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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 industrialized 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 simple dynamic model in an environment characterized by the lagged implementation of a new rule. Lagged implementation 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 closely 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 government vs opposition dimension), which we attribute to overconfidence rather than noisy information. These results suggest that national fiscal rules can be strengthened through no-bailout rules, sustainable initial fiscal conditions and complementary sub-national rules.

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1. Introduction

Constitutional fiscal rules such as a balanced budget requirement 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 in order to boost public borrower reputation. The Fiscal Compact, accepted by all EU countries except the UK and the Czech Republic in 2012, has been another milestone for the spread of numerical fiscal constraints. The signatory countries commit to the introduction of national debt brakes with well-defined numerical contents (i.e. governments are required to limit structural deficits to a maximum of 0.5% of GDP, and to lower debt levels systematically when exceeding 60% of GDP, European Council, 2011).

A growing literature examines the impact of numerical fiscal rules based on aggregate fiscal performance in different regional contexts. The standard approach is the estimation of cross-section or panel models for the selected jurisdictions and their deficit or debt performance (for the US see Eichengreen and Bayoumi, 1994, Poterba, 1996; for Europe see Debrun, 2000, Lagona and Padovano, 2007, Debrun et al., 2008; for OECD countries see Dahan and Strawczynski, 2010; and for Swiss cantons and municipalities see Feld and Kirchgässner, 2008; Krogstrup and Wälti, 2008). A shortcoming of these highly aggregated approaches is that they do not reveal how fiscal rules impact on the beliefs of fiscal decision makers regarding the credibility of the fiscal rule and hence their expectations for compliance. The present paper aims to fill this hole by examining theoretically and empirically the intermediate step between fiscal rules on the one hand and decision makers' expectations on future fiscal outcomes on the other hand.

A defining characteristic of an effective and credible rule is that it anchors expectations consistent with the rule's constraints. This logic has long been the key for assessing monetary rules. In the monetary context, incentives to generate surprise inflation may undermine the credibility of an inflation rule (Kydland and Prescott, 1977; Barro and Gordon, 1983). Hence, a monetary rule's effectiveness can be assessed by analyzing its impact on inflationary expectations. For fiscal policy, an analogy applies for a deficit rule and its impact on compliance expectations. Due to the political costs of fiscal consolidation, politicians may face incentives not to comply with the deficit rule in the future.

Whether and to what extent the new rule is seen as a binding constraint should be detectable from compliance expectations. This should hold in particular for the expectations of those political actors who take the relevant budgetary decisions. Therefore, the impact of fiscal rules on politicians' expectations offers a natural way to assess the credibility and effectiveness of a new rule-based fiscal regime.

Although the underlying idea is of obvious and fundamental importance, our contribution is the first to study through a survey of politicians to what extent policy makers expect compliance with a new fiscal rule. Thus, it serves to fill a striking gap in the literature on fiscal rules' effectiveness. The approach has a further strength: While studies on the link between rules and observable fiscal performance are only applicable on an ex post-basis (i.e. after many years of experience with an existing rule) our method can be employed ex ante (i.e. once a rule has come into existence but performance data are not yet available). Furthermore, it opens the black box of aggregation and, instead, looks into the impact of a fiscal rule on the (heterogeneous) expectations of those individual politicians who actually take the budgetary decisions.

The institutional context of our analysis is the German debt brake. We explore expectation formation for the members of all German state parliaments regarding an existing fiscal rule that becomes binding only several years from now. The case of Germany's debt brake is of interest for the understanding of fiscal rules more generally and beyond Germany: First, the German government has been a major advocate for establishing the Fiscal Compact in Europe. In fact, in many dimensions the provisions of the Fiscal Compact are similar to that of Germany's debt brake. Therefore, a better understanding of the German debt brake will also be helpful for assessing the Compact's consequences for other EU countries. Second, the German debt brake is characterized by lagged implementation since its binding constraints are phased in over a longer period (for the central level until the year 2016 and for the state level in 2020). Lagged implementation is a frequent strategy to realize far reaching institutional reforms since it helps to overcome reform resistance (see Buchanan, 1994, for a general discussion). At the same time, the transition process raises substantial credibility questions and the German debt brake example offers the opportunity to better understand the general conditions under which lagged implementation can nevertheless be credible.

Our analysis of expectation formation comprises a theoretical and an empirical contribution. First we develop a theoretical model with three periods (labelled 0, 1, 2) describing

the dynamic fiscal decision situation in an environment characterized by phasing in a zero deficit rule. Decisions on deficits are dynamic by nature and imply trade-offs between instant and future political costs from fiscal consolidation. The model's key feature is the existence of a fiscal rule which takes effect only in the future (period 2). A fiscal shock in the near future (period 1) makes compliance with the fiscal rule uncertain when the fiscal rule is not credible. In period 1, the government trades off the benefits and costs of adhering to the fiscal rule. Compliance is more likely the lower is the initial deficit in period 0, the higher is the government's competence in smoothing the fiscal shock, the lower are bailout expectations, the tighter is a fiscal rule at the state level in period 1, and the higher the deficit reduction in period 0. The model also allows us to consider noisy information about a government's ability and overconfidence with respect to compliance with the fiscal rule, which can explain heterogeneous beliefs of politicians. The model thus captures key features of the German debt rule as well as similar institutional innovations elsewhere and guides the empirical analysis.

In a second step, we test these model predictions on the drivers of compliance expectations based on a unique survey of members of all 16 German state parliaments, who have been contacted with a questionnaire relating to the new debt brake. In the survey we elicited responses for the politicians' expectations on the own state complying with the new rule by the year 2020, on other states' compliance, and on the likelihood of sanctions or bailout if a state violates the new rule in 2020. Since the survey was not anonymous, individual characteristics (such as education, party membership, etc.) and state characteristics (such as current fiscal position and future need for fiscal consolidation) can be used to systematically study the determinants of compliance expectations.

The survey shows that the debt brake's credibility is far from perfect. The heterogeneity of compliance expectations in the survey 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 versus out-of-state politicians and the government versus opposition dimension). Insiders tend to be significantly more optimistic than outsiders regarding the likelihood of state's compliance. Based on the guidance of our theoretical model we diagnose overconfidence of insiders (and not noisy information) as driving this asymmetry. These detailed insights improve our understanding on how the credibility of a new national fiscal rule can be strengthened in general. Our

results point to the importance of no-bailout rules, sustainable initial fiscal conditions and complementary sub-national rules.

Our paper is related to various other literatures. A few recent papers analyze theoretically the role of fiscal rules in a political economy framework, such as Azzimonti, Battaglini and Coate (2008). 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 federal context are considered by Goodspeed (2002). Kirchgässner (2002) and Voigt and Blume (2011) examine empirically the effects of fiscal constraints on fiscal outcomes. Expectation effects of fiscal rules with respect to bond market investors play a role for studies which look into the impact of fiscal rules on risk premia of government bonds (Heinemann, Osterloh and Kalb, 2014; Iara and Wolff, 2014). Surveys of politicians 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 the German state of Baden-Württemberg to empirically motivate the spatial structure of local tax competition in a theoretical tax competition model. Heinemann and Osterloh (2013) survey members of the European Parliament regarding the introduction of a minimum tax for companies in the EU in order to disentangle ideological and national preferences of politicians.

