Meya, Johannes; Poutvaara, Panu; Schwager, Robert

Conference Paper

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Beiträge zur Jahrestagung des Vereins für Socialpolitik 2015: Ökonomische Entwicklung - Theorie und Politik - Session: Political Economy III, No. C21-V2

Provided in Cooperation with:
Verein für Socialpolitik / German Economic Association

Pocketbook Voting and Social Preferences in Referenda*

Johannes Meya† Panu Poutvaara‡ Robert Schwager§

August 2015

Abstract

We study the roles of self-interest and social preferences in referenda. Our analysis is based on the collective purchasing decisions of university students regarding deeply discounted flat rate tickets for public transportation and cultural amenities. Individual usage data allow quantifying the monetary benefits associated with each ticket. We find that turnout is much higher among students who benefit greatly from having a ticket, suggesting instrumental voting. In each referendum, a majority votes in line with self-interest, providing strong evidence for pocketbook voting. However, social preferences, such as altruism, public good considerations and paternalism, shift the vote of a sizable minority against their own financial interests.

Keywords: pocketbook voting, social preferences, altruism, instrumental voting, public goods, referendum
JEL classification: D72, H41, D64

*We thank Thushyanthan Baskaran, Mikael Elinder, Ingo Geishecker, Henrik Jordahl, Martin Kocher and Niklas Potrafke for helpful comments, Felix Albrecht for research assistance, and everyone who helped with the data collection. Johannes Meya and Robert Schwager gratefully acknowledge financial support from the German Federal Ministry of Education and Research under grant number 01PW11004. Responsibility for the content remains with the authors.

†Chair of Public Economics, Georg-August University Goettingen, Platz der Goettinger Sieben 3, Germany - 37073 Goettingen, jmeya@uni-goettingen.de

‡University of Munich and Ifo Institute - Leibniz Institute for Economic Research at the University of Munich, Poschingerstrasse 5, Germany - 81679 Munich, poutvaara@ifo.de

§Chair of Public Economics, Georg-August University Goettingen, Platz der Goettinger Sieben 3, Germany - 37073 Goettingen, rschwag@uni-goettingen.de

1 Introduction

Referenda are an integral part of democracy in several jurisdictions, such as Switzerland and California. For example, by bounding the property tax rate, Proposition 13 in 1978 decisively shaped local public finances in California (see California State Board of Equalization, 2012, p. 1). On the expenditure side, major examples include referenda on the Gotthard train tunnel in Switzerland in 1992 and on the high-speed railway in California (Proposition 1A) in 2008. In other countries, referenda have usually been restricted to constitutional issues such as membership in the European Union. In recent years, however, an increasing number of countries have also held referenda on non-constitutional issues, particularly on public infrastructure projects. For example, local referenda on transportation took place in 2005 (Edinburgh road tolls referendum) and 2008 (Greater Manchester transport referendum) in the United Kingdom, Italy voted on nuclear power and water service tariffs in 2011, and a German state held a referendum on a major railway project (Stuttgart 21) in 2011.

Despite their increasing popularity, referenda are controversial. Proponents welcome the broad public debate and the democratic legitimacy of decisions ensured by referenda. In this spirit, Rousseau (2012 [1762], p. 65) argued 250 years ago, "Every law the people has not ratified in person is null and void – is, in fact, not a law." Opponents fear that uninformed or ideologically biased citizens either do not bother to vote or make inefficient or inequitable decisions. Schumpeter (1994 [1942], p. 261) was convinced that "[the private citizen] expends less disciplined effort on mastering a political problem than he expends on a game of bridge." We contribute to this debate by empirically analyzing the motives for participating in a referendum and for voting against or in favor of a proposal. Our results show that 'pocketbook voting', that is, voting along monetary interests, is predominant. However, social considerations, such as the costs and benefits to other voters or the promotion of a common good, are also present and sometimes even pivotal.

We consider referenda on flat rate tickets for students at Goettingen University in Germany. If passed, these tickets give all students the right to unlimited use of a facility, such as public transportation or cultural amenities. The price of each ticket is very attractive compared with that for individual purchases; however, buying a ticket becomes compulsory for every student if the majority vote in favor. These tickets therefore share essential features with tax-financed public projects, such as the examples noted above. Collectively procuring a ticket reduces the per capita cost of the respective facility so that frequent users stand to gain substantially from approval by the majority. At the same time, some voters use the facility in question very little or not at all but are still forced to pay as much for it as anyone else.

Investigating these referenda is particularly promising because they involve easy-to-understand public policy decisions. In particular, in our setting, the voters knew exactly what a ticket would cost, and the benefits were clearly defined. In contrast, if the vote had involved, for example, a large infrastructure project, then the costs and benefits would have been uncertain. Different voting decisions could also then reflect different subjective expectations for possible deviations from projections and differences in risk attitudes. In this sense, the referenda that we study are like a 'laboratory' for direct democratic decisions, where confounding influences are reduced to a minimum.

Our main dataset covers votes on tickets for regional trains, cultural facilities and local buses held in 2013. The second dataset is from a referendum regarding a train ticket held in 2010. Our analysis is based on two surveys conducted after the votes. Whereas the 2013 survey was a paper-based exit poll, the dataset from 2010 was collected online. Therefore, this second dataset also encompasses students who did not participate in the referendum, allowing for an analysis of the decision whether to vote.

Both datasets contain detailed information on usage behavior, votes, political preferences and other characteristics of over a thousand respondents each. In the main dataset, usage is reported in categorical variables. In the second dataset, we construct a detailed monetary measure of the individual benefits conferred by the ticket. To do so, we combine information on the number of trips to visit parents with regular ticket prices that we derive from parental address data. Additionally, students were asked the extent to which the interests of others shaped their voting decisions. Other motives included social or political goals, such as promoting local cultural life and expressing protest against the pricing policy of the rail company.

Our primary focus is on the probability of voting in favor of these tickets. We find strong evidence for pocketbook voting. Most students vote in line with monetary interests. In the main dataset, a student who uses a facility very often is between 52 and 76 percentage points more likely to vote in favor of the corresponding ticket than one who never uses it. In the second dataset, a 10 percent increase in cost savings conferred by the train ticket raises the probability of voting in favor by 0.7 to 0.8 percentage points. This finding translates into widely differing predictions, given that savings vary between zero and more than three thousand euros per year.

However, our results show that monetary self-interest is not the entire story. While party preferences are mostly not relevant to the voting decision, variables capturing social preferences, such as altruism and merit good considerations, show highly significant and economically relevant effects. A sizable share of students who do not stand to gain in monetary terms from a ticket vote in favor because of social motives. The analysis suggests that social preferences were likely pivotal in one of

the four referenda and close to pivotal in another. Pocketbook voting and social preferences together can rationalize almost all votes cast.

In the second part of the paper, the dependent variable is participation in the referendum. We find that the probability of taking part increases with individual stakes, measured by the absolute value of the difference between the benefits conferred by the ticket and its price. This finding suggests some degree of instrumental turnout. Furthermore, our analysis shows that students with substantial positive benefits drive this result. Additionally, there is evidence that some students did turn out to protest the train company's pricing policy.

Our paper contributes to the literature on the motives of voters. A central question in this literature is the extent to which citizens vote according to their narrowly defined self-interest and to which voting decisions are driven by social considerations.

Pocketbook voting is the starting point in models of income redistribution that build on Meltzer and Richard (1981), in the theory of probabilistic voting (Lindbeck and Weibull, 1993; Dixit and Londregan, 1996) and in the median voter models of local public finance (Romer et al., 1992; Epple and Romano, 1996; Epple et al., 2001). Several authors specifically seek to empirically detect this motive in referenda. In an early contribution, Deacon and Shapiro (1975) find that voters in cities connected to the BART transport system in the San Francisco area were more likely to favor a proposition that would shift gas tax revenues to public transportation. Similarly, voters in precincts that are located near sports stadiums feel more positively toward subsidizing them (Coates and Humphreys, 2006). Intriguingly, according to Potrafke (2013), this finding does not hold for concert halls. Vlachos (2004) concludes that voting patterns in the Swedish referendum on EU membership are in line with conflicting regional interests. Similar to these authors, we find evidence for pocketbook voting; however, we go further by analyzing individual voting and turnout decisions rather than relying on regional vote shares.

Even more important, we study the role of social preferences, which has to date been neglected in the analysis of real world referenda. This neglect contrasts with experimental studies on voting behavior that typically find that in addition to monetary self-interest, voting reflects various types of social preferences. In particular, Tyran and Sausgruber (2006) show that inequity aversion in the sense of Fehr and Schmidt (1999) is important in laboratory elections. Introducing a novel random price voting mechanism, Messer et al. (2010) conclude that subjects' behavior is better explained by pure altruism than by inequity aversion. Balafoutas et al. (2013) find that while voting on redistribution is mostly predicted by self-interest, there is greater support for redistribution when inequalities are arbitrary than when they reflect performance in an experimental task. This finding is in line with the conclusions

derived by Fong (2001) and Alesina and Angeletos (2005) from survey evidence.

