Fiscal Rules and Compliance Expectations – Evidence for the German Debt Brake

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Abstract: Fiscal rules have become popular to limit deficits and high debt burdens in many countries. A growing literature examines their impact based on aggregate fiscal performance. So far, no evidence exists on how fiscal rules influence deficit expectations of fiscal policy makers. In the context of the German debt brake, we study this expectation dimension. In a first step, we introduce a dynamic model in an environment characterized by lagged implementation of a new rule, which in turn characterizes the setup of the German debt brake and raises credibility issues. In a second step, we analyze a unique survey of members of all 16 German state parliaments and show that the debt brake's credibility is far from perfect. The heterogeneity of compliance expectations in the survey corresponds to our theoretical predictions regarding states' initial fiscal conditions, specific state fiscal rules, and bailout perceptions. In addition, there is a robust asymmetry in compliance expectations between insiders and outsiders (both for in-state vs. out-of-state politicians and the incumbent government vs. opposition dimension), which we attribute to overconfidence rather than noisy information.

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1. Introduction

Constitutional fiscal rules have been used for decades in federal countries such as Switzerland and the US states to limit deficits and debts of sub-national jurisdictions (for a survey of current fiscal rules see IMF, 2012). On the national level, the euro area debt crisis has triggered a wave of new statutory and constitutional budget constraints. For example, the Fiscal Compact, accepted by 25 EU member states in 2012, has been another milestone for the spread of numerical fiscal constraints where the signatory countries commit to the introduction of national debt brakes (see, European Council, 2011).

A key argument in favor of numerical fiscal rules is that they can contribute to credible fiscal strategies, boost borrower reputation and anchor long-run expectations about future government public finances and, ultimately, solvency (IMF, 2009). Hence, expectation effects of fiscal rules are a natural yardstick to assess a rule's potential effectiveness in the future. A credible rule affects expectations of very different players both in the private sector (e.g. investors in government bond market) and the public sector (e.g. political decision makers). While a limited literature exists covering private investors' expectation effects and the impact of rules on government bond risk premia (e.g. Heinemann, Osterloh and Kalb, 2014 and Iara and Wolff, 2014), analyses on politicians' expectations are completely missing.

We contribute to filling this gap, and to the best of our knowledge, we are the first to examine expectation effects of a fiscal rule for fiscal policy makers themselves. These effects are of direct importance as actual budgetary decisions are more likely to be affected if a rule enjoys credibility with actual policy makers. Expectations of politicians who are constrained by a rule form a key intermediary step between fiscal rules on the one hand and fiscal outcomes on the other hand. Politicians for whom the fiscal rule credibly shuts down any future deficit financing have to adjust their fiscal policies accordingly.

We analyze the extent to which a deficit rule induces compliance expectations of politicians who are to be constrained by a numerical fiscal target. In addition, we analyze the interaction between a rule's credibility in the eyes of policy makers and the incentive to make fiscal adjustments, where interactions are driven by initial conditions, fiscal shocks, as well as personal and institutional determinants. We thereby contribute to the understanding of the distinction between fiscal rule compliance on the one hand and

induced fiscal outcomes on the other hand. This distinction has recently been highlighted in empirical research by Cordes et al. (2015).

Existing studies on the link between fiscal rules and fiscal decisions are only applicable on a concurrent basis (through the use of real time data, see Beetsma and Giuliodori, 2010) or ex post (i.e. after years of experience with an existing rule; see references below). Our survey method, by contrast, can be employed ex ante and gives an early indication of the rule's potential effectiveness in the future before data on actual fiscal outcomes become available. Finally, our approach opens the black box of aggregating heterogeneous preferences and expectations of policy makers into fiscal decisions. We study the role of individual characteristics in this aggregation process, such as political ideology, education, and political experience.

To this end, we make use of the specific institutional context of the German debt brake, a fiscal rule which was put into the constitution in 2009 and which restricts the budget deficit of federal and state governments. We explore expectations for the members of all 16 German state parliaments. This setting offers favorable conditions to study the link between state politicians' compliance expectations on the one hand and diverse initial fiscal conditions on the other hand. Moreover, the German debt brake offers a rich dynamic setting which is characterized by lagged implementation: The rules' binding constraints are phased in over a longer period (for the state level by the year 2020, for the federal government already in 2016). Lagged implementation creates a dynamic decision problem for state parliamentarians who have to decide on the extent and timing of consolidation efforts given substantial fiscal uncertainties over the transition phase.

Our analysis of expectation formation comprises a theoretical and an empirical dimension. Our theoretical model captures the key features of the lagged implementation of a deficit rule and guides the empirical analysis. Decisions on deficits are dynamic by nature and imply a trade-off between instant and future political costs from fiscal consolidation. A fiscal shock occurring over the transition phase accounts for the fiscal uncertainties which characterize a long transition period.

In the model, we analyze the impact of several, policy relevant factors. We show that compliance is more likely i) the lower is the initial deficit, ii) the lower are bailout expectations, iii) the tighter is a fiscal rule in the near future (e.g. through additional state-specific constraints), and iv) the higher is the first round deficit reduction. Furthermore,

the model predicts that insiders (defined to be members of parties of the incumbent government or in-state parliamentarians) have more optimistic compliance expectations than outsiders (opposition members, out-of-state politicians) if the overall compliance expectation is low. Within the model we analyze two possible explanations, which lead to different testable implications: asymmetric information between insiders and outsiders on the distribution of the fiscal shock, and overconfidence on the side of insiders.

In our empirical analysis, we test the model predictions on the drivers of compliance expectations based on a unique survey of members of all 16 German state parliaments. In the survey we elicited responses for the politicians' expectations on the own state complying with the debt brake by the year 2020, on other states' compliance, and on the likelihood of sanctions or bailout if a state were to violate the new rule in 2020. Since the survey was non-anonymous, individual characteristics (such as education, party membership, etc.) and state characteristics (such as future need for fiscal consolidation) can be used to systematically study the determinants of compliance expectations. We obtained answers from 639 politicians who provided their compliance expectations for 16 states, which leads to more than 10,000 observations.

The survey not only shows that the German debt brake's credibility among policy makers is far from perfect. It also reveals that the heterogeneity of compliance expectations closely corresponds to our theoretical predictions: states' initial fiscal conditions, specific state fiscal rules and bailout perceptions matter. In addition, there is a robust asymmetry in compliance expectations between insiders and outsiders (both for in-state vs. out-of-state politicians and the government vs. opposition dimension), when the overall compliance expectation for a state is low. In that case, insiders tend to be significantly more optimistic than outsiders regarding the likelihood of their state's compliance. Based on the guidance of our theoretical model we diagnose overconfidence of insiders (and not noisy information) as driving this asymmetry. Overall, our analysis demonstrates that the credibility of a new national fiscal rule can be strengthened through no-bailout rules, sustainable initial fiscal conditions, and complementary sub-national rules.

Our specific credibility analysis is forward-looking and hence different from the extensive literature which examines the impact of numerical fiscal rules based on aggregate past fiscal performance. The standard approach is the estimation of cross-section or panel models for the selected jurisdictions and their fiscal performance (see e.g. for the

US Poterba, 1996; for Europe Debrun et al., 2008; for OECD countries Dahan and Straw-czynski, 2010; and for Swiss cantons Krogstrup and Wälti, 2008; for a comprehensive meta-analysis on that literature see Heinemann, Moessinger and Yeter, 2016). Our theo-retical contribution corresponds to a few recent papers which analyze theoretically the role of fiscal rules in a political economy framework, such as Azzimonti, Battaglini and Coate (2016). Janeba (2012) considers the role of delay in making a German type debt brake binding when the fiscal rule itself is credible. The incentives of bailouts in a feder-al context are considered by Goodspeed (2002). Our survey approach and its empirical implementation benefit from prior surveys of politicians that have been used in recent research by two of the present authors. Heinemann and Janeba (2011) use a survey of members of Germany's national parliament to study ideological bias in tax policy. Janeba and Osterloh (2013) use a survey of mayors in Germany to empirically motivate the spa-tial structure of local tax competition in a theoretical tax competition model.

The rest of the paper is organized as follows. Section 2 sets up the theoretical model and derives comparative statics for the likelihood of compliance with the debt brake. Sec-tion 3 describes our original survey and provides background information on Germany's political and fiscal system and the debt brake. Our empirical findings are presented and discussed in section 4. Finally, section 5 concludes.

2. A Model of Fiscal Rule Compliance

We model the dynamic fiscal decision of an incumbent government to reduce its deficit in order to meet the target of a fiscal rule becoming effective only in the future. Deficit shocks make compliance non-trivial and uncertain. Specifically, we assume that the economy lasts for three periods, $t = 0, 1, 2$, where period 0 is the past, period 1 is the near future when a fiscal shock occurs, and period 2 is the distant future when the fiscal rule becomes binding (i.e. 2020 in the context of the German debt brake). There are two key budgetary decisions to be taken at the beginning of periods 1 and 2. The admittedly simple structure is sufficient to capture the uncertainty about compliance with the debt brake and allows us to derive hypotheses for our empirical analysis.

The main variable of interest is the government deficit d_t. The initial deficit $d_0 > 0$ is exogenous from the viewpoint of the incumbent government in period 1. The fiscal rule requires the government to run (at least) a balanced budget in period 2. If this target is met, that is, $d_2 \leq 0$, the government obtains (gross) payoff u, which excludes the cost of

fiscal adjustment. Otherwise the government is non-compliant and obtains payoff bu, where b is an endogenous variable that reflects the degree of non-compliance and is discussed in more detail below. The difference between u and bu comprises, inter alia, a reputation effect. Policy makers across party lines have high regard for the debt brake, which may reflect the importance of the rule of law in Germany.[1] Violating the constitution is likely to be costly for a state government in terms of reputation and possible consequences.[2] The term bu may also capture a possible bailout when the government does not comply, which we discuss in detail below.

