Obstacles to Efficient Allocations of Public Education Spending

Evidence From a Representative Survey Experiment

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Abstract

Economic research suggests that investments in early education are generally more successful than investments at later ages. This paper presents a representative survey experiment on education spending in Germany, which exhibits low relative public spending on early education. Results are consistent with a model of misconceptions: informing randomly selected respondents about benefits of early education spending shifts majority support for public spending increases from later education levels to spending on early and primary education. Effects of information provision persist over a two-week period in a follow-up survey. By contrast, results do not suggest self-interested groups inefficiently allocate public education spending.

Keywords: misconceptions, public spending, education spending, information, survey experiment

JEL classification: I22, D83, H52, P16

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1 Introduction

Education systems are inherently hierarchical: Successful learning always depends on the skills acquired at earlier education stages. An important implication for investments in education is that spending on early education is required to ensure effectiveness of later investments (Cunha et al., 2006). If education spending is optimal, we would expect the allocation of education spending to equalize returns for spending on different education areas. However, empirical studies suggest that spending increases that benefit early education are generally more beneficial for fostering education and other life outcomes than spending increases on later education areas (Heckman, 2008). This implies that at the current allocation of spending, there is sub-optimally low investment in early education areas. In light of this debate, the allocation of public spending in Germany has come under particular scrutiny—in particular since the share of public spending on early education in Germany is far lower than the share of public spending in tertiary education (OECD, 2016b).

This paper investigates whether spending preferences of the population can offer an explanation for inefficiencies in the allocation of public education spending across different education levels. The possibility of the non-optimal allocation of government resources in democracies has commanded substantial public and scientific interest. The existence of such inefficiencies is well documented for a variety of contexts (Caplan, 2007; Romer, 2003). The theoretical literature on the political economy of resource allocation shows that inefficiencies in democratic processes are possible: 1) if special interest groups influence elections in their personal best interest (Su, 2006; Karabarbounis, 2011; Grossman and Helpman, 2001; Gradstein et al., 2005) or 2) if voters

hold misconceptions about the likely effects of policies (Gilens, 2001; Romer, 2003). In this paper, I conduct a survey experiment to provide a better understanding of the political economy of education spending allocation.

Specifically, this paper looks at preferences for increases of public education spending for different education areas from early education to university in a representative sample of the voting-age population in Germany. The sample contains more than 4,000 respondents and is randomly split into a control and a treatment group. In the control group, respondents are asked to state their preference for what education level should benefit from additional government spending on education. The treatment group of respondents receives information that, according to numerous studies, investments in earlier education yield greater benefits for the future prosperity of society than investments in later education levels. Then, they answer the same question as the control group.

Analysis shows no evidence for the special interest groups model. Public preferences for education spending do not differ between respondents with high or low incomes, contrary to the model's predictions (Su, 2006). In addition, preferences in the control group are consistent with the current allocation. Only 45 percent of respondents favor additional spending on early education levels: 15 percent for early childhood education, and 30 percent for elementary school. In contrast, 41 percent of respondents favor additional spending for secondary schools: 9 percent for vocational schools and 6 percent for

universities. Hence, consistent with the status quo, the majority of respondents (55 percent) favor additional spending for later education.[2]

The survey experiment reveals that misconceptions among the public are consistent with inefficient allocations of education spending: Information on the efficacy of early education spending shifts the majority's preference toward spending on earlier education levels. In the treatment group, 66 percent of respondents favor allocating additional spending to early education or primary schools, an increase of 21 percentage points compared to the control group. The largest increase is for early education (16 percentage points), with a smaller increase for elementary schools (5 percentage points). For later education levels, support drops by 14 percentage points for secondary schools, 4 percentage points for vocational schools, and 2 percentage points for universities. Furthermore, the preferences for additional education spending correlate with respondents' beliefs (elicited earlier in the survey) at what education level additional public spending would have the greatest benefit for the country's future prosperity. This corroborates the earlier conclusion that perceived benefits of additional spending are an important determinant of public preferences.

Further analysis confirms the robustness of this interpretation. In a subgroup analysis, I find that this treatment effect is also present in an oversample of parents with school-aged children, who are a particularly relevant group in education policy. In a separate experiment, I additionally confirm that the effects of information persist over time in a sample of university students. Two weeks after treatment, students who received the

[2] The sum of numbers can deviate from those reported in the text due to rounding.

information are 29 percentage points more likely to think that additional spending on early education would be most beneficial than the uninformed control group, and are 21 percentage points more likely to favor additional spending in this area. This suggests that treatment effects are due to genuine belief updating rather than artifacts of the survey design.

These results contribute to several strands of the literature. Most importantly, they add to the political economy literature on the consequences of misconceptions (Romer, 2003) by providing empirical evidence on public preferences for the allocation of education spending across levels (Su, 2006; Gradstein, 2003, Bursztyn, 2016; Glomm et al., 2011). This complements evidence investigating perceptions of the productivity of educational investment at the individual level (Boneva and Rauh, 2018). Moreover, this paper contributes to the literature on the potential of information treatments to mitigate the effects of imperfect information (see for example Schueler and West, 2016; Cruces et al., 2013; Hastings et al., 2016; Elias et al., 2015; Kuziemko et al., 2015; Hoxby and Turner, 2015; Di Tella et al., 2012; Gilens, 2001). While this literature documents imperfect information in various domains, to my knowledge this research is the first to study misconceptions in preferences for the allocation of public education spending. The analysis also relates to experimental studies that inform survey respondents about scientific findings (e.g. Elias et al., 2015; Alesina et al., 2018; Lergetporer et al., 2017), and extends this literature by studying preferences for education policy.

The paper proceeds as follows. Section 2 provides background information on the inefficiencies of education spending in Germany and develops the theoretical framework for allocation of public spending across education levels. Section 3 describes the opinion

survey and the experimental design in more detail. Section 4 reports evidence for the special interest group model. Section 5 presents evidence for the misconceptions model, including results of the survey experiment. Section 6 discusses the robustness of the information effects over time. Section 7 offers a discussion of the findings.

2 Institutional Background and Theoretical Framework

This section provides institutional background and a theoretical framework for the survey experiment described below. First, section 2.1 offers background information on education spending in Germany. Then, section 2.2 proposes a theoretical framework of inefficient voting outcomes.

2.1 Inefficiencies in Education Spending in Germany

Economic theory of education spending suggests that there are dynamic synergies in the acquisition of skills over the life cycle. Skill attainment in earlier periods increases the productivity of learning and hence skill attainment in later periods, leading to the conclusion that skill begets skill (Cunha et al., 2006). This literature concludes that average effects of both private and public investments in human capital are greatest in early childhood and tend to decline with age (Heckman, 2008). One important implication for the allocation of public spending is that early investments can be both efficient and equity-enhancing, while later human capital investments are generally more effective for those who have a higher baseline level of skill (Woessmann, 2008a). From an empirical perspective, a consensus is emerging that high-quality early childhood education can have substantial returns, especially for children from disadvantaged backgrounds (Elango et al., 2015; Garces et al., 2002; Ludwig and Miller, 2007). While many of the early findings

in this literature rely on U.S. data, more recent work draws similar conclusions for Germany (Cornelissen et al., 2018; Felfe and Lalive, 2014), Norway (Havnes and Mogstad, 2011), and Denmark (Gupta and Simonsen, 2016). Overall, the literature suggests that public investments in early childhood education are a promising avenue for equity-enhancing policy.[3]

In light of this evidence, the German government has been criticized for investing too little in early education compared to high spending on tertiary education (OECD, 2016a).[4] Proponents of increased spending for early childhood education argue that the German education system is characterized by costly high-quality childcare (for a discussion of the preschool education system in Germany, see Felfe and Lalive, 2014). At the same time, the German public university system is tax-funded and generally does not charge tuition fees (for an overview of this political debate, see Lergetporer and Woessmann, 2018).[5] The current figures for public expenditures per student as a share of GDP per capita are illustrative. While Germany spends 16 percent of per capita GDP on preprimary education, it spends 31 percent on tertiary education (own calculations; OECD, 2016b). This implies that the share of preprimary to tertiary public education spending is 50 percent in Germany, compared to 61 percent for the OECD average. Thus, in Germany,

[3] However, even if an intervention is successful overall, there might be heterogeneities in impact. For example, preschool education seems to have no or even negative effects if state-funded preschools crowd out high-quality parental investment (Heckman et al., 2016; Fort et al., 2016). Furthermore, it is unclear whether preschool improves children's outcomes directly or through other channels, for example, changes in parental investment (Elango et al., 2015). Also, interventions are usually evaluated by their effect on labor-market or life outcomes, not necessarily allowing conclusions on the effects of interventions on individuals' utility.

[4] Recent international tests results have drawn renewed attention to the issue of early education funding, as they show that the correlation between academic achievement of primary school students and their socioeconomic background has significantly increased in Germany over the past decade (Hussmann et al., 2017).

[5] As students from advantaged backgrounds are overrepresented among university students, public higher education funding in Germany is highly regressive (Middendorff et al., 2013)

spending on early education is low compared to spending on tertiary education. The next section introduces a theoretical approach to potential obstacles inherent in the political economy of education spending.

2.2 Theories of Inefficient Voting Outcomes

The puzzle of whether inefficient policies can persist in democratic settings has received considerable attention in the literature. This paper tests the relevance of two models of inefficiency. The first model focuses on the role of special interest groups in voting outcomes. A second approach, the misconceptions model, shows that inefficient outcomes can also occur in case of imperfect information (Caplan, 2007; Romer, 2003). This section develops both arguments in the context of public spending on education.

A Model of Special Interests The first explanation for how the political process can lead to inefficient policies is that not all citizens have equal representation in voting outcomes. Instead, it is possible that special interest groups acting in their own best interest are able to manipulate voting outcomes in their favor (Acemoglu, 2003). For example, it is commonly assumed that individuals with higher income have higher weight in the political process (Karabarbounis, 2011; Campante, 2011). Starting from this assumption, Su (2006) shows that the hierarchical structure of the education system leads to conflicts of interest within society: Since children from wealthy family backgrounds are more likely to attend higher education, it can be optimal for high-income voters to favor

spending increases for tertiary education at the expense of spending on early general education to maintain the exclusivity of their own children's education.

The special interest group model generates two clear predictions for preferences on public education spending: First, individuals with high incomes will be more likely to favor additional spending for later education than low-income individuals. Second, the observed policy outcome will not correspond to the preferences of the median voter, but be skewed toward the preferences of the more influential group. The data from a representative sample of the German population allow me to test the validity of these predictions.

A Model of Misconceptions A second possible explanation of inefficient political outcomes focuses on voters' misconceptions. While the evidence for widespread ignorance in various domains of public policy is vast (e.g., Gilens, 2001), imperfect information among the electorate is not a sufficient condition for inefficient voting outcomes (Wittman, 1995). For example, biased preferences of individual voters need not lead to inefficient voting outcomes if laws of large numbers apply, or if the decision to vote is itself endogenous, with better-informed voters turning out at higher rates. However, Romer (2003) proves that if misconceptions exist, inefficient outcomes are possible even if the electorate is large and voter participation is endogenous—as individual voters are likely to draw the same fallacious conclusions, there is systematic bias to society's ignorance.[6] The model shows that if individuals' errors are correlated,

[6] For example, among the people who do not correctly answer that a cannon ball and a feather will fall equally fast in vacuum, almost everyone will incorrectly assume the cannon ball is faster, while very few will incorrectly assume the feather falls faster (Romer, 2003).

the population votes against a policy reform that would be beneficial for every member of society with positive probability.