The literature on economic voting has mostly focused on representative democracy. Lewis-Beck and Stegmaier (2007) survey more than 400 studies without finding much evidence for pocketbook voting. Most of these studies suffer from severe identification problems: they assume that voters attribute all changes in their financial situation to the policies of the incumbent government. When analyzing well defined past policies, Levitt and Snyder (1997), Richter (2006), Manacorda et al. (2011), Kriner and Reeves (2012), Pop-Eleches and Pop-Eleches (2012), De La O (2013) and Zucco (2013) find that voters increase their support for the government if they have benefited from its transfers in the past. Thachil (2014) shows that poor people vote for elite parties because organizations linked to these parties provide them with local public services. Elinder et al. (2015) find strong evidence for prospective pocketbook voting: voters are already reacting when reforms appear as electoral promises.

In general, it should be noted that pocketbook voting does not exclude taking into account what is good for others. Fiorina (1978) and Markus (1988) conclude that both self-interest and convictions on what benefits society matter to American voters. In Sweden, most survey respondents admitted that their own interest mattered either as much as or more than their convictions regarding what benefits society when they chose which party to vote for (Carlsson and Johansson-Stenman, 2010).

We also contribute to the literature on voter turnout. Downs (1957) and Riker and Ordeshook (1968) already presented the idea that the more that is at stake, the more likely an individual is to vote. Indeed, Andersen et al. (2014) observe that turnout in Norwegian local elections is higher in jurisdictions with high hydropower income. Alternative explanations suggest that voting is driven by ethical concerns (Harsanyi, 1980; Coate and Conlin, 2004), social pressure (Gerber et al., 2008; Funk, 2010), expressive motivations (Brennan and Buchanan, 1984; Brennan and Hamlin, 1998; Coate et al., 2008; Hillman, 2010), or social identity (Ben-Bassat and Dahan, 2012; Hillman et al., forthcoming). We also find that the likelihood of participating increases with the personal stake. However, there is also evidence that some voters turned out to protest the train company's pricing policy. This behavior could be tactical to improve students' bargaining position. Alternatively, it could be motivated by expressive concerns.

A number of studies have found that voting decisions react to national economic conditions. Seminal contributions to this literature include Key (1966), Barro (1973), Kinder and Kiewiet (1979), Fiorina (1981), and Rogoff and Sibert (1988). Because favorable economic conditions generally also benefit the individual voter, this sociotropic voting may reflect self-interest or altruism. Recently, Margalit (2013)

and Ansell (2014) show that those personally affected by macroeconomic developments adjust their attitude toward redistributive policies. While our setting is unrelated to macroeconomic performance, our analysis complements this line of work by distinguishing between pocketbook voting and various social preferences.

Finally, our paper is also broadly related to the literature that investigates the impact of direct democracy on the public budget. Referenda are associated with lower public spending in both the US (Matsusaka, 1995) and Switzerland (Feld and Kirchgässner, 2001; Feld and Matsusaka, 2003; Funk and Gathmann, 2011). The focus of our paper differs from these contributions in that we do not aim to compare direct and representative democracy. Nevertheless, our finding that those who benefit most are most likely to vote suggests that direct democracy does not necessarily result in underspending.

The remainder of the paper is structured as follows. Section 2 presents the data and some background information. In Section 3, we give a descriptive overview of voting motives. Econometric results on voting and participation decisions are presented in Sections 4 and 5, respectively. Section 6 concludes the paper.

2 Data

2.1 Institutional background and data collection

Goettingen University periodically holds referenda among students on whether they should collectively purchase flat rate tickets, called '*Semestertickets*'. These tickets give all students at the university the right to use a specific service as often as they wish. The price of a ticket is very attractive compared with prices for individual use; however, once a ticket is accepted in the referendum, its price is collected as part of the registration fee from all students with very few exemptions.

Referenda are usually held yearly over at least three consecutive days in January at several locations on campus, and voting by mail is possible. For a ticket to be accepted, a double threshold must be passed: at least 50% of the votes must be in favor of the ticket, and, at the same time, at least 15% of the total number of students must vote in favor.

We analyze votes on tickets for regional trains, local buses, and cultural amenities. The main dataset, which we label Dataset I in the following, is based on a survey related to referenda on all three tickets that took place in January 2013. The bus ticket would be valid on all buses within Goettingen and two nearby villages. The culture ticket offers free or highly discounted entrance to a number of cultural institutions and events, such as theaters, museums and concerts. The train ticket, which is described in more detail below, grants free travel on local trains. The train

ticket had been in place without interruption since 2004, and the cultural ticket was introduced in October 2012, while the bus ticket would have been a novelty.

The prices per semester amounted to 8.55 euros for the cultural ticket, 25.80 euros for the bus ticket and 95.04 euros for the train ticket. Approximately 36% of almost 25,600 students took part in each referendum, and two of the three referenda were close. While the culture ticket just passed with 53% approval, the bus ticket failed with 46% support. An overwhelming majority of 82% voted in favor of the train ticket.

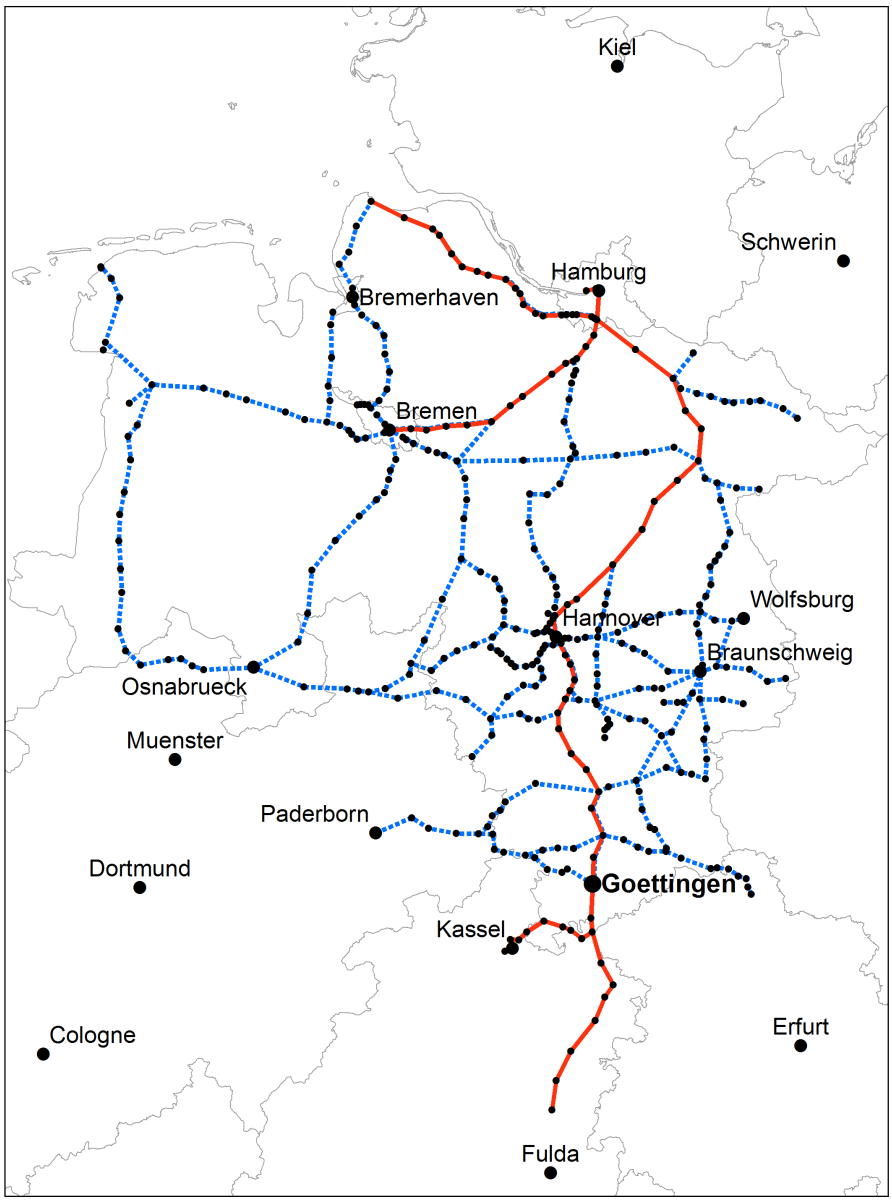
Dataset I was collected using exit polls. After leaving the polling place, students were approached by members of the survey team and asked to take part in a paper-based survey. To preserve anonymity, cubicles similar to polling booths were installed. Participation was incentivized by a lottery with prizes of 200, 100 and 50 euros.

Dataset II was collected after a referendum held in May 2010 on the train ticket only. The ticket cost 42.24 euros per semester and differed in scope from that voted on in 2013, as explained below. Of approximately 22,800 students registered at that time, 24% participated in the referendum, of whom 82% voted yes.

To obtain data on the voting and traveling behavior of students, an anonymous online survey was conducted. Unlike exit polls, this method allows nonvoters to be included in the dataset. To incentivize participation, students were invited to take part in a lottery with prizes including 250 euros and 15 pairs of tickets to a local cinema. The survey was open from July 6 until November 11, 2010.