The government can reach the balanced budget in two steps by reducing the deficit in periods 1 and 2 by the amounts r_1 and r_2, respectively, which could be negative. We model deficit reduction in a reduced form without specifying the nature of the fiscal adjustment (i.e. tax increases and/or expenditure cuts). Deficit reduction (increase) is costly (beneficial) for the government in the period when it takes place because government approval ratings or reelection chances are harmed (improved). We focus on the concurrent cost even though the cost of permanent deficit reduction may spill over to future periods. The cost function for permanently reducing the deficit by r is $c(r)$ in the period when the adjustment is made, and has the properties $c(r) \gtreqqless 0$ for $r \gtreqqless 0$, and c'>0, c'' > 0. Strict convexity implies that spreading a given deficit reduction over time is efficient. This assumption seems reasonable given the long time horizon until the debt brake becomes binding for German states and given the high initial deficits in some states at the time of the rule's introduction 2009.

The actual deficit in period 1 is a function of the initial deficit d_0, the reduction r_1 undertaken (at the beginning of) in period 1, and a shock $s \in [\underline{s}, \overline{s}]$ that occurs during period 1:

$$d_1 = d_0 - r_1 + s. \tag{1}$$

In period 2, after observing the realized value of d_1, the government sets the deficit for period 2 by choosing r_2 so that

$$d_2 = d_1 - r_2. \tag{2}$$

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[1] In line with this assumption is the fact that German states typically advertise publicly their efforts on the way to complying with the debt brake.

[2] One might wonder why states agreed to the debt brake in the first place. Two reasons seem to be relevant: First, policymakers who agreed to the debt brake in 2009 are not necessarily in power when the balanced budget requirement becomes binding in 2020. Second, five economically and fiscally weaker states obtain annual transfers until 2019 which made agreement more attractive. See section 3.1 for more details.

By assumption no shock takes place in period 2. The government payoff at the beginning of period 1 is given by

$$U = -c(r_1) + \delta[v - c(r_2)], \tag{3}$$

where $v = u$ when the government is compliant in period 2, that is $d_2 \leq 0$, and $v = bu$ when not. Let $\delta \leq 1$ be the discount factor.

2.1 Solving the Model

We analyze the conditions under which it is in the government's interest (not) to comply with the fiscal target. For the time being we focus on the political decision maker. Later we consider how other individuals (such as opposition politicians or politicians from outside of state) assess the likelihood of compliance. The model is solved from the back.

Period 2

As shown in (1), the value of r_2 that is necessary to meet the fiscal target is the result of the deficit reduction effort in period 1, the fiscal shock and the initial deficit. On the one hand, the government may choose to comply and selects $r_2 = d_1 = d_0 - r_1 + s$, which implies $d_2 = 0$. There is no benefit from over-achieving the fiscal target because deficit reduction is costly. Knowing the value of s, the period 2 payoff for compliance is

$$U_c = u - c(d_0 - r_1 + s). \tag{4}$$

If, on the other hand, the government does not comply with the fiscal rule its net payoff, after taking fiscal policy choices into account, is $b(r_2)u - c(r_2)$. We assume that the degree of non-compliance, captured by the function $b(r_2)$, matters. Deviations are costly in terms of public reputation. While small deviations may be interpreted by the public as bad luck or inaccurate measurement, large deviations are likely to be blamed on policy makers. Specifically, we assume that the function $b(r_2)$ is increasing and strictly concave: $b'(r_2) > 0 > b''(r_2)$.

Whether compliance or non-compliance is optimal depends on the net utility of each option after taking fiscal policy choices into account. The optimal level of fiscal consolidation (possibly negative) when not complying is found by maximizing the payoff with respect to r_2. The first order condition reads $b'(r_2)u - c'(r_2) = 0$. The second order condition is fulfilled by assumption on the properties of functions $b(r_2)$ and $c(r)$. Denote the optimal choice by r_{2nc}^*. Assuming that this level is indeed not sufficient to be compli-

ant with the target (i.e. $r_{2nc}^* < d_0 - r_0 + \underline{s}$), the (period 2) net benefit from optimal non-compliance is

$$U_{nc} = b(r_{2nc}^*)u - c(r_{2nc}^*). \tag{5}$$

A comparison of (4) and (5) reveals that compliance is preferable to non-compliance if and only if $U_c \geq U_{nc}$, which is equivalent to

$$c(d_1) \leq \Delta u := u - U_{nc} = \left(1 - b(r_{2nc}^*)\right)u + c(r_{2nc}^*), \tag{6}$$

that is, the cost of reducing the deficit to zero under compliance is not higher than the gain from compliance measured by Δu. Condition (6) shows that $b(r_{2nc}^*) < 1$ is a necessary condition for compliance to occur because $c(d_1) > c(r_{2nc}^*)$. In short, the reputation loss under non-compliance must be sufficiently strong. We make this assumption which seems reasonable in the German context: Even fiscally weak states make some efforts to reach the balanced budget target in 2020 (Detemple, Michels and Schramm, 2015) and politicians agree on the desirability of the debt brake.

The cost of deficit reduction $c(\mathrm{r})$ is a monotone function of r. In addition U_{nc} is independent of d_0, r_1 and s. We can therefore invert (6) when it holds with equality, and define a critical level of the period 1 deficit for compliance to occur, namely, $d_1^* = c^{-1}(\Delta u)$. For d_1 less than or equal to d_1^*, the government chooses to be compliant, otherwise not.

Using (1), the threshold level defines implicitly a maximum level of the deficit shock s, called s^*, that is consistent with $d_2 = 0$:

$$s^* = d_1^* + r_1 - d_0 = c^{-1}(\Delta u) + r_1 - d_0. \tag{7}$$

Instead of stating government compliance in terms of the period 1 deficit (d_1^*), condition (7) allows us to restate the condition in terms of the realized value of the shock s: For $s \leq s^*$ the government is compliant, otherwise not. The threshold level $s^* = s(r_1, \Delta u, d_0)$ is a positive function of the additional gain from compliance and the deficit reduction in period 1, but depends negatively on the initial deficit d_0. Recall that r_1 is exogenous from the viewpoint of period 2, but endogenous ex ante.

The stochastic nature of the government deficit in period 1 makes compliance uncertain. We capture this aspect in the probability of compliance p, viewed from the time before the shock realizes (but after r_1 was chosen). We are interested in the relationship between p and exogenous parameters of the model, such as the initial deficit d_0, the gross

gain from compliance Δu, possible bailout expectations, as well as an additional fiscal rule restricting the maximum deficit level in period 1.

In order to state the probability of compliance and to obtain closed-form solutions we assume that the shock s is drawn from a uniform distribution with support $[\underline{s}, \overline{s}]$ and probability density $S^{-1} = (\overline{s} - \underline{s})^{-1}$. When $s^* \in [\underline{s}, \overline{s}]$, the probability of compliance with the fiscal rule, prior to the fiscal shock, is given by

$$p = p(d_0, r_1, \Delta u, \underline{s}, \overline{s}) = \frac{s^* - \underline{s}}{\overline{s} - \underline{s}} = \frac{c^{-1}(\Delta u) + r_1 - d_0 - \underline{s}}{S}. \tag{8}$$

The probability p depends on $(r_1, \Delta u, d_0)$ and lies between 0 and 1 under suitable assumptions on the size of d_0 and S.[3] We make those assumptions, as this leads to an empirically relevant setup. The probability p increases (decreases) with the level of period 1 deficit reduction (initial deficit), and the gross gain from compliance:[4]

$$\frac{\partial p}{\partial r_1} = -\frac{\partial p}{\partial d_0} = \frac{1}{S} > 0, \quad \frac{\partial p}{\partial (\Delta u)} = \frac{c^{-1\prime}(\Delta u)}{S} > 0. \tag{9}$$

Period 1

At the beginning of period 1 the government chooses r_1 and affects the probability of compliance via (8). The expected government payoff is

$$E[U] = -c(r_1) + \frac{\delta}{S} \left[\int_{\underline{s}}^{s^*} (u - c(d_0 - r_1 + s)) ds + \int_{s^*}^{\overline{s}} U_{nc} \, ds \right]$$

$$= -c(r_1) + \delta \left[U_{nc} + p\Delta u - \frac{1}{S} \int_{\underline{s}}^{s^*} c(d_0 - r_1 + s) \, ds \right] \tag{10}$$

The first line shows in square brackets the utility (periods 1 and 2) under compliance and non-compliance, respectively. For low levels of s, $s \leq s^*$, the government complies in period 2 by choosing a level of deficit reduction that leads to $d_2 = 0$ (the first integral). For high realizations of s, $s \geq s^*$, the government does not comply (the second integral). Rewriting terms, the second line in (10) displays in square brackets the same expression as before, now as the sum of the guaranteed utility under non-compliance and the ex-

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[3] First, the probability is strictly positive if $s^* > \underline{s}$, which for given r_0 holds when d_0 and $\underline{s}$ are relatively small. The probability of compliance is less than one if $s^* < \overline{s}$, which holds for relatively high values of the initial deficit d_0 and maximum shock $\overline{s}$.

[4] The sign of the results shown in (9) do not depend on assuming a uniform density function for the fiscal shock s. Moreover, for any continuous density function, the government payoff function looks almost identical to (10), except for the fact that now the probability density would enter the integral on the right hand side, which makes the subsequent comparative static analysis more difficult.

pected gross gain from compliance, minus the cost of deficit reduction in period 2 when s is sufficiently small ($s \leq s^*$).

First period deficit reduction r_1 affects (10) via the cost of effort in period 1 (the first term in (10)), the probability of realizing the gross gain of compliance p, and the cost of effort in period 2 under compliance. Recall that the threshold level s^* is a function of r_1. The first order condition with respect to r_1 is

$$\frac{\partial E[U]}{\partial r_1} = -c'(r_1) + \delta \left[\Delta u \frac{dp}{dr_1} - \frac{1}{S} \int_{\underline{s}}^{s^*} \frac{dc(d_0 - r_1 + s)}{dr_1} ds - \frac{1}{S} c(d_0 - r_1 + s^*) \frac{ds^*}{dr_1} \right]$$

$$= -c'(r_1) + \delta \left[\frac{\Delta u - c(d_0 - r_1 + \underline{s})}{S} \right] = 0. \, ^5 \tag{11}$$

Condition (11) has the following interpretation: An increase in r_1 increases the marginal cost of deficit reduction in the current period. The marginal benefit of doing so is the discounted increase in the expected gross gain of compliance (due to the increase in the probability of compliance) adjusted for the cost of eliminating the remaining deficit $d_0 - r_1 + \underline{s}$. Recall that S^{-1} represents the increase in the probability of compliance when r_1 is raised marginally. We denote by $\hat{r}_1$ the optimal level of deficit reduction in period 1.