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. Section 3 describes our original survey and provides background information on Germany's political and fiscal system and the debt brake. Our main 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 distant future. Political costs of deficit reduction are modeled in a reduced form in order to focus on the likelihood of compliance with the fiscal rule. Lack of government commitment and deficit shocks make compliance non-trivial and uncertain. Specifically, we assume that the economy lasts for three periods, $t = 0,1,2$. The main variable of interest is the government deficit d_t. The initial deficit is given by $d_0 > 0$ and is exogenous from the viewpoint

of the incumbent government in period 0. The fiscal rule (i.e., the debt brake) requires the government to run a balanced budget in period 2. If this target is met (that is, $d_2 \leq 0$), the government obtains payoff u_c (c for compliance). Otherwise the government is noncompliant and obtains payoff u_{nc}. We define $u = u_c - u_{nc}$ as the gross gain from compliance. This dynamic set-up corresponds to the lagged implementation of the German debt brake. Periods 0 and 1 represent the time in which the debt brake has been implemented but not yet taken effect. Period 2, from the perspective of German states, would be the year 2020 in which the zero deficit limit for the German states enters into force.

The government can reduce the deficit in two steps toward the goal by reducing the deficit in periods 0 and 1 by the amounts $r_0 \geq 0$ and $r_1 \geq 0$, respectively. 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 is costly for the government in the period when it takes place because approval ratings of the government or reelection chances are harmed. We focus on the concurrent cost even though the cost of permanent deficit reduction may spill over to future periods. We thus implicitly assume that voters and politicians care mostly about the *change* of the deficit, rather than its level. The cost function for permanently reducing the deficit is c(r) in the period when the adjustment is made, and has the properties c'≥0, c'' > 0, c(0) = 0, and c'(0) = 0. Strict convexity implies that spreading a given deficit reduction over time is efficient, all else being equal.

The deficit in period 1 is a function of the initial deficit d_0 minus the reduction r_0 undertaken in period 0. The deficit d_1 is stochastic due to a shock influencing the deficit in period 1. The shock is labeled s and is drawn from the uniform distribution with support [0,S], where S > 0. The probability density function is thus 1/S. The realized deficit shock is the product of s and an exogenous government competence measure q > 0, which reflects the ability of the government to moderate shocks. Lower levels of q reflect higher ability. When putting these elements together the actual deficit in period 1 is

$$d_1 = d_0 - r_0 + qs. \tag{1}$$

In period 1 the government reduces the deficit further by choosing r_1 so that

$$d_2 = d_1 - r_1. \tag{2}$$

By assumption no shock is assumed to take place in period 2. The government payoff is given by

$$U = -c(r_0) + \delta[v - c(r_1)], \qquad (3)$$

where $v = u_c$ when the government is compliant in period 2, that is $d_2 \leq 0$, and $v = u_{nc}$ when not. Let $\delta \leq 1$ be the discount factor.[1]

2.1 Credible Fiscal Rule

We start with a benchmark situation in which the fiscal rule $d_2 \leq 0$ is credible and the government must comply with it regardless of the realization of the shock in period 1 Therefore deficit reduction in period 1 is $r_1 = d_0 - r_0 + qs$. The expected utility from compliance is then

$$E[U] = -c(r_0) + \delta \left[u_c - \frac{1}{S} \int_0^S c(d_0 - r_0 + qs)\, ds \right], \qquad (4)$$

where we made use of the assumption that shocks are uniformly distributed over the interval [0,S]. The costs of compliance come from the cost of deficit reduction in the first period plus the discounted, probability weighted cost in period 1, which depend on the initial deficit d_0, period 0 deficit reduction r_0, and the magnitude of the realized shock qs.

The government influences the expected utility by choosing r_0, which affects the distribution of deficit reduction costs over time. The optimal first period deficit reduction is found by maximizing (4) with respect to r_0. The optimum $\tilde{r}_0$ is implicitly given by the condition

$$\frac{\delta[c(d_0 - \tilde{r}_0 + qS) - c(d_0 - \tilde{r}_0)]}{qS} = c'(\tilde{r}_0). \qquad (5)$$

Strict convexity of the cost function ensures that the second order condition holds. The right hand side of (5) represents the marginal cost of increasing deficit reduction in period 0. The left hand side captures the marginal benefit of doing so. An increase in period 0 deficit reduction decreases the range of feasible deficits in period 1, which on net saves cost $c(d_0 - \tilde{r}_0 + qS) - c(d_0 - \tilde{r}_0)$.

Inserting the optimal value $\tilde{r}_0$ into (4) gives the maximal utility from compliance with a credible deficit rule and is denoted $U^{cc}(\tilde{r}_0)$. We like to note that there is no guarantee

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[1] We could discount utility in period 2 by δ^2 instead of δ. Doing so would simply rescale the utility level v, without affecting results. We omit the complication in order to save on notation.

that a government is better off compared to not complying with the fiscal rule (the latter is by assumption not a choice, though).

2.2 Lack of commitment

In contrast to the previous section, we now assume that the compliance decision is not forced by a credible rule. The cost of compliance in period 1 may become high if the level of deficit reduction in period 0 is low and/or the realization of the budget shock in period 1 is bad. In such a situation, a government may find it attractive to not comply. We analyze the conditions under which it is in the government's interest to (not) comply with the fiscal target, and if so, how the deficit reduction is distributed over time. For the time being we focus on the political decision maker and her interest in compliance. Later we consider how other individuals (such as opposition politicians or observers from outside of state) assess the likelihood of compliance.

The stochastic nature of the government deficit in period 1 makes it uncertain whether compliance occurs. An important variable in our subsequent analysis is the probability of compliance p. 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 u, government competence q, possible bailout expectations, as well as additional fiscal rules restricting the maximum deficit level in period 1 (prior to the existing fiscal rule in period 2). The lack of commitment requires that we solve the model by backward induction. Note that the gross gain u must be positive for compliance with the fiscal rule to take place with positive probability because deficit reduction is costly.

Period 1.

The binary payoff structure (u_c, u_{nc}) combined with costly deficit reduction implies that we can reduce the government choice set to two options: Either not reaching the deficit goal in period 2 (and therefore not spending any effort, $r_1 = 0$) or just reaching the goal (with the need to set $r_1 = d_1$). The latter dominates the former if

$$c(d_1) \leq u = u_c - u_{nc}, \tag{6}$$

that is, the cost of reducing the deficit to zero is not higher than the gross gain from compliance. Since the cost of deficit reduction c(r) is a monotone function of r, we can invert (6) when it holds with equality, and define a critical level of the period 1 deficit

for compliance to occur, namely, $d_1^* = c^{-1}(u)$. For d_1 less than or equal to d_1^*, the government will choose 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 $d_2 = 0$. The critical level is given by

$$s^* = \frac{d_1^* + r_0 - d_0}{q} = \frac{c^{-1}(u) + r_0 - d_0}{q}. \tag{7}$$

Instead of stating government compliance in terms of period 1 deficit (d_1^*), condition (7) allows us to restate the same decision in terms of the realized value of the shock s: For $s \leq s^*$ the government will be compliant, otherwise not. The threshold level s* is a positive function of the additional gain from compliance and of the deficit reduction in period 0, but depends negatively on initial deficit d_0 and the inverse of government competence q (the latter only under appropriate assumptions made further below). We thus write $s^* = s(r_0; u, d_0, q)$. Note that r_0 is exogenous from the viewpoint of period 1, but endogenous ex ante (unlike the other three variables) and determined in period 0.

Given a uniform probability density function for s we now use (7) to introduce the probability of compliance with the fiscal rule

$$p = \frac{s^*}{S} = \frac{c^{-1}(u) + r_0 - d_0}{qS}. \tag{8}$$

The probability p is the key object for our further analysis and lies between 0 and 1 under suitable assumptions on the size of d_0 and S.[2] It depends on $(r_0; u, d_0, q, S)$. Note in particular that

$$\frac{\partial p}{\partial r_0} = -\frac{\partial p}{\partial d_0} = \frac{1}{qS} > 0, \tag{9}$$

that is, p increases (decreases) with the level of period 0 deficit reduction (initial deficit) and the change is given by the competence weighted probability density of the variable s. More deficit reduction in period 1 makes compliance with the fiscal rule more likely.

