔGruene_vote	240	0.0315	0.1900	-0.5416	1.3863
Δbund_SPD_vote	340	-0.0053	0.0454	-0.1646	0.0922
Δbund_CDU_vote	340	-0.0030	0.0415	-0.1160	0.1166
Δbund_FDP_vote	340	0.0072	0.1500	-0.4664	0.3704
Δbund_Gruene_vote	230	0.0759	0.3119	-0.5068	1.3173
SPD_Green_gov	350	0.1114	0.3151	0	1
SPD_FDP_gov	350	0.1600	0.3671	0	1
CDU_FDP_gov	350	0.1143	0.3186	0	1
grand_coal	350	0.0457	0.2092	0	1
ampel_gov	350	0.0086	0.0923	0	1
bund_SPD_FDP_gov	350	0.3714	0.4839	0	1
bund_CDU_FDP_gov	350	0.4571	0.4989	0	1
change_gov	350	0.1086	0.3115	0	1
change_gov_aggr	350	1.1171	0.9960	0	5
change_mp	350	0.0314	0.1747	0	1
preelect	350	0.2429	0.4294	0	1
election	350	0.2543	0.4361	0	1
lagelection	340	0.2559	0.4370	0	1
bailout	350	0.3143	0.4649	0	1
bailout_hb	350	0.0314	0.1747	0	1
bailout_saar	350	0.0314	0.1747	0	1

Table A2. Descriptive Statistics (continued)

Variable	Obs	Mean	Std. Dev.	Min	Max
change_gov_SPD_Gruene	350	0.0171	0.1300	0	1
change_gov_SPD_FDP	350	0.0143	0.1188	0	1
change_gov_CDU_FDP	350	0.0200	0.1402	0	1
change_gov_grand_coal	350	0.0057	0.0755	0	1
change_gov_SPD_alone	350	0.0229	0.1497	0	1
change_gov_CDU_alone	350	0.0229	0.1497	0	1
preelect_SPD_Gruene	350	0.0257	0.1585	0	1
preelect_SPD_FDP	350	0.0343	0.1822	0	1
preelect_CDU_FDP	350	0.0286	0.1668	0	1
preelect_grand_coal	350	0.0114	0.1064	0	1
preelect_SPD_alone	350	0.0600	0.2378	0	1
preelect_CDU_alone	350	0.0743	0.2626	0	1
election_SPD_Gruene	340	0.0206	0.1422	0	1
election_SPD_FDP	340	0.0353	0.1848	0	1
election_CDU_FDP	340	0.0294	0.1692	0	1
election_grand_coal	340	0.0118	0.1080	0	1
election_SPD_alone	340	0.0618	0.2411	0	1
election_CDU_alone	340	0.0765	0.2661	0	1
lagelection_SPD_Gruene	340	0.0235	0.1518	0	1
lagelection_SPD_FDP	340	0.0382	0.1920	0	1
lagelection_CDU_FDP	340	0.0206	0.1422	0	1
lagelection_grand_coal	340	0.0118	0.1080	0	1
lagelection_SPD_alone	340	0.0676	0.2515	0	1
lagelection_CDU_alone	340	0.0853	0.2797	0	1

Table A3. Descriptive Sources

Variable	Data Source
spending	Statistisches Bundesamt
revenue	Statistisches Bundesamt
gdp	Statistisches Landesamt Baden-Wuerttemberg
bund_gdp	Statistisches Bundesamt
interest	IFS
unemployed	Statistisches Bundesamt
employed	Statistisches Bundesamt
population	Statistisches Bundesamt
debt	Statistisches Bundesamt
ratio_industry	Statistisches Bundesamt
urbanity	Statistisches Bundesamt
ratio_frontier	Landesvermessungsämter
area	Statistisches Bundesamt
coal_size	Jochimsen and Nuscheler (2007) and own adjustments
treasury	Statistische Landesämter and Staatskanzleien
minist	Statistische Landesämter and Staatskanzleien
minist_ratio	Statistische Landesämter and Staatskanzleien
br_bund	Datenhandbuch Deutscher Bundestag
br_land	Datenhandbuch Deutscher Bundestag
SPD_vote	Jochimsen and Nuscheler (2007) and own adjustments
CDU_vote	Jochimsen and Nuscheler (2007) and own adjustments
FDP_vote	Jochimsen and Nuscheler (2007) and own adjustments
Gruene_vote	Jochimsen and Nuscheler (2007) and own adjustments
bund_SPD_vote	Datenhandbuch Deutscher Bundestag
bund_CDU_vote	Datenhandbuch Deutscher Bundestag
bund_FDP_vote	Datenhandbuch Deutscher Bundestag
bund_Gruene_vote	Datenhandbuch Deutscher Bundestag
SPD_gov	Jochimsen and Nuscheler (2007) and own adjustments
CDu_gov	Jochimsen and Nuscheler (2007) and own adjustments
FDP_gov	Jochimsen and Nuscheler (2007) and own adjustments
Gruene_gov	Jochimsen and Nuscheler (2007) and own adjustments
bund_SPD_gov	Datenhandbuch Deutscher Bundestag
bund_Gruene_gov	Datenhandbuch Deutscher Bundestag
change_gov	Statistische Landesämter and Staatskanzleien
change_gov_aggr	Statistische Landesämter and Staatskanzleien
change_mp	Statistische Landesämter and Staatskanzleien
election	Jochimsen and Nuscheler (2007) and own adjustments

C. Decomposition

The estimated models of growth rates for revenue and spending allow a decomposition of actual revenue and spending into an economic, political, fixed effects and residual part at the state level. We calculate indices I_t (with a starting point of 100) for each component and cross-section

$$I_t = I_{t-1}(1 + \text{growth rate}_t) \tag{2}$$

based on the estimated growth rates

$$\widehat{y} = \widehat{Cons} + \widehat{\beta}_{ec} \cdot x_{ec} + \widehat{\beta}_{pol} \cdot x_{pol} + \widehat{\beta}_{fe} \cdot x_{fe} \tag{3}$$

with $\widehat{y}$ representing either revenue or spending. To identify the economic (the political) part of the estimated growth rate, all coefficients except those for the economic variables, $\widehat{\beta}_{ec}$, (for the political variables, $\widehat{\beta}_{pol}$) are set equal to 0. The contribution of the fixed effects includes the constant. Then, for the residual part the difference between the actual growth rate of revenue and spending, respectively, and the their estimations are calculated. The resulting indices for each cross-section and an weighted average for all states are shown in Figures 4-7 and A1-A6.[21]

[21] Weights are based on real spending and revenue levels, respectively, and change over time.