2.2 Comparative Statics and Hypotheses

We now study the determinants of the probability of compliance p from the perspective of period 0, which depends on exogenous model parameters both directly, as shown in (8), but also indirectly via the optimal level of initial deficit reduction r_1, as implicitly defined in (11). We use insights from the theory of monotone comparative statics to sign the effects (see van Zandt, 2002).[6]

1. Initial deficit: We first analyze the effect of a change in the initial deficit d_0 on period 1 deficit reduction. Based on Remark 5 and Theorem 4 in van Zandt (2002), the expected payoff function (10) has the property of strictly decreasing differences in (r_1, d_0)

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[5] Solutions to (11) may indicate maxima or minima depending on the sign of the second-order condition $-c''(r_1) + \frac{\delta c'(d_0 - r_1 + \underline{s})}{S}$. We use techniques from the theory of monotone comparative statics to sign comparative static effects.

[6] Alternatively, assuming that the second order conditions hold for maximization of (10), we obtain the same comparative static results.

$$\frac{\partial^2 E[U(r_1,d_0)]}{\partial r_1 \partial d_0} = -\frac{\delta c'(d_0-r_1+\underline{s})}{s} < 0. \tag{12}$$

Theorem 1 in van Zandt implies that an increase in the initial deficit lowers deficit reduction in period 1, that is $\frac{\partial \hat{r}_1}{\partial d_0} < 0$. The probability of compliance p (see (10)) is also lowered by the direct effect so that the total effect becomes

$$\frac{\partial p}{\partial d_0} = \frac{1}{s}\left(\frac{\partial \hat{r}_1}{\partial d_0} - 1\right) < 0. \tag{13}$$

States with a larger initial deficit are less likely to comply with the fiscal rule in period 2 (Hypothesis 1: H1).

2. Bailout expectations: Up to now we did not explicitly address the role of a possible bailout. Suppose a bailout is possible and consider an increase in the exogenous probability of a bailout. Formally, we capture the bailout probability by interpreting the utility from non-compliance *bu* as expected utility, which comprises the utility if no bailout occurs and if it does occur. An increase in the bailout probability (for any given level of fiscal adjustment r₂) leads to a higher level of *bu*, a higher net utility U_{nc} (the indirect effect on optimal deficit reduction in period 1, r_{1nc}^*, can be ignored as a result of the envelope theorem), and thus lower net utility gain Δu. Looking again at the cross partial derivative of (8)

$$\frac{\partial^2 E[U(r_r, \Delta u)]}{\partial r_r \partial (\Delta u)} = \frac{\delta}{s} > 0, \tag{14}$$

the expected payoff function has the property of strictly increasing differences in $(r_r, \Delta u)$. An increase in Δu, which is equivalent to a lower bailout probability, leads to a an increase in period 0 deficit reduction

$$\frac{\partial \hat{r}_1}{\partial (\Delta u)} > 0. \tag{15}$$

Moreover, a lower bailout utility increases the probability of compliance because an increase in Δu raises p both directly and indirectly:

$$\frac{\partial p}{\partial (\Delta u)} = \frac{1}{s}\left(c^{-1'}(\Delta u) + \frac{\partial \hat{r}_1}{\partial (\Delta u)}\right) > 0. \tag{16}$$

Higher bailout expectations (= smaller Δu) make compliance with the balanced budget requirement less likely (Hypothesis 2: H2).

3. *State fiscal rule in period 1*: Some states in Germany have introduced own fiscal rules which constrain fiscal policy prior to 2020. The state rules are often supposed to strengthen the national debt brake. We capture this aspect by allowing for an *additional* fiscal rule to be already effective in period 1. We assume that the additional fiscal rule is credible, perhaps because there is no one to bail out the government within its state. Yet, the fiscal rule may be of different strictness, which we express in terms of the maximum deficit that is allowed in period 1, $d_0 + \overline{s}$. The upper limit of the deficit in period 1 must obey

$$d_1 \le \bar{d}_1 = \alpha(d_0 + \overline{s}). \tag{17}$$

The parameter $\alpha \in [0,1]$ represents the strength of the fiscal rule. Lower values of α correspond to a tighter fiscal rule in period 1. Using (2) we can reformulate the requirement in (17) in terms of initial deficit reduction:

$$r_1 \ge (1 - \alpha)(d_0 + \overline{s}) =: \overline{r}_1. \tag{18}$$

A tighter fiscal rule in period 1 requires a (weakly) higher deficit reduction effort in period 1 ($\overline{r}_1$ is decreasing in α). Whether the additional fiscal rule has bite depends on the magnitudes of $\overline{r}_1$ and $\hat{r}_1$, where the latter is the solution to (11) and represents the optimal choice of initial deficit reduction in the absence of the additional fiscal rule in period 1. When $\overline{r}_1 > \hat{r}_1$, the new fiscal rule is binding. This result has further ramifications for the probability of compliance with the original fiscal rule in period 2. When the state rule is binding, compliance with the debt brake is more likely because probability p depends positively on r_1.

The likelihood of compliance (weakly) increases in the strength of a credible fiscal rule at state level which restricts the period 1 deficit (Hypothesis 3: H3).

4. *Individual Beliefs*: Consider the (interim) belief in government compliance during period 1 (before s is realized, but after r_1 chosen). We wish to compare the beliefs in compliance of two types of politicians: the incumbent government or in-state legislators on the one hand (the "insiders"), and opposition politicians or out-of-state politicians on the other hand (the "outsiders").

The psychological literature (see Moore and Healy, 2008) suggests that a large number of individuals (more than half) believe to perform better than the median which is im-

possible. In the present context, we model overconfidence as follows: Insiders believe the range of fiscal shocks to be more favorable than outsiders, perhaps due to their self-perceived competency in managing the economy. To capture this, we define the upper and lower bound of the fiscal shock as

$$\bar{s} = s^{max} - \gamma \quad \text{and} \quad \underline{s} = s^{min} - \gamma, \tag{19}$$

where s^{max} and s^{min} are the base values of the maximal and minimal shock. A higher value of γ means that the distribution of the fiscal shock shifts lower, leading to a smaller expected value of the shock $E[s] = (s^{max} - s^{min} - 2\gamma)/2$, but unchanged variance $Var[s] = (s^{max} - s^{min})^2/12$. The inverse density $S = \bar{s} - \underline{s} = s^{max} - s^{min}$ is independent of γ.

If incumbent governments or in-state politicians are overconfident, they believe in a higher value of γ than outsiders. We can derive the implications for the probability of compliance by inserting (19) into (8), then differentiating to find (for given r_1)

$$\frac{dp}{d\gamma} = \frac{1}{S} > 0. \tag{20}$$

Hence at an interim stage in period 1 insiders believe in a higher probability of compliance than outsiders. This effect is reinforced if we consider the *ex-ante* perspective when r_1 is chosen. The effect of γ on period 1 deficit reduction can be signed by looking at the cross-partial derivative to (10)

$$\frac{\partial^2 E[U(r_1,\gamma)]}{\partial r_1 \partial \gamma} = \frac{\delta c\prime(d_0 - r_1 + s^{min} - \gamma)}{S} > 0. \tag{21}$$

Hence a higher value of γ makes it more attractive to reduce the deficit in period 1, which in turn increases the probability of compliance even further, an interesting aspect we return to in the concluding section. *Overconfident insiders believe more strongly in compliance than outsiders.*

Alternatively, we may assume that insiders have more precise information about the range of fiscal shocks than outsiders. Let us assume that the fiscal shock is bounded by

$$\bar{s} = s^{max} + \sigma \quad \text{and} \quad \underline{s} = s^{min} - \sigma. \tag{22}$$

In this case variations in σ leave the expected value of the fiscal shock $E[s] = (s^{max} - s^{min})/2$ unaffected, while the variance increases in the parameter σ. Note that $S = \bar{s} - \underline{s} = s^{max} - s^{min} + 2\sigma$ is a function of the shift parameter σ. We assume that

outsiders have a noisier signal about the range of the fiscal shock, and thus a larger value of σ. Inserting (22) into p and differentiating with respect to σ gives

$$\frac{dp}{d\sigma} = \frac{1-2p}{\overline{s}-\underline{s}}. \tag{23}$$

Condition (23) allows us to rank the beliefs of insiders and outsiders: If insiders believe in compliance with more than 50% probability ($p^{ins} > 0.5$) then outsiders attach a lower probability ($p^{out} < p^{ins}$). If, on the other hand, insiders find compliance less likely than non-compliance ($p^{ins} < 0.5$), outsiders are more optimistic than insiders, that is $p^{out} > p^{ins}$. *In other words, insiders have more extreme views than outsiders when the latter have noisier information than the former.*

Combining the insights from the two alternative setups we formulate our fourth hypothesis: *Insiders (the incumbent government or in-state politicians) are <u>more</u> optimistic about the probability of compliance than outsiders (political opposition or out-of-state politicians) if insiders are either overconfident or if under the noisy information hypothesis insiders consider compliance with the fiscal rule more likely than non-compliance. Insiders are <u>less</u> optimistic about compliance than outsiders only under the noisy information hypothesis and if insiders believe compliance is less likely than non-compliance. (Hypothesis 4: H4).* It is the latter case which allows us to distinguish the two alternative hypotheses empirically. Looking at states with on average low expectations regarding compliance, the finding that insiders are more optimistic than outsiders favors the overconfidence explanation.

3. Institutional and survey details
3.1. Germany's federal system and the constitutional debt brake

Before we introduce the survey we provide a brief introduction to Germany's electoral, political and fiscal system (for a more detailed description of the German party and electoral system the reader is referred to Roberts, 1988, and Poguntke, 1994).

<u>Democracy.</u> Germany is a parliamentary democracy with two chambers at the federal level: the lower chamber called *Bundestag*, which is elected by all citizens, and the upper chamber called *Bundesrat*, which represents the 16 German states. The debt brake was approved in 2009 by more than the required 2/3 majority in both chambers in order to change the constitution. At the state level, there exists only one chamber like the lower

chamber at the federal level. We surveyed members of these state parliaments, called MSP henceforth.

