Reasoning about Public Services: Evidence from Higher Education

Reuben Hurst* ⓡ Andrew Simon† ⓡ Michael David Ricks‡

September 2026

Abstract

We conduct three theoretically motivated experiments to study how people reason about public spending on higher education. In two survey experiments, we validate model predictions that reasoning about cost-effectiveness causally drives support for spending and document motivated reasoning from public-service performance signals. The model and results highlight how reasoning, not just perceptions and tastes, determines policy views. We find reasoning reduces ideological polarization of ideal spending policies (30%) and affective polarization in a letter-writing campaign (23%). In a field experiment, we find that the letter-writing campaign shapes elected officials' engagement on higher education issues, connecting constituent reasoning and policymaker focus.

Keywords: motivated reasoning, polarization, field experiments, higher education finance
JEL Codes: D9, H4, H7, I2

*University of Maryland. Email: whurst@umd.edu
†University of Virginia. Email: arsimon@virginia.edu
‡University of Nebraska – Lincoln. Email: mricks4@unl.edu

We thank Garrett Anstreicher, Elizabeth Bell, John Bound, Julie Cullen, Michael Cuna, Gordon Dahl, Jeff Denning, Sara Heller, Jim Hines, Justin Holz, Nicole Holz, Yifan Gong, Brian Jacob, Amanda Kowalski, Sophia Laderman, John List, Tanya Rosenblat, Chris Roth, Wayne Sandholtz, Kevin Stange, Michael Stepner, Daniel Tannenbaum, Anthony Yim, and Adam Zelizer, as well as audiences at University of Chicago, University of Michigan, Brown University, UCSD, UC Irvine, Brigham Young University, UNC-Greensboro, Australian National University, 15th North American Meeting of the Urban Economics Association, 2022 Economic Science Association Meeting, the Association of Education Finance and Policy 48th Annual, 2023 International Institute of Public Finance Congress, 2023 Advances with Field Experiments Conference, National Bureau of Economic Research Spring 2024 Public Economics meeting, and the Michigan Tax Invitational for their thoughtful comments. This research was funded in part by grants from the University of Michigan; Brigham Young University; and the Institute for Education Sciences R305B150012. The experiments were pre-registered as AEARCTR-0007619, 0009409, 0011306. This paper was previously circulated under the title "Public Good Perceptions and Polarization: Evidence from Higher Education Appropriations"

Individuals routinely observe how well public services perform—test scores, graduation rates, crime statistics, and hospital and transit wait times—but these measures are open to interpretation. Performance reflects both how much the government spends and how cost-effectively it converts spending into services, so making sense of any performance signal requires attributing it between the two. The same news that a public service is performing better than expected can lead one person to conclude that the government is more cost-effective and another that it just spends more. Equilibrium policy therefore depends on which inferences individuals draw and how their policy views and behaviors respond. Using a model and three experiments, we study how people reason about public services, what mechanisms drive reasoning differences, and what this means for polarization and policy.

We formalize this reasoning process in a price-theoretic framework of demand for public services. Individuals' policy views and political behavior depend on preferences and perceptions of two primitives: the level of public-service spending and the cost-effectiveness with which spending produces public-service outputs. We refer to the attribution of signals across these primitives as "reasoning." Although other research often holds perceptions of cost-effectiveness fixed (for tractability on other dimensions, e.g., Lergetporer et al., 2018; Giaccobasso et al., 2025), reasoning about spending and reasoning about cost-effectiveness imply theoretically distinct effects. Reasoning about spending changes perceptions of status-quo provision, a movement along fixed perceived marginal curves; while reasoning about cost-effectiveness shifts the perceived marginal cost curve, changing perceived prices. In effect, for a given signal, only reasoning about cost-effectiveness changes ideal policies since demand slopes down. Moreover, the two forms have opposite-signed effects on the perceived gap between the policies individuals want and the policies they believe they are getting, altering the incentives for political engagement. The prevalence, distribution, and drivers of each type of reasoning are therefore first-order determinants of policy views, political engagement, and polarization.

We study reasoning in the context of US public higher education for three reasons. First, it is a large public service where outputs are consistently measured and state investments have a documented causal effect on outcomes that benefit society (e.g. Bound et al., 2010; Hendren and Sprung-Keyser, 2020). Second, cost-effectiveness is an important concern for taxpayers who believe that state funding should be tied to performance-based or accountability metrics (Nguyen et al., 2023; Jones, 2024). Finally, there is considerable public disagreement about the social benefits from higher education; Democrats are twice as likely as Republicans to think that higher education has a positive effect "on the way things are going" in the United States (Parker, 2019). These features make higher education a useful setting for testing how differences in perceptions of and reasoning about cost-effectiveness shape how people form

and express their support.

We conduct three theoretically motivated experiments to understand how reasoning about public-service performance affects support for US public higher education and policymaker engagement. In two survey experiments, we elicit individuals' perceptions of public higher education and then invite them to reason about public service performance by randomizing exposure to information on the graduation rate at public colleges in their state (a signal of public-service "outputs"), appropriations per student (spending "inputs"), or both. Critically, the experiments allow individuals to endogenously determine how much of each performance signal to attribute to spending versus cost-effectiveness.[1] Using individuals' stated policy views and behavior in an embedded letter-writing campaign with elected officials, we use the first experiment to test model predictions about how differences in reasoning affect behavior. The second experiment directly tests the mechanism of reasoning about cost-effectiveness versus spending and allows us to explore the cognitive processes related to differences in reasoning, including motivated reasoning. Finally, in the third experiment, we randomize when elected officials receive the letters to measure how constituent demand affects policymaker engagement on the supply side of the policy market.

The first experiment tests whether reasoning drives policy views and political participation, with implications for ideological and affective polarization. With regards to policy views, the model has a strong prediction that the graduation-rate signal will change individuals' ideal policies *if and only if* they reason about cost-effectiveness. Therefore, a positive or negative causal effect of information on ideal spending implies that some individuals must reason about cost-effectiveness. As such, finding a reduced-form effect of information on ideal spending levels implies that this ignored reasoning channel meaningfully affects policy views. We find exactly this in the data. Providing information about graduation rates increases average ideal spending by 5% ($600 per student). Furthermore, in pre-registered heterogeneity analysis, we find that responses to information vary by party and prior, which leads reasoning about graduation information to close 30% ($800) of the partisan gap in ideal spending policies. Differences in reasoning are therefore a first-order driver of ideological polarization.

The results from the first experiment also test model predictions about reasoning and political participation. In the model, political participation decisions are a function of the distance between individuals' ideal policies and their perceptions of status-quo policy. Economic intuition suggests that increasing this perceived distance raises the expected marginal benefits of participation, but work in political science suggests it may also increase the affective costs of participation—particularly with out-partisan elected officials (e.g., Broockman

[1]This design complements past approaches where researchers nudge participants to reason in specifics ways, e.g. Stantcheva (2021), allowing us to study how people endogenously reason from information.

and Ryan, 2016). Using the embedded letter-writing campaign, we find reasoning about graduation information increases letter-writing by 12%—an effect concentrated in positive letters sent to out-partisan elected officials (23% increase). Because the only groups who are induced to write more letters are those that tend to reason that perceived distance (under- or over-provision) is less severe, the affective channel dominates for determining political behavior. Together these patterns indicate that ideological and affective polarization are linked through how individuals reason, which suggests that credibly changing partisan perceptions could soften contentious policy conversations.

The second experiment directly tests whether differences in reasoning explain responses to information in two ways. First, given the model-implied link between the magnitude of the treatment effects across groups and reasoning about cost-effectiveness, the second experiment elicits posterior perceptions of spending after allowing individuals to reason about graduation. We compare the reasoning of groups who experience larger and smaller treatment effects in Experiment 1 using a new sample of individuals. Consistent with the model, we find that Republicans who learn that graduation rates are higher and increase their demand for spending tend to reason cost-effectiveness is higher, while the other three groups defined by political affiliation and prior perceptions of graduation rates who do not change their demand for spending in Experiment 1 tend to reason about spending. Second, jointly randomizing spending and graduation information produces an additional, qualitatively consistent pattern: conditional on spending information, graduation information shifts ideal policies for those who tend to reason about cost-effectiveness.

Understanding how reasoning differences affect other policy contexts requires measuring the cognitive processes that drive them. Following Benjamin (2019), we consider Bayesian updating and two forms of motivated reasoning as the key mechanism. We use data on belief updating, survey questions, and open-ended responses to distinguish among them. First, the patterns we find are difficult to reconcile with neoclassical Bayesian updating. For example, individuals with the same priors and similar proxies for prior precision attribute the same signal differently by party. Additionally, we find that Republicans who learn graduation rates are higher attribute the signal to cost-effectiveness, while Republicans who learn they are lower attribute it to spending. This direction-dependent asymmetry is instead consistent with motivated reasoning (Thaler, 2024; Little, 2025).

We then consider whether this motivated reasoning is preference-based, where individuals update toward better states of the world, or prior-based, where individuals update in ways that confirm their priors. For cases where the model provides relatively sharp tests between these two types, our results point to preference-based motivated reasoning. In particular, for a given signal, individuals' perceptions of over- and under-provision determine which

type of attribution is more favorable, and we document heterogeneous attribution along this dimension. In other cases, prior and preference-based reasoning predict the same behavior. Moreover, because reasoning toward more favorable states reshapes individuals' perceived gaps between ideal and status-quo policy, it reshapes their political engagement, linking ideological and affective polarization through this mechanism.

Finally, we demonstrate how the effects of reasoning matter for policymaker engagement in our third experiment. We examine policymakers' responses to constituent demand by randomizing when 238 governors and state legislators receive the letters elicited in the first two experiments. Elected officials, or their staff, who learn about constituent demand are more likely to click on a proposed resolution to maintain state funding for public colleges compared to those who receive a similar email without information about constituent demand. Emails including this information also generate more responses but we are not powered to detect effects on costlier actions. These results suggest that over-polarized political engagement, driven in part by misperceptions and preference-based motivated reasoning, may have negative societal consequences because they bias policymaker perceptions.

We make four main contributions. First, we provide and empirically test a price-theoretic explanation and offer evidence on an underlying behavioral mechanism for two puzzles in the information-provision literature: why information changes beliefs but not policy preferences, and why individuals—both across and within parties—reason differently from the same information (e.g., Kuziemko et al., 2015; Alesina et al., 2018, 2021; Roth et al., 2022). The key theoretical insight is that whenever an economic outcome is co-determined by structural factors and policy responses (e.g., cost-effectiveness and spending level), new information requires reasoning about which changed. Although this endogenous reasoning channel is often ignored, we document its quantitative importance and show that it is consistent with preference-based motivated reasoning where individuals reason toward more favorable states of the world (as in Benjamin, 2019; Möbius et al., 2022). Our results provide causal evidence about endogenous reasoning on a salient economic primitive, complementing descriptive evidence on cross-party reasoning differences (Alesina et al., 2020; Stantcheva, 2021) and psychologically-motivated reasoning differences among co-partisans (e.g. Chinoy et al., 2026).

Second, we show that how individuals reason about public-service performance provides a common mechanism linking ideological and affective polarization, with consequences for policymaker engagement. In particular, we find that individuals who reason in ways that reduce perceived over- or under-provision (whether about spending or cost-effectiveness) are more likely to engage constructively with out-partisan officials, indicating lessened affective polarization (e.g., Iyengar et al., 2019). This links the two types of polarization: for example,

Republicans who underestimate graduation rates demand more spending and perceive less over-provision precisely because they reason about cost-effectiveness. More broadly, these reasoning results provide an explanation for the mixed results on the relationship between ideological and affective polarization (e.g. Webster and Abramowitz, 2017; Lelkes, 2018; Desmet and Wacziarg, 2021; Bertrand and Kamenica, 2023), as reasoning about spending only shapes affective polarization, while reasoning about cost-effectiveness can shape both. Our evidence also contrasts with the view that deeply held partisan identities prevent individuals from updating beliefs and behaviors in response to information (Mason, 2018; Nyhan and Reifler, 2010). Because policymakers are responsive to learning constituent demand (see Zelizer (2018) and our natural field experiment with elected officials) the reasoning-driven distortions in political communication we document have real consequences for policy.

Third, to make these contributions, we develop a two-sided experimental design in which letters generated by survey participants serve as direct inputs into a natural field experiment with elected officials. On the demand side, we develop new revealed-preference measures of affective polarization based on a letter-writing campaign. Whether and to whom individuals write, along with the letters' content, provide measures of affect in a real world political context, whereas existing methods use self-reports or non-political behaviors (Iyengar et al., 2019). Our measure also sheds light on the cognitive processes underpinning reasoning because the text captures individuals' first-order concerns (Ferrario and Stantcheva, 2022; Haaland et al., 2024). These behaviors have direct relevance for policymaking since we find that receiving the letters leads elected officials to engage more with the policy issues. This design provides a potentially useful template for future survey experiments (Haaland et al., 2023) illustrating how to connect revealed-preference survey measures of policy demand (e.g. petitions, donations, or social media re-posts) with the policymaking process to study both sides of the market.

Finally, we provide causal evidence that perceived cost-effectiveness is a key economic primitive that causally shapes public demand for higher education appropriations and partisan disagreement over that spending. A large literature documents how state appropriations affect public colleges (e.g., Bound et al., 2010), but there is limited evidence on what shapes support for this spending (Bound et al., 2019) or partisan polarization over it. Existing debates often emphasize irreconcilable differences in tastes over higher education (e.g. Quadlin and Powell, 2022), while leaving open whether disagreements instead reflect differing perceptions of how cost-effectively public colleges convert spending into socially valuable outcomes. Our results, in fact, provide causal evidence that concerns about government waste (i.e. low cost-effectiveness) help generate partisan disagreements, building on descriptive evidence (e.g. Stantcheva, 2021). Reasoning about the cost-effectiveness of public colleges changes

individuals' ideal higher-education spending policies, and how they express those policies to elected officials, with downstream consequences for policymaker engagement.

1. Model of Perceptions and Support for Public Services

In this section, we present a price-theoretic model describing the formation and expression of individual support for public services on one side of the market and the associated responses of elected officials on the other. By formalizing how perceptions and reasoning can affect policy views and political participation, we derive new insights and testable predictions that motivate our experimental design. In the model, individuals' policy views and political behavior are shaped by their preferences (i.e., the value they place on public services relative to consumption) and perceptions of the public services provision process (i.e., beliefs about the level and cost-effectiveness of public spending). As individuals reason from signals about the public-service performance, their changing perceptions affect their policy views and political participation. Policymakers in turn learn from and respond to individual's endogenous political behaviors. In what follows we present the model and the two testable implications that guide our experimental design and analysis.

1.1 Perceptions and Policy Views

1.1.1 Forming Policy Views about Public Services

In the model, support for public services trades off private benefits against the tax costs of public production. Let $u_i(c_i, G)$ be individual i's jointly concave utility function over two normal goods, consumption, c_i, and a public service, G. Although individuals may experience different value (or harm) from the public services, we assume that the level of provision, G, and costs of provision, $S = p(G; \omega)$, are shared by residents of the same state. The convex expenditure function reflects the tax cost of producing G given the state's cost-effectiveness, ω.[2] Individuals have perceptions of these two primitives $\tilde{\mathcal{I}}_i = \{\tilde{G}_i, \tilde{\omega}_i\}$ that may or may not be accurate.

Individuals form policy views about the allocations they believe would maximize their utility. To see this, note that—conditional on perceptions of cost-effectiveness, ω_i—the level of public services G in any allocation automatically determines spending and consumption. Individuals must therefore trade off the benefits of additional public services with the costs of higher taxes, which reduce their ability to consume. An individual's ideal policy equalizes the perceived marginal benefit of additional public services with the perceived marginal cost

[2]Fixing $p()$ within jurisdictions is a normalization allowing us to study perceptions of ω.

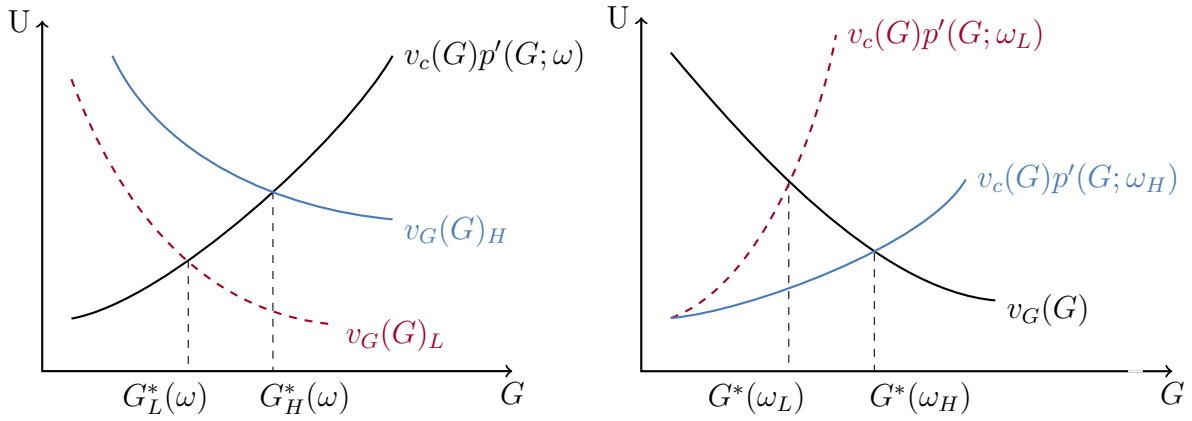
(given $\tilde{\mathcal{I}}_i$) for interior solutions:

$$\underbrace{v_G(G^*(\tilde{\omega}))}_{\text{Perceived Marginal Benefit}} = \underbrace{v_c(G^*(\tilde{\omega}))p'(G^*(\tilde{\omega});\tilde{\omega})}_{\text{Perceived Marginal Cost}}, \tag{1}$$

In this Equation 1, i subscripts are suppressed, $v(c(G), G)$ is the indirect utility, partial derivatives are denoted by subscripts, and $p'(G;\omega)$ is the perceived marginal price of increasing G (see derivation in Appendix B.1). We extend this result in Appendix B.2 illustrating the same core trade off in model extensions with heterogeneous tax rates, multiple inputs to G (e.g., spending on public colleges and the preparedness of incoming students), and multiple dimensions of the public service (e.g., states' rank relative to other states, or yardstick competition).

Figure 1 illustrates how both tastes and perceptions create heterogeneity in the policy views characterized in Equation 1. Both panels of the figure depict decreasing marginal benefits from additional public services, $v_G(G)$—the left-hand side of Equation 1—and increasing perceived marginal costs. The cost is the marginal utility of foregone consumption, $v_c(G)p'(G;\omega)$—the right-hand side of Equation 1. The intersection of the marginal benefit and cost curves at $G^*(\omega)$ determines each individual's ideal policy.

Figure 1: Preferences and Perceptions Jointly Determine Policy Views



(a) Different Tastes

(b) Different Perceptions

Note: Panel (a) displays how differences in tastes for public services could lead to diverging policy views. Panel (b) displays how differences in perceived cost-effectiveness could generate identical results, even among individuals with identical tastes.

Figure 1 illustrate how differences in tastes and perceptions can drive divergence in policy views. Panel (a) depicts a shared, upward-sloping curve reflecting the perceived marginal costs of public services and downward-sloping marginal benefits curves that vary by taxpayer type. If some individuals value marginal increases in public services more, then their marginal

benefit curve (solid blue) will be higher than others (dashed red) and they will support a higher G^*.[3] Panel (b) depicts a shared downward-sloping marginal benefit curve alongside upward-sloping marginal cost curves that vary by taxpayer type. If some individuals perceive that their state is more cost-effective at producing the public service (larger ω) then their perceived marginal cost curve (solid blue) will be flatter than others (dashed red) and they will support a higher G^*.

While policy discussions often focus on differences in tastes for high-quality public services as a key driver of polarization, Figure 1 illustrates that, instead, differences in perceptions of public-service performance alone can generate the same patterns in the data. We therefore design our experiments to study how perceptions of and reasoning about cost-effectiveness shape policy views overall and by political identity.

1.1.2 Endogenous Reasoning Informs Policy Views

We now consider how the endogenous formation of perceptions may—or may not—affect policy views. Upon receiving a signal about public-service performance, individuals update from their (point) prior perceptions, $\tilde{\mathcal{I}}_i = \left\{\tilde{G}_i, \tilde{\omega}_i\right\}$, to (still possibly inaccurate) posterior perceptions, $\hat{\mathcal{I}}_i = \left\{\hat{G}_i, \hat{\omega}_i\right\}$. We refer to the process of going from $\tilde{\mathcal{I}}_i$ to $\hat{\mathcal{I}}_i$ as "reasoning."

In the model individuals' cognitive processes endogenously determine how much of the signal to attribute to spending versus cost-effectiveness. Recall that perceptions of spending, cost-effectiveness, and the level of provision are connected through the expenditure function $S_i = p(G_i, \omega_i)$. As a result, signals about each primitive do not mechanically determine how to update about the others. For example, provision could be higher because the state spends more or because spending is more cost-effective (or both). Individuals must decide how much to reason about spending versus about cost-effectiveness. Figure 2 illustrates two extreme cases of endogenous reasoning: reasoning only about spending or reasoning only about cost-effectiveness. The figure depicts responses to a positive signal ($\hat{G}_i > \tilde{G}_i$), but the logic is symmetric for negative signals.

On the one hand, upon learning the level of provision is higher than initially perceived, some individuals may reason that spending is also higher than initially perceived. This change is depicted in Panel (a) of Figure 2. Reasoning only about spending increases perceived expenditures from $p(\tilde{G}_i, \tilde{\omega}_i)$ to $p(\hat{G}_i, \tilde{\omega}_i)$. Because preferences and perceived cost-effectiveness remain unchanged, reasoning about spending induces a movement along the initially perceived marginal cost and benefit curves rather than shifting either. Reasoning

[3] In the extreme cases, such as when $v_G(\cdot) \ll 0$ and any amount of the service is a public "bad," the optimal level of provision is $G^* = 0$.

about spending, therefore, had no effect on policy views because it does not change prices and the point where the marginal curves intersect.

On the other hand, upon learning the same information, other individuals may reason that the state converts spending into public services more cost-effectively than initially perceived. This change is depicted in Panel (b) of Figure 2. Reasoning only about cost-effectiveness increases perceptions from $\tilde{\omega}_i$ to $\hat{\omega}_i$, holding expenditures constant: $p(\tilde{G}_i, \tilde{\omega}_i) = p(\hat{G}_i, \hat{\omega}_i)$. Because changing ω changes the perceived costs of public service provision, reasoning about cost-effectiveness shifts the perceived marginal cost curve rather than causing a movement along it. By decreasing prices, reasoning about cost-effectiveness in this example, increases demand for public services.

Figure 2 highlights two key features about the effects of information about public-service performance. First, given a signal about public-service performance, reasoning about spending and reasoning about cost-effectiveness generate different feasible interpretations consistent with the signal. Second, the effect on policy views depends on whether individuals reason about spending or cost-effectiveness. The possibility that individuals naturally reason in different ways underpins our experimental design which allows for and measures endogenous reasoning and its effects—complementing prior survey experiments specifically designed to nudge individuals to reason in particular ways (e.g., Stantcheva, 2021; Alesina et al., 2021, 2023).

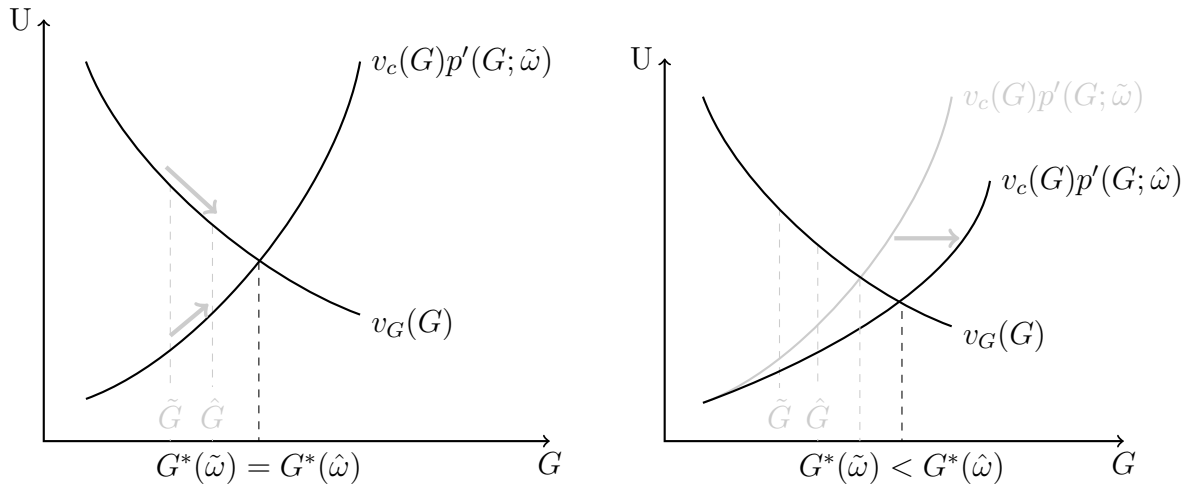
Implication 1: Information about public-service performance only changes policy views if individuals reason about cost-effectiveness.

Figure 2 illustrates a testable implication from this model of endogenous reasoning. While individuals may reason about both spending and cost-effectiveness, only reasoning about cost-effectiveness changes policy views. This can be seen by comparing Panel (a) and Panel (b) of Figure 2. Because the movements along the marginal curves in Panel (a) do not change perceived prices ($\tilde{\omega}_i = \hat{\omega}_i$) and therefore where the curves intersect, reasoning about spending does not change individuals' ideal level of provision, $G^*(\tilde{\omega}_i) = G^*(\hat{\omega}_i)$. In Panel (b), however, reasoning about cost-effectiveness shifts perceived prices and changes policy views. Empirically, this means that detecting reduced-form effects of reasoning from information on ideal policies imply economically significant reasoning about cost-effectiveness.[4]

Despite having starkly different predictions for policy, (endogenous) reasoning about cost-effectiveness is understudied. Previous research on support for public services and public expenditures has two embedded features that impede a direct examination of endogenous

[4]The only-if implication is not strictly true for ideal spending because in knife-edge cases the substitution and income effects of higher or lower cost-effectiveness on total spending could exactly cancel each other out.

