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# DISCUSSION PAPER

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## Transparency and Policy Competi- tion: Experimental Evidence From German Citizens and Politicians

# Transparency and Policy Competition: Experimental Evidence from German Citizens and Politicians\*

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## Abstract

A lack of transparency about policy performance can pose a major obstacle to welfare-enhancing policy competition across jurisdictions. In parallel surveys with German citizens and state parliamentarians, we document that both groups misperceive the performance of their state's education system. Experimentally providing performance information polarizes citizens' political satisfaction between high- and low-performing states and increases their demand for greater transparency of states' educational performance. Parliamentarians' support for the transparency policy is opportunistic: Performance information increases (decreases) policy support in high-performing (low-performing) states. We conclude that increasing the public salience of educational performance information may incentivize politicians to implement welfare-enhancing reforms.

Keywords: yardstick competition, beliefs, information, citizens, politicians, survey experiment

JEL classification: H11, I28, D83

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## 1. Introduction

Providing citizens with comparative information on policy outcomes of different jurisdictions is an often-vaunted strategy to reward efficient public service provision and facilitate welfare-improving policy innovations. To evaluate the performance of their own political representatives, citizens can use observable policy outcomes of similar jurisdictions as a benchmark (e.g., Besley and Case, 1995a; Revelli, 2006; Revelli and Tovmo, 2007; Terra and Mattos, 2017). Such horizontal comparisons allow citizens to hold politicians accountable for their policy choices, facilitating the selection of high-quality candidates with potentially positive effects on policy outcomes and welfare (e.g., Case, 1993; Besley and Case, 1995b; Congleton, 2007). Importantly, a necessary condition for subnational policy competition's ability to improve welfare is that citizens have access to information about policy outcomes to form sufficiently accurate beliefs about policy performance. This requires transparency regarding policy outcomes both in terms of availability and comparability of relevant information. There is, however, mounting evidence from various countries that the electorate is largely misinformed about policy outcomes in many areas (e.g., Gilens, 2001; Alesina et al., 2020; Nyhan, 2020; Haaland et al., forthcoming). Misperceptions exist not only for policy outcomes at the national level and in comparison to other countries (e.g., Fehr et al., 2022), but also for outcomes at subnational levels, regarding, e.g., costs of living across US cities (Giaccobasso et al., 2022), property tax rates across US school districts (Bottan and Perez-Truglia, 2022), or local tax rates, COVID-19 infection rates, and regional income levels in Spain (Foremny, 2022; Foremny et al., 2020; Balcells et al., 2015). These information frictions limit the extent to which horizontal competition among political representatives can improve welfare.

Similarly, while politicians are often assumed to be well-informed about government performance (e.g., Besley and Case, 1995b; Seabright, 1996), recent evidence shows that they often have misperceptions about policy outcomes, too (e.g., Lee et al., 2021). We argue that such misperceptions are likely rooted in the insufficient availability of information about policy outcomes, which can undermine effective public service provision because uninformed policy makers may vote for suboptimal policies in parliament. Despite the importance of beliefs about jurisdictions' policy performance in reaping the benefits of subnational policy competition, comparative evidence on these beliefs among citizens and politicians is largely lacking. Moreover, nothing is known about whether providing relative performance information affects citizens' satisfaction with their state's policy, and both groups' demand for transparency-enhancing policies. This is the research gap that we address in this paper.

Existing (observational) datasets do not contain information on citizens' and politicians' beliefs about their jurisdictions' policy performance, let alone exogenous variation in these beliefs. To overcome this identification challenge, we conducted parallel surveys with large samples of the German population and parliamentarians from the 16 German federal states. In the surveys, we first elicited respondents' beliefs about their state's relative policy performance in education, one of the key policy areas for which states are responsible. We then implemented experiments to study how factual performance information affects citizens' satisfaction with their state's education policy, and citizens' and parliamentarians' demand for increased transparency of policy outcomes.

We focus on education policy in Germany, which offers an ideal setting to study (the lack of) subnational policy competition. In Germany, legislative and executive power over public education rests with the 16 federal states, and hence both the design of each state's education system and student performance vary widely from one state to the next (e.g., Lergetporer et al., 2018; Mahler and Koelm, 2019). Competition between education systems at the state level in Germany is hampered by a lack of available information to compare student performance across states. For many years, education authorities have hindered systematic research on impacts of state-specific education initiatives, and the comparability of student performance by denying access to existing performance data and limiting possibilities to collect new data (e.g., Riphahn et al., 2016). The few student-achievement tests that enable state-level comparisons are not suitable for targeted analyses of state-specific education reforms (e.g., owing to the large time gaps between tests), and their results are not prominent in public discussions (see Section 3 for details). Although most citizens consider education to be a very important policy area (e.g., Henderson et al., 2021) and that transparency can increase student achievement (e.g., Morozumi and Tanaka, 2020; Bergbauer et al., forthcoming), a lack of information on student performance may prevent citizens in Germany from making well-founded assessments of their state's educational performance in comparison with other states.

We study experimentally how beliefs about states' educational performance affect citizens' and parliamentarians' attitudes towards education policy. We conducted parallel experiments in a large-scale survey with a representative sample of the German population ( $N > 10,000$ ) and a sample of politicians comprising around 30% of all German state parliamentarians ( $N > 500$ ).

The population survey was conducted online and first elicited respondents' beliefs about their state's performance rank from 1 (best) to 16 (worst) in the most recent student achievement test on mathematical competencies. We then randomly assigned respondents to one of five experimental groups. In the control group, we elicited respondents' satisfaction with their state's

education policy and their support for a proposed transparency policy (i.e., implementing biennial student-achievement tests and publishing their results for state comparisons; see Section 4). Before answering the same outcome questions, respondents in the two information *provision* treatments (*Info provision OWN rank* and *Info provision ALL ranks*) were shown information about their own state's rank or the full ranking of all 16 German federal states, respectively. Reflecting the fact that comparative performance information is often not readily available to citizens, two information *acquisition* treatments were designed to increase the cost of accessing state-ranking information. Instead of providing citizens with the information, we gave respondents in these treatment groups the option of actively retrieving the information by clicking on a link. Treatment *Info acquisition OWN rank* (*Info acquisition ALL ranks*) offered respondents the option to acquire information about their own state's rank (the full ranking of all states). Given that clicking on a link is a low hurdle compared to the efforts needed to obtain comparative state-performance information in practice any difference between the information *acquisition* treatments and the information *provision* treatments should be interpreted as a lower bound estimate for the effects of costly information acquisition.

Following the same structure, the parliamentary survey first elicited parliamentarians' beliefs about their state's ranking in the most recent student-achievement test. We then informed a randomly selected treatment group about their state's ranking in student performance.<sup>1</sup> Subsequently, we elicited all respondents' preferences for the proposed transparency policy of biennial comparative testing. Finally, we elicited how both citizens and parliamentarians perceive each other's preferences for the transparency policy.

We first establish that citizens and parliamentarians misperceive their state's relative student performance. The beliefs of both groups are biased towards the mean: Citizens and parliamentarians in states with above-average (below-average) student performance estimate the rank of their own state to be worse (better) than it actually is. Misperceptions are somewhat more pronounced among citizens than among parliamentarians, which is consistent with assumptions of voter-politician information gaps in theoretical models of public goods provision, such as models of yardstick competition (Besley and Case, 1995b) or government accountability (Seabright, 1996).<sup>2</sup>

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<sup>1</sup> In the parliamentary survey, we implemented only two experimental groups (one control group and one treatment group) because the sample size was smaller compared to the population survey.

<sup>2</sup> Typically, the theoretical political economy literature assumes that politicians are better informed about the production and provision of public goods and services as their true effort is private information and cannot be observed by their respective constituents (e.g., Biglaiser and Mezzetti, 1997; Raff and Wilson, 1997; Iaryczower et al., 2013). However, there are several reasons why politicians might hold biased beliefs despite potentially having better access to information (e.g., about – as in our context – state performance in education) more frequently than the general public. For example, only few politicians engage in debates about a certain topic (like education policy)

Second, we show that the information treatments polarize citizens' satisfaction with their state's education policy. Consistent with theories of politician-electorate interactions (e.g., Lewis-Beck and Stegmaier, 2007), satisfaction depends on the state's educational performance: In the control group, 57.5% of respondents in states with above-average performance are satisfied with their education policy, while satisfaction in average and below-average states is only 42.8% and 39.9%, respectively. Importantly, the information treatments reinforce these differences: Information *provision* increases satisfaction in states with above-average performance by 24.2 (treatment *Info provision OWN rank*) and 27.3 percentage points (treatment *Info provision ALL ranks*). Conversely, the treatments significantly decrease satisfaction by 14.6 to 16.2 percentage points in states with below-average performance. Consistent with information-based updating (e.g., Bleemer and Zafar, 2018), treatment effects are more positive (negative) for those whose prior beliefs were too pessimistic (optimistic) regarding their state's performance. In sum, alleviating citizens' misperceptions regarding their state's relative educational performance further polarizes citizens' satisfaction with their state's education policy. This implies that citizens' ignorance regarding policy outcomes may undermine potential efficiency and welfare gains in public service provision that would be possible through subnational policy competition.

Turning to the information *acquisition* treatments, we next study how increasing the cost burden to acquire state-ranking information mitigates the information effects on citizens' satisfaction. Results demonstrate that the information *acquisition* treatments also polarize citizens' satisfaction with their state's education policy. However, treatment effects are smaller compared to the information *provision* treatments, likely because not all respondents (about 60%) retrieve the information on offer. For citizens in states with above-average and average performance, the treatment effects range from +11.5 to +14.6 percentage points. In below-average performing states, treatment effects are negative at -5.2 (treatment *Info acquisition OWN rank*) and -2.6 percentage points (treatment *Info acquisition ALL ranks*). Thus, information on states' relative performance has a much smaller impact on citizens' satisfaction with their state's education policy when access to information is made more costly.

Third, we study the impact of state-ranking information on citizens' demand for a transparency policy (i.e., implementing biennial student-achievement tests used for state comparison). In the control group, support for the proposal is high at 77.6%, regardless of the education performance of the respondents' state. Treatment *Info provision OWN rank* even increases the share of respondents supporting the transparency policy among those living in

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on a daily basis, for instance because they are members of a committee. For others, performance information may have a similarly low salience as for a typical member of the general public.

above-average and below-average performance states (by 7.1 and 4.8 percentage points, respectively). In a robustness experiment, we show that these results hold when we attach direct political consequences to survey responses to reduce the likelihood that stated preferences are cheap talk (see Section 4.1).

In the parliamentary survey, preferences for the transparency policy are similar to those of citizens: Support for the policy is high, averaging 75.6% with some evidence that support rates are higher in states with lower student performance. Importantly, the impact of the information treatment differs significantly by states' educational performance: Among parliamentarians in the better half of states in terms of student performance, performance information increases support for implementing biennial student-achievement tests by 10.1 percentage points. Most critically, treatment effects are significantly lower by 19.8 percentage points for those in the worse-performing half of German states. While our research design is not intended to identify the ultimate reasons for a lack of transparency in the German education system, these results highlight a plausible information-based impediment to transparency reforms. Namely, that parliamentarians' support for transparency policies crumbles in poorly-performing states once they are confronted with their state's low performance.

Finally, we show that beliefs among citizens and parliamentarians about each other's transparency-policy preferences are asymmetrically misaligned. Parliamentarians have fairly accurate beliefs about their citizens' support for increased transparency. This finding is difficult to reconcile with the hypothesis that transparency of states' educational performance in Germany is low because politicians misperceive citizens' preferences for transparency. In contrast, citizens in the control group greatly underestimate politicians' stated support and believe that only 46.0% of their state's parliamentarians support the transparency policy, while the actual average share is 75.6%. Moreover, citizens expect their parliamentarians to be opportunistic (which aligns with our findings from the parliamentary experiment): State-ranking information in above-average performing states significantly increases citizens' beliefs about the share of parliamentarians who support the transparency policy.

The rest of the paper is structured as follows: Section 2 describes our literature contributions. Section 3 provides a brief summary of education policy in Germany. Section 4 introduces the data and the experimental design. Section 5 presents our results and Section 6 concludes.

## **2. Literature Contributions**

Our paper contributes to several strands of research. It adds to the political economy literature on yardstick competition (see, e.g., Salmon (2019) for an overview and Bordignon et al. (2003),



Revelli (2006), Büttner and von Schwerin (2016), and Terra and Mattos (2017) for empirical analyses of yardstick competition). At the most basic level, we advance this literature by studying citizens' beliefs about their state's policy performance – an important but experimentally understudied aspect of yardstick-competition theory. Our results highlight the importance of providing citizens with accurate state-performance information as a prerequisite for holding politicians accountable, and thus capturing the welfare gains from yardstick competition.

Relatedly, several papers study how the availability of information affects politicians' decisions. For instance, Nielsen (2014) and Avis et al. (2018) show that bureaucrats and politicians are responsive to performance information. Akhmedov and Zhuravskaya (2004), Ferraz and Finan (2008), and Repetto (2018) find that the extent of policy transparency is strongly linked to political outcomes like public spending, budget deficits, or prospects of re-election for incumbent politicians. Hjort et al. (2021) show that informing Brazilian mayors about the effectiveness of policies to enhance tax compliance increases the probability of such policies being implemented. Geys and Sørensen (2018) use a survey experiment to study how politicians change their preferences for school reforms when confronted with local school-performance data. Similarly, Banerjee et al. (2020) experimentally show that local politicians are more responsive to their electorate's preferences when they expect their individual performance data to be disclosed. In sum, while the literature on the role of information and transparency in influencing politicians' behavior is relatively extensive, evidence on the *determinants* of transparency-enhancing reforms is scarce. A small number of descriptive studies examine various correlates with public sector transparency (see, e.g., Alt et al., 2006; Alt and Lassen, 2006; Wehner and de Renzio, 2013; Rodríguez Bolívar et al., 2013). We provide first causal evidence on the determinants of politicians' preferences for increased transparency and show that their transparency preferences for policy outcomes strongly depend on information about their own state's performance.