There is reason to assume that systematic bias, i.e. misconceptions, could also play a role in the political economy of education policy.[7] If, for instance, the electorate on average underestimate the benefits of early education spending or overestimates the benefits of later education spending, voting outcomes might be inefficient as a result of these misconceptions. The survey experiment tests whether information changes the public's spending preferences, as would be expected if initial beliefs are biased. I complement the experiment by evidence on respondents' beliefs on the beneficial effects of spending at different education levels (see section 3.2 for details).

3 Opinion Survey and Experimental Design

3.1 Data

The data used in this paper are from the ifo Education Survey 2015, which is sampled and weighted to be representative of the German voting-age population.[8] The sample of 4,204 respondents includes an oversample of 1,744 parents of school-aged children, which allows detailed analysis of an important special interest group in the political economy of

[7] For example, the return to investment in education is inherently hard to observe given that benefits materialize only in the very long run. Also, changes in the composition of students over time might lead to changes in the financing needs of education institutions, which might be underestimated by the general population.

[8] Respondents answered the survey electronically, either online (80 percent) or as part of a face-to-face interview that employed a handheld tablet device (remaining 20 percent).

education policy. The survey was conducted in May 2015 and comprised a total of 34 opinion questions, as well as a wide range of socioeconomic background variables.[9]

If respondents chose not to answer a question, a pop-up notification encouraged them to do so; if they still preferred to skip the question, they were taken to the next question. Overall, item non-response is very low, 1 percent on average, across all questions used in this paper. Appendix Table A.1 (column 1) shows descriptive statistics for the samples' socioeconomic background characteristics.

3.2 Experimental Design

The survey was designed to answer the following questions. First, how should increases in education spending be allocated according to public preferences in Germany? Second, does information on the benefits of education spending across education stages change public preferences?

To address these questions, respondents were asked to choose which level of education should benefit from additional public education spending. The question was worded as follows (see Appendix Table A.2 for a summary of all question wordings): "Numerous studies show that education is important for the future prosperity of society. Suppose the government plans an increase in education spending. If only one level of education can benefit from this increase, which area should it be in your opinion?" Respondents were asked to choose one of the following answer categories: "early education," "elementary

[9] A particularly important background variable in this paper is monthly net household income, which was recorded in 18 bins from "below 400 Euro," …, to "5,000 Euro and more." Following the convention in the literature, the first bin is assigned the border value multiplied by a factor of 0.75, each following bin is assigned a value equal to the average of the upper and lower border, and the last bin is assigned the border value multiplied by a factor of 1.5 (Katz and Autor, 1999). Throughout the paper, income is reported in 1,000 Euro.

schools," "secondary schools," "vocational schools," or "universities and universities of applied sciences."[10]

The experiment implemented in the survey was designed to establish whether information provision can shift preferences for public education spending. To this end, a randomly selected group of respondents was assigned to the treatment condition. The treatment was designed to provide information reflecting current findings from the economic literature (see section 2.1) in an easily accessible way. Thus, the introductory sentence in the treatment condition was changed to: "Numerous studies show that spending for early childhood education has a more beneficial effect on the future prosperity of society than spending in later areas of education." Otherwise, the question was presented exactly the same as the question in the control condition.[11] Respondent-level randomization of treatment status allows me to cleanly identify the causal effect of information provision.[12]

[10] The wording for the answer category "early education" included all types of childcare institutions that typically enroll children between the ages of 1 and 6 years old. "Secondary school" in Germany commonly refers to a school of the tracked system, for example, Gymnasium. Vocational schools are an integral part of Germany's apprenticeship system, which combines formal schooling with in-company training. These schools are typically specialized in a few professions and provide additional academic training to apprentices, for example, lessons in optical physics for optometrists. Throughout the rest of this paper, I refer to "universities and universities of applied sciences" as universities.

[11] Survey experiments can be susceptible to priming effects, where the use of specific words might change responses momentarily in a subconscious reaction to the treatment (Bargh and Chartrand, 2000). In order minimize the possibility that such unintended priming effects arise, the question wording for the control and treatment groups differed only in the information content of the introductory sentence. Both experimental groups read that numerous studies find that education spending is important for the future prosperity of society. The only difference in wording was that respondents in the treatment group were told that research supports spending for early education. Therefore, all effects potentially caused by other elements of the question wording, for example, the focus on the future prosperity of society or the mention of scientific studies, are present in both the control and treatment groups and hence do not bias the estimation of treatment effects.

[12] A subset of respondents in the treatment group additionally received the information that Germany spends less than the EU average on early childhood education, but more than the EU average on tertiary education (see also discussion in section 2.1). Since there are no significant differences in answers between treatment groups, results are pooled for the purpose of this paper.

Lastly, the survey elicits respondents' prior beliefs by asking them to guess at what level of the education system addition education spending would have the greatest benefit. The question, which was asked before the survey experiment, was worded in the following way:[13] "What is your best guess, in which one of the following areas would additional public spending have the most beneficial effect on the future prosperity of society?"[14] Again, respondents choose one of the five answer categories from early education to university. Respondents also indicate how sure they were that their answer was close to correct on a seven-point scale ranging from "very unsure" to "very sure."

3.3 Empirical Framework

This section describes the empirical strategy I use to test the predictions of the special interest group model and the misconceptions model. Since the outcome of interest is categorical, I use multinomial logit models for estimation.[15]

First, I assess the relevance of the special interest group model by regressing spending preferences on income:

$$P(y_i = j) = F(\alpha_0 + \alpha_1 Income_i + \alpha_2{}' X_i + \varepsilon_i) \qquad j = 1, \ldots, 5 \qquad (1)$$

[13] This question was asked at the beginning of the survey (15 questions earlier than the main outcome question) to avoid behavioral responses that might arise from providing information in a way that is perceived as a correction of previously stated beliefs.

[14] If we assume that respondents' only concern is to maximize future prosperity of society, we would expect to see a perfect correlation between the answers to the question of greatest benefits and the question of spending preferences. Different answers should therefore be interpreted as both driven by classical measurement error and by respondents who are not answering as if maximizing the future prosperity of society.

[15] An alternative approach would be to use the hierarchical structure of the education levels to estimate an ordered regression model. Results do not change under this specification. However, due to the early tracking between general and vocational education in Germany, there is no natural progression for the categories "secondary schools", "vocational schools", and "university". Since LR and Wald specification tests reject the null hypothesis of parallel regressions for an ordered probit model, I estimate the multinomial model as my preferred specification.

where y_i is an indicator equal to *j* if individual *i* favors increased spending for education level *j*, $Income_i$ is a measure of individual *i*'s net household income, X_i is a vector of control variables, and ε_i is an error term. The coefficient of interest is α_1, the estimated effect of income on the probability of choosing category *j*.

Second, to assess the relationship between respondents' baseline beliefs and public preferences for education spending, I estimate the following regression model:

$$P(y_i = j) = F(\beta_0 + \sum_k \beta_1^k x_{ik} + \beta_2' X_i + \vartheta_i) \qquad j, k = 1, \ldots, 5 \quad (2)$$

where again y_i is an indicator equal to *j* if individual *i* favors increased spending for education level *j*, x_{ik} is an indicator that equals 1 if respondent *i* estimated that benefits of additional public spending would be greatest for education level *k*, X_i is the vector of control variables, and ϑ_i is an error term. In this specification, the coefficients $\beta_1^1, \ldots, \beta_1^5$ describe the relationship between prior information and spending preferences. For example, β_j^j represents the difference in the probability to favor spending on education level *j* for respondents who do and do not think that benefits are largest for spending on *j*.

Finally, I test the impact of the information treatment on spending preferences by estimating the following regression model:

$$\mathrm{P}(y_i = j) = F(\gamma_0 + \gamma_1 Treatment_i + \gamma_2' X_i + \tau_i) \qquad j = 1, \ldots, 5 \quad (3)$$

where $Treatment_i$ is an indicator equal to 1 if individual *i* received the information treatment, and τ_i is an error term. The parameter of interest, γ_1, captures the effect of information provision on the probability of choosing spending category *j*.

The treatment effect γ_1 in equation (3) is identified by random assignment to information provision. Therefore, the inclusion of covariates, X_i, should not affect the magnitude of the estimated causal effect, but may increase precision. In contrast, estimates of α_1 and β_1 in equations (1) and (2) do not have a causal interpretation due to potential endogeneity and might be sensitive to the inclusion of covariates. Throughout the paper, I present estimation results with and without additional covariates.

4 Evidence on the Special Interest Group Model

This section provides results for the special interest group model introduced in section 2.2. As outlined above, a first prediction of the model is that policy outcomes should generally be at odds with majority opinion of the electorate. In contrast to this prediction, the bottom row of Table 1 shows that the German public's preferences for education spending are consistent with low levels of investment in early education. More spending for early childhood education is preferred by 14 percent of respondents and more spending for elementary schools by 30 percent. Allocating increased spending to secondary schools is the most favored option for 41 percent, to vocational schools for 9 percent, and to universities for 5 percent of respondents. Thus, the majority of respondents do not favor an expansion of spending on the early education levels.

Estimating equation (1) also shows very limited support for the prediction of the special interest group model. According to the theory of special interests, we would expect a negative correlation of higher income with spending for compulsory education, which

disproportionately benefits poorer families[16], and a positive correlation with spending on universities, which mostly benefits children from more advantaged backgrounds. The two panels of Table 1 report average marginal effects of a 1,000 Euro increase in monthly household income on spending for each of the five education levels. As it turns out, effects are very small at 1 percentage point or less, indicating that respondents with higher household income are neither more nor less likely to support spending on any level of education. As mentioned previously, the correlation between spending preferences and household income do not necessarily capture the causal effect of an income increase. If respondents with higher household income differ along other characteristics, for example marital status, that also influence preferences for education spending the coefficients in Table 1 do not allow to distinguish these channels. All coefficients discussed in this section should be interpreted carefully in this light. We can test the sensitivity of the estimates by controlling for potential confounding factors: When controls for age, education, and other sociodemographic characteristics[17] are included, the correlation of income and spending on universities gains significance but remains very small in magnitude. Overall, these results do not support the hypothesis that high-income respondents purposely restrict funding to early general education levels as predicted by

[16] This theoretical result depends on the assumption that children from poorer families receive the same level of general early education while contributing less to the public education budget through redistributive taxation. In the German context, which socioeconomic groups benefit from additional spending is ambiguous in the case of early childhood education at preprimary level: while cost of attendance are generally means-tested, the share of children from families that enroll is generally lower among low-income families. For spending on elementary education, which is compulsory, the model predicts a clear negative correlation.

[17] Certain characteristics, like urbanicity of the municipality of residence, might in fact be mediating the influence of income on spending preferences. In this case conditioning on these outcomes could bias estimates away from the coefficient of interest. In an additional specification that only includes characteristics that are arguably exogeneous to individual education decisions (age, gender, parental education and whether the respondent was born in Germany), I find that these results do not differ from a specification without any controls (not shown). This corroborates the interpretation that my data show no indication of a causal link between income and education spending preferences.

the special interest group model. Instead, findings show that the preferred allocation of spending across education levels hardly differs by socioeconomic status.[18]

5 Evidence on the Misconceptions Model

This section presents three sets of evidence on the misconceptions model. First, I provide descriptive results on respondents' beliefs about where additional education spending would have the greatest benefits, and assess how these beliefs relate to spending preferences. Second, I discuss the experimental evidence for the effect of information provision on spending preferences. A concern for the interpretation of the survey experiment might be that the allocation of education spending across different levels is neither a particularly salient issue nor directly relevant for a majority of the German public. Therefore, the survey experiment might overestimate the malleability of preferences in response to information compared to the effects for stake-holders (Benabou and Tirole, 2016). To test this possibility, the third set of results tests the robustness of results for the subgroup of parents with children below the age of 25. Finally, the section concludes with further evidence of heterogeneities of the experimental estimates and a discussion of the role of interviewer demand effects.