Figure A1. Spending (without fixed effects)

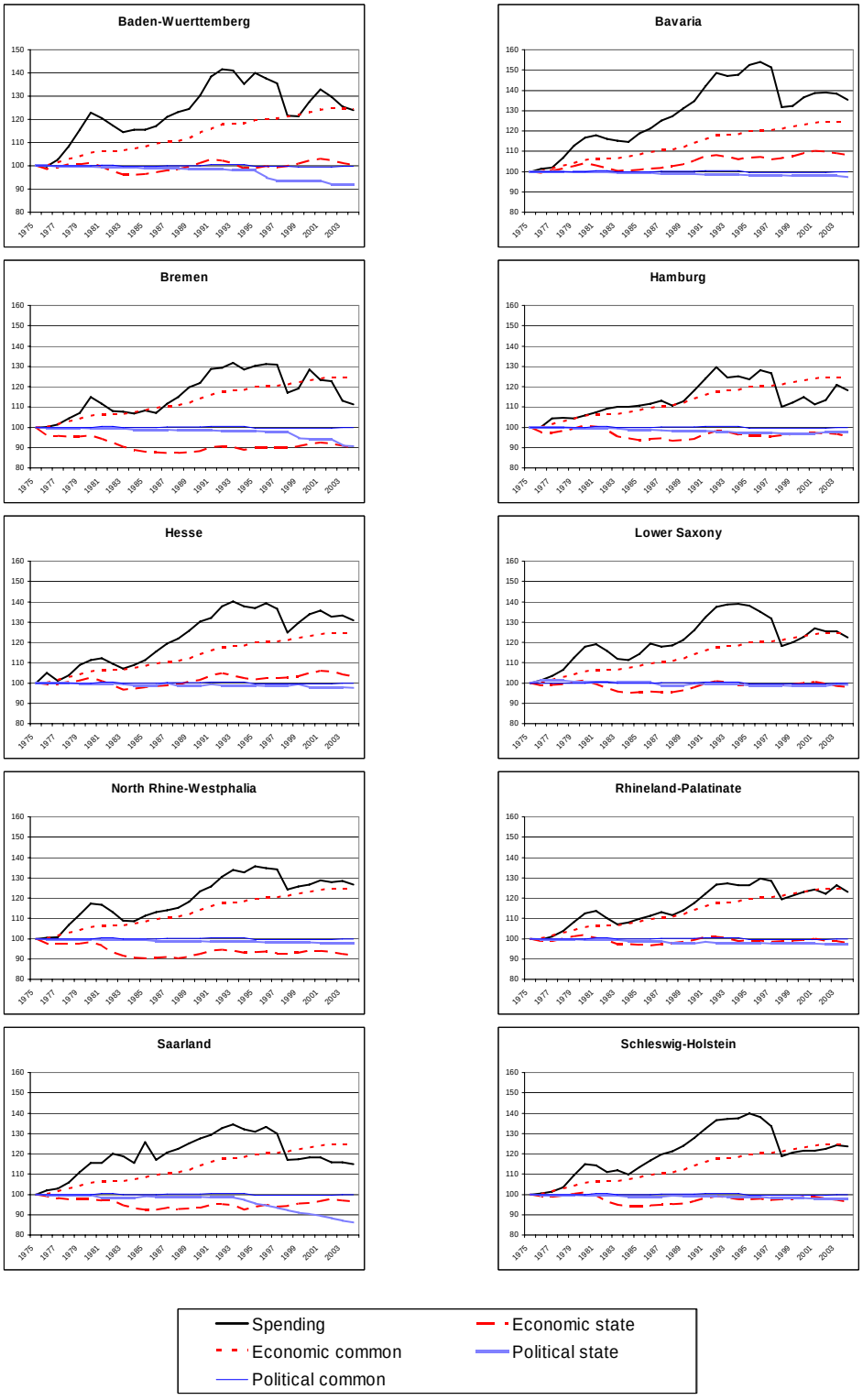
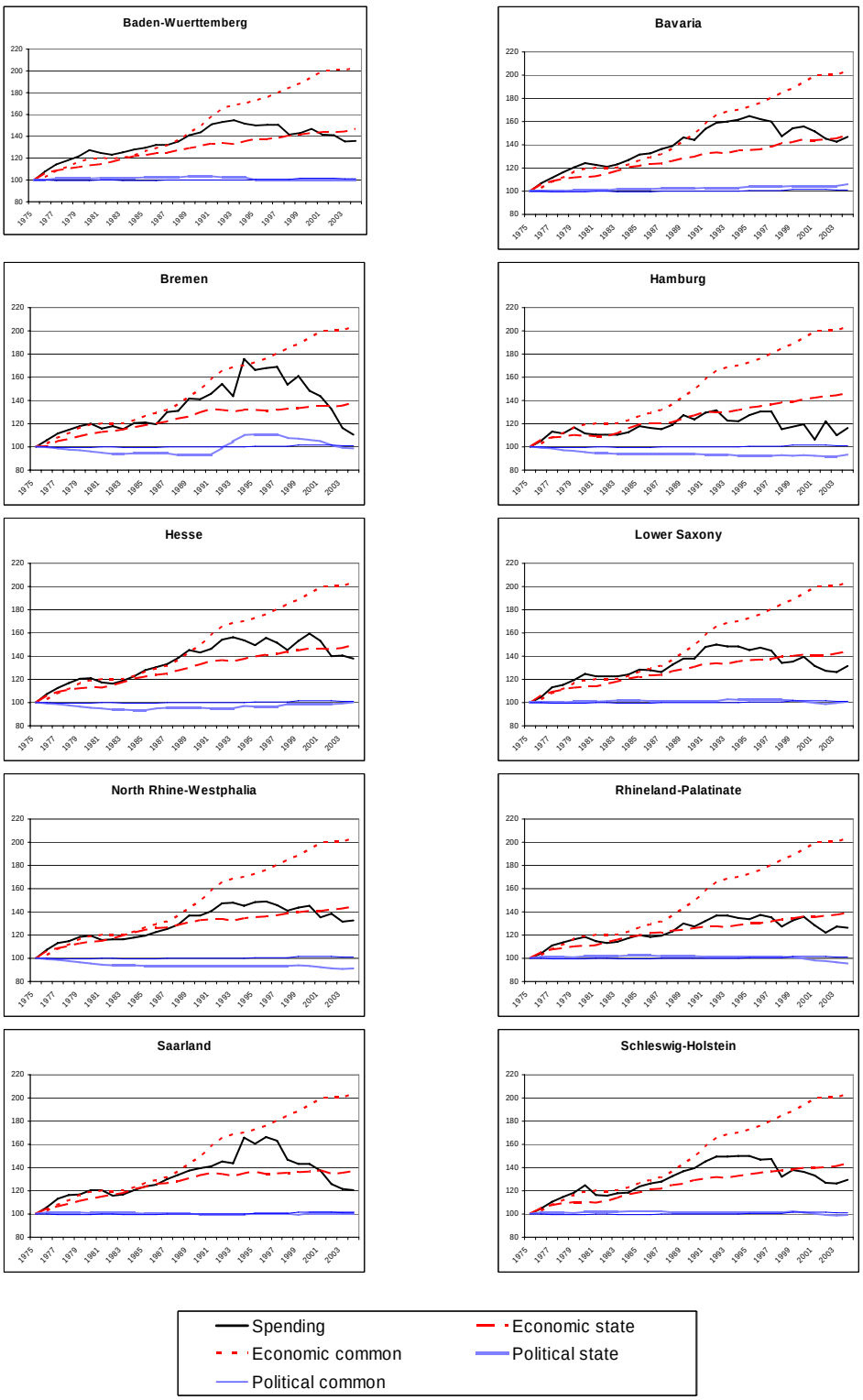