Our study also adds to the growing economics literature that uses survey experiments to study how information affects public policy preferences in various policy areas (see Haaland et al. (forthcoming) for a review). Examples include Cruces et al. (2013), Alesina et al. (2018), and Fehr et al. (2022) on preferences towards redistribution, Bursztyn (2016) and Lergetporer et al. (2018) on education policy preferences, Haaland and Roth (2020) on attitudes towards immigration, or Blesse and Heinemann (2020) and Roth et al. (2022) on preferences towards state mergers and public debt. We extend this literature by conducting parallel factual-information experiments with citizens *and* politicians and compare how both groups react to factual educational-performance

information.<sup>3</sup> In particular, we study how *relative* performance information (as opposed to absolute information) affects policy satisfaction and transparency preferences, which are crucial in the context of yardstick competition.

Finally, by comparing beliefs among citizens and parliamentarians about each other's support for a proposed transparency policy, we contribute to an emerging literature that studies citizens' and politicians' beliefs about one another. In line with the notion that people often hold biased beliefs about others (e.g., Bursztyn and Yang, 2022), past research has shown that politicians tend to misperceive citizens' policy preferences (e.g., Broockman and Skovron, 2018; Rosenzweig, 2021), and citizens tend to misperceive politicians' policy stances (e.g., Samuels and Zucco, 2014; Grewenig et al., 2020). We document that German state parliamentarians correctly estimate citizens' transparency preferences in the context of German education policy, whereas citizens misperceive parliamentarians' stated preferences. Importantly, we show experimentally that information about policy outcomes affects citizens' beliefs about politicians' preferences. In this regard, our comparative analysis of citizens and parliamentarians contributes to the literature on gaps in attitudes, preferences, and behavior between the public and political elites such as parliamentarians (for a review, see Kertzer, 2020).

### 3. Institutional Background

#### 3.1. Federalism in the German Education System

In Germany, the autonomy of the 16 federal states over their education policies is enshrined in the constitution (*Grundgesetz*). Changes to the *Grundgesetz* require a two thirds majority in both legislative chambers, and are therefore much more rarely attempted than changes in other laws that can be made by majority vote. German states are directly represented in the legislative process as the second chamber of the legislative (*Bundesrat*) and can reject any proposals that threaten their federalist competencies. The federalist structure of education is therefore deeply embedded and well protected in the German context.

As a result, laws to enact education initiatives on the federal level are rarely attempted, rarely successful, and generally fraught with difficulty. This is despite the fact that voluntary cooperation between federal and state level is explicitly permitted in this context based on Articles 91b and 104c of the *Grundgesetz*. A recent example of such a cooperation is the attempt to accelerate the

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<sup>3</sup> In the political-science literature, several studies have conducted parallel experiments with the general public and elites to investigate determinants of elite-public gaps in political behavior (see Kertzer, 2020 for a review). Importantly, only a small subset of these studies leverage parallel *information* experiments (e.g., Arnesen et al., 2021; Christensen and Moynihan, 2020; Baekgaard et al., 2019). These few parallel information experiments do not provide *factual* information as we do, but rather rely on fictitious information or hypothetical effects of the studied policies.

digital transformation of the German education system through the *Digitalpakt*, which was designed as an instrument to make federal funds available for schools to purchase digital equipment, and has suffered from political delay and low take-up (Federal Ministry of Education and Research, 2021). Similarly, laws that are seen as infringing upon states' autonomy to legislate on education policy are heavily contested, and often subject to legal disputes.

In the absence of decision-making competencies at the federal level, the education ministers of the 16 states form the *Kultusministerkonferenz* (KMK), a framework that allows for coordination of education policies across Germany. As the KMK does not have legislative powers of its own, any decisions of the group are non-binding until they have been implemented in state law through the appropriate legislative process in each state. Therefore, the responsibility of education policy lies with the state parliamentarians who we have surveyed for this paper.

As decisions by the KMK rely on the voluntary participation of states, its effectiveness in standardizing education policy across Germany has been limited. One salient example is the initiative to standardize the university entrance qualification (*Abitur*) across states. While there is general agreement that the divergence of standards across states creates inequalities in access to higher education, and recommendations for education standards in key subjects were published as early as 2004, no agreement on fully standardized *Abitur* examinations has been reached to date (KMK, 2022).

As a result, the federal nature of education policy is reflected in the wide differences in the design of education systems across states. States vary in the types of schools that exist and how students are assigned to a particular school track. States also design their own curricula and decide, for example, which subjects they teach, how many lessons they teach in each grade, and how many years of schooling it takes to complete the *Abitur*. In addition, they also have different standards regarding the training and hiring of teachers, with some states offering civil servant status to large shares of their teachers, while others do not. This heterogeneity in education systems gives rise to large differences in students' outcomes. For instance, the share of school graduates that have obtained a university entrance qualification varied between 60.5% and 38.4% across states in 2019 (Federal Statistical Office, 2020).

### **3.2. The Debate on State Comparisons of Student Performance**

The wide variety of state-specific education policies would, in principle, lend itself to studying the effects of a decentralized education system on student achievement and to reaping the benefits of policy competition in the sense of yardstick competition. Such competition encourages states to implement policies observed to be successful in other states and could lead to a productive policy environment raising student achievement throughout Germany. However,

such competition is largely undermined by the lack of comparative student-performance data across states.

Student achievement tests are a standard instrument to monitor the performance of education systems in many countries (Hanushek and Woessmann, 2015). Such tests are not only a necessary prerequisite for evaluating the performance of education systems, they can also have direct positive effects on student performance (Bergbauer et al., forthcoming). In recent decades, large-scale student performance tests like the *Programme for International Student Assessment* (PISA), which tests 15-year olds in mathematics, science, and reading every three years, have been increasingly used to compare educational quality across countries.

The results of the first PISA test in 2000 showed that – contrary to the expectations of many politicians, education practitioners, and journalists – the achievements of German 15-year-olds are only mediocre at an international level. The impact of the first PISA test results on the public debate and education policy in Germany (often called the “PISA-Schock”) was substantial and initiated a set of major education reforms (e.g., Davoli and Entorf, 2018; Sancassani, 2022). As well as the regular PISA test intended for international comparisons, Germany conducted a supplementary study (PISA-E) to analyze educational performance of individual German states. PISA-E was representative at state level and revealed large differences in student performance between states: Comparing German states to other countries, the highest-performing state was just below the international top ten at the level of Sweden, while the lowest-performing state ranked at the bottom of the 31-country list at the performance level of the Russian Federation (FOCUS, 2002; Baumert et al., 2002).<sup>4</sup> These wide performance disparities played an important role in the ensuing policy debates.

Strong political pressure forced low-performing states in particular to act and reform their education system. This effort was not without success (Riphahn et al., 2016). By 2003, the three worst-performing states (Brandenburg, Saxony-Anhalt, and Bremen) all managed to achieve significantly better results in the area of reading competencies, which was the focus of the 2000 PISA test. In contrast, among the top-three performance states, only Saxony (ranked 3<sup>rd</sup> in 2000) was able to achieve a small and significant increase in test results (Prenzel et al., 2005, p. 13). By 2006, the discrepancy between the best- and worst-performing states continued to decrease – a result that is particularly due to improvements in all three worst-performing states from 2000 (Prenzel et al., 2008). These absolute and relative improvements in low-performance states

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<sup>4</sup> In fact, variation in student performance was higher in Germany than in most other OECD countries (KMK, 2002).

strongly suggest that there is significant room for state policy to improve educational outcomes, even within a relatively short time horizon.

While Germany as a country still regularly participates in PISA tests which take place every three years, the state-level study PISA-E was discontinued in 2006 after just three waves and was replaced by the newly-developed student achievement test *IQB Bildungstrend* since 2008/09. The new test was designed to measure whether students reach adequate competence levels defined by the states through the KMK. They are conducted every five years at primary-school level and every three years at lower secondary level; but with alternating emphases in the latter case (languages or mathematics/science). The *IQB Bildungstrend* has been severely criticized by education researchers since the structural break with the previous PISA-E tests and the large intervals between comparable tests of five to six years make targeted analyses of state-specific education reforms impossible (Riphahn et al., 2016).<sup>5</sup>

In addition, the *IQB Bildungstrend* is no longer comparable to other international student achievement tests and is much less salient in the German public debate compared to the PISA test. Appendix Figure A1 documents the relative frequency of Google search requests for the two tests from January to December 2019. The figure shows that the relative number of search requests for “PISA” are much larger than the ones for “IQB” or “Bildungstrend”. In addition, research requests for “PISA” spiked around the release of the PISA results on December 3, 2019, whereas there was no spike in search requests for “IQB” or “Bildungstrend” around the release date of the *IQB Bildungstrend* on October 18, 2019. The KMK has a long history of actively undermining state comparisons of student achievements by denying data access (Woessmann, 2013) or deleting state identifiers from existing datasets (Riphahn et al., 2016). It is therefore not surprising that the official *IQB-Bildungstrend* reports explicitly discourage state comparisons of student achievements (e.g., Stanat et al., 2019, p. 17-18). In this sense, the replacement of PISA-E by the *IQB-Bildungstrend* has led to a substantial reduction in the availability of comparable state-specific performance data.

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<sup>5</sup> Our experiment focuses on students’ math competencies elicited in the 2018 *IQB Bildungstrend* study (see Section 4). The first of these assessments of students’ math competencies took place in 2012 – six years after the last PISA-E study. This time gap makes it difficult to assess dynamics in states’ performance differences from 2006 (when PISA-E ended) to 2012. For the following period from 2012 to 2018, differences in math performance between the best and the worst performing state increased in the *IQB Bildungstrend*, whereas the German average decreased slightly. Similarly, average PISA test scores in mathematics for Germany as a whole decreased from 2012 to 2018 (and from 2006 to 2018). This may be taken as evidence that differences between states continue to be substantial and also economically significant.

## 4. Data, Experimental Design, and Econometric Model

This section describes the survey- and experimental design of the population survey (Section 4.1) and the parliamentary survey (Section 4.2), and introduces our econometric model (Section 4.3).

### 4.1 The Population Survey

Our survey of the general population was fielded as part of the ifo Education Survey, an annual opinion survey on education policy. It covers 10,325 respondents aged between 18 and 69 years, surveyed between June 3 and July 1, 2020 via an online access panel.<sup>6</sup> The sample was drawn to be representative of the German population with regard to gender, age, education, region of residence, and employment status. Respondents answered the survey on a computer or other digital device. Item non-response for the outcome variables is low, well below 1%. Appendix Table A1 presents descriptive statistics on the population sample's sociodemographic characteristics, and political and economic preferences.

To study the effect of performance information on citizens' satisfaction and transparency-policy preferences, we first elicited respondents' prior beliefs about their state's *relative* education performance. Specifically, we asked: "*A recent educational study compared the mathematics performance of 9<sup>th</sup> grade students in the 16 German federal states. What is your best guess on how the students in your state ranked?*". Respondents were encouraged to report a number between 1 and 16, 1 implying their state was the best-performing state in Germany. Moreover, we asked respondents how sure they are that their beliefs are correct. Appendix Figure A2 presents the wording of the population survey questions. We focus on math competency scores because they are (i) easily comparable across different education systems and are (ii) strongly linked to later labor-market success (e.g., Hanushek and Woessmann, 2015).

Second, we randomly assigned respondents to one of four different information treatment groups or a control group. The treatments used information about the relative performance of 9<sup>th</sup> graders in respondents' states on the 2018 *IQB Bildungstrend* assessment in mathematics (Stanat et al., 2019, p. 203). The experiment comprised two information *provision* treatments: Treatment *Info provision OWN rank* provided respondents with information about their own state's rank. Treatment *Info provision ALL ranks* informed them about the full ranking of all 16 states. The difference between the two information provision treatments enables us to ascertain to what

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<sup>6</sup> Data from the ifo Education Survey 2014-2021 are available free of charge for scientific use (see Freundl et al., 2022).

degree respondents' attitudes are influenced not only by the rank of the own state, but also by a comparison to ranks of other (e.g., neighboring) states.

The two remaining treatments featured information *acquisitions* (e.g., Capozza et al., 2021). Respondents in treatments *Info acquisition OWN rank* and *Info acquisition ALL ranks* had the option of actively retrieving the same information provided in the information *provision* treatments by clicking on a link. This design reflects the fact that comparative performance information is often not readily available to citizens, especially in the case of the *IQB Bildungstrend*. Respondents in the control group did not receive any information about state-level student performance, nor did they receive the option to retrieve such information.