The tracks and stations covered by the train tickets are depicted in Figure 1. Before 2010, there had been one train ticket covering, with only minor changes, all of the tracks depicted, served by several operators. The vote in 2010, however, was preceded by complaints from student representatives about the price charged by Deutsche Bahn for its section of the tracks. As a result, the ticket was split in two. The first ticket covered the offer by the two companies Metronom and Cantus, henceforth called the MetroCan ticket (the tracks are depicted as solid red lines in Figure 1) and was approved in January 2010. The second ticket covered the tracks served by Deutsche Bahn and two smaller companies (depicted as blue dashed lines in Figure 1). The latter companies are jointly referred to as Bahn throughout this paper. After some negotiations with Bahn, a referendum on the Bahn ticket was held in May 2010. Information in Dataset II refers to this referendum. In subsequent years, including 2013, the ticket proposal again covered all tracks.

Figure 1: Map



The tracks covered by the Bahn (dashed blue lines) and MetroCan (solid red lines) tickets. The gray lines are state boundaries.

2.2 Dataset I

After excluding those students who did not provide any voting decision, Dataset I contains 1,334 observations. Summary statistics are shown in Table 1. Within our sample, the shares of yes votes for all three tickets are slightly higher than the respective overall shares. The students in the dataset would have just passed the bus ticket, which narrowly missed the 50% approval threshold in the referendum. However, because our sample contains detailed information on one seventh of all the votes cast, we are confident that these deviations are of minor importance when analyzing individual voting decisions.

The intensity of use is measured by categorical variables defined differently for the tickets (Table 1). For the train and culture tickets, students were asked about their use of these amenities within the last 12 months and the year before the ticket had been introduced, respectively. For the bus ticket, the intensity of use refers to teaching periods during term. Because first-year students had not yet been at the university for a full year, we control for freshman status in the regression analysis.

For each of the three tickets, the survey contained a question capturing whether the respondent considered savings to other students to be important in his or her vote. The answers to these questions were given on a four-point Likert scale ranging from 'not important' to 'important'. Furthermore, we asked about other motives, such as environmental aspects in the case of the train ticket or strengthening local transportation or local cultural life in the case of the bus or cultural tickets, respectively, using the same Likert scale. In Table 1, we give the shares of students who replied that these other considerations were important. Additional control variables are gender and fields of study.[1] Moreover, political preferences were captured by a question on how the respondent would vote in a federal election if this election were to take place the following Sunday. Finally, students were asked if they would buy the ticket for themselves if the ticket were rejected in the referendum but were available for purchase at the same price on an individual basis.

2.3 Dataset II

Summary statistics for Dataset II are reported in Table 2. This dataset consists of 1,189 observations after cleaning the data.[2] Of these, 828 students took part in the referendum, showing an overrepresentation of voters in our sample. At the same time, these data allow us to base our analysis on detailed information on almost one

[1] Due to the high number of polling stations, the survey team could not cover all of the stations during open hours on all three days. Therefore, the faculties of Law, Humanities, Economic Sciences and Social Sciences are overrepresented in the dataset.

[2] See Appendix A.I in the supplementary material for a detailed description.

Table 1: Summary statistics Dataset I

Variable	N	Mean
Train ticket		
Train ticket: yes	1252	0.86
Would buy it	1248	0.64
Never	1321	0.07
Rarely ($\leq$ 5/year)	1321	0.17
Sometimes (monthly)	1321	0.32
Often (weekly)	1321	0.21
Very often ($\geq$ 2/week)	1321	0.24
Savings to others important	1292	0.47
Environment important	1284	0.38
Bus ticket$^{\diamond}$		
Bus ticket: yes	1246	0.51
Would buy it	1276	0.37
Never	1329	0.40
Rarely (1 or 2/semester)	1329	0.24
Sometimes (monthly)	1329	0.13
Often (weekly)	1329	0.09
Very often ($\geq$ 2/week)	1329	0.14
Savings to others important	1280	0.23
Strengthening bus important	1245	0.12
Culture ticket		
Culture ticket: yes	1283	0.54
Would buy it	1233	0.44
Never	1234	0.56
Rarely (1 or 2/year)	1234	0.25
Sometimes (3 to 5/year)	1234	0.12
Often (6 to 10/year)	1234	0.04
Very often ($>$ 10/year)	1234	0.03
Savings to others important	1235	0.24
Others should go important	1201	0.29
Strengthening local culture important	1229	0.39
Control variables		
Female	1276	0.50
Freshman	1318	0.30
Christian Democrats	1140	0.26
Social Democrats	1140	0.29
Liberal Democrats	1140	0.04
Green	1140	0.31
Left	1140	0.05
Other parties	1140	0.05
Economic sciences	1322	0.30
Social sciences	1322	0.24
Forestry/Agriculture	1322	0.06
Humanities	1322	0.27
Geology/Geography	1322	0.03
Law	1322	0.11
Natural sciences	1322	0.08
Other fields	1322	0.03

$^{\diamond}$ Intensity of the use of the bus ticket refers to the lecture period.

Table 2: Summary statistics Dataset II

	All		Vote on Bahn ticket=1	
Variable	N	Mean	N	Mean
Vote on Bahn ticket	1189	0.70	828	1.00
Bahn ticket: yes	818	0.68	818	0.68
Savings$^{\diamondsuit}$	1189	255.09	828	302.92
Stakes$^{\spadesuit}$	1189	259.31	828	297.56
Own price threshold$^{\clubsuit}$	1125	69.76	783	72.31
Exp. ave. price threshold$^{\heartsuit}$	1099	63.20	764	63.03
Leisure/work	1189	0.06	828	0.06
Visiting others	1174	0.65	819	0.67
Female	1176	0.57	817	0.54
Freshman	1099	0.15	768	0.18
Altruist(−)	1074	0.14	741	0.13
Altruist(+)	1074	0.34	741	0.33
Protest	1189	0.21	828	0.24
Christian Democrats	911	0.21	645	0.22
Social Democrats	911	0.24	645	0.27
Liberal Democrats	911	0.11	645	0.11
Green	911	0.35	645	0.33
Left	911	0.03	645	0.02
Other parties	911	0.05	645	0.05

$^{\diamondsuit}$Savings are between 0 and 3,800 with a std. dev. of 449.72 within the entire sample and 487.99 among the voters; $^{\spadesuit}$stakes are between 0 and 3,715.52 with a std. dev. of 405.06 and 444.15, respectively; $^{\clubsuit}$own price thresholds are between 0 and 750 with a std. dev. of 65.22 and 64.14, respectively; $^{\heartsuit}$and expected average price thresholds are between 10 and 720 with a std. dev. of 47.92 and 46.76, respectively.

sixth of all voters in the referendum. Among the voters in the sample, the share of yes votes is 68% and hence smaller than the share of yes votes in the polling box.

The key variable in this dataset is the individual savings of each student. We construct an objective measure of the savings associated with the Bahn ticket by combining the number of trips to visit the respondents' parents using this ticket within the last 12 months with the price that would have been paid in the absence of the ticket.[3] We focus on trips to visit parents because this is the most common trip students make. Moreover, the two larger cities close to Goettingen, namely Hannover and Kassel, which might be attractive leisure destinations, can be reached using the Metro-Can ticket (Figure 1). To analyze the decision to take part in the referendum, we transform the savings variable by subtracting the ticket price per year and taking the absolute value. We thereby gain a quantitative measure of the stake that a student had in the referendum.

The control variables in this dataset include gender and the party for which the student voted in the last federal election in 2009. Further variables contain

[3]A detailed description of the calculation of savings is included as Appendix A.II in the supplementary material.

information on whether the student visited people other than his or her parents using the ticket and whether the student is a freshman. These data are relevant because the first-year students in the dataset only began university in October 2009. Thus, they could not use the ticket for a full year.

The questionnaire also allowed students to enter free text regarding the primary reasons to vote for or against the Bahn ticket. To use this qualitative information, a content analysis was performed to identify the relevant topics. Afterward, three raters independently coded all of the answers with respect to whether a topic did apply. Finally, an indicator variable was defined that is equal to one if at least two of the three raters independently identified the topic in the statement given and zero otherwise.

We use two variables resulting from this qualitative analysis. The first item, *leisure/work*, captures whether the student mentioned leisure activities other than visiting people, such as exploring the region, or work-related usage. The second item emerging from the content analysis is *protest*: some students expressed their unwillingness to accept the price of the ticket or feared that accepting the conditions would foster future price increases. Among the voters, the shares of students referring to *leisure/work* and *protest* are approximately 6% and 24%, respectively.