5.1 Descriptive Evidence on Prior Beliefs and Spending Preferences

Respondents' beliefs about where additional spending would have the greatest benefits are consistent with the notion that respondents misconceive the benefits of additional

[18] This conclusion equally holds if I compare the spending preferences of respondents with different education attainment, an alternative measure of socioeconomic status. Results by education (not reported) show that respondents who hold a university entrance qualification are (marginally) less likely to favor additional spending for elementary schools and more likely to favor additional spending for university (not robust to the inclusion of controls). The theoretical prediction of differences in spending preferences by socioeconomic status is again not confirmed in the data.

spending in the different areas. The bottom row of Table 2 depicts the shares of respondents who believe that additional education spending would be most beneficial at the respective spending level. With the exemption of preferences for early education, the distribution of beliefs is similar to spending preferences described above. 25 percent of respondents estimate that increased public spending would be most beneficial at the early education level, 10 percentage points higher than the share of respondents that favor additional spending in this area. 26 percent of respondents estimate that increased public spending would be most beneficial at elementary school level. The largest share of 35 percent thinks that benefits are greatest for additional spending on secondary schools, while 8 percent and 6 percent of respondents believe benefits are greatest for spending on vocational school and university.

The majority of respondents (61 percent) prefer spending increases in the category which they believe would yield the largest benefits.[19] For each education level, the two panels of Table 2 report the coefficients β_j^j from estimating equation (2).[20] Results show that for all five education levels, there is a strong link between the expected benefits of additional spending for the future of society and spending preferences. The probability to favor investments in a given category is between 40 and 49 percentage points higher for respondents who think investments will be most beneficial in this category (32 percentage points and 47 percentage points, respectively, in a specification with controls). Overall,

[19] The joint distribution of answers, with a correlation of 0.55, is summarized in Appendix Figure A.1. Further analysis shows that respondents are less likely to answer the question on the highest benefits differently than the question on spending preferences when they have higher educational attainment or when they are sure about their guess (see Appendix Table A.3).

[20] For ease of exposition, I report only the diagonal entries (β_i^j with $i = j$) for each of the five education levels.

estimated benefits for investment in different education levels closely mirror preferences for the allocation of public education spending. While the strong correlation suggests that beliefs on the greatest benefits for society might drive spending preferences, it does not necessarily reflect a causal effect if respondents with different beliefs also differ along other unobserved dimensions. For example, as mentioned above, the share of respondents who think additional spending is most beneficial for early education is lower than the share that favors additional spending in this area. This suggests that respondents who think benefits are higher for early education are at the same time less likely to favor investments in the area where they perceive the highest benefits to society, a potential reflection of selection effects. The next section addresses this concern by reporting findings from a randomized survey experiment.

5.2 Experimental Evidence

The misconceptions model developed in section 2.2 predicts that if misconceptions of the electorate are a concern in the political economy of education spending, information provision should affect preferences for education spending. I test this prediction empirically by informing respondents about findings from studies that estimate that the benefits of additional education spending are generally higher for young children. This experiment allows us to assess to what extent the correlation between estimated benefits and preferences for education spending discussed above represents a causal relationship between beliefs and preferences.

The results of the survey experiment show that respondents change their answers substantially when they receive information, which is consistent with the prediction of the misconceptions model (see Figure 1). Table 3 reports average marginal effects of

treatment based on equation (3) and shows that the treatment increases the share of respondents who favor additional spending on early education by 16 percentage points to a total of 31 percent (see Panel I).[21] For elementary schools, spending support increases by 5 percentage points to 35 percent. In contrast, the treatment significantly decreases support for additional spending on all later education levels. For secondary schools, the share that favors additional spending falls by 14 percentage points to 26 percent; for vocational schools, it falls by 4 percentage points to 5 percent; and for university by 2 percentage points to 3 percent. Taking into account that support for vocational schools and university started from low baseline levels, this implies a reduction by more than a third for each of these education levels. As expected given randomization, the inclusion of control variables does not change these results.

Overall, the experimental results show that information on the benefits of education spending shifts the majority in favor of increased investment in early education levels. A strict interpretation of the treatment information would imply that additional funds should be invested in early childhood education. Indeed, we observe the strongest gain in support for this category. In a weaker sense, the treatment information implies that investments are more effective the earlier they are made. The positive treatment effect for elementary schools indicates that respondents see spending in this area similarly as investment in

[21] In a large sample, randomization yields unbiased estimates of treatment effects. To test whether randomization successfully balanced respondents' observable characteristics between treatment and control groups, Appendix Table A.1 reports estimates from the following regressions:

$$Treatment_i = \alpha + \beta\, Covariate_i + \varepsilon_i \quad (4)$$

where $Treatment_i$ is individual i's treatment status and $Covariate_i$ is individual i's value for each control variable. With only three exceptions, the assignment to treatment and control group balances the observable characteristics well (one marginally significant, two at the 5 percent level). When all controls are included as regressors, the null hypothesis of joint significance is rejected with an F-test p-value of 0.1208. Overall, these findings suggest that randomization was successful.

early education. Looking at the joint support for spending on early childhood education and elementary schools is therefore insightful. For the education levels prior to secondary schools, the information treatment turns a minority of 45 percent in support for increased spending into a majority of 66 percent (both shares are different from the simple majority of 50 percent at the 1 percent level of significance). In this sense, providing information to correct potential misconceptions changes the efficiency of the majority opinion.

The heterogeneity of treatment effects with respect to the certainty with which respondents hold their beliefs about the benefits of education spending provides further suggestive evidence that the observed treatment effects are due to belief updating. The upper (lower) part of Panel II in Table 3 shows estimates of equation (3) separately for sure (unsure) respondents.[22] Models of belief updating would suggest that effects of information on posterior beliefs should be largest for respondents who were less sure about their prior beliefs (see for example Benabou and Tirole, 2016). Consistent with this hypothesis, treatment effects of information provision tend to be larger in the subgroup of respondents that reported low certainty of their guess where additional spending would yield the greatest benefits.[23] For instance, the treatment effect of information provision on preferences for spending on early childhood education is 18 percentage points for unsure respondents, but only 12 percentage points for sure respondents (difference marginally significant). The additional increase in support for early education is mirrored

[22] I define sure respondents as those who indicated a value of 5 or higher on a seven-point scale of how sure they are their answers are correct, unsure respondents those with a value of 1 to 4. As almost a third of respondents chose the middle category of certainty, the arbitrary assignment of these respondents to the unsure group might be a concern. However, results are robust to an alternative specification that includes the middle category in the definition of sure respondents (not shown).

[23] Further analysis suggests that this difference is not driven by experimenter demand effects (see section 5.5 for details).

by a decrease in support for secondary schools and universities, where treatment decreases by 15 percentage points and 3 percentage points for unsure respondents compared to 13 percentage points and null percentage points for sure respondents. The treatment effects for spending on elementary schools and vocational schools are of the same magnitude for both groups.[24] Overall, treatment effects are still very large in the group of respondents who reported high certainty, suggesting high malleability of spending preferences in general. Thus, both the evidence of the previous section and the results of the experiment suggest that imperfect information is an important piece of the puzzle for understanding preferences for education spending.

5.3 Education Spending Preferences of Stake-Holders: Parents

The allocation of public education spending is likely to be a particularly salient issue for parents. As long as their children are still in school, parents are likely to have considerable insight into the strengths and weaknesses of the education system. Arguably, they hold stronger prior opinions on the optimal allocation of resources to schools, not least because they are directly affected by education policy. If the results so far are driven by respondents who react strongly to information because they do not have a prior opinion on the issue, we would expect that treatment effects are lower for stake-holders. The following section investigates this hypothesis with data from an oversample of parents with children of school age.

[24] We can also analyse whether the effect of the treatment information differs depending on respondents' prior beliefs in which category spending would be most beneficial as well as respondents' reported certainty. As it turns out, treatment effects do not differ significantly between respondents with different prior beliefs on where additional spending is most beneficial. However, among unsure respondents, treatment effects are largest for those who guessed benefits would be highest for additional spending on early childhood education.

Results show that findings from the previous sections hold equally well for this subgroup. Table 4 replicates the findings from the general population for the oversample of parents. In the main specification, parents include all respondents who report having a child below the age of 25.[25] The bottom row shows that spending preferences are very similar to those of the general population. Parents are significantly less likely (by 5 percentage points) to favor spending for early education and significantly more likely (by 10 percentage points) to favor spending on secondary schools;[26] however, the magnitudes of these differences are such that they do not change the conclusion that the majority favors spending for later education areas. As the first panel of Table 4 shows, there is no evidence that parents with higher household income favor spending for early education less than parents with lower household income. Only support for additional spending on secondary schools decreases slightly by 3 percentage points per 1,000 Euro of household income (marginally significant). As for the general population, this analysis suggests that the prediction of the special interest model does not describe parents' preferences.

The second panel of Table 4 shows the estimated treatment effects for the subsample of parents with children below the age of 25. Parents in the treatment group are 19 percentage points more likely to favor increased spending on early education compared to parents in the control group.[27] Similarly, the treatment increases support for spending on elementary schools by 6 percentage points and decreases support for spending on

[25] The effects of information provision hold equally for alternative definitions of parents, namely, parents who state that their children currently live in their household, as well as parents whose children are still in the education system.

[26] See Appendix Table A.4 for details. Parents are also significantly less likely to guess that further spending for university is most beneficial; answers are not significantly different for the other education areas.

[27] The difference in treatment effects between parents and respondents without children below the age of 25 is marginally significant (see Appendix Table A.5).

secondary schools (20 percentage points) and vocational schools (5 percentage points), while leaving support for spending on universities unaffected. Thus, for spending on early education (marginally significant) and secondary schools, the treatment effects of the subgroup of parents are even larger than for respondents without children below the age of 25 (see Appendix Table A.5). This is contrary to what would be expected if the effects of the information treatment were driven by respondents who do not have strong opinions on issues of education spending. Finally, the third panel of Table 4 highlights that the relationship between prior beliefs about the benefits of additional spending and spending preferences are as aligned for parents as for the general population. These additional tests suggest that even if we limit the analysis to those directly affected, we find little support for the special interest group model and strong support for the misconceptions model.

Another advantage of looking at parents is that it allows insight into the importance of self-interested answering behavior by respondents. For example, parents of two-year-old children might support additional funds for early education, while parents of 20-year-olds might be more likely to favor additional funds for vocational schools or universities. I test this hypothesis by regressing a dummy equal to 1 if any of the respondent's children attend the respective education level on the spending preference indicated by the parent. For this analysis, I limit the sample to respondents in the control group so as not to confound level differences with differences in treatment effects.[28] The average marginal effects are reported in the first panel of Table 5.[29] A parent whose child attends a certain

[28] In fact, there is sizeable heterogeneity in treatment effects among different parents: the treatment effect for parents of small children, for whom self-interest and common interest as suggested by the information treatment run in the same direction, is twice as large as the treatment effect for parents of children between primary school age and 25 years old (not shown).

[29] These results hold in specifications with and without further socioeconomic controls.

education level is generally more likely to answer that spending should benefit this education level. For example, the probability to favor additional spending on elementary schools is 10 percentage points higher among parents who have a child attending elementary school than among other parents. The association is also positive for early education (3 percentage points, not significant) and secondary school (18 percentage points), and close to zero for vocational school and university. This pattern is even stronger for the estimate as to which area spending would be most beneficial, where the correlations are sizeable and significant for early education (13 percentage points), elementary school (12 percentage points), and secondary school (10 percentage points). A possible explanation consistent with this observation is that having children in the education system increases the salience of funding needs at their institution, and hence raises the perceived return to investment for that education level.[30] In conclusion, it seems that while self-interested answering behavior is observed for parents, this effect is stronger for the estimate of benefits than for preferences on spending increases. In addition, the results on parents' preferences show evidence that misconceptions are also widespread among this interest group, and hence suggest that a lack of concern for education spending is not driving the large effects of information provision.