Figure 2: Whether Signals Affect Ideal Policies Depends on Reasoning



(a) Movements Along Marginal Curves

(b) Shifting Perceived Marginal Curves

Note: This figure demonstrates how reasoning about public service provision may change ideal policies. Panel (a) shows the effect of a movement along the supply and demand curves. This type of reasoning changes perceptions spending and provision, but not ideal policies. Panel (b) shows the effect of shifting the marginal cost curve due to changing perceptions of cost-effectiveness. This type of reasoning will change the ideal policy.

reasoning: (1) explicitly assuming perceived prices are fixed (e.g., Lergetporer et al., 2018; Giaccobasso et al., 2025) and (2) using relative rather than absolute policy preferences as outcomes such as "should spending increase, decrease, or remain the same?" (e.g., Lergetporer et al., 2018; Roth et al., 2022). The first feature limits all reasoning to the spending channel—a condition that is empirically falsifiable in our experiment. The second feature contaminates measurement by conflating changes in ideal policies (shifts) with changes in perceived status-quo policies (movements)—two conceptually distinct reasoning responses.

1.1.3 Cognitive Processes Induce Distinct Types of Reasoning

For a given signal about public service-performance, reasoning about spending and reasoning about cost-effectiveness are both feasible attributions consistent with the data. *Why* or *when* will individuals endogenously reason in each way? To understand the mechanisms that underlie these reasoning decisions, we consider which cognitive processes might lead individuals to reason more about spending or cost-effectiveness. Here, we outline potential cognitive processes consistent with the model that help motivate our experiments.

We explore the implications of the three cognitive processes proposed in Benjamin (2019): individuals may update to inform beliefs about which they have less information (neoclassical

reasoning), believe in better states of the world (preference-based motivated reasoning), or to confirm their priors (prior-based motivated reasoning).

Under neoclassical reasoning, individuals update using Bayes Rule. Individuals reasoning in this way should update about spending vs cost-effectiveness based on the relative precision of their priors and the signal's information content. Because true economic primitives are likely unknown, neoclassical reasoning would suggest that individuals should tend to attribute changes in public service provision across a combination of both spending and cost effectiveness. In this case, individuals who receive positive signals should typically express higher ideal levels of provision, and those who receive negative signals lower levels. Furthermore, if priors are draws from a similar distribution, we should expect symmetric updating to positive and negative signals.

Under preference-based reasoning, individuals tend to interpret ambiguous signals as "good news" to update toward better states of the world. Coherently defining "better" states of the world is traditionally difficult, but our model offers two natural conceptualizations. First, from a production-technology perspective, a world with a more cost-effective (or less wasteful) government is "better" in the sense that higher ω implies a strictly dominant production possibility frontier $\{c, G\}$. Because the perceived marginal costs curve characterized by $\hat{\omega}$ targets this social potential, individuals who reason in this way would be inclined to update up about cost-effectiveness but disinclined to update down. Second, from a Harberger-Triangle perspective, a world with less perceived under- or over-provision is "better." Let $|\widehat{W}_i| = |G_i^*(\hat{\omega}_i) - \hat{G}_i|$ denote this (posterior) wedge between the policy individuals want implemented and what they perceive as the status quo policy. Individuals who reason in this way would be disproportionately inclined to update up about spending when the signal pushes $\hat{G}_i$ towards $G_i^*(\tilde{\omega}_i)$ and about cost effectiveness otherwise.

Finally, under prior-based reasoning, individuals tend to update in ways that confirm their baseline perceptions. Although the hallmark of prior-based reasoning in scalar models is asymmetric responsiveness to confirming versus disconfirming signals, the fact that reasoning requires attributing a signal across two primitives means that no signal is inherently confirming or disconfirming. We leverage this attribution problem to define a reasoning-relevant prior: individuals may disproportionately assign the signal to the primitive that preserves their prior explanation of public service provision. For example, someone who initially attributes high (or low) provision to spending would be more likely to continue to reason about spending—while someone who attributes it to cost-effectiveness would be more likely to interpret the same signal as evidence about ω. In this case, heterogeneous reasoning (conditional on the signal) should load symmetrically on priors about S and G. Any partisan reasoning differences should be explained by different baseline priors. Importantly,

prior-based reasoning requires defining the relevant priors, and we use our model and the data in our experiment to broadly consider a broad class of priors.

1.2 Perceptions, Political Participation, and Policymaker Response

1.2.1 Expressing Support for Public Services

The policy implications of reasoning depend not only on individuals' policy views but how they communicate those views to elected officials and how elected officials reason and respond. To that end we propose a two-sided framework of political communication. On the demand side of the market for policy, individuals, i, decide whether to engage in the political process by communicating their policy views to elected officials in a letter-writing campaign. On the supply side, elected officials update their perceptions of constituent preferences and re-optimize accordingly.

On the demand side, political participation is driven by the distance between individuals' ideal policies and what they perceive their elected officials to be doing. Let $\widehat{W}_i = G^*(\hat{\omega}_i) - \hat{G}_i$ denote this (posterior) wedge between the policy individuals want implemented and what they perceive their elected officials to be doing. In Appendix B.3 we derive the following decision rule for political participation:

$$\text{Letter}_{i,j} = \mathbb{1}\left[(v_G - v_c p_G)\,\widehat{W}_i > \hat{\psi}_{i,j}\right] \tag{2}$$

Here the marginal benefit from policy change is an increasing function of absolute perceived distance, $|\widehat{W}_i|$.[5] The effective cost of policy change, $\hat{\psi}_{i,j}$, is equal to all costs of political participation, divided by the perceived receptiveness of elected official j. These cost could include the effort cost of writing the letter as well as other frictions that affect the cost of specifically interacting with official j.

Equation 2 allows affective polarization—dislike and distrust of those affiliated with the opposing political party—to depress political participation by raising $\hat{\psi}_{i,j}$. Contrasting with the neoclassical assumption that the only cost of political participation is the effort cost of writing a letter, research in political science has shown that affective polarization does reduce cross-party communications (Broockman and Ryan, 2016) despite the fact that these policymakers are still responsive to communications from out-partisan constituents (Butler and Nickerson, 2011).[6] Experimental participants even accept financial penalties to avoid

[5]Note that the benefit of political participation are zero when $\widehat{W}_i = 0$ and increase with the absolute gap in both directions. Relaxing the assumption that u_G is locally constant for plausible policy reforms makes this increase convex because marginal utility gains and letters' information content both increase in $|\widehat{W}_i|$ (see Appendix B.3).

[6]Although policymakers may be relatively more responsive to co-partisans than to out-partisans (Butler

discussing policy with out-partisans (Carlson and Settle, 2022). Affective frictions like these would manifest in the model through official-specific $\psi_{i,j}$ if the cost of writing out-partisan officials exceeds the effort cost or if individuals are overly pessimistic about the responsiveness of out-partisan elected officials.

We allow for the possibility that reasoning changes these affective frictions through evolving perceptions of $\widehat{W}_i$. Modeling $\hat{\psi}_{i,j}$ as a function of $\widehat{W}_i$ captures the intuition that individuals may be more willing to engage with elected officials who are more likely to to hear them out or represent their policy preferences well. While this mechanism is hard to reconcile with (tribal) identity-based models of affective polarization (e.g., Iyengar et al., 2012), it provides a plausible micro-foundation for the interconnection of affective and ideological polarization—consistent with mixed but growing evidence that increasing the perceived ideological distance augments stated affective polarization (Webster and Abramowitz, 2017; Desmet and Wacziarg, 2021; Bertrand and Kamenica, 2023).

1.2.2 Reasoning Informs Political Participation

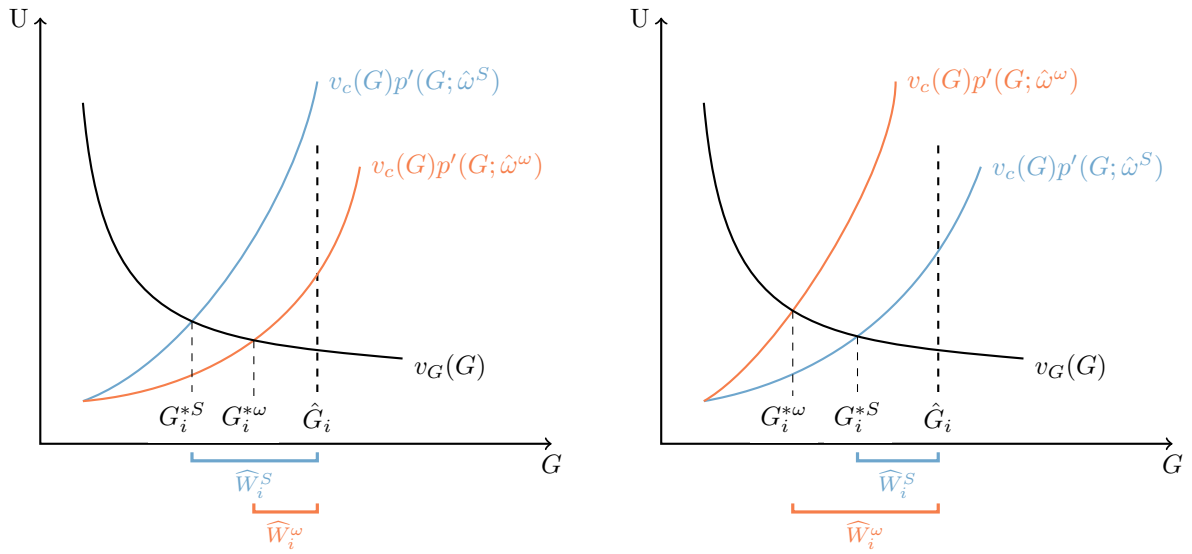
Because perceptions of $\widehat{W}_i$ drive the expected benefits from political participation and may affect the costs, we explore how different types of reasoning shape $\widehat{W}_i$. To build intuition for these relationships, Figure 3 explores how two individuals from the same state with identical preferences could reason in response to the same information about provision. To clarify exposition we assume that due to differences in prior perceptions, the new information is a positive signal for the individual in Panel (a) and a negative signal for the individual in Panel (b). Both Panels depict the ideal polices G_i^* and perceived gaps $\widehat{W}_i$ from only reasoning about spending and only reasoning about cost-effectiveness. Although the Figure depicts the reasoning of individuals who initially perceive over-provision, analogous arguments hold in general.

The comparisons in Figure 3 reveal that reasoning about spending and cost-effectiveness have opposite-signed effects on $\widehat{W}_i$. To see this relationship note that reasoning only about spending mechanically pushes the gap in the direction of $\hat{G}$, widening the perceived gap in Panel (a) and narrowing the perceived gap in Panel (b). Reasoning about cost effectiveness reverses these effect. Moving the marginal cost curves shrinks the large gap in Panel (a) and causes the small gap in Panel (b) to grow. In Appendix B.5 we show that in many cases reasoning about cost-effectiveness even reverses the sign of the mechanical change from a given signal (see Proposition 1). By extension differences in reasoning also produce opposing changes in the costs-benefit calculation motivating political participation.[7]

and Dynes, 2016; Pereira, 2022; Bolet and Campbell, 2024), they are still responsive to both on average.

[7]Appendix B.5 also outlines the technical conditions necessary for this change in perceived gaps to spill

Figure 3: Spending and Cost-Effectiveness Reasoning Have Opposite Effects on Gaps



(a) Positive Signal about Provision

(b) Negative Signal about Provision

Note: This figure illustrates how reasoning about spending and cost-effectiveness affect the gap between ideal and perceived policy. Each panel shows marginal-cost curves, ideal policies, and implied gaps from two extreme types of reasoning (only reasoning about spending, indexed with S superscripts, or only reasoning about cost-effectiveness, indexed with ω). For example this shorthand defines $G^{*S} \equiv G^*(\hat{\omega}^S) \equiv G^*(\tilde{\omega})$. Panel (a) shows the effects from a positive signal, and Panel (b) shows the effects of a negative signal.

Implication 2: Subgroup effects on letterwriting separate neoclassically and affectively motivated political participation. Because the neoclassical and affective channels push political participation in opposite directions, the reduced-form effects of reasoning will reveal which channel dominates in practice. For example, if the neoclassical channel is stronger, the model suggests that reducing $|\widehat{W}_i|$ reduce political participation by lowering expected benefits, but if the affective channel dominates, it will increase political participation by lowering affective costs. Implementing this testable implication requires identifying subgroups who tend to reason in ways that either increase or decrease $|\widehat{W}_i|$. Creating this partition is challenging in practice because it requires measuring political participation, taking priors about provision gaps, and identifying which types of individuals tend to reason more about spending versus cost-effectiveness. We design our experiments and elicitation to enable us to test whether endogenous reasoning creates a causal link between ideological and affective polarization.

over into changes in political participation.

1.2.3 Selective Participation and Equilibrium Policy

Finally, in Appendix B.4, we show how selective communication from the demand side can systematically bias elected officials' and shape their behavior on the supply side. The key intuition is that the messages that elected officials see are determined both by selection into sending a letter and the information content of the letters. Reasoning, in equilibrium, affects both of these channels (Section 1.2.1) and therefore alters the signals elected officials' receive about their constituents ideal policies, which should then affect the policies they implement.

2. Experimental Design: Testing Theory with Public Higher Education

In this section, we outline the samples and procedures for our first two experiments. The first experiment measures baseline demand and perceptions, and characterizes how these change in response to information about public-service performance. The second experiment measures how information about both provision and spending affects ideal policies. It also allows us to identify the partisan reasoning mechanism formalized in the preceding section.[8]

Our experimental context is public higher education, and we signal the level of public service provision using graduation rates. Specifically, we provide signals about public service performance using the six-year graduation rate at public four-year colleges in each state and signals about costs using the yearly per-student tax expenditures (both in levels and relative ranks). Graduation rates underlie most public motivations for investing in higher education such as promoting growth, raising wages, attracting migrants, increasing civic engagement, and promoting pro-social behavior (e.g., Moretti, 2004; Agrawal et al., 2022; Blesse et al., 2023). Furthermore, using graduation rates in the experiments has five conceptual and empirical advantages over using other metrics.

First, the graduation rate serves as a straightforward signal about the level of provision. This conceptual clarity is critical for designing a successful information intervention (Haaland et al., 2023), and the fact that graduation rates are bounded between 0 and 100 make belief elicitation more accurate (Stantcheva, 2023). Second, state spending produces graduates by causally increasing enrollment rates and graduation rates (Bound et al., 2010; Deming and Walters, 2017). This causal connection is required for interpreting effects through our conceptual framework. Third, graduation rates are more closely tied to the process of education than economic outcomes which is important because it allows for the negative valuations of higher educational outputs vocally expressed by some individuals. Fourth, for a given level of spending, the graduation rate contains information about cost-effectiveness and the

[8]The experiments and preanalysis plans were registered with the AEA RCT registry (AEARCTR-0007619, AEARCTR-0009409).

average social ROI. All else equal, a higher rate indicates that more graduates are produced from a given level of spending, the return on state investments is larger, and the state is less wasteful.[9]

Beyond these conceptual motivations, graduation rates are also a first-order concern for policymakers and taxpayers. As of 2021, policymakers in 46 states had codified goals for increasing their college-educated workforces. For example, Florida aims to "increase the percentage of working-age Floridians with a high-value post-secondary certificate, degree, or training experience to 60% by 2030" (Lumina Foundation, 2021). Taxpayers care about graduation rates too. Doyle (2007) reports that about 75% of Americans believe that lowering the number of college students who do not graduate is either "absolutely essential" or "important but not essential." Moreover, taxpayers emphasize graduation rates as a key accountability measure. Among both Republicans and Democrats about 80% believe that colleges should receive less tax revenue if graduation rates are low, and nearly 90% believe that publicizing indicators of college quality like graduation rates is important (Nguyen et al., 2023).[10] In this sense, our information experiments also allow us to discuss the causal effects of increased transparency on polarization.

Notwithstanding its theoretical and policy importance, prior research has never studied how taxpayers reason about the outputs of public services. A number of survey experiments have studied the effects of providing information about education spending (Lergetporer et al., 2018) and general spending (e.g., Peyton, 2020; Roth et al., 2022), often finding anchoring effects toward the true policy. Others provide information about the share of tax dollars spent on education (Giaccobasso et al., 2025), the private returns to public services (Lergetporer et al., 2021; Lergetporer and Woessmann, 2023), and inequities in access to these services (Lergetporer et al., 2020; Hermes et al., 2024), often finding muted effects on policy preferences. Because these results do not study the outputs of public services, they cannot speak to the core theoretical insight that individual perceptions about cost-effectiveness may be a first-order contributor to policy preferences and polarization. Because measuring cost-effectiveness requires a consideration of *both* costs and benefits even contemporary work like

[9]Our measure is analogous to Conzelmann et al. (2023) and similar to Hoxby (2018) who defines the value of higher education to society is the causal effect on outcomes divided by the social cost of educating students. This maps more neatly to our model extension which allows for an additional input into public services (i.e., the academic preparedness of incoming students) in which the adjustment maintains the informativeness of the signal conditional on beliefs about preparedness. Holding spending constant, individuals who learn the graduation rate is higher may reason that the causal effect of spending is higher. Alternatively, if they reason that student quality is higher, they may conclude that their tax dollar are less likely to be wasted to drop-out. Our goal is to measure how individuals reason about the overall benefits for the state vs the costs, but we do not aim to disentangle perceptions over particular components.

[10]Nguyen et al. (2023) also mention employment rates and earnings among graduates. While these statistics are also of interest, they miss the fact that nearly 40% of public college students do not graduate.

Blesse et al. (2023), which reveals the average outcomes of students in public schools to constituents and policymakers, misses the centrality of perceived cost-effectiveness.

2.1 Experiment 1: Reasoning about Graduation Information

We initially recruited 3,715 participants through Qualtrics in May 2021. We requested a sample that represented the US population in terms of political partisanship, education level, and gender. However, since the sample we were provided with was non-representative on age, we recruited an additional 1,004 participants in August 2021 using CloudResearch.[11] On average, participants finished the survey in about 6.3 minutes (with 90% taking between 3.3 and 15.2 minutes).

After consenting to participate, participants answered demographic screening questions measuring political partisanship, gender, and state of residence.[12] We targeted to have a third each of Republicans, Democrats and Independents to be nationally representative and to ensure we had sufficient sample of each group to study polarization. Next, participants reported their beliefs regarding the US average six-year public college graduation rate, the graduation rate in their state, and the rank of the graduation rate relative to the other 49 states. They also reported their beliefs of the tax expenditure per student spent on public higher education in their home state (in dollars) and the rank relative to levels of other states.

Participants were then randomized to receive one of two information treatments or to receive no information (the control group). The first treatment presented the six-year public college graduation rate in their state, based on data from the National Center for Education Statistics. The second treatment presented both the state's graduation rate and its rank. In both treatments, participants were also reminded of their prior beliefs and shown the difference between that prior and the truth.[13] Appendix Figures C1a and C1b show the information treatments, and Appendix Tables A1 and A2 show they are balanced on both demographics and beliefs.

Participants then reported their ideal level of state spending per student at public four-year colleges in their state.[14] Participants also answered questions capturing potential mech-

[11] Overall, elderly individuals are more responsive to information, so limiting our analysis to the original Qualtrics sample produces larger effects.

[12] We did not include participants from Washington, DC as it does not have a traditional public higher education system.

[13] Although we choose communicate objective measures of higher-education outputs to avoid experimenter demand effects, recent work indicates that demand effects tend to be minimal if they exist at all (e.g., de Quidt et al., 2018). In fact, Mummolo and Peterson (2019) find null demand effects even when respondents are financially incentivized to match researchers' stated objectives.

[14] We asked each participant two versions of this question, one "acknowledging the potential effects of the

anisms. Specifically, we elicited policy beliefs about the impacts of marginal changes in public college financing including how much enrollment and graduation rates would change with an additional $100 spent per student and asked five-point Likert scale questions gauging their general trust in how public four-year colleges use tax revenue, the extent to which students should bear the cost of funding public higher education, and whether or not the federal government should provide financial support for public four-year colleges.

Next, participants were given the opportunity to participate in two costly tasks designed to elicit revealed preferences.[15] Our first task extends the political letter-writing campaigns in other research (Grigorieff et al., 2018; Haaland and Roth, 2020; Holz et al., 2020; Hager et al., 2023). As in other studies we invited participants to share open-ended written opinions about their states' spending on public four-year colleges, but we uniquely offered to send those letters to elected state officials of their choice.[16] Spending time writing an optional letter was costly because it lowered participants' effective wage. Critically, individuals send the same letter to all officials, so the marginal cost of sending letters to additional recipients is zero. As such, decisions about interacting with officials of the other party provide a measure of affective polarization, as do the letters' sentiments. In particular, we use a participant's decision to reach across the aisle to send a message negative in tone as a measure of affective polarization.[17] This exercise builds on Ferrario and Stantcheva (2022) by allowing researchers to observe participants' first-order concerns as expressed to policymakers while also studying selection into this political participation (as in Bursztyn et al., 2023). Political participation has policy significance when politicians update policy positions to reflect voters' preferences (Sevenans, 2021). The letters generated in this exercise are the key input into our third experiment with elected officials.[18]

We concluded the survey with questions about demographics[19] and (in the CloudResearch

COVID-19" and the other "after the pandemic has passed." We prespecified the second question as a main outcome to capture preferences less affected by the unique context of the COVID pandemic. Responses to both questions were highly correlated, and treatment effects were similar.

[15]Relying on stated preferences will be misleading if participants suffer from "hypothetical bias." This bias may not present a significant issue as hypothetical and real responses to intensive margin decisions are similar (List et al., 2006), and our main stated-preference measure is ideal spending, which is strictly positive for most of the sample.

[16]They choose from one or more of the following officials: the Republican leaders in their state legislatures, the Democratic leaders in their state legislatures, or the governor.

[17]Reaching across the aisle by itself could reflect other priorities related to information sharing and political participation. However, if the message is negative in tone, it suggests dislike or distrust more explicitly. We additionally explore the content of the letters as further evidence on how individuals reason.

[18]As a second revealed-preference task, participants could donate some of their wages to a public college in their state similar to Alesina et al. (2023) and in Akesson et al. (2022). The median participant spent six minutes on the survey, so making a $0.25 donation implied a cost of $2.50 in median hourly wages.

[19]We elicit age; employment status; whether or not the respondent has had (or does have) children attending a public college in their state; whether they believe their children will attend a public college in

sample) posterior beliefs. Participants in the graduation-rate-only condition and the control group were shown graduation rate information and were then asked for a posterior belief for the rank. The posterior beliefs allow us to test for partisan differences in reasoning or learning from information.

2.2 Experiment 2: Information on Graduation and Spending

For the second experiment, we recruited 3,037 participants in May and June 2022 through CloudResearch.

The procedure for the experiment follows the first with three exceptions. First, participants were randomized to receive one of three information treatments: 1) the graduation rate and rank information (as in the first experiment), 2) the amount of spending per student in dollars and this amount's rank relative to other states, or 3) the content from both treatments 1 and 2. The second difference was extending the ways individuals could communicate with their elected officials. After writing their own letter as in the first experiment, participants could choose from a set of prespecified messages to send or add to their own letter. These pre-written messages included a request for a desired level of spending (increase, decrease, or no change) along with reasons for this request that they could choose from the prespecified list. The reasons related to yardstick competition, the social returns on investment, and the private returns to students.

Finally, at the end of the survey, we elicited posterior beliefs about the graduation rate and spending information for individuals who had not received this information. After reminding participants in the graduation information treatment group (1) about the graduation information, we elicited spending posteriors. Similarly, after participants in the spending information treatment group (2) were reminded of the spending information, we elicited graduation posteriors.

2.3 Variable Definitions for Experiments 1 and 2

We define our key measures of perceptions, outcomes, characteristics following the pre-analysis plans (noting any changes).

Belief Errors. We calculate a continuous variable measuring the belief error as the truth minus the participants' priors for their state's graduation rate and corresponding percentile rank, as well as spending levels and corresponding percentile rank.[20] An individual under-

their state; whether they attended or currently attend a public college in their state; and how often they watch colleges from their state compete in sports.

[20]The treatments display ranks out of 50, but we use percentile ranks for the analysis.

estimates the truth when this difference is negative and overestimates when the difference is positive. We observe state graduation rates and spending levels from Snyder et al. (2019) and Laderman and Heckert (2021), respectively.

Outcomes. The main survey outcomes are the preferred spending level[21] (to measure policy views ideological polarization) and to whom individuals write letters (to measure political participation and affective polarization). As a supplemental outcome we also measure writing a letter with positive tone, where the tone as positive if the Syuzhet dictionary score is greater than 0.

Demographics. Participants were coded as Republican if they indicated their partisanship as lean Republican, not very strong Republican, or strongly Republican. Following our pre-analysis plan, we compare Republicans against Democrats and Independents in our analyses. We also create controls for family attachment (whether the participants or their children has attended a public four-year college in their state), whether respondents follow the state's public college sport teams (if they watch at least two games per year) and elderly status (if they are 65 or older).

3. Reasoning, Policy Views, and Political Participation

In this section, we present the main results from Experiments 1 and 2. In these experiments, we first provide randomized individuals with information about graduation outputs and then allow them to endogenously reasons in different ways from the information. Our results use the behavioral responses from information to test model predictions about policy views, the cost-effectiveness mechanism, political participation, and polarization. We additionally present evidence from Experiment 2 that these patterns come from heterogeneous reasoning from information by measuring posterior beliefs from output information and the effects of spending information.

3.1 Reasoning about Graduation Changes Policy Views

We measure how ideal spending policies change as individuals reason about the outputs of higher education services. Following the pre-analysis plan, we estimate separate treatment effects on stated ideal spending for our two graduation signals: the graduation rate only, D_1, and both rate and rank, D_2. In the linear regression

$$Y_i = \tau_1 D_{1i} + \tau_2 D_{2i} + \beta X_i + \varepsilon_i \tag{3}$$

[21] We originally prespecified log spending, but returned to levels when we found some individuals reporting a \$0 ideal. Using a Poisson regression does not change any results.

X_i is a vector of demographics plus an indicator that the participant was recruited from Qualtrics and a constant. Although, conceptually, reasoning about the graduation rate in addition to rank could lead to differences in reasoning, we find similar patterns in practice and so focus our discussion on the effects of graduation rate information.[22] As we discuss in Section 1, how individuals reason about this information may depend on their prior perceptions or on their (partisan) worldview. Given these model-based insights, and following the pre-analysis plan, we also divide the sample into four groups by political affiliation and graduation rate prior and estimate the treatment effects by subgroups.[23]

Figure 4 presents ideal spending policy by treatment group for the full sample and for each party-by-prior subgroup.[24] We use these results to test three implications of the model: (1) linking baseline policy view (and polarization) to beliefs about cost-effectiveness, (2) identifying the presence of reasoning about cost-effectiveness vs reasoning about spending, and (3) assessing the implications of heterogeneous reasoning for polarization.

Beliefs about Cost-Effectiveness are Linked to Policy Views. First, using data on the control group, we measure high but polarized baseline demand for higher education spending. In our sample the average ideal level of state spending is \$12,210 per student (which is higher than the actual \$8,500). Both partisanship and beliefs are correlated with ideal spending: Republicans prefer 29% less (-\$2800) spending than Democrats and Independents—21%after adjusting for other differences like age and education—and across both parties those who under-estimate graduation rates prefer about 10% less than those who over-estimate graduation rates. These large partisan gaps are similar to gaps in more qualitative questions about higher education from nationally-representative PEW Research Center surveys (Parker, 2019; Hartig, 2020).