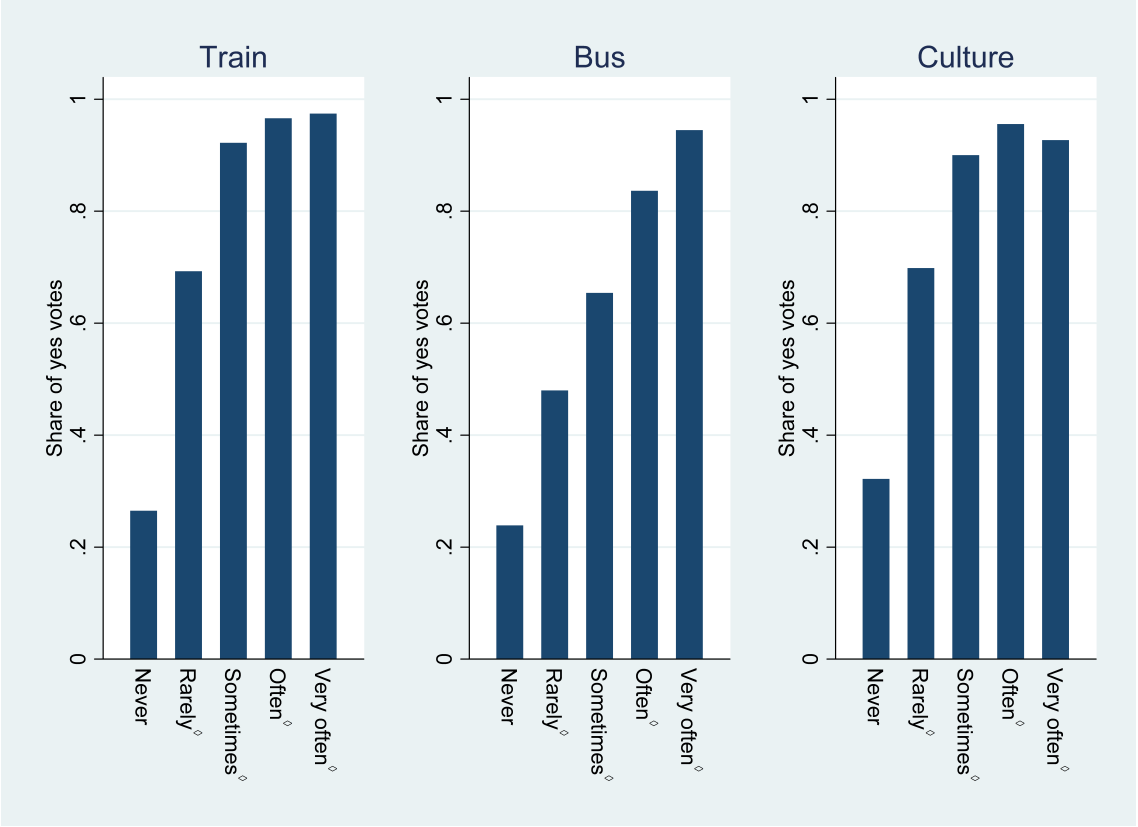
Dataset II includes information on the highest prices at which students would vote in favor of the Bahn ticket and their beliefs about the corresponding average of fellow students. We also asked students how they weighted these two amounts in their votes. If the decision is influenced by more than just his or her own amount, then a student is classified as an altruist. The resulting group of altruists is then split into those who think that students on average will gain from this ticket and those who think that students on average will lose. Accordingly, *altruist(+)* is equal to one if the student bases his or her decision on more than his or her own amount and believes that the price threshold of fellow students is on average greater than the price, and zero otherwise. We define *altruist(−)* analogously. If the student did not vote, then these two indicator variables are based on the hypothetical question of how he or she would have weighted these amounts.

3 The big picture

In this section, we take a closer look at the data in a descriptive analysis. The big picture that emerges is that there is strong evidence for pocketbook voting but that social preferences also play an important role. For a first impression of the relevance of pocketbook voting, consider Figure 2. This figure depicts the share of yes votes in Dataset I depending on how intensively the voter used the service that was the subject of the vote. There is a strong link between own use and the likelihood of

voting yes. For each ticket, more than 90% of those who very often used the service voted in favor, while the share of yes votes varies between 24% and 32% for those who never used the service.

Figure 2: Intensity of use and yes votes, Dataset I



◇Definitions of the intensity of use differ: Rarely, Sometimes, Often, and Very often correspond to at most 5 times a year, monthly, weekly, and at least twice a week, respectively, for the train ticket; once or twice a semester, monthly, weekly, at least twice a week, respectively, during the lecture period for the bus ticket and once or twice a year, 3 to 5 times a year, 6 to 10 times a year, > 10 times a year, respectively, for the culture ticket.

To understand the extent to which pocketbook considerations can explain voting, we relate the voting decision to the binary variable stating whether the respondent would have bought the ticket individually if it were rejected in the referendum. If voting exclusively followed pocketbook considerations, we would expect those who voted in favor to also be willing to buy the ticket if it were available for individual purchase and those who voted against to be unwilling to do so. Table 3 shows that 93% to 96% of those who voted against a semester ticket would also decline the opportunity to buy it privately. Remarkably, 23% to 27% of those who voted in

Table 3: Pocketbook voting – Dataset I

Train ticket			
Buy it	Vote		Total
	No	Yes	
No	158	256	414
Yes	11	755	766
Total	169	1,011	1,180

Bus ticket			
Buy it	Vote		Total
	No	Yes	
No	572	160	732
Yes	21	441	462
Total	593	601	1,194

Culture ticket			
Buy it	Vote		Total
	No	Yes	
No	519	147	666
Yes	27	495	522
Total	546	642	1,188

favor of a ticket would not be willing to buy it privately for the same price. Taken together, approximately 30% of the respondents voted differently as citizens than they would have as private consumers. We conjecture that social preferences explain most of this difference.

To test our conjecture, we next calculated the fraction of those who voted in favor of each ticket but would not buy it privately who also reported at least one important social motive (strong social preferences) and the fraction who reported no important social motive but at least one somewhat important one (moderate social preferences). The social preferences that we consider relate to altruistic concerns toward other students and to common good considerations. The former are relevant when a respondent notes that savings to others are a motivation to vote in favor of a ticket. The latter is present when a respondent supports the service in question because it benefits the environment (in the case of the train ticket) or because he or she wants to strengthen local culture or the bus system. Social preferences also encompass responses stating that other students should use cultural services more often.

Table 4 shows that strong social preferences were especially pronounced among those supporting the culture ticket even if they were unwilling to buy it privately. In fact, everyone who supported the culture ticket without being willing to buy it claimed at least moderate social preferences. More than 90% of those voting in favor of the train or bus ticket despite not being willing to buy it privately reported at least moderate social preferences.

Figure 3 summarizes these findings. It shows that 77% to 85% of all votes can be rationalized by pocketbook voting, corresponding to voting in favor of a ticket when one would buy it privately at the price charged and voting against when one would not buy it. Almost all of the votes that cannot be rationalized in this way can be rationalized by social preferences. Only one to two percent of the respondents voted against a ticket, despite having their own pocketbook considerations that support the service. The share of unrationalizable yes votes, those supporting a service that they would not purchase privately at the quoted price and for which they did not express any social concerns, varied between zero and two percent.

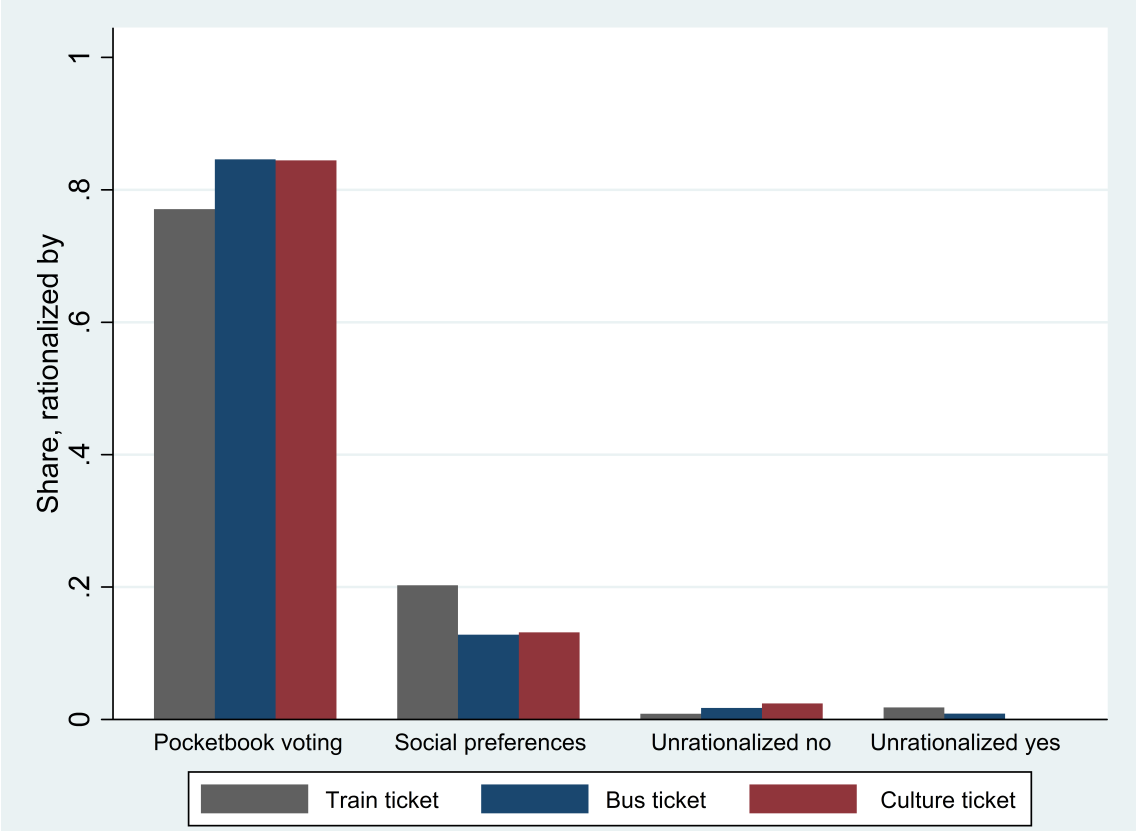
When interpreting Figure 3, it is notable that individual financial interests and

Table 4: Voting in favor but unwilling to buy: importance of social preferences

	Train	Bus	Culture
Strong social preferences	137	75	99
Moderate social preferences	92	69	46
No social preferences	21	10	0
Total	250	154	145

Strong social preferences: at least one social motive was important to the student. Moderate social preferences: at least one social motive was somewhat important to the student; however, no motive was important. No social preferences: all social motives were unimportant to the student. The social motives considered include for all three tickets savings to other students. They also include environmental aspects for the train ticket, strengthening local public transportation for the bus ticket, and strengthening local cultural life and the belief that others should visit cultural institutions more frequently for the culture ticket.