[30] If parents' answers are self-serving and forward-looking, they might favor additional spending for education levels that their child will attend in the future, for example, they might favor spending on secondary schools while their child is in elementary school. However, regressions that allow for parents to favor any education level that their child attends now or is likely to attend in the future estimate correlations of a similar magnitude (not shown). Furthermore, I find no evidence that parents are more likely to support spending for the next higher education level when their children are approaching the typical age of transition.

5.4 Heterogeneities of Treatment Effects

In this section, I present an explorative analysis of treatment effect heterogeneities across regional and sociodemographic subgroups of the German population.

Local Conditions While the wording of questions is concerned with education spending in Germany as a whole, respondents might still intuitively answer in light of local circumstances, for example, depending on the spending needs they observe in their region. In this section, I focus on early education spending, where I observe the largest treatment effects. To test whether experimental results vary by current policy, I use administrative data on the share of children below the age of six who are enrolled in formal daycare (Statistisches Bundesamt, 2014a; 2015). This dataset is matched to my survey data at the municipal level, allowing a close approximation of local conditions. Appendix Figure A.2 shows the correlation between enrollment share and support for additional spending on early education (aggregated to the state level for ease of exposition). Additional estimates show that in the control group, respondents in municipalities with a higher than median share of children in early education are not more or less likely to favor additional spending for early education. The experimental results show that the treatment effect of information provision for spending on early education is 8 percentage points larger in the group of high-attendance municipalities than in municipalities with below median attendance (not shown). It is well documented that individuals typically prefer information that is in line with their preferences (Benabou and Tirole, 2016). The finding of higher treatment effects in high-attendance municipalities is therefore consistent with higher unconditional preference for early education spending in high-attendance municipalities and higher willingness to take into

account information consistent with one's preferences. I conduct a similar exercise using data on the public spending on early education in each state (Textor, 2015). The relationship between current government spending and support for additional spending is shown in Appendix Figure A.3. The results show that control-group respondents in states that spend above median on early education are neither more nor less likely to favor further spending on early education, and have the same treatment effect as respondents from states that spend below the median.

Sociodemographic Characteristics In addition to our detailed analysis of parents, the rich set of demographic characteristics allows me to estimate treatment effects for other relevant subgroups of the population. Figure 2 provides an overview of the treatment effects for different subgroups, showing that effects are very homogeneous. For ease of exposition, the figure reports the effects of the treatment on the likelihood of favoring increased spending on early education areas, that is, early education and elementary schools combined.

For instance, respondents who are employed in the education sector are another important special interest group with vested interests in questions of education spending. For this group, treatment effects do not differ significantly from treatment effects for the general population. The same is true for respondents who report they vote regularly and those who consider education topics a priority when casting their vote. Similarly, treatment effects are of the same magnitude for respondents in West Germany, respondents who have above-average news media exposure, and respondents who vote for the Social Democratic Party (rather than the Christian Democratic Union). I also estimate the effect of information for grandparents, and again find results no different than those for the

overall population.[31] Only the treatment effect for parents of very young children is significantly larger than the results reported for the German population overall. These findings again show no evidence that influential groups of stakeholders hinder reform of education spending allocation in Germany. Overall, the results of this section show that misconceptions are not confined to certain groups, but are both wide-spread and malleable across the German population.

5.5 Interviewer Demand Effects

A potential concern with the findings reported so far is the possibility of interviewer demand effects. The wording of the treatment information might send a signal to respondents about what the experimenter considers to be the "right" answer, which can leave respondents reluctant to express disagreement (Cavallo et al., 2014). To investigate whether treatment effects are driven by these demand effects, I make use of the different survey modes for our offline and online sample.

More specifically, we can compare the treatment effects in the offline and online sample to get an indication of the size of potential interviewer demand effects. Although respondents in both groups answered the same computerized survey, for the offline respondents an interviewer was present at the time of the interview. A model of interviewer demand effects would predict that the loss of privacy compared to the online sample will increase demand effects for respondents in the offline sample (Rosnow and Rosenthal, 1997). While this test is not perfect due to the non-random selection of

[31] The figure also includes results for parents of children below the age of 25 (see section 5.3), respondents in counties with a high share of children attending early childhood education, and respondents in states with above average spending on early education for completeness.

respondents into online and offline mode along dimensions that might correlate with the susceptibility to interviewer demand effects, it still offers a reasonable approximation to judge the robustness of the findings. As Appendix Table A.6 shows, treatment effects are robust in my sample.[32] The interaction effect between the treatment effect and the interview mode is small and insignificant, meaning that respondents in the offline mode do not react differently to the treatment than respondents in the online mode. This suggests that respondents do not react differently to the information treatment in the presence of an interviewer. Furthermore, including controls for age and background characteristics yields an insignificant estimate of the coefficient on the dummy indicating offline status. The absence of mode effects indicates that, conditionally, offline respondents answer questions on education spending across areas similarly to online respondents, strengthening the validity of the above test. Therefore, it seems unlikely that interviewer demand effects explain the large effects of information provision.

6 Persistence of Effects: Evidence from a Convenience Sample

The experimental design of this paper allows estimating the causal effect of providing respondents with information on studies in favor of investments in early childhood education. However, interpretation of the effects crucially depends on whether the results presented so far are due to true information updating or merely artifacts of the survey design. The persistence of treatment effects supports the notion that these effects are due to genuine belief updating, because experimenter demand and priming effects are very

[32] This result holds both in a sample including all offline respondents and for the sample of offline respondents who asked the interviewer to fill out the survey for them, implying a standard face-to-face interview.

unlikely to yield persistent shifts in respondents' policy preferences (see Grigorieff et al., 2016).

6.1 Convenience Sample

To test whether information provision has lasting effects, I collect additional evidence from a convenience sample that allows me to follow participants over a two-week period. The sample consists of 262 students at a German-speaking university. The study design allows me to observe 75 students for two sessions.[33] Students were matched across time through an anonymized code that precludes identification of individual students' answers by the researcher.

In the first session, students were randomly allocated to treatment and control group and, like the main sample, were asked what education level—from early education to university—should benefit from additional spending. As before, students in the treatment group were informed that, according to studies, spending on earlier areas of education had greater benefits for society than spending on later education. In the second session two weeks later, all students answered the question of where they think additional spending would have the greatest benefits for society. Then, all students again answered the question on spending preferences from the first session but without any information provision for either group. Overall, 16 percent of students favored additional spending for early education, 32 percent for elementary schools, 25 percent for secondary schools, 3 percent for vocational schools, and 24 percent for universities (see Appendix Table A.7).

[33] All students were invited to an experimental lab and paid a standard compensation for their participation. For reasons of logistics, students answered the survey questions via pen and paper rather than on a computer. As only 75 observations are available for investigating persistence, the empirical analysis in this section has less power than the main analysis. However, the findings remain helpful in indicating potential mechanisms behind the treatment effects in the main sample.

Results show that university students are 20 percentage points more likely to prefer spending for university than the general population. They are also less likely to support additional spending on secondary schools (17 percentage points) and vocational schools (5 percentage points). They do not differ in support for early education and elementary schools.

For the student sample, I also conduct an additional analysis to test the prevalence of interviewer demand effects. As suggested in the literature, the extent of interviewer demand can be approximated by asking questions that make the "desirable" answer obvious (Quidt et al., 2017). I use a six-item scale of such questions to generate a measure of social desirability.[34] If demand effects are a major driver of the treatment group's answers, we would expect that students with high social desirability scores are less likely to deviate from presumed interviewer demand and thus exhibit stronger treatment effects than those with low desirability scores. As in the main sample, I find no evidence that demand effects drive the observed treatment effects (see Appendix Table A.8). Students with high social desirability scores do not react to the treatment more strongly than students with low social desirability scores. To the contrary, as the second panel shows, treatment effects are muted and not significantly different from zero for this group. This suggests that the increase in support for increased spending on early education areas is not driven by students mainly choosing these answers because of demand effects. Interestingly, the largest difference in effects is that students with high desirability scores

[34] Items include, for example, "My first impression of people is often correct" or "I am always honest towards others" and answers are recorded on a seven-point Likert-scale from "not correct at all" to "applies completely." I use questions suggested by Winkler et al. (2006), who develop a scale by choosing questions with the best predictive power from a larger set of commonly used questions from to the Marlowe-Crowne scale. Students are assigned a higher social desirability score if they answer more positively.

increase, rather than decrease, their support for increased spending for universities in the treatment condition compared to the control condition (marginally significant). As a result, the effect of treatment on support for university spending is larger for students with low social desirability scores. This suggests an alternative interpretation of the desirability of answers. Given that the convenience sample was surveyed at an experimental lab by university staff, it is possible that students assumed that increased spending for university would be the experimenters' desired answer. In this sense, students with high social desirability might have been more reluctant to react to the treatment information because it contradicted presumed interviewer demand. Overall, the additional evidence strengthens our confidence that demand effects are not the main explanatory factor for the observed treatment effects of information provision.

6.2 Experimental Results

As can be seen from Table 6, the immediate treatment effects in the convenience sample mirror the results for the main sample. Students in the treatment group are 22 percentage points more likely to favor increased spending for early education compared to the control group. Support for additional spending on elementary schools also increased by 3 percentage points, although the effect does not reach statistical significance. By construction, the increases in support for early education spending imply less support for spending on later education. While in the main sample the largest reduction is observed for secondary schools, in the convenience sample, support decreases most for spending on university (19 percentage points).

If the treatment merely primes respondents or changes the salience of information already known by the individual, these effects will dissipate quickly after the end of the survey

(Kuziemko et al., 2015; Cavallo et al., 2014). However, if respondents are able to recall the treatment information at a later point in time, this implies that they must have read, understood, and processed the information. The second and third panel of Table 6 show results two weeks after information provision. Students who received the treatment information in the first session are 29 percentage points (significant at the 1 percent level) more likely to guess that the benefits of education spending are highest for early education than are respondents in the control group. At the same time, they are 14 percentage points less likely to guess that benefits are highest for university (marginally significant). As before, there is no significant effect of treatment on beliefs about the benefits of spending on elementary schools and secondary schools. Consistent with the change in beliefs on the benefits of education spending, students in the treatment group remain 21 percentage points more likely to prefer additional spending for early education. Support for higher spending on elementary schools also increases by 11 percentage points (not significant), while support for spending on secondary schools and university is again lower by 18 percentage points and 14 percentage points, respectively, in the initially treated group (both marginally significant). These results strongly suggest that the estimated treatment effects are indeed due to new information that contrasts with previously held misconceptions, and cannot be explained by priming effects of the information treatment.

It is not clear ex ante to what extent the findings from the student population in the convenience sample generalize to more diverse samples. However, as the bottom rows of Appendix Table A.7 show, the magnitude of treatment effects is not significantly different for students and the general population with regard to spending on early education. For the later education areas, treatment effects are smaller for spending on secondary schools

and vocational schools in the convenience sample, but larger for spending on university. This is likely due to ceiling effects given the low level of support for increased university spending in the general population and the low level of support for increased spending on vocational schools in the convenience sample. Overall, these additional tests suggest that the preferences for spending on early education of the student sample approximate the preferences of the general public surprisingly well.