Third, we measured citizen's satisfaction with their state's education policy as well as individual preferences for increasing the transparency of states' educational performance.<sup>7</sup> Specifically, we asked respondents how satisfied they are with the education policy in their state on a 5-point Likert scale from "very satisfied", "rather satisfied", "neither satisfied nor unsatisfied", and "rather unsatisfied" to "very dissatisfied".<sup>8</sup> To elicit respondents' preferences for increased performance transparency, we asked whether they favor or oppose the following concrete reform proposal: *Introducing nationwide student achievement tests in all school types, which take place regularly every two years from the 5<sup>th</sup> grade onwards. The average results by state are published to compare student achievements across states.* This policy proposal is based on a suggestion by the Advisory Council of the Federal Ministry for Economic Affairs and Energy, which has criticized the lack of transparency and policy competition in the German education system (see Riphahn et al., 2016, p. 12). Respondents reported their preference on a 5-point Likert scale, ranging from "very in favor", "rather in favor", "neither in favor nor against", and "rather against" to "very against".

A common criticism against eliciting policy preferences using surveys is that stated preferences may be susceptible to reporting bias because they are "cheap talk" in the sense that they have no immediate political consequences (e.g., Carson, 2012; Kling et al., 2012). To test the robustness of our results to attaching political consequences to individual survey responses, we randomly assigned half of all respondents to a treatment group (*Consequential*). Respondents in this treatment group were informed that aggregate survey answers would be passed on to politicians in their state parliament. Respondents then indicated their preferences for the

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<sup>7</sup> Naturally, the survey question on the perceived rank of the own state might prime respondents and affect their stated satisfaction levels. Importantly, respondents in *all* experimental groups – including the control group – answered this question and were thus exposed to potential priming, so priming should not affect the *difference* in outcomes between the control group and the treatment groups.

<sup>8</sup> The neutral option was presented as the last option to minimize error of central tendency.

transparency policy. Following completion of the survey, we informed each of the 126 parliamentarians serving as education-policy spokespersons in the respective state parliament about average public support for the policy proposal. Randomization was carried out independent of the randomization into the information treatments, which allows us to study information-effect heterogeneities by responses' consequentiality (see Lergetporer and Woessmann (2022) for a similar application).

Finally, we elicited respondents' beliefs about the share of state parliamentarians who would support the policy proposal. Respondents were asked to state the share of state parliamentarians who they think "strongly support" or "rather support" the transparency-policy proposal.

## 4.2 The Parliamentary Survey

To complement the population survey, we conducted a parallel survey among all elected members in the 16 German state parliaments. This survey constituted a joint project between ZEW Mannheim and University of Mannheim and was in the field between May 25 and July 31, 2020.<sup>9</sup> Parliamentarians could either participate using a pen and paper questionnaire that was sent to them by postal mail or online via an individualized survey link. Importantly, parliamentarians were assured that their answers would be anonymized and that the data would not enable any conclusions to be drawn about their identity.<sup>10</sup> We contacted all 1,862 parliamentarians and received responses from 557, which yielded a response rate of approximately 30%.<sup>11</sup> Appendix Table A2 documents selection into our sample. We find no selection based on party affiliation, parliamentarians' educational background, or whether they work in the field of education policy. Female parliamentarians and those with longer tenure in parliament are, however, somewhat less likely to participate in the survey. Participation is lower for parliamentarians from states with below-average student performance (column 1 of Appendix Table A2), too, though the coefficient becomes insignificant when controlling for other characteristics (column 4 of Appendix Table A2).

The parliamentary survey followed the same structure as the population survey. First, we elicited parliamentarians' beliefs about their state's relative student performance. Second, we randomly assigned parliamentarians to an information treatment, providing them with information

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<sup>9</sup> The study was conducted as part of the Collaborative Research Center SFB 884 "Political Economy of Reforms". For more details on the survey see Blesse et al. (2021).

<sup>10</sup> To underline the credibility of this statement, reference was made to previous surveys of state parliamentarians concerning different policy areas such as budgetary issues and fiscal rules, conducted by the same institutions and using the same procedure. Results of these surveys are, among others, published in Heinemann et al. (2016) and Heinemann et al. (2021).

<sup>11</sup> For the questions used in this paper, we have at most 520 observations due to item non-response.



about relative student performance. Third, we measured respondents' preferences for the reform proposal to increase transparency of states' educational performance. Finally, we elicited parliamentarians' beliefs regarding the share of respondents in their electorate who favor the reform proposal (see Appendix Figure A3 for the question wordings). Furthermore, we hand collected publicly available background information of all parliamentarians. Appendix Table A3 presents descriptive statistics of our sample of parliamentarians.

We applied the same survey design to the population- and parliamentary survey. However, given the smaller sample size in the parliamentary survey, we only implemented one information provision treatment which informed parliamentarians whether their state is in the better or worse half of states in terms of student performance in the *IQB Bildungstrend 2018*. This is in contrast to the population survey in which the *information provision* and *acquisition* treatments included information about the actual rank of the own state. As a result, the information treatment in the parliamentary survey is somewhat less informative than in the population survey.

Given that the experimental design entails eliciting prior beliefs before providing the factual information, we only administered the information treatment in the online version of the parliamentary survey (where we were able to prevent respondents from going back and revising their answer to the prior-belief question after receiving the information treatment). About two thirds of the participating parliamentarians were surveyed online, forming our experimental parliamentarian sample.

### 4.3 Econometric Model

Owing to the random assignment of respondents to experimental groups in both surveys, the treatment effects can be estimated with the following regression model:

$$y_i = \alpha + \beta'_k \mathbf{Treatment}_{k,i} + \theta' \mathbf{X}_i + \mu_s + \varepsilon_i, \quad (1)$$

where  $y_i$  is the outcome of interest for individual  $i$  and  $\mathbf{Treatment}_{k,i}$  is an indicator of whether respondent  $i$  received treatment  $k$ . In the population survey,  $k \in \{\text{Information provision OWN rank, Information provision ALL ranks, Information acquisition OWN rank, Information acquisition ALL ranks}\}$ ; in the parliamentary survey  $k = \text{Information provision worse/better half}$ . Vector  $\mathbf{X}_i$  contains relevant control variables and  $\mu_s$  represent state fixed effects. We discuss estimation results with and without covariates and state fixed effects. Providing information about state performance should influence political satisfaction and transparency-policy preferences in opposite directions, depending on whether the information shows that the relative performance of a respondent's state is high or low. Therefore, for our main analysis of the population survey, we

estimate Equation (1) separately for three groups of respondents who currently live in states with *above-average*, *average*, or *below-average* student performance using sample splits. This categorization is based on whether student performance in the *IQB Bildungstrend* 2018 of the respective state was statistically significant above or below the German average and is taken from the official *IQB Bildungstrend* report (Stanat et al., 2019). The ranking, scores, standard errors, and classification into the three performance groups is documented in Appendix Table A4.<sup>12</sup>

Throughout our regression analysis of the population survey, we employ survey weights calibrated to match administrative statistics with respect to age, gender, state, educational attainment, municipality size classes, and employment status.

We also estimate interaction models to analyze whether treatment effects differ by specific subgroups of the sample such as respondents whose prior beliefs are too optimistic or too pessimistic regarding the education performance of their own state. For these analyses, we extend the regression model in Equation (1) to:

$$y_i = \alpha + \beta'_k \mathbf{Treatment}_{k,i} + \gamma' \mathbf{Subgroup}_i + \delta'_k \mathbf{Treatment}_{k,i} * \mathbf{Subgroup}_i + \theta' \mathbf{X}_i + \mu_s + \varepsilon_i, \quad (2)$$

where  $\mathbf{Subgroup}_i$  is equal to 1 if respondent  $i$  belongs to the respective subgroup. The treatment effect for non-members of the subgroup is given by  $\beta_k$ , whereas  $\delta_k$  measures the additional treatment effect on the subgroup.

To test whether our randomization was successful, we estimate regressions of different sociodemographic characteristics on the treatment dummies. For the population survey (parliamentary survey) Appendix Table A1 (Appendix Table A3) confirms that random assignment balanced respondents' characteristics across experimental groups.

## 5. Results

This section presents our empirical results. We start by documenting misperceptions about state's educational performance (Section 5.1). We then show how providing citizens with factual performance information affects their satisfaction with their state's education policy (Section 5.2). Section 5.3 studies how performance information affects citizens' and parliamentarians' support for a transparency-enhancing policy proposal, and Section 5.4 studies citizens' and parliamentarians' beliefs about each other's preferences for the transparency policy.

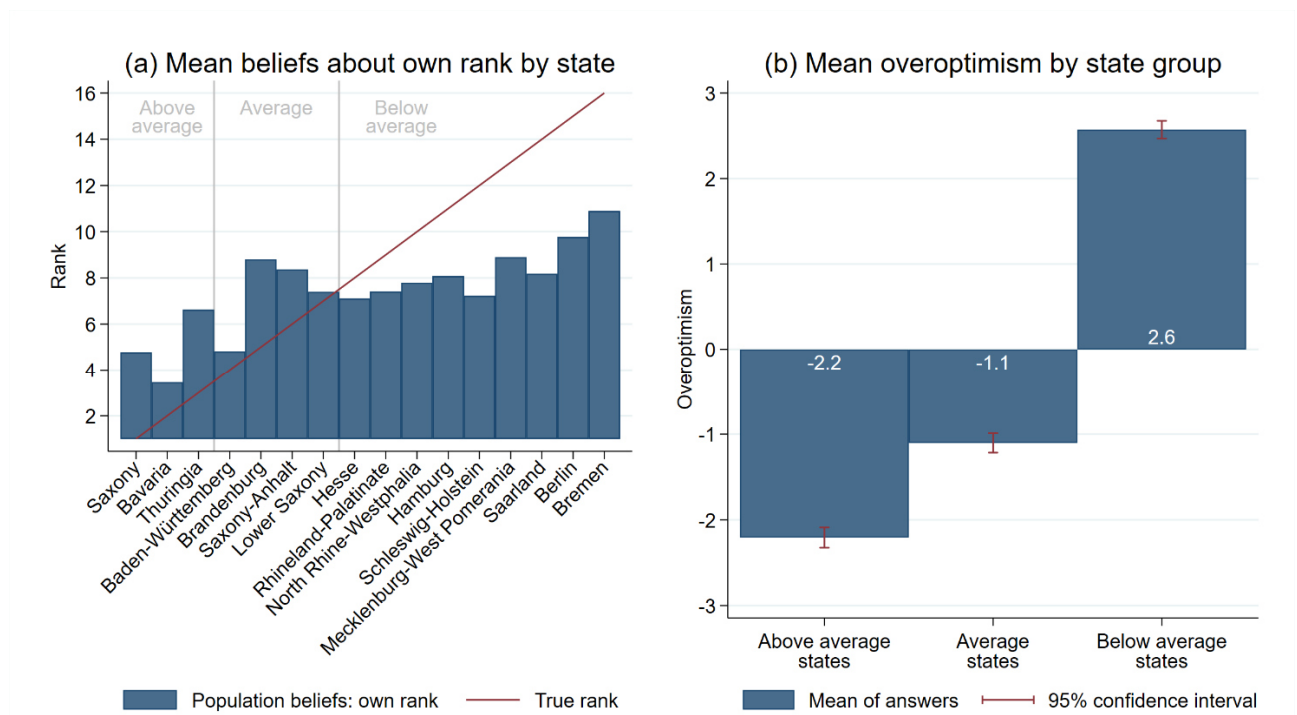
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<sup>12</sup> Note that survey respondents in both surveys were at no point confronted with this performance-based categorization of states, which merely serves us as a simplification for the cleaner presentation of our findings.

## 5.1. Citizens' and Parliamentarians' Misperceptions about Educational Performance

Panel (a) of Figure 1 shows the distribution of citizens' beliefs about their state's performance rank from 1 (best) to 16 (worst). The vertical axis depicts average rank beliefs, while the horizontal axis ranks the individual states according to their actual educational performance of 9<sup>th</sup> graders in mathematics (in the *IQB Bildungstrend* 2018). Thus, the perfect information case is represented by the 45-degree line. As it turns out, participants from above-average performing states are overly pessimistic, i.e., they tend to estimate their state's rank on average 2.2 ranks worse than it actually is (see Panel (b)). Similarly, respondents from average performing states estimate their state's rank 1.1 ranks worse than it actually is. In contrast, citizens from below-average performance states are overly optimistic and estimate their state's rank 2.6 ranks better than it actually is.

**Figure 1: Population beliefs about own state performance in education**



Notes: Panel (b) shows the mean overoptimism (true rank minus respondents' rank estimate) by state group. States are grouped into three categories according to the results of a recent cross-state comparative student test among 9<sup>th</sup> graders in the subject of math (Stanat et al., 2019, p. 203). The categorization into the three performance groups is indicated by the vertical gray lines in Panel (a) of the figure. N=10,313. Data source: ifo Education Survey 2020.