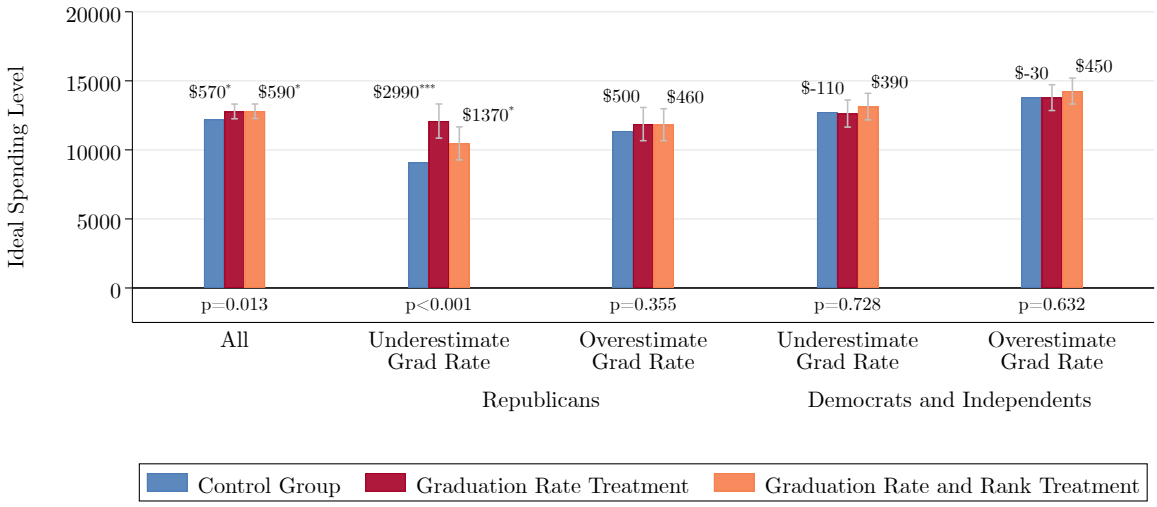
We also use the survey to test whether perceptions of cost effectiveness predict policy views. Appendix Figure A2 reveals that beliefs about the causal effects of spending are also equally strong predictors of policy views even conditional on party (and other demographics). For example, in the control group individuals with larger-than-average beliefs about the causal effect of a \$100 increase in per-student expenditure on enrollment and graduation demand 19% ($p < 0.001$) and 16% ($p < 0.001$) more spending than those with less-than

[22] We also report p-values for pooled tests of receiving any signal about G.

[23] The four subgroups are {Republican; Democrat and Independent} × {Underestimate graduation rate; Overestimate graduation rate}. Note that we also pre-specified family attachment to state universities and graduation rank priors as an additional dimensions for heterogeneity. After data collection, the sample contained insufficient respondents with no family attachment (fewer than 900). The results using rank priors look similar and are presented in Appendix Figure A3 to conserve space.

[24] Note that all respondents appear in two out of the five specifications shown in the Figure 4: (1) all individuals and (2) a relevant party-by-prior subgroup.

Figure 4: Reasoning Shapes Ideal Higher-Education Spending Policies



Note: This figure presents stated ideal spending per student by treatment group, party, and prior perceptions of the state graduation rate along with 95% confidence intervals on the effects of the two treatments. The sample is the 4,679 individuals who completed surveys through Qualtrics and CloudResearch for the first experiment. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, $^{+}p < 0.1$

average beliefs (Panel (a)). These relationships highlight a tight link between perceptions of policy impacts characterizing cost-effectiveness and individuals' ideal policies.

Treatment Effects Imply Non-Trivial Reasoning about Cost-Effectiveness. Recall the sharp prediction in Section 2 that if individuals reason only about spending, then reasoning about graduation will not change ideal policies. According to the model, identifying a meaningful average treatment effect on ideal spending would be a sufficient condition that cost-effectiveness is an economically important part of reasoning about public services. Figure 4 reveals that reasoning about the level of public service provision in an individual's state raises average ideal spending level by about $600 per student per year, or 5%. Because priors of the graduation rate are unbiased on average, individuals in the sample are equally likely to have chances to update positively or negatively about the cost-effectiveness. The positive average effect suggests heterogeneity in reasoning about spending versus cost-effectiveness between individuals with different priors.

Descriptive evidence also supports the model-based interpretation of this result. In the control group, perceived cost-per-graduate ($\frac{S}{G}$), a heuristic for cost-effectiveness, is our strongest predictor of ideal spending levels. Furthermore, partisan gaps in perceptions of cost-per-graduate are entirely driven by differences in perceptions of spending (Panel (b) of Appendix Figure A2), highlighting the importance of allowing individuals to reason jointly

about public service inputs and outputs. While this evidence is consistent with reasoning about cost-effectiveness, in Section 3.2 we will use Experiment 2 to directly test reasoning about cost-effectiveness as the key mechanisms.

One concern with interpreting these average effects as evidence of reasoning about cost-effectiveness is the possibility that receiving any information about the public service lead to priming or experimenter demand effects. This seems unlikely for three reasons. First, by reporting their priors, individuals were all equally primed to think about education finance, and the effects of the randomized treatments are independent of this. Second, experimenter demand effects should not affect real-stakes outcomes, but we find that treated individuals are 6% more likely to make a donation ($p = 0.060$) and send 12% more letters ($p = 0.069$). Finally, traditional experimenter demand effects should be constant across subgroups, but, as we discuss next, our treatment effects vary by both by party and prior.

Heterogeneous Reasoning Contributes to Ideological Polarization. Consistent with the model suggestion that identities and priors can shape reasoning responses, Figure 4 reveals that Republicans who underestimate graduation rates at baseline experience the largest increases in ideal spending. Among these Republicans, learning that the graduation rate is higher increases their ideal spending levels by 28% ($p < 0.001$).[25] This response almost completely drives the main effects. Indeed, we only find smaller, statistically insignificant effects on Republicans who overestimate graduation rates and on both groups of Independents and Democrats. Importantly for polarization, reasoning about the public service provision moderates the most extreme policy preferences; we estimate that 14% of the effect on Republicans who learn graduation rates are higher comes from a 3.7 percentage point (56%, $p = 0.035$) reduction in their likelihood of demanding \$0 in spending when treated.[26]

One implication of these results is that reasoning about cost-effectiveness accounts for roughly 30% of the partisan gap between Republicans and Democrats/Independents. At baseline, there is a \$2800 gap in ideal spending levels, but because effects are concentrated among Republicans,[27] this gap shrinks by over \$800 (30%) in the treated groups (\$1500 (53%) in the graduation rate treatment and \$300 (12%) in the rate and rank treatment). In the context of our model, our results imply that Republicans reason about cost effectiveness relatively more than Independents and Democrats, who update almost entirely about spend-

[25]This is also the only group for whom there is an appreciable difference between the two treatments. In the model this would be because the rank information moderates updating about cost-effectiveness as individuals learn about the distribution of outputs (see Appendix B.2).

[26]For context, at baseline this group is almost three times more likely to demand \$0 in spending than the other groups (6.6% versus 2.3%).

[27]The average effect of reasoning is about \$1150 ($p = 0.002$) for Republicans compared to \$250 ($p = 0.427$) for Democrats and Independents.

ing levels. The fact that reasoning about economic primitives reduces ideological polarization also contrasts sharply with popular conversations about polarized support for higher education. While the myriad other explanations for the polarization of higher education surely do matter, these explanations reflect differences in tastes for higher levels of provision. In contrast, we find that economic reasoning about cost-effectiveness could account for a full third of ideological polarization.

We also rule out two alternatives to our model-based interpretation of the results. First, because the magnitude of the treatment is a function of priors, heterogeneous effects could reflect differences in information content by party or prior. In practice we find no differences in information content: the distribution of initial perceptions about graduation rates is very similar across parties (Appendix Figure A1). Furthermore, this mechanism cannot rationalize the within-party differences in reasoning or the heterogeneous responses to identical information along party lines. Second, because the signal communicated in each treatment varies by state, heterogeneous effects could reflect differences in information content by party or prior. But using only within-state variation from a version of from Equation 3 with state fixed effects, we find nearly identical results. Although our results are consistent with reasoning about cost-effectiveness being an important driver of support for public services, and although we rule out other plausible interpretations, Experiment 1 does not allow us to directly test the hypothesized reasoning mechanisms. For that we turn to Experiment 2.

3.2 Testing for Reasoning about Cost-Effectiveness

We design our second experiment to better isolate differences in reasoning as the core determinant of effect heterogeneity. By analyzing posterior beliefs about spending elicited after individuals receive graduation information, we directly test the model's implications for whether reasoning about cost-effectiveness drives the results from Experiment 1. We also consider ancillary evidence of reasoning about cost-effectiveness from the joint randomization of graduation and spending information and from posteriors about cost-per-student across treatment groups.

Based on the model in Section 1, spending posteriors from information about graduation provide a direct test of reasoning as a mechanism. Recall that individuals who reason that the level of provision, G, is different from their initial perception must either update about cost-effectiveness or the amount of spending, S. Because the model implies that individuals' ideal policies only change after reasoning about cost-effectiveness (and not solely about spending), the results in Experiment 1 can be driven by reasoning about cost-effectiveness if and only if Republicans who under-estimated graduation rates tend to update about cost-effectiveness and that all other groups tend to update about spending levels.

We test this hypothesis by measuring how graduation rate information shifts beliefs about spending. To begin, we plot the difference between participants' posterior and prior beliefs about spending ($\Delta S_i = \hat{S}_i - \tilde{S}_i$) as a function of their initial beliefs and the graduation information they receive:

$$\Delta S_i = \sum_p \gamma_p \Delta G_i \mathbb{1}[i \in p] + \gamma X_i + \varepsilon_i \tag{4}$$

where ΔG_i is operationalized with belief errors about graduation (truth minus prior perceptions) and reasoning is allowed to vary across the four party-by-prior groups, p.[28]

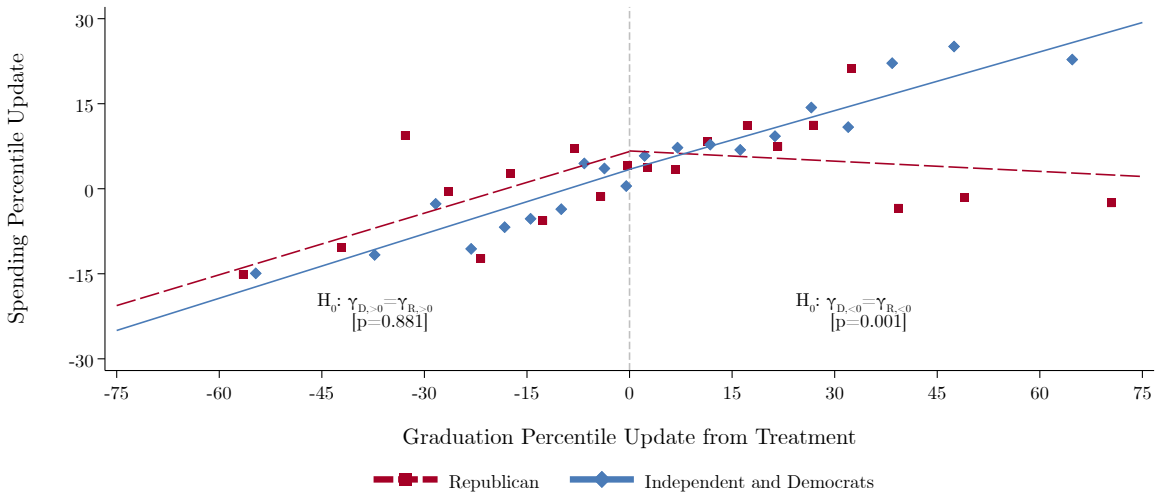
Figure 5 reports the results as a set of binned scatterplots with the implied lines of best fit from the regression. Panel (a) presents estimates from Equation 4, where S and G are each percentile ranks and Panel (b) where G is the numerical graduation rate. We focus on the rank-rank comparison because it required less numerical facility than spending levels, it seemed to be better understood by survey respondents, and was less affected by anchoring, but the analogous results are presented for levels in Appendix Figure A4. Interpreting these patterns through the model, updating only about spending would imply a positive γ, all else equal, and updating only about cost-effectiveness would imply $\gamma = 0$. However, because the γs are identified by nonrandom variation in baseline perceptions, all else may not be equal. Instead, we focus on differences in updating by party and prior, as in a difference-in-differences. In this sense, a difference in relative slopes reflects differences in the relative prevalence of reasoning about cost effectiveness.

Consistent with Experiment 1, we find strong evidence that most individuals tend to reason about spending. Considering the left-hand side of Panel (a), we see that Republicans, Democrats, and Independents who learn that the graduation rate is relatively lower all tend to reason that their state spends relatively less, indicated by the upward -sloping lines. Looking to the right-hand side, Democrats and Independents who learn that their states' rank is higher tend to reason that it must be spending relatively more, also reflected in the upward-sloping line. Consistent with the Experiment 1 implication that these three groups update almost entirely about spending, there is no difference between the slopes of these lines ($p = 0.9$). Based on the results in Experiment 1 the model predicted that these individuals reasoned about spending—a movement along the marginal curves—and we see exactly that in Experiment 2. [29] We find similar updating about spending ranks in response response to

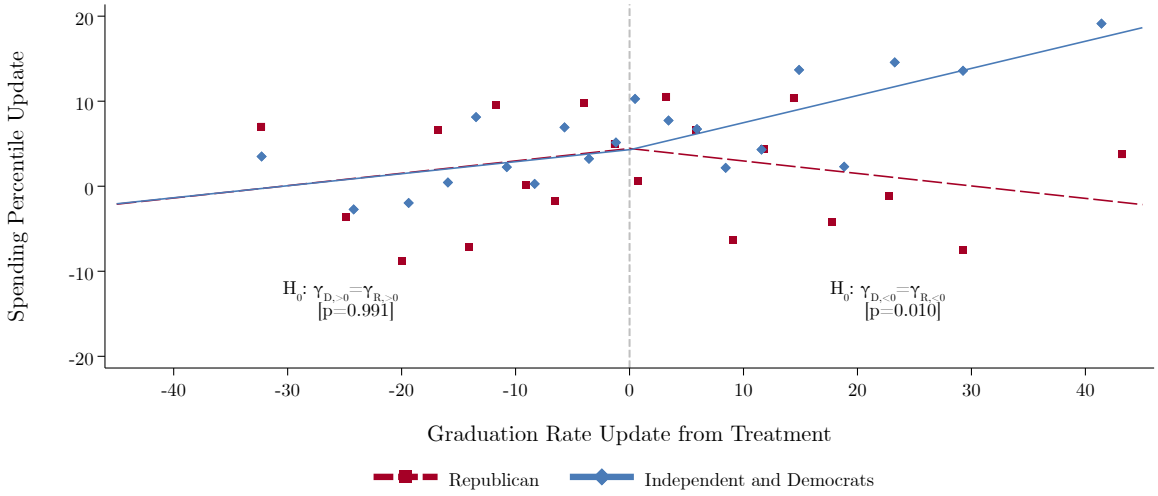
[28]This specification is a linear spline with a knot at $\tilde{G} - G = 0$ for each party, imposing that the amount respondents update is a continuous function of belief errors. When we allow for separate intercepts, the results don't change meaningfully.

[29]Note that Figures 4 and 5 are from different experiments and therefore use different samples, providing two pieces of independent evidence of this reasoning mechanism.

Figure 5: Posteriors Confirm Reasoning about Spending and Cost-Effectiveness



(a) Graduation Rank Information Changes



(b) Graduation Rate Information Changes

Note: This figure illustrates differences in updating by partisanship and by prior perceptions. Each panel presents the change in the perceived state spending percentile rank for individuals with different partisan identities over their belief errors, i.e., the truth minus the prior perceptions minus. Panel (a) shows updating over the support of their belief error about the state graduation percentile rank and Panel (b) shows updating over the support of their belief error about the state graduation rates. In both graphs, markers represent averages of 12 quantiles above and below zero and lines represent regression lines with varying slopes for good and bad news, restricted to be continuous at zero. Points and lines are regression adjusted for the prespecified regression controls. Panels reflect responses of participants recruited for our second experiment from CloudResearch.

graduation rate information (Panel (b)).

At the same time, we find sharp differences in reasoning that align exactly with the heterogeneous results of Experiment 1. To see this, consider the right-hand side of either Panel. In contrast to the other groups, Republicans who learn the state has a higher graduation rank do *not* update their beliefs about relative spending on average. The estimated slope $\gamma_{R,<0}$ are slightly negative but not distinguishable from 0. In the model, perceiving a higher graduation rank with no change in spending belief, implies a higher relative cost-effectiveness. As such, the model predicts they will increase their demand for public expenditure, which is what we found in Experiment 1 (see Figure 4). As indicated by the differing slopes, this reasoning process differs from that of Democrats and Independents who also underestimate graduation ($p = 0.001$) and from other Republicans ($p = 0.020$). In Panel (a), the differences in slope are partially driven by Republicans with significantly underestimated priors, suggesting that the magnitude of misperceptions may be related to individuals' propensity to update about cost-effectiveness. In Panel (b), however, the asymmetric updating about cost-effectiveness holds across the distribution.

The differences in reasoning by party and prior enrich our understanding of "partisan reasoning" and related phenomena. The fact that Republicans and Democrats with the same priors reason differently is consistent with descriptive patterns in the tax reasoning literature (e.g., Stantcheva, 2021). By estimating causal effects, however, we show that the "polarization of reality" does not simply arise from selective information availability, but from heterogeneous responses to the same information. Furthermore, our results show that within-party reasoning differences by initial beliefs are equally important contributors to polarization. This insight complements contemporaneous work documenting psychological reasoning differences among co-partisans (like zero sum thinking Chinoy et al., 2026) with evidence about reasoning differences based on economic primitives.

Ancillary Evidence of Reasoning about Cost-Effectiveness. In addition to this direct test of the reasoning mechanisms, the Experiment 2 provides several additional pieces of evidence the help distinguish between potential mechanisms. First, the treatment effects from Experiment 2 provide another test of the cost-effectiveness mechanism. Having documented how individuals reason in response to graduation information in the first experiment, the Experiment 2 enables us to assess whether reasoning changes when uncertainty about spending levels is resolved. As such the main comparison of interest is between only learning about spending and learning about both spending and graduation (although we also include a graduation-only treatment for completeness). This comparison has the added advantage

of partialing out anchoring effects from learning spending levels.[30]

When we conduct this test, we find that the groups who reason about spending respond in the same way same to learning about spending or graduation (or both). This response arises because for these groups learning about true graduation tends to leads them to also learn about true spending. Appendix Figure A5 depicts six treatment-by-party splines over graduation rate errors. For Independents and Democrats, there are no detectable differences between learning about spending, learning about graduation, or learning about both. The same is true for Republicans who originally over-estimated graduation rates. Given the evidence in Figure 5 that learning about graduation led these groups to reason about spending, these patterns suggest that the spending information validates that reasoning, leading to no difference by treatment in ideal policies.

In contrast to the other groups, Republicans who underestimated graduation rates change their ideal spending after learning spending and graduation information. Appendix Figure A5 depicts a divergence in ideal policies across treatments for this group. Conditional on knowing the spending level, receiving a signal about the level of provision leads to higher ideal policies. Although the difference is not statistically significant on average, this divergence is concentrated among those who more significantly underestimated graduation rate—the same subgroup driving the reasoning about cost-effectiveness. Reasoning from graduation information reduces polarization, as seen visually in the closing gaps in Figure A5. This reduction in polarization induced by adding signals about graduation (rate and rank) to information about spending is 12%—nearly the same as the reduction in polarization by providing signals about graduation (rate and rank) in Experiment 1.

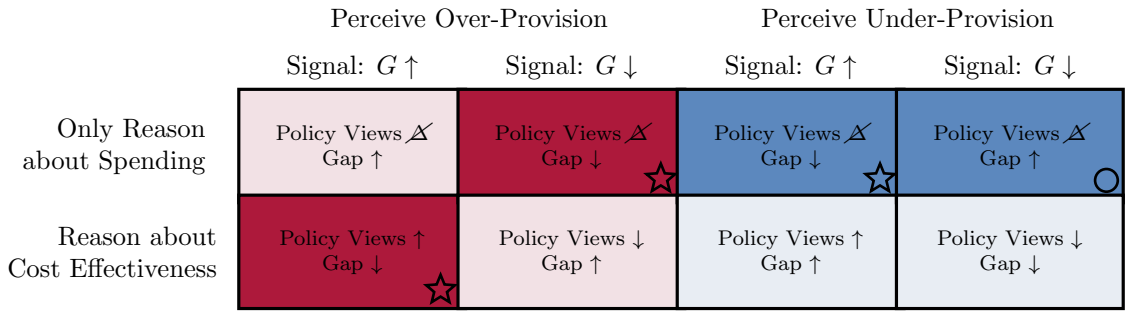
3.3 Reasoning Changes Nature and Extent of Political Participation

The broader economic and policy implications of support for higher-education spending (on the demand side) depend in part on how individuals express their preferences to policymakers (on the supply side). To the extent to which perceptions of public service provision affect political engagement, reasoning may change whether and how individuals communicate with elected officials and could either amplify or ameliorate affective polarization. Changing constituent interactions with policymakers, at a minimum, should update policymakers' beliefs about constituent preferences and could shift equilibrium policy.

Our empirical approach assesses how differences in reasoning affect political participation. Recall two related model predictions: (1) the marginal benefits and affective costs of political

[30] Across both parties we find that learning spending shrinks ideal policies away from priors and toward the actual level in the state. This is consistent with results from other information experiments using spending levels (e.g., Lergetporer et al., 2018; Cattaneo et al., 2020).

Figure 6: Reasoning Reshapes Perceived Gaps Between Actual and Ideal Policies



Note: This Figure visualizes the implications of different reasoning responses (rows) for our four party-by-prior groups (columns). Each cell reports the model-predicted change in policy views and perceived gaps between actual and ideal policies. For each group, we highlight the dominant form of reasoning identified in Experiment 2. Based on the theory in Section 2, we also separate groups whose reasoning tends to reduce the distance between their perceived and ideal policies (star markers) and groups whose reasoning tends to expand increase this distance (circle marker). $\not\Delta$ indicates no change.

participation are both shaped by perceived gaps between actual and ideal policies, and (2) for a given individual, the effects of reasoning about cost-effectiveness or spending have opposite-signed effects on this perceived gap (because reasoning about cost-effectiveness changes G^* and reasoning about spending changes $\hat{G}$). Mapping the model into Experiment 1, we want compare the effects of reasoning based on whether it is likely to expand or reduce this gap. Because, individual-level reasoning is unobserved, we use the prior results from Experiments 1 and 2 to aggregate party-by-prior groups into those whose for whom reasoning is likely to reduce or exacerbate perceived under- or over-provision.

Figure 6 visualizes our approach for aggregating these groups. It reports the model-predicted effects of reasoning about cost-effectiveness or spending on the four groups—classified by initial perceptions of over- or under-provision and the sign of the graduation signal. We aggregate groups using this information in three steps. First, using survey descriptives we map these groups into the party-by-prior groups from the previous section placing Republicans—who tend to perceive over-provision on the left (in red)—and Democrats—who tend to perceive under-provision on the right (in blue).[31] Second, using the results from randomization, we identify the dominant type of reasoning for each group and highlight it in each column: cost-effectiveness for Republicans who receive positive signals about G and spending for the other three groups. Finally, we aggregate groups based on the model-based

[31]Using data on individuals' reported ideal and perceived spending in the Experiment 1 control group, we estimate that both Democrats who understate and overstate graduation rates tend to perceive under-provision (67% and 68%) and both Republicans who understate and overstate graduation rates tend to perceive over-provision (62% and 55%).

implications for perceived over- and under-provision. The model predicts reasoning will reduce the gap for all Republicans and for Democrats/Independents with positive signals about G (star markers in Figure 6); reasoning will increase the gap for Democrats/Independents with negative signals about G (circle marker).[32]

We estimate the effects of reasoning on political participation in Experiment 1 following Equation 3 in Section 3.1. The core difference is that rather than reporting heterogeneity by party and prior we report effects on the model-based groups depicted in Figure 6, but disaggregated results are presented in the Appendix. We discuss two sets of results. First, we examine letter-writing behavior and find that reasoning alters the nature and extent of affective polarization and is closely connected with ideological polarization. Second, we use the text from the letters to show that the direction of the change in the wedge is linked to how individuals reason, including about cost-effectiveness.

Reasoning Connects Ideological and Affective Polarization. We consider how political communication changes as individuals reason about the outputs of higher education services. As outlined in Section 1, reasoning may affect whether individuals communicate with elected officials, with whom they choose to communicate, and the content of those communications. Therefore, Figure 7 reports the results on total number of letters sent, letter recipients, and letter sentiment—again reporting effects of both treatments and joint tests of the pooled treatments versus control.

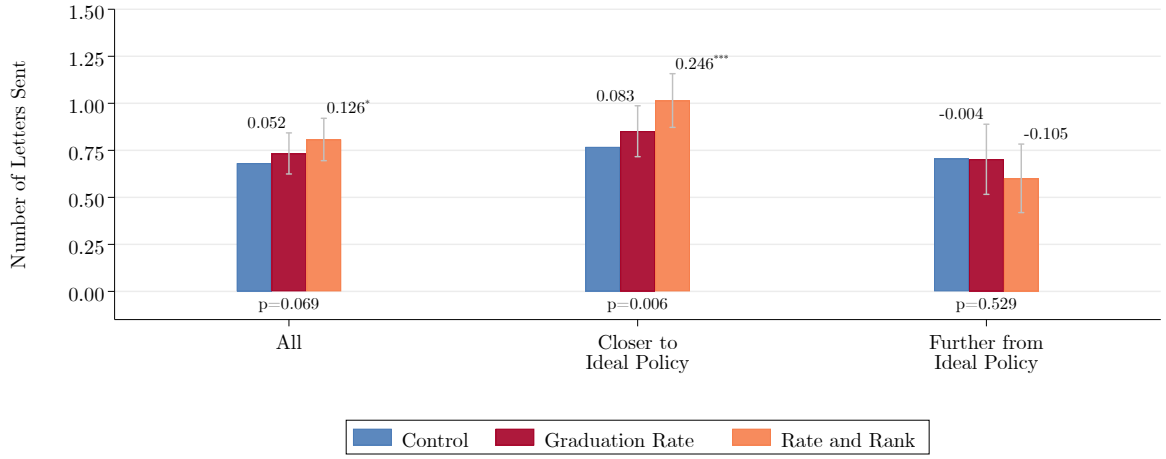
We consider four main results. First, we find that, on average, reasoning weakly increases communication with elected officials. Panel (a) of Figure 7 reports the results. In the control group the average individual sends 0.68 letters (out of a maximum of 5).[33] Reasoning increases letter writing by 0.05–0.13 letters (7–18%) in the full sample (p=0.069). Absent frictions from affective polarization, the theory in Section 1 implies that reasoning should only increase letter writing on the extensive margin (by changing the expected benefits of writing). In actuality, reasoning only induces a 2 percentage point increase in the share of respondents who write letters, indicating a substantial intensive-margin response and suggesting affective costs of interacting with out-partisan officials.