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[2] First, we assume that $c^{-1}(u) \geq d_0$, which is sufficient to make s* in (7) nonnegative (because we assume $r_0 \geq 0$). The condition holds, if the initial deficit is not too large relative to the gross gain of compliance. Second, we assume that the maximally possible shock S is sufficiently large so that $s^* \leq S$ always holds. This assumption requires the initial deficit to be large enough.

Period 0.

We now turn to the analysis of period 0, in which the government chooses r_0 and therefore affects the probability of compliance via (9). From the incumbent government's view in period 0 the utility is uncertain due to the shock s. The expected payoff is

$$E[U] = -c(r_0) + \frac{\delta}{S}\left[\int_0^{s^*} (u_c - c(d_0 - r_0 + qs))ds + \int_{s^*}^{S} u_{nc}\, ds\right]$$

$$= -c(r_0) + \delta\left[u_{nc} + pu - \frac{1}{S}\int_0^{s^*} c(d_0 - r_0 + qs)\, ds\right] \qquad (10)$$

The first line shows in square brackets the utility (periods 1 and 2) under compliance and non-compliance, respectively, depending on the realization of the shock s. For low levels of s, s ≤ s*, the government complies in period 1 by deficit reduction leading to d_2 = 0 (the first integral). If s is higher than s*, the government does not comply (the second integral).[3] Rewriting terms, the second line in (10) shows in brackets the same expression as before, now as the sum of the guaranteed utility under non-compliance and the expected gross gain from compliance, minus the cost of deficit reduction in period 1 when s is sufficiently small (s<s*).

First period deficit reduction r_0 affects (10) via the cost of effort in period 0 (the first term in (10)), the probability of realizing the gross gain of compliance p, and the cost of effort in period 2 in the latter case. Recall that the threshold level s* is a function of r_0 via (7) and (9). The derivative of expected utility with respect to r_0 is

$$\frac{dE[U]}{dr_0} = -c'(r_0) + \delta\left[u\frac{dp}{dr_0} - \frac{1}{S}\int_0^{s^*}\frac{dc(d_0 - r_0 + qs)}{dr_0}ds - \frac{1}{S}c(d_0 - r_0 + qs^*)\frac{ds^*}{dr_0}\right]$$

$$= -c'(r_0) + \delta\left[\frac{u - c(d_0 - r_0)}{qS}\right] \qquad (11)$$

Derivative (11) has the following interpretation: An increase in r_0 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 probability of compliance) adjusted for the cost of reducing the deficit by d_0 - r_0. Recall

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[3] This assumes implicitly that d_1 >0, which holds, if r_0<d_0.

that $(qS)^{-1}$ represents the increase in the probability of compliance when r_0 is raised marginally.[4]

Evaluating (11) at two values of r_0 provides additional insight: On the one hand, at $r_0 = 0$ the marginal cost of deficit reduction in period 0 is zero by assumption, and hence the expected utility gain $dE[U]/dr_0$ is positive when the gross gain u is larger than the cost of reducing the original deficit d_0 ($u > c(d_0)$). We make that assumption, which insures that $r_0 \leq 0$ cannot be a solution to (11) (when set equal to zero). At $r_0 = d_0$, on the other hand, the government faces high marginal cost initially, but gains by increasing the probability of compliance $(1/(qS))$ weighted by the gross gain u. We assume $c'(d_0) > \delta u/(qS)$, so that $dE[U]/dr_0 < 0$ at $r_0 = d_0$. Thus a local maximum must obtain in the interval between 0 and d_0. The optimal level of first period deficit reduction $\hat{r}_0$ is found by setting (11) equal to zero, which gives

$$\frac{\delta[u-c(d_0-\hat{r}_0)]}{qS} = c'(\hat{r}_0). \qquad (12)$$

Given our assumptions just made, the second order condition is fulfilled at $r_0 = \hat{r}_0$:

$$-c''(r_0) + \frac{\delta c'(d_0-r_0)}{qS} < 0. \qquad (13)$$

2.3 Results

We now study the effects of exogenous variables on the probability of compliance p, which depends on exogenous model parameters both directly, as shown in (8), but also indirectly via the optimal level of initial deficit reduction r_0, as implicitly defined in (12). The latter is the period 0 *anticipation effect*, whereas the former is the period 1 *compliance incentive effect*.

1. Initial deficit: Differentiation of (12) shows that an increase in the initial deficit d_0 leads to a lower government effort in initial deficit reduction, that is

$$\frac{\partial \hat{r}_0}{\partial d_0} = \frac{c'(d_0-\hat{r}_0)}{[\delta c'(d_0-\hat{r}_0)-qSc''(\hat{r}_0)]} < 0, \qquad (14)$$

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[4] The difference between the optimal deficit reduction under credible and non-credible fiscal rules is twofold. First, the utility gain from compliance u appears in (11) but not in (5) because with a credible rule the government always obtains u_c. Second, the marginal benefit of extending r_0 does not contain the cost term $c(d_1)$ in (11) because an increase in r_0 reduces the cost of deficit reduction for given probability of compliance (p or s* in (10)), but at the same time makes compliance more likely (s* goes up). The two effects cancel out.

which is negative by the second order condition. The probability of compliance p is also lowered by the direct (compliance incentive) effect so that the total effect becomes

$$\frac{\partial p}{\partial d_0} = \frac{1}{qS}\left(\frac{\partial \hat{r}_0}{\partial d_0} - 1\right) < 0. \tag{15}$$

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

2. Bailout expectations: Up to now we did not explicitly address the role of a possible bailout in case of non-compliance with the fiscal rule. Rather we assigned a utility level for the case of non-compliance, assuming it to be lower than in case of compliance. Suppose now that a bailout is possible but less than certain (so non-compliance is worse than compliance in expected terms: $u_{nc} < u_c$), and consider that the probability of a bailout goes up. This affects the government effort in reaching the deficit target. Formally, we capture the bailout probability by interpreting the utility from non-compliance u_{nc} as expected utility, which comprises the utility when no bailout occurs and when it does occur. An increase in the bailout probability thus leads to a higher level of u_{nc}, and thus lower net utility gain u. The comparative statics are

$$\frac{\partial \hat{r}_0}{\partial u} = \frac{-1}{[\delta c'(d_0 - \hat{r}_0) - qSc''(\hat{r}_0)]} > 0, \tag{16}$$

thus lowering the effort in initial deficit reduction. Moreover, a higher bailout utility reduces the probability of compliance because a decrease in u decreases p both directly and indirectly:

$$\frac{\partial p}{\partial u} = \frac{1}{qS}\left(c^{-1'}(u) + \frac{\partial \hat{r}_0}{\partial u}\right) > 0. \tag{17}$$

We conclude that higher bailout expectations make compliance with the balanced budget requirement less likely (Hypothesis 2: H2).