Misperceptions about states' student performance are thus significant and mean beliefs about their own state's rank are particularly far off among low-performance states (see Panel (a) of Figure 1). To illustrate the extent of citizens' misperceptions, we can also calculate the shares of citizens whose beliefs about their state's performance rank would imply a substantial deviation from its true rank position among German states according to these three performance groups. In

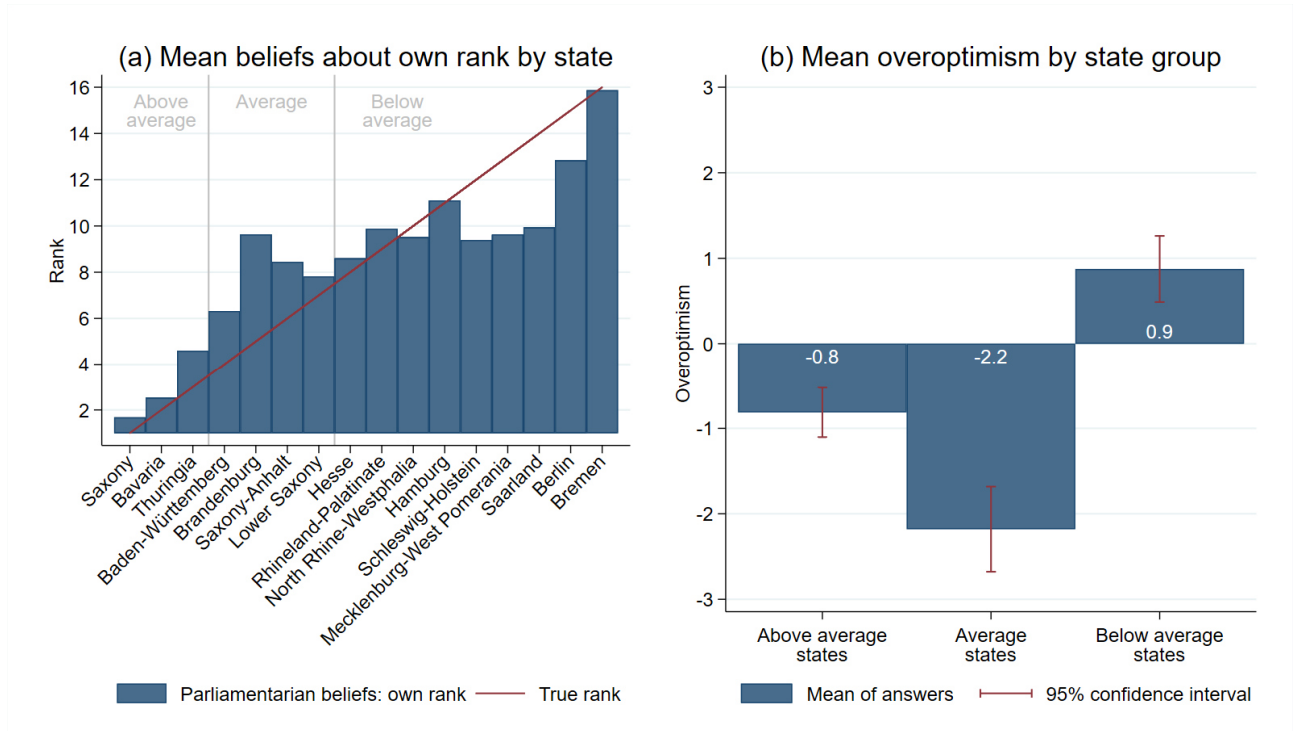
the above-average performing states, 41.1% of respondents are overly pessimistic and believe that student performance in their state is only at the rank-level of average or below-average performance states. Similarly, 46.1% of respondents from below-average performance states are overly optimistic and mistakenly think that their state's performance rank is at the rank-level of average or above-average states. Misperceptions are even higher among respondents from states in the average-performance group, where 62.2% believe that their own state's performance is equivalent to the rank level of above- or below-average states.

Thus, citizens are severely misinformed about their state's educational performance, especially in poorly-performing states. These information gaps limit the extent to which citizens can hold their state politicians accountable: If voters are not sufficiently well-informed about policy outcomes, the performance of other jurisdictions cannot serve as a yardstick for evaluating their own politicians' performance.

Turning to the parliamentary survey, Figure 2 shows that parliamentarians are on average better informed about their state's relative educational performance than citizens. Yet, misperceptions among parliamentarians follow a similar pattern as misperceptions among citizens: Those from above-average performance states estimate their true rank 0.8 ranks worse than the actual rank (compared to 2.2 in the population survey), while those from below-average performing states estimate their state's rank 0.9 ranks better (compared to 2.6 in the population survey). Misperceptions are relatively large among parliamentarians in average performing states: They estimate their rank to be 2.2 ranks worse than it actually is (compared to 1.1 in the population survey). Instead of the mean rank misperceptions, we can again look at the shares of parliamentarians from above-average, average, and below-average performance states whose answers would incorrectly imply that their state is in another performance category. In the parliamentary survey, these shares are 17.2%, 63.3%, and 20.2%, respectively; revealing that misperceptions among parliamentarians are also substantial. Appendix Table A5 provides a complete matrix representation of these misperceptions about states' student performance among both citizens and parliamentarians by the three performance groups.

In the experiment implemented in the parliamentary survey, we consider only two groups of states in terms of their educational performance due to limited sample size: Those in the better half of all states, and those in the worse half. Using these performance categories, 25.2% of parliamentarians from the better half, and 27.2% of parliamentarians from the worse half, have performance beliefs that place their state in the wrong group.

**Figure 2: Parliamentary beliefs about own state performance in education**



Notes: Panel (b) shows the mean overoptimism (true rank minus parliamentarians' rank estimate) by state group. States are grouped into three categories according to the results of a recent cross-state comparative student test among 9<sup>th</sup> graders in the subject of math (Stanat et al., 2019, p. 203). The categorization into the three performance groups is indicated by the vertical gray lines in Panel (a) of the figure. N=515. Data source: ZEW/University Mannheim parliamentary survey 2020.

In sum, we document stark misperceptions among respondents about the educational performance of their own state, especially among citizens. In the next section, we study how correcting these misperceptions through information interventions affects political satisfaction and preferences for increased transparency.

## 5.2. Treatment Effects on Citizens' Satisfaction

Table 1 reports effects of our information treatments on citizens' satisfaction with their state's education policy based on Equation (1).<sup>13</sup> Columns 1, 2 and 3 report results for citizens in states with above-average, average, and below-average performance, respectively. The dependent variable is a binary variable coded 1 if respondents are "very" or "rather" satisfied, 0 otherwise. The control means reveal that respondents' satisfaction with their state's education policy is strongly correlated with a state's actual educational performance: A majority of 57.5% of respondents in states with above-average performance is satisfied with their state's education policy, whereas this only holds for 42.8% of respondents in states with average performance, and for 39.9% with below-average performance. More importantly, our treatments significantly

<sup>13</sup> Results of Table 1 are robust to excluding individual controls and state fixed effects (see Appendix Table A7).

amplify these gaps: The information-*provision* treatments *Info provision OWN rank* and *Info provision ALL ranks* significantly increase satisfaction in states with above-average performance by 24.2 and 27.3 percentage points, respectively. The treatments also increase satisfaction in average-performing states, which is not surprising given that respondents in these federal states tend to be overly pessimistic about their state's rank (see Figure 1). Intriguingly, the treatments significantly decrease satisfaction in states with below-average performance by 14.6 to 16.2 percentage points. Thus, citizens' satisfaction with their state's education policy further diverges when provided with factual information about their state's performance in educating students. The magnitude of effects is similar across information treatments, suggesting that citizens mostly care about their states' relative performance overall, and not the comparison with specific states (e.g., neighboring states).

**Table 1: Treatment effects of relative performance information on citizen satisfaction with state education policy**

State's student performance:	Dependent variable: Satisfaction with education policy		
	Above average (1)	Average (2)	Below average (3)
Info provision OWN rank	0.242*** (0.027)	0.182*** (0.029)	-0.162*** (0.020)
Info provision ALL ranks	0.273*** (0.027)	0.265*** (0.028)	-0.146*** (0.020)
Info acquisition OWN rank	0.115*** (0.030)	0.125*** (0.029)	-0.052** (0.021)
Info acquisition ALL ranks	0.146*** (0.029)	0.128*** (0.029)	-0.026 (0.022)
Control mean	0.575	0.428	0.399
Individual controls	yes	yes	yes
State fixed effects	yes	yes	yes
Observations	2,421	2,982	4,871
R-squared	0.126	0.090	0.081

Notes: OLS regressions. *Info provision OWN rank*, *Info provision ALL ranks*, *Info acquisition OWN rank*, and *Info acquisition ALL ranks* are experimental treatments in the survey. Dependent variable: Dummy variables 1 = respondents are "very satisfied" or "rather satisfied" with their state's education policy, 0 otherwise. Control mean: mean of the outcome variable in the control group in a regression without covariates (see Appendix Table A7). Weighted regressions. Survey weights are constructed to match administrative data for the German population regarding age, gender, state, educational attainment, municipality size classes, and employment status. Data source: ifo Education Survey 2020. Robust standard errors in parentheses. Significance levels: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

Table 1 also presents the results of the information *acquisition* treatments on citizens' satisfaction with the education policy in the own state, which gave participants the option to retrieve the ranking information by clicking on a link. We find that treatment effects largely remain statistically and economically significant. However, the magnitude of the treatment effects

is roughly halved, which is consistent with the finding that about 60% of respondents chose to retrieve the information before stating their satisfaction.<sup>14</sup> This information-acquisition rate is relatively high compared to other studies (see, e.g., Capozza et al. (2021) for a review), suggesting that respondents consider performance information important for their satisfaction with state education policies.<sup>15</sup> At the same time, the fact that treatment effects halve when switching from information *provision* to the option of information *acquisition* highlights that even low barriers to performance information can have major effects on the extent to which citizens take this information into account.

Next, we study whether information treatment effects differ by respondents' prior beliefs. Specifically, we categorize respondents into those who (i) estimate their state's rank worse than it is (too pessimistic), (ii) correctly estimate it, and (iii) estimate it be better than the correct rank (too optimistic), and run interacted models based on Equation (2). To ease exposition, we combine the two information *provision* treatments and information *acquisition* treatments, respectively.<sup>16</sup> Appendix Table A8 reveals two key findings: First, treatment effects are significantly more positive for those who are overly pessimistic about their own state's rank, and more negative for those who are overly optimistic. This suggests that treatment effects are driven by genuine belief-updating. At the same time, we also find significant treatment effects among those who correctly estimate their state's rank. The latter finding suggests that salience-based updating plays a role in our setting, too (e.g., Bleemer and Zafar, 2018). This is hardly surprising given the lack of transparency and student-performance information available to citizens.<sup>17</sup>

In sum, we find that citizens misperceive their state's educational performance, and that correcting these misperceptions through information provision strongly affects how satisfied citizens are with their state's education policies. These findings provide first evidence that

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<sup>14</sup> Calculating treatment-effects-on-the-treated (TOT) in the information *acquisition* treatments by dividing the intention-to-treat effects (ITT) reported in Table 1 by the information-acquisition rate shows that those who retrieve the information have similar information effects as the general-population subsample assigned to the information *provision* treatments. Thus, there does not appear to be a strong selection into information retrieval based on potential information effects. The exception is the subset of respondents in below-average performing states, where the TOT is less than half the size of the ITT. In these states, it appears to be the case that those who retrieve the information are *less* responsive to the information than the general-population sample in the information *provision* treatments.

<sup>15</sup> Analyzing information acquisition behavior, Appendix Table A6 shows that click rates are higher among females, those with higher income and education levels, frequent voters, less patient and more risk tolerant respondents, and those working outside the education sector. Interestingly, click rates hardly vary by state performance.

<sup>16</sup> Wald tests of group equivalence confirm that differences between these treatments are statistically insignificant.

<sup>17</sup> In additional analyses we study how treatment effects differ by how sure respondents are that their prior beliefs are correct to distinguish *misinformation* from *uninformedness* (see Kuklinski et al., 2000; Lergetporer et al., 2020). Interaction effects between the treatment indicators and respondents' beliefs do not vary systematically by the certainty with which respondents hold their beliefs (results are available upon request).

citizens' misinformation could undermine efforts to hold politicians accountable for their policy performance; thus, preventing the full benefits of subnational policy competition from being realized.

### 5.3. Treatment Effects on Citizens' and Parliamentarians' Policy Preferences

Next, we analyze how alleviating misperceptions about relative student performance affects citizens' and parliamentarians' support for a reform proposal to increase transparency regarding the performance of the education system.

**Results for citizens.** Table 2 illustrates the information treatment effects on a binary indicator of citizens' support for the transparency policy proposal (coded 1 if respondents are "very" or "rather" in favor, 0 otherwise). The control means reveal that support for the policy proposal is very high at 77.6% in the control group, and that support does not differ by states' student performance. Treatment *Info provision OWN rank* significantly increases support for the transparency policy among respondents in above- and below-average performing states by 7.1 and 4.8 percentage points, respectively. While treatment effects are similar between both groups of respondents, their motives may well differ (e.g., utility from proving that ones' state is top ranked versus holding politicians accountable for poor educational performance of their own state). Interestingly, the coefficients on treatment *Info provision ALL ranks* is smaller and not statistically significant, which is in contrast to the treatment effects on political satisfaction (Table 1). Thus, the extent to which performance information affects support for the transparency policy depends on what exact performance information is presented.<sup>18</sup> While the effect of treatment *Information acquisition OWN rank* is positive and marginally significant for respondents in below-average performance states (in line with the effect of treatment *Information provision OWN state*) the other coefficients on the information-acquisition indicators are also small and insignificant. These effects remain mostly insignificant when studying heterogeneities by prior beliefs about the own state's relative performance (see Appendix Table A9). In addition, Appendix Table A10 reveals that the identified treatment effects of Table 2 are robust to the exclusion of control variables and state fixed effects.