7 Conclusions

This paper suggests that the predictions of a special interest group model of political power are not borne out in the context of a survey on education spending. Instead, the findings of the survey experiment support the theory that widely held misconceptions on the benefits of education investments play a major role in explaining the current inefficiencies in spending allocation. Informing respondents about the higher benefits of investments in early childhood education significantly shifts the median respondent to support increased spending in this area. Further tests corroborate both the robustness of this result and that it is, indeed, driven by true information updating.

The findings presented here suggest that the German public is open to changes in the status quo of education spending. However, it is worth noting that the evidence in the education literature on the relationship between increased spending and improved outcomes is all but conclusive (Jackson et al., 2016; Hanushek, 2003). In practice, a well-designed strategy for successful implementation will be crucial to secure the potential benefits associated with any change in education spending.

While results suggest that differences in preferences across socioeconomic groups do not contribute to our understanding of education spending, they do not disprove the existence of political pressure groups along other dimensions not measured in this survey. Similarly, if power is concentrated not only in certain groups but lies with certain individuals, a survey sampling approach is unlikely to capture these dynamics. At the very least, the findings of this paper highlight that misconceptions play a role in explaining preferences in education spending.

Also, my data do not speak to the origins of the misconceptions held by the German public. The evidence of parents overestimating returns to investments in education areas currently serving their children suggests myopia or salience effects as potential mechanisms. Further research would be necessary to explore these hypotheses and provide more direct tests of possible channels.

Survey experiments necessarily suffer from a certain degree of artificiality. Most respondents will collect relevant information from a variety of sources over extended periods of time rather than reading this information immediately before casting a vote. Also, respondents might still lack relevant information even in the treatment condition. A number of alternative information treatments might also influence public preferences. For example, previous research has found that providing respondents with information on the current spending levels per child shifts preferences in the direction of equalized spending per child across different education levels (Lergetporer et al., 2018). The finding of significant information effects hence raises the broader question of what types of information are relevant for voters' decisions and how different information sets might

interact. Further research in this area will contribute important insights into the vulnerability of the political process to misleading or one-sided information.

Overall, this paper shows that information about scientific evidence can have large effects on the preferences of the electorate, suggesting substantial scope for information campaigns to initiate meaningful reforms of the education system. In particular, given the evidence on the benefits of childcare in Germany (see Cornelissen et al., 2018), increased focus on early education could provide one potential avenue to improve the equity of education outcomes.

References

Acemoglu, D. (2003). "Why Not a Political Coase Theorem? Social Conflict, Commitment, and Politics." Journal of Comparative Economics 31(4): 620-652.

Alesina, A., S. Stantcheva and E. Teso (2018). "Intergenerational Mobility and Support for Redistribution." American Economic Review 108(2): 521-554.

Bargh, J. A. and T. L. Chartrand, Eds. (2000). Studying the Mind in the Middle: A Practical Guide to Priming and Automaticity Research. Handbook of Research Methods in Social Psychology. New York: Cambridge University Press.

Benabou, R. and J. Tirole (2016). "Mindful Economics: The Production, Consumption, and Value of Beliefs." Journal of Economic Perspectives 30(3): 141-164.

Boneva, T. and C. Rauh (2018). “Parental Beliefs about Returns to Educational Investments – The Later the Better?” Forthcoming at Journal of the European Economic Association.

Bursztyn, L. (2016). "Poverty and the Political Economy of Public Education Spending: Evidence From Brazil " Journal of the European Economic Association 14(5): 1101-1128.

Campante, F. R. (2011). "Redistribution in a Model of Voting and Campaign Contributions." Journal of Public Economics 95: 646-656.

Caplan, B. (2007). The Myth of the Rational Voter: Why Democracies Choose Bad Policies. Princeton, NJ: Princeton University Press.

Cavallo, A., G. Cruces and R. Perez-Truglia (2017). “Inflation Expectations, Learning and Supermarket Prices: Evidence from Survey Experiments.” American Economic Journal: Macroeconomics 9(3): 1-35.

Cornelissen, T., C. Dustmann, A. Raute and U. Schönberg (2018). "Who Benefits from Universal Childcare? Estimating Marginal Returns to Early Childcare Attendance?" Forthcoming in Journal of Political Economy.

Cruces, G., R. Perez-Truglia and M. Tetaz (2013). "Biased Perceptions of Income Distribution and Preferences for Redistribution: Evidence from a Survey Experiment." Journal of Public Economics 98: 100-112.

Cunha, F., J. J. Heckman, L. Lochner and D. V. Masterov (2006). Interpreting the Evidence on Life Cycle Skill Formation. Handbook of the Economics of Education Volume 1. Amsterdam, North Holland: Elsevier.

DiTella, R., S. Galiani and E. Schargrodsky (2012). "Reality Versus Propaganda in the Formation of Beliefs About Privatization." Journal of Public Economics 96(5-6): 552-567.

Elango, S., J. L. Garcia, J. J. Heckman and A. Hojman (2015). "Early Childhood Education." NBER Working Paper No. 21766.

Elias, J. J., N. Lacetera and M. Macis (2015). "Sacred Values? The Effect of Information on Attitudes Toward Payments for Human Organs." American Economic Review 105(5): 361-365.

Felfe, C. and R. Lalive (2018). "Does Early Child Care Affect Children's Development." Journal of Public Economics 159: 33-53.

Fort, M., A. Ichino and G. Zanella (2016). "Cognitive and Non-Cognitive Costs of Daycare 0-2 for Girls." IZA Discussion Paper No. 9756.

Garces, E., D. Thomas and J. Currie (2002). "Longer-Term Effects of Head Start." The American Economic Review 92(4): 999-1012.

Gilens, M. (2001). "Political Ignorance and Collective Policy Preferences." The American Political Science Review 95(2): 379-396.

Glomm, G., B. Ravikumar and I. C. Schiopu (2011). The Political Economy of Education Funding. Handbook of the Economics of Education Volume 4. Amsterdam, North Holland: Elsevier.

Gradstein, M. (2003). "The Political Economy of Public Spending on Education, Inequality, and Growth." World Bank Policy Research Working Papers.

Gradstein, M., M. Justman and V. Meier (2005). The Political Economy of Education. Implications for Growth and Inequality. Cambridge, MA: MIT Press.

Grigorieff, A., C. Roth and D. Ubfal (2016). "Does Information Change Attitudes Towards Immigrants? Representative Evidence from Survey Experiments." IZA Discussion Paper No. 10419.

Grossman, G. M. and E. Helpman (2001). Special Interest Politics. Cambridge, MA: MIT Press.

Gupta, N. D. and M. Simonsen (2016). "Academic Performance and Type of Early Childhood Care." Economics of Education Review 53: 217-229.

Hanushek, E. A. (2003). "The Failure of Input-Based Schooling Policies." Economic Journal 113(485): F64-F98.

Hastings, J. S., C. A. Neilson, A. Ramirez and S. D. Zimmerman (2016). "(Un)Informed College and Major Choice: Evidence from Linked Survey and Administrative Data." Economics of Education Review 51: 136-151.

Havnes, T. and M. Mogstad (2011). "No Child Left Behind: Subsidized Child Care and Children's Long-Run Outcomes." American Economic Journal: Economic Policy 3(2): 97-129.

Heckman, J. J. (2008). "Schools, Skills, and Synapses." Economic Inquiry 46(3): 289-324.

Heckman, J. J., J. E. Humphries and G. Veramendi (2016). "Returns to Education: The Causal Effects of Education on Earnings, Health and Smoking." NBER Working Paper No. 22291.

Hoxby, C. M. and S. Turner (2015). "What High-Achieving Low-Income Students Know About College." The American Economic Review 105(5): 514-517.

Hussmann, A., H. Wendt, W. Bos, A. Bremerich-Vos, D. Kasper, E.-M. Lankes, N. McElvany, T. C. Stubbe and R. Valtin (2017). IGLU 2016 Lesekompetenzen von Grundschulkindern in Deutschland im internationalen Vergleich. Münster: Waxmann.

Jackson, C. K., R. C. Johnson and C. Persico (2016). "The Effects of School Spending on Educational and Economic Outcomes: Evidence from School Finance Reforms." Quarterly Journal of Economics 131(1): 157-218.

Karabarbounis, L. (2011). "One Dollar, One Vote." Economic Journal 121(553): 621-651.

Katz, L. F. and D. H. Autor (1999). Changes in the Wage Structure and Earnings Inequality. Handbook of Labor Economics Volume 3A. Amsterdam, North Holland: Elsevier.

Kuziemko, I., M. I. Norton, E. Saez and S. Stantcheva (2015). "How Elastic Are Preferences for Redistribution? Evidence from Randomized Survey Experiments." American Econonic Review 105(4): 1478-1508.

Lergetporer, P., M. Piopiunik and L. Simon (2017). "Do Natives' Beliefs About Refugees' Education Level Affect Attitudes Toward Refugees? Evidence from Randomized Survey Experiments." CESifo Working Paper No. 6602.

Lergetporer, P., G. Schwerdt, K. Werner, M. R. West and L. Woessmann (2018). "Information and Preferences for Public Spending: Evidence from Representative Survey Experiments." Journal of Public Economics 167: 138-157.

Lergetporer, P. and L. Woessmann (2018). The Political Economy of University Tuition Fees: Information Provision and Income Contingency in Representative Survey Experiments. mimeo.

Ludwig, J. and D. L. Miller (2007). "Does Head Start Improve Children's Life Chances? Evidence from a Regression Discontinuity Design." Quarterly Journal of Economics 122(1): 159-208.

Middendorff, E., B. Apolinarski, J. Poskowsky, M. Kandulla and N. Netz (2013). Die wirtschaftliche und soziale Lage der Studierenden in Deutschland 2012 - 20. Sozialerhebung des Deutschen Studentenwerks. Berlin: HIS-Institut für Hochschulforschung.

Nyhan, B. and J. Reifler (2010). "When Corrections Fail: The Persistence of Political Misperceptions." Political Behavior 32(2): 303-330.

OECD (2016). Country Note Germany. Programme for International Student Assessment (PISA) - Results from PISA 2015. Paris: Organisation for Economic Co-operation and Development.

OECD (2016). Education at a Glance 2016: OECD Indicators. Paris: Organisation for Economic Co-operation and Development.

Quidt, J. d., J. Haushofer and C. Roth (2017). "Measuring and Bounding Experimenter Demand." NBER Working Paper No. 23470.

Romer, D. (2003). "Misconceptions and Political Outcomes." Economic Journal 113(484): 1-20.

Rosnow, R. L. and R. Rosenthal (1997). People Studying People: Artifacts and Ethics in Behavioral Research. New York: W.H. Freeman.

Schueler, B. E. and M. R. West (2016). "Sticker Shock: How Information Affects Citizen Support for Public School Funding." Public Opinion Quarterly 80(1): 90-113.

Statistisches Bundesamt (2014). Bevölkerungsstand: Bevölkerung nach Geschlecht und Altergruppen. Wiesbaden: Statistisches Bundesamt.

Statistisches Bundesamt (2015). Statistik der öffentlich geförderten Kindestagespflege, nach Art der Kindertagesbetreuung. Wiesbaden: Statistisches Bundesamt.

Su, X. (2006). "Endogenous Determination of Public Budget Allocation Across Education Stages." Journal of Development Economics 81: 438-456.