3. *State fiscal rule in period 1*: The fiscal rule under consideration becomes effective in period 2. Some states in Germany have introduced fiscal rules at the state level with constraints becoming effective prior to the national debt brake's crucial year 2020. These state rules are supposed to strengthen the effort and likelihood of compliance. In the present framework we capture this idea by allowing for an additional fiscal rule to be already effective in period 1. We assume that the additional fiscal rule is credible, per-

haps because there is no one to bail out the government within the state. Yet we allow for the possibility that the fiscal rule may be of different strictness. We express the strictness in terms of the maximum feasible deficit that can occur in period 1, $d_0 + qS$. The upper limit of the deficit in period 1 must obey

$$d_1 \leq \bar{d}_1 = \alpha(d_0 + qS). \qquad (18)$$

The parameter α from [0,1] represents the strength of the fiscal rule. The fiscal rule has no bite whatsoever when $\alpha=1$ because no deficit reduction is necessary in period 0 to be compliant with the new rule in period 1. By contrast, $\alpha=0$ means that the government is not allowed to run a government deficit in period 1 regardless of s when the new fiscal rule is credible. This would mandate deficit reduction in period 0 of $d_0 + qS$, thus inducing $d_1 \leq 0$. Lower values of α thus correspond to a tighter fiscal rule in period 1. Using (2) we can reformulate the requirement in (18) in terms of initial deficit reduction:

$$r_0 \geq (1 - \alpha)(d_0 + qS) =: \bar{r}_0. \qquad (19)$$

Note that $\bar{r}_0$ is decreasing in α. A tighter fiscal rule in period 1 requires a higher deficit reduction effort in period 0. Whether the additional fiscal rule has bite depends on the magnitudes of $\bar{r}_0$ and $\hat{r}_0$, where the latter is taken from (12) and represents the optimal choice of initial deficit reduction in the absence of the fiscal rule in period 1. When $\bar{r}_0 > \hat{r}_0$, the new fiscal rule is binding, otherwise it is not. This result has further ramifications for the probability of compliance with the original fiscal rule in period 2. Probability p depends positively on r_0.

We conclude that 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 now the beliefs in government compliance after the decision on period 0 deficit reduction has been taken but before the shock s realizes. We thus focus on the expectations at an interim stage for a given level of r_0. We wish to compare the beliefs in compliance of two types of politicians: the incumbent government or in-state legislatures on the one hand, and opposition politicians or out-of-state politicians on the other hand.

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

which is impossible. This is termed overconfidence. In the present context this could mean that the incumbent government believes its competency to be higher than what the opposition asserts, that is, the government believes to have a lower value of q than what the opposition thinks this value to be. This assumption does not require a statement about the true competence, only that the two beliefs differ. Equation (8) implies immediately that for given r_0 the incumbent's subjective probability of compliance is higher than that of the opposition. This effect is reinforced when period 0 deficit reduction is endogenous. To see this, note that the effect from higher values of q on deficit reduction in period 0 is found by differentiation of (12), assuming that q is the true value:

$$\frac{\partial \hat{r}_0}{\partial q} = \frac{Sc'(\hat{r}_0)}{[\delta c\prime(d_0 - \hat{r}_0) - qSc''(\hat{r}_0)]} < 0, \tag{20}$$

which is negative by the second order condition. The incumbent government is more optimistic about the likelihood of compliance in period 1 and thus undertakes more effort in period 0, which in turn makes compliance more likely.

Alternatively, we may assume that insiders (which may be the incumbent government or in-state legislators) know the government's competence exactly, denoted by q, but outsiders (which may be the opposition or out-of-state politicians) have only a noisy signal about the government's competence. Specifically, we assume that outsiders believe that government competence is q_l with probability z and q_h with probability 1-z such that $E[q] = zq_l + (1-z)q_h = q$. The expected value of the outsiders' subjective belief of government competence equals therefore the true government competence. We now compare the expected compliance of the government by comparing the beliefs of insiders and outsiders, again at an interim stage when r_0 has been set already. The insider's belief is simply

$$p^{ins} = \frac{c^{-1}(u) + r_0 - d_0}{qS}. \tag{21}$$

By contrast, the outsider's expected likelihood of compliance by the government is

$$p^{oot} = z\left[\frac{c^{-1}(u) + r_0 - d_0}{q_l S}\right] + (1 - z)\left[\frac{c^{-1}(u) + r_0 - d_0}{q_h S}\right] \tag{22}$$

$$= p^{ins} q\left[\frac{z}{q_l} + \frac{(1-z)}{q_h}\right].$$

Comparison of (21) and (22) shows that $p^{out} > p^{ins}$. In other words, the outsider believes under noisy information that the government is more likely to comply than the insider.

The intuition comes from the observation that the probability p in (8) is a convex function of q.

We conclude that the outsiders (political opposition or out-of-state politicians) are more optimistic about compliance than insiders (the incumbent or in-state politicians) under noisy information about the incumbent government's competence but less optimistic under overconfidence (Hypothesis 4: H4).

Thus, our model arrives at hypotheses on the heterogeneity of compliance expectations across individual politicians. These hypotheses are derived for a setting where jurisdictions are confronted with an identical fiscal rule, as it is the case for German states and the national debt brake. Our survey among members of German state parliaments offers the basis for testing their relevance.

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).

Democracy. 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 states of Germany and whose members are delegates of state governments. The debt brake was approved in 2009 by more than the 2/3 required 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.

Parties. The number of political parties has some regional variation. We describe the main parties: The Christian Democrats (CDU/CSU) are a centre-right party, which pursues a relatively market oriented policy but which is socially conservative in some states (like Bavaria) and on some policy issues (such as the traditional role of the family). The Social Democratic Party (SPD) is the other major party and represents the center-left (less market oriented than the Christian Democrats, socially progressive and in favor of more intense redistribution than CDU/CSU). The Free Democratic Party (FDP) is the most market oriented party which favors small government and low taxes. On social

issues it is more progressive than the Christian Democrats. The Left Party unites former communists in East Germany (mostly pragmatic) and disappointed Social Democrats from the left wing in West Germany (more ideological). The Green Party is also on the centre-left and pushes for environmental and social reforms with diverse views on economic issues. The party is popular with well-educated individuals from the middle class.

Fiscal Federalism. The German state features three government layers with partly overlapping 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, whose legal foundation is set in Article 106 of the German constitution (*Grundgesetz*), according to which material living conditions should be comparable across German states. 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; for details on equalization and tax sharing see also Heinemann et al., 2013).

Fiscal Rules. The fiscal rule is the German debt brake ("*Schuldenbremse*"), which became part of the German constitution (the "*Grundgesetz*") in 2009. It was motivated by the continuing buildup of public debt across all levels of government since the 1970s. 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 für Finanzen, 2009 for a detailed description). For German states ("*Länder*") the new rule is more stringent and requires them to run a zero deficit (cyclically adjusted). The zero deficit constraint for the states does not become legally effective until the budgetary year 2020. The rule for the federal government is accompanied with a specific plan detailing how the structural deficit shall be reduced between 2011 and 2015 so that the target is reached in 2016. For the states, no specific path exists in general. However, five states (Berlin, Bremen, Saarland, Saxony-Anhalt und Schleswig-Holstein) receive "consolidation aids" in 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 adjusted their state constitutions or state budgetary laws with rules echoing or even sharpeninig the national rule (for a survey see Ciaglia and Heinemann, 2013).

Enforcement. The Stability Council ("*Stabilitätsrat*") has the task to supervise fiscal performance and compliance both at the federal and the state level. It represents the federal ministers for finance and economics as well as all state finance ministers. The Council has relatively little power to enforce fiscal rules and improve fiscal performance because it 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. The lack of comprehensive monetary sanctions and the long transitory period raise serious questions about the new rule's credibility. In addition, the highly diverse fiscal situation of states feeds diverging expectations. Table 1 provides information on key indicators and shows the large difference in economic activity. 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 (an index ranging from -0.6 +3.5, where Berlin and Bremen are near the maximum). In the light of these fiscal performances it is somewhat surprising that credit ratings are fairly positive in all states (all in the A range). One explanation consistent with these observations is that bailout expectations exist. Because these rankings apparently do not reflect the strength of the debt rule at the state level in great detail, the last column of Table 1 provides an index for the stringency of German individual states' fiscal rules as developed by Ciaglia and Heinemann (2013). This index takes account of the rule's contents and precision, legal basis and enforcement.

Table 1: Economic and Fiscal Indicators

	Popula-tion 2011 (in millions)	GDP per capita 2011 (in thousands of €)	Total debt to GDP ratio 2011 (in %)	Need for Consoli-dation 2011-2020 (in % of GDP)	Bond Rating 2012[a]	Index of stringen-cy 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).