To address a common concern about policy preferences elicited in surveys, namely that they are "cheap talk" and therefore susceptible to reporting bias, we randomly informed respondents that their aggregate answers to the question about support for the transparency policy will be

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<sup>18</sup> Possible reasons for the smaller effects of treatment *Info provision ALL ranks* on policy preferences could be that the treatment contains too much information for respondents to process, or that information about the performance ranks of other states influences respondents' policy preferences. We consider studying why people react differently to different pieces of performance information interesting for future research.



passed on to their state politicians (treatment *Consequential*). Appendix Table A11 presents results of an interaction model based on Equation (2). If anything, treatment *Consequential* increases support for the transparency policy, implying that high support levels reported in Table 2 are not due to a lack of political consequences of the survey answers. At the same time, the small and insignificant coefficients on the interaction terms reveal that information treatment effects do not vary systematically by responses' consequentiality.

**Table 2: Treatment effects of performance information on citizen support for the transparency policy**

State's student performance:	Dependent variable: Support for comparative tests		
	Above average (1)	Average (2)	Below average (3)
Info provision OWN rank	0.071*** (0.025)	0.032 (0.024)	0.048*** (0.018)
Info provision ALL ranks	0.030 (0.028)	-0.007 (0.026)	-0.015 (0.019)
Info acquisition OWN rank	-0.003 (0.027)	-0.004 (0.025)	0.031* (0.018)
Info acquisition ALL ranks	0.010 (0.027)	-0.019 (0.025)	-0.030 (0.019)
Control mean	0.776	0.779	0.775
Individual controls	yes	yes	yes
State fixed effects	yes	yes	yes
Observations	2,421	2,983	4,872
R-squared	0.053	0.068	0.075

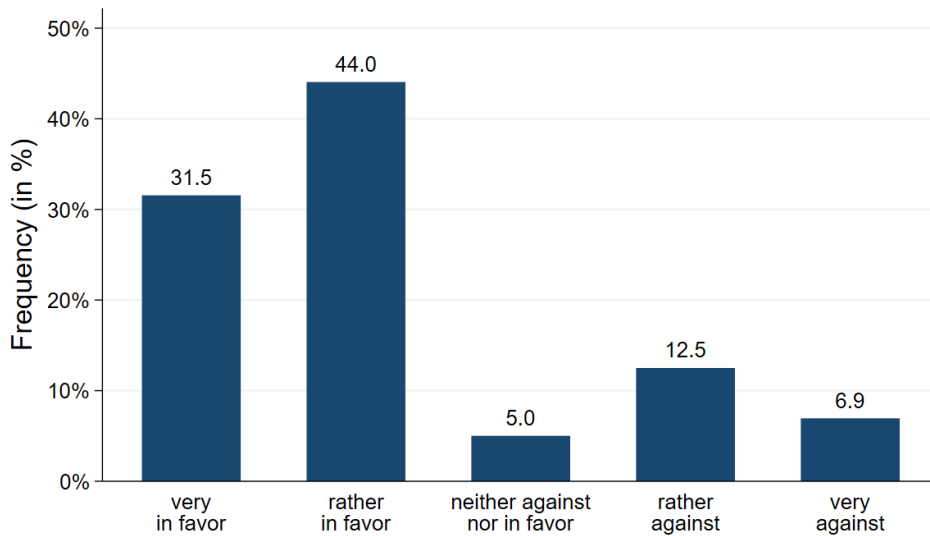
Notes: OLS regressions. *Info provision OWN rank*, *Info provision ALL ranks*, *Info acquisition OWN rank*, and *Info acquisition ALL ranks* are experimental treatments in the survey. Dependent variable: Dummy variables 1 = respondents are "very in favor" or "rather in favor" of introducing regular comparative student tests, 0 otherwise. Control mean: mean of the outcome variable in the control group in a regression without covariates (see Table A10). Weighted regressions. Survey weights are constructed to match administrative data for the German population regarding age, gender, state, educational attainment, municipality size classes, and employment status. Data source: ifo Education Survey 2020. Robust standard errors in parentheses. Significance levels: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

**Results for parliamentarians.** We now turn to our parliamentary survey and analyze to what extent parliamentarians' preferences for the transparency policy are consistent with citizens' preferences, and how they are affected by performance information. Although politicians should theoretically represent the policy preferences of their constituents, they may have different attitudes towards transparency.<sup>19</sup> However, as Figure 3 shows, a large share of 75.6% of all survey

<sup>19</sup> In theories of political representation, voters delegate decisions to citizens who present themselves as candidates to run for public office and become elected to represent their constituents (i.e., the idea of citizen candidates as developed by Besley and Coate, 1997; Osborne and Slivinski, 1996). However, politicians are often misinformed about their citizens' preferences, which undermines the ability of politicians to represent the electorate's preferences (Broockman and Skovron, 2018).

respondents state that they are “very” or “rather” in favor of the transparency policy, a share almost as high as in the population sample.<sup>20</sup> These results suggest that transparency preferences of parliamentarians and citizens are well aligned, which speaks against the hypothesis that the lack of performance transparency in the German education system is due to parliamentarians not representing citizens’ preferences. However, it is important to keep in mind that stated average support rates among parliamentarians may be subject to social desirability bias in the context of our survey.

**Figure 3: Parliamentary support for the transparency policy**



Notes: The survey question asked parliamentarians whether they are in favor or against the policy proposal to introduce regular comparative student tests (details see Figure A3 in the Appendix). N=520. Data source: ZEW/University Mannheim parliamentary survey 2020.

We then analyze the effect of providing relative performance information to parliamentarians on their preferences for the transparency policy. In Table 3, we regress policy support on (i) the treatment dummy *Information provision worse/better half* (coded 1 if the parliamentarian received information about whether his/her state is in the worse/better half of German states, 0 otherwise), (ii) an indicator whether the parliamentarian’s state is actually in the worse half, and (iii) the interaction of the two. As dependent variables, we use the binary indicator for policy support (column 1) as well as the 5-point scale (column 2). Among parliamentarians in the better half of states, the information treatment increases support for the transparency policy by 10.1 percentage points ( $p < 0.1$ ). The positive effect is also sizable and statistically significant at the 5% level in model (2), which exploits the full variation in the outcome variable. While parliamentarians in

<sup>20</sup> Support rates are similar among members of government parties (72.7%) and opposition parties (79.6%), though the share of those “very in favor” is significantly lower in the former group. The survey mode (pen and paper versus online), has no statistically significant effect on policy support (results are available upon request).

worse-performing states tend to be *more* supportive of comparative tests when not provided with performance information (see coefficients on the worse-half indicator), more importantly, their information-treatment effect is *negative* and statistically significantly lower than that of parliamentarians in better-performing states (see the respective interaction terms). These strong treatment effects (and heterogeneities) suggest that parliamentarians are (i) poorly informed about their state’s educational performance (in line with our descriptive findings in Section 5.1) and (ii) opportunistic in how they change their support for the transparency policy in response to performance information: They increase (decrease) their support for the transparency policy when learning that their state’s education policy outcomes are in the better (worse) half of all states.<sup>21</sup>

**Table 3: Treatment effects of performance information on parliamentary support for the transparency policy**

	Dependent variable: Support for comparative tests	
	Dependent variable: dummy	Dependent variable: 5-point scale
	(1)	(2)
Info provision worse/better half	0.101* (0.058)	0.367** (0.150)
Worse half (ranks 9-16)	0.135** (0.066)	0.508*** (0.168)
Info provision x Worse half	-0.198** (0.093)	-0.785*** (0.242)
Constant	0.508	3.088
Individual controls	yes	yes
Party fixed effects	yes	yes
Observations	353	353
R-squared	0.156	0.245

Notes: OLS regressions. *Info provision worse/better half* is an experimental treatment in the survey. Dependent variable model (1): Dummy variable 1 = respondents are “very in favor” or “rather in favor” of introducing regular comparative student tests, 0 otherwise. Dependent variable model (2): Categorical variable 1 = respondents are “very against” to 5 = “very in favor” of introducing regular comparative student tests. Missing data for three control variables (*Education profession*, *Abitur*, *University degree*) has been imputed based on sample means. Imputation dummies are included in both models. Data source: ZEW/University Mannheim parliamentary survey 2020. Robust standard errors in parentheses. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.10.

In sum, while the population strongly supports greater transparency with support rates, if anything, increasing with the provision of educational performance information, the direction in which performance information affects parliamentarians’ transparency preferences depends on whether the information disclosed is favorable to them or not. Parliamentarians’ heterogeneous

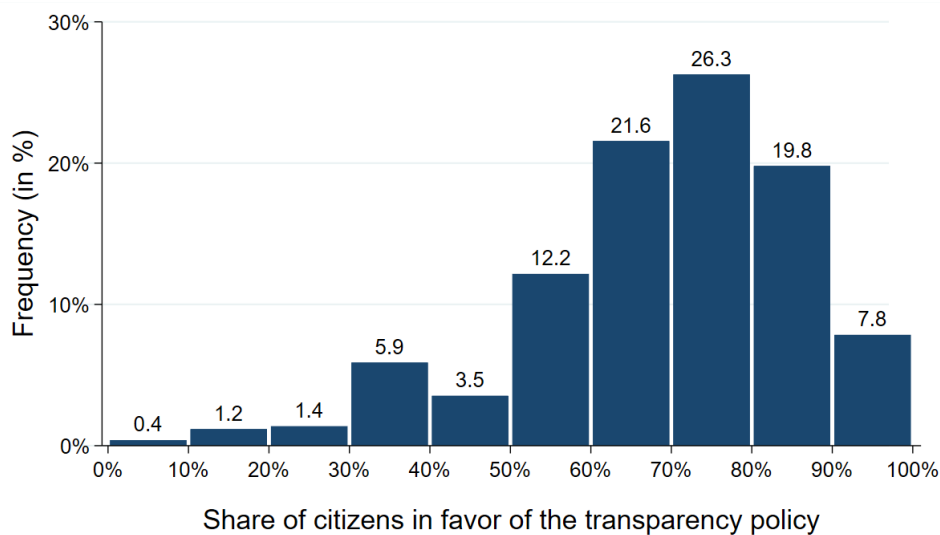
<sup>21</sup> The regression results for parliamentarians need to be interpreted with some caution as the number of observations is relatively low (N=353). Yet, the findings from Table 3 are robust to using ordered probit regressions instead of OLS (see Appendix Table A12). Table A12 also reports results from OLS models excluding covariates.

reactions to performance information are consistent with social-image or re-election concerns, and may constitute an impediment to implementing policies to foster comparability of educational performance across states. This is particularly true since parliamentarians are likely to inform themselves about their state’s performance prior to voting on the introduction of regular student performance assessments.<sup>22</sup>

#### 5.4. Citizen’s and Parliamentarian’s Beliefs about Each Other’s Policy Preferences

This section investigates citizens’ and parliamentarians’ beliefs about each other’s transparency preferences. In addition to citizens’ and parliamentarians’ preferences for transparency, their *beliefs* about each other’s preferences may also determine whether transparency reforms are actually implemented or not. For instance, if parliamentarians (mistakenly) believe that citizens do not support the transparency policy, they could be reluctant to implement it even if they support it themselves.

**Figure 4: Parliamentarian beliefs about citizen support for the transparency policy**



Notes: The survey question elicited parliamentarians’ beliefs about support among citizens for the introduction of regular comparative tests. Parliamentarians were asked to state the share of citizens in their state that they think is “very in favor” or “rather in favor” of the reform proposal (details see Figure A3 in the Appendix). N=510. Data source: ZEW/University Mannheim parliamentary survey 2020.

First, we analyze to what extent parliamentarians are aware of citizens’ preferences. To do so, we asked parliamentarians to guess what share of the public in their state supports the proposed transparency policy. Figure 4 presents the distribution of beliefs and reveals that parliamentarians

<sup>22</sup> Note that the political hurdles for implementing more stringent nationwide student-performance tests are relatively high (see Section 3.1). A comprehensive reform would require the governments of all 16 states to reach a consensus on the issue. This process can be easily undermined by individual states unwilling to implement the transparency policy (e.g., since it would increase the visibility of low performance).

are rather well informed of citizens' transparency preferences. On average, parliamentarians believe that 64.9% of citizens support the policy (compared to an actual support rate of 77.6%). Put differently, well over two-thirds of parliamentarians believe that a majority of citizens in their state supports the policy proposal.

Next, we analyze citizens' beliefs about parliamentarians' transparency preferences. These beliefs were elicited after the information treatments in the population survey. Thus, we cannot only report average beliefs, but can also estimate performance-information effects on these beliefs.

Interestingly, the control means of Table 4 reveal that across respondents in different states only minorities of 45.6% to 46.6% believe that their state parliamentarians support the reform proposal. This lies in stark contrast to parliamentarians' stated support of about 75.6%. The coefficients on the treatment indicators shows that citizens update their beliefs about parliamentarians' policy support after receiving information about their state's relative educational performance. In particular, both information *provision* and *acquisition* treatments significantly increase citizen beliefs by 2.7 to 7.2 percentage points in states with above-average student performance. In average performing states, we find positive effects of both information *provision* treatments (of 2.9 and 4.5 percentage points). Among citizens living in below-average performing states, beliefs about parliamentary support for the transparency policy remain low regardless of the information treatments.<sup>23</sup> These treatment effects reveal that citizens (correctly) estimate parliamentarians' policy support as opportunistic in the sense that parliamentarians are expected to support performance transparency if the disclosed performance information is favorable to them. This view among the population may ultimately undermine public pressure to improve transparency of states' educational performance if citizens believe that politicians will only be willing to implement such policies if they generate positive reputation signals for themselves (e.g., to increase re-election probabilities).<sup>24</sup>

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<sup>23</sup> The findings are robust to the exclusion of individual controls and state fixed effects (see Appendix Table A13).