Fiscal Federalism. The German state features three government layers with partly over-lapping areas of policy responsibility: (1) the federal level, (2) the states, and (3) the municipal level. Tax autonomy at the state level is relatively low. Revenues are equalized to a significant degree across states and in addition through vertical tax sharing. Differences in state revenues per capita are reduced via a fiscal equalization system. Through the large degree of revenue sharing the German federal system is closer to being an example of cooperative fiscal federalism rather than competitive federalism (Braun, 2007).

Fiscal Rules. The fiscal rule is the German debt brake ("*Schuldenbremse*"), which became part of the German constitution ("*Grundgesetz*") in 2009. The new constitutional rule requires the federal government to run a (cyclically adjusted) budget deficit of no more than 0.35% of GDP starting in 2016 (see Bundesministerium der Finanzen, 2009 for a detailed description). For German states ("*Länder*") the new rule is more stringent and requires them to run a (cyclically adjusted) zero deficit from 2020 onwards. For the states, no specific path of deficit reduction is defined. However, five states (Berlin, Bre-men, Saarland, Saxony-Anhalt und Schleswig-Holstein) receive "consolidation aids" amounting to a total of €800 million annually until 2019. In return they are required to reduce their 2010 budget deficit in equal steps until 2020. As a reaction to the new national constitutional rule, several states have introduced own rules echoing or even sharpening the national rule (for a survey see Ciaglia and Heinemann, 2013).

Enforcement. The Stability Council ("*Stabilitätsrat*") has the task to detect budgetary emergencies at the federal and state level and to check compliance with the Fiscal Compact. It represents the federal ministers of finance and economics as well as all state finance ministers. The Council is not allowed to impose monetary sanctions directly. In the case of the five states receiving consolidation aids, the Council is entitled to withhold aids in case of non-compliance. Non-monetary sanctions for all states originate from the possible publicity of the Stability Council's statements or from political costs materializing if a state budget is ruled as unconstitutional by the Federal Constitutional Court.

Economic Performance. Fiscal and economic situations of states are highly diverse (Table 1): GDP per capita in Hamburg, for example, is more than twice as large as in most eastern states. Debt to state GDP is particularly high for the city states of Berlin and

Bremen (both above 60%). Often high debt levels go hand in hand with large projected fiscal adjustments, as identified by the German Council of Economic Advisors' calculation of consolidation need. One explanation for the nevertheless fairly positive credit ratings is that bailout expectations exist. The last column of Table 1 provides an index for the stringency of individual states' fiscal rules (Ciaglia and Heinemann, 2013), which takes account of the rule's contents and precision, legal basis and enforcement.

Table 1: Economic and fiscal indicators

	Population 2011 (in millions)	GDP per capita 2011 (in thousands of €)	Total debt to GDP ratio 2011 (in %)	Need for Consolidation 2011-2020 (in % of GDP)	Bond Rating 2012[a]	Index of stringency of state debt rule
Federal Government	81.84	44.02	49.79[e]	-	AAA[d,e]	
Baden-Württemberg	10.79	34.89	17.16	0.10	AAA[d]	0.62
Bavaria	12.60	35.44	6.79	-0.60	AAA[d]	0.48
Berlin	3.50	28.95	61.64	3.50	Aa1[c]	0.65
Brandenburg	2.50	22.08	35.77	2.10	Aa1[c]	0.51
Bremen	0.66	42.39	73.63	3.40	-	0.64
Hamburg	1.80	52.49	26.86	0.30	-	0.47
Hesse	6.09	37.51	17.28	1.30	AA[d]	0.50
Mecklenburg-West Pomerania	1.63	21.40	29.11	1.70	-	0.46
Lower Saxony	7.91	28.35	25.42	1.30	-	0.55
North Rhine-Westphalia	17.84	31.88	33.22	1.60	AA-[d]	0.45
Rhineland-Palatinate	4.00	28.31	32.49	1.80	AAA[b]	0.69
Saarland	1.01	30.10	41.83	2.80	-	0.70
Saxony	4.14	22.98	9.99	0.60	AAA[d]	0.76
Saxony-Anhalt	2.31	22.43	39.84	2.50	AA+[d]	0.77
Schleswig-Holstein	2.84	25.95	38.57	1.30	AAA[b]	0.77
Thuringia	2.22	21.66	35.04	2.30	AAA[b]	0.66

Notes: [a] from http://www.welt.de/finanzen/article107267058/Bundeslaender-profitieren-von-Deutschland-Bonds.html last access on 23 July 2013; [b] Fitch; [c] Moody's; [d] S&P, [e] referring to federal level alone, not to aggregate for Germany. Need for consolidation is taken from Sachverständigenrat (2011) and is based on the average budget deficits from 2007 to 2010. It indicates the extent of consolidation necessary to comply with the debt brake by 2020. For that purpose, it takes account for pension obligations and the reduction of transfers from the federal level (Special Purpose Grants) which will both come into effect until 2020. The Index of stringency of the debt rule is normalized between 0 and 1, where higher values indicate a more stringent debt rule (Ciaglia and Heinemann, 2013).

3.2. The survey among members of state parliaments

Our survey was sent to all 1861 members of the 16 German state parliaments during a period of 14 months in 2011 and 2012. Surveys were conducted approximately at mid-term of an electoral cycle. 639 politicians participated in the survey which resulted in a response rate of 34%. This is a reasonably high rate compared to other surveys among members of parliaments with response rates between 20 and 30% in most cases (for regional parliaments see André et al., 2014; for national parliaments see André et al., 2015). Response rates differ along state and party affiliation (Table 2). Possible concerns about the effect of different response rates are dealt with in the econometric analysis below.

Table 2: Response rates and survey waves

	Number of MSPs	Number of responses	Response rate	Survey wave[a]	Last state election before survey
Overall	1861	639	34.34%		
Baden-Württemberg	138	77	55.80%	3	3/2011
Bavaria	187	75	40.11%	1	9/2008
Berlin	149	30	20.13%	3	9/2011
Brandenburg	88	19	21.59%	1	9/2009
Bremen	83	18	21.69%	3	5/2011
Hamburg	124	39	31.45%	2	2/2011
Hesse	114	50	43.86%	2	1/2009
Mecklenburg-West Pomerania	71	17	23.94%	3	9/2011
Lower Saxony	152	54	35.53%	1	1/2008
North Rhine-Westphalia	181	51	28.18%	2	5/2010
Rhineland-Palatinate	101	50	49.50%	3	3/2011
Saarland	51	20	39.22%	1	8/2009
Saxony	133	45	33.83%	2	8/2009
Saxony-Anhalt	106	47	44.79%	2	3/2011
Schleswig-Holstein	95	29	30.53%	1	9/2009
Thuringia	88	36	40.91%	1	8/2009

Notes: [a] The first wave (1) took place in March and April 2011, the second wave (2) took place in December 2011 and January 2012, and the third wave (3) took place in April and May 2012.

The survey was non-anonymous and we are able to match the survey responses with personal characteristics such as education, committee membership, etc. from public

sources and with state characteristics such as GDP per capita, debt, need for fiscal consolidation, etc. (see Table A1 in the appendix for all variables).

Non-anonymity of responses could lead to untruthful replies. Parliamentarians might be concerned about their perceived loyalty to the own state or official party lines. Fiscal preferences could impact on expectations through a self-serving bias. However, both the survey design and the empirical analysis below substantially reduce the potential resulting bias. In the conduct of our survey, we explicitly guarantee confidential treatment of individual responses. Insofar as the parliamentarians trust this assurance they do not expect that any individual statements become public. In this respect, our confidential survey approach is superior to studies which exploit recorded votes with their unavoidable publicity. Moreover, in the econometric analysis below we take further precautions and explicitly control for several individual characteristics which could drive incentives to hide true expectations (including proxies on debt preferences and the role in government or opposition).

The questionnaire consisted of eight questions covering preferences for revenue autonomy and fiscal equalization, spending preferences as well as questions related to the debt brake (for a full description see Heinemann et al., 2014). For our study, we focus on the following two questions:

Question compliance expectation: *Which of the 16 German states will comply with the constitutional debt brake as of 2020 with high probability?*

Each of the 16 states could be ticked individually or options "*all*" or "*none*" could be chosen.

In a second question, we also asked for the consequences of non-compliance:

Question consequences of non-compliance: *What will happen if German states do not comply with the constitutional debt brake as of 2020? (multiple answers possible)*

o   Constitutional courts (on state and federal levels) will enforce budget consolidation
o   The constitution will be changed so as to relax the debt brake
o   Transfer payments to non-complying states are given, which help to lower the deficit
o   There will be sanctions against non-complying states, e.g. lower transfers within the federal fiscal equalization scheme
o   There will be ordinary legal or constitutional interventions in non-complying states' budget autonomy
o   Merger of states
o   Nothing will happen
o   Other:_____

Figure 1 indicates that the deficit rule's credibility is imperfect and compliance expectations differ remarkably for different states. While Bavaria is seen as an almost certain case of compliance the prospects of the city states of Bremen and Berlin are highly pessimistic. These expectations obviously correlate closely with current consolidation needs and debt levels (see Table 1). Note again that expectations for a particular state i come from legislators in state i and legislators from all other fifteen states $j{\neq}i$. In addition, a strong asymmetry emerges for insider/outsider expectations on financially weak states (see Figure 2): While MSPs from other states are highly skeptical, a large majority of politicians from economically weaker states expect their state to respect the debt brake's zero deficit cap by the year 2020 (see Table OA1 in the online appendix for full information on cross-state expectations).