Second, the increase in communication is driven by groups who tend to reason that the

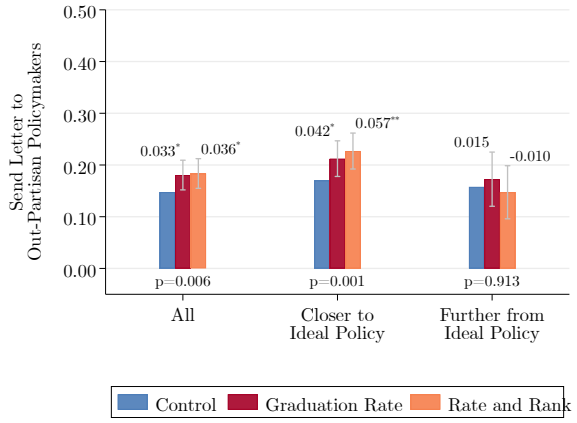
[32]To make this concrete, consider a Republican and a Democrat who both receive a positive signal about G. The Republican who learns graduation rates are higher reasons about cost-effectiveness, pushing ideal level of spending up toward their perceived level and reducing the perceived gap. The Democrat who learn the same information reasons about spending, pushing their perception of the status quo up toward their ideal level—also reducing the gap. For a Republican and a Democrat who receive negative signals about G, reasoning about spending will reduce both perceptions of the status quo, reducing the Republican's perceived gap (over-provision) but increasing it for the Democrat.

[33]Only 20% of individuals write letters. They send their letters to them to 3.2 elected officials on average.

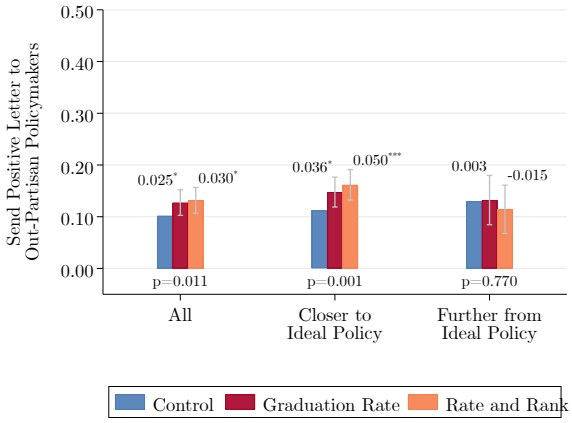
Figure 7: Reasoning Increases Communication—Especially with Out-Partisan Officials



(a) Number of Letters Sent



(b) Letter to Out-Partisan



(c) Positive Letter to Out-Partisan

Note: This figures depicts the treatment effects on political participation from our letter-writing campaign. Each panel presents an outcome of interest by treatment group and change in ideological distance along with 95% confidence intervals on the effects of the two treatments and joint tests of their effect relative to the control. Panel (a) reports the average number of letters written. Panel (b) reports the share who sent a letter to an out-partisan elected official. Panel (c) reports the share who wrote a letter with positive Syuzhet sentiment score to an an out-partisan elected official. Panels (b) and (c) reflect responses from 3,787 participants who completed surveys through Qualtrics and CloudResearch for the first experiment and who at least lean toward a political affiliation. That is, we exclude Independents in Panels (b) and (c) because they do not belong to a party and so cannot reach out to out-partisans.

over/under-provision gap ($|\hat{G} - G^*|$) decreases. In Section 1 identified an ambiguity in how this gap could affect participation. Reducing the gap will decrease participation when neo-classical benefits dominate, but will increase participation when affective frictions dominate. The second and third series in Panel (a) reveal that the entire increase in communication is driven by individuals from groups who reason that the gap is smaller (p=0.006). Point estimates even suggest that reasoning to increase the gap actually decreases letter writing. This negative relationship between the perceived gap and communication implies that the reduced benefits are more than offset by reductions in affective frictions. We parse these mechanisms directly by studying the recipients and contents of the letters.

Third, the increase in communication is entirely accounted for by letters sent to out-partisan elected officials, revealing reduced affective polarization. Panel (b) of Figure 7 reports how reasoning affects the probability that an individual sends a letter to an out-partisan official.[34] At baseline 17% of individuals (75% of letter writers) choose to include out-partisan elected officials as recipients of their letters. Reasoning about graduation information increases this by about 3 percentage points in the full sample and by 4–6 for groups whose reasoning reduces $|\hat{G} - G^*|$. Because, we find small effect (1-2pp) on sending letters to co-partisans that are not statistically different from 0, these results suggest that reductions in the perceived gaps reduce the affective costs of engaging with out-partisans. Consistent with this interpretation, the Appendix shows that the effects are 34% larger for individuals in states where out-partisan officials are in control of the state legislature.[35] To further reinforce this point, we also show that the gap in out-partisan engagement is most pronounced among self identified "strong" partisans (Appendix Figure A8) and that these same strong partisans experience the largest increases in cross-party communication (Appendix Table A9).

Finally, we find that the increase in cross-party communications is driven by positive, constructive interactions rather than negative, critical ones, sharpening the picture of reduced affective polarization. Panel (c) reports treatment effects on positive letters sent to out partisans (where "positive" sentiment is defined having a positive Syuzhet index). At baseline only 12% of individuals send positive letters to out-partisan elected officials (53% of letter writers). In practice, in addition to the 25% of letter writers who avoid cross-party communication, 22% of the individuals who do write out-partisans create negative interactions when they do.[36] Reasoning about graduation information increases positive

[34]Because independents do not technically have out-partisan elected officials, we omit them from Panel (b) and (c).

[35]The reduction in political communication from individuals who reason that the gap is larger are also driven by individuals in these states (p=0.047).

[36]3% are coded as neutral.

interactions by 2.8 percentage points (p=0.011), a 23% increase over the baseline. Again this effect is concentrated among groups whose reasoning reduces $|\hat{G} - G^*|$ (4.3 percentage points, p=0.001). Our point estimates indicate that the share of positive letters decreases in the other group, although point estimates are not significant. Using the emergent coding described in the following subsection, we also find no increase in letters engaging in name calling, obscenities, or accusations of corruption, fraud, or nefarious intent.

Taken together these results provide new evidence that reasoning and political participation may perpetuate a cycle of mutually-reinforcing affective and ideological polarization. In the status quo most individuals perceive large gaps between their ideal and preferred policies, reflecting a pessimism about how well elected officials represent their interest. This pessimism about the policies that (out-partisan) elected officials enact could breed resentment (Iyengar et al., 2019) which is known to reduce cross-party communications (Carlson and Settle, 2022).[37] Because policymakers are not wholly unresponsive to the concerns of out-partisan constituents (as in Broockman and Ryan (2016) and confirmed in Section 5), this reduced cross-party communication can only exacerbate the distance between the policies preferred by individuals those pursued by out-partisan policymakers—which in turn may amplify affective polarization. Our results suggest that reasoning about core economic primitives reverses this self-reinforcing polarization by increasing political engagement across party lines.

Letter Content Broadens Cross-Party Engagement. In addition to documenting reductions in affective polarization consistent with our model of taxpayer reasoning, we also provide direct evidence of the key reasoning considerations using the letters' text. Following a process of emergent coding, we assigned each letter to one of six themes: (1) letters emphasizing the *public goods* nature of higher education, (2) letters emphasizing the *private goods* nature of higher education, (3) letters expressing concern for the *cost-effective spending* of state funds, (4) letters expressing concern about college access and *affordability*, (5) *ideological attacks*, and (6) other letters.We focus on the first four groups, which are the most common and which have direct analogues in the model. Letters emphasizing the public or private goods nature of higher education reflect taxpayers tastes for the output ($v(G)$ or how much they believe society does or does not benefit from additional graduates). Letters about cost-effective spending reflect attention to the rate at which public funds are converted into the public good or the returns on state investments. Letters about access and affordability also focus on the connection between spending and graduation with the

[37] In the context of our theory, this relationship is why we model the affective cost of cross-party communication as a function of perceived ideological distance.

implicit assumption that there is a positive mechanical effect, which seems most related to reasoning about spending.

We find three main patterns from the letter content. First, letters from the control group discuss both the tastes for public education outputs or perceptions of the cost-effectiveness mechanisms, but partisans tend to raise different perspectives. In the control group 39% of the letters are about the value of public services (22% emphasizing public goods nature of higher education and 17% the private goods nature) and 42% are more related to reasoning (16% about cost-effective spending and 26% about affordability). The letters' central themes vary substantially along partisan lines. Republicans are more than three times as likely to bring up cost-effective spending (20% versus 6%) and twice as likely to discuss private goods (22% versus 10%). Democrats on the other hand, write much more about public goods (32% versus 10%) and and somewhat more about affordability (34% versus 20%). These differences characterize how Republicans and Democrats tend to think about public higher education differently both in terms of tastes for the outputs and in perceptions of the mechanism underlying the public goods production process.

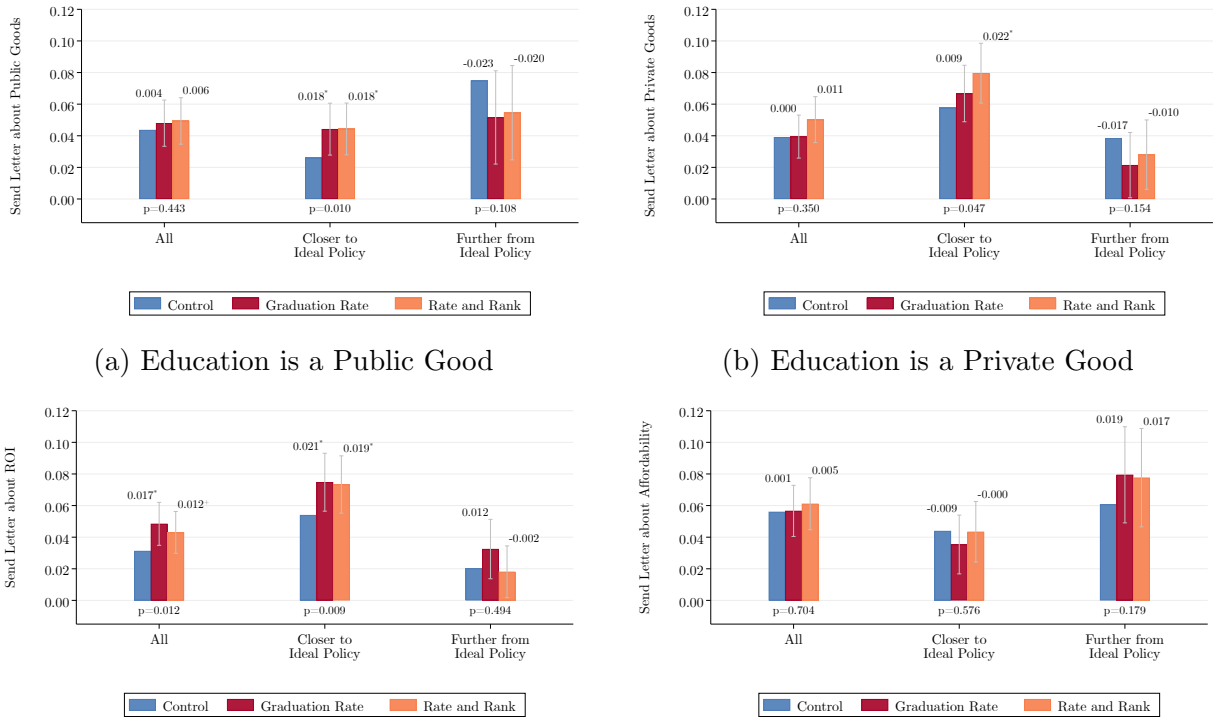
Second, estimating treatment effects on letter themes reaffirms the importance of reasoning about cost-effectiveness. In the full sample the only type of letter with a meaningful increase (1.4 percentage point, 45%) is about cost-effective spending.[38] Among groups who reason in ways that tend to reduce perceived over- or under-provision there is a roughly 2 percentage point increase in letters about cost-effectiveness and letters about the public good nature of higher education,[39] and there are slightly smaller increases in letters about education as a private good. These results indicate that the increase in political participation is coming from a broad support of individuals with different first order concerns about higher education, but that across the board, cost-effectiveness tends to be the concern with the largest marginal response from reasoning.

Finally, reasoning results in a significant increase in elected officials' exposure to out-partisan perspectives and concerns. In the full sample, there is a 3.3 percentage point (38%) increase of letters sent communicating traditionally partisan issues to out-partisan elected officials. To fix terms, this includes letters from Republicans to Democratic officials about cost-effective spending or the private goods nature of higher education as well as letters from Democrats to Republican officials about public goods or affordability. Among individuals

[38] As Republicans tend to be more attentive to cost effectiveness and cost-effective spending, this effect is primarily driven among them, with a 3 percentage point (71%) increase. But notwithstanding Democrats' lower baseline interest in cost-effective spending, they also see a marginally significant 1 percentage point (32%) increase.

[39] The decrease in letters noted in the previous section is almost completely driven by Democrats who no longer write about public goods after learning that graduation rates are lower ($p = 0.108$).

Figure 8: Reasoning Effects on Letter Content



(a) Education is a Public Good

(b) Education is a Private Good

(c) Cost-Effective Spending/ROI

(d) Access and Affordability

Note: This figures depicts the treatment effects on political participation from our letter-writing campaign. Each panel presents an outcome of interest by treatment group and change perceived over- or under-provision along with 95% confidence intervals on the effects of the two treatments and joint tests of their effect relative to the control. We report four results on letter content: writing a letter about (a) the public goods nature of higher education (b) the private goods nature (c) cost-effective spending and ROI, and (d) affordability. Panels reflect responses from 4,679 participants who completed surveys through Qualtrics and CloudResearch for the first experiment.

who reason that ideological distance has decreased, the change is even more pronounced: 4.8 percentage points (65%). This increased communication means that as a result of taxpayer reasoning, elected officials now receive communications that reflect a more complete and nuanced set of constituent concerns. While reasoning does not completely override partisan's key concerns (Republicans are still expressing concern about cost-effectiveness for example), it does seem to embolden them to express those concerns to out-partisan elected officials who would rarely hear them otherwise.

4. Mechanisms Underlying Reasoning Differences

We now turn to studying why individuals reason differently. Documenting the mechanisms helps to clarify the drivers of demand and polarization in higher education and sheds light on the potential effects in other policy contexts. Understanding these mechanisms are especially policy relevant as individuals often lack guidance or framing on how to interpret information (as in Stantcheva, 2021) or get guidance from like-minded individuals (Levy and Razin, 2019).

We consider three broad classes of psychological mechanisms as defined in Benjamin (2019):

1. Neoclassical reasoning where individuals update using Bayes Rule and would update about spending vs cost-effectiveness based on the relative precision of their priors

2. Preference-based motivated reasoning where individuals interpret evidence as "good news" to update toward better states of the world (such as reduced over- and under-provision, less waste, or more effective policies)

3. Prior-based motivated reasoning where individuals update in ways that confirm their baseline perceptions about spending or cost-effectiveness

We first consider neoclassical reasoning where individuals Bayesian update after receiving information given its prominence in economic models. In these models, individuals should update their beliefs solely based on the precision of priors and information content of the signals, and not based on their party. In our tests of this potential mechanism, we focus on how individuals respond to the signals in our treatments differently by prior and party. We proxy for prior precision with previous experiences with higher education, time spent engaging with the information treatment, and the cross-sectional variances of priors.

The simple Bayesian framework has several implications that are inconsistent with our data. First, we find that Republicans and Democrats and Independents who underestimate

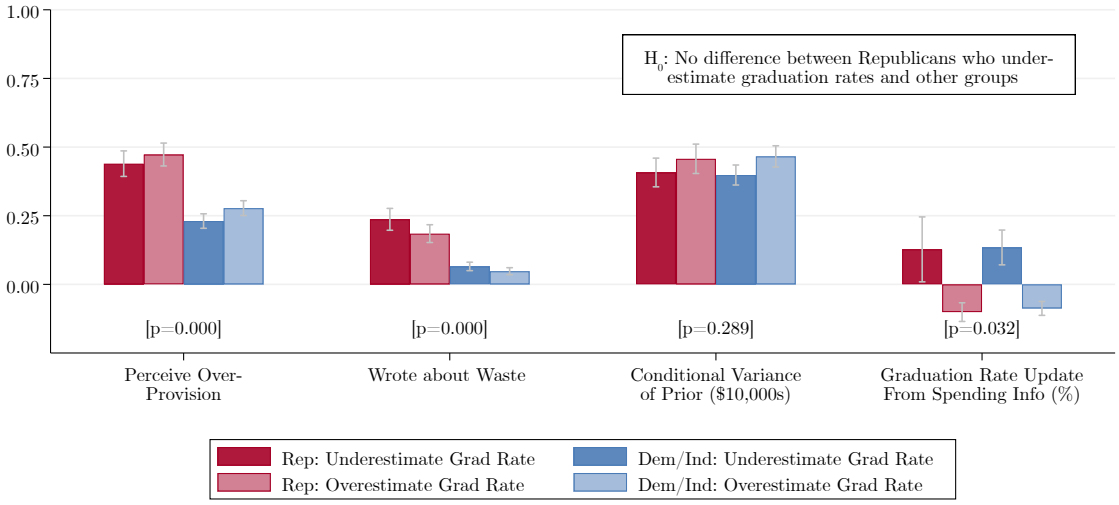
graduation rates attribute graduation information differentially across spending and cost-effectiveness despite having the same graduation-rate priors and similar proxies for prior precision (Figure 5). Second, Republicans update asymmetrically about spending vs cost-effectiveness to learning the graduation rate is higher vs lower, but a Bayesian's attribution depends on priors and signal precision, not the direction of the surprise. Third, since Republicans who underestimate graduation rates believe there is a positive causal effect of spending on graduation rates (Figure A7), a Bayesian holding their beliefs would raise spending perceptions after learning graduation is higher, inconsistent with Figure 5. Without using complex heterogeneous-prior models to rationalize differences in updating as neoclassical, this evidence suggests individuals may engage in some form of motivated reasoning.

In the remainder of this section, we turn to studying motivated reasoning. Our goal is two-fold. First, we provide direct evidence in favor of motivated reasoning as the mechanism underlying our results. Second, we aim to differentiate between prior and preference-based reasoning to provide further insights into the cognitive processes that we expect shape how individuals respond to news across a variety of settings. We present this evidence in Figures 9 and 10, and Appendix Figure A7.

Following our discussions from Section 1, we first consider preference-based motivated reasoning where individuals update toward "better" states of the world. Recall that the model suggested two definitions of better: higher ω and smaller $|\widehat{W}_i|$. In our experiment, whether reasoning about spending or cost-effectiveness creates good news depends on the interaction of two baseline characteristics for each group: (1) whether the signal suggests that G is higher or lower and (2) baseline perceptions of over and under-provision (Figure 6). Because Republicans tend to perceive over-provision at baseline whereas Democrats and Independents tend to perceive under-provision, the four party-by-prior groups fall into different cells of these two characteristics. We now examine each group separately to consider whether their behavior is consistent with either type of preference-based reasoning. For both groups of Republicans, the "good" states of the world both push toward only one type of reasoning, producing a sharp test for this preference based theory; for Democrats and Independents the predictions between prior and preference-based reasoning are suggestive but not sharp, and we consider prior-based motivated reason afterwards. We end our discussion of preference-based reasoning by turning more directly to predicted perceptions of over- and under-provision.

Republicans who underestimate graduation rates: For this group, reasoning about spending implies unambiguously worse news than reasoning about cost-effectiveness. Reasoning about spending creates bad news because it leads the perceived policy wedge to widen, while having no effect on ω. Instead, reasoning about cost-effectiveness creates both types

Figure 9: Features of Cognitive Processes by Party and Prior



Note: This figure illustrates differences in individual characteristics, beliefs, or actions by partisanship and by prior perceptions. Bars for each group represent the share of individuals who perceive over-provision and who wrote letters about waste (measures of preference-based reasoning), the conditional variance of spending priors (neoclassical), and updating about graduation from spending information (prior-based). Hypothesis tests report the p-values for a binary regression of each outcome on an indicator for Republicans who underestimate graduation rates. The results reflect responses from all participants recruited for our second experiment from CloudResearch.

of good news because it reduces the wedge and raises ω. Consistent with preference-based reasoning, this group is the only one that reasons about cost-effectiveness. We find additional confirmatory evidence these mechanisms in individuals' short letters to policymakers and in their stated first order-considerations about higher-education spending. We measure concerns about over-provision and cost-effectiveness based on their use of "waste" in these responses. The second series in Figure 9 shows that waste is more likely to be a top-of-mind concern for these Republicans perhaps consistent with greater "fiscal conservatism." (see similar finding in Stantcheva, 2021). Evidence from their free-response text suggests that part of what makes over-provision a "bad" state of the world for these Republicans is that their tax dollars are "wasted" when they are spent on students who do not graduate.[40]

Republicans who overestimate graduation rates: In contrast with Republicans who under-estimated graduation rates, for this group, reasoning about spending leads to unambiguously better news than reasoning about cost-effectiveness. Reasoning down about spending reduces perceived over-provision wedge, but while reasoning about cost-effectiveness

[40]For example, after learning the graduation information, one respondent wrote "I was shocked that [our state] was ranked number 2 but that makes me feel good about my tax dollars at work." Another wrote "colleges are doing a poor job if 1/3 drop out without a degree." Reasoning about cost-effectiveness moves them away from this bad state of the world.

would lower ω *and* imply even more severe over provision. Consistent with preference-based reasoning, we find that this group endogenously reasons about spending. The difference in attribution between spending and cost-effectiveness across Republicans with different priors therefore comes from the fact that since they receive different signals about G, there are different feasible options to interpret those signals as good news. The within Republican, across prior differences in attribution because of the available good news helps validate preference-based reasoning as the mechanism. This direction-dependent attribution is a key feature of motivated reasoning (Thaler, 2024; Little, 2025).

Unlike both Republican groups, where only one attribution type constitutes good news and the mechanism therefore makes a unique, falsifiable prediction, preference-based reasoning does not pin down a single prediction for Democrats and Independents. Both routes can be rationalized as (relatively) good news depending on how they weight wedge-reduction against productivity. We next discuss whether these groups' behavior is consistent with preference-based reasoning rather than direct tests, and draw on independent evidence from their survey and free-text responses to assess whether the implications are plausible.

Democrats/Independents who underestimate graduation rates: For this group, reasoning about spending shrinks the wedge with no effect on ω while reasoning about cost-effectiveness leads ω to be larger—raising ideal spending widens amount of perceived under-provision. They choose to reason about spending, shrinking the wedge, but not updating about ω. Relative to Republicans who receive the same information content, this group is much more likely to emphasize access and affordability in their letters and free responses, which may indicate that appropriate spending levels are more valued than productivity, consistent with our finding that they reason about spending. We additionally note that reasoning about cost-effectiveness means that it is precisely the implied improvement in ω itself that exacerbates under-provision, which is unlikely to be good news.

Democrats/Independents who overestimate graduation rates: Similar to other Democrats and Independents, this final group faces a trade-off if they try to attribute information toward good news. Individuals can reason down about spending which widens the under-provision wedge, or they reason about cost-effectiveness which pulls down ω but reduces ideal spending toward the status quo. Because both types of reasoning imply bad news, this group does not provide a clean test of the mechanism. However, if preference-based reasoning is the mechanism driving our results, it indicates that this group would rather have worse under-provision than worse institutions. This conjecture is consistent with this groups' responses to the free-text and other survey questions. For example, they are almost twice as likely as other Democrats and Independents to write legislators about the public-goods nature of higher education, 19 pp (55%) much more likely to believe that

their state spends well at baseline, and tend to believe that the marginal dollar has larger effects on enrollment, graduation rates, student's careers, and social welfare.

Predicted perceptions of over- and under-provision: As a more direct test of model-consistent preference-based reasoning, we now consider beliefs about over- and under-provision. Following the discussion surrounding Figure 6, perceptions of this policy wedge shape whether reasoning about cost-effectiveness vs spending generates good news. We therefore supplement our previous evidence by party and prior, which are correlated with these beliefs, by further considering the relevant primitive more directly. To do this, we use data from our control group in Experiment 1 on their beliefs about state spending and ideal spending to predict whether individuals in Experiment 2 (for whom we measure belief updating) perceive over- or under-provision at baseline.[41] We then reconsider our updating analysis in Section 3.2 where we instead estimate heterogeneity by the sign of the graduation information shock and whether the individual is predicted to believe the state spends too much (over-provision) or too little (under-provision).