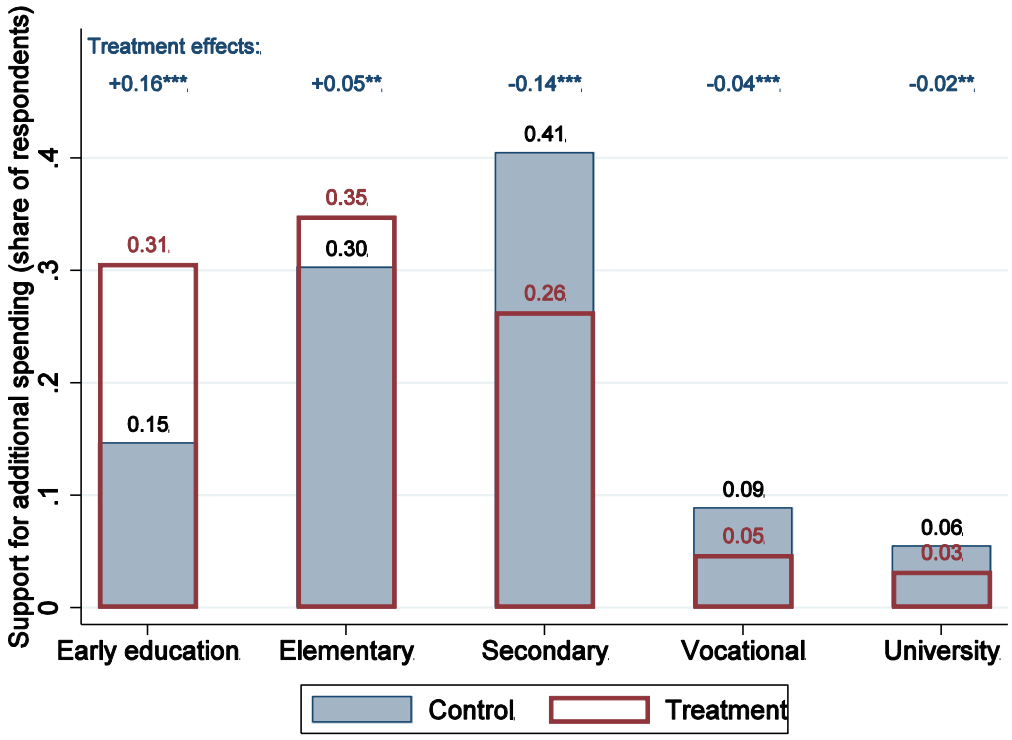
Textor, M. R. (2015). Pro-Kopf-Ausgaben für Kindertagesbetreuung: 2006-2013.

Winkler, N., M. Kroh and M. Spiess (2006). "Entwicklung einer deutschen Kurzskala zur zweidimensionalen Messung von sozialer Erwuenschtheit." DIW Discussion Paper 579.

Wittman, D. A. (1995). The Myth of Democratic Failure: Why Political Institutions are Efficient. Chicago, IL: The University of Chicago Press.

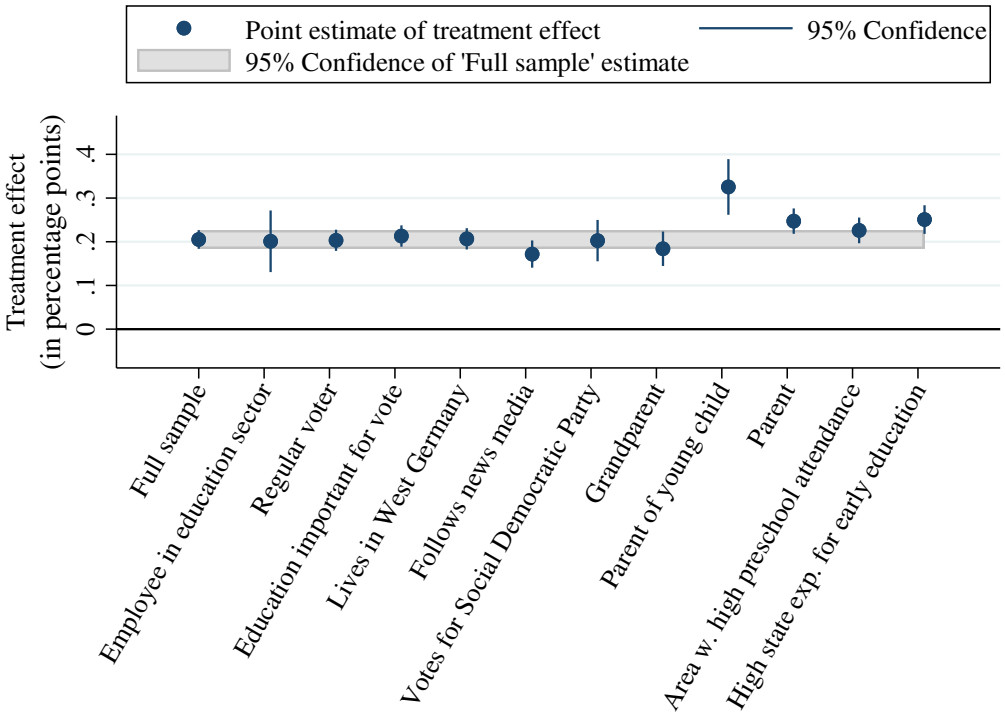
Woessmann, L. (2008). "Die Bildungsfinanzierung in Deutschland im Licht der Lebenszyklusperspektive: Gerechtigkeit im Widerstreit mit Effizienz?" Zeitschrift für Erziehungswissenschaft 11(2): 214-233.

Figure 1: Experimental results of information treatment on spending preferences



Notes: Share of respondents who favor each category for additional spending. Treatment: "Numerous studies show that early investments in education have greater positive benefits on the future prosperity of society than investments at later ages." Control: No information. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Data source: ifo Education Survey 2015.

Figure 2: Differences in treatment effects across subgroups



Notes: Results from 12 separate regressions Dependent variable is a dummy equal to 1 if the respondent favors early education or elementary school for increases in spending. Each point estimate of the treatment effect is from an OLS regression of preferences for additional spending on treatment status in the respective subgroup. As shown by the confidence intervals, all treatment effects are different from zero at the 5 percent level. Regular voter is a dummy coded 1 if the respondent votes "always" or "usually," 0 if respondent votes "sometimes" or "never." Follows news media user is a dummy coded 1 if the respondent reports consuming more news media than the median, 0 otherwise. Votes for Social Democratic Party is a dummy coded 1 if the respondent tends to vote for the Social Democratic Party, 0 if she votes for the Christian Democratic Union. Parent of young child is coded 1 if the respondent has children who do not yet attend elementary school. Parent is a dummy coded 1 if the respondent has children below the age of 25 years. Area with high preschool attendance is a dummy coded equal to 1 if the respondent lives in a municipality where the share of children who attend preschool is above the median, 0 else. High state expenditure for early education is a dummy coded 1 if the respondent lives in a state that spends more than median on early childhood. Regressions weighted by survey weights. Data source: ifo Education Survey 2015.

Table 1: Heterogeneities of spending preferences by income

	Additional spending for				
	Early education	Elementary	Secondary	Vocational	University
(I) Without controls					
Household income	-0.007	0.014	-0.008	-0.008	0.009
	(0.008)	(0.012)	(0.012)	(0.013)	(0.008)
Observations	1,403				
(II) With controls					
Household income	-0.005	0.018	-0.019	-0.009	0.014**
	(0.010)	(0.014)	(0.015)	(0.017)	(0.007)
Observations	1,372				
Control mean	0.145	0.30	0.412	0.087	0.056

Notes: Results from a multinomial logit model. The table reports the average marginal effects of an increase in monthly household income by 1,000 Euro. Dependent variable is the answer to the question: Which education level, given an increase in public education spending, should benefit from the increase in spending? Controls include age, gender, migration status, parental education, municipality size, living with a partner, education, region of residence, having children below the age of 25, employment status, and working in the education sector. Control mean: share of respondents choosing each category in the control group. Regression is weighted by survey weights. Standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Data source: ifo Education Survey 2015.

Table 2: Spending preferences and subjective benefits for society

	Additional spending for				
	Early education	Elementary	Secondary	Vocational	University
(I) Without controls					
Category has greatest subjective benefit	0.440***	0.469***	0.486***	0.448***	0.404***
	(0.039)	(0.038)	(0.034)	(0.062)	(0.077)
Observations	1,437				
(II) With controls					
Category has greatest subjective benefit	0.409***	0.444***	0.470***	0.441***	0.317***
	(0.041)	(0.038)	(0.034)	(0.067)	(0.082)
Observations	1,370				
Share: category has greatest benefit	0.251	0.257	0.352	0.078	0.062

Notes: Results from a multinomial logit model. The table reports the average marginal effects of beliefs that spending has the largest benefits for education level *j* on preferences for spending on education level *j*. Dependent variable is the answer to the question: Which education level, given an increase in public education spending, should benefit from the increase in spending? Controls include age, gender, migration status, parental education, municipality size, living with a partner, education, income, region of residence, having children below the age of 25, employment status, and working in the education sector. Last row: share of respondents choosing each category. Regression is weighted by survey weights. Standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Data source: ifo Education Survey 2015.

Table 3: Effects of information on benefits of spending for earlier education levels

Panel I: Full sample

	Additional spending for				
	Early education	Elementary	Secondary	Vocational	University
(I) Without controls					
Treatment	0.160***	0.046**	-0.142***	-0.041***	-0.022**
	(0.016)	(0.020)	(0.021)	(0.012)	(0.011)
Observations	4,223				
(II) With controls					
Treatment	0.154***	0.057***	-0.143***	-0.044***	-0.023**
	(0.016)	(0.02)	(0.021)	(0.013)	(0.011)
Observations	4,013				

Panel II: Results by certainty

	Additional spending for				
	Early education	Elementary	Secondary	Vocational	University
(I) High certainty of prior estimate					
Treatment	0.122***	0.049	-0.125***	-0.037*	-0.009
	(0.028)	(0.032)	(0.031)	(0.019)	(0.014)
Observations	1,723				
(II) Low certainty of prior estimate					
Treatment	0.184***	0.047*	-0.153***	-0.044***	-0.034**
	(0.020)	(0.025)	(0.028)	(0.016)	(0.015)
Observations	2,467				
Difference in treatment effects	0.062*	-0.002	-0.028	-0.007	-0.025
Control mean	0.145	0.30	0.412	0.087	0.056

Notes: Results from multinomial logit models. The table reports the average marginal effects of being assigned to the treatment group. Treatment: Information that, according to studies, investments in early education have larger benefits for the future prosperity of society than investments in later education. Control: No information. Dependent variable is the answer to the question: Which education level, given an increase in public education spending, should benefit from the increase in spending? Controls include age, gender, migration status, parental education, municipality size, living with a partner, education, income, region of residence, having children below the age of 25, employment status, and working in the education sector. High certainty is a dummy equal to 1 if respondents indicated a value of 5 or above on a seven-point Likert scale indicating how sure they were of their previous belief. Low certainty of estimate is a dummy equal to 1 if respondents indicated a value of 4 or below. Regressions are weighted by survey weights. Standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Data source: ifo Education Survey 2015.

Table 4: Analysis for subsample of parents

	Additional spending for				
	Early education	Elementary	Secondary	Vocational	University
(I) Heterogeneities of spending preferences by income					
Household income	0.004	0.019	-0.032*	0.011	-0.002
	(0.007)	(0.014)	(0.017)	(0.015)	(0.013)
Observations	775				
(II) Effects of information and spending preferences					
Treatment	0.188***	0.059**	-0.195***	-0.048***	-0.003
	(0.021)	(0.027)	(0.029)	(0.018)	(0.017)
Observations	2,288				
(III) Spending preferences and subjective benefits for society					
Category has greatest subjective benefits	0.347***	0.541***	0.518***	0.443***	0.341**
	(0.053)	(0.049)	(0.048)	(0.096)	(0.172)
Observations	780				
Control mean	0.144	0.261	0.462	0.087	0.045

Notes: Sample restricted to parents with children below the age of 25. Results from multinomial logit models. The table reports results on three separate regressions. Dependent variable is the answer to the question: Which education level, given an increase in public education spending, should benefit from the increase in spending? The first panel reports the average marginal effects of an increase in monthly household income by 1,000 Euro. The second panel shows the average marginal effects of being assigned to the treatment group. Treatment: Information that, according to studies, investments in early education have larger benefits for the future prosperity of society than investments in later education. Control: No information. The third panel reports the average marginal effects of beliefs that spending has the largest benefits for education level *j* on preferences for spending on education level *j*. Control mean: share of respondents choosing each category in the control group. Regressions are weighted by survey weights. Standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Data source: ifo Education Survey 2015.