Figure 1: Expected compliance – average answers with equal weights across states

BB=Brandenburg, BE=Berlin, BW=Baden-Württemberg, BY=Bavaria, HB=Bremen, HE=Hesse, HH=Hamburg, MV=Mecklenburg-West Pomerania, NI=Lower Saxony, NW= North Rhine-Westphalia, RP=Rhineland-Palatinate, SH=Schleswig-Holstein, SL=Saarland, SN=Saxony, ST=Saxony-Anhalt, TH=Thuringia
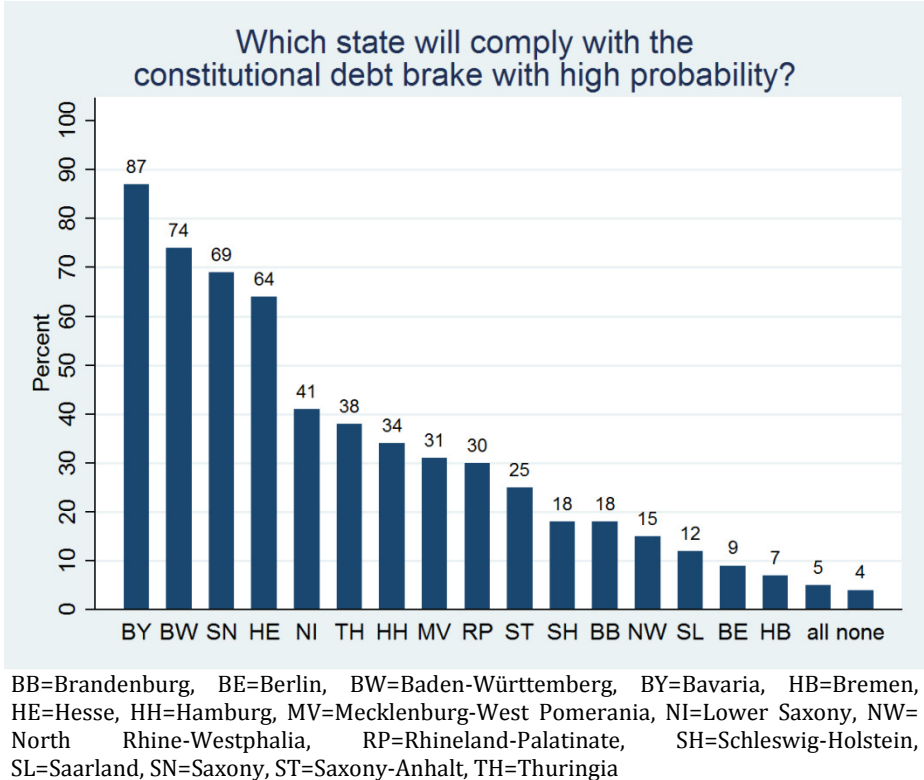
Figure 2: Mean assessment of insiders vs. mean assessment of outsiders
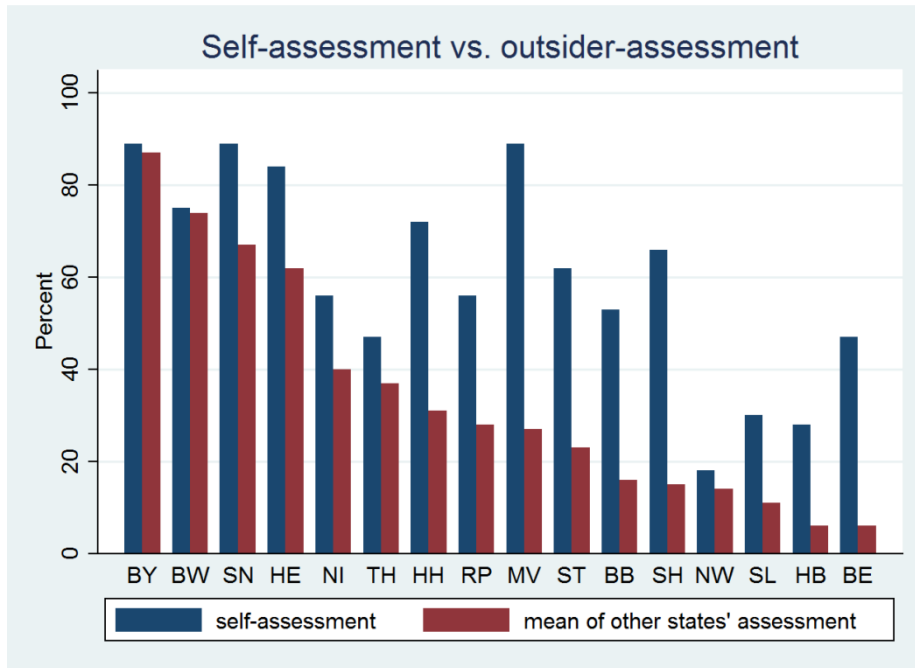
State acronyms: See Figure 1.
Note: the mean assessment of outsiders is just the average answer of outsiders with equal weights across the respective 15 other states (see line "$\emptyset_{15 \text{ other states}}$" in Table OA1 in the online appendix)

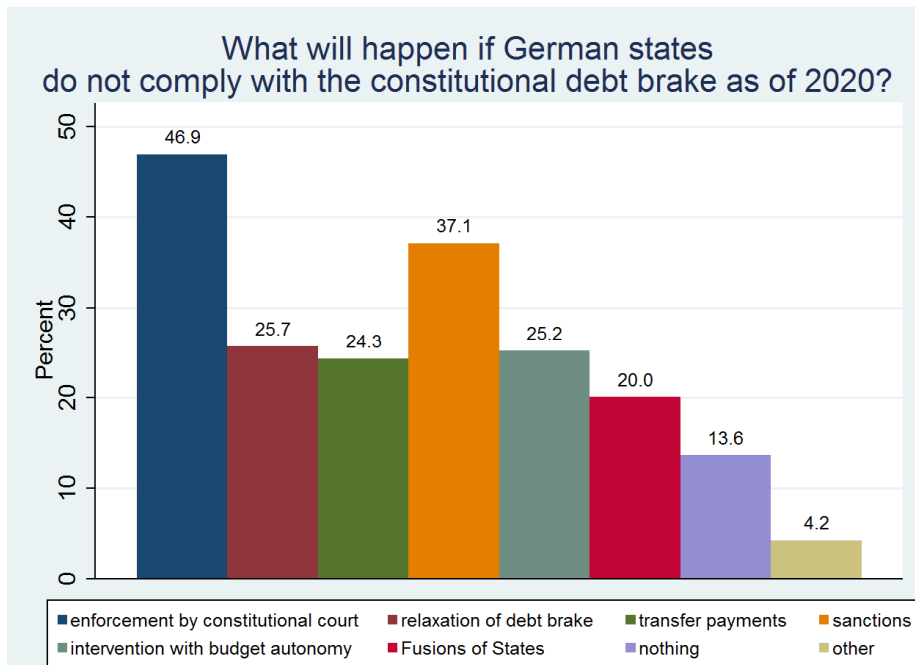**Figure 3:** Expected consequences of non-compliance – multiple answers possible

Figure 3 summarizes the results for the non-compliance question: A significant number of politicians expects a strong role of constitutional courts to enforce consolidation or sanction. However, a large fraction of politicians expect the government budget con-

straint to be soft due to bailout-transfers or a relaxation of the strict debt brake. Overall, these descriptive findings point to the possible relevance of our model's prediction on the role of the initial fiscal situation, bailout expectations or the expected asymmetry between insiders and outsiders. We substantiate the model's explanatory power in the subsequent regression analysis.

4. Regression analyses

Our theoretical model predicts that compliance expectations of politicians should be related to the initial deficit, or more general, the initial economic and fiscal conditions of the state in question (H1), the individual politician's bailout expectations (H2), the existence and characteristics of state rules which complement the national debt brake (H3), and the individual politician's insider/outsider status (due to either asymmetric information or overconfidence on the side of insiders, H4). We cover these four dimensions as follows (for precise variable information see Table A1 in the appendix):

- The state characteristics include GDP per capita and the initial budgetary position, i.e. the average budget deficit over the last three years prior to the survey. To test for the robustness of results we replace the average budget deficit by the need for consolidation or total debt to GDP, respectively. The need for consolidation is taken from the German Council of Economic Advisors (Sachverständigenrat, 2011) and reflects the extent to which states need to consolidate their budgets until 2020 when the debt brake comes into effect.

- For bailout-expectations (H2) we exploit the survey question on the expected consequences of non-compliance (Figure 3). From this question we construct an index which captures the individual perception of the strength of the budget constraint. A larger indicator value represents the perception of a stricter budget constraint and lower bailout-expectations.[7]

- For the existence and stringency of a state rule (H3) we use Ciaglia and Heinemann's (2013) indicator as presented in Table 1.

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[7] Indicator construction is as follows: We add one point if a politician expects one of the "tough" reactions to a state not complying (i.e. "enforcement through constitutional courts", "sanctions", "intervention in budget autonomy" or "merger of states") and subtract one point for each of these reactions which is not expected. Analogously, we subtract one point for each of the expected "soft" reactions to a state not complying (i.e. "change of constitution", "transfers" or "nothing") and add one point for each of these reactions which is not expected.

- The insider-outsider-differentiation (H4) has two dimensions: First, we can distinguish between incumbents as insiders and all others, where "incumbents" are defined as members of one of the governing parties in the respective state. Second, we can compare the expectations for a specific state's compliance between in-state and out-of-state legislators. We include both dimensions in our testing.

We enrich this theory-guided choice of variables through the inclusion of further individual and state controls. A growing empirical literature points to the importance of these variables for economic, monetary and fiscal performance (Besley et al., 2011, Göhlmann and Vaubel, 2007, Moessinger, 2014). We take account of the politician's gender, age, education (tertiary degree, type of degree, such as in business/economics), role in parliament (membership in budget committee) and experience (number of years in parliament). To control for a potential self-serving bias or expressive preferences – meaning that respondents might answer what they would like to be true – we include the answers to two more questions from our survey as controls. First, we use a politician's view on the (unconditional) desirability of her own state's compliance.[8] Second, we account for each politician's preference for fiscal consolidation.[9]

Additionally, we add party dummies to allow for the impact of ideology which might influence expectations since perceptions of economic constraints can be biased by strong ideological positions (see e.g. Heinemann and Janeba, 2011, for the perception of globalization constraints on tax policy).

Among state controls we include a dummy for those states receiving consolidation aid and the extent of fiscal equalization transfers received. These variables cover transfer dependency. Finally, we add a dummy for the political orientation of the incumbent government which allows for the possibility that the incumbent's political orientation has an impact on compliance expectations for the respective state.