<sup>24</sup> In additional robustness analyses, our regression results hold when using interaction models instead of sample splits to analyze the citizen survey, and when using probit regressions instead of OLS (results are available upon request).

**Table 4: Treatment effects of performance information on citizen beliefs about parliamentary support for the transparency policy**

State's student performance:	Dependent variable: Citizen belief about parliamentary support		
	Above average (1)	Average (2)	Below average (3)
Info provision OWN rank	7.159*** (1.482)	2.911** (1.256)	-1.264 (0.982)
Info provision ALL ranks	2.671* (1.442)	4.454*** (1.209)	-0.875 (0.989)
Info acquisition OWN rank	4.845*** (1.386)	1.469 (1.269)	-0.734 (0.969)
Info acquisition ALL ranks	7.175*** (1.421)	1.729 (1.219)	-1.014 (0.973)
Control mean	45.629	46.584	45.868
Individual controls	yes	yes	yes
State fixed effects	yes	yes	yes
Observations	2,418	2,981	4,866
R-squared	0.042	0.036	0.032

Notes: OLS regressions. *Info provision OWN rank*, *Info provision ALL ranks*, *Info acquisition OWN rank*, and *Info acquisition ALL ranks* are experimental treatments in the survey. Dependent variable: Continuous variable ranging from 0 to 100%, capturing the share of parliamentarians “very in favor” or “rather in favor” of the policy proposal to introduce regular comparative student tests from the citizen perspective. Control mean: Mean of the outcome variable in the control group in a regression without covariates (see Appendix Table A13). Weighted regressions. Survey weights are constructed to match administrative data for the German population regarding age, gender, state, educational attainment, municipality size classes, and employment status. Data source: ifo Education Survey 2020. Robust standard errors in parentheses. Significance levels: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

## 6. Conclusion

The key argument for policy competition between subnational entities is that allowing citizens to compare policy outcomes of their and similar jurisdictions encourages politicians to deliver public services effectively and efficiently. We argue that for that to be the case, policy outcomes of different jurisdictions need to be observable and comparable, which is often not the case and can lead to misinformation about policy outcomes. Indeed, information frictions about policy outcomes are ubiquitous across many policy areas and countries and exist both at the national and subnational level. A case in point is the German education system, where the legislative and executive power over public education is vested in the 16 federal states. While this structure would, in principle, lend itself to reaping the benefits of yardstick competition, this is undermined by the lack of regular student achievement tests that would enable comparisons of educational performance across states. In this context, we implemented parallel surveys with German citizens ( $N > 10,000$ ) and state parliamentarians ( $N > 500$ ) to study (i) the degree of misperceptions about state's educational performance in both groups, and (ii) how factual

information about states' relative educational performance affects citizens' satisfaction with education policy, and both citizens' and parliamentarians' support for increasing transparency in the education system.

We first document that beliefs about states' educational performance are biased. In particular, citizens and parliamentarians from low-performing states are too optimistic about their state's relative performance. Second, we show that citizens' satisfaction with their own state's education policy is strongly correlated with the state's educational performance, and that information about actual student performance further polarizes the satisfaction levels between better- and worse-performing states. Third, citizens strongly support the proposal to improve transparency in the education system by introducing regular comparative student tests for state comparisons. Providing information about actual student performance further increases preferences for transparency among citizens in above- and below-average performing states. Fourth, parliamentarians' support for increased transparency (which is comparable to the support of citizens in the control group) responds strongly and opportunistically to relative performance information: Parliamentarians in above-average (below-average) performing states increase (decrease) their support for increased transparency upon learning about their own state's performance rank. Fifth, citizens underestimate their parliamentarians' support for increased transparency, but correctly anticipate that parliamentarians increase (decrease) their stated policy support when provided with favorable (unfavorable) information about their state's educational performance.

In sum, we have identified two plausible obstacles to citizens holding their state parliamentarians accountable for low policy performance in the spirit of yardstick competition. First, citizens are poorly informed about their state's educational performance, implying that a prerequisite for subnational policy competition is not met in the German education system. Second, and relatedly, our results are consistent with opportunistic behavior by parliamentarians in the sense that they only support increased performance transparency if information disclosure is favorable to them (e.g., with respect to their public image which will eventually translate into their likelihood for re-election). At the most basic level, our results call for an incorporation of insufficient and non-comparable information on policy outcomes into models of yardstick competition, since ensuing informational frictions can undermine potential welfare gains from subnational policy competition.

From a policy perspective, our findings suggest that the discussions around increased student-performance testing in Germany are stuck in a "bad equilibrium": Citizens are misinformed about their state's educational performance, and parliamentarians in low-performing states have

incentives to block initiatives to increase transparency so as to not to be held accountable for low performance. Our strong information treatment effects on citizens' satisfaction with their own state's education policy demonstrate that providing them with more state performance information (possibly not only regarding education performance) may increase pressure on state parliamentarians to not only improve transparency, but also public service performance more generally.



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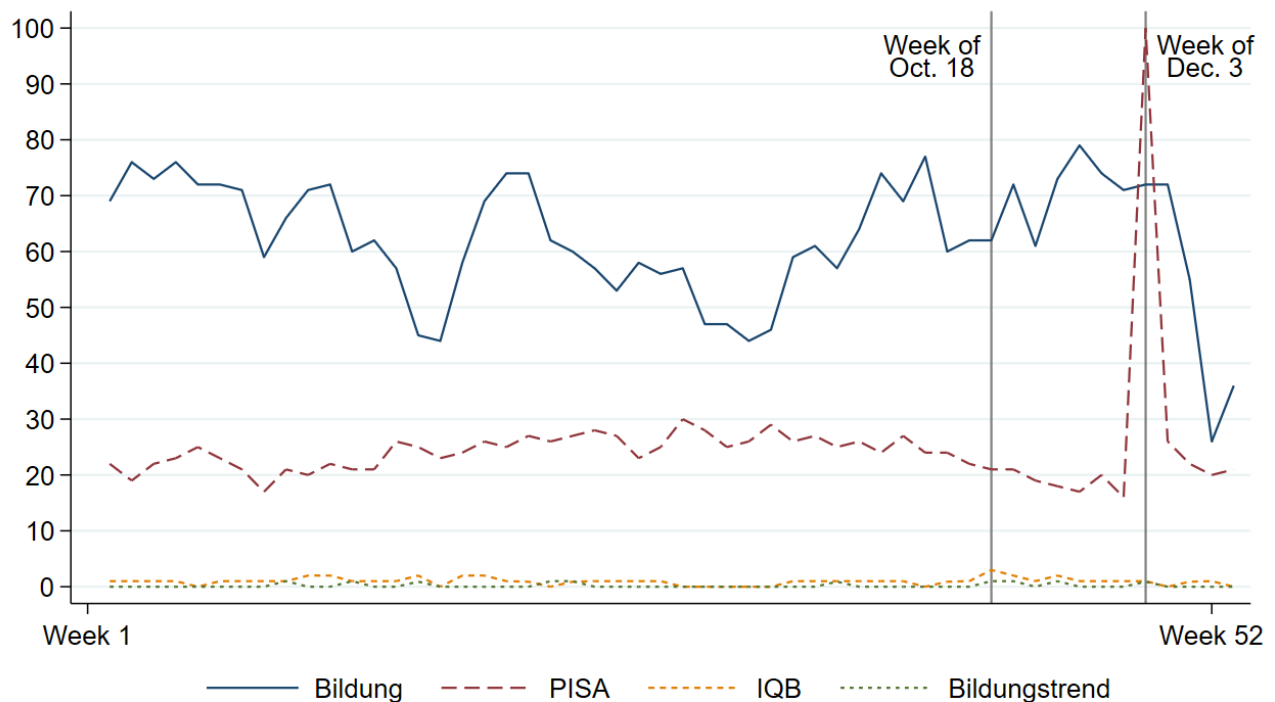
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## Appendix

**Figure A1: Google search requests for the words “PISA”, “IQB”, “Bildungstrend”, and “Bildung”, in 2019**



Notes: Google search requests from January to December 2019 in Germany. Weekly data. Frequencies depicted relative to the highest number of search requests. The spike in the search requests for “PISA” coincides with the release of the PISA test results on December 3, 2019. The results of the *IQB Bildungstrend* were published on October 18, 2019 (no spike visible). Source: Google Trends ([www.google.com/trends](http://www.google.com/trends) [accessed on November 18, 2022]), own figure.

**Figure A2: Questions from the population survey**

Please state your spontaneous opinion.	
<p>A recent educational study compared the mathematics performance of 9<sup>th</sup> grade students in the 16 German federal states. What is your best guess on how the students in your state ranked? (1 is the best, 16 is the worst)</p>	<p>Rank ...</p>
<p>How certain are you about your answer being roughly correct?</p>	<p style="text-align: center;">Very uncertain 1 2 3 4 5 6 7 Very certain</p>

**Randomization:**  
Five groups in total (a-e). Probabilities of being allocated into one of the groups are indicated below.

Please state your spontaneous opinion.	
[a] [Probability=1/3; N≈3,333]	
<p>How satisfied are you with the education policy of your state?</p>	<ul style="list-style-type: none"> <li><input type="radio"/> Very satisfied</li> <li><input type="radio"/> Rather satisfied</li> <li><input type="radio"/> Rather unsatisfied</li> <li><input type="radio"/> Very unsatisfied</li> <li><input type="radio"/> Neither satisfied nor unsatisfied</li> </ul>
[b] [Probability=1/6; N≈1,666]	
<p>The students in <b>your state ranked X among all 16 states</b> in the educational study mentioned in the previous question.</p>	
<p>How satisfied are you with the education policy of your state?</p>	<ul style="list-style-type: none"> <li><input type="radio"/> Very satisfied</li> <li><input type="radio"/> Rather satisfied</li> <li><input type="radio"/> Rather unsatisfied</li> <li><input type="radio"/> Very unsatisfied</li> <li><input type="radio"/> Neither satisfied nor unsatisfied</li> </ul>

Figure continues on next page.



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[c] [Probability=1/6; N≈1,666. Example here: Lower Saxony.]

Students from the **different states** ranked as shown below in the educational study mentioned in the previous question:

1. Saxony
2. Bavaria
3. Thuringia
4. Baden-Württemberg
5. Brandenburg
6. Saxony-Anhalt
7. Lower Saxony
8. Hesse
9. Rhineland-Palatinate
10. North Rhine-Westphalia
11. Hamburg
12. Schleswig-Holstein
13. Mecklenburg-West Pomerania
14. Saarland
15. Berlin
16. Bremen

How satisfied are you with the education policy of your state?

- ☐ Very satisfied
- ☐ Rather satisfied
- ☐ Rather unsatisfied
- ☐ Very unsatisfied
- ☐ Neither satisfied nor unsatisfied

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[d] [Shows the information of randomization [b] if participants click. Probability=1/6; N≈1,666]

Click here if you want to learn how students from **your state** ranked in the educational study mentioned in the previous question.

How satisfied are you with the education policy of your state?

- ☐ Very satisfied
- ☐ Rather satisfied
- ☐ Rather unsatisfied
- ☐ Very unsatisfied
- ☐ Neither satisfied nor unsatisfied

---

[e] [Shows the information of randomization [c] if participants click. Probability=1/6; N≈1,666]

Click here if you want to learn how students from **different states** ranked in the educational study mentioned in the previous question.

How satisfied are you with the education policy of your state?

- ☐ Very satisfied
- ☐ Rather satisfied
- ☐ Rather unsatisfied
- ☐ Very unsatisfied
- ☐ Neither satisfied nor unsatisfied

---

Figure continues on next page.

Randomization:

Half of the participants see the question as shown below (i.e., [a]). The other half receives the information as shown in the text box below (see [b]).

Please state your spontaneous opinion.

[a] [Probability=1/2; N≈5,000]

Are you in favor or opposed to the proposal to introduce uniform nationwide tests in Mathematics and German in all school types that, starting in grade 5, are conducted every two years and whose average results by state would be published to allow a comparison of student achievement across states?

I am...

- ☐ Very in favor
- ☐ Rather in favor
- ☐ Rather against
- ☐ Very against
- ☐ Neither in favor nor against

[b] [Probability=1/2; N≈5,000]

The average answers to the next question will be send to the parliamentarians of your state after the survey is finished. Your answer is therefore particularly important.

Are you in favor or opposed to the proposal to introduce uniform nationwide tests in Mathematics and German in all school types, that, starting in grade 5, are conducted every two years and whose average results by state would be published to allow a comparison of student achievement across states?

I am...

- ☐ Very in favor
- ☐ Rather in favor
- ☐ Rather against
- ☐ Very against
- ☐ Neither in favor nor against

Please state your spontaneous opinion.

What is your best guess, which share of parliamentarians in your state is “very in favor” or “rather in favor” of the reform proposal mentioned in the previous question about introducing nationwide uniform student tests?

..... percent

How certain are you about your answers being roughly correct?

Very uncertain

1 2 3 4 5 6 7

Very certain

Notes: Randomization procedures are described by the gray-shaded text. Information treatments are indicated by a black box around the provided information text. Source: ifo Education Survey 2020.

**Figure A3: Questions from the parliamentary survey (pen & paper)**

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A recent educational study compared the mathematics performance of 9<sup>th</sup> grade students in the 16 German federal states. What is your best guess on how the students in your state ranked? (1 is the best, 16 is the worst.) Rank .....