Figure A2. Revenue (without fixed effects)



E. EBA Results

Reported are the average coefficient $\bar{\beta}$ of all regressions for each variable, the share of regressions in which the variable is significant at least on the 10 percent level, and the unweighted cumulative distribution function $CDF(0)$ proposed by Sala-i-Martin (1997). The $CDF(0)$ gives the larger fraction of the cumulative distribution function lying on one side of zero, i.e. $0.5 \leq CDF(0) \leq 1$. A variable is considered to have a robust influence on the dependant variable, if $CDF(0) > 0.95$.

Table A1. EBA with fixed effects: spending

Variable	$\overline{\beta}$	significant	CDF
Δgdp	0.2250	0.99	0.98
Δgdp(lag)	0.1833	0.94	0.96
Δunemployed	-0.0201	0.34	0.94
Δunemployed(lag)	-0.0174	0.06	0.92
Δemployed	0.0619	0.00	0.76
Δemployed(lag)	-0.0601	0.00	0.76
Δpopulation	0.2467	0.00	0.71
Δpopulation(lag)	0.4853	0.00	0.84
Δdebt(lag)	-0.0638	0.93	0.97
Δratio_industry	0.3011	0.55	0.95
Δratio_industry(lag)	0.3508	0.97	0.97
Δurbanity	0.2515	0.20	0.94
Δurbanity(lag)	-0.0054	0.00	0.53
ratio_frontier	0.0113	0.00	0.85
area	0.0000	0.00	0.71
Δdensity	-0.0104	0.00	0.54
coal_size	0.0033	0.32	0.93
treasury	-0.0075	0.06	0.79
minist	-0.0002	0.00	0.59
minist_ratio	-0.0035	0.00	0.70
SPD_bund_land	-0.0040	0.05	0.91
CDU_bund_land	-0.0006	0.00	0.60
FDP_bund_land	0.0019	0.00	0.77
Green_bund_land	-0.0003	0.00	0.56
br_land	0.0006	0.00	0.64
br_bund_land	-0.0002	0.00	0.56
ΔCDU_vote	-0.0225	0.09	0.92
ΔFDP_vote	-0.0073	0.10	0.93

Table A1. EBA with fixed effects: spending (continued)

Variable	$\overline{\beta}$	significant	CDF
SPD_Green_gov	-0.0002	0.00	0.57
SPD_FDP_gov	0.0026	0.03	0.80
CDU_FDP_gov	0.0040	0.05	0.90
grand_coal	-0.0081	0.10	0.90
ampel_gov	-0.0065	0.00	0.71
change_gov	0.0023	0.00	0.76
change_gov_aggr	0.0001	0.00	0.57
change_mp	0.0068	0.02	0.90
preelect	0.0012	0.00	0.70
election	-0.0009	0.00	0.65
lag_election	-0.0043	0.93	0.97
bailout_HB	-0.0070	0.04	0.81
bailout_Saar	-0.0065	0.03	0.84
change_gov_SPD_Green	-0.0035	0.00	0.70
change_gov_SPD_FDP	-0.0004	0.00	0.54
change_gov_CDU_FDP	0.0138	1.00	0.98
change_gov_grand_coal	-0.0079	0.00	0.70
change_gov_SPD_alone	0.0045	0.00	0.73
change_gov_CDU_alone	-0.0036	0.00	0.68
preelect_SPD_Green	0.0065	0.00	0.88
preelect_SPD_FDP	-0.0086	0.12	0.93
preelect_CDU_FDP	0.0022	0.00	0.65
preelect_grand_coal	0.0032	0.00	0.60
preelect_SPD_alone	-0.0005	0.00	0.56
preelect_CDU_alone	0.0000	0.00	0.54
election_SPD_Green	-0.0053	0.00	0.80
election_SPD_FDP	0.0005	0.00	0.55
election_CDU_FDP	0.0033	0.00	0.70
election_grand_coal	-0.0304	1.00	0.99
election_SPD_alone	-0.0006	0.00	0.56
election_CDU_alone	0.0011	0.00	0.63
lag_election_SPD_Green	-0.0053	0.00	0.82
lag_election_SPD_FDP	-0.0054	0.00	0.81
lag_election_CDU_FDP	-0.0106	0.29	0.94
lag_election_grand_coal	0.0113	0.03	0.83
lag_election_SPD_alone	-0.0061	0.23	0.94
lag_election_CDU_alone	-0.0014	0.00	0.68

Table A2. EBA with fixed effects: revenue

Variable	$\overline{\beta}$	significant	CDF
Δgdp	0.4033	1.00	1.00
Δgdp(lag)	0.1825	0.04	0.91
Δunemployed	0.0017	0.00	0.56
Δunemployed(lag)	-0.0257	0.45	0.95
Δemployed	0.0011	0.00	0.54
Δemployed(lag)	0.1177	0.00	0.84
Δpopulation	-0.2421	0.00	0.67
Δpopulation(lag)	-0.1309	0.00	0.60
Δdebt(lag)	0.0938	1.00	0.98
Δratio_industry	0.3180	0.01	0.89
Δratio_industry(lag)	0.1567	0.00	0.74
Δurbanity	0.0160	0.00	0.54
Δurbanity(lag)	0.0346	0.00	0.56
ratio_frontier	0.0107	0.00	0.83
area	0.0000	0.01	0.75
Δdensity	-0.0382	0.00	0.56
coal_size	0.0028	0.06	0.83
treasury	0.0142	0.00	0.82
minist	-0.0009	0.00	0.79
minist_ratio	-0.0015	0.04	0.63
SPD_bund_land	-0.0057	0.61	0.95
CDU_bund_land	-0.0044	0.17	0.92
FDP_bund_land	0.0001	0.00	0.58
Green_bund_land	-0.0005	0.00	0.58
br_land	-0.0012	0.03	0.71
br_bund_land	-0.0054	0.08	0.91
ΔCDU_vote	0.0392	0.88	0.96
ΔFDP_vote	-0.0051	0.00	0.79