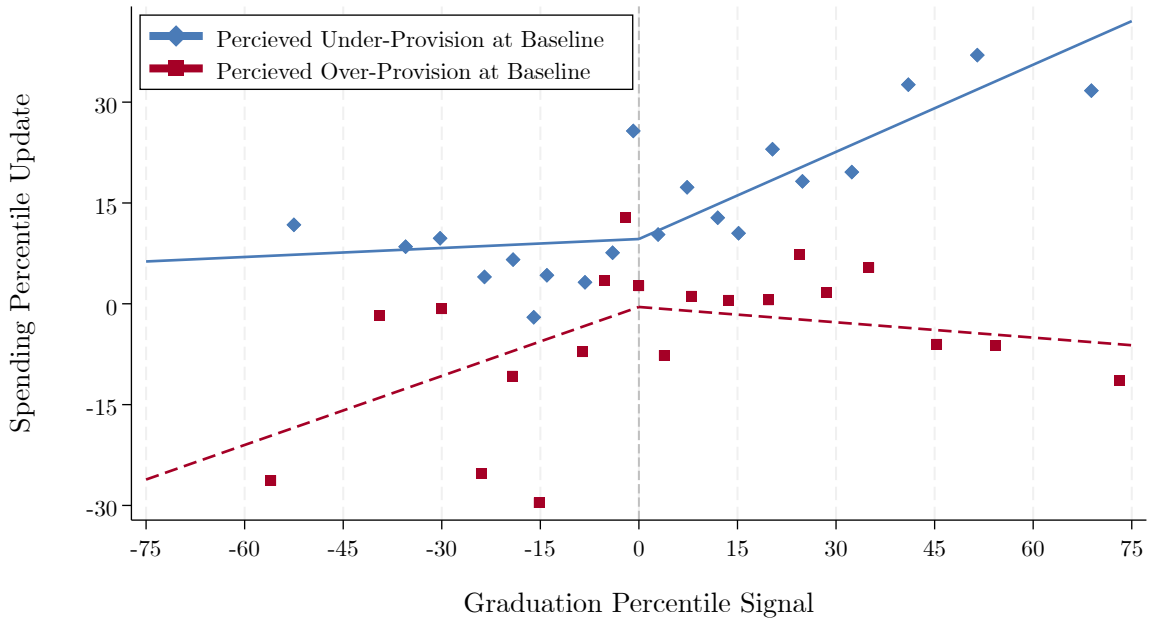
The results in Figure 10 provide further evidence in support of preference-based motivated reasoning: individuals reason in ways that better align their ideal policy with their state's policy. Among individuals who learn that the graduation rate in their state is more highly ranked (right-hand side of the figure), individuals who we predict initially perceive over-provision reason that spending is effectively unchanged (and therefore productivity is higher) because reasoning that state spending is higher would exacerbate over-provision generating bad news. Analogously, individuals who receive the same information but initially perceive under-provision reason that state spending is higher to "correct" the perceived policy wedge, whereas reasoning about productivity would worsen perceived under-provision. We see the reverse pattern when individuals learn their state is less highly ranked, again consistent with individuals endogenously reasoning in ways to reduce the policy wedge. The results indicate heterogeneous updating from graduation signals by perceptions of over- and under-provision ($p = 0.02$).

We interpret these patterns to be largely consistent with preference-based motivated reasoning. Preference-based reasoning can explain why we see heterogeneous attribution within Republicans who receive different signals about G as well as for Republicans and Democrats and Independents who underestimate G. Preference-based reasoning also aligns with heterogeneous attribution to different signals by perceptions of over- and under-provision.

However, a tension in this interpretation is: why do Democrats and Independents both

[41] We use cross-validated lasso for the prediction using beliefs, demographics, and the state of residence. We limit the sample to individuals in Experiment 1 from CloudResearch for the prediction to better match the sample in Experiment 2.

Figure 10: Misaligned policies and belief updating



Note: This figure illustrates differences in updating by predicted perceptions of over- and under-provision. We use data from our CloudResearch sample in Experiment 1 on beliefs, state of residence, and demographics to predict the likelihood each participants in our CloudResearch sample in Experiment 2 perceives over- and under-provision. We then estimate the extent of updating about spending percentile rank as a linear spline of graduation percentile rank information separately for those more likely to perceive over- vs under-provision.

reason about spending from different information? We offer several explanations. First, our discussion by party and prior, by construction, masks within group heterogeneity in beliefs about over- and under-provision. When we specifically look at these beliefs (Figure 10), our evidence aligns with preference-based reasoning. Second, this could come from asymmetric costs on learning productivity and spending are low versus high or difference in weights on the trade-off between types of good or bad news. An alternative is that reasoning about spending is "top of mind" (Haaland et al., 2024) given their focus on concerns about underfunding institutions. These results could also be consistent with individuals reasoning to confirm their priors about the causal effects of spending (Figure A7), which we turn to next.

Finally, we consider prior-based reasoning where individuals update to confirm their priors. First, we find no evidence of prior-based reasoning based on production technology heuristics. If individuals attribute signals in ways that confirm their mental models of production (i.e., attributing high/low graduation to high/low spending or high/low cost-effectiveness), then prior not partisanship should explain reasoning differences. But while Republicans who think graduation rates are low are more likely to attribute that to low cost-

effectiveness at baseline, there is no heterogeneity between who do and those who attribute it to relatively low spending. Furthermore, Democrats and Independents with the same priors update only about spending. So this form of prior-based reasoning cannot explain reasoning difference by party and prior.

The updating patterns are potentially consistent with prior-based reasoning if individuals act to confirm their beliefs about the causal effects of spending. However, the patterns are inconsistent with several other key features of the data. First, the Republicans who underestimate graduation rates do believe there is a positive causal effect of spending, on average, and so if they were to confirm their priors, we would estimate a positive slope in Figure 5. Second, prior-based reasoning about cost-effectiveness would lead individuals to confirm their existing effectiveness beliefs. Republicans who underestimate graduation rates perceive the lowest cost-effectiveness, proxied by perceived $\frac{S}{G}$ and the causal effects of spending. Prior-based reasoning should push them to interpret the graduation signal as consistent with low effectiveness, but instead, they update toward higher cost-effectiveness (Figure 5), disconfirming their priors. As a final test, we measure how individuals who learn spending information update their beliefs about graduation rates in Experiment 2. The final series of Figure 9 shows that reasoning about spending leads individuals to have more accurate posteriors about graduation rates, rather than protecting their initial beliefs.

Overall, the evidence strongly suggests that motivated reasoning is the mechanism driving our results, and that it likely comes in the form of preference-based reasoning about over- and under-provision. We document patterns in our treatment effects, belief updating, and qualitative data that is difficult to reconcile with Bayes Rule or neoclassical reasoning, and appears to be consistent with individuals interpreting new signals about higher education as good news. While we acknowledge that a different form of motivated reasoning (that is, prior-based) could be partially consistent with our data, the full set of results make this explanation unlikely.

5. Polarized Communication Distorts Policymaker Engagement on the Issues

How the reduced polarization and improved political participation translate to policy depends on the supply-side decisions of the elected officials who receive individuals' letters. When affective polarization reduces cross-party letter-writing and when constituents hold inaccurate perceptions of provision that affect the content of their communications, officials receive a biased signal about true constituent demand. Based on our two-sided model of political communication and policymaker engagement in Section B.4, our third experiment studies policymakers' responses to constituent demand. If constituent demand does in fact

shape policymakers' engagement with higher education issues, increased cross-party dialogue could de-polarize actual policies that represent constituents better.

5.1 Design for Experiment on Policymaker Engagement

In the first two experiments we collected letters from the constituents of 48 governors and 190 state legislators.[42] For our third experiment we randomize whether elected officials receive the constituent letters and information about demand in April 2023. We then estimate the causal effect of receiving information about constituent demand on elected official behavior by comparing the 2023 behavior of officials who receive the information earlier to those who will receive it later.[43]

Within each state, parties (e.g., Michigan Republicans) are randomized into one of three conditions. In each state one party is randomized into our main treatment group, Constituent Demand. These parties receive an email containing the following:[44] (1) summary statistics from the demand experiments highlighting how stated ideal spending is higher than actual national spending in the US, on average, by political partisanship, and by age; (2) up to three highlighted positive letters about the need for more public investment in higher education in their state; (3) a link to a document with all collected letters; (4) a second link to a state-specific resolution for maintaining the level of higher education appropriations per student for them to consider and propose; and (5) an offer to discuss the survey findings with us.[45]

The remaining party in each state are then randomized equally into a pure control group, which have not been contacted, and a Contact Only control group, which receives an initial email from us in 2023 but without specific information about constituent preferences, containing only the resolution and an offer to discuss more. As a result, each state has one state party in the Constituent Demand treatment and one in either of the two control groups.

We note that the information sent to elected officials is, on average, a positive shock to perceived constituent demand for two reasons. First, as we document in Section 3, baseline ideal spending across partisan groups is higher than current state policy, signaling under-provision. Second, the information treatments in Experiments 1 and 2 uniformly increased stated ideal spending. We therefore discuss and interpret the results given that the information to policymakers should, if anything, nudge them to consider higher spending policies.

[42] Individuals could send a letter to up to five elected officials in their state (except in Nebraska, due to its unicameral legislature). We had few letters from North Dakota and South Dakota and therefore excluded them from the randomization.

[43] The experiment and pre-analysis plan were registered as AEARCTR-0011306.

[44] For elected officials where an email was not publicly available, we use their online contact form.

[45] While our outcome measures are based on our interactions with the elected officials, Butler and Nickerson (2011) and Hager and Hilbig (2020) show that similar changes in exposure to constitution demand as we measure do impact the legislative behavior of elected officials.

5.2 Policymakers Respond to Constituent Demand

For each contacted elected official, we measure their engagement with higher education policy by whether they view the attached resolution, whether they reply to the email, and whether they meet with us to discuss the resolution further.[46] For each of our higher education engagement outcomes, H_j, for legislator j, we estimate our treatment effects from the following linear regression:

$$H_j = \phi_0 + \phi_1 \text{Constituent Demand}_j + \phi_2 \text{Contact Only}_j + \psi X_j + \varepsilon_j \tag{5}$$

where ϕ_1 and ϕ_2 give the causal effect of receiving information about constituent demand on elected official engagement. In our specifications, we also control for the elected official's party and their chamber. Since we conduct a clustered paired experiment, we cluster our standard errors by state and do not include state fixed effects (following de Chaisemartin and Ramirez-Cuellar, 2020).[47]

Consistent with our model of policymaker engagement, we find that providing information about relatively high constituent demand increases engagement from elected officials (Figure 11). Elected officials in the Constituent Demand treatment are 15 percentage points more likely to open our resolution to maintain higher education funding compared to those who only receive a generic email ($p = 0.034$). This is largely driven by Republican officials ($p = 0.079$), with a much smaller effect for Democrats that is not statistically significant. Similarly, the Constituent Demand treatment leads elected officials, especially Republicans, to engage more on higher education issues by responding to our emails,[48] while our Contact Only treatment does not lead officials to engage in this way.[49]

Exploratory analyses suggest that party legislative control is an important moderator of these effects, as was the case with individuals' ideal spending and political participation. In the Contact Only treatment, state legislators are much less likely to engage if they are in the minority party of their chamber. Appendix Table A5 shows that for each 10 percentage point increase in the Republican share, Democrats are 10pp less likely (17%) to view the

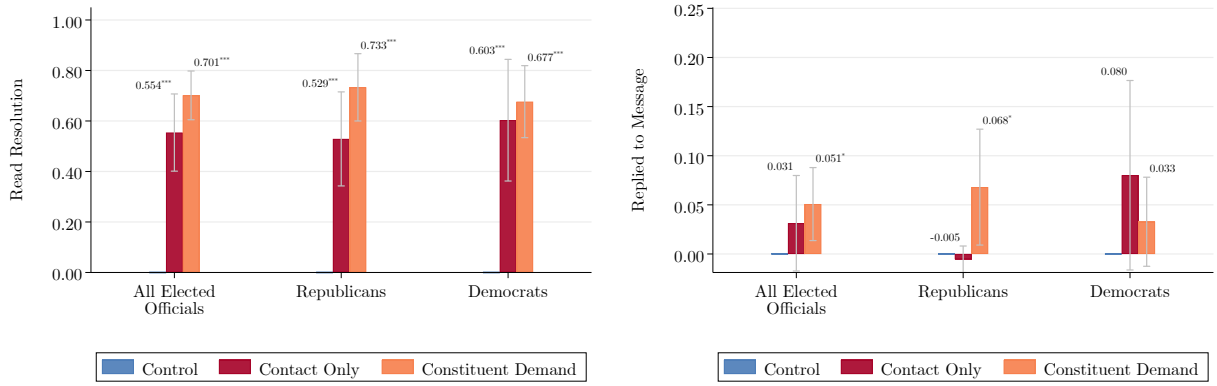
[46] We also observe whether each official in the Constituent Demand and Contact Only groups opens the email and whether those in the *Constituent Demand* treatment view the full list of letters.

[47] Including state fixed effects has a minimal effect on our main estimates for all legislatures. However, we cannot include them when limiting our analysis to Republicans or Democrats.

[48] The very small negative effect on "Contact Only" for Republicans is due to the fact that we include controls for chamber based on our randomization design. However, since Republican Governors are more likely to respond than members of the state House and state Senate, and Republican Governors are slightly overrepresented in "Contact Only," we would expect to have received a response from a Republican Governor in that treatment, but do not.

[49] For Republican-elected officials, the difference in the likelihood they respond to our Constituent Demand email, compared to the generic Contact Only email, is statistically different from 0 ($p = 0.024$).

Figure 11: Constituent Demand Boosts Engagement on Higher Education



(a) Open Resolution to Maintain Spending

(b) Send an Email Reply

Note: Each figure presents an outcome of interest by treatment and elected official characteristics along with 95% confidence intervals on the effects of the two treatments. Panel (a) reports the share of that elected official who open our resolution to maintain higher education funding. Panel (b) reports the share of elected officials who reply to our email. Both panels reflect responses from the 238 elected officials in our sample. Standard errors are clustered by state. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, $^{+}p < 0.1$

resolution and 1pp (13%) less likely to respond to our email. A similar increase makes Republicans weakly more likely to engage. Receiving the Constituent Demand treatment completely erases this difference. In this treatment, both Democrats and Republicans have essentially flat gradients over majority for both outcomes. Conversations with legislators who met with us suggest disillusionment as a possible mechanism. Some Democrats expressed discouragement about higher education when in the minority party. Consistent with our model of policymaker engagement, minority officials face higher costs of engaging on issues where they have limited ability to move policy. The constituent demand treatment may level the gradient in engagement because the information reveals relatively broad support for higher education across constituents of both political parties.

The results from our three experiments suggest that elected officials may be shaping higher education policy in response to distorted perceptions of constituent preferences and in response to constituents' inaccurate perceptions of state higher education. This likely heightens polarization in public discussions around higher education policy, ultimately influencing which policies are implemented. While we find affective polarization is an important driver of distorted communication, our results that Republican constituents and elected officials respond the most to information indicate that within-party barriers likely also play an important role.

6. Conclusion

Despite its positive effects on student outcomes (Bound and Turner, 2007; Bound et al., 2010; Zimmerman, 2014; Deming and Walters, 2017) and society more broadly (Moretti, 2004), state investment in public higher education has been a low priority and marked by strong partisan disagreements. Our findings suggest that perceptions of the returns on investment are an important driver of both limited public support and polarized attitudes. When taxpayers, especially Republicans, believe their state spends a lot on public higher education without producing a sufficient number of graduates, they are less willing to support the system with their tax dollars. Correcting these perceptions reduces polarization, suggesting that not all ideological differences are irreconcilable. Moreover, these sentiments matter for policy, as they affect how constituents communicate with policymakers and in turn affect policymaker behavior.

Our findings indicate that state policymakers seeking to build support for higher education may benefit from tying public investment to cost-effectiveness measures and then communicating the associated returns to their constituents. Comments in the letters to elected officials collected in our experiments suggest that taxpayers may be more open to funding students who are likely to graduate and contribute to the economy, thereby increasing the returns.[50]

Moreover, our results inform when and why we should expect individuals' policy views to change, with implications beyond higher education. Haaland et al. (2023) notes the counter-intuitive pattern that even though information successfully changes beliefs, it often does not affect stated policy choices. Our results suggest that one reason this might be the case is that these papers, like ours, all provide information about equilibrium objects. Whenever an economic object is co-determined by both policy and exogenous factors, information about that object could lead to updating about either the effectiveness of current policy or the need for policy intervention. By identifying perceptions of under- and over-provision as a theoretically-grounded metrics relevant for public spending in all policy areas that could drive preference-based reasoning, we document differences in how individuals choose to interpret equilibrium signals about education—differences that lead most groups to have highly inelastic policy preferences just as in earlier work.

Finally in the broader context of increasingly polarized political systems across the world, our results show how perceptions of the policy process also affects how partisans view each

[50] As one respondent commented, "If we give more money toward students should be requirement [sic] they reside in Wisconsin for period of time or are required to reimburse rather than taxpayer funding education for them to get money and then move elsewhere. Possibly State tax credit after than graduate as long ad [sic] paying Wisc taxes."

other. Our work provides evidence that ideological and affective polarization reinforce one another through a shared reasoning mechanism. Therefore, just as state divestment in public higher education may not only negatively affect colleges and students but also have broader implications for societal cohesion, other polarizing policies implemented by both political parties run the risk of further reinforcing the polarization that gave rise to them. Interestingly, we find that increasing transparency about service provision can lessen these negative social effects. While further research is needed to determine whether altering perceptions for other public services can yield similar reductions in polarization, our results help us understand the extent to which partisan reasoning matters, and our work provides a framework for assessing its role in other settings.

References

Agrawal, David R, William H Hoyt, and John D Wilson (2022) "Local Policy Choice: Theory and Empirics," *Journal of Economic Literature*, 60 (4), 1378–1455.

Akesson, Jesper, Robert W Hahn, Robert D Metcalfe, and Itzhak Rasooly (2022) "Race and Redistribution in the United States: An Experimental Analysis,"Technical report, National Bureau of Economic Research.

Alesina, Alberto, Matteo F. Ferroni, and Stefanie Stantcheva (2021) "Perceptions of Racial Gaps, their Causes, and Ways to Reduce Them," *National Bureau of Economic Research* (w29245), `https://www.nber.org/papers/w29245`.

Alesina, Alberto, Armando Miano, and Stefanie Stantcheva (2020) "The Polarization of Reality," in *AEA Papers and Proceedings*, 110, 324–28.

——— (2023) "Immigration and Redistribution," *The Review of Economic Studies*, 90 (1), 1–39.

Alesina, Alberto, Stefanie Stantcheva, and Edoardo Teso (2018) "Intergenerational mobility and preferences for redistribution," *American Economic Review*, 108 (2), 521–554.

Benjamin, Daniel J (2019) "Errors in probabilistic reasoning and judgment biases," *Handbook of Behavioral Economics: Applications and Foundations 1*, 2, 69–186.

Bertrand, Marianne and Emir Kamenica (2023) "Coming Apart? Cultural Distances in the United States Over Time," *American Economic Journal: Applied Economics*.

Blesse, Sebastian, Philipp Lergetporer, Justus Nover, and Katharina Werner (2023) "Transparency and policy competition: Experimental evidence from German citizens and politicians."

Bolet, Diane and Rosie Campbell (2024) "Does (non-) localness affect MPs' levels of responsiveness? Evidence from a UK field experiment," *British Journal of Political Science*, 54 (4), 1446–1456.

Bound, John, Breno Braga, Gaurav Khanna, and Sarah Turner (2019) "Public universities: The supply side of building a skilled workforce," *RSF: The Russell Sage Foundation Journal of the Social Sciences*, 5 (5), 43–66.

Bound, John, Michael F Lovenheim, and Sarah Turner (2010) "Why Have College Completion Rates Declined? An Analysis of Changing Student Preparation and Collegiate Resources," *American Economic Journal: Applied Economics*, 2 (3), 129–57.

Bound, John and Sarah Turner (2007) "Cohort Crowding: How Resources Affect Collegiate Attainment," *Journal of public Economics*, 91 (5-6), 877–899.

Broockman, David E. and Timothy J. Ryan (2016) "Preaching to the Choir: Americans Prefer Communicating to Copartisan Elected Officials," *American Journal of Political Science*, 60 (4), 1093–1107, 10.1111/ajps.12228.

Bursztyn, Leonardo, Georgy Egorov, Ingar Haaland, Aakaash Rao, and Christopher Roth (2023) "Justifying dissent," *The Quarterly Journal of Economics*, 138 (3), 1403–1451.

Butler, Daniel M and Adam M Dynes (2016) "How politicians discount the opinions of constituents with whom they disagree," *American Journal of Political Science*, 60 (4), 975–989.

Butler, Daniel M and David W Nickerson (2011) "Can Learning Constituency Opinion Affect How Legislators Vote? Results from a Field Experiment," *Quarterly Journal of Political Science*, 6 (1), 55–83.

Carlson, Taylor N. and Jaime E. Settle (2022) *What Goes Without Saying*: Cambridge University Press.

Cattaneo, Maria, Philipp Lergetporer, Guido Schwerdt, Katharina Werner, Ludger Woessmann, and Stefan C. Wolter (2020) "Information provision and preferences for education spending: Evidence from representative survey experiments in three countries," *European Journal of Political Economy*, 63, 101876, 10.1016/j.ejpoleco.2020.101876.

de Chaisemartin, Clement and Jaime Ramirez-Cuellar (2020) "At What Level Should One Cluster Standard Errors in Paired and Small-Strata Experiments?,"Technical report, National Bureau of Economic Research.

Chinoy, Sahil, Nunn Nathan, Sequeira Sandra, and Stantcheva Stefanie (2026) "Zero-sum thinking and the roots of US political divides," *American Economic Review*, 116, 1052–1096.

Conzelmann, Johnathan G, Steven W Hemelt, Brad J Hershbein, Shawn Martin, Andrew Simon, and Kevin M Stange (2023) "Grads on the go: Measuring college-specific labor markets for graduates," *Journal of Policy Analysis and Management*.

Deming, David J and Christopher R Walters (2017) "The Impact of Price Caps and Spending Cuts on US Postsecondary Attainment,"Technical report, National Bureau of Economic Research.

Desmet, Klaus and Romain Wacziarg (2021) "The Cultural Divide," *The Economic Journal*, 131 (637), 2058–2088.

Doyle, William R (2007) "Public Opinion, Partisan Identification, and Higher Education Policy," *The journal of higher education*, 78 (4), 369–401.

Ferrario, Beatrice and Stefanie Stantcheva (2022) "Eliciting People's First-Order Concerns: Text Analysis of Open-Ended Survey Questions," in *AEA Papers and Proceedings*, 112, 163–169.

Giaccobasso, Matias, Brad Nathan, Ricardo Perez-Truglia, and Alejandro Zentner (2025) "Where do my tax dollars go? tax morale effects of perceived government spending,"Technical Report 4.

Grigorieff, Alexis, Christopher Roth, and Diego Ubfal (2018) "Does Information Change Attitudes Towards Immigrants? Representative Evidence from Survey Experiments," *Representative Evidence from Survey Experiments (March 10, 2018)*.

Haaland, Ingar K, Christopher Roth, Stefanie Stantcheva, and Johannes Wohlfart (2024) "Measuring what is top of mind,"Technical report, National Bureau of Economic Research.

Haaland, Ingar and Christopher Roth (2020) "Labor market concerns and support for immigration," *Journal of Public Economics*, 191, 104256.

Haaland, Ingar, Christopher Roth, and Johannes Wohlfart (2023) "Designing Information Provision Experiments," *Journal of Economic Literature*, 61 (1), 3–40.

Hager, Anselm, Lukas Hensel, Christopher Roth, and Andreas Stegmann (2023) "Voice and Political Engagement: Evidence from a Field Experiment," *The Review of Economics and Statistics*, 1–34, 10.1162/rest_a_01320.

Hager, Anselm and Hanno Hilbig (2020) "Does public opinion affect political speech?" *American Journal of Political Science*, 64 (4), 921–937.

Hartig, Hannah (2020) "Democrats Overwhelmingly Favor Free College Tuition, while Republicans are Divided by Age, Education."

Hendren, Nathaniel and Ben Sprung-Keyser (2020) "A Unified Welfare Analysis of Government Policies," *The Quarterly Journal of Economics*, 135 (3), 1209–1318.

Hermes, Henning, Philipp Lergetporer, Fabian Mierisch, Guido Schwerdt, and Simon Wiederhold (2024) "Does information about inequality and discrimination in early child care affect policy preferences?".

Holz, Justin, Rafael Jiménez Durán, and Eduardo Laguna-Müggenburg (2020) "Quantifying Repugnance to Price Gouging with An Incentivized Reporting Experiment," *Available at SSRN 3750332*.

Hoxby, Caroline M (2018) "The productivity of US postsecondary institutions," in *Productivity in higher education*, 31–66: University of Chicago Press.

Iyengar, Shanto, Yphtach Lelkes, Matthew Levendusky, Neil Malhotra, and Sean J Westwood (2019) "The Origins and Consequences of Affective Polarization in the United States," *Annual Review of Political Science*, 22 (1), 129–146.

Iyengar, Shanto, Gaurav Sood, and Yphtach Lelkes (2012) "Affect, not ideology: A social identity perspective on polarization," *Public opinion quarterly*, 76 (3), 405–431.

Jones, Jeffrey M. (2024) "U.S. Confidence in Higher Education Now Closely Divided."
Kuziemko, Ilyana, Michael I Norton, Emmanuel Saez, and Stefanie Stantcheva (2015) "How Elastic are Preferences for Redistribution? Evidence from Randomized Survey Experiments," *American Economic Review*, 105 (4), 1478–1508.
Laderman, Sophia and Kelsey Heckert (2021) "SHEF: State Higher Education Finance, FY 2020.," *State Higher Education Executive Officers*.
Lelkes, Yphtach (2018) "Affective Polarization and Ideological Sorting: A Reciprocal, Albeit Weak, Relationship," in *The Forum*, 16, 67–79, De Gruyter.
Lergetporer, Philipp, Guido Schwerdt, Katharina Werner, Martin R. West, and Ludger Woessmann (2018) "How Information Affects Support for Education Spending: Evidence from Survey Experiments in Germany and the United States," *Journal of Public Economics*, 167, 138–157, 10.1016/j.jpubeco.2018.09.011.
Lergetporer, Philipp, Katharina Werner, and Ludger Woessmann (2020) "Educational Inequality and Public Policy Preferences: Evidence from Representative Survey Experiments," *Journal of Public Economics*, 188, 104226.
——— (2021) "Does ignorance of economic returns and costs explain the educational aspiration gap? Representative evidence from adults and adolescents," *Economica*, 88 (351), 624–670.
Lergetporer, Philipp and Ludger Woessmann (2023) "Earnings Information and Public Preferences for University Tuition: Evidence from Representative Experiments," *Jounral of Public Economics*.
Levy, Gilat and Ronny Razin (2019) "Echo Chambers and their Effects on Economic and Political Outcomes," *Annual Review of Economics*, 11, 303–328.
List, John A, Paramita Sinha, and Michael H Taylor (2006) "Using Choice Experiments to Value Non-Market Goods and Services: Evidence from Field Experiments," *Advances in economic analysis & policy*, 5 (2).
Little, Andrew T (2025) "How to distinguish motivated reasoning from Bayesian updating," *Political Behavior*, 47 (4), 1501–1525.
Lumina Foundation, The (2021) "A Stronger Nation."
Mason, Lilliana (2018) *Uncivil Agreement: How Politics Became Our Identity*, Chicago, IL: University of Chicago Press.
Möbius, Markus M, Muriel Niederle, Paul Niehaus, and Tanya S Rosenblat (2022) "Managing self-confidence: Theory and experimental evidence," *Management Science*, 68 (11), 7793–7817.
Moretti, Enrico (2004) "Human Capital Externalities in Cities," in *Handbook of regional and urban economics*, 4, 2243–2291: Elsevier.
Mummolo, Jonathan and Erik Peterson (2019) "Demand Effects in Survey Experiments: An Empirical Assessment," *American Political Science Review*, 113 (2), 517–529.
Nguyen, Sophie, Rachel Fishman, and Olivia Cheche (2023) "Varying Degrees 2023: New America's Seventh Annual Survey on Higher Education."
Nyhan, Brendan and Jason Reifler (2010) "When Corrections Fail: The Persistence of Political Misperceptions," *Political Behavior*, 32 (2), 303–330.
Parker, Kim (2019) "The Growing Partisan Divide in Views of Higher Education," *Pew Research Center, August*.
Pereira, Miguel M (2022) "How do public officials learn about policy? A field experiment on policy diffusion," *British Journal of Political Science*, 52 (3), 1428–1435.
Peyton, Kyle (2020) "Does Trust in Government Increase Support for Redistribution? Evidence from Randomized Survey Experiments," *American Political Science Review*, 114 (2), 596–602.
Quadlin, Natasha and Brian Powell (2022) *Who Should Pay?: Higher Education, Responsibility, and the Public*: Russell Sage Foundation.
de Quidt, Jonathan, Johannes Haushofer, and Christopher Roth (2018) "Measuring and Bounding Experimenter Demand," *American Economic Review*, 108 (11), 3266–3302.
Roth, Christopher, Sonja Settele, and Johannes Wohlfart (2022) "Beliefs about public debt and the demand for government spending," *Journal of Econometrics*, 231 (1), 165–187.
Sevenans, Julie (2021) "How Public Opinion Information Changes Politicians' Opinions and Behavior," *Political Behavior*, 10.1007/s11109-021-09715-9.
Snyder, Thomas D, Cristobal De Brey, and Sally A Dillow (2019) "Digest of Education Statistics 2017, NCES 2018-070.," *National Center for Education Statistics*.
Stantcheva, Stefanie (2021) "Understanding Tax Policy: How do People Reason?," *The Quarterly Journal*

of Economics, 136 (4), 2309–2369.