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---

What is your best guess, what do citizens in your state think about how the students in your state ranked in the educational study? (1 is the best, 16 is the worst.) Rank .....

---

---

Are you in favor or opposed to the proposal to introduce uniform nationwide tests in Mathematics and German in all school types that, starting in grade 5, are conducted every two years and whose average results by state would be published to allow a comparison of student achievement across states? I am...

- ☐ Very in favor
- ☐ Rather in favor
- ☐ Rather against
- ☐ Very against
- ☐ Neither in favor nor against

---

---

What is your best guess, which share of citizens in your state is “very in favor” or “rather in favor” of the reform proposal mentioned in the previous question about introducing nationwide uniform student tests? ..... percent

---

Notes: The pen & paper survey was sent to all parliamentarians. Politicians could choose whether they wanted to use the pen & paper or the online version (see Section 4.2) of the survey. Source: ZEW/University Mannheim parliamentary survey 2020.

**Figure A4: Additional questions from the online version of the parliamentary survey**

Randomization:

Half of the participants received the question below without any additional information (i.e., [a]). The other half received the information as shown in the text box below (see [b]).

[a] [Probability=1/2]

Now we would like to once more learn about your opinion on regular comparative tests.

Are you in favor or opposed to the aforementioned reform proposal about introducing nationwide uniform student comparison tests?

I am...

- ☐ Very in favor
- ☐ Rather in favor
- ☐ Rather against
- ☐ Very against
- ☐ Neither in favor nor against

[b] [Probability=1/2]

Now we would like to learn once more about your opinion on regular comparative tests.

In a recent educational study on student performance in the subject of mathematics, students from your state ranked in the **better/worse** half among all states.

Are you in favor or opposed to the previously mentioned reform proposal about introducing nationwide uniform student comparison tests?

I am...

- ☐ Very in favor
- ☐ Rather in favor
- ☐ Rather against
- ☐ Very against
- ☐ Neither in favor nor against

Notes: The pen & paper survey was sent to all parliamentarians. Participants could choose whether they wanted to use the pen & paper or the online version of the survey (see Section 4.2). For questions that were asked to all parliamentarians, see Appendix Figure A3. Parliamentarians who chose to participate online received additional questions that made use of information treatments as described in this figure. Randomization procedures are described by the gray-shaded text. Information treatments are indicated by a black box around the provided information text. Source: ZEW/University Mannheim parliamentary survey 2020.

**Table A1: Summary statistics and balancing tests – population survey**

	Control group	Info provision OWN rank		Info provision ALL ranks		Info acquisition OWN rank		Info acquisition ALL ranks	
	mean	mean	difference	mean	difference	mean	difference	mean	difference
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Age	45.48	44.68	-0.81*	44.01	-1.48***	44.68	-0.81*	44.39	-1.10**
Female	0.510	0.488	-0.023	0.523	0.012	0.474	-0.036**	0.481	-0.030*
Born in Germany	0.944	0.935	-0.009	0.947	0.003	0.949	0.005	0.948	0.004
Monthly household income (€)	2,757	2,716	-42.0	2,767	9.5	2,707	-50.0	2,716	-42.0
Partner in household	0.615	0.602	-0.013	0.618	0.003	0.583	-0.032**	0.601	-0.014
Parent(s) with university degree	0.323	0.343	0.020	0.328	0.005	0.324	0.001	0.328	0.005
Works in education sector	0.114	0.130	0.016	0.138	0.024**	0.124	0.010	0.130	0.016
<i>Highest educational attainment</i>									
No degree/basic degree	0.308	0.303	-0.005	0.305	-0.003	0.318	0.010	0.325	0.017
Middle school degree	0.296	0.280	-0.016	0.283	-0.013	0.267	-0.029**	0.280	-0.016
University entrance degree	0.396	0.417	0.021	0.412	0.016	0.416	0.020	0.395	-0.001
<i>Highest professional degree</i>									
Vocational degree	0.696	0.655	-0.041***	0.664	-0.033**	0.650	-0.046***	0.670	-0.027*
University degree	0.220	0.244	0.024*	0.218	-0.002	0.235	0.015	0.221	0.001
No degree	0.082	0.086	0.003	0.109	0.027***	0.096	0.014	0.100	0.018*
In training	0.046	0.064	0.017**	0.060	0.014*	0.061	0.015*	0.059	0.012
University student	0.027	0.038	0.011*	0.032	0.005	0.034	0.007	0.031	0.004
<i>Employment status</i>									
Full-time employed	0.497	0.465	-0.032**	0.493	-0.003	0.496	-0.001	0.492	-0.005
Part-time employed	0.156	0.166	0.009	0.158	0.002	0.155	-0.001	0.162	0.006
Self-employed	0.053	0.047	-0.006	0.048	-0.005	0.050	-0.003	0.054	0.001
Unemployed	0.040	0.057	0.017**	0.054	0.015**	0.033	-0.006	0.041	0.002
<i>Parental status</i>									
No children	0.451	0.453	0.002	0.456	0.005	0.450	0.000	0.449	-0.002
At least one child < 18	0.234	0.244	0.010	0.256	0.022	0.231	-0.004	0.230	-0.004
All children > 18	0.315	0.303	-0.012	0.288	-0.027*	0.319	0.004	0.321	0.006
<i>Political party preference</i>									
CDU/CSU	0.223	0.209	-0.014	0.219	-0.004	0.202	-0.022*	0.204	-0.020
SPD	0.120	0.111	-0.008	0.135	0.015	0.132	0.012	0.131	0.011
Linke	0.088	0.073	-0.015*	0.088	0.000	0.086	-0.002	0.081	-0.007
Grüne	0.134	0.131	-0.002	0.135	0.001	0.161	0.028**	0.140	0.007
Other	0.162	0.181	0.018	0.161	-0.001	0.162	0.000	0.160	-0.003
None	0.273	0.295	0.022	0.263	-0.010	0.257	-0.016	0.284	0.011
Frequent voter	0.823	0.817	-0.006	0.831	0.008	0.819	-0.004	0.811	-0.011
Patience (11-point scale)	7.434	7.400	-0.035	7.429	-0.005	7.409	-0.025	7.316	-0.118
Risk tolerance (11-point scale)	5.320	5.387	0.066	5.309	-0.011	5.339	0.018	5.420	0.100
Observations	3,404	1,756		1,713		1,731		1,721	

Notes: Columns 3, 5, 7, and 9 show the difference to the control group. Weighted summary statistics. Survey weights are constructed to match administrative data for the German population regarding age, gender, state, educational attainment, municipality size classes, and employment status. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.10. Data source: ifo Education Survey 2020.

**Table A2: Survey participation analysis – parliamentary survey**

	Dependent variable: Survey participation			
	(1)	(2)	(3)	(4)
Student performance: Average	-0.014 (0.032)			-0.002 (0.033)
Student performance: Below average	-0.077*** (0.027)			-0.042 (0.029)
<i>Political party affiliation</i>				
SPD		-0.054* (0.028)		-0.025 (0.030)
Grüne		0.007 (0.035)		-0.002 (0.037)
AFD		-0.025 (0.035)		-0.058 (0.044)
Linke		0.011 (0.043)		0.020 (0.046)
FDP		0.071 (0.050)		0.085 (0.054)
Other		-0.029 (0.060)		-0.090 (0.061)
Age			0.002 (0.001)	0.002* (0.001)
Female			-0.076*** (0.023)	-0.077*** (0.025)
Education profession			0.060 (0.049)	0.065 (0.048)
Abitur			0.040 (0.038)	0.042 (0.038)
University degree			-0.008 (0.032)	-0.012 (0.032)
Opposition			-0.031 (0.022)	-0.019 (0.026)
Years in state parliament			-0.007*** (0.002)	-0.008*** (0.002)
State education committee			0.006 (0.028)	0.001 (0.028)
Constant	0.344*** (0.023)	0.311*** (0.019)	0.232*** (0.063)	0.250*** (0.066)
Observations	1,862	1,862	1,604	1,604
R-squared	0.006	0.005	0.016	0.023

Notes: OLS regressions. Data source: ZEW/University Mannheim parliamentary survey 2020. Robust standard errors in parentheses. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.10.

**Table A3: Summary statistics and balancing tests – parliamentary survey**

	Control group	Treatment: Information provision	
	mean (1)	mean (2)	difference (3)
<i>Political party affiliation</i>			
CDU/CSU	0.305	0.240	-0.065
SPD	0.226	0.209	-0.017
Grüne	0.168	0.168	-0.000
AfD	0.121	0.117	-0.004
Linke	0.089	0.112	0.023
FDP	0.074	0.102	0.028
Other	0.016	0.051	0.035*
Age	50.71	50.26	-0.450
Female	0.253	0.250	-0.003
Education profession	0.109	0.069	-0.040
Abitur	0.878	0.950	0.072
University degree	0.814	0.764	-0.050
Opposition	0.38.9	0.429	0.039
Years in state parliament	6.47	6.22	-0.249
State education committee	0.279	0.224	-0.054
Observations	190 <sup>1</sup>	196 <sup>2</sup>	

Notes: Column 3 shows the difference to the control group. Data source: ZEW/University Mannheim parliamentary survey 2020. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.10.

<sup>1</sup>Reduced number of observations for the variables *Abitur* (180), *University degree* (188), and *Education profession* (156).

<sup>2</sup>Reduced number of observations for the variables *Abitur* (179), *University degree* (195), and *Education profession* (159).

**Table A4: State results for the cross-state student test in mathematics including the categorization into three performance groups**

Rank	State	Mean	Standard error	Performance group
1	Saxony	530	3.1	Above average
2	Bavaria	524	3.3	
3	Thuringia	507	3.7	
4	Baden-Württemberg	503	2.7	Average
	<b>Germany</b>	<b>499</b>	<b>1.2</b>	
5	Brandenburg	493	3.0	
6	Saxony-Anhalt	493	3.6	
7	Lower Saxony	491	4.2	
8	Hesse	491	2.8	Below average
9	Rhineland-Palatinate	490	3.4	
10	North Rhine-Westphalia	490	3.4	
11	Hamburg	488	2.8	
12	Schleswig Holstein	486	3.8	
13	Mecklenburg West-Pomerania	482	3.5	
14	Saarland	481	4.0	
15	Berlin	479	4.3	
16	Bremen	460	4.0	

Notes: States are grouped into three categories according to the results of a recent cross-state comparative student test among 9th graders in the subject of math (*IQB Bildungstrend* 2018). Categorization into the three performance groups is based on statistically significant differences ( $p < 0.05$ ) to the German average. Source: Stanat et al. (2019, p. 203).

**Table A5: Actual state performance ranks versus rank beliefs of citizens and parliamentarians**

		Performance group of the actual rank			
[Numbers for parliamentarians in brackets]		above average	average	below average	
<b>Performance group of rank beliefs</b>	above average	13.9% [20.6%]	7.0% [2.5%]	4.6% [0.2%]	25.6% [23.3%]
	average	6.0% [2.7%]	11.0% [9.9%]	17.2% [9.5%]	34.2% [22.1%]
	below average	3.7% [1.6%]	11.1% [14.6%]	25.5% [38.4%]	40.3% [54.6%]
		23.6% [24.9%]	29.1% [27.0%]	47.3% [48.2%]	100.0% [100.0%]

Notes: States are grouped into three categories according to the results of a recent cross-state comparative student test among 9<sup>th</sup> graders in the subject of math (Stanat et al., 2019, p. 203). The first cell of the matrix, for example, illustrates that 13.9% of all citizens live in a state with above-average student performance AND have rank beliefs that correctly put their state in this performance group. Numbers do not always perfectly add up across rows and columns due to rounding. Population survey: N=10,313, data source: ifo Education Survey 2020. Parliamentary survey: N=515, data source: ZEW/University Mannheim parliamentary survey 2020.



**Table A6: Individual characteristics and information acquisition in the population survey**

	Dependent variable: Information acquisition via link					
	All	Above average	Average	Below Average	Univariate regression	Multivariate regression
	(1)	(2)	(3)	(4)	(5)	(6)
	-			-		
Info acquisition ALL ranks	0.037** (0.018)	0.016 (0.037)	-0.041 (0.034)	0.060** (0.026)	-0.037** (0.018)	-0.028 (0.017)
Optimist (regarding own state's rank)					-0.019 (0.018)	-0.006 (0.026)
Pessimist (regarding own state's rank)					0.011 (0.018)	0.004 (0.026)
Sure about beliefs					-0.025 (0.018)	-0.014 (0.018)
Age					0.003*** (0.001)	0.002** (0.001)
Female					0.085*** (0.018)	0.065*** (0.019)
Born in Germany					0.089** (0.041)	0.038 (0.039)
Monthly household income (€)					0.022*** (0.005)	0.019*** (0.006)
Partner in household					0.003 (0.018)	-0.033 (0.021)
Parent(s) with university degree					0.031* (0.019)	-0.011 (0.021)
Middle school degree					0.045*** (0.020)	0.106*** (0.028)
Univ. entrance degree					0.080*** (0.018)	0.137*** (0.028)
University degree					0.028 (0.020)	-0.021 (0.026)
University student					0.172*** (0.043)	0.142*** (0.051)
Full-time employed					-0.062*** (0.018)	-0.096*** (0.025)
Part-time employed					-0.001 (0.024)	-0.077** (0.029)
Self-employed					0.040 (0.041)	-0.029 (0.044)
Unemployed					-0.144*** (0.050)	-0.109** (0.054)
Works in education sector					-0.130*** (0.028)	-0.106*** (0.028)
At least one child < 18					-0.029 (0.021)	0.004 (0.024)
Table continues on next page. All children > 18					0.056***	0.004

					(0.019)	(0.025)
CDU Supporter					0.020	0.000
					(0.022)	(0.021)
Frequent voter					0.150***	0.085***
					(0.024)	(0.025)
Patience (11-point scale)					-0.017***	-0.020***
					(0.004)	(0.004)
Risk tolerance (11-point scale)					0.025***	0.025***
					(0.004)	(0.004)
Constant	0.615	0.604	0.602	0.627		0.280
Observations	3,451	823	999	1,629		3,433
R-squared	0.001	0.000	0.002	0.004		0.080

Notes: OLS regressions. Only including respondents that were randomly allocated to the information *acquisition* experiment. *Info acquisition ALL ranks* is an experimental treatment in the survey. Dependent variable: Dummy variables 1 = respondents acquired information on their state's student performance rank by clicking on a link, 0 otherwise. Column (5) shows the coefficient estimates of separate univariate regressions for each explanatory variable. Column (6) shows the coefficient estimates of a multivariate regression including all listed explanatory variables. Data source: ifo Education Survey 2020. Robust standard errors in parentheses. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.10.