Table A2. EBA with fixed effects: revenue (continued)

Variable	$\overline{\beta}$	significant	CDF
SPD_Green_gov	0.0015	0.00	0.68
SPD_FDP_gov	0.0041	0.03	0.86
CDU_FDP_gov	0.0037	0.03	0.84
grandcoal	-0.0200	1.00	1.00
ampel_gov	0.0590	1.00	1.00
change_gov	-0.0008	0.00	0.59
change_gov_aggr	0.0004	0.00	0.62
change_mp	0.0099	0.15	0.92
preelect	-0.0042	0.06	0.92
election	-0.0023	0.00	0.78
lag_election	0.0040	0.06	0.91
bailout	-0.0105	0.47	0.91
bailout_HB	-0.0130	0.00	0.84
bailout_Saar	-0.0046	0.00	0.68
change_gov_SPD_Green	-0.0051	0.00	0.72
change_gov_SPD_FDP	-0.0159	0.00	0.82
change_gov_CDU_FDP	0.0074	0.01	0.81
change_gov_grand_coal	-0.0145	0.00	0.81
change_gov_SPD_alone	-0.0078	0.00	0.80
change_gov_CDU_alone	-0.0014	0.00	0.56
preelect_SPD_Green	-0.0027	0.00	0.64
preelect_SPD_FDP	-0.0043	0.00	0.70
preelect_CDU_FDP	-0.0093	0.03	0.88
preelect_grand_coal	-0.0256	0.84	0.95
preelect_SPD_alone	-0.0038	0.00	0.75
preelect_CDU_alone	-0.0032	0.00	0.79
election_SPD_Green	-0.0087	0.00	0.85
election_SPD_FDP	-0.0020	0.00	0.61
election_CDU_FDP	-0.0008	0.00	0.56
election_grand_coal	-0.0250	0.15	0.93
election_SPD_alone	-0.0008	0.00	0.57
election_CDU_alone	-0.0003	0.00	0.56
lag_election_SPD_Green	0.0073	0.00	0.84
lag_election_SPD_FDP	0.0038	0.00	0.67
lag_election_CDU_FDP	0.0119	0.11	0.93
lag_election_grand_coal	-0.0236	0.31	0.93
lag_election_SPD_alone	-0.0043	0.01	0.80
lag_election_CDU_alone	0.0045	0.00	0.86

Table A3. EBA without fixed effects: spending

Variable	$\overline{\beta}$	significant	CDF
Δgdp	0.2938	0.95	0.99
Δgdp(lag)	0.5634	1.00	1.00
Δbund_gdp	0.3922	0.97	0.99
Δbund_gdp(lag)	0.7309	1.00	1.00
Δinterest	-0.0034	0.90	0.97
Δinterest(lag)	0.0023	0.78	0.95
Δunemployed	-0.0710	1.00	1.00
Δunemployed(lag)	-0.0395	0.95	0.99
Δemployed	0.5087	1.00	1.00
Δemployed(lag)	0.2320	0.92	0.97
Δpopulation	1.2484	0.97	1.00
Δpopulation(lag)	0.6250	0.94	0.99
Δdebt(lag)	-0.1499	1.00	1.00
Δratio_industry	0.0422	0.08	0.67
Δratio_industry(lag)	0.6487	0.95	0.99
Δurbanity	0.3193	0.09	0.92
Δurbanity(lag)	-0.0645	0.00	0.63
ratio_frontier	-0.0017	0.00	0.63
area	0.0000	0.01	0.81
Δdensity	0.4574	0.79	0.95
coal_size	0.0041	0.29	0.93
treasury	-0.0054	0.03	0.66
minist	0.0008	0.06	0.84
minist_ratio	-0.0057	0.00	0.74
SPD_bund_land	-0.0012	0.00	0.67
CDU_bund_land	-0.0006	0.00	0.59
FDP_bund_land	0.0024	0.00	0.77
Green_bund_land	0.0025	0.00	0.65
br_bund	-0.0016	0.05	0.68
br_land	0.0002	0.00	0.58
br_bund_land	-0.0007	0.00	0.59
ΔCDU_vote	-0.0353	0.84	0.97
ΔFDP_vote	0.0030	0.00	0.71
Δbun_CDU_vote	-0.0537	0.88	0.97
Δbund_FDP_vote	0.0165	0.84	0.96

Table A3. EBA without fixed effects: spending (continued)

Variable	$\overline{\beta}$	significant	CDF
SPD_Green_gov	0.0001	0.00	0.57
SPD_FDP_gov	0.0029	0.00	0.76
CDU_FDP_gov	0.0045	0.05	0.87
grand_coal	-0.0059	0.02	0.75
ampel_gov	-0.0056	0.00	0.63
bund_SPD_FDP_gov	-0.0035	0.03	0.76
bund_CDU_FDP_gov	-0.0003	0.01	0.62
change_gov	0.0083	0.83	0.97
change_gov_aggr	0.0023	0.38	0.92
change_mp	0.0120	0.85	0.96
preelect	-0.0007	0.00	0.62
election	0.0027	0.00	0.82
lag_election	-0.0045	0.36	0.94
bailout	-0.0164	0.93	0.98
bailout_HB	-0.0090	0.03	0.81
bailout_Saar	-0.0091	0.84	0.96
change_gov_SPD_Green	-0.0022	0.00	0.60
change_gov_SPD_FDP	0.0143	0.00	0.82
change_gov_CDU_FDP	0.0098	0.09	0.89
change_gov_grand_coal	0.0035	0.00	0.59
change_gov_SPD_alone	0.0111	0.03	0.89
change_gov_CDU_alone	0.0061	0.03	0.76
preelect_SPD_Green	0.0002	0.00	0.56
preelect_SPD_FDP	-0.0109	0.11	0.92
preelect_CDU_FDP	0.0038	0.00	0.70
preelect_grand_coal	0.0151	0.00	0.81
preelect_SPD_alone	-0.0018	0.00	0.64
preelect_CDU_alone	-0.0025	0.00	0.73
election_SPD_Green	0.0031	0.00	0.65
election_SPD_FDP	0.0065	0.00	0.79
election_CDU_FDP	0.0144	0.86	0.97
election_grand_coal	-0.0300	0.87	0.96
election_SPD_alone	0.0033	0.00	0.74
election_CDU_alone	-0.0007	0.00	0.60
lag_election_SPD_Green	-0.0008	0.00	0.58
lag_election_SPD_FDP	-0.0053	0.00	0.76
lag_election_CDU_FDP	-0.0111	0.12	0.91
lag_election_grand_coal	0.0123	0.00	0.79
lag_election_SPD_alone	-0.0062	0.10	0.89
lag_election_CDU_alone	-0.0025	0.01	0.72