——— (2023) "How to run surveys: A guide to creating your own identifying variation and revealing the invisible," *Annual Review of Economics*, 15 (1), 205–234.

Thaler, Michael (2024) "The fake news effect: Experimentally identifying motivated reasoning using trust in news," *American Economic Journal: Microeconomics*, 16 (2), 1–38.

Webster, Steven W and Alan I Abramowitz (2017) "The Ideological Foundations of Affective Polarization in the US Electorate," *American Politics Research*, 45 (4), 621–647.

Zelizer, Adam (2018) "How Responsive are Legislators to Policy Information? Evidence from a Field Experiment in a State Legislature," *Legislative Studies Quarterly*, 43 (4), 595–618.

Zimmerman, Seth D. (2014) "The Returns to College Admission for Academically Marginal Students," *Journal of Labor Economics*, 32 (4), 711–754, 10.1086/676661.

Online Appendix

A Additional Tables and Figures **52**

B Theoretical Appendix **64**

B.1 Baseline Model 64

B.2 Model Extensions 64

B.3 Constituent Political Communication 66

B.4 Elected Official Engagement with Constituent Political Communication 67

B.5 Reasoning, Policy Views, and Perceived Gaps 69

C Survey Questions and Treatments for Experiments **74**

C.1 Measuring Priors 74

C.2 Information Treatments 74

C.3 Survey Outcomes 74

C.4 Behavioral Outcomes 76

C.5 Demographic Questions 77

C.6 Additional Questions 78

C.7 Updating Questions 78

C.8 Experiment 3: *Constituent Demand* Treatment 79

C.9 Experiment 3: *Contact Only* Treatment 80

A. Additional Tables and Figures

Table A1: Treatment Balance for Experiment 1

Panel A: Belief Errors	Mean	Control	Rate	Rate and Rank	Control - Rate	Control - Both
US graduation rate	1.283	1.078	2.052	0.704	-0.974	0.375
	(17.5)				[p=0.114]	[p=0.556]
State Graduation Rate	0.591	0.246	1.195	0.316	-0.950	-0.070
	(19.1)				[p=0.166]	[p=0.918]
State Graduation Rank	6.799	6.619	6.756	7.021	-0.138	-0.402
	(16.0)				[p=0.809]	[p=0.485]
State Per-Student Spending	2894	2786	2873	3023	-87	-238
	(7019)				[p=0.730]	[p=0.346]
State Spending Rank	3.359	2.848	3.309	3.913	-0.461	-1.065
	(18.2)				[p=0.474]	[p=0.105]
Panel B: Respondent Characteristics	Mean	Control	Rate	Rate and Rank	Control - Rate	Control - Both
Female	0.500	0.494	0.494	0.512	0.000	-0.018
	(0.500)				[p=0.991]	[p=0.315]
Republican	0.368	0.377	0.362	0.367	0.015	0.010
	(0.482)				[p=0.385]	[p=0.579]
No College	0.348	0.345	0.349	0.349	-0.004	-0.004
	(0.476)				[p=0.802]	[p=0.801]
BA Degree	0.364	0.364	0.361	0.367	0.003	-0.003
	(0.481)				[p=0.878]	[p=0.845]
Age	61.98	61.11	60.93	60.89	0.18	0.23
	(16.2)				[p=0.755]	[p=0.699]
Attend Public	0.314	0.313	0.319	0.310	-0.007	0.002
	(0.464)				[p=0.695]	[p=0.893]
Child Attended	0.239	0.238	0.244	0.233	-0.006	0.005
	(0.426)				[p=0.709]	[p=0.746]
Child May Attend	0.722	0.708	0.734	0.724	-0.026	-0.016
	(0.448)				[p=0.111]	[p=0.323]
Follows College Sports	0.363	0.366	0.374	0.350	-0.007	0.016
	(0.481)				[p=0.670]	[p=0.357]
Observations	4,679	1,535	1,585	1,559	3,120	3,094

Note: Each row presents the overall sample mean, mean by treatment group, and the difference between the two treatments and control. The standard deviations are also listed in parentheses in the overall mean column.

Table A2: Treatment Balance for Experiment 2

Panel A: Belief Errors	Mean	Graduation	Spending	Spending & Graduation	Spending - Both	Spending - Graduation
US graduation rate	0.662	0.269	1.219	0.498	-0.951	-0.229
	(16.25)				[p=0.184]	[p=0.753]
State Graduation Rate	-0.068	-0.861	0.788	-0.126	-1.649	-0.735
	(18.44)				[p=0.042]	[p=0.374]
State Graduation Rank	3.405	3.703	2.988	3.524	0.715	0.179
	(14.97)				[p=0.287]	[p=0.786]
State Per-Student Spending	1775	1590	2073	1660	-483	-70
	(6643)				[p=0.101]	[p=0.815]
Sate Spending Rank	2.210	3.052	1.720	1.844	1.332	1.207
	(17.26)				[p=0.081]	[p=0.119]
Panel A: Belief Errors	Mean	Graduation	Spending	Spending & Graduation	Spending - Both	Spending - Graduation
Female	0.555	0.548	0.558	0.560	-0.010	-0.012
	(0.497)				[p=0.661]	[p=0.576]
Republican	0.326	0.329	0.322	0.328	0.008	0.001
	(0.469)				[p=0.715]	[p=0.970]
No College	0.226	0.215	0.231	0.232	-0.016	-0.017
	(0.418)				[p=0.379]	[p=0.357]
BA Degree	0.429	0.423	0.429	0.436	-0.006	-0.013
	(0.495)				[p=0.789]	[p=0.559]
Age	45.2	45.3	45.0	45.3	0.3	0.0
	(16.0)				[p=0.671]	[p=0.955]
Attend Public	0.453	0.468	0.436	0.456	0.032	0.012
	(0.498)				[p=0.144]	[p=0.590]
Child Attended	0.165	0.166	0.154	0.174	0.012	-0.008
	(0.371)				[p=0.474]	[p=0.646]
Child May Attend	0.778	0.779	0.777	0.778	0.003	0.001
	(0.416)				[p=0.892]	[p=0.949]
Follows College Sports	0.397	0.418	0.382	0.393	0.036	0.025
	(0.489)				[p=0.093]	[p=0.245]
Observations	3,037	1,024	1,017	996	2,041	2,020

Note: Each row presents the overall sample mean, mean by treatment group, and the difference between the two treatments and control. The standard deviations are also listed in parentheses in the overall mean column.

Table A3: Posterior Perceptions of Grads per Dollar Moderate Effects of Reasoning

	Graduation Signal	Spending Signal	Both Signals
Treatment Effects Conditional on Grads per Dollar	4	-246	-328
	(455)	(525)	(399)
	t=0.01	t=0.47	t=0.82

Note: This table reports the treatment effects from a pooled regression of all individuals for whom we can estimate posterior perceptions of cost-per-graduate in Experiment 1 or Experiment 2. We regress ideal spending on treatment effects, quadratics of this posterior, their interactions, and baseline demographic controls. Because grads per dollar is a ratio, we Windsorize the right tail at the 90th percentile of all posteriors.

Table A4: Treatment Balance for Experiment 3

	Mean	Pure Control	Contact Control	Constituent Demand	Constituent - Either Control	Constituent - Contact
Republican Governor	0.202	0.190	0.226	0.195	-0.013	-0.031
	(0.402)				[p= 0.777]	[p= 0.541]
Republican House	0.395	0.397	0.387	0.398	0.007	0.011
	(0.490)				[p= 0.777]	[p= 0.659]
Republican Sentate	0.403	0.414	0.387	0.407	0.007	0.020
	(0.492)				[p= 0.777]	[p= 0.448]
State's spending per student	$8,058	$7,883	$7,898	$8,227	$337	$330
	(3969)				[p= 0.148]	[p= 0.502]
Spending Rank (/50)	25.4	25.9	26.2	24.8	-1.2	-1.4
	(14.7)				[p= 0.156]	[p= 0.539]
State Rate (%)	59.0	59.1	59.8	58.5	-1.0	-1.3
	(8.7)				[p= 0.053]	[p= 0.360]
State Rank (/50)	25.0	25.0	23.4	25.8	1.6	2.3
	(14.6)				[p= 0.062]	[p= 0.342]

Note: Each row presents the overall sample mean, mean by treatment group, and the differences between the two controls and constituent demand and between the contact control and constituent demand. The standard deviations are also listed in parentheses in the overall mean column.

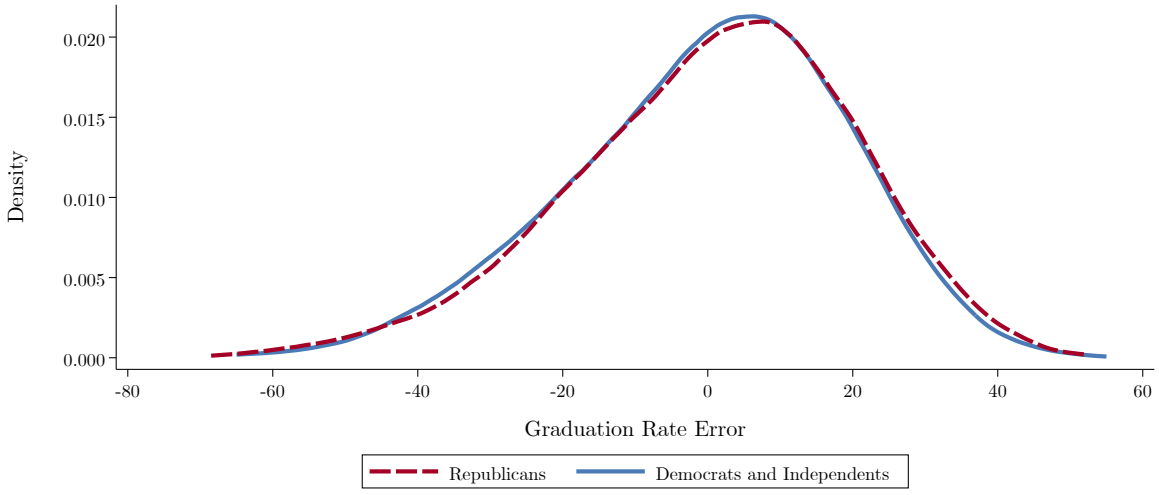
Table A5: Party Majority Moderates Baseline Policymaker Engagement

Panel A: Contact Only	Democrats Click	Republicans Click	Democrats Reply	Republicans Reply
Share Republican (10pp)	-0.10	0.04	-0.01	0.000
	(0.05)	(0.05)	(0.03)	-
Mean at 50/50	0.62	0.52	0.11	0.000
Test Equal Slopes		$[p = 0.06]$		-

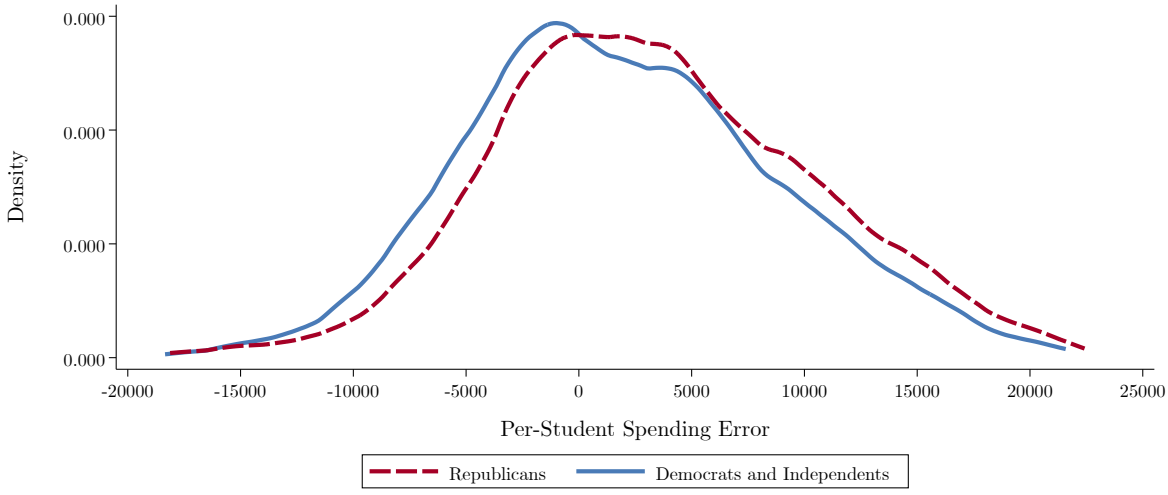
Panel B: Constituent Demand	Democrats Click	Republicans Click	Democrats Reply	Republicans Reply
Share Republican (10pp)	0.01	0.03	0.00	0.02
	(0.04)	(0.04)	(0.00)	(0.02)
Mean at 50/50	0.60	0.66	0.02	0.04
Test Equal Slopes		$[p = 0.57]$		$[p = 0.88]$

Note: This table shows how responses vary by political partisanship and congressional vote share. The sample is limited to state legislators and results report bivariate regressions of outcomes on $s = \text{pct_rep} - 0.5$ for each subgroup. Hypothesis test come from models interacting republican share with party.

Figure A1: Perceptions of Higher Education by Party



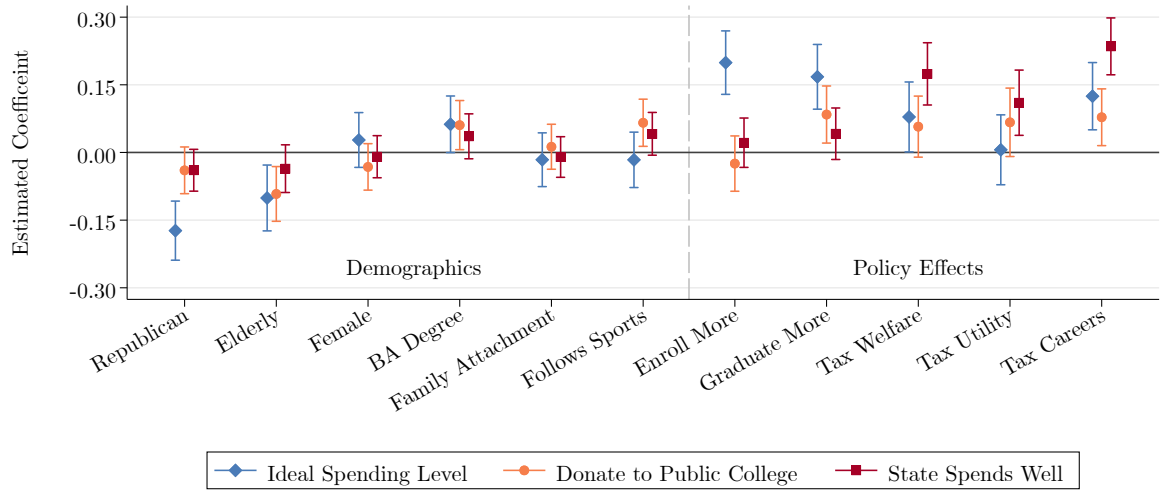
(a) Graduation Rate



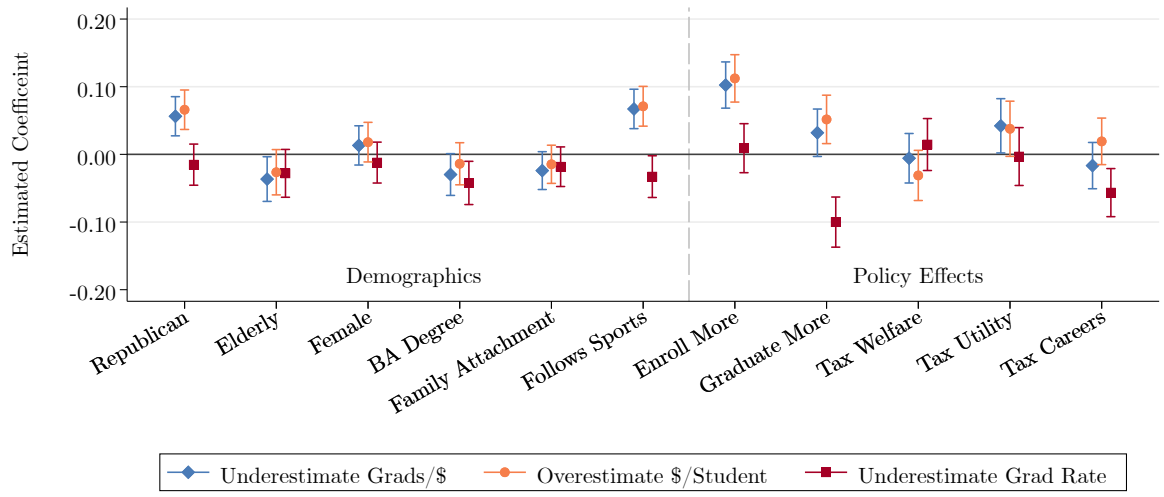
(b) Per-Student Spending

Note: Each figure presents the distribution of belief errors separately by party. Panel (a) reports the distributions of belief errors about the graduation rate in respondents' states and Panel (b) about the per-student spending. Both panels report pooled responses from the first and second survey.

Figure A2: Policy Beliefs Predict of Perceptions and Policy Views



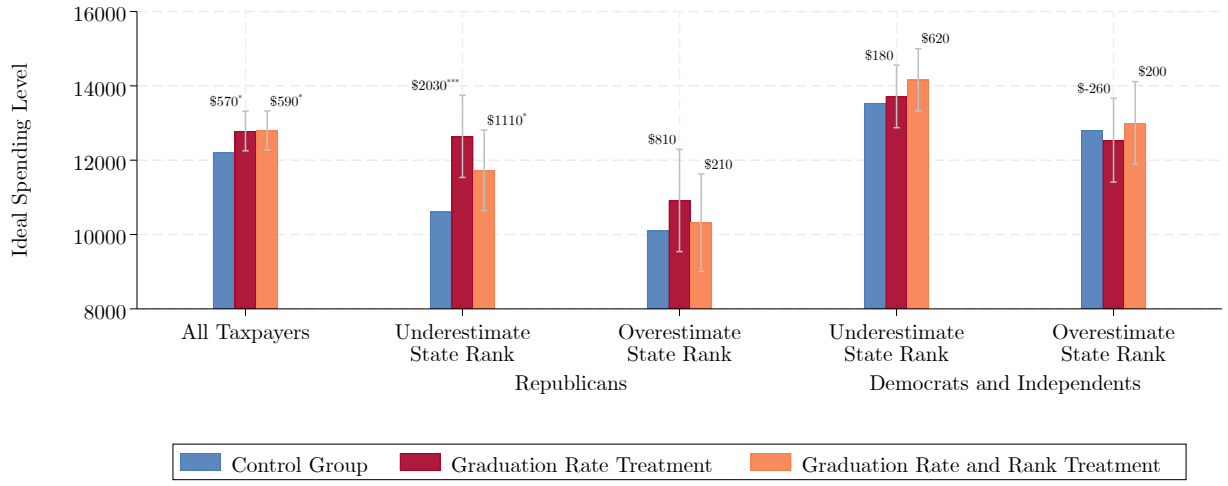
(a) Policy Views



(b) Perceptions

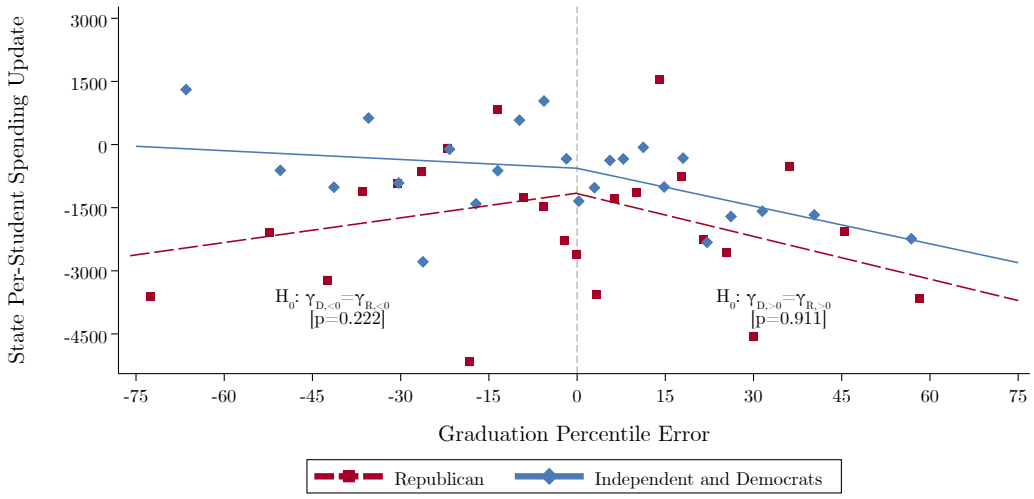
Note: This figure shows the relationships between observable characteristics, policy beliefs and and individuals' survey responses. Panel (a) predicts support for higher education The markers with blue diamonds are estimates from a Poisson regression of the ideal spending level, those with orange circles are estimates from a linear regression on an indicator that the individual made a donation to a public college in their state, and those with red squares are estimates from a linear regression on an indicator that the individual agrees or strongly agrees that they trust the state to spend tax revenue well on public higher education. Panel (b) predicts perceptions of cost-effectiveness ROI. To make all predictors binary we split each policy belief by above and below average. The three series are signals of perceived cost-effectiveness. The markers with blue diamonds are estimates for indicator variables for underestimating the graduation rate in their state, the markers with orange circles for overestimating the per-student spending on public higher education in their state, and the markers with red squares for underestimating the number of graduates per $10,000 spent on public higher education in their state. Data come from control-group survey responses from the Qualtrics and CloudResearch samples for the first experiment.

Figure A3: Heterogeneity by Partisanship and State Rank Perceptions

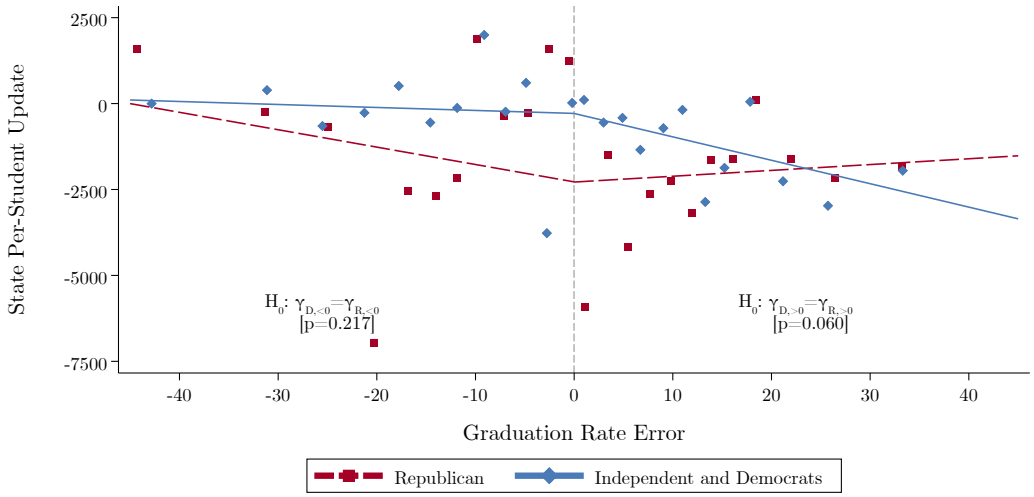


Note: This figure presents stated ideal spending per student by treatment group and characteristics along with 95% confidence intervals on the effects of the two treatments. The sample is the 4,679 individuals who completed surveys through Qualtrics and CloudResearch for the first experiment. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, $^{+}p < 0.1$

Figure A4: Additional Evidence of Partisan Reasoning from Graduation Information



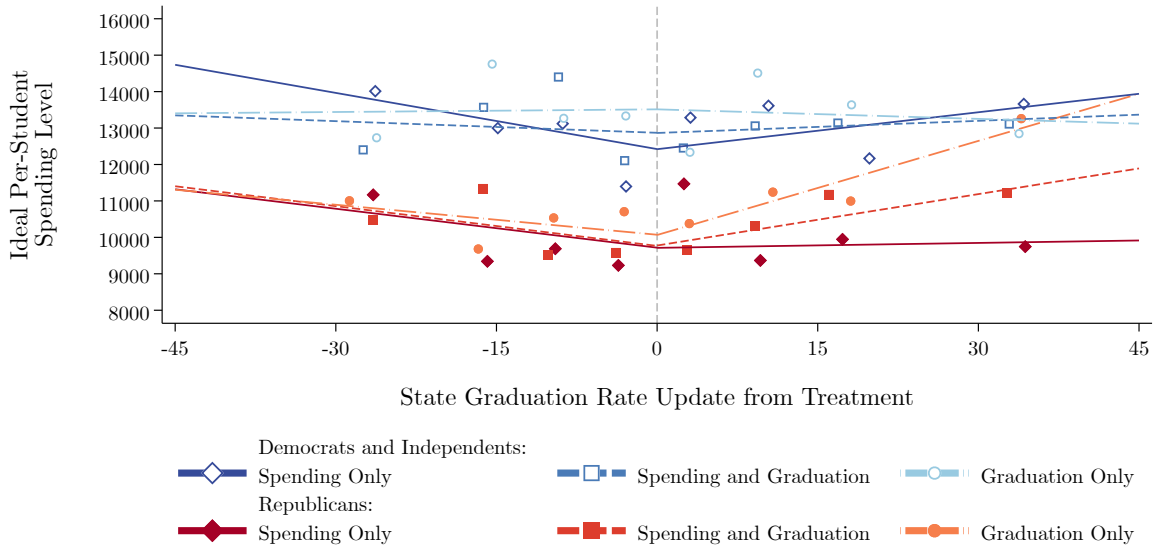
(a) Graduation Rank Information Changes



(b) Other Evidence of Partisan Reasoning from Graduation Rate Information

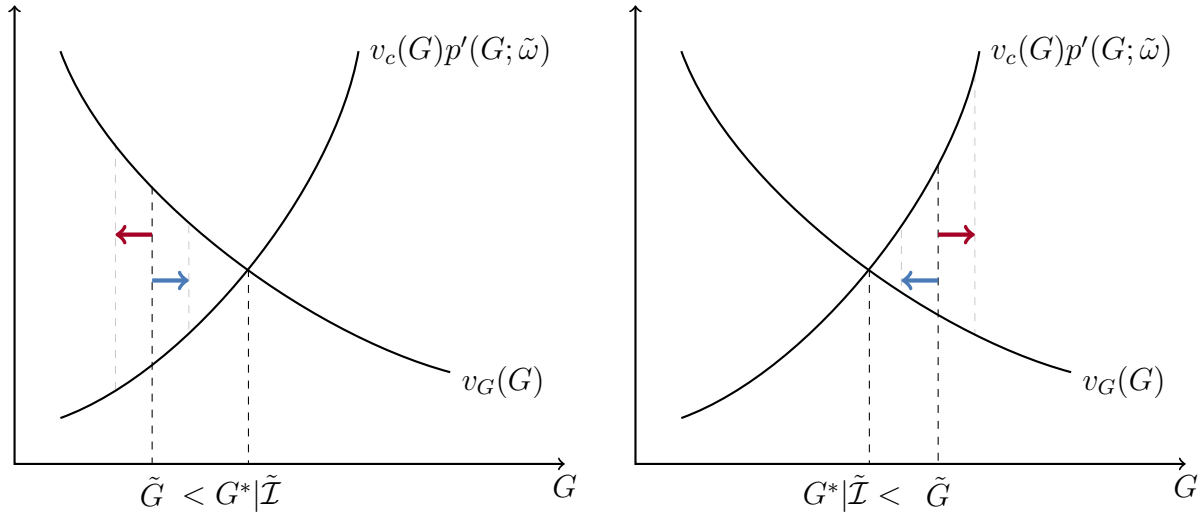
Note: This figure illustrates differences in updating by partisanship and priors. Each panel presents the change in the perceived state per-student spending for individuals with different partisan identity over their belief errors, i.e., the prior perceptions minus the true value. Panel (a) shows updating about the state graduation percentile rank and Panel (b) shows updating about the state graduation rates. In both graphs, markers represent averages of 12 quantiles above and below zero and lines represent regression lines with varying slopes for good and bad news, restricted to be continuous at zero. Points and lines are regression adjusted for the prespecified regression controls. Panels reflect responses of taxpayers recruited for our second experiment from CloudResearch.