Hence, both the legal setting and the fiscal divergence leave ample space for highly het-erogeneous expectations on state compliance which we study through our survey among members of parliament.

3.2. The survey among members of state parliaments

Our survey was sent to all members of the 16 German state parliaments during a period of 14 months in 2011 and 2012. We conducted the survey in three waves in order to make sure that it did not collide with election times (surveys were conducted approximately at mid-term of an electoral cycle). We approached members of parliament by written letters and subsequent follow-up emails. If still unsuccessful, we contacted them by phone. Taken all three waves together 639 politicians finally participated in the survey which resulted in a response rate of 34%. Response rates differ along state and party affiliation. Table 2 provides an overview. 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 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 but politicians were guaranteed confidentiality for individual responses. Thus, we are able to match the survey responses with personal characteristics such as education, committee membership, etc. from public sources (per-

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

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 order to illuminate the expected impact of the debt brake we also asked for the consequences of non-compliance:

Question consequences of non-compliance: *What will happen if German states do <u>not</u> 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 debt rule credibility is imperfect and compliance expectations differ remarkably across states. While Bavaria is seen as an almost certain case of compliance (85% believe it is highly probable) the prospects of the city states of Bremen (3%) and Berlin (4%) are highly pessimistic. These expectations obviously correlate closely with current consolidation needs and debt levels (see Table 1). In addition, a strong asymmetry emerges for insider/outsider expectations on financially weak states (see Figure 2 with the example for Mecklenburg-West Pomerania): 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 zero deficit cap by the year 2020 (see Table A2 in the appendix for full information on cross-state expectations which con-

firms this asymmetry in general). Figure 3 summarizes the results for the non-compliance question: For this scenario, a significant number of politicians expect a strong role of constitutional courts (both from federal and state level) to enforce consolidation or sanction. However, a large fraction of politicians expect the government budget constraint 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.

Figure 1: Compliance across states
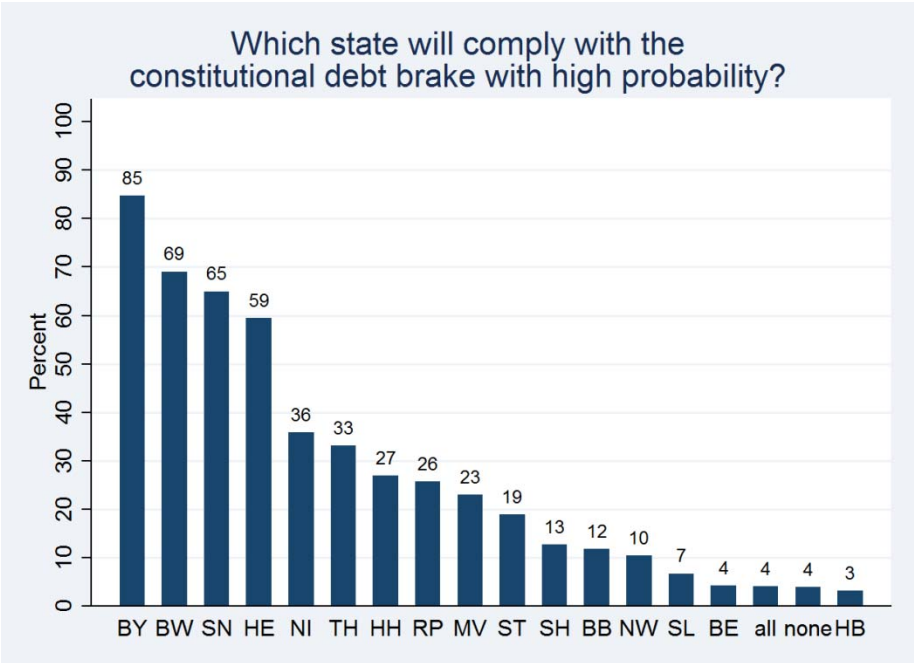
BB=Brandenburg, BE=Berlin, BW=Baden-Württemberg, BY=Bavaria, HB=Bremen, HE=Hesse, HH=Hamburg, MV=Mecklenburg-West Pomerania, NI=Lower Saxony, NW= North Rhine-Westphalia, RP=Rhineland-Palatinate, SH=Schleswig-Holstein, SL=Saarland, SN=Saxony, ST=Saxony-Anhalt, TH=Thuringia

Figure 2: Compliance expectation Mecklenburg-West Pomerania
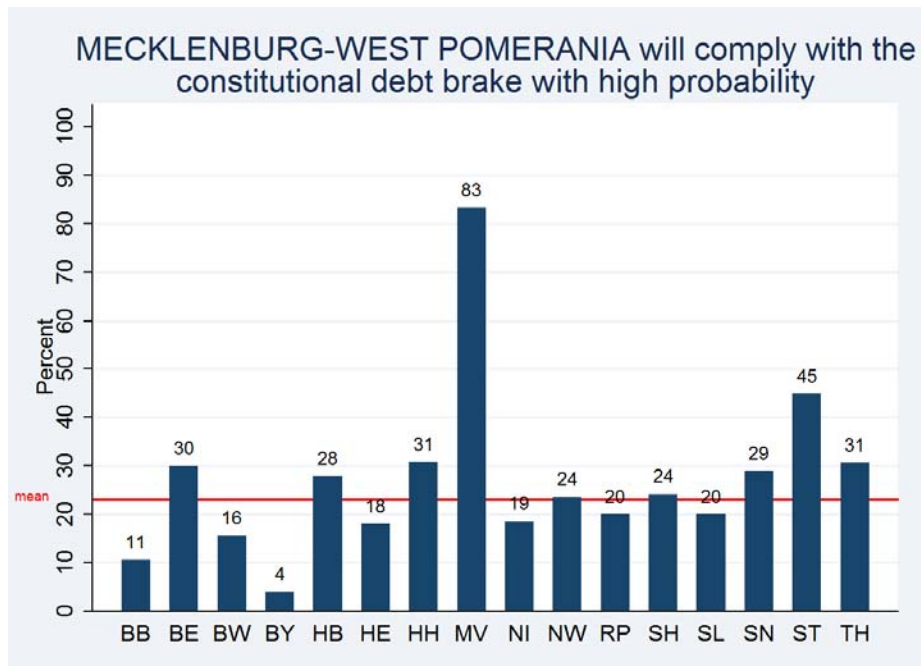
BB=Brandenburg, BE=Berlin, BW=Baden-Württemberg, BY=Bavaria, HB=Bremen, HE=Hesse, HH=Hamburg, MV=Mecklenburg-West Pomerania, NI=Lower Saxony, NW= North Rhine-Westphalia, RP=Rhineland-Palatinate, SH=Schleswig-Holstein, SL=Saarland, SN=Saxony, ST=Saxony-Anhalt, TH=Thuringia