Table A4. EBA without fixed effects: revenue

Variable	$\overline{\beta}$	significant	CDF
Δgdp	0.8847	1.00	1.00
Δgdp(lag)	0.3609	0.97	1.00
Δbund_gdp	1.2578	1.00	1.00
Δbund_gdp(lag)	0.3795	0.94	0.98
Δinterest	-0.0053	0.93	0.97
Δinterest(lag)	0.0005	0.00	0.69
Δunemployed	-0.0753	0.97	0.99
Δunemployed(lag)	0.0083	0.14	0.76
Δemployed	0.3099	0.87	0.96
Δemployed(lag)	0.0012	0.05	0.66
Δpopulation	0.9811	0.94	0.99
Δpopulation(lag)	0.5452	0.73	0.95
Δdebt(lag)	0.1081	0.98	0.98
Δratio_industry	0.8291	0.97	0.99
Δratio_industry(lag)	0.0462	0.05	0.69
Δurbanity	0.1920	0.00	0.75
Δurbanity(lag)	-0.2256	0.00	0.78
ratio_frontier	0.0088	0.00	0.80
area	0.0000	0.09	0.89
Δdensity	0.4607	0.53	0.91
coal_size	0.0047	0.12	0.86
treasury	0.0193	0.00	0.86
minist	0.0005	0.02	0.67
minist_ratio	0.0036	0.02	0.64
SPD_bund_land	-0.0124	0.95	0.99
CDU_bund_land	0.0026	0.01	0.76
FDP_bund_land	0.0072	0.16	0.91
Green_bund_land	-0.0022	0.00	0.65
br_bund	0.0046	0.09	0.88
br_land	-0.0021	0.03	0.70
br_bund_land	-0.0004	0.05	0.63
ΔCDU_vote	0.0093	0.03	0.62
ΔFDP_vote	0.0054	0.00	0.74
Δbun_CDU_vote	0.0139	0.01	0.66
Δbund_FDP_vote	-0.0192	0.56	0.94

Table A4. EBA without fixed effects: revenue (continued)

Variable	$\overline{\beta}$	significant	CDF
SPD_Green_gov	0.0024	0.00	0.66
SPD_FDP_gov	0.0078	0.10	0.89
CDU_FDP_gov	0.0055	0.00	0.83
grand_coal	-0.0221	0.95	0.98
ampel_gov	0.0544	0.99	0.97
bund_SPD_FDP_gov	-0.0229	0.95	0.99
bund_CDU_FDP_gov	0.0097	0.92	0.98
change_gov	0.0068	0.02	0.86
change_gov_aggr	0.0011	0.00	0.71
change_mp	0.0201	0.96	0.98
preelect	-0.0021	0.00	0.71
election	-0.0052	0.11	0.90
lag_election	0.0059	0.27	0.93
bailout	-0.0128	0.75	0.94
bailout_HB	-0.0141	0.01	0.84
bailout_Saar	-0.0065	0.00	0.71
change_gov_SPD_Green	-0.0063	0.00	0.69
change_gov_SPD_FDP	0.0024	0.00	0.59
change_gov_CDU_FDP	0.0128	0.02	0.88
change_gov_grand_coal	-0.0036	0.00	0.62
change_gov_SPD_alone	0.0014	0.00	0.59
change_gov_CDU_alone	0.0047	0.00	0.65
preelect_SPD_Green	0.0148	0.22	0.93
preelect_SPD_FDP	-0.0017	0.00	0.58
preelect_CDU_FDP	0.0019	0.00	0.60
preelect_grand_coal	-0.0216	0.05	0.86
preelect_SPD_alone	-0.0087	0.00	0.86
preelect_CDU_alone	-0.0059	0.00	0.85
election_SPD_Green	-0.0047	0.00	0.66
election_SPD_FDP	-0.0083	0.00	0.76
election_CDU_FDP	-0.0039	0.00	0.65
election_grand_coal	-0.0129	0.00	0.74
election_SPD_alone	-0.0037	0.00	0.69
election_CDU_alone	-0.0028	0.00	0.71
lag_election_SPD_Green	0.0064	0.00	0.75
lag_election_SPD_FDP	-0.0034	0.00	0.63
lag_election_CDU_FDP	0.0035	0.00	0.64
lag_election_grand_coal	-0.0116	0.00	0.75
lag_election_SPD_alone	-0.0064	0.01	0.79
lag_election_CDU_alone	0.0136	0.98	0.99

Table A5. General model EBA-based: spending

	β	p
Δgdp	0.2623	0.000
Δgdp(lag)	0.1932	0.008
Δdebt(lag)	-0.0652	0.007
lag_election	-0.0051	0.010
change_gov_CDU_FDP	0.0190	0.000
election_grand_coal	-0.0372	0.003
1975	0.0528	0.003
1977	-0.0137	0.015
1978	0.0133	0.004
1979	0.0314	0.000
1980	0.0270	0.000
1982	-0.0243	0.000
1983	-0.0215	0.000
1984	-0.0153	0.001
1985	0.0106	0.021
1991	0.0095	0.068
1992	0.0152	0.002
1994	-0.0124	0.022
1996	-0.0092	0.043
1997	-0.0258	0.000
1998	-0.1136	0.000
2002	-0.0172	0.000
2004	-0.0248	0.000
N. Rhine-Westph.	0.0042	0.054
Cons	0.0083	0.000