Figure A5: The Effect of Graduation and Spending Information by Party and Prior



Note: This figure illustrates how the effects of information vary by partisanship and by prior perceptions of the state graduation rate. Each panel presents the ideal policies for individuals in different treatment groups over the support of their belief error about the state graduation rates, i.e., the prior perceptions minus the true rate. Panel (a) contains Republicans and Panel (b) Democrats and Independents. In both graphs, markers represent averages of four quantiles above and below zero and lines represent regression lines with varying slopes for good and bad news, restricted to be continuous at zero. Points and lines are regression adjusted for the prespecified regression controls. Both panels reflect responses of participants recruited for the second experiment.

Figure A6: Examples of Preference-Based Reasoning from Over- and Under-Provision

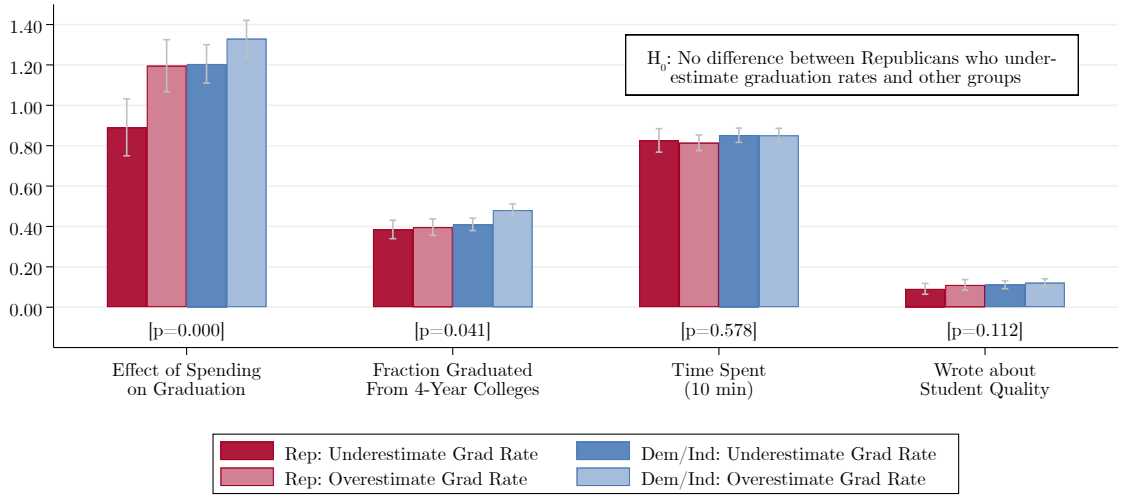


(a) Perceive Over-Provision

(b) Perceive Under-Provision

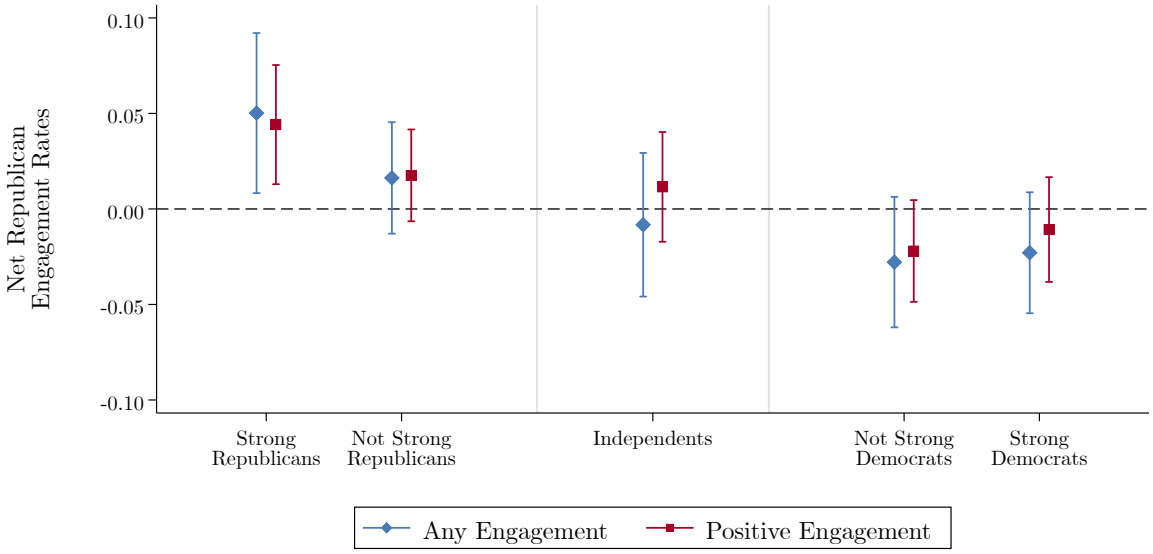
Note: This figure demonstrates how reasoning about spending can change and individuals perceiptions of over- and under-provision. Reasoning that reduces perceive over- or under-provision are depicted with (blue) arrows pointing toward the optima, and reasoning that increases these perceptions with (red) arrows pointing away from the ideal. Analogous intuition applies for reasoning about ROI.

Figure A7: Additional Evidence of Preference-Based Reasoning about ROI



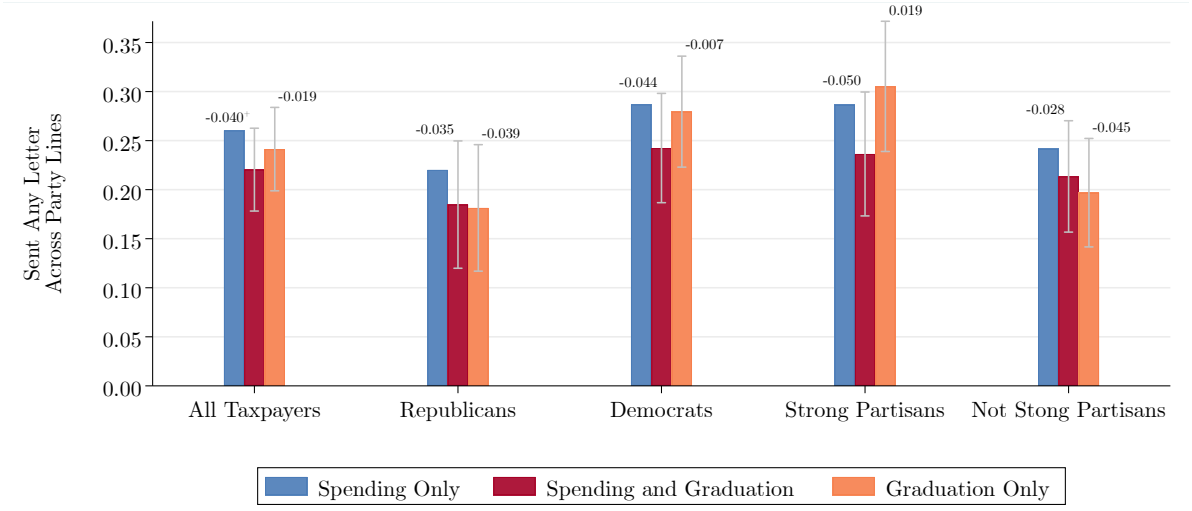
Note: This figure illustrates differences in individual characteristics, beliefs, or actions by partisanship and by prior perceptions. Bars for each group represent the perceived causal effect of spending, the share of individuals with a four-year degree, time spent interacting with information and on the survey, and whether individuals student input quality in their letters. Hypothesis tests report the p-values for a binary regression of each outcome on an indicator for Republicans who underestimate graduation rates. The results reflect responses from all participants recruited for our second experiment from CloudResearch.

Figure A8: Affective Polarization in Public Higher Education

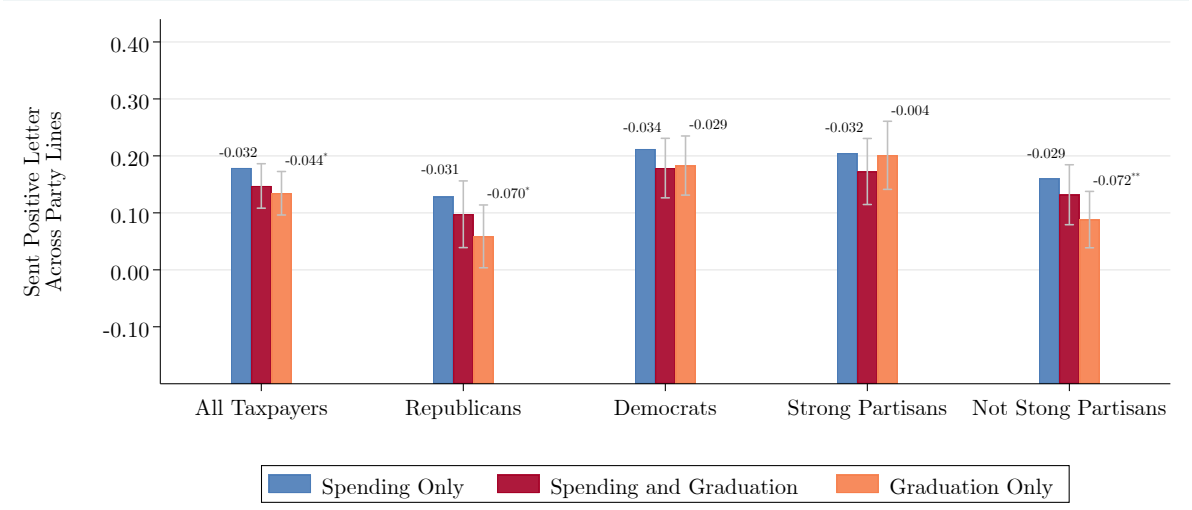


Note: This figure shows two measures of affective polarization. The first series reports the net probability of sending a letter to Republican over Democratic representatives, and the second the net probability of sending a positive letter to Republican over Democratic representatives. For each series we measure the rate of *Net Republican Engagement* as the difference in the likelihood of sending a letter to at least one Republican official compared to at least one Democrat. Both rates are between -1 (only Democrats) and 1 (only Republicans), so in the presence of affective polarization, we would expect positive values of both measures for Republicans and negative values for Democrats. Markers and standard errors come from the constant term in linear probability models with demeaned controls. Sentiment is measured as the average sentiment of words in the letters from the Syuzhet Lexicon, with no letter being zero; a positive letter has sentiment value above zero. Estimates reflect responses of individuals in the control group recruited from Qualtrics and CloudResearch for the first experiment.

Figure A9: Spending Information and Political Engagement



(a) Sent Any Letter Across the Aisle



(b) Sent A Positive Letter Across the Aisle

Note: Each figure presents an outcome of interest by treatment group and characteristics along with 95% confidence intervals on the effects of the two treatments. Panel (a) reports the share that wrote a letter to an elected official from the opposing party. Panel (b) reports the share that wrote a letter with positive Syuzhet sentiment score to to an elected official from the opposing party. Both panels reflect responses from 2,464 individuals who completed surveys for the second experiment and who at least lean toward a political affiliation.

B. Theoretical Appendix

B.1 Baseline Model

For a representative individual i with income y_i define $u_i(c_i, G)$ as the utility over consumption c_i and the public service G. Let $p(G;\omega)$ be the expenditure function returning the tax cost of providing G given cost-effectiveness ω. Individuals cannot choose G directly, but their ideal level of provision is characterized as

$$G^*(\omega) = \arg\max_G u_i(c_i, G)$$
$$\text{st: } c_i = y_i - p(G;\omega)$$

Assumption 1. Utility and Technology: (1) $u_i(c_i, G)$ is increasing in c and jointly concave in c and G, (2) both c and G are normal goods (3) is $p(G;\omega)$ be increasing and convex in G, decreasing and convex in ω.

Lemma 1 (Derivation of Equation 1). Under Assumption 1, $G^*(\omega)$ is characterized by $u_G(y - p(G^*;\omega), G) = u_c(y - p(G^*;\omega), G)p_G(G;\omega)$.

Proof. Substituting in the budget constraint and differentiating with respect to G yields

$$F(G,\omega) = u_G(y - p(G;\omega), G) - u_c(y - p(G;\omega), G)p_G(G;\omega) \tag{A1}$$

setting $F = 0$ and simplifying notation using indirect utility of G, $v(G) = u(c(G), G)$, gives us Equation 1.

Return on Investment Definition. Let $g(S;\omega)$ be a production function returning the inverse of the expenditure function given ω: $S = p(g(S;\omega);\omega)$. The return on investment from spending S is, therefore

$$\text{ROI}(S;\omega) = \frac{v(g(S;\omega)) - v(g(0;\omega))}{S}$$

where $v()$ is the indirect utility from an allocation with G public goods. If $g(0;\omega) = 0$, then we can write $\text{ROI}(S;\omega) = \bar{\gamma}\frac{G}{S}$ where $\bar{\gamma}$ is the average value of graduates produced in this range.

B.2 Model Extensions

Corollary 1 (Heterogeneous Tax Rates). Take a set of individuals $i \in \{1, ..., I\}$ whose taxes are responsible for funding a fraction of total expenditures $\tau_i S$ then by the same

argument

$$v_G(G^*(\omega)) = v_c(G^*(\omega))\tau_i p'(G;\omega)$$

Corollary 2 (Public Services with Level and Rank Dimensions). Let the public service have a second dimension: the (percentile) rank of public service provision relative to other jurisdictions, $R = F(G)$. Let individuals have jointly concave utility over $u_i(c, G, R)$ and a perceptions of the distribution $F(G)$ in $\mathcal{I}$. Under Assumption 1 and if $F(G)$ is continuously differentiable, then interior ideal policies are characterized by

$$\underbrace{v_G(G^*|\mathcal{I}) + v_R(G^*|\mathcal{I})f(G^*|\mathcal{I})}_{\text{Perceived Marginal Benefit}} = \underbrace{v_c(G^*)p'(G^*;\omega|\mathcal{I})}_{\text{Perceived Marginal Cost}}, \tag{A2}$$

where $f(G) = F'(G)$ is the perceived probability density function of G.

Remark. In this version of the model, signals about public service provision can also lead individuals also update their beliefs about the rank. Now individuals must attribute positive signals about provision either to the jurisdictions rank (movement) or to the distribution of provision (shift). Whereas as endogenous reasoning about spending and cost-effectiveness either moves along or shifts marginal costs, this endogenous reasoning either moves along or shifts marginal benefits. Following Equation A2, a movement along the marginal benefit curve holds $F()$ constant and updates R accordingly. As such it does not change ideal policies. In contrast, a shift of the marginal benefits will increase the ideal level of provision. This shift occurs because, given perceptions of G, reasoning that the distribution of $F()$ is higher (or more dispersed) reduces the perceived rank, increasing v_R.

Corollary 3 (Input Quality). Let $S = p(G; A, \omega)$ where A captures input quality into the public service and individuals also have perceptions about A in $\mathcal{I}$. Under Assumption 1 and if $p()$ is decreasing and convex in A, then interior ideal policies will be at

$$\underbrace{v_G(G^*(\omega); A)}_{\text{Perceived Marginal Benefit}} = \underbrace{v_c(G^*(\omega))p'(G^*(\omega); A, \omega)}_{\text{Perceived Marginal Cost}}, \tag{A3}$$

Remark. In the higher education context, state spending on higher-education is certainly not the only determinant of the number of graduates produced. In this case input quality might capture the academic preparedness or work ethic of incoming students. This preparedness could affect expenditures because it is more expensive to educate poorly prepared students.

This extension changes the first-order condition in two ways that affect reasoning. First, the new marginal costs curve depends on perceived cost-effectiveness, ω, as well as on the perceived input quality, A. As such someone who think that A is low (students are lazy or unprepared) is more likely to perceive the marginal cost of provision as very high. Second, the perceived benefits the public service, v_G may be informed by perceptions of input quality (lazy students aren't as productive as graduates or aren't "worthy" of public spending). As such to the extent to which signals about provision lead to updating about A, it may shift *both* the marginal cost and marginal benefit curves. If reasoning about A changes the slopes of the marginal curves too, the results on policy views are only an empirical question.

B.3 Constituent Political Communication

Let elected officials, indexed by j represent our individuals, i, who have policy beliefs and ideal policies as defined in the prior sections. Officials have (possibly inaccurate) prior perceptions of the ideal policies of their constituents $f_j(G^*) \sim \mathcal{N}(\tilde{\Gamma}_j, \tilde{\sigma}_j^2)$. Officials implement the optimal policy of their (perceived) median voter: $G = \tilde{\Gamma}$. We treat priors as exogenous, so they can account for beliefs that are centered around co-partisan constituents (higher or lower $\tilde{\Gamma}_j$) or for officials who are more or less responsive to additional information (lower or higher $\tilde{\sigma}_j^2$).

When an elected official receives a communication from a constituent, it serves as a signal about the true distribution of constituent preferences. Each letter contains a signal $g_i = G_i^* + \epsilon_i$ with $\epsilon_i \sim \mathcal{N}(0, \sigma_\epsilon^2)$, the signals are imprecise because officials know that constituents may be writing them and expressing preferences based off of inaccurate beliefs $\mathcal{I}_i$ and because they may need to extract policy preferences indirectly from the letter's content and tone. Officials update in a Bayesian manner:

$$\hat{\Gamma} = \tilde{\Gamma} + \frac{\tilde{\sigma}_j^2}{\tilde{\sigma}_j^2 + \sigma_\epsilon^2} \left(g_i - \tilde{\Gamma} \right)$$

where we denoting the weight on the signal $\kappa_j = \frac{\tilde{\sigma}_j^2}{\tilde{\sigma}_j^2 + \sigma_\epsilon^2}$. Note that allowing the policymaker to reason about selection into letter writing which would further deflate κ_j since only more extreme policy preferences are worth paying the cost to express.

Constituents weigh the costs and benefits of communicating with the elected official with their own (possibly inaccurate) perceptions. Note that in this model constituents decide whether to send a letter, but not what signal to send. Constituents know that the officials implement the optimal policy of the perceived median voter and thus believe that $\Gamma_j = \hat{G}$. Constituents also have their own perceptions of the strength of this prior relative to the

information content of their letters, $\kappa_{i,j}$. Finally, writing letters requires an effort cost which we allow to vary at the individual-by-official level $c_{i,j}$. Combining these pieces, constituents compare the utility of writing or not writing a letter:

$$V_{\text{send}} = \mathbb{E}_\epsilon \left[v_i \left(\hat{G} + \kappa_{i,j} \left(G_i^* - \hat{G} \right) + \kappa_{i,j} \epsilon_i \right) \right] - c_{i,j}$$
$$V_0 = v_i(\hat{G})$$

If we denote $\nu_{i,j} \left(G_i^* - \hat{G} \right) = \mathbb{E}_\epsilon \left[v \left(\hat{G} + \kappa_{i,j} \left(G_i^* - \hat{G} \right) + \kappa_{i,j} \epsilon_i \right) - v_i(\hat{G}) \right]$, then constituents will sent a letter if and only if the expected benefits exceed the costs, i.e., when

$$\nu_{i,j} \left(G_i^* - \hat{G} \right) > c_{i,j}$$

Corollary 4 (Reasoning and Letter Writing). Under Assumptions 1 and 2, if $\kappa_{i,j}$ is constant, then under a Taylor approximation of $u()$ where marginal utility is approximately constant over the range of policies G induced by the letter, then individuals should send a letter if and only if

$$v_G(\hat{G})\, \widehat{W} > \frac{c_{i,j}}{\kappa_{i,j}} \equiv \hat{\psi}_{i,j}$$

B.4 Elected Official Engagement with Constituent Political Communication

We now consider how constituent political communication affects elected official's decisions to engage. Recall that official j holds prior $f_j(G^*) \sim \mathcal{N}(\tilde{\Gamma}_j, \tilde{\sigma}_j^2)$. We decompose the prior mean as

$$\tilde{\Gamma}_j = \Gamma + b_j, \tag{A4}$$

where Γ is the true median constituent ideal policy and b_j captures distortions in j's prior. This bias may come from selective constituent communication where elected officials are more likely to learn about the preferences of individuals in their own party because of affective polarization, or from constituents communicating based on inaccurate perceptions. With $b_j \neq 0$, elected officials implement policies misaligned with their constituents (Butler and Nickerson, 2011).

Now suppose official j receives an informative signal about constituent preferences from

their communications: $s_j = \Gamma + (1-\beta)b_j + \eta_j$ with $\eta_j \sim \mathcal{N}(0, \sigma_\eta^2)$ and $\beta \in [0,1]$. This new signal may not be unbiased because of selection into who chooses to engage with their elected officials as described above. In line with our experiment, we consider a setting where we lessen selection into political communication, implying β captures how much of the prior bias the signal corrects. We expect the precision of the signal $(1/\sigma_\eta)$ to be increasing with the number of constituents who communicate their preferences. A Bayesian elected official will update so that:

$$\hat{\Gamma}_j = \tilde{\Gamma}_j + \lambda_j(s_j - \tilde{\Gamma}_j), \quad \lambda_j = \frac{\tilde{\sigma}_j^2}{\tilde{\sigma}_j^2 + \sigma_\eta^2}. \tag{A5}$$

where λ_j is analogous to κ_j but applied to an aggregate signal s_j that reflects the collective communication of constituents (e.g. from a letter-writing campaign) rather than from a single letter. Substituting $\tilde{\Gamma}_j = \Gamma + b_j$ and $s_j = \Gamma + (1-\beta)b_j + \eta_j$ and taking expectations over η_j gives:

$$\mathbb{E}[\hat{\Gamma}_j] = \Gamma + (1 - \lambda_j\beta)b_j. \tag{A6}$$

The information partially corrects the bias, leading elected officials to be more informed about true preferences in their state. Consistent with the empirical patterns we document, consider the case in which assume $b_j < 0$: officials underestimate constituent demand for higher-education spending. Under this assumption, corrective signals imply, on average, $\hat{\Gamma} > \tilde{\Gamma}$.

After observing the signal and updating their beliefs, the official decides whether to engage with the policy issue—for example, by reviewing a resolution or responding to a constituent. The benefit of engaging is the perceived gain from moving policy closer to constituent preferences, which is proportional to the belief shift $\hat{\Gamma}_j - \tilde{\Gamma}_j$.[51] Engagement also carries a cost $c_j = \bar{c} + \varphi(1 - m_j)$, where $m_j \in [0,1]$ is official $j's$ party's share of legislative seats and $\varphi > 0$ determines the disadvantage the minority party faces. Minority-party officials face higher costs, reflecting the disillusionment associated with limited ability to move policy. The official engages if

$$\hat{\Gamma}_j - \tilde{\Gamma}_j > \bar{c} + \varphi(1 - m_j). \tag{A7}$$

From equation (A5), $\hat{\Gamma}_j - \tilde{\Gamma}_j = \lambda_j(s_j - \tilde{\Gamma}_j)$, so the left-hand side is the belief shift induced by the signal, scaled by the weight the official places on it.

[51] Since elected officials implement their perceived median voter's ideal policy, the baseline policy before receiving s_j is equal to $\tilde{\Gamma}_j$.

The model highlights a key connection between constituent communication from Section B.3 and elected official behavior. The messages that elected officials see are determined both by selection into sending a letter and the information content of the letters. Therefore, constituent reasoning from information that changes G_i^*, $\psi_{i,j}$, and therefore the number of letters has two potential effects: it changes both the signal, s_j, and the informativeness of the signal, λ_j.

B.5 Reasoning, Policy Views, and Perceived Gaps

B.5.1 Reasoning and Policy Views

The main paper asserted that when individuals reason that cost effectiveness is higher (lower) that it would increase (decrease) their ideal level of provision. In the model, this can be stated as the derivative of G^* with respect to the perceived ω always being positive.