Figure 3: Rationalizing votes – Dataset I



social preferences are not mutually exclusive but, rather, may coincide. Therefore,

the figure does not state that 80% of all voters would base their decisions only on their own financial benefit. Rather, it shows that there are very few votes that cannot be rationalized by either pocketbook voting or social considerations or both types of motivation together. We performed the analysis summarized in Figure 3, splitting the sample by gender and by political orientation. We find that the differences between men and women and between supporters of the left and those of the right are minor.

To observe the full power of social preferences, note in Table 3 that although only a minority of students in the sample would have bought the culture ticket or the bus ticket, a majority supported them in the referenda. As Figure 3 shows, for a sizable minority of the voters, social preferences were the decisive factor in their decision. The closeness of the results in the actual referenda on the culture and bus tickets suggests that social preferences were pivotal in the former vote and close to pivotal in the latter.

For each ticket, Table 5 more deeply explores the various social preferences of those who voted in favor of the ticket but would not buy it privately. For the train and bus tickets, altruistic consideration for savings to others was by far the most important social motivation for supporting the ticket. Four out of five also viewed environmental benefits as at least a somewhat important motivation for supporting the train ticket. A collective purchase decision in favor of an environmentally friendlier form of transportation can be seen as a way to avoid free riding in protecting the environment. For the culture ticket, a different picture arises. The most common motivation to support this ticket as a voter, even if unwilling to buy it as consumer, is strengthening local cultural institutions. This motivation, in turn, can have an altruistic component but can also be self-interested: a stronger local cultural landscape improves the choices that one has as a private consumer. The altruistic motivation of providing savings to others and the view that others should attend cultural activities more often are less pronounced. Interestingly, the latter motivation appears to be somewhat more common than the concern regarding savings for others. Wanting other students to consume more culture can be interpreted as paternalism but might also reflect a desire to have more company at cultural events.

Yet another reason for supporting the culture ticket could be related to problems of self-control. Students may want to commit themselves to consuming more culture, just as a flat rate gym membership can be seen as a commitment device to exercise more often (DellaVigna and Malmendier, 2006). Note, however, that buying this ticket privately would also provide a commitment device. The fact that a substantial number of respondents voting in favor of the ticket would not make this private purchase but at the same time state that others should attend cultural

Table 5: Voting in favor but unwilling to buy: different social preferences

	Important	Somewhat important	Unimportant	Total
Train ticket				
Savings to others	119	106	29	254
Environment	96	105	50	251
Bus ticket				
Savings to others	63	70	24	157
Strengthening bus system	29	69	57	155
Culture ticket				
Savings to others	54	65	26	145
Strengthening local culture	65	75	6	146
Others should go	55	76	13	144

events more often suggests that many students saw the self-control problem in their fellow students rather than in themselves.

We now turn to Dataset II, which refers to the 2010 vote on the Bahn ticket. First, we note that savings on the trips to visit parents are highly diverse. While almost half of the students do not use the Bahn ticket at all to visit their parents, mean savings amount to 255 euros. Figure 4 depicts the share of yes votes according to the magnitude of the savings conferred by this ticket for student trips to visit parents. Approximately 40% in the lowest four deciles, which consist of students with zero savings, voted in favor of the ticket. Thereafter, support for the ticket increased monotonically when moving to higher savings deciles, exceeding 90% for the four highest deciles. Therefore, the picture that we find is again very much in line with pocketbook voting.

We also asked students whether they used the ticket for visits other than those to their parents. This inquiry allows us to define those for whom savings from visiting parents were less than the price of the ticket and who neither visit other people using the ticket nor mention leisure or work-related trips as losers in terms of private benefits and those for whom the savings from visiting parents exceeded the price of the ticket as clear winners. Those for whom savings from visiting parents fell short of the price of the ticket but who also mentioned other trips are a middle category, in which we cannot say for sure whether the student in question privately gained or lost from the ticket. Table 6 shows that 92% of the winners voted in favor of the ticket and 75% of the losers against. Therefore, pocketbook voting can again rationalize most of the votes; however, there is also a significant minority that voted against their narrowly defined self-interest.

Looking more closely at those who voted against their narrowly defined self-interest shows that most respondents who lost privately but voted in favor of the ticket cared about the savings that the ticket delivered to other students. To analyze

Figure 4: Savings and share of yes votes – Dataset II

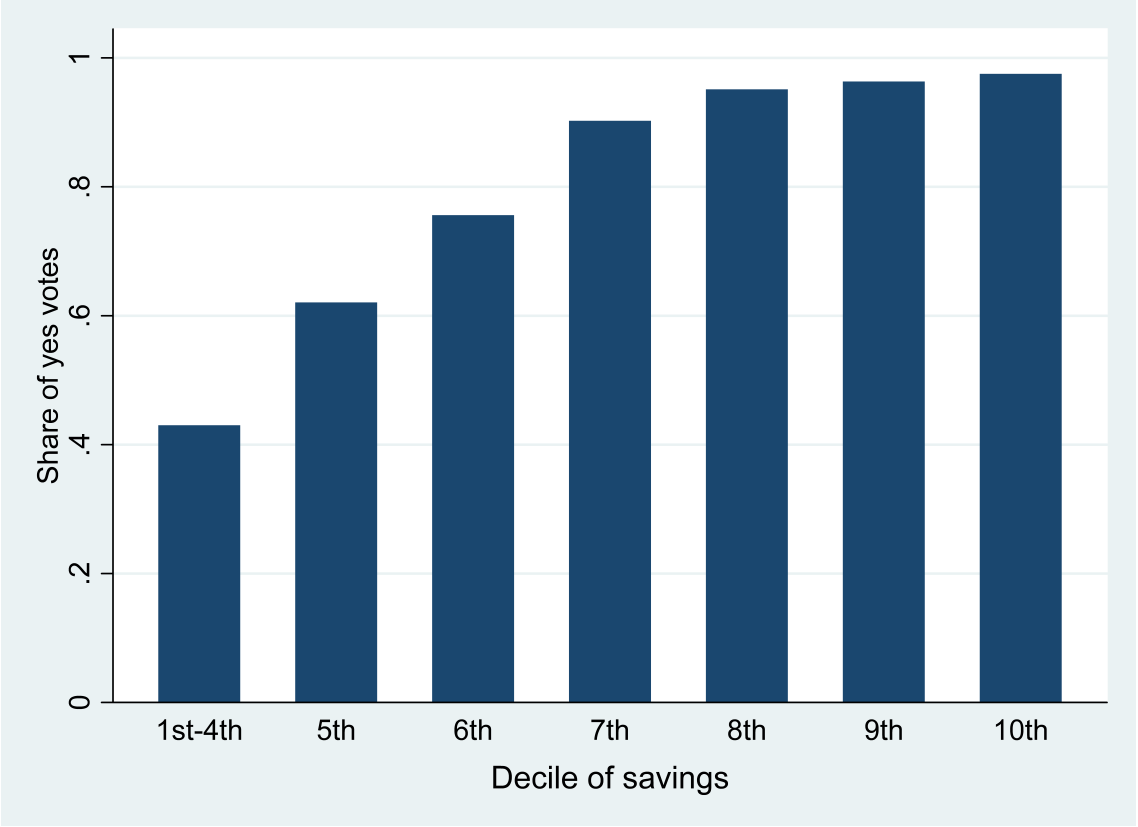


Table 6: Pocketbook voting – Dataset II

Bahn ticket			
Net gain	Vote		Total
	No	Yes	
Loser	144	49	193
Moderate savings & add. monetary gains	80	140	220
Winner	34	368	402
Total	258	557	815

Losers' savings do not cover ticket costs, and they neither visit other people using the ticket nor mention leisure/work usage. The savings of the middle group alone do not cover ticket costs; however, they mention other trips. Winners' savings cover ticket costs.