Table A6. General model EBA-based: revenue

	β	p
Δgdp	0.4977	0.000
Δunemployed(lag)	-0.0419	0.000
Δdebt(lag)	0.1245	0.001
SPD_bund_land	-0.0045	0.090
ampel_gov	0.0453	0.037
preelect_grand_coal	-0.0252	0.025
1976	0.0435	0.000
1977	0.0236	0.000
1981	-0.0481	0.000
1982	-0.0120	0.067
1986	-0.0094	0.099
1987	-0.0129	0.024
1990	-0.0365	0.000
1995	-0.0170	0.008
1997	-0.0407	0.000
1998	-0.0874	0.000
2000	-0.0108	0.077
2001	-0.0667	0.000
2002	-0.0367	0.000
2003	-0.0309	0.000
Cons	0.0116	0.000

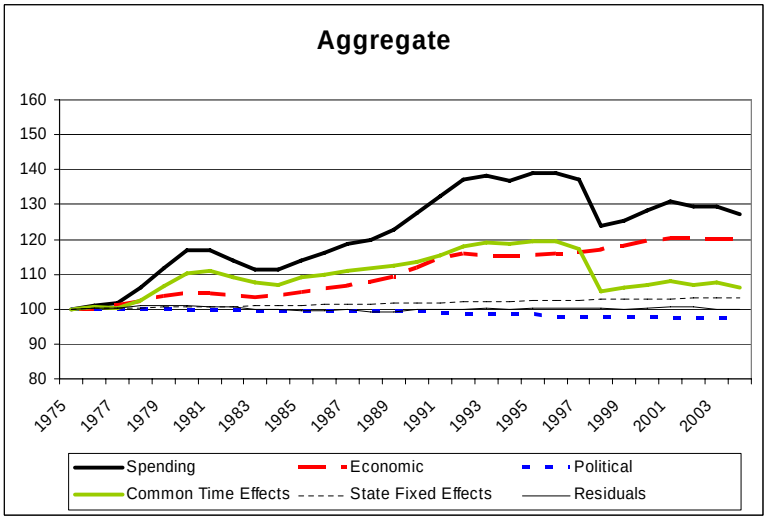
Table A7. General model EBA-based without fixed effects: spending

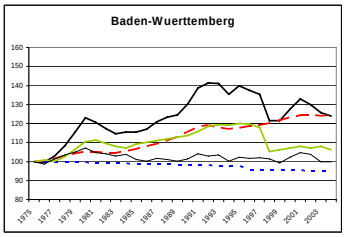
	β	p
Δgdp(lag)	0.2103	0.016
Δdebt(lag)	-0.0864	0.001
Δunemployed	-0.0361	0.000
Δemployed(lag)	-0.1467	0.033
Δbund_gdp(lag)	0.4860	0.000
Δinterest	0.0056	0.000
change_mp	0.0111	0.021
bailout_Saar	-0.0122	0.009
election_grand_coal	-0.0316	0.013
Δbund_FDP_vote	0.0213	0.003
bailout	-0.0060	0.018
oil	0.0241	0.000
dummy(=1998)	-0.1098	0.000
unification	-0.0126	0.046
Cons	0.0054	0.105

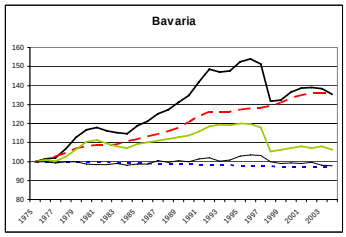
Table A8. General model EBA-based without fixed effects: revenue

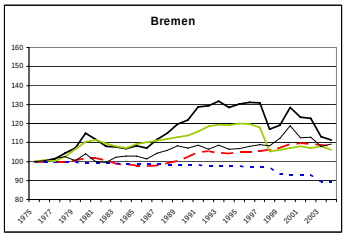
	β	p
Δgdp	0.2681	0.031
Δdebt(lag)	0.0999	0.004
Δbund_gdp	0.9220	0.000
Δinterest	-0.0067	0.000
SPD_bund_land	-0.0079	0.011
ampel_gov	0.0602	0.007
lag_election_CDU_alone	0.0078	0.069
unification(=1990)	-0.0346	0.000
dummy(=1998)	-0.0754	0.000
trend	-0.0007	0.000
Cons	-0.0014	0.787

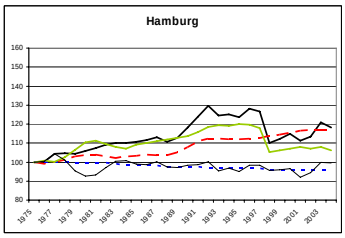
Figure A3. Spending (general model EBA-based)