Figure 3: Consequences of Non-Compliance

4. Regression analyses

Our database is sufficiently rich to test whether the predictions from our theoretical model on expectation heterogeneity are consistent with the observable response pattern. Our 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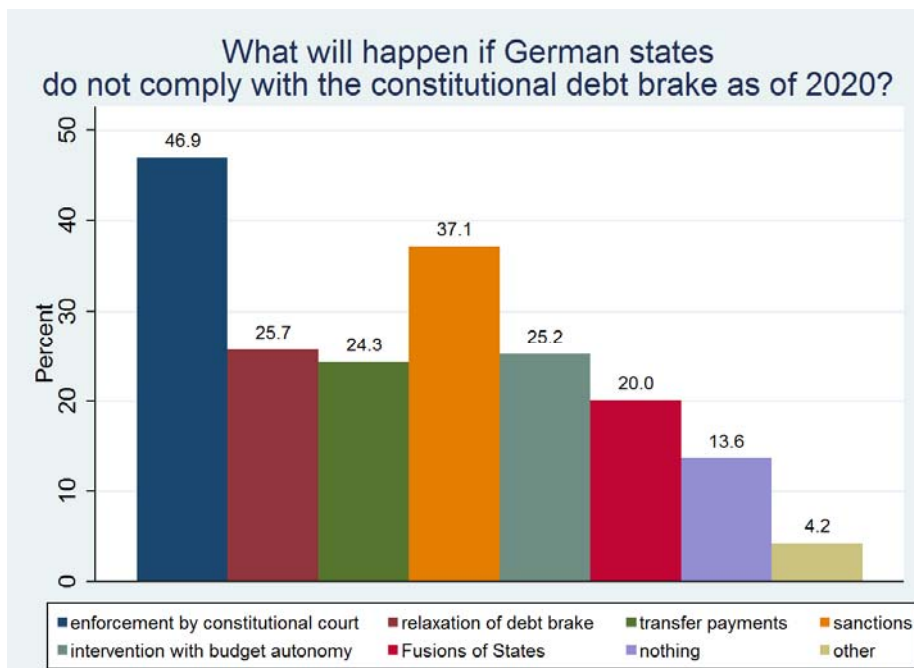 individual politician's bailout expectations (H2), the existence and characteristics of state rules which complement the national debt brake (H3), and the individual politician's insider/outsider status (due to either asymmetric information or overconfidence on the side of incumbents, H4). We cover these four dimensions as follows (for precise variable information see Table A1 in the appendix):

- The state characteristics merged to the politician's responses include GDP per capita and the need for consolidation (see Table 1). The latter gives a comprehensive picture of the current fiscal and economic conditions (H1). 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.[5]

- For the existence and stringency of a state rule (H3) we merge data from Ciaglia and Heinemann (2013) who develop an index for the stringency of German individual states' fiscal rules, which takes account of the rule's contents and precision, legal basis and enforcement.

- 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

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[5] Indicator construction is as follows: We add one point if a politician expects one of the "tough" reactions to a state non-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-non complying (i.e. "change of constitution", "transfers" or "nothing") and add one point for each of these reaction which is not expected.

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 because 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). Inter alia, these variables proxy differences in the individual information level. Furthermore, we add party dummies to allow for the impact of ideology. Ideology might influence expectations since perceptions of economic constraints can be biased by strong ideological positions (see, for example, Heinemann and Janeba, 2011, for the perception of globalization constraint 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.

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 10,224 observations. We cluster standard errors for state pairs. Column (1) in Table 3 summarizes our starting point with the full set of control variables. The results show that compliance expectations are related both to the individual and own state characteristics of respondents. 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 (as it is suggested by the descriptive analysis, see Table A2 in the appendix).

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 ex-

pectations for states with unfavorable starting positions (lower GDP per capita or larger need for consolidation) 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-individual fiscal rule is correlated with a more favorable view for this particular state. The size of the effects is substantial judged on the basis of average marginal effects: A one percentage point increase of a state's consolidation need (H1) lowers the probability that this state is expected to be compliant by about 10 percentage points. The difference between a very soft (-7) and very hard (+7) perception of the budget constraint (H2) amounts to an impact of 24 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 16 percentage points that a state is predicted to comply.[6] H4-related proxies are highly significant for both insider-outsider-dimensions: Insiders (members of parties who form a state's government/in-state-politicians) 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 percentage points) than for the government-opposition-distinction (4 percentage points). In the light of our theory, the positive sign of insider status points to the role of overconfidence as driving insider-outsider-asymmetry. If outsiders had an information disadvantage they should sometimes over- and sometimes underestimate the competence of insiders but not necessarily be systematically more pessimistic than insiders. Therefore, the systematically larger optimism of insiders is consistent with over-confidence rather than with noisy information.

The other control variables 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. Equally, a longer parliamentary experience reduces compliance expectation. This finding is not driven by an age effect which points into the opposite direction with older members being more confident. Female legislators are more pessimistic than their male colleagues. Party imprint on compliance expectations is moderate: For example, there are no significant differences between parties from the opposite ends of the political spec-

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[6] (0.78-0.45)*49 = 16 where 0.78 is the largest observed value of the index and 0.45 is the smallest observed value.

trum (i.e. between the market-liberal FDP and the socialist Left Party).[7] 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 seem to compensate for the less favorable economic and fiscal conditions of the five related states since the related dummy is significantly negative.

We employ various model variants: In column (2) we allow for individual fixed effects.[8] This specification accounts for the risk that unobserved individual characteristics may bias the results for state indicators. No substantial differences emerge. Table 4 takes account of the spatial dimension of our cross-state analysis. In particular, we allow for more differentiated information asymmetries across states. For that purpose, we include two measures of geographic proximity between states: First the distance between the own state's capital and that of the state to be assessed and second a dummy for a common border. The hypothesis is that proximity and a common border matter for mutual information. Again, column (1) includes our full set of individual controls while column (2) replaces them by individual fixed effects. Only the distance indicator is (weakly) significant in the individual fixed effects specifications. Compliance expectations tend to be more optimistic for more distant states than for close neighbors. This is in line with the prediction of the theoretical model with respect to information asymmetries. All other results hardly change, neither in terms of significance nor in the size of marginal effects.

4.2 Robustness of regression results

First, the results presented above are robust with respect to the use of different variables capturing state fiscal conditions (Hypothesis 1). No matter whether we include either a state's total debt stock relative to its GDP or the average budget deficit (over the last three years) relative to GDP instead of the need for consolidation, our above findings are confirmed (see Table A3 in the Appendix). Just like the need for consolidation the debt stock and the average deficit enter highly significantly and with a negative sign. Higher debt or deficits also decrease the compliance expectations of legislators. The impact of almost all other variables remains as in the baseline regressions. The coefficient for GDP per capita becomes significant, thereby providing additional evidence for the

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[7] Weighted regressions, however, indicate that Left Party politicians are more confident that the debt brake will be respected than politicians from the FDP, see below section 4.2.
[8] Due to perfect collinearity of individual and home state fixed effects, we have to exclude the latter in this specification.

validity of a more general formulation of hypothesis 1: The higher the income per inhabitant, the less financially constrained is a state and the higher the probability of compliance. Only the coefficients to the fiscal equalization transfers change significance and signs across specifications. We belief that this can be explained by the fact that debt is highly correlated with financial equalization transfers[9], whereas the average deficit is not.

Second, a concern about the validity of our data could originate from sample selection. For our survey, Heinemann et al. (2013) 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.[10] The non-response analysis identifies variables at the individual and state level that affect politicians' participation decision. 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. Yet, we cannot fully exclude that we might still have a selection bias (Little and Vartivarian, 2005). As a further robustness check, we therefore employ a weighted regression (see Table A4 in the appendix). For the weighting, we use the inverse response probability based on party and state affiliation. The weighted regression slightly changes the findings for party dummies: The Social Democrats dummy loses significance whereas the difference between the Left Party and the Free Democrats now becomes significant. Interestingly, in this regression variant left- leaning politicians are more optimistic than their right-leaning colleagues. The essential findings for our 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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[9] The correlation coefficient amounts to 0.76.
[10] 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 – Results Excluding Geographic Proximity