Table 7: Social preferences and protest among winners and losers – Dataset II

Bahn ticket, only losers			
Altruist(+)	Vote		Total
	No	Yes	
No	119	17	136
Yes	12	23	35
Total	131	40	171

Bahn ticket, only winners			
Altruist(−) or protest	Vote		Total
	No	Yes	
No	9	239	248
Yes	23	100	123
Total	32	339	371

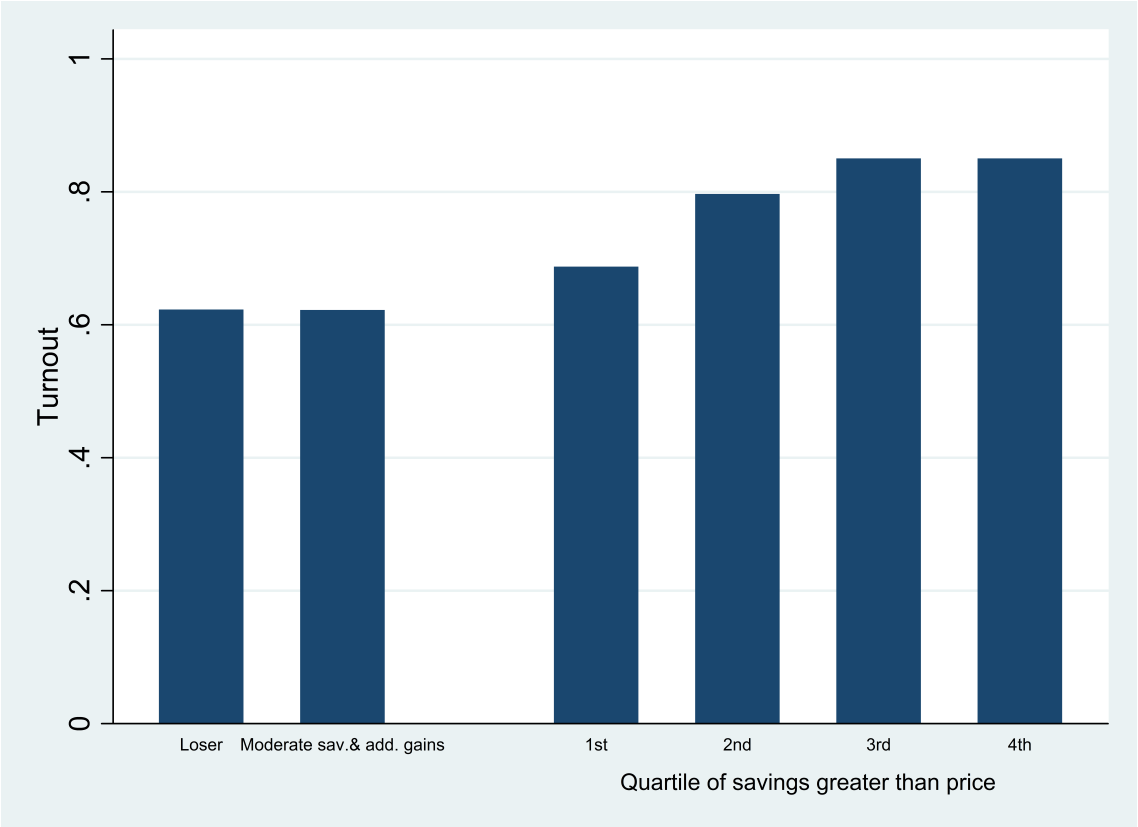
Losers' savings do not cover ticket costs, and they neither visit other people using the ticket nor mention leisure/work usage. Winners' savings cover ticket costs.

these concerns, we use the variables *altruist(+)* and *altruist(−)*, which describe students who stated that they cared about other students' benefits in their votes and at the same time thought that students on average would gain or lose, respectively, when the ticket was introduced. As seen in Table 7, the majority of respondents who voted in favor of the ticket even if they lost privately thought that other students gained from it and reported that they cared about this gain. Among those who voted against the ticket, even if it promised them higher private savings than the price of the ticket, a clear majority was either of the view that other students would lose from the ticket or mentioned protest motives regarding price or pricing policy in the questionnaire's write-in section.

We also analyzed how the decision to participate in the vote was related to savings when visiting parents. Figure 5 presents turnout separately for three groups defined according to the monetary gains conferred by the ticket: 1) those who lost from the ticket; 2) those with moderate savings who may also have netted personal gain from trips other than those to visit parents; and 3) those whose savings from visiting parents exceeded the price. Those with zero and moderate savings are least likely to vote; after that, turnout increases monotonically. This finding suggests that those with higher stakes are more likely to vote, in line with the rational calculus of voting. It is noteworthy that gains and losses are asymmetrically distributed: the maximum loss is the price of a ticket (84.48 euros), while among the winners, the average savings just from visiting parents is 586 euros.

Taken together, our findings suggest that voters voted on the collective purchasing decisions largely in line with their financial interests. At the same time, social preferences also shaped voting decisions. In particular, there is a considerable altruistic component, and many students explicitly referred to the benefits for other students in the write-in section. A large proportion of the students were also motivated to support public good provision, possibly as a way of solving the free-rider problem in the case of private choices: as a result, they supported a collective purchasing decision even at a price that they would not have been willing to pay for the ticket privately. In the area of culture, a paternalistic component is also important,

Figure 5: Turnout and savings – Dataset II



Losers' savings do not cover ticket costs, and they neither visit other people using the ticket nor mention leisure/work usage. For the middle group, the savings when visiting parents do not cover ticket costs; however, they mention other trips.

with a large fraction of students willing to support the culture ticket to nudge other students into using cultural services more often. The differences in turnout decisions are in line with what the rational calculus of voting suggests: those who have more to gain are more likely to vote.

4 The vote

We now turn to the regression analysis of the voting decisions. The dependent variable is the probability of voting in favor of the respective ticket, which we estimate using probit models. We start with the first dataset and present the results for the train, bus and culture tickets in Tables 8, 9 and 10, respectively. Indicator variables

for social preferences take the value one if the respondent considered the respective motivation to be important; descriptive statistics are given in Table 1. To interpret the results right away, we display the marginal effects[4] for the benchmark students in the regression tables. These students are characterized by all indicator variables being zero. Thus, the benchmark is male and not a freshman, and savings to other students are not important to his decision. The base category for the intensity of use is "never".

Our econometric results confirm the impressions gathered in Section 3: the probability of voting in favor of a ticket strongly increases with the intensity of personal use, suggesting a high degree of pocketbook voting. The effects are significant at the 0.1 percent level and are of an economically relevant size. For example, concerning the bus ticket, estimations imply that an otherwise identical student who uses the bus several times per week is more than 70 percentage points more likely to vote in favor of this ticket than the benchmark student who does not use the bus.

However, variables capturing social preferences also show highly significant and positive effects. Those who consider savings to other students important to their decisions vote in favor of the respective ticket with higher probability. Additionally, students who consider environmental aspects or strengthening local public transportation to be important are more likely to vote in favor of the train ticket or the bus ticket, respectively.

The same holds true regarding the culture ticket for those who indicate that strengthening local cultural life or that encouraging others to visit these institutions more frequently is important to them in their voting decisions.[5] Freshmen are, ceteris paribus, more likely to vote in favor of the bus and culture tickets. However, because for freshmen, the questions on the intensity of use refer to a shorter time period or might cover some time when they were not yet in Goettingen, we refrain from emphasizing this finding.

To examine whether general political attitudes contribute to explaining individual votes, we include party preferences in the regressions. Although the parties traditionally present in German parliaments cannot easily be strictly ordered from the left to the right, there arguably exists a general consensus that the Social Democrats

[4] We calculate marginal effects as discrete changes from zero to one for all indicator variables. Coefficients for all regressions are reported in Tables A.1-A.6 in the supplementary material.

[5] A similar picture emerges from the regression analysis if we use indicator variables encompassing motives that were at least somewhat important rather than focusing on motives that were important. In line with expectations, these variables capturing less pronounced social preferences in general display smaller marginal effects than those shown in Tables 8-10. We have also included complete sets of indicator variables containing information on whether someone considered a motive unimportant, somewhat important, or important, and the conclusions remained the same (not reported for brevity).

Table 8: Train ticket – Dataset I

Dependent Variable: Supporting Train Ticket				
	(1)	(2)	(3)	(4)
Rarely ($\leq$ 5/year)	0.428***	0.422***	0.393***	0.373***
	(7.35)	(7.41)	(6.73)	(6.21)
Sometimes (monthly)	0.657***	0.683***	0.680***	0.676***
	(13.05)	(14.23)	(13.56)	(13.14)
Often (weekly)	0.701***	0.750***	0.749***	0.745***
	(14.10)	(15.65)	(14.61)	(14.19)
Very often ($\geq$ 2/week)	0.709***	0.764***	0.766***	0.760***
	(14.39)	(16.26)	(15.19)	(14.69)
Savings to others		0.300***	0.285***	0.198***
		(6.11)	(5.48)	(3.65)
Female			0.090*	0.074*
			(2.44)	(2.04)
Freshman			-0.043	-0.029
			(-1.39)	(-0.92)
Environment				0.242**
				(3.25)
Pseudo R^2	0.285	0.334	0.342	0.364
Log Likelihood	-356.2	-315.2	-298.1	-277.9
Observations	1247	1217	1163	1145

Probit estimation; discrete effects for benchmark students due to changes from 0 to 1 for all variables; z-statistic in parentheses. $^{*}p < 0.05, ^{**}p < 0.01, ^{***}p < 0.001$.