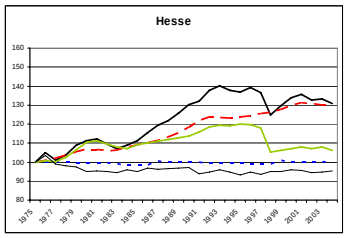


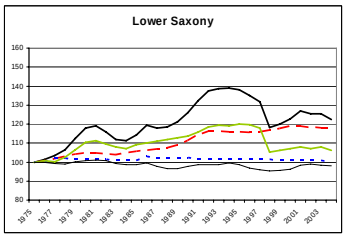


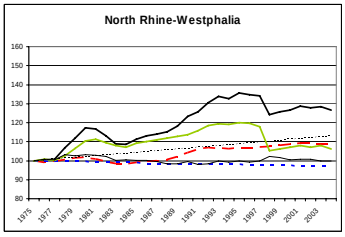


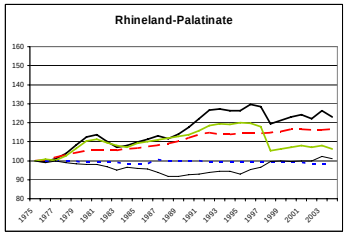


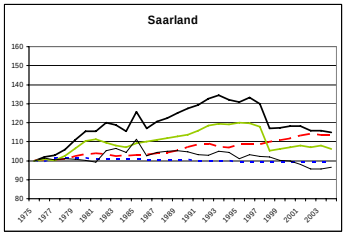












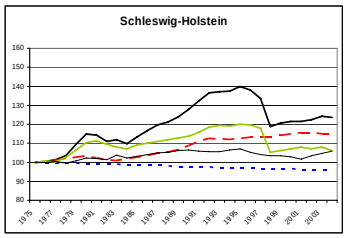
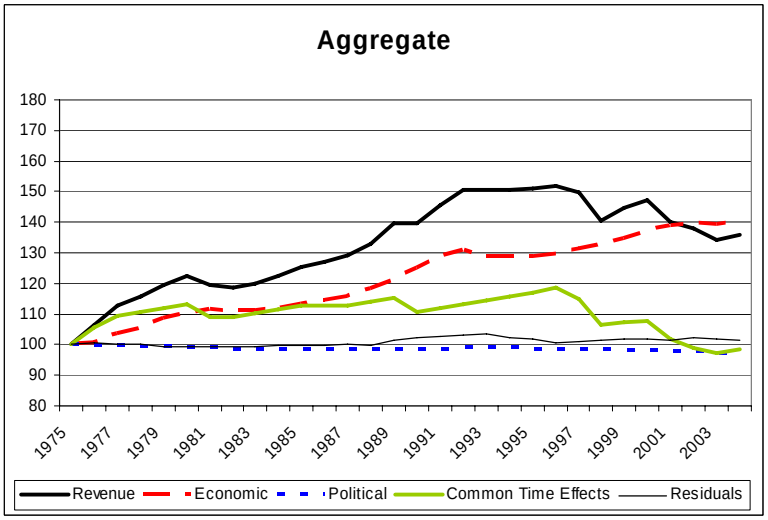
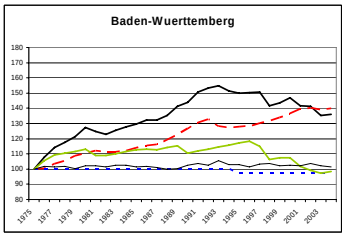
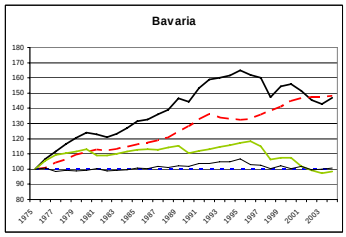
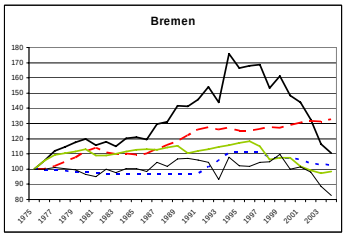


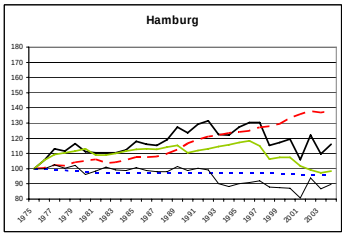
Figure A4. Revenue (general model EBA-based)

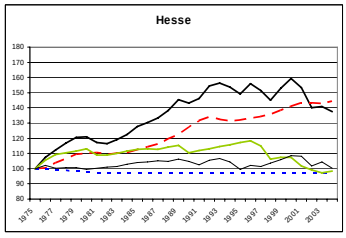


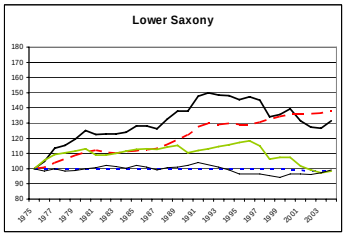


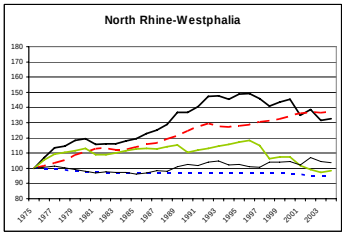


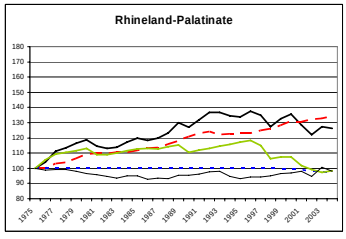


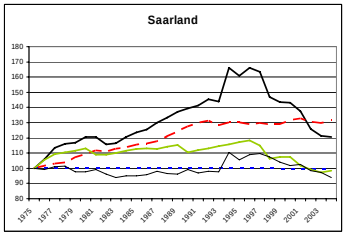












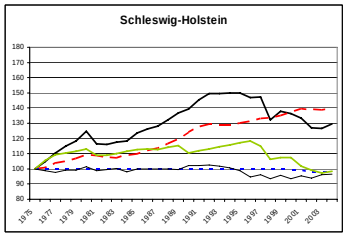
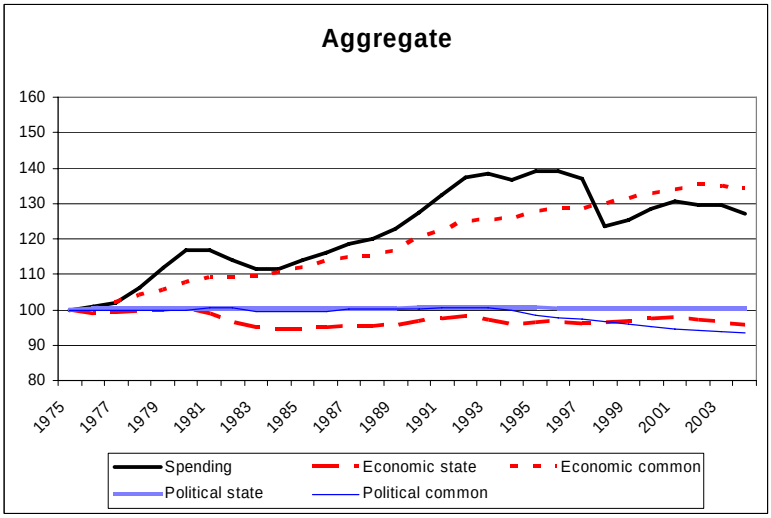
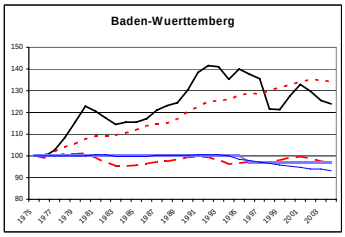
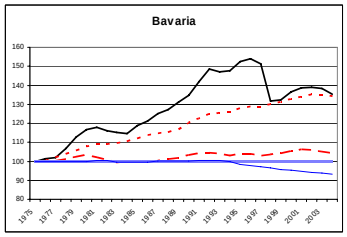
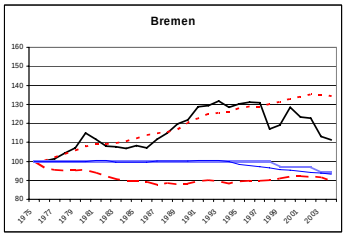


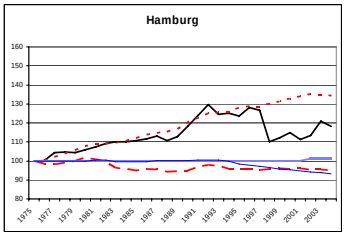
Figure A5. Spending (general model EBA-based without fixed effects)