Table 5: Role of self-interest for subsample of parents

Panel I: Spending preferences

	Additional spending for				
	Early education	Elementary	Secondary	Vocational	University
Child attends education category	0.031	0.098**	0.183***	0.001	-0.000
	(0.038)	(0.044)	(0.050)	(0.041)	(0.033)
Observations	803				
Control mean	0.144	0.261	0.462	0.087	0.045

Panel II: Beliefs on benefits of additional spending

	Greatest benefits for spending on				
	Early education	Elementary	Secondary	Vocational	University
Child attends education category	0.134***	0.118***	0.103***	0.036	0.009
	(0.034)	(0.026)	(0.027)	(0.022)	(0.021)
Observations	2,269				
Control mean	0.258	0.248	0.373	0.071	0.050

Notes: Sample restricted to parents with children still in education. Results from multinomial logit models. The table reports results on two separate regressions. First panel: average marginal effects of having a child attending education level *j* on the preferences for spending on education level *j*. Dependent variable is the answer to the question: Which education level, given an increase in public education spending, should benefit from the increase in spending? Second panel: average marginal effects of having a child attending education level *j* on the belief that spending on education level *j* has the highest benefit. Dependent variable is the answer to the question: For what education level would additional spending have the largest positive effects on the future prosperity of society? Control mean: share of respondents choosing each category. Regressions are weighted by survey weights. Standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Data source: ifo Education Survey 2015.

Table 6: Persistence of treatment effects

Panel I: Spending preferences at first session

	Additional spending for			
	Early education	Elementary	Secondary	University
Treatment effect	0.222**	0.031	-0.067	-0.185**
	(0.107)	(0.107)	(0.094)	(0.078)
Observations	75			
Control mean	0.220	0.293	0.244	0.244

Panel II: Beliefs on benefits of additional spending two weeks later

	Greatest benefits for spending on			
	Early education	Elementary	Secondary	University
Treatment effect	0.290***	0.001	-0.155	-0.136*
	(0.099)	(0.106)	(0.105)	(0.074)
Observations	75			
Control mean	0.122	0.293	0.390	0.195

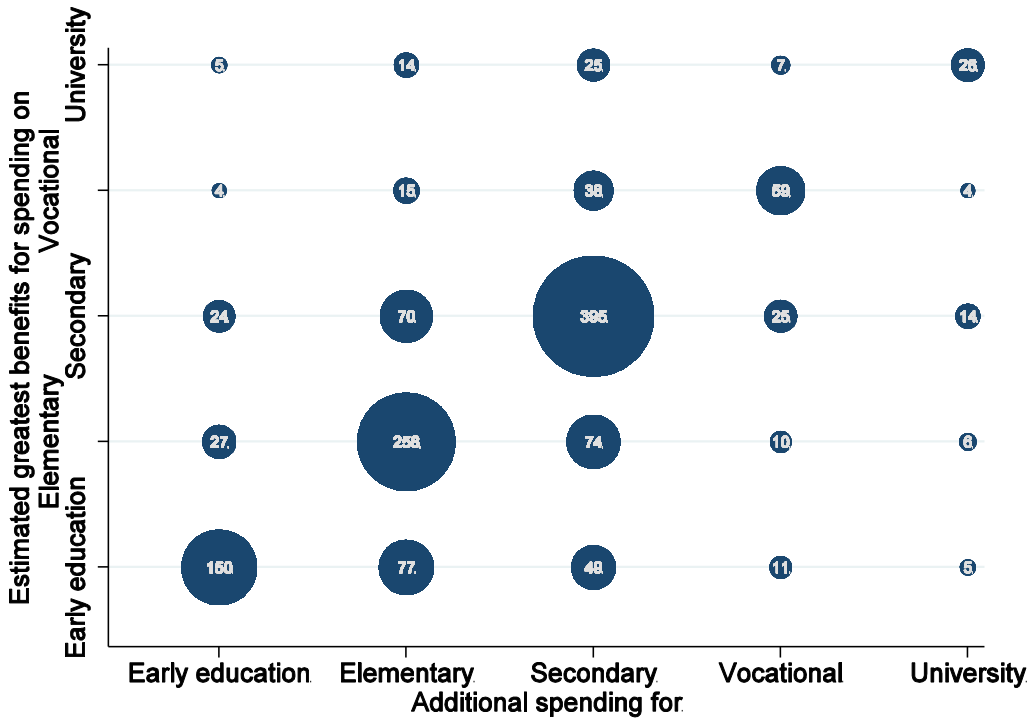
Panel III: Spending preferences two weeks later

	Additional spending for			
	Early education	Elementary	Secondary	University
Treatment effect	0.212**	0.109	-0.184*	-0.136*
	(0.102)	(0.106)	(0.103)	(0.074)
Observations	75			
Control mean	0.171	0.244	0.390	0.195

Notes: Sample of university students that were invited to two sessions. Results from multinomial logit models. The category "vocational school" is omitted because of zero observations. The table reports the average marginal effects of being assigned to the treatment group. Treatment: Information that, according to studies, investments in early education have larger benefits for the future prosperity of society than investments in later education. Control: No information. First and third panel: Dependent variable is the answer to the question: Which education level, given an increase in public education spending, should benefit from the increase in spending? Second panel: Dependent variable is the answer to the question: For what education level would additional spending have the largest positive effects on the future prosperity of society? Control mean: share of respondents choosing each category in the control group. Standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

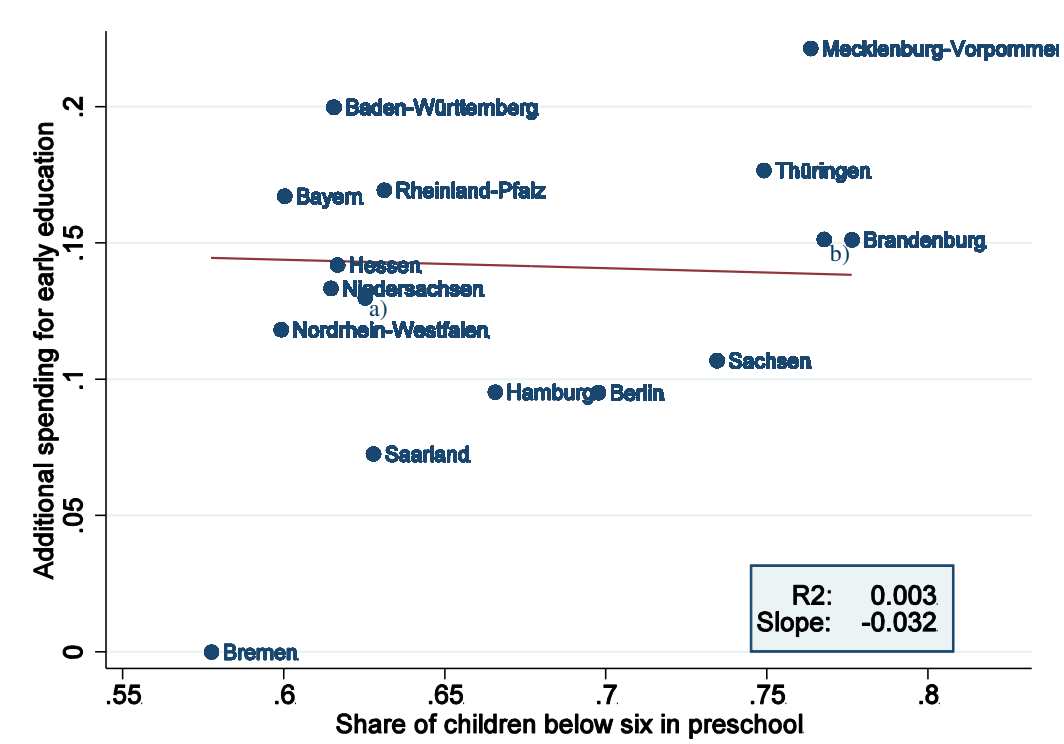
8 Appendix

Figure A.1: Joint distribution of beliefs on highest benefit and spending preferences



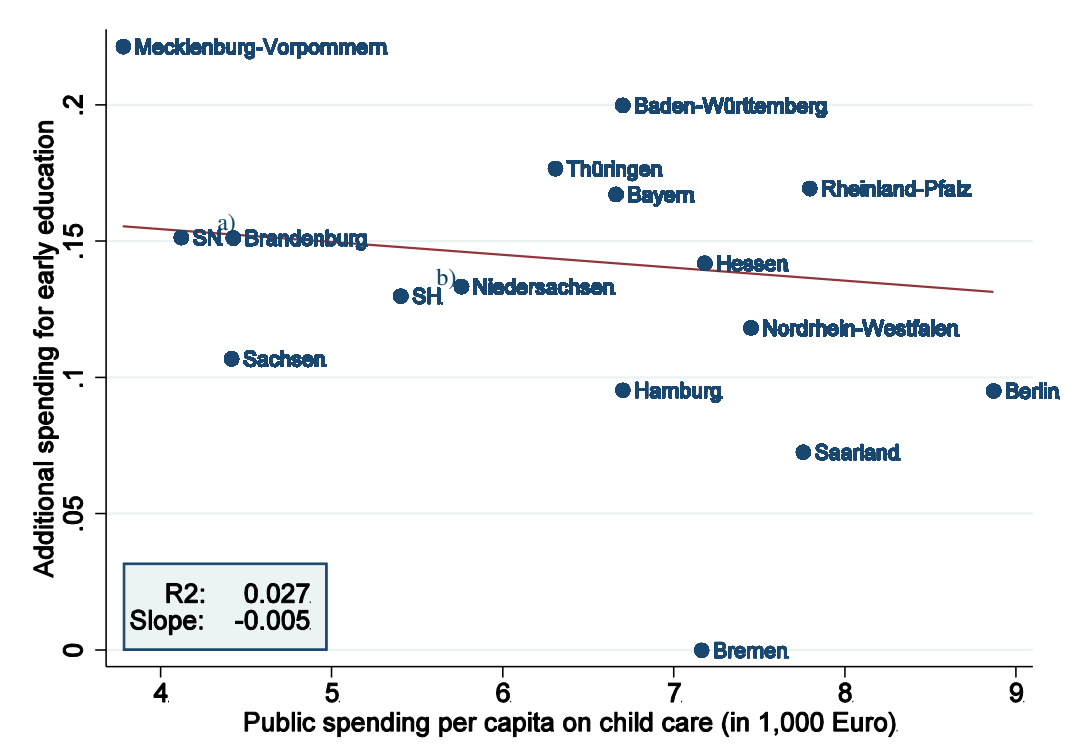
Notes: Variable on the horizontal axis is the answer to the question: Which education level, given an increase in public education spending, should benefit from the increase in spending? Variable on the vertical axis is the answer to the question: For what education level would additional spending have the largest positive effects on the future prosperity of society? Data source: ifo Education Survey 2015.

Figure A.2: Correlation of preference for early education spending and attendance



Notes: Data on the shares of children in early education are aggregated to state level for the purpose of this graph. [a)]Label for Schleswig-Holstein and [b)] Sachsen-Anhalt omitted for expositional reasons. R-squared and slope are based on a simple OLS regression. Data source: ifo Education Survey 2015 and Statistisches Bundesamt 2014/2015.