Table 9: Bus ticket – Dataset I

Dependent Variable: Supporting Bus Ticket				
	(1)	(2)	(3)	(4)
Rarely (1 or 2/semester)	0.241***	0.218***	0.217***	0.203***
	(6.94)	(6.31)	(6.15)	(5.64)
Sometimes (monthly)	0.415***	0.398***	0.416***	0.411***
	(9.81)	(8.88)	(8.79)	(8.19)
Often (weekly)	0.597***	0.597***	0.617***	0.587***
	(14.88)	(13.63)	(13.58)	(11.38)
Very often ($\geq$ 2/week)	0.706***	0.726***	0.744***	0.728***
	(27.55)	(25.34)	(24.39)	(20.17)
Savings to others		0.221***	0.204***	0.158***
		(5.93)	(5.36)	(4.07)
Female			-0.006	0.007
			(-0.27)	(0.29)
Freshman			0.081**	0.067*
			(2.92)	(2.44)
Strengthening bus system				0.418***
				(5.87)
Pseudo R^2	0.224	0.245	0.252	0.285
Log Likelihood	-668.1	-623.5	-589.1	-539.1
Observations	1242	1192	1137	1090

Probit estimation; discrete effects for benchmark students due to changes from 0 to 1 for all variables; z-statistic in parentheses. $^{*}p < 0.05, ^{**}p < 0.01, ^{***}p < 0.001$.

Table 10: Culture ticket – Dataset I

Dependent Variable: Supporting Culture Ticket				
	(1)	(2)	(3)	(4)
Rarely (1 or 2/year)	0.376***	0.347***	0.355***	0.290***
	(11.67)	(9.91)	(9.60)	(6.83)
Sometimes (3 to 5/year)	0.578***	0.570***	0.597***	0.572***
	(18.57)	(15.26)	(13.28)	(7.80)
Often (6 to 10/year)	0.634***	0.643***	0.693***	0.649***
	(17.78)	(14.19)	(12.09)	(4.94)
Very often (> 10/year)	0.605***	0.585***	0.640***	0.522**
	(13.59)	(9.37)	(7.96)	(2.95)
Savings to others		0.280***	0.262***	0.104*
		(6.91)	(6.21)	(2.40)
Female			0.071*	0.019
			(2.53)	(0.80)
Freshman			0.109**	0.084*
			(3.17)	(2.58)
Others should go				0.433***
				(5.83)
Strengthening local culture				0.453***
				(8.74)
Pseudo R^2	0.192	0.215	0.215	0.440
Log Likelihood	-664.7	-599.2	-571.1	-378.7
Observations	1189	1110	1055	988

Probit estimation; discrete effects for benchmark students due to changes from 0 to 1 for all variables; z-statistic in parentheses. $^{*}p < 0.05, ^{**}p < 0.01, ^{***}p < 0.001$.

and Greens represent the center left and that the Left Party is positioned according to its name. The Liberal Democrats and Christian Democrats form the center right.

The strong empirical support for both pocketbook voting and social considerations is robust to the inclusion of party preferences. Furthermore, for both the train and the bus tickets, we find almost no significant effects for any of the parties.[6]

Thus, party politics in general do not drive the voting decisions here. However, political attitudes appear to play a role with regard to the joint provision of local cultural goods. Even within the left bloc, our results show differences with respect to voting behavior. Namely, we find that support for the culture ticket, ceteris paribus, increases as party preferences become more leftist.

As a robustness check, we also control for the field of study (Table A.8 in the supplementary material). The overall picture is that they do not appear to matter much for individual votes. Only a small number of fields show significant effects on the voting decisions, and our main results remain robust. All else being equal, students of the humanities and social sciences are more likely to vote in favor of the

[6]See Table A.7 in the supplementary material. The only exceptions are the negative effects of Liberal Democrats, which are significant at the 10 and 5 percent levels in Tables A.7 and A.9, respectively. The results are similar if we group parties into a left bloc and a right bloc.

Table 11: Bahn ticket – Dataset II

Dependent Variable: Supporting Bahn Ticket					
	(1)	(2)	(3)	(4)	(5)
Log savings	0.070***	0.070***	0.073***	0.077***	0.078***
	(24.47)	(17.90)	(18.36)	(22.52)	(24.48)
Leisure/work		0.079	0.033	0.042	0.046
		(1.02)	(0.41)	(0.52)	(0.56)
Visiting others		0.296***	0.308***	0.269***	0.272***
		(8.31)	(8.22)	(6.50)	(6.62)
Female			0.055	0.043	0.042
			(1.51)	(1.13)	(1.09)
Freshman			0.103*	0.127*	0.134*
			(2.04)	(2.42)	(2.57)
Altruist(−)				-0.149**	-0.147**
				(-3.04)	(-2.94)
Altruist(+)				0.288***	0.286***
				(6.78)	(6.83)
Protest					-0.080
					(-1.93)
Pseudo R^2	0.225	0.306	0.333	0.434	0.438
Log Likelihood	-395.7	-351.7	-307.4	-236.0	-234.2
Observations	818	810	741	669	669

Probit estimation; marginal effects for benchmark students; discrete changes from 0 to 1 for indicator variables; z-statistic in parentheses. $^{*}p < 0.05$,$^{**}p < 0.01$,$^{***}p < 0.001$.

culture ticket. One explanation for this finding may be the large share of students in these fields who study culture-related subjects. Our main findings are also robust to the inclusion of both fields and party preferences in the regressions (Table A.9 in the supplementary material).

Turning to our second dataset and the constructed measure of monetary savings, a similar picture emerges. To account for the expected non-linear effect of savings on the decisions, we use the natural logarithm of savings, after adding 1 euro, in the regressions. Table 11 shows the corresponding marginal effects for the benchmark students. Again, the benchmark is defined by all indicator variables being zero. However, to account for the high variation with respect to individual savings on trips to visit parents, we also incorporate the individual values of the savings variable in the calculation of marginal effects. Hence, we display average marginal effects for benchmark students.

The main variable of interest, the natural logarithm of savings on trips to visit parents, is significant at the 0.1 percent level and shows the expected positive sign. The corresponding marginal effect remains virtually the same if we include additional variables. This implies that a benchmark student is on average 0.7-0.8 percentage points more likely to vote in favor if savings increase by 10%. Given the range of the variable, this translates into sizable differences in the prediction: based on

the full specification, column (5), the probability of a positive vote is 14% for a benchmark student who does not save at all on trips to visit parents. This value increases to 56% if his savings only cover ticket costs, which is remarkably close to our expectations based on theoretical considerations; this student should be fairly indifferent between the alternatives. The predicted probability is 67% if his savings are of average size and 79% if he saves one thousand euros. Additionally, visiting others using the ticket significantly increases the probability of voting in favor. This finding confirms the high importance of personal monetary benefits to individual votes.

However, social preferences also have a share in this vote: both altruism variables carry the expected sign and are significant at least at the 1 percent level. Approximately half of the students consider their fellow students' gains and losses in their votes. According to their own perception of whether the other students will on average gain or lose, these students are, ceteris paribus, respectively more or less likely than the benchmark to vote in favor of the ticket. Expecting other students to gain from the ticket and considering this expectation increases support for the ticket as much as using it oneself to visit other people aside from one's parents. Furthermore, the protest variable carries a negative sign and is almost significant at the 5 percent level. Therefore, there is weak evidence suggesting that some students expressed their protest against the train company's pricing policy by voting against the ticket.

Finally, as in the analysis of Dataset I, including general political preferences in the regressions does not change our main results. All else being equal, supporters of the left are not more likely to vote in favor of the ticket; we do not find significant effects for any of the parties (Table A.10 in the supplementary material).[7] Without placing too much emphasis on this, it is noted that the private savings and altruism variables particularly contribute to the pseudo R-squared in Table 11.

A general concern with survey data is the reliability of answers. In our setting, this problem may arise particularly with regard to social preferences because of social desirability. For example, one might wonder whether the respondents genuinely care for others or if they just feel social pressure to express this concern. However, both the descriptive and econometric analyses show that stated social preferences, altruism in particular, have a substantial impact on the voting decision, explaining most votes that cannot be rationalized by monetary benefits.

From an econometric perspective, one might be concerned with reverse causality, omitted variables or sample selection. A reverse causality problem would arise if those respondents who voted in favor of a ticket against their monetary interest ex post rationalized their decision by mentioning social preferences. However, this

[7] This finding also holds true for grouping the left and right into blocs.

argumentation leaves open the question of why they voted in favor of the ticket in the first place. Given the extensive set of controls that we use, there is no obvious candidate for an omitted variable that affects the voting decision and is correlated with the explanatory variables. An issue of sample selection could arise if the respondents in the surveys systematically differ from the student population. As shown in Section 2, voters are somewhat overrepresented in Dataset II. This is not, however, a problem because we exclude nonvoters from the analysis of voting decisions. Finally, semester tickets should only play a minor role in the decision whether to enroll at Goettingen University. Taken together, we do not think that any of these issues is likely to seriously bias our results.