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[8] Survey Question: "In 2020, how desirable is it for your Bundesland to comply with the constitutional debt brake?" Answers given on discrete nine point scale ranging from -4 (completely undesirable) to +4 (very desirable).

[9] Survey Question: "Assume that your state's budget exhibits a permanent surplus (after business cycle adjustment). How would you use this surplus?" Answer given by distributing a hypothetical 100 € surplus to different budgetary items such as "higher expenses", "lesser taxes and fees" and "repayment of legacy debt". Here, we use the relative amount allotted to "repayment of legacy debt", which leaves us with a variable ranging from 0 to 100.

4.1 Baseline results

We estimate a probit model with the compliance expectation as dependent variable (dummy equals 1: Politician expects a state to comply with the debt brake as of 2020; 0: expect a state not to comply). Since we have expectations of 639 politicians on 16 states we can exploit a total of up to 10,224 observations depending on the specification. We cluster standard errors for state pairs. Column (1) in Table 3 summarizes our starting point with the full set of control variables. We include fixed effects for MSPs' states of origin to account for the possibility that politicians of particular states may be more or less optimistic in general.

All proxies related to our four hypotheses are highly significant. Signs are in line with the theoretical expectations for the H1-, H2- and H3-related indicators: Compliance expectations for states with unfavorable starting positions (lower GDP per capita or larger deficits) are less optimistic. The belief in bailout transfers or other relaxations of the fiscal rule (lower index for strength of budget constraint) lowers compliance expectations. A stricter state-specific fiscal rule is correlated with a more favorable view for this particular state. Judged on the basis of average marginal effects, the size of the effects is substantial: A one percentage point higher initial average deficit (H1) lowers the probability that this state is expected to be compliant by about 9 percentage points on average. The difference between a very soft (-7) and very hard (+7) perception of the budget constraint (H2) amounts to an impact of 18 percentage points. And the difference between the weakest (0.45) and strongest (0.78) observable state debt rule (H3) is associated with a probability increase of 24 percentage points that a state is predicted to comply.

H4-related proxies are highly significant for both insider-outsider-dimensions: Insiders (members of a state's governing parties/in-state-MSPs) are more optimistic than outsiders (members of opposition parties/out-of-state-MSPs). The size of the effect is much larger for the in-state vs. out-of-state-dimension (21-22 percentage points) than for the government-opposition-distinction (6 percentage points).

Our theoretical analysis suggests, however, that the existence of more optimistic insiders could be due to overconfidence or noisy information. For a distinction, we deepen our econometric analysis by splitting the sample on the basis of compliance expectations

of insiders (Table 4).[10] Specifically, we approximate the theory-based probability of compliance of insiders (p^{ins}) by the average compliance expectation of own-state-politicians, as recorded on the diagonal of Table OA1 in the online appendix. We follow our theoretical model by splitting the sample into states with $p^{ins} < 0.5$ and states with $p^{ins} > 0.5$. Doing this, we end up with one smaller sample of five "pessimistic" states (see column (1) of Table 4) and a larger sample of eleven "optimistic" states (see column (2) of Table 4). We make use of the subsample for "pessimistic" states to distinguish between the two competing theories which can cause insiders to be more confident than outsiders.

The estimated coefficient for the dummy for own-state evaluation remains significantly positive in both subsamples, indicating that even those politicians from pessimistic states are more confident when it comes to the evaluation of their own state. According to our theory, this finding is only consistent with the explanation based on overconfidence, not noisy information. The finding is robust to splitting the sample on the basis of a stricter rule (i.e. $p^{ins} < 0.34$ and $p^{ins} > 0.66$). The own state dummy enters significantly with a positive sign, thereby confirming our H4 hypothesis on overconfidence.[11] Compared to our baseline regressions, most of the other coefficients remain robust in signs and significance in both samples.

The other control variables in column (1) of Table 3 are important to understand the heterogeneity of expectations, as well. The observed education characteristics do not show up significantly. Members of the budget committee view adherence to the debt brake as more difficult. Moreover, a longer parliamentary experience reduces compliance expectation. This finding is not driven by an age effect which is separately controlled for and does not enter significantly in the baseline estimations. Female legislators are significantly more pessimistic than their male colleagues. Party imprint on compliance expectations is moderate: Whereas social democratic politicians seem to be less optimistic than the liberal democrats (i.e. the base category) on average, politicians from the Left Party are significantly more optimistic.

States with a government consisting of right parties (i.e. Christian Democrats and/or FDP) are perceived to have a higher chance of compliance. Consolidation aid does not

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[10] We have to use sample splits because we cannot estimate interaction effects reliably due to the non-linearity of the probit model used.

[11] Results are not shown here but are available upon request.

seem to compensate for the less favorable economic and fiscal conditions of the five related states since the related dummy is significantly negative.

To check for the general validity of our results, we employ various model variants: In column (2) of Table 3 we allow for individual fixed effects. This specification accounts for the risk that omitted individual characteristics may bias the results. No substantial differences in the coefficients to the state characteristics emerge.

4.2 Robustness of regression results

The results presented above are robust with respect to the use of different variables capturing state fiscal conditions (see Table OA2 in the online appendix): Just like the average deficit, the debt stock and the need for consolidation enter highly significantly and with a negative sign. The impact of almost all other variables remains as in the baseline regressions. Only the coefficients to the fiscal equalization transfers change significance and signs across specifications. We believe that this can be explained by the fact that debt is highly correlated with financial equalization transfers[12], whereas the average deficit is not.

A concern about the validity of our data could originate from sample selection. For our survey, Heinemann et al. (2015) have conducted a unit non-response analysis. They make use of data on the personal characteristics for all 1683 legislators, not only those who responded.[13] According to these results, significant drivers of survey participation are: education (degree in economics or business), budget committee membership, membership in government coalition parties and gender. Thus, our regressions comprise as controls those factors which are important drivers of non-response. This greatly reduces the potential for selection bias (Little and Vartivarian, 2005). As a further robustness check, we employ a weighted regression (see Table OA3 in the online appendix). For the weighting, we use the inverse response probability based on party and state affiliation. The essential findings for our four key hypotheses are confirmed. Compared to the non-weighted regression there are only minor changes in the size of average marginal effects.

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[12] The correlation coefficient amounts to 0.76.

[13] We do not face severe item non-response but predominantly unit non-response. Item non-response amounts to less than 1% of respondents and is therefore negligible for the survey at hand.

Table 3: Likelihood of state's compliance – baseline results

Probit regressions with compliance expectation as dependent variable (1: compliance expected, 0: not expected)

Independent Variables	(1) Baseline 1	(1) Average marginal effects	(2) Baseline 2	(2) Average marginal effects
Individual: education				
Tertiary degree	0.006	0.002		
	[0.036]	[0.010]		
Economics/Business degree	0.023	0.006		
	[0.037]	[0.010]		
Individual: parliamentary role				
Member of governing parties in state (H4)	0.207***	0.056***		
	[0.046]	[0.012]		
Member of budget committee	-0.162***	-0.044***		
	[0.039]	[0.010]		
Number of years in parliament	-0.006**	-0.002**		
	[0.002]	[0.001]		
Individual: other demographic variables				
Female	-0.111***	-0.030***		
	[0.032]	[0.009]		
Age in years	0.002	0.001		
	[0.001]	[0.000]		
Individual: preferences and bailout-expectation				
Desirability of own state's unconditional compliance	0.066***	0.018***		
	[0.010]	[0.003]		
Preference for fiscal consolidation (debt reduction)	0.004***	0.001***		
	[0.001]	[0.000]		
Index for perceived strength of budget constraint (H2)	0.046***	0.012***		
	[0.005]	[0.001]		
Individual: party affiliation[a]				
CDU/CSU	-0.111	-0.030		
	[0.068]	[0.018]		
SPD	-0.154**	-0.041**		
	[0.074]	[0.020]		
Green Party	0.091	0.025		
	[0.084]	[0.023]		
Left Party	0.157*	0.042*		
	[0.085]	[0.023]		
Other Parties	-0.115	-0.031		
	[0.113]	[0.031]		
State characteristics[b]				
Average budget deficit over last three years (H1)	-0.326***	-0.088***	-0.567***	-0.098***
	[0.033]	[0.009]	[0.050]	[0.008]
Debt rule index (H3)	2.730***	0.734***	4.005***	0.691***
	[0.289]	[0.076]	[0.400]	[0.067]
GDP per capita	0.027***	0.007***	0.023***	0.004***
	[0.005]	[0.001]	[0.007]	[0.001]
Dummy for consolidation assistance	-0.718***	-0.193***	-1.074***	-0.185***
	[0.089]	[0.023]	[0.128]	[0.022]
Fiscal equalization transfers to GDP	-0.356***	-0.096***	-0.719***	-0.124***
	[0.051]	[0.013]	[0.091]	[0.015]
Government coalition consists of right parties	0.589***	0.158***	0.788***	0.136***
	[0.072]	[0.019]	[0.096]	[0.016]
Cross state dimension:				
Own state (H4)	0.801***	0.215***	1.213***	0.209***
	[0.105]	[0.028]	[0.174]	[0.029]
Home state fixed effects	✓	✓		
Person fixed effects			✓	✓
Regression diagnostics:				
Observations	10,208		10,224	
Pseudo-R^2	0.257		0.519	
p-value joint significance of all variables	0.000		0.000	
p-value joint significance of all individual variables	0.000		n.a.	
p-value joint significance of party-dummies	0.000		n.a.	
p-value joint significance of state characteristics	0.000		0.000	

*Notes: */**/*** denote significance at the 10%/5%/1% level; Standard errors in brackets; [a] base category is the market oriented liberal demo-cratic party "FDP"; [b] State characteristics are 2010 data for survey waves 1 and 2, which both took place in 2011, and 2011 data for survey wave 3, which took place in 2012.*

Table 4: Likelihood of state's compliance – check H4: sample splits by table OA1

Probit regressions with compliance expectation as dependent variable (1: compliance expected, 0: not expected)