Probit regressions with compliance expectation as dependent variable (1: compliance expected, 0: not expected)				
	(1)		(2)	
Independent Variables	Baseline 1	Average marginal effects	Baseline 2	Average marginal effects
Individidual: education				
Tertiary degree	0.020 [0.035]	0.006 [0.009]		
Economics/Business degree	0.040 [0.039]	0.011 [0.011]		
Individual: parliamentary role				
Member of governing parties in state (H4)	0.149*** [0.046]	0.040*** [0.013]		
Member of budget committee	-0.150*** [0.039]	-0.041*** [0.011]		
Number of years in parliament	-0.006** [0.002]	-0.002** [0.001]		
Individual: other				
Female	-0.106*** [0.032]	-0.029*** [0.009]		
Age in years	0.002* [0.001]	0.001* [0.000]		
Individual: bailout-expectation				
Index for perceived strength of budget constraint (H2)	0.063*** [0.005]	0.017*** [0.001]		
Individual: party affiliation[a]				
CDU/CSU	-0.112 [0.068]	-0.030 [0.019]		
SPD	-0.181** [0.074]	-0.049** [0.020]		
Green Party	0.050 [0.087]	0.013 [0.024]		
Left Party	0.109 [0.084]	0.030 [0.023]		
Other Parties	-0.109 [0.125]	-0.030 [0.034]		
State characteristics[b]				
GDP per capita (H1)	0.007 [0.005]	0.002 [0.001]	0.005 [0.007]	0.001 [0.001]
Need for consolidation (H1)	-0.386*** [0.048]	-0.105*** [0.013]	-0.541*** [0.063]	-0.098*** [0.011]
Debt rule index (H3)	1.860*** [0.292]	0.506*** [0.079]	2.736*** [0.398]	0.497*** [0.072]
Dummy for consolidation assistance	-0.767*** [0.110]	-0.209*** [0.030]	-1.220*** [0.147]	-0.222*** [0.027]
Fiscal equalization transfers to GDP	-0.067 [0.047]	-0.018 [0.013]	-0.151** [0.070]	-0.027** [0.013]
Government coalition consists of right parties	0.605*** [0.074]	0.165*** [0.020]	0.870*** [0.103]	0.158*** [0.018]
Cross state dimension:				
Own state (H4)	0.759*** [0.104]	0.207*** [0.028]	1.121*** [0.169]	0.204*** [0.030]
Distance	--	--	--	--
Adjacency	--	--	--	--
Home state fixed effects	✓	✓		
Person fixed effects			✓	✓
Regression diagnostics:				
Observations	10,224		10,224	
Pseudo-R²	0.243		0.491	
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 controls	0.000		0.000	
p-value joint significance of cross state variables	n.a.		n.a.	

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 4: Likelihood of State's Compliance – Results Including Geographic Proximity

Probit regressions with compliance expectation as dependent variable (1: compliance expected, 0: not expected)				
	(1)		(2)	
Independent Variables	Baseline 1	Average marginal effects	Baseline 2	Average marginal effects
Individidual: education				
Tertiary degree	0.021 [0.035]	0.006 [0.009]		
Economics/Business degree	0.039 [0.039]	0.011 [0.011]		
Individual: parliamentary role				
Member of governing parties in state (H4)	0.148*** [0.046]	0.040*** [0.012]		
Member of budget committee	-0.150*** [0.039]	-0.041*** [0.011]		
Number of years in parliament	-0.006** [0.002]	-0.002** [0.001]		
Individual: other				
Female	-0.105*** [0.032]	-0.029*** [0.009]		
Age in years	0.002* [0.001]	0.001* [0.000]		
Individual: bailout-expectation				
Index for perceived strength of budget constraint (H2)	0.063*** [0.005]	0.017*** [0.001]		
Individual: party affiliation[a]				
CDU/CSU	-0.112 [0.069]	-0.030 [0.019]		
SPD	-0.181** [0.074]	-0.049** [0.020]		
Green Party	0.050 [0.087]	0.014 [0.024]		
Left Party	0.108 [0.084]	0.029 [0.023]		
Other Parties	-0.107 [0.126]	-0.029 [0.034]		
State characteristics[b]				
GDP per capita (H1)	0.007 [0.005]	0.002 [0.001]	0.005 [0.007]	0.001 [0.001]
Need for consolidation (H1)	-0.408*** [0.048]	-0.111*** [0.013]	-0.572*** [0.064]	-0.103*** [0.011]
Debt rule index (H3)	1.806*** [0.286]	0.491*** [0.078]	2.683*** [0.393]	0.485*** [0.071]
Dummy for consolidation assistance	-0.723*** [0.112]	-0.196*** [0.030]	-1.166*** [0.150]	-0.211*** [0.028]
Fiscal equalization transfers to GDP	-0.045 [0.046]	-0.012 [0.012]	-0.116* [0.069]	-0.021* [0.012]
Government coalition consists of right parties	0.582*** [0.071]	0.158*** [0.019]	0.838*** [0.099]	0.151*** [0.017]
Cross state dimension				
Own state (H4)	0.621*** [0.129]	0.169*** [0.035]	0.940*** [0.197]	0.170*** [0.036]
Distance	-0.014 [0.026]	-0.004 [0.007]	-0.010 [0.037]	-0.002 [0.007]
Adjacency	0.133 [0.083]	0.036 [0.022]	0.217* [0.119]	0.039* [0.021]
Home state fixed effects	✓	✓		
Person fixed effects			✓	✓
Regression diagnostics:				
Observations	10,224		10,224	
Pseudo-R²	0.244		0.496	
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 controls	0.000		0.000	
p-value joint significance of cross state variables	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.*

5. Conclusion

Fiscal rules are designed to influence fiscal performance of states. When a fiscal rule is effective, it must impact on the expectations and beliefs of those politicians who decide on the government budget. Our study of the new debt brake in Germany reveals an imperfect credibility of the fiscal rule and points to highly heterogeneous expectations with respect to sub-national compliance.

An essential result relates to the asymmetric expectations of insiders and outsiders. This holds both for the government versus opposition and the in-state versus out-of-state dimension. 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, which could lead to too little consolidation effort. The asymmetry has the potential to undermine a fiscal rule's effectiveness: The prevalent expectation that other jurisdictions might not comply could also weaken the perceived pressure for the own state.

Our analysis allows us to draw a few 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. 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 might be a helpful complement to a national rule in a federal context like Germany where states have substantial spending and deficit autonomy. And third, clear and comprehensive sanctions and consequences in case of non-compliance are important to anchor compliance expectations.

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Appendix A. Tables

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		
Female	Dummy	Member of parliament is female
Age in years	Discrete	Calculated as 2011/2012 minus year of birth
Individual: bailout-expectation		
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
FDP	Dummy	Member of Free Democratic Party
Green Party	Dummy	Member of Green Party
Left Party	Dummy	Member of Left Party (not included into regressions since it serves as base category)
SPD	Dummy	Member of Social Democratic 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 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	Dummy	Takes the value of 1 for states receiving consolidation

<table>
<tr><td>assistance</td><td></td><td>assistance</td></tr>
</table>

assistance		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

Table A2: 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	13	33	70	73	0	67	37	30	47	10	23	13	10	57	27	50	35
	BW	5	0	75	93	1	58	22	16	17	9	19	8	4	71	5	19	26
	BY	3	3	57	89	3	53	21	4	25	5	17	7	4	61	5	32	24
	HB	11	0	67	72	11	56	28	28	50	11	28	6	6	56	28	22	30
	HE	10	2	56	76	2	78	26	18	34	10	16	8	8	58	16	32	28
	HH	21	8	72	74	0	62	67	31	44	15	36	8	3	54	21	28	34
	MV	6	0	72	78	0	53	41	83	24	0	12	0	6	78	12	29	31
	NI	4	0	74	91	2	57	24	19	56	11	26	11	6	54	20	26	30
	NW	6	4	67	82	0	53	10	24	45	16	29	10	4	61	20	31	29
	RP	14	0	76	78	4	64	28	20	36	14	52	12	4	64	22	40	33
	SH	10	7	65	86	10	55	17	24	38	10	21	66	10	52	28	31	33
	SL	20	5	95	100	5	85	45	20	55	10	35	20	30	55	25	35	40
	SN	11	0	67	80	2	42	11	29	20	0	13	4	0	89	16	42	27
	ST	24	3	76	83	7	52	28	45	35	14	28	17	17	72	59	45	38
	TH	22	11	67	97	11	69	22	31	47	19	33	28	11	89	28	47	40
Ø_MSP		12	4	69	85	3	59	27	23	36	10	26	13	7	65	19	33	31
Ø_State		15	5	70	84	4	60	30	27	38	11	26	14	8	65	22	34	32
# of times where outsiders are more optimistic than insiders		0	0	3	4	0	1	0	0	0	1	0	0	0	0	0	1	