Summarizing our empirical analysis so far, we find first that pocketbook voting is an important determinant of referendum outcomes, second, that party politics plays only a minor role and third that monetary self-interest is not the entire story. In particular, social preferences should not be disregarded – especially because the descriptive analysis in Section 3 suggests that these motives were or came close to being pivotal in two of the four referenda studied.

5 Participation

We now turn to the second part of our analysis, which is to understand what induced students to vote in the referendum. For this purpose, we use Dataset II, which also contains detailed information on non-voters.

Specifically, we investigate whether the calculated savings are also able to explain participation in the referendum. Hence, we estimate the probability of taking part in the vote conditional on the explanatory variables using probit specifications. As described above, we therefore transform savings into stakes, defined as the absolute value of the difference between the yearly price and savings. In the regressions, we use the natural logarithm of these stakes augmented by one euro. Table 12 shows the average marginal effects for benchmark students.[8] Looking at the full sample, regressions (1)-(4), we see a highly significant positive effect from stakes. This effect is robust to the inclusion of additional control variables. It appears that students whose stakes were high made sure to take part in the referendum.

Unlike in the decision to vote in favor or against, visiting others does not have a significant effect on the decision to take part. Being female reduces the probability of voting, whereas being a freshman increases it. However, we cannot disentangle alternative possible explanations driving the freshman effect. It could be based on the

[8] As in Section 4, all indicator variables are zero for benchmark students. The continuous variable, log of stakes plus 1 euro, enters into the calculation of marginal effects at individual values.

Table 12: Taking part – Dataset II

Dependent Variable: Taking Part in Referendum						
	(1)	(2)	(3)	(4)	(5)	(6)
	all	all	all	all	savings $\geq$ price	savings $<$ price
Log stakes	0.070***	0.072***	0.074***	0.077***	0.046**	0.041
	(5.94)	(5.85)	(5.88)	(6.00)	(2.99)	(1.04)
Leisure/work		-0.017	-0.007	-0.008	-0.014	-0.003
		(-0.28)	(-0.12)	(-0.14)	(-0.16)	(-0.03)
Visiting others		0.041	0.033	0.031	0.036	-0.009
		(1.46)	(1.17)	(1.09)	(0.73)	(-0.22)
Female			-0.106***	-0.107***	-0.124**	-0.087*
			(-3.61)	(-3.58)	(-2.61)	(-2.16)
Freshman			0.137***	0.140***	0.081	0.188***
			(4.29)	(4.18)	(1.85)	(3.95)
Protest				0.087**	0.061	0.094*
				(2.81)	(1.51)	(2.09)
Pseudo R^2	0.023	0.026	0.050	0.056	0.046	0.027
Log Likelihood	-713.1	-700.8	-625.6	-622.0	-213.2	-403.5
Observations	1189	1174	1075	1075	449	626

Probit estimation; marginal effects for benchmark students; discrete changes from 0 to 1 for indicator variables; z-statistic in parentheses. Regression (5): only students whose savings cover ticket costs (winners). Regression (6): only students whose savings do not cover ticket costs. $^{*}p < 0.05, ^{**}p < 0.01, ^{***}p < 0.001$.

fact that the savings of freshmen refer to a shorter period of time, or alternatively, it may reflect that many freshmen are more easily reached by voting advertisements or more enthusiastic about taking the opportunity to vote in this referendum. Students who mention protest motives attend the polls with a significantly higher probability.

Splitting the sample into those whose savings on trips to visit parents cover the ticket costs and those whose savings do not, we find that the stakes remain significant among the winners at the 1 percent level but become insignificant among the second group. This finding may be due to the asymmetric distribution of gains and losses: the latter are limited to the yearly price of the ticket, 84.48 euros, whereas the stakes of someone who uses the Bahn ticket every weekend to visit his or her parents could be much higher.

Remarkably, those who mention protest motives took part in the referendum with significantly higher probability only among those whose savings fall short of the ticket price. One potential interpretation for this result could be that for someone who gains monetarily from the ticket, protest and monetary interest are opposing motives. In contrast, in the case of smaller savings, both motives should shift the vote in the direction of rejecting the ticket. Therefore, the latter group might have a stronger opinion concerning rejection or approval, which could foster participation.

To further examine the question of whether high gains drive our results, we gradually remove observations with the highest stakes from the dataset. Table 13 contains corresponding average marginal effects for benchmark students. In regres-

Table 13: Taking part, reduced sample – Dataset II

Dependent Variable: Taking Part in Referendum						
	(1)	(2)	(3)	(4)	(5)	(6)
Bottom	95%	90%	85%	80%	75%	70%
Log stakes	0.082***	0.073***	0.068***	0.052*	0.029	0.011
	(5.32)	(4.21)	(3.41)	(2.23)	(1.09)	(0.39)
Leisure/work	-0.006	-0.012	-0.022	-0.011	-0.005	-0.028
	(-0.10)	(-0.17)	(-0.31)	(-0.15)	(-0.07)	(-0.35)
Visiting others	0.037	0.038	0.043	0.037	0.023	0.007
	(1.26)	(1.25)	(1.35)	(1.11)	(0.67)	(0.19)
Female	-0.106***	-0.106**	-0.102**	-0.094**	-0.097**	-0.081*
	(-3.39)	(-3.27)	(-3.07)	(-2.72)	(-2.74)	(-2.22)
Freshman	0.150***	0.153***	0.148***	0.162***	0.160***	0.157***
	(4.15)	(4.08)	(3.71)	(3.86)	(3.63)	(3.39)
Protest	0.098**	0.100**	0.098**	0.099**	0.109**	0.105**
	(3.01)	(3.00)	(2.76)	(2.67)	(2.88)	(2.69)
Pseudo R^2	0.052	0.044	0.036	0.030	0.027	0.022
Log Likelihood	-594.8	-580.7	-558.1	-535.0	-509.4	-486.7
Observations	1011	967	912	858	806	761

Probit estimation; marginal effects for benchmark students; discrete changes from 0 to 1 for indicator variables; z-statistic in parentheses. Columns show percentiles with respect to stakes, e.g., column (1) contains those observations that belong to the bottom 95% with respect to stakes. $^{*}p < 0.05, ^{**}p < 0.01, ^{***}p < 0.001$.

sion (1), we only omit the top 5% of students in terms of stakes, whereas in regression (6), we omit the top 30%. Stakes have a positive and highly significant effect if we use almost all of the observations. The more observations with high stakes we remove, the smaller the size and z-statistic of the marginal effects become. Looking at the bottom 75% only, the effect is no longer significantly different from zero. In contrast, the significances of the control variables female, freshman and protest suffer much less from this reduction of the sample, and the marginal effects are much more stable. This suggests that the loss of significance for the stakes variable should not be attributed to the smaller sample size alone.

Reverse causality should not be a problem in the analysis of the participation decision. The variables capturing travel patterns and demographics are clearly not affected by the decision to vote. The protest variable is derived from the write-in section; consequently, it appears unlikely that it captures ex-post rationalization of the participation decision. In contrast, stated altruism could be affected by the participation decision. In fact, non-voters more often claimed that they would have considered the benefits to others, had they voted, than voters did. One interpretation for this finding is that it is easy to claim noble motivations if one does not make an actual decision. For this reason, we did not include the altruism variables in the regressions explaining the participation decision.

Sample selection and omitted variables are more serious concerns given the un-

derrepresentation of non-voters in the sample. If the decisions to vote and to take part in the survey are affected by the same unobserved variables, our participation regressions could be biased. However, it is not clear what these variables could be and in which direction they would bias our results.

In summary, the results from this section shed some light on the motives for voting in referenda. First, we find that students who mention protest motives take part with a higher probability, suggesting expressive voting. Second, our results are also in line with the theory of instrumental voting, which predicts that for a given probability of being pivotal and a given cost of voting, participation should increase with stakes. More specifically, we conclude that those who gain substantially, and hence lose substantially if the ticket fails, particularly drive this result. Thus, in a referendum, one may expect disproportionately higher turnout by voters who stand to benefit substantially when the proposal passes, whereas voters who are affected only moderately are more likely to abstain.

6 Conclusion

We investigate the determinants of individual votes in four referenda on deeply discounted flat rate tickets to train, bus and cultural services held among university students. Introducing these tickets resembles the collective provision of a public good. The service becomes much cheaper by being provided collectively; however, all voters, including those who do not use the service, must pay taxes to finance it.

Our results show that monetary interests are a major driver of both turnout and voting decisions. However, we also find that in addition to this 'pocketbook voting', altruistic and social motives, such as the costs and benefits to other students or the desire to support local public transportation or cultural life, are also important and occasionally even decisive for the referendum outcome. Finally, we found evidence that some students took part in the referendum to express dissatisfaction with the train company's pricing policy. Remarkably, among those upset by the high price of the ticket, those who would lose from the ticket being introduced were more likely to turn out to express their protest.

The set of referenda that we study concerns a relatively small group of voters and has the specific feature that the voters had very good information on the individual costs and benefits of the decision on the ballot. While this feature allows studying voting motives in a clearly defined setting, it remains an open question to what extent our results extend to referenda in a broader context. In particular, we expect ideology and general political attitudes to play a larger role in regard to referenda on much larger issues. Nevertheless, similar to laboratory experiments, it appears plausible that the major voting motives identified in the present study will also be

active in other direct democratic decisions.

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