Independent Variables	(1) $p^{ins} < 0.5$ Baseline 1 for BE, HB, NW, SL, TH	Average marginal effects	(2) $p^{ins} > 0.5$ Baseline 1 for BB, BW, BY, HE, HH, MV, NI, RP, SH, SN, ST	Average marginal effects
Individual: education				
Tertiary degree	0.124* [0.074]	0.022* [0.013]	-0.036 [0.042]	-0.010 [0.012]
Economics/Business degree	-0.211*** [0.081]	-0.038*** [0.015]	0.091** [0.044]	0.027** [0.013]
Individual: parliamentary role				
Member of governing parties in state (H4)	0.201** [0.099]	0.036** [0.018]	0.217*** [0.056]	0.063*** [0.016]
Member of budget committee	-0.176** [0.083]	-0.032** [0.015]	-0.164*** [0.046]	-0.048*** [0.013]
Number of years in parliament	-0.011** [0.005]	-0.002** [0.001]	-0.005* [0.003]	-0.001* [0.001]
Individual: other demographic variables				
Female	-0.268*** [0.072]	-0.048*** [0.013]	-0.069* [0.036]	-0.020* [0.011]
Age in years	0.003 [0.004]	0.001 [0.001]	0.002 [0.002]	0.001 [0.000]
Individual: preferences and bailout-expectation				
Desirability of own state's unconditional compliance	0.049*** [0.019]	0.009*** [0.003]	0.073*** [0.013]	0.021*** [0.004]
Preference for fiscal consolidation (debt reduction)	0.004*** [0.001]	0.001*** [0.000]	0.004*** [0.001]	0.001*** [0.000]
Index for perceived strength of budget constraint (H2)	0.062*** [0.011]	0.011*** [0.002]	0.043*** [0.006]	0.013*** [0.002]
Individual: party affiliation[a]				
CDU/CSU	-0.129 [0.156]	-0.023 [0.028]	-0.111 [0.078]	-0.032 [0.023]
SPD	-0.330* [0.176]	-0.059* [0.032]	-0.112 [0.086]	-0.032 [0.025]
Green Party	0.093 [0.161]	0.017 [0.029]	0.089 [0.106]	0.026 [0.031]
Left Party	0.165 [0.179]	0.030 [0.032]	0.149 [0.098]	0.043 [0.029]
Other Parties	-0.156 [0.202]	-0.028 [0.036]	-0.119 [0.140]	-0.035 [0.041]
State characteristics[b]				
Average budget deficit over last three years (H1)	-0.059 [0.201]	-0.011 [0.036]	-0.627*** [0.044]	-0.182*** [0.011]
Debt rule index (H3)	4.120** [1.719]	0.741** [0.310]	2.509*** [0.293]	0.728*** [0.082]
GDP per capita	0.010 [0.025]	0.002 [0.005]	-0.004 [0.004]	-0.001 [0.001]
Dummy for consolidation assistance	-1.155*** [0.204]	-0.208*** [0.036]	-0.695*** [0.094]	-0.202*** [0.027]
Fiscal equalization transfers to GDP	-0.047 [0.124]	-0.008 [0.022]	-0.901*** [0.062]	-0.261*** [0.016]
Government coalition consists of right parties	0.069 [0.299]	0.012 [0.054]	0.277*** [0.057]	0.080*** [0.016]
Cross state dimension				
Own state (H4)	0.491*** [0.132]	0.088*** [0.024]	0.902*** [0.110]	0.262*** [0.031]
Home state fixed effects	✓	✓	✓	✓
Regression diagnostics:				
Observations	3,190		7,018	
Pseudo-R²	0.204		0.245	
p-value joint significance of all variables	0.000		0.000	
p-value joint significance of all individual variables	0.000		0.000	
p-value joint significance of party-dummies	0.001		0.007	
p-value joint significance of state controls	0.000		0.000	

Notes: */**/*** denote significance at the 10%/5%/1% level; Standard errors in brackets; [a] base category is the market oriented liberal demo-cratic party "FDP"; [b] State characteristics are 2010 data for survey waves 1 and 2, which both took place in 2011, and 2011 data for survey wave 3, which took place in 2012. BB=Brandenburg, BE=Berlin, BW=Baden-Württemberg, BY=Bavaria, HB=Bremen, HE=Hesse, HH=Hamburg, MV=Mecklenburg-West Pomerania, NI=Lower Saxony, NW= North Rhine-Westphalia, RP=Rhineland-Palatinate, SH=Schleswig-Holstein, SL=Saarland, SN=Saxony, ST=Saxony-Anhalt, TH=Thuringia.

5. Conclusion

In this paper we have argued that an effective fiscal rule should impact on the expectations and beliefs of those politicians who decide on the government budget. Our study of the debt brake in Germany reveals an imperfect credibility of the fiscal rule and points to highly heterogeneous expectations with respect to sub-national compliance.

We see a key finding in the asymmetric expectations of insiders and outsiders, both for the government vs. opposition and the in-state vs. out-of-state dimensions. This result might be considered unproblematic, if the governing parties and politicians in the state under consideration were better informed and therefore more trustworthy in their judgments than outsiders. Our empirical findings based on a theoretical model point into a different direction, however. Insiders (in-state politicians, members from governing coalition parties) are more optimistic than outsiders and are likely to be subject to an overconfidence bias. Our theoretical analysis suggests that overconfidence tends to have a self-fulfilling effect. Overconfident insiders underestimate the size of future fiscal shocks (and resulting adjustment costs) and therefore see the benefits from compliance in better reach than outsiders. This in turn creates a larger incentive to consolidate from the beginning. Overconfidence may thus increase the probability of compliance.

Our analysis allows us to draw two tentative conclusions that should be taken into account in the design of fiscal rules also in the European context. First, a weak initial fiscal situation is a burden for rule credibility from the perspective of actual policy makers themselves. This corresponds to the empirical observation that fiscal rules are often introduced subsequent to a phase of successful consolidation in order to lock in earlier adjustment efforts (IMF, 2009). Otherwise, the phasing-in of a new rule should be paralleled by attempts to remove or at least reduce the problem of unsustainable budgetary legacies such as high initial debt. Second, sub-national rules are a helpful complement to a national rule in a federal context like Germany where states have substantial spending and deficit autonomy. This points to the potential credibility effects of consistent and mutually reinforcing fiscal rules across different layers of government in general. It is a question for further research whether the experience from the German case also applies in Europe, for example, for the emerging parallelism of rules at the European Union level (Stability and Growth Pact) and the national level (induced by the European Fiscal Compact).

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Appendix

Table A1: Individual and State Variables

Variable	Unit	Explanations
Individual: education		
Tertiary degree	Dummy	Degree from university or polytechnic
Economics/Business degree	Dummy	Tertiary education in business or economics
Individual: parliamentary role		
Member of governing parties in state	Dummy	Member of one of the ruling parties
Member of budget committee	Dummy	Deals with state government budget
Number of years in parliament	Discrete	Calculated as 2011/2012 minus year of parliament entry (interruptions taken into account)
Individual: other demographic variables		
Female	Dummy	Member of parliament is female
Age in years	Discrete	Calculated as 2011/2012 minus year of birth
Individual: preferences and bailout-expectation		
Desirability of own state's unconditional compliance	Discrete	Survey Question: "In 2020, how desirable is it for your Bundesland to comply with the constitutional Debt Brake?" Answers given on discrete nine point scale ranging from -4 (completely undesirable) to +4 (very desirable)
Preference for fiscal consolidation (debt reduction)	Continuous	Survey Question: "Assume that your state's budget exhibits a permanent surplus (after business cycle adjustment). How would you use this surplus?" Answer given by distributing a hypothetical 100 € surplus to different budgetary items such as "higher expenses", "lesser taxes and fees" and "repayment of legacy debt". This variable uses the relative amount allotted to "repayment of legacy debt" and thus ranges from 0 to 100.
Index for perceived strength of budget constraint	Discrete	Measure ranging from -7 to +7, with higher values indicating a higher expectation of the debt brake being enforced in case of non-compliance, see footnote 3
Individual: party affiliation		
CDU/CSU	Dummy	Member of Christian Democratic or Christian Social Party, center-right party
FDP	Dummy	Member of Free Democratic Party, most market oriented party favoring small government and low taxes
Green Party	Dummy	Member of Green Party, center-left with focus on environmental issues
Left Party	Dummy	Member of Left Party (not included into regressions since it serves as base category), uniting former communists in East Germany and disappointed Social Democrats from the left wing
SPD	Dummy	Member of Social Democratic Party, center-left party
Other	Dummy	Member of other Party
State characteristics		
GDP per capita	Continuous	Gross domestic product per capita, in thousands of Euros, *source:* German Statistical Office
Need for consolidation	Continuous	In % of GDP, consolidation needed to comply with debt brake by the year 2020, *source:* Sachverständigenrat (2011)
Total debt to GDP	Continuous	Total debt divided by gross domestic product, in %, *source:*

		German Statistical Office
Three year average budget deficit to GDP	Continuous	Weighted average of the last three budget deficits (weights: first lag: 0.5, second lag: 0.3, third lag: 0.2) divided by gross domestic product, in %, *source:* German Statistical Office
Index of stringency of state debt rule	Continuous	Normalized between 0 and 1, larger values indicating stricter rule, *source*: Ciaglia and Heinemann (2013)
Dummy for consolidation assistance	Dummy	Takes the value of 1 for states receiving consolidation assistance
Fiscal equalization transfers to total spending	Continuous	Total net intra-state transfer payments divided by total spending, in %, *sources:* Federal Ministry of Finance, German Statistical Office
Government coalition consists of right parties	Dummy	Takes the value of 1 for a purely right-leaning government (coalition), a value of 0.5 for a mixed government coalition and a value of 0 for a purely left-leaning government (coalition)

Cross state dimension

Distance	Continuous	Distance in 100 km between any two state capital cities
Adjacency	Dummy	Takes on the value of 1 if the home state of the respondent and the state to be evaluated share a common border (and if the state to be evaluated is the home state of the respondent)
Own state	Dummy	Takes on the value of 1 if the state to be evaluated it the home state of the respondent

Further Material for Online Appendix

Fiscal Rules and Compliance Expectations –
Evidence for the German Debt Brake

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Table OA1: Cross-state compliance expectations