Figure A.3: Correlation of preference for early education spending and expenditures



Notes: Label for [a)] Sachsen-Anhalt (SN) and [b)] Schleswig-Holstein (SH) shortened for expositional reasons.
R-squared and slope are based on a simple OLS regression. Data source: ifo Education Survey 2015 and Textor (2015).

Table A.1: Summary statistics and balancing

	Mean	Std. deviation	Treatment status	p-value
	(1)	(2)	(3)	(4)
Age	50.798	17.903	0.000	0.748
Female	0.515		-0.023	0.223
Born in Germany	0.948		0.059	0.218
Parent holds university degree	0.277		0.040*	0.059
City size ≥ 100,000	0.314		0.014	0.497
Partner in household	0.612		0.013	0.533
Highest school degree				
No degree/basic degree	0.400		0.014	0.489
Middle school degree or equivalent	0.301		-0.041**	0.041
University entrance qualification	0.299		0.025	0.229
Lives in former West Germany	0.798		-0.007	0.746
Household income	2.278	1.402	-0.003	0.708
Parent	0.358		-0.011	0.555
Employment status				
Student	0.054		0.047	0.398
Employed	0.531		-0.022	0.251
Non-employed	0.415		0.013	0.509
Job in education sector	0.106		0.064**	0.032
Observations	4,206		4,203	

Notes: First column: sample means. Second column: standard deviation in brackets (for non-dummy variables). Third column: each row reports the coefficients from regressions of equation (4) for the survey experiment. Fourth column: p-values from coefficients in column (3). Regressions weighted by survey weights. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Data source: ifo Education Survey 2015.

Table A.2: Overview of question wordings

No.	Group	Wording	Type of question
15a	All	What is your best guess, in which one of the following areas would additional public spending have the most beneficial effect on the future prosperity of society?	5 answer categories: “Early education”; “Elementary schools”; “Secondary schools”; “Vocational schools”; “Universities and universities of applied sciences”
15b	All	How sure are you that your answer is close to correct?	7-point scale from “very unsure” to “very sure”
32	Control	Numerous studies show that education is important for the future prosperity of society. Suppose the government plans an increase in education spending. If only one level of education can benefit from this increase, which area should it be in your opinion?	5 answer categories: “Early education”; “Elementary schools”; “Secondary schools”; “Vocational schools”; “Universities and universities of applied sciences”
32	Treatment	Numerous studies show that spending for early childhood education has a more beneficial effect on the future prosperity of society than spending in later areas of education. Suppose the government plans an increase in education spending. If only one level of education can benefit from this increase, which area should it be in your opinion?	5 answer categories: “Early education”; “Elementary schools”; “Secondary schools”; “Vocational schools”; “Universities and universities of applied sciences”

Table A.3: Additional spending other for than area with greatest benefit

	Characteristics of respondents	
	(1)	(2)
Age	-0.003*	-0.002
	(0.002)	(0.002)
Female	0.036	0.025
	(0.037)	(0.037)
Born in Germany	0.042	0.035
	(0.083)	(0.081)
Parent holds university degree	0.098**	0.093**
	(0.042)	(0.041)
City size ≥ 100,000	0.010	0.006
	(0.039)	(0.038)
Partner in household	0.066	0.064
	(0.042)	(0.042)
Education (baseline: no degree)		
Middle school degree or equivalent	-0.115***	-0.113**
	(0.044)	(0.044)
University entrance qualification	-0.190***	-0.178***
	(0.050)	(0.050)
Lives in former West Germany	-0.071	-0.071*
	(0.043)	(0.043)
Household income	0.000	0.002
	(0.015)	(0.015)
Parent	-0.071*	-0.071*
	(0.040)	(0.039)
Employment (baseline: employed)		
Student	0.065	0.048
	(0.131)	(0.128)
Non-employed	0.024	0.016
	(0.041)	(0.040)
Job in education sector	0.098*	0.110*
	(0.060)	(0.060)
Certainty (baseline: unsure)		
Undecided		0.007
		(0.047)
Sure		-0.108**
		(0.043)
Constant	0.554	0.601
Observations	1,329	1,329
R-squared	0.0376	0.0499

Notes: OLS regressions. Control group only. Dependent variable is dummy equal to 1 if respondent estimate that benefits are highest to spending for education area *j* but prefers additional spending for education level *i*. Regressions weighted by survey weights. Standard errors reported in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Data source: ifo Education Survey 2015.

Table A.4: Differences between full sample and parents

Panel I: Spending preferences

	Additional spending for				
	Early education	Elementary	Secondary	Vocational	University
Parent	-0.051**	-0.023	0.104***	-0.011	-0.019
	(0.024)	(0.031)	(0.033)	(0.023)	(0.021)
Observations	1,413				
Control mean	0.144	0.299	0.413	0.09	0.054

Panel II: Beliefs on benefits of additional spending

	Greatest benefits for spending on				
	Early education	Elementary	Secondary	Vocational	University
Parent	0.008	-0.010	0.028	0.001	-0.026**
	(0.018)	(0.017)	(0.019)	(0.012)	(0.011)
Observations	4,126				
Control mean	0.246	0.259	0.357	0.077	0.061

Notes: Results from multinomial logit models. The table reports the average marginal effects of a dummy equal to 1 if the respondent has children below the age of 25. First panel: Dependent variable is the answer to the question: Which education level, given an increase in public education spending, should benefit from the increase in spending? Second panel: Dependent variable is the answer to the question: For what education level would additional spending have the largest positive effects on the future prosperity of society? Control mean: share of respondents choosing each category. Regressions are weighted by survey weights. Standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Data source: ifo Education Survey 2015.

Table A.5: Treatment effect heterogeneities for parents

Panel I: Full sample

	Additional spending for				
	Early education	Elementary	Secondary	Vocational	University
Treatment effect	0.160***	0.046**	-0.142***	-0.041***	-0.022**
	(0.016)	(0.020)	(0.021)	(0.012)	(0.011)
Observations	4,223				

Panel II: Results by parental status

	Additional spending for				
	Early education	Elementary	Secondary	Vocational	University
(I) Parents					
Treatment effect	0.188***	0.059**	-0.195***	-0.048***	-0.003
	(0.021)	(0.027)	(0.029)	(0.018)	(0.017)
Observations	2,288				
(II) Nonparents					
Treatment effect	0.137***	0.045	-0.108***	-0.042**	-0.032**
	(0.023)	(0.028)	(0.029)	(0.017)	(0.014)
Observations	1,821				
Difference in treatment effects	-0.051*	-0.014	0.087**	0.007	-0.028
Control mean	0.164	0.312	0.368	0.095	0.060

Notes: Results from multinomial logit models. The table reports the average marginal effects of being assigned to the treatment group. Treatment: Information that, according to studies, investments in early education have larger benefits for the future prosperity of society than investments in later outcomes. Control: No information. Dependent variable is the answer to the question: Which education level, given an increase in public education spending, should benefit from the increase in spending? Parents is a dummy equal to 1 if respondents have a child below the age of 25. Nonparents is a dummy equal to 1 if respondent does not have children or all children are older than 25 years. Control mean: share of respondents choosing each category. Regressions are weighted by survey weights. Standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Data source: ifo Education Survey 2015.

Table A.6: Interviewer demand effects

	Additional spending for early education	
	(1)	(2)
Treatment	0.165***	0.164***
	(0.017)	(0.017)
Offline interview	0.090**	0.045
	(0.037)	(0.042)
Treatment × Offline interview	-0.024	-0.039
	(0.049)	(0.051)
Female		0.033*
		(0.017)
Age group (baseline: 18 to 45)		
45 to 64		0.050***
		(0.018)
65+		0.084***
		(0.030)
Born in Germany		0.016
		(0.039)
Parent holds university degree		0.010
		(0.019)
Number of books at home		0.035*
		(0.020)
Constant	0.130	0.056
Observations	4,223	4,177
R-squared	0.0341	0.0394

Notes: OLS regressions. Coefficient estimates show effect of treatment and survey mode on the probability to favor spending for early education. Treatment: Information that, according to studies, investments in early education have larger benefits for the future prosperity of society than investments in later education. Control: No information. Offline interview is equal to 1 if respondents were interviewed as part of a personal interview, 0 if they responded online. Dependent variable is dummy equal to 1 if respondent favors additional spending for early education. Regressions weighted by survey weights. Standard errors reported in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Data source: ifo Education Survey 2015.

Table A.7: Differences between main sample and convenience sample

Panel I: Differences in control group

	Additional spending for				
	Early education	Elementary	Secondary	Vocational	University
Sampled in convenience sample	0.010	0.013	-0.167***	-0.051**	0.196***
	(0.046)	(0.058)	(0.054)	(0.022)	(0.052)
Observations	1,467				

Panel II: Differences in treatment effects

	Additional spending for				
	Early education	Elementary	Secondary	Vocational	University
(I) Main sample					
Treatment effect	0.157***	0.048***	-0.153***	-0.041***	-0.011*
	(0.013)	(0.015)	(0.016)	(0.008)	(0.006)
Observations	4,218				
Control mean	0.152	0.311	0.417	0.080	0.039
(II) Convenience sample					
Treatment effect	0.120*	0.049	-0.041	0.007	-0.135**
	(0.062)	(0.073)	(0.065)	(0.027)	(0.059)
Observations	178				
Difference in treatment effects	-0.037	0.001	0.112*	0.048*	-0.124**
Control mean	0.162	0.324	0.250	0.029	0.235

Notes: Results from multinomial logit models. The table reports results from three separate regressions. The first panel reports the average marginal effects of a dummy equal to 1 if the respondent was sampled as part of the follow-up sample of university students. The second and third panel show the average marginal effects of being assigned to the treatment group. Treatment: Information that, according to studies, investments in early education have larger benefits for the future prosperity of society than investments in later education. Control: No information. Dependent variable is the answer to the question: Which education level, given an increase in public education spending, should benefit from the increase in spending? Control mean: share of respondents choosing each category in the control group. Standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. Data source: ifo Education Survey 2015.

Table A.8: Treatment effect heterogeneities by students' social desirability score

Panel I: Full sample

	Additional spending for				
	Early education	Elementary	Secondary	Vocational	University
Treatment effect	0.120*	0.049	-0.041	0.007	-0.135**
	(0.062)	(0.073)	(0.065)	(0.027)	(0.059)
Observations	178				
Control mean	0.162	0.324	0.250	0.029	0.235

Panel II: Results by social desirability score

	Additional spending for				
	Early education	Elementary	Secondary	Vocational	University
(I) High social desirability					
Treatment effect	0.050	-0.054	-0.058	0.028	0.034
	(0.108)	(0.123)	(0.113)	(0.027)	(0.099)
Observations	61				
Control mean	0.200	0.360	0.280	0.000	0.160
(II) Low social desirability					
Treatment effect	0.158**	0.103	-0.030	-0.006	-0.225***
	(0.075)	(0.090)	(0.080)	(0.039)	(0.073)
Observations	117				
Difference in treatment effects	0.078	0.125	-0.000	-0.020	-0.182*
Control mean	0.140	0.302	0.233	0.047	0.279

Notes: Sample of university students. Results from multinomial logit models. The table reports the average marginal effects of being assigned to the treatment group. Treatment: Information that, according to studies, investments in early education have larger benefits for the future prosperity of society than investments in later education. Control: No information. Dependent variable is the answer to the question: Which education level, given an increase in public education spending, should benefit from the increase in spending? High social desirability is a dummy equal to 1 if respondents scored 18 or higher on one of two social desirability scales. Low social desirability is a dummy equal to 1 if respondents scored below 18 on both scales. Control mean: share of respondents choosing each category. Regressions are weighted by survey weights. Standard errors in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.