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

Table A3: Likelihood of Any State's Compliance – Robustness Checks 1 (alternative variables)

	(1)		(2)	
	Baseline 1 (with total debt)	Average marginal effects	Baseline 1 (with budget deficit)	Average marginal effects
Independent Variables				

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

Independent Variables	Baseline 1 (with total debt)	Average marginal effects	Baseline 1 (with budget deficit)	Average marginal effects
Individidual: education				
Tertiary degree	0.023 [0.035]	0.006 [0.009]	0.023 [0.035]	0.006 [0.010]
Economics/Business degree	0.038 [0.039]	0.010 [0.011]	0.037 [0.039]	0.010 [0.011]
Individual: parliamentary role				
Member of governing parties in state (H4)	0.127*** [0.046]	0.034*** [0.012]	0.106** [0.049]	0.029** [0.013]
Member of budget committee	-0.152*** [0.039]	-0.041*** [0.011]	-0.149*** [0.039]	-0.041*** [0.011]
Number of years in parliament	-0.006*** [0.002]	-0.002*** [0.001]	-0.006*** [0.002]	-0.002*** [0.001]
Individual: other				
Female	-0.105*** [0.033]	-0.028*** [0.009]	-0.106*** [0.032]	-0.029*** [0.009]
Age in years	0.002* [0.001]	0.001* [0.000]	0.002* [0.001]	0.001* [0.000]
Individual: bailout-expectation				
Index for perceived strength of budget constraint (H2)	0.063*** [0.005]	0.017*** [0.001]	0.062*** [0.005]	0.017*** [0.001]
Individual: party affiliation[a]				
CDU/CSU	-0.110 [0.068]	-0.030 [0.018]	-0.103 [0.067]	-0.028 [0.018]
SPD	-0.177** [0.074]	-0.048** [0.020]	-0.167** [0.073]	-0.046** [0.020]
Green Party	0.047 [0.088]	0.013 [0.024]	0.046 [0.087]	0.013 [0.024]
Left Party	0.103 [0.085]	0.028 [0.023]	0.097 [0.085]	0.026 [0.023]
Other Parties	-0.115 [0.128]	-0.031 [0.034]	-0.117 [0.126]	-0.032 [0.034]
State characteristics[b]				
GDP per capita (H1)	0.022*** [0.005]	0.006*** [0.001]	0.027*** [0.005]	0.007*** [0.001]
Total debt to GDP (H1)	-0.053*** [0.005]	-0.014*** [0.001]		
Average budget deficit over last three years (H1)			-0.314*** [0.034]	-0.086*** [0.009]
Debt rule index (H3)	0.896*** [0.324]	0.241*** [0.087]	2.581*** [0.285]	0.706*** [0.077]
Dummy for consolidation assistance	-0.100 [0.117]	-0.027 [0.031]	-0.734*** [0.094]	-0.201*** [0.025]
Fiscal equalization transfers to GDP	0.148*** [0.053]	0.040*** [0.014]	-0.315*** [0.051]	-0.086*** [0.014]
Government coalition consists of right parties	0.145* [0.075]	0.039* [0.020]	0.590*** [0.073]	0.161*** [0.020]
Cross state dimension				
Own state (H4)	0.627*** [0.106]	0.169*** [0.028]	0.731*** [0.129]	0.200*** [0.035]
Distance	-0.015 [0.021]	-0.004 [0.006]	0.011 [0.025]	0.003 [0.007]
Adjacency	0.147** [0.073]	0.040** [0.020]	0.136* [0.083]	0.037* [0.023]
Home state fixed effects	✓	✓	✓	✓
Regression diagnostics:				
Observations	10,224		10,224	
Pseudo-R²	0.253		0.242	
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 controls	0.000		0.000	
p-value joint significance of cross state variables	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 A4: Likelihood of Any State's Compliance – Robustness Checks 2 (Weighting)

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

Independent Variables	(1) Baseline 1 (Weighted regression)	Average marginal effects	(2) Baseline 1 (Weighted regression)	Average marginal effects
Individidual: education				
Tertiary degree	0.008 [0.039]	0.002 [0.011]	0.009 [0.040]	0.002 [0.011]
Economics/Business degree	0.077* [0.042]	0.021* [0.012]	0.076* [0.042]	0.021* [0.012]
Individual: parliamentary role				
Member of governing parties in state (H4)	0.138*** [0.047]	0.038*** [0.013]	0.140*** [0.047]	0.039*** [0.013]
Member of budget committee	-0.140*** [0.041]	-0.039*** [0.011]	-0.140*** [0.041]	-0.039*** [0.011]
Number of years in parliament	-0.015*** [0.003]	-0.004*** [0.001]	-0.015*** [0.003]	-0.004*** [0.001]
Individual: other				
Female	-0.084** [0.036]	-0.023** [0.010]	-0.084** [0.036]	-0.023** [0.010]
Age in years	0.007*** [0.002]	0.002*** [0.001]	0.007*** [0.002]	0.002*** [0.001]
Individual: bailout-expectation				
Index for perceived strength of budget constraint (H2)	0.057*** [0.006]	0.016*** [0.002]	0.057*** [0.006]	0.016*** [0.002]
Individual: party affiliation[a]				
CDU/CSU	0.000 [0.075]	0.000 [0.021]	-0.001 [0.075]	-0.000 [0.021]
SPD	-0.125 [0.082]	-0.035 [0.023]	-0.126 [0.082]	-0.035 [0.023]
Green Party	0.037 [0.097]	0.010 [0.027]	0.037 [0.097]	0.010 [0.027]
Left Party	0.287*** [0.098]	0.080*** [0.027]	0.287*** [0.098]	0.079*** [0.027]
Other Parties	-0.525** [0.204]	-0.146*** [0.057]	-0.523** [0.204]	-0.145** [0.056]
State characteristics[b]				
GDP per capita (H1)	0.004 [0.005]	0.001 [0.001]	0.005 [0.005]	0.001 [0.001]
Need for consolidation (H1)	-0.384*** [0.045]	-0.107*** [0.012]	-0.393*** [0.046]	-0.109*** [0.013]
Debt rule index (H3)	1.770*** [0.286]	0.492*** [0.079]	1.763*** [0.284]	0.489*** [0.078]
Dummy for consolidation assistance	-0.733*** [0.108]	-0.203*** [0.029]	-0.713*** [0.112]	-0.198*** [0.030]
Fiscal equalization transfers to GDP	-0.049 [0.045]	-0.014 [0.012]	-0.034 [0.044]	-0.009 [0.012]
Government coalition consists of right parties	0.578*** [0.072]	0.160*** [0.019]	0.558*** [0.070]	0.155*** [0.019]
Cross state dimension				
Own state (H4)	0.816*** [0.123]	0.227*** [0.034]	0.747*** [0.142]	0.207*** [0.039]
Distance	--	--	0.013 [0.025]	0.003 [0.007]
Adjacency	--	--	0.148* [0.080]	0.041* [0.022]
Home state fixed effects	✓	✓	✓	✓
Regression diagnostics:				
Observations	10,224		10,224	
Pseudo-R²	0.235		0.243	
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 controls	0.000		0.000	
p-value joint significance of cross state variables	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.*