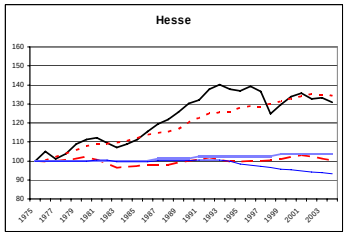


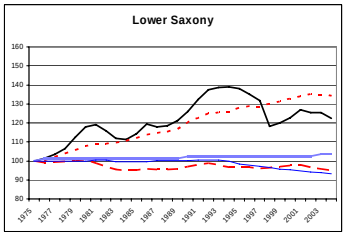


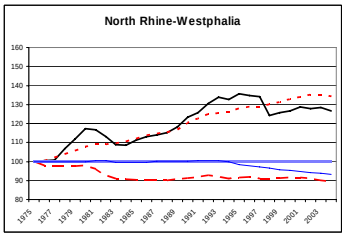


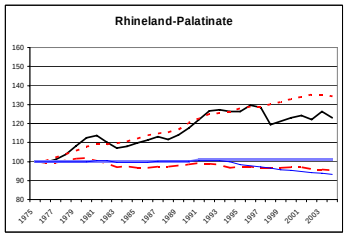


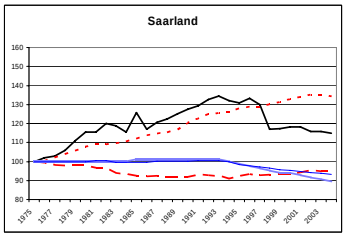












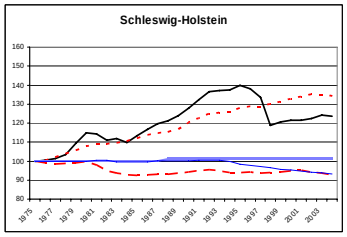
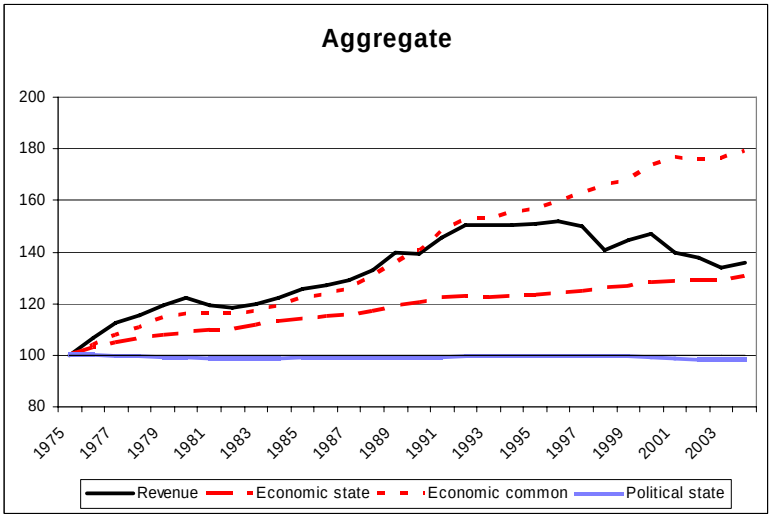
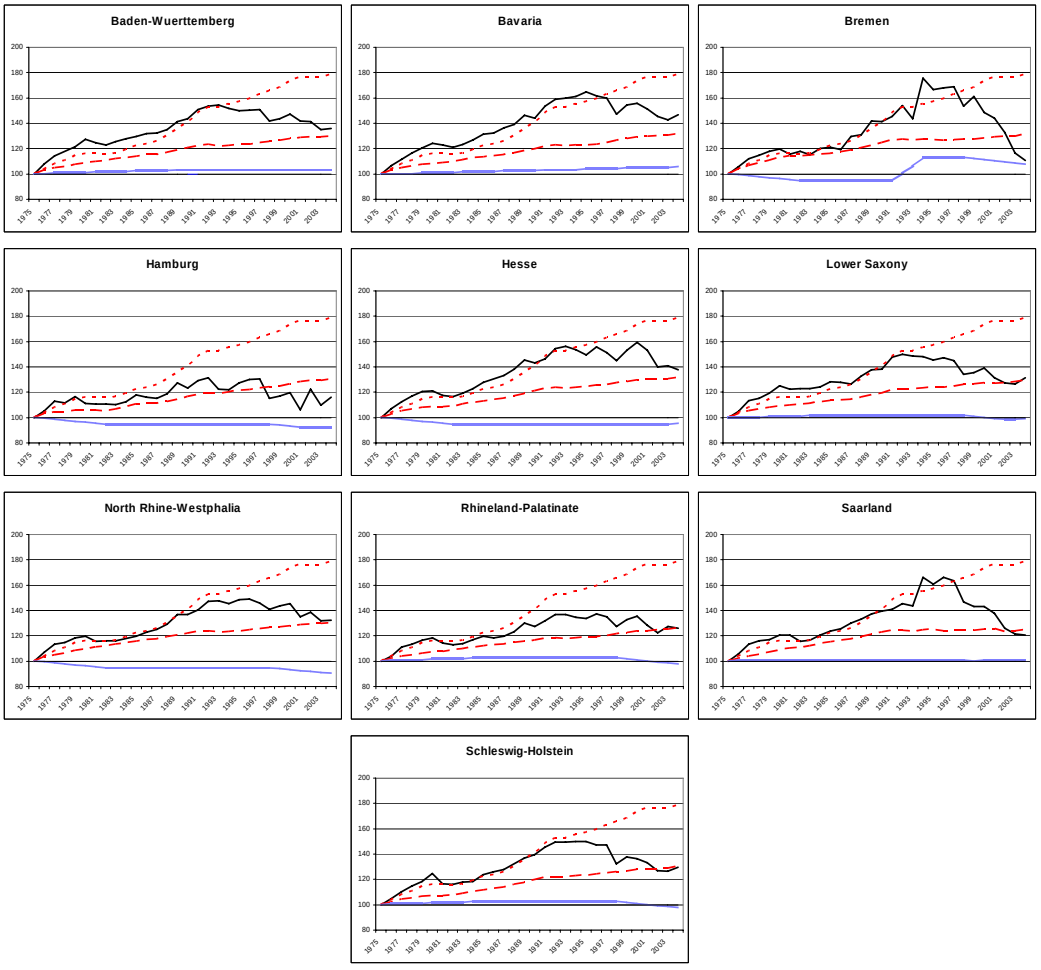


Figure A6. Revenue (general model EBA-based without fixed effects)





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