		BB	BE	BW	BY	HB	HE	HH	MV	NI	NW	RP	SH	SL	SN	ST	TH	Ø
								Evaluated states										
Evaluating states	BB	53	5	68	89	0	58	53	11	37	16	32	5	11	68	16	37	35
	BE	27	47	83	87	13	80	50	43	60	23	37	27	23	70	40	63	48
	BW	5	0	75	94	1	58	22	16	17	9	19	8	4	71	5	19	27
	BY	3	3	59	89	3	53	21	4	25	5	17	7	4	61	5	32	24
	HB	28	17	83	89	28	72	44	44	67	28	44	22	22	72	44	39	47
	HE	16	8	62	82	8	84	32	24	40	16	22	14	14	64	22	38	34
	HH	26	13	77	79	5	67	72	36	49	21	41	13	8	59	26	33	39
	MV	11	6	78	83	6	59	44	89	28	6	18	6	11	83	17	33	36
	NI	4	0	74	91	2	57	24	19	56	11	26	11	6	54	20	26	30
	NW	8	6	69	84	2	55	12	25	47	18	31	12	6	63	22	33	31
	RP	18	4	80	82	8	68	32	24	40	18	56	16	8	68	26	44	37
	SH	10	7	66	86	10	55	17	24	38	10	21	66	10	52	28	31	33
	SL	25	10	95	100	10	85	50	25	55	15	35	25	30	60	30	40	43
	SN	11	0	67	80	2	42	11	29	20	0	13	4	0	89	16	42	27
	ST	28	7	79	86	10	55	31	48	38	17	31	21	21	76	62	48	41
	TH	22	11	67	97	11	69	22	31	47	19	33	28	11	89	28	47	40
$\emptyset_{\text{MSP}}$		15	7	72	87	6	62	30	26	38	13	28	15	9	68	22	36	
$\emptyset_{\text{State}}$		18	9	74	87	7	64	34	31	41	15	30	18	12	69	25	38	
$\emptyset_{\text{15 other states}}$		16	6	74	87	6	62	31	27	40	14	28	15	11	67	23	37	
# of times where outsiders are more optimistic than insiders		0	0	7	5	0	1	0	0	2	5	0	0	0	0	0	2	

Note: Figures are in percent and indicate the share of MSPs who expect that the evaluated state will be compliant. $\emptyset_{\text{MSP}}$ indicates the average over all MSPs. $\emptyset_{\text{State}}$ indicates the unweighted average over the state figures. $\emptyset_{\text{15 other states}}$ indicates the unweighted average over all states except the evaluated state.

Table OA2: Likelihood of state's compliance – robustness checks 1
(alternative variables for H1)

Probit regressions with compliance expectation as dependent variable (1: compliance expected, 0: not expected)

Independent Variables	(1) Baseline 1 (with total debt)	Average marginal effects	(2) Baseline 1 (with budget deficit)	Average marginal effects
Individidual: education				
Tertiary degree	0.006 [0.036]	0.001 [0.010]	0.004 [0.036]	0.001 [0.010]
Economics/Business degree	0.024 [0.038]	0.006 [0.010]	0.025 [0.037]	0.007 [0.010]
Individual: parliamentary role				
Member of governing parties in state (H4)	0.198*** [0.045]	0.052*** [0.012]	0.211*** [0.045]	0.056*** [0.012]
Member of budget committee	-0.164*** [0.039]	-0.044*** [0.010]	-0.163*** [0.039]	-0.044*** [0.010]
Number of years in parliament	-0.006** [0.002]	-0.002** [0.001]	-0.006** [0.002]	-0.002** [0.001]
Individual: other demographic variables				
Female	-0.111*** [0.032]	-0.029*** [0.009]	-0.110*** [0.032]	-0.029*** [0.008]
Age in years	0.002 [0.001]	0.001 [0.000]	0.002 [0.001]	0.001 [0.000]
Individual: preferences and bailout-expectation				
Desirability of own state's unconditional compliance	0.068*** [0.011]	0.018*** [0.003]	0.067*** [0.010]	0.018*** [0.003]
Preference for fiscal consolidation (debt reduction)	0.004*** [0.001]	0.001*** [0.000]	0.004*** [0.001]	0.001*** [0.000]
Index for perceived strength of budget constraint (H2)	0.046*** [0.005]	0.012*** [0.001]	0.046*** [0.005]	0.012*** [0.001]
Individual: party affiliation[a]				
CDU/CSU	-0.112 [0.069]	-0.030 [0.018]	-0.112 [0.069]	-0.030 [0.018]
SPD	-0.155** [0.074]	-0.041** [0.020]	-0.156** [0.074]	-0.042** [0.020]
Green Party	0.088 [0.085]	0.023 [0.022]	0.090 [0.084]	0.024 [0.022]
Left Party	0.155* [0.085]	0.041* [0.022]	0.159* [0.084]	0.042* [0.022]
Other Parties	-0.123 [0.115]	-0.033 [0.031]	-0.113 [0.114]	-0.030 [0.030]
State characteristics[b]				
Total debt to GDP (H1)	-0.051*** [0.005]	-0.014*** [0.001]		
Need for consolidation (H1)			-0.402*** [0.047]	-0.108*** [0.012]
Debt rule index (H3)	1.131*** [0.328]	0.299*** [0.087]	1.975*** [0.291]	0.528*** [0.077]
GDP per capita	0.021*** [0.005]	0.006*** [0.001]	0.006 [0.005]	0.002 [0.001]
Dummy for consolidation assistance	-0.152 [0.116]	-0.040 [0.031]	-0.738*** [0.104]	-0.197*** [0.027]
Fiscal equalization transfers to GDP	0.096* [0.054]	0.025* [0.014]	-0.082* [0.048]	-0.022* [0.013]
Government coalition consists of right parties	0.177** [0.077]	0.047** [0.021]	0.591*** [0.073]	0.158*** [0.019]
Cross state dimension				
Own state (H4)	0.789*** [0.089]	0.209*** [0.024]	0.770*** [0.103]	0.206*** [0.027]
Home state fixed effects	✓	✓	✓	✓
Regression diagnostics:				
Observations	10,208		10,208	
Pseudo-R^2	0.266		0.259	
p-value joint significance of all variables	0.000		0.000	
p-value joint significance of all individual variables	0.000		0.000	
p-value joint significance of party-dummies	0.000		0.000	
p-value joint significance of state characteristics	0.000		0.000	

Notes: */**/*** denote significance at the 10%/5%/1% level; Standard errors in brackets; [a] base category is the market oriented liberal democratic party "FDP"; [b] State characteristics are 2010 data for survey waves 1 and 2, which both took place in 2011, and 2011 data for survey wave 3, which took place in 2012.

Table OA3: Likelihood of state's compliance – robustness checks 2
(weighting by inverse response probability based on party and state affiliation)

Probit regressions with compliance expectation as dependent variable (1: compliance expected, 0: not expected)

Independent Variables	(1) Baseline 1 (Weighted regression)	(1) Average marginal effects	(2) Baseline 2 (Weighted regression)	(2) Average marginal effects
Individidual: education				
Tertiary degree	0.011 [0.040]	0.003 [0.011]		
Economics/Business degree	0.050 [0.041]	0.014 [0.011]		
Individual: parliamentary role				
Member of governing parties in state (H4)	0.169*** [0.045]	0.046*** [0.012]		
Member of budget committee	-0.176*** [0.043]	-0.048*** [0.012]		
Number of years in parliament	-0.013*** [0.003]	-0.004*** [0.001]		
Individual: other demographic variables				
Female	-0.126*** [0.036]	-0.035*** [0.010]		
Age in years	0.006*** [0.002]	0.002*** [0.000]		
Individual: preferences and bailout-expectation				
Desirability of own state's unconditional compliance	0.062*** [0.010]	0.017*** [0.003]		
Preference for fiscal consolidation (debt reduction)	0.004*** [0.001]	0.001*** [0.000]		
Index for perceived strength of budget constraint (H2)	0.048*** [0.006]	0.013*** [0.002]		
Individual: party affiliation[a]				
CDU/CSU	-0.125* [0.068]	-0.034* [0.019]		
SPD	-0.239*** [0.074]	-0.065*** [0.020]		
Green Party	0.033 [0.087]	0.009 [0.024]		
Left Party	0.260*** [0.100]	0.071*** [0.027]		
Other Parties	-0.475*** [0.158]	-0.130*** [0.043]		
State characteristics[b]				
Average budget deficit over last three years (H1)	-0.310*** [0.032]	-0.085*** [0.009]	-0.556*** [0.051]	-0.110*** [0.010]
Debt rule index (H3)	2.623*** [0.294]	0.719*** [0.079]	3.929*** [0.408]	0.779*** [0.079]
GDP per capita	0.025*** [0.005]	0.007*** [0.001]	0.023*** [0.007]	0.005*** [0.001]
Dummy for consolidation assistance	-0.693*** [0.086]	-0.190*** [0.023]	-1.044*** [0.129]	-0.207*** [0.025]
Fiscal equalization transfers to GDP	-0.332*** [0.047]	-0.091*** [0.013]	-0.681*** [0.089]	-0.135*** [0.017]
Government coalition consists of right parties	0.598*** [0.071]	0.164*** [0.019]	0.792*** [0.097]	0.157*** [0.019]
Cross state dimension				
Own state (H4)	0.843*** [0.121]	0.231*** [0.033]	1.295*** [0.201]	0.257*** [0.039]
Home state fixed effects	✓	✓		
Person fixed effects			✓	✓
Regression diagnostics:				
Observations	10,208		9,104	
Pseudo-R²	0.249		0.448	
p-value joint significance of all variables	0.000		0.000	
p-value joint significance of all individual variables	0.000		n.a.	
p-value joint significance of party-dummies	0.000		n.a.	
p-value joint significance of state characteristics	0.000		0.000	

Notes: */**/*** denote significance at the 10%/5%/1% level; Standard errors in brackets; [a] base category is the market oriented liberal democratic party "FDP"; [b] State characteristics are 2010 data for survey waves 1 and 2, which both took place in 2011, and 2011 data for survey wave 3, which took place in 2012. Weighting based on inverse response probabilities based on party and state affiliation.