Lemma 2 (Ideal Policy Monotonicity). Under Assumption 1, $\frac{\mathrm{d}G^*}{\mathrm{d}\omega} > 0$.

Proof. We begin by using the implicit function theorem on Equation A1:

$$\begin{aligned}\frac{\partial G^*}{\partial \omega} &= -\frac{F_\omega}{F_G} \\ &= \frac{p_\omega(u_{cc}p_G - u_{Gc}) - u_c p_{G\omega}}{u_{GG} - 2u_{Gc}p_G + u_{cc}p_G^2 - u_c p_G G} \\ &> 0\end{aligned}$$

where the resulting inequality comes from the fact that G and c are normal and jointly concave. The normal goods assumption implies $u_{cc}p_G - u_{Gc} > 0$ and makes the numerator negative. The joint concavity implies the second order condition holds, so that the denominator is negative at $G^*(\hat{\omega})$.

B.5.2 Reasoning and Perceived Gaps

The main paper relies on two results about how endogenous reasoning changes gaps. Reasoning about cost-effectiveness and reasoning about spending (1) always lead different sized perceived gaps and (2) can lead to opposite-signed changes in the gaps.

Let the distance between an individual's perceived and ideal policies be $W(G, \omega) = G^*(\omega) - G$, given any or posterior perception: $\tilde{\mathcal{I}} = (\tilde{G}, \tilde{\omega})$ or $\hat{\mathcal{I}} = (\hat{G}, \hat{\omega})$.

Proposition 1 (Opposite-Signed Results). Under Assumption 1, for any marginal increase in $\hat{G}$ reasoning about cost-effectiveness and reasoning about spending push perceptions

of W in opposite ways. Furthermore, for all individuals with utility such that $\frac{\mathrm{d}S^*}{\mathrm{d}\omega} > 0$, the combined changes in W can have opposite signs.

Proof. Let $\alpha \in [0,1]$ be the share of $\tilde{G} \to \hat{G}$ attributed to cost-effectiveness such that:

$$\hat{S}_\alpha = (1-\alpha)p(\hat{G}, \tilde{\omega}) + \alpha p(\tilde{G}, \tilde{\omega})$$

where $p(\hat{G}, \tilde{\omega})$ is the expenditure inferred by reasoning only about spending, and $p(\tilde{G}, \tilde{\omega})$ is the expenditure inferred by reasoning only about cost-effectiveness (equal to the prior). Also let $\hat{\omega}_\alpha$ satisfy $p(\hat{G}, \hat{\omega}_\alpha) = \hat{S}_\alpha$.

To prove the first half of the proposition we consider how W changes with respect to a marginal shock to perceptions of G—and how those changes are moderated by α:

$$\begin{aligned}\frac{\mathrm{d}\hat{W}}{\mathrm{d}\hat{G}} &= \frac{\mathrm{d}G^*(\hat{\omega}_\alpha) - \hat{G}}{\mathrm{d}\hat{G}} \\ &= \frac{\mathrm{d}G^*}{\mathrm{d}\hat{\omega}}\frac{\mathrm{d}\omega_\alpha}{\mathrm{d}\hat{G}} - 1\end{aligned}$$

In the extreme case of spending-only reasoning ($\alpha = 0$), $\frac{\mathrm{d}\hat{W}}{\mathrm{d}\hat{G}} = -1$, i.e., a the signal about higher G decreases W (making positive gaps smaller and negative gaps even more negative).

To see how this changes with α, note that we can recover $\frac{\mathrm{d}\hat{\omega}_\alpha}{\mathrm{d}\hat{G}}$ from the definition of $\hat{\omega}_\alpha$ by differentiation with respect to :

$$\begin{aligned} & & p(\hat{G}, \hat{\omega}_\alpha) &= \hat{S}_\alpha \\ \implies & & p_G + p_\omega \frac{\mathrm{d}\hat{\omega}_\alpha}{\mathrm{d}\hat{G}} &= (1-\alpha)p_G \\ & & \frac{\mathrm{d}\hat{\omega}_\alpha}{\mathrm{d}\hat{G}} &= -\alpha\frac{p_G}{p_\omega}\end{aligned}$$

$$\begin{aligned} \implies & & \frac{\mathrm{d}^2\hat{W}}{\mathrm{d}\hat{G}\mathrm{d}\alpha} &= -\alpha\frac{\mathrm{d}G^*}{\mathrm{d}\hat{\omega}}\frac{p_G}{p_\omega} \\ & & &> 0\end{aligned}$$

where the final inequality comes from the assumptions that $p_G > 0$ and $p_\omega < 0$ and the Lemma 2 result that $\frac{\mathrm{d}G^*}{\mathrm{d}\hat{\omega}} > 0$. Thus the change in W from spending reasoning is negative but increasing in the share of cost-effectiveness reasoning.

To prove the second statement in the proposition, let $S^* = p(G^*(\omega); \omega)$ such that $\frac{\mathrm{d}S^*}{\mathrm{d}\omega} = p_G\frac{\mathrm{d}G^*}{\mathrm{d}\omega} + p_\omega$. Then

$$\begin{aligned}\frac{\mathrm{d}\hat{W}}{\mathrm{d}\hat{G}} &= -\alpha\frac{\mathrm{d}G^*}{\mathrm{d}\hat{\omega}}\frac{p_G}{p_\omega} - 1 \\ &= -\frac{\alpha}{p_\omega}(\frac{\mathrm{d}G^*}{\mathrm{d}\hat{\omega}}p_G + p_\omega) - (1-\alpha) \\ &= -\frac{\alpha}{p_\omega}\frac{\mathrm{d}S^*}{\mathrm{d}\omega} - (1-\alpha)\end{aligned}$$

Because $-(1-\alpha) < 0$, the only way for $\frac{\mathrm{d}\hat{W}}{\mathrm{d}\hat{G}} > 0$ is if $\frac{\mathrm{d}S^*}{\mathrm{d}\omega} > 0$. In the case where $\alpha = 1$ it is both necessary and sufficient:

$$\frac{\mathrm{d}\hat{W}}{\mathrm{d}\hat{G}} > 0 \iff \frac{\mathrm{d}S^*}{\mathrm{d}\omega} > 0$$

Remark. The condition that $\frac{\mathrm{d}S^*}{\mathrm{d}\omega} > 0$ is not automatically guaranteed; it is plausible in the higher-education spending where low-cost effectiveness is often the explicit rationale maintaining low spending (Jones, 2024). We also empirically validate that this condition holds for a non-trivial share of respondents.

Remark. Because different reasoning pushes individuals in different direction, it is informative to compare the resulting gaps from extreme cases of reasoning. In general the which type of reasoning will result in a larger *absolute* perceived gap depends on the sign of the initial gap (over- or under-provision) and of the signal. Consider four cases where we compare the extreme cases of reasoning: reasoning only about spending (leading to gap $|\hat{W}|_S$) and reasoning only about cost-effectiveness (leading to gap $|\hat{W}|_\omega$). To help with intuition we focus on absolute gaps:

- For someone who perceives over-provision, attributing higher G to spending increases the gap more than attributing it to cost effectiveness:
  $\tilde{W} > 0$ and $\tilde{G} < \hat{G} \implies |\hat{W}|_S > |\hat{W}|_\omega$
- For someone who perceives over-provision, attributing lower G to spending reduces the gap more than attributing it to cost effectiveness:
  $\tilde{W} > 0$ and $\tilde{G} > \hat{G} \implies |\hat{W}|_S < |\hat{W}|_\omega$
- For someone who perceives under-provision, attributing higher G to spending reduces the gap more than attributing it to cost effectiveness
  $\tilde{W} < 0$ and $\tilde{G} < \hat{G} \implies |\hat{W}|_S < |\hat{W}|_\omega$

- For someone who perceives under-provision, attributing lower G to spending increases the gap more than attributing it to cost effectiveness:
  $\tilde{W} < 0$ and $\tilde{G} > \hat{G} \implies |\hat{W}|_S > |\hat{W}|_\omega$

B.5.3 Reasoning ant Political Participation

Let the policy realized from an individual's communication be $\mathcal{G} = \hat{G}_i + \kappa_{i,j}(W_i + \epsilon_i)$, such that the expected benefits of political participation are $\nu_{i,j} = \mathbb{E}_\epsilon \left[v(\mathcal{G}_{i,j}) - v(\hat{G}_i) \right]$

Lemma 3 (Reasoning and Letter Writing). Under Assumptions 1 and 2, if $\kappa_{i,j}$ is constant, then under a Taylor approximation of $u()$ where marginal utility is approximately constant over the range of G induced by the letter, reasoning that increases the expected benefit of letter writing if and only if it increases the absolute perceived gap between ideal and status-quo policy.

Proof. In general reasoning changes the marginal benefits of political participation change through two channels:

$$\begin{aligned}\frac{\mathrm{d}\nu_{i,j}}{\mathrm{d}G_i} &= \mathbb{E}_\epsilon \left[v'(\mathcal{G}) \left(1 + \kappa_{i,j} \frac{\mathrm{d}W_i}{\mathrm{d}G_i} \right) - v'(\hat{G}_i) \right] \\ &= \underbrace{\kappa_{i,j} \frac{\mathrm{d}W_i}{\mathrm{d}G_i} \mathbb{E}_\epsilon \left[v'(\mathcal{G}) \right]}_{\text{reasoning effect}} + \underbrace{\mathbb{E}_\epsilon \left[v'(\mathcal{G}) \right] - v'(\hat{G}_i)}_{\text{utility curvature effect}}\end{aligned}$$

Under the Taylor expansion where $u''(\cdot) = 0$ locally, this simplifies to one effect:

$$\frac{\mathrm{d}\nu_{i,j}}{\mathrm{d}G_i} = \kappa_{i,j}^2 W \frac{\mathrm{d}W_i}{\mathrm{d}G_i} v'(\hat{G})$$

Consider two cases. First, note that if $W_i > 0$, then $v'(\cdot) > 0$ between $\hat{G}_i$ and G_i^* and that $\frac{\mathrm{d}W_i}{\mathrm{d}G_i} > 0$ corresponds to a reduction in the perceived gap. Therefore, a reduction in the perceived gap reduces the benefits of participating. On the other hand if $W_i < 0$, then $v'(\cdot) < 0$ between $\hat{G}_i$ and G_i^* and that $\frac{\mathrm{d}W_i}{\mathrm{d}G_i} > 0$ corresponds to an *increase* in the perceived gap. Therefore, an increase in the perceived gap increases the benefits of participating.

Remark. An alternative condition that guarantees the same result without constant marginal utility is that individuals don't think letter can have opposite-signed effects on policy. Then for a utility function with any amount of curvature $\mathbb{E}[u'(\mathcal{G})] - u(\hat{G})$ will always have the correct sign because $\mathcal{G}$ will always move toward G^*.

Corollary 5 (Reasoning and Affective Frictions). Under Assumptions 1 and 2 and if $\psi_{i,j}$ is weakly decreasing in W, reasoning may increase or decrease letter writing depending on whether changes in the neoclassical benefits or affective cost dominate.

C. Survey Questions and Treatments for Experiments

*Only included in Experiment 2

C.1 Measuring Priors

- What percent of students who enroll in public four-year colleges in the United States graduate within six years of enrollment? Use the slider below to indicate your guess.[*Sliding scale from 0 and 100 (increments of 1)*]
- What percent of students who enroll in public four-year colleges in **STATE** graduate within six years of enrollment? Use the slider below to indicate your guess. [*Sliding scale from 0 and 100 (increments of 1)*]
- Where does [Participant's State's] graduation rate rank relative to other states? Use the slider below to indicate your guess. NOTE: A rank of 1 means you believe **STATE** has the country's lowest graduation rate. [*Sliding scale from 1 and 50 (increments of 1)*]
- In 2019, how many tax dollars did **STATE** spend per student at public four-year colleges? Use the slider below to indicate your guess in $1000s. [*Sliding scale from 0 and 25 (increments of 0.1)*]
- How does **STATE**'s spending per student rank relative to other states? Use the slider below to indicate your guess. NOTE: A rank of 1 means you believe **STATE** spends more tax dollars per student than any other state; a rank of 50 means you believe **STATE** spends fewer tax dollars per student than any other state. [*Sliding scale from 1 and 50 (increments of 1)*]

C.2 Information Treatments

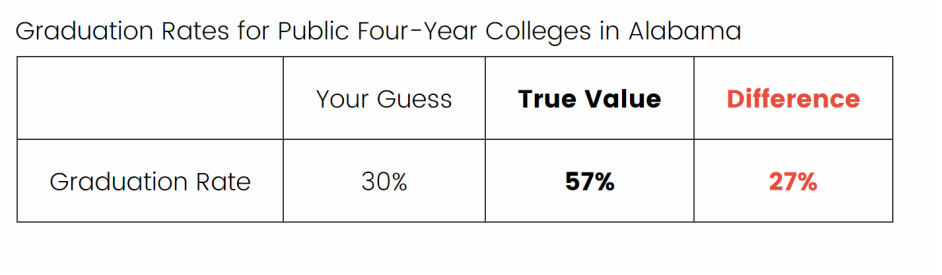
Please take a moment to review these tables and see how close your guesses were to the true values. [*Participants in the first experiment are randomized to see either Figure C1a or Figure C1b, or to not see this screen at all. Participants in the second experiment are randomized to see only Figure C1b, only Figure C1c, or both Figure C1b and Figure C1c.*]

C.3 Survey Outcomes

- How much do you think **STATE** should spend per student each year at public four-year colleges (in $1000s)? [*Sliding scale from 0 to 25 (increments of 0.1)*]

Figure C1: Information Treatments

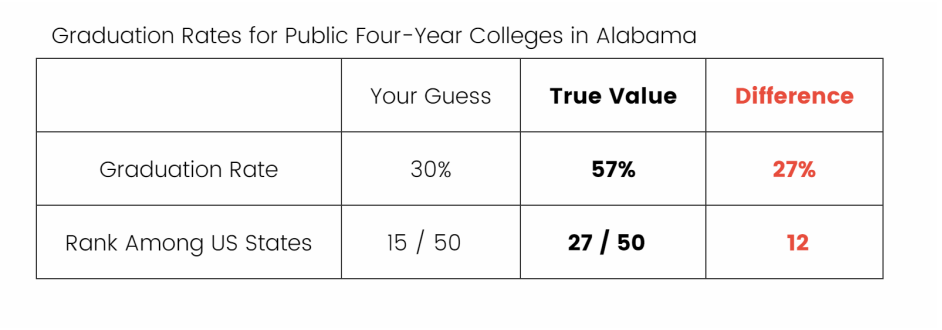
(a) Graduation Rate



Graduation Rates for Public Four-Year Colleges in Alabama

	Your Guess	**True Value**	**Difference**
Graduation Rate	30%	**57%**	**27%**

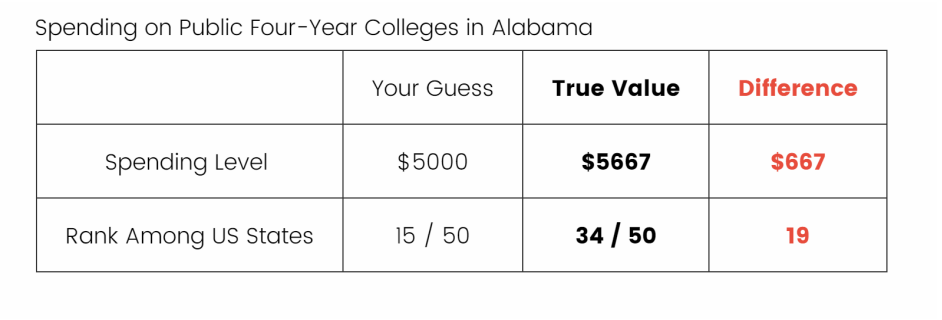
(b) Graduation Rate and Rank



Graduation Rates for Public Four-Year Colleges in Alabama

	Your Guess	**True Value**	**Difference**
Graduation Rate	30%	**57%**	**27%**
Rank Among US States	15 / 50	**27 / 50**	**12**

(c) Spending Level and Rank



Spending on Public Four-Year Colleges in Alabama

	Your Guess	**True Value**	**Difference**
Spending Level	$5000	**$5667**	**$667**
Rank Among US States	15 / 50	**34 / 50**	**19**

- Imagine **STATE** spends an additional $100 per student on public four-year colleges next year. As a result of this additional spending... how much would you expect enrollment at public four-year colleges to increase (in percent)? A negative number indicates fewer students would enroll. [*Sliding scale from -5 to 5 (increments of 0.1)*]

- ...how much would you expect the graduation rate for four-year colleges to increase (in percent)? A negative number indicates a lower proportion of students would graduate. [*Sliding scale from -5 to 5 (increments of 0.1)*]

- Now imagine **STATE** collects an additional $1 in tax revenue each year from every resident in the state to spend on public four-year colleges in **STATE**. To what extent do you agree with the following statements regarding this change? ... The average

person in **STATE** would be better off. [*Strongly disagree, Somewhat disagree, Neither agree or disagree, Somewhat agree, Strongly agree*]

- ... I personally would be better off. [*Strongly disagree, Somewhat disagree, Neither agree or disagree, Somewhat agree, Strongly agree*]
- ... New graduates from public four-year colleges would have better careers.[*Strongly disagree, Somewhat disagree, Neither agree or disagree, Somewhat agree, Strongly agree*]
- To what extent do you agree with the following statements? ... I trust that public four-year colleges in **STATE** use taxpayer dollars well. [*Strongly disagree, Somewhat disagree, Neither agree or disagree, Somewhat agree, Strongly agree*]
- ... I personally would be better off. [*Strongly disagree, Somewhat disagree, Neither agree or disagree, Somewhat agree, Strongly agree*]
- ... **STATE** should shift the cost of public higher education from taxpayers to students by charging higher tuition. [*Strongly disagree, Somewhat disagree, Neither agree or disagree, Somewhat agree, Strongly agree*]
- ... The federal government should increase financial support for public four-year colleges. [*Strongly disagree, Somewhat disagree, Neither agree or disagree, Somewhat agree, Strongly agree*]

C.4 Behavioral Outcomes

- Thank you for sharing your opinions regarding state spending on public four-year colleges in **STATE**. We'd now like to give you a chance to share your thoughts about public higher education with your elected officials. We will compile any comments you make in a report for **STATE** state officials. If you wish to make any comments, please provide them here: [*Long text entry*]
- Who would you like us to send these preferences to? Please select at least one. [*The Governor of **STATE**; The Republican leader in the **STATE** House of Representatives; The Democrat leader in the **STATE** House of Representatives; The Republican Leader in the **STATE** Senate; The Democratic Leader in the **STATE** Senate; I do not wish to make any comments*]
- *Thank you for sharing. [for those who wrote: In addition to what you just wrote] would you like to add one of the below statements to your message to your representative? I believe **STATE** should (select least one)... [*increase its spending on*

public higher education; decrease its spending on public higher education; not change its spending on public higher education; I do not want to add any of these additional statements

- *because... (select at least one) [*it's important for **STATE** to be a leader on public higher education, it's not important for xx to be a leader on public higher education, **STATE**'s spending on higher education generally strengthens the economy, **STATE**'s spending on higher education generally goes to waste, **STATE** is responsible for providing college education for students, **STATE** is not responsible for providing college education to students, I do not want to add any of these additional statements*]

- We'd also like to give you a chance to directly support public higher education in **STATE**. As part of this survey you can donate up to $0.25 to higher education in **STATE** , keeping any money you do not donate as a bonus payment (for example, you could choose to donate $0.10 and keep $0.15). In the first box below, please type the name of the public university in **STATE**. Please use the slider to choose the amount you wish to donate. College name: [*Text entry*]

- Amount: [*Sliding scale from 0 to 0.25 (increments of 0.01)*]

C.5 Demographic Questions

- To start, select the state where you live: [*Dropdown list.*]

- What is your gender? [*Male; Female; Non-binary/third gender; Prefer not to say*]

- What is the highest level of education you have completed? [*Less than a high school degree; High school degree or equivalent; Some college but no degree; Associate degree; Bachelor's degree; Graduate degree (e.g., Master's, JD, MD, PhD)*]

- Generally speaking, do you consider yourself to be a:[*Strong Republican, Not very strong Republican, Independent leaning Republican, Independent, Independent leaning Democrat, Not very strong Democrat, Democrat*]

- How old are you? [*Numerical response*]

- Which of the following best describes your current employment situation? [*Employed, working 40 or more hours per week; Employed, working 1-39 hours per week; Not employed, looking for work; Retired; Disabled, not able to work*]

- What is your residential zip code? [*Numerical response*]

- Choose one or more races you consider yourself to be. [*White; Asian; Black of African American; Native Hawaiian or Pacific Islander; American Indian or Alaska Native; Other (with text box in which to specify)*]
- Are you Spanish, Hispanic, Latino, or none of these? [*Yes; None of these*]
- How frequently do you watch **STATE**'s public colleges' sports teams compete? This can includes both in-person and remote (radio, television) [*Never; Once a year; 2-5 times a year; 6-15 times a year; 16+ times a year*]
- Do you have any children who have attended (or are currently attending) a public college in **STATE**? [*Yes; No*]
- How likely is it that one of your children will someday attend a public college in **STATE**? [*Very Unlikely; Unlikely; Likely; Very Likely; NA*]
- Previously, you indicated that you have attended at least some college. Have you attended or are you currently attending a public college in **STATE**? [*Yes, I am currently attending a public college in **STATE**, Yes, I have attended a public college in **STATE**; No. I have attended public college, but not in **STATE**; No, I have never attended a public college.*]

C.6 Additional Questions

- *Before we finish, we're interested in how you think about state spending on higher education. When you said that **STATE** should spend **ANSWER** per student annually on public higher education, what were the main considerations that came to your mind? [*Long text entry*]
- *What do you think the graduation rate and its rank relative to other states says about public higher education in **STATE**? [*Long text entry*]

C.7 Updating Questions

- *As a final exercise, please take a moment to review this table and see how close your guess regarding graduation rates in **STATE** was to the true value. Please also review your previous guess regarding how this rate ranks relative to other US states.

  Considering the information above, please again provide an estimate as to how much you believe **STATE** spent in tax dollars per student at public four-year colleges in

2019. As before, Use the slider below to indicate your guess in $1000s. [*Sliding scale from 0 to 25 (increments of 0.10)*]

- *Considering the information above, please again provide an estimate as to where you believe **STATE**'s spending on higher education ranks relative to other states. As before, please use the slider below to indicate your guess. NOTE: A rank of 1 means you believe **STATE** spends more per student on higher education than all other states; a rank of 50 means you believe **STATE** spends less per student on higher education than any other state. [*Sliding scale from 1 to 50 (increments of 1)*]

- *Considering the information above, please again provide an estimate as to what percent of students who enroll in public four-year colleges in **STATE** graduate within six years of enrollment. Use the slider below to indicate your guess. [*Sliding scale from 0 to 100 (increments of 1)*]

- *Considering the information above, please again provide an estimate as to where **STATE**'s graduation rate ranks relative to other states? Use the slider below to indicate your guess. NOTE: A rank of 1 means you believe **STATE** has the country's highest graduation rate; a rank of 50 means you believe **STATE** has the country's lowest graduation rate. [*Sliding scale from 1 to 50 (increments of 1)*]

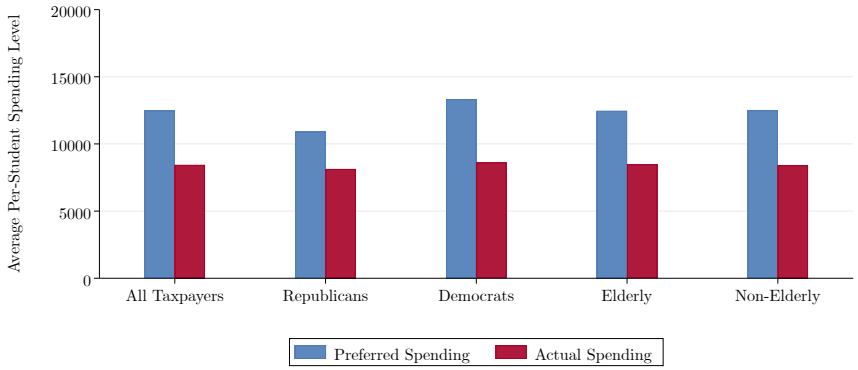
In experiment 3, a set of state politicians, including governors as well as Democratic and Republican leaders of states' houses of representatives and senates, were randomized to receive emails. All of these emails included an invitation to review a draft resolution preventing further reductions in state higher education appropriations. The randomized difference was whether these messages included or did not include information about information regarding preferences for higher-education spending gathered from our survey experiments. The emails were sent from one of the authors' official university account. For illustration, here are the control and treatment emails for politicians in Montana.

C.8 Experiment 3: *Constituent Demand* Treatment

Dear **OFFICIAL**,

My name is **RESEARCHER**, and I am an economist at the **UNIVERSITY**. My collaborators and I study support for higher education at state colleges and universities.

We recently surveyed taxpayers in all fifty states and found that, on average, they would prefer their states to spend more per student on four-year colleges than they currently do. The figure below summarizes our findings, revealing that across partisan and generational lines, taxpayers would prefer 30-60% more spending on public higher education.



In addition to these findings from our nation-wide survey, a number of responding taxpayers in Montana specifically asked us to share their support for public higher education with you.

- Public higher education in Montana is important and should be supported by Montana's government. By providing support to higher education, the state of Montana will grow as more people become college graduates. (Republican, Age 54)
- Investing in our young people will benefit the state more then not investing in them. (Democrat, Age 74)

A full list of comments directed to you can be found here: **LINK**

Despite this taxpayer preference for higher spending, over the last few years many states have drastically cut spending on public higher education. In light of this and our survey results, we invite you to propose a resolution preventing further reductions of higher education appropriations in Montana. A draft resolution for Montana, including information on historical appropriations, can be found here: **LINK**

Finally, we would appreciate the opportunity to talk more about higher education in Montana. If you would like to meet, please send us a few times when you are available. If you have any other questions, comments, or further considerations, we would also love to hear from you.

Sincerely, **RESEARCHERS AND AFFILIATIONS**

C.9 Experiment 3: *Contact Only* Treatment

Dear **OFFICIAL**,

My name is **RESEARCHER**, and I am an economist at the **UNIVERSITY**. My collaborators and I study support for higher education at state colleges and universities.

Over the last few years many states have drastically cut spending on public higher education. In light of this and our survey results, we invite you to propose a resolution preventing further reductions of higher education appropriations in Montana. A draft resolution for Montana, including information on historical appropriations, can be found here: **LINK**

Finally, we would appreciate the opportunity to talk more about higher education in Montana. If you would like to meet, please send us a few times when you are available. If you have any other questions, comments, or further considerations, we would also love to hear from you.

Sincerely, **RESEARCHERS AND AFFILIATIONS**