**Table A7: Treatment effects of performance information on citizen satisfaction with state education policy – excluding covariates and state fixed effects**

	Dependent variable: Satisfaction with education policy		
	(1)	(2)	(3)
State's student performance:	Above average	Average	Below average
Info provision OWN rank	0.245*** (0.028)	0.173*** (0.029)	-0.162*** (0.021)
Info provision ALL ranks	0.267*** (0.028)	0.262*** (0.028)	-0.147*** (0.021)
Info acquisition OWN rank	0.111*** (0.031)	0.122*** (0.030)	-0.054** (0.022)
Info acquisition ALL ranks	0.148*** (0.030)	0.116*** (0.029)	-0.024 (0.022)
Control mean	0.575	0.428	0.399
Individual controls	no	no	no
State fixed effects	no	no	no
Observations	2,434	3,000	4,888
R-squared	0.052	0.035	0.020

Notes: OLS regressions. *Info provision OWN rank*, *Info provision ALL ranks*, *Info acquisition OWN rank*, and *Info acquisition ALL ranks* are experimental treatments in the survey. Dependent variable: Dummy variables 1 = respondents are "very satisfied" or "rather satisfied" with their state's education policy, 0 otherwise. Control mean: mean of the outcome variable in the control group. Weighted regressions. Survey weights are constructed to match administrative data for the German population regarding age, gender, state, educational attainment, municipality size classes, and employment status. Data source: ifo Education Survey 2020. Robust standard errors in parentheses. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.10.

**Table A8: Effects of performance information on citizen satisfaction with state education policy – by prior beliefs**

State's student performance:	Dependent variable: Satisfaction with education policy			
	All (1)	Above average (2)	Average (3)	Below Average (4)
Info provision (OWN & ALL ranks)	0.038 (0.030)	0.196*** (0.045)	0.121* (0.066)	-0.172*** (0.048)
Info acquisition (OWN & ALL ranks)	0.034 (0.032)	0.042 (0.049)	0.129** (0.064)	-0.048 (0.051)
Optimist (regarding own state's rank)	0.114*** (0.027)	0.061 (0.060)	0.009 (0.055)	0.070* (0.041)
Info provision x Optimist	-0.138*** (0.035)	-0.069 (0.077)	0.006 (0.076)	-0.016 (0.052)
Info acquisition x Optimist	-0.061* (0.037)	-0.036 (0.081)	-0.052 (0.075)	-0.012 (0.055)
Pessimist (regarding own state's rank)	-0.160*** (0.027)	-0.122*** (0.043)	-0.158*** (0.052)	-0.145*** (0.047)
Info provision x Pessimist	0.192*** (0.036)	0.108** (0.054)	0.188** (0.073)	0.163*** (0.060)
Info acquisition x Pessimist	0.107*** (0.037)	0.142** (0.058)	0.026 (0.072)	0.097 (0.064)
Control mean	0.520	0.661	0.528	0.368
Individual controls	yes	yes	yes	yes
State fixed effects	yes	yes	yes	yes
Observations	10,265	2,419	2,980	4,866
R-squared	0.164	0.133	0.100	0.093

Notes: OLS regressions. *Info provision (OWN & ALL ranks)* and *Info acquisition (OWN & ALL ranks)* are (combinations of) experimental treatments in the survey. Dependent variable: Dummy variables 1 = respondents are “very satisfied” or “rather satisfied” with their state's education policy, 0 otherwise. Control mean: mean of the outcome variable in the control group in a regression without covariates. Weighted regressions. Survey weights are constructed to match administrative data for the German population regarding age, gender, state, educational attainment, municipality size classes, and employment status. Data source: ifo Education Survey 2020. Robust standard errors in parentheses. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.10.

**Table A9: Treatment effects of performance information on citizen support for the transparency policy – by prior beliefs**

State's student performance:	Dependent variable: Support for comparative tests			
	All (1)	Above average (2)	Average (3)	Below Average (4)
Info provision (OWN & ALL ranks)	0.056** (0.027)	0.054 (0.044)	0.121** (0.054)	0.029 (0.044)
Info acquisition (OWN & ALL ranks)	-0.022 (0.029)	0.010 (0.045)	-0.036 (0.060)	-0.031 (0.047)
Optimist (regarding own state's rank)	0.006 (0.023)	-0.000 (0.056)	0.080* (0.047)	-0.019 (0.035)
Info provision x Optimist	-0.051 (0.031)	0.002 (0.074)	-0.159** (0.063)	-0.015 (0.048)
Info acquisition x Optimist	0.014 (0.033)	-0.029 (0.076)	-0.036 (0.069)	0.045 (0.051)
Pessimist (regarding own state's rank)	-0.008 (0.024)	-0.020 (0.039)	0.029 (0.047)	0.005 (0.041)
Info provision x Pessimist	-0.022 (0.032)	-0.003 (0.052)	-0.101* (0.061)	-0.009 (0.056)
Info acquisition x Pessimist	0.034 (0.034)	-0.006 (0.053)	0.071 (0.067)	0.001 (0.060)
Control mean	0.779	0.781	0.743	0.800
Individual controls	yes	yes	yes	yes
State fixed effects	yes	yes	yes	yes
Observations	10,267	2,419	2,981	4,867
R-squared	0.060	0.052	0.072	0.072

Notes: OLS regressions. *Info provision (OWN & ALL ranks)* and *Info acquisition (OWN & ALL ranks)* are (combinations of) experimental treatments in the survey. Dependent variable: Dummy variables 1 = respondents are “very in favor” or “rather in favor” of introducing regular comparative student tests, 0 otherwise. Control mean: mean of the outcome variable in the control group in a regression without covariates. Weighted regressions. Survey weights are constructed to match administrative data for the German population regarding age, gender, state, educational attainment, municipality size classes, and employment status. Data source: ifo Education Survey 2020. Robust standard errors in parentheses. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.10.

**Table A10: Treatment effects of performance information on citizen support for the transparency policy – excluding covariates and state fixed effects**

State's student performance:	Dependent variable: Support for comparative tests		
	(1) Above average	(2) Average	(3) Below average
Info provision OWN rank	0.064** (0.025)	0.019 (0.025)	0.046** (0.018)
Info provision ALL ranks	0.021 (0.029)	-0.017 (0.027)	-0.023 (0.020)
Info acquisition OWN rank	-0.002 (0.027)	-0.017 (0.026)	0.029 (0.019)
Info acquisition ALL ranks	0.009 (0.028)	-0.035 (0.026)	-0.040* (0.020)
Control mean	0.776	0.779	0.775
Individual controls	no	no	no
State fixed effects	no	no	no
Observations	2,434	3,001	4,889
R-squared	0.003	0.002	0.005

Notes: OLS regressions. *Info provision OWN rank*, *Info provision ALL ranks*, *Info acquisition OWN rank*, and *Info acquisition ALL ranks* are experimental treatments in the survey. Dependent variable: Dummy variables 1 = respondents are “very in favor” or “rather in favor” of introducing regular comparative student tests, 0 otherwise. Control mean: mean of the outcome variable in the control group. Weighted regressions. Survey weights are constructed to match administrative data for the German population regarding age, gender, state, educational attainment, municipality size classes, and employment status. Data source: ifo Education Survey 2020. Robust standard errors in parentheses. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.10.

**Table A11: Treatment effects of performance information on citizen support for the transparency policy – by consequentiality of answer**

State's student performance:	Dependent variable: Support for comparative tests			
	All (1)	Above average (2)	Average (3)	Below Average (4)
Info provision (OWN & ALL ranks)	0.037** (0.015)	0.057* (0.032)	0.034 (0.029)	0.027 (0.022)
Info acquisition (OWN & ALL ranks)	0.008 (0.016)	0.018 (0.033)	-0.015 (0.030)	0.015 (0.022)
Consequential	0.044*** (0.015)	0.038 (0.031)	0.055* (0.028)	0.041* (0.022)
Info provision x Consequential	-0.028 (0.021)	-0.015 (0.044)	-0.044 (0.040)	-0.020 (0.030)
Info acquisition x Consequential	-0.021 (0.022)	-0.032 (0.045)	0.005 (0.041)	-0.027 (0.031)
Control mean	0.752	0.757	0.748	0.752
Individual controls	yes	yes	yes	yes
State fixed effects	yes	yes	yes	yes
Observations	10,276	2,421	2,983	4,872
R-squared	0.061	0.053	0.070	0.072

Notes: OLS regressions. *Info provision (OWN & ALL ranks)*, *Info acquisition (OWN & ALL ranks)*, and *Consequential* are (combinations of) experimental treatments in the survey. Dependent variable: Dummy variables 1 = respondents are “very in favor” or “rather in favor” of introducing regular comparative student tests, 0 otherwise. Control mean: mean of the outcome variable in the control group in a regression without covariates. *Consequential* captures whether the respondent was informed about average support rates for the policy by state being communicated to the parliamentarians of the own state or not. Weighted regressions. Survey weights are constructed to match administrative data for the German population regarding age, gender, state, educational attainment, municipality size classes, and employment status. Data source: ifo Education Survey 2020. Robust standard errors in parentheses. Significance levels: \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.10$ .

**Table A12: Treatment effects of relative performance information on parliamentary support for the transparency policy – probit regressions and excluding covariates**

Dependent variable:	Dependent variable: Support for comparative tests			
	(Ordered) probit		OLS	
	Dummy	5-point scale	Dummy	5-point scale
	(1)	(2)	(3)	(4)
Info provision worse/better half	0.327 (0.200)	0.379** (0.157)	0.092 (0.061)	0.314* (0.161)
Worse half (ranks 9-16)	0.498** (0.231)	0.578*** (0.178)	0.075 (0.069)	0.302 (0.184)
Info provision x Worse half	-0.689** (0.317)	-0.843*** (0.251)	-0.182* (0.097)	-0.685*** (0.264)
Individual controls	yes	yes	no	no
Party fixed effects	yes	yes	no	no
Observations	353	353	353	353

Notes: (Ordered) probit regressions (columns 1 and 2) and OLS regressions (columns 3 and 4). *Info provision worse/better half* is an experimental treatment in the survey. Dependent variable models (1) and (3): Dummy variable 1 = respondents are “very in favor” or “rather in favor” of introducing regular comparative student tests, 0 otherwise. Dependent variable models (2) and (4): Categorical variable 1 = respondents are “very against” to 5 = “very in favor” of introducing regular comparative student tests. Missing data for three control variables (*Education profession*, *Abitur*, *University degree*) has been imputed based on sample means. Imputation dummies are included in models (1) and (2). Data source: ZEW/University Mannheim parliamentary survey 2020. Robust standard errors in parentheses. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.10.

**Table A13: Treatment effects of performance information on citizen beliefs about parliamentary support for the transparency policy – excluding covariates and state fixed effects**

State's student performance:	Dependent variable: Citizen belief about parliamentary support		
	(1) Above average	(2) Average	(3) Below average
Info provision OWN rank	6.374*** (1.528)	2.604** (1.257)	-1.065 (0.998)
Info provision ALL ranks	2.428* (1.469)	4.857*** (1.215)	-0.411 (0.995)
Info acquisition OWN rank	4.772*** (1.407)	1.023 (1.290)	-0.736 (0.988)
Info acquisition ALL ranks	7.229*** (1.442)	1.537 (1.246)	-1.008 (0.983)
Control mean	45.629	46.584	45.868
Individual controls	no	no	no
State fixed effects	no	no	no
Observations	2,430	2,999	4,883
R-squared	0.017	0.006	0.000

Notes: OLS regressions. *Info provision OWN rank*, *Info provision ALL ranks*, *Info acquisition OWN rank*, and *Info acquisition ALL ranks* are experimental treatments in the survey. Dependent variable: Continuous variables ranging from 0 to 100%, capturing the share of parliamentarians “very in favor” or “rather in favor” of the policy proposal to introduce regular comparative student tests from the citizen perspective. Control mean: mean of the outcome variable in the control group. Weighted regressions. Survey weights are constructed to match administrative data for the German population regarding age, gender, state, educational attainment, municipality size classes, and employment status. Data source: ifo Education Survey 2020. Robust standard errors in parentheses. Significance levels: \*\*\* p<0.01, \*\* p<0.05, \* p<0.10.





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