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## Political Budget Cycles Revisited: Testing the Signalling Process

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# **Political Budget Cycles Revisited: Testing the Signalling Process**

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# Political Budget Cycles Revisited: Testing the Signalling Process

**Abstract** A widespread view in the ‘political budget cycles’ literature is that incumbent politicians seek to influence voters’ perceptions of their competence and/or preferences by using the composition of the fiscal budget as a signalling tool. However, little is known about whether voters actually receive and perceive the signal in that way. To empirically assess the relevance of the signalling channel at the municipal level, we conducted a survey among 2,000 representative German citizens in 2018. Only a small fraction of voters feel well-informed about the fiscal budget signal and use the information it contains to decide whether to vote for the incumbent politician. Persons paying more attention to the signal sent by local politicians live in smaller municipalities, are more satisfied with their economic situation, are more educated, and do not feel that they are being electorally targeted. Our analysis suggests that the municipal voting decision, at least in Germany, is a more complex process than is commonly assumed in political budget cycle models.

**JEL Classification:** E62, D83, H70, H72

**Keywords:** Political budget cycles, Signalling mechanism, Local government, Fiscal policy, Representative population survey, Germany

# 1. Introduction

A large literature in political economy suggests that elections have an impact on economic policies and that good macroeconomic conditions prior to an election enhance an incumbent's chance of re-election. Thus, it was thought that macroeconomic cycles might be influenced by electoral cycles, a phenomenon known as the 'political business cycle'. However, empirical studies found little support for this hypothesis and researchers began investigating the possibility of election-induced cycles in fiscal policy, known as the 'political budget cycle' (PBC). According to this perspective, incumbent politicians seek to influence voters' perceptions of their competence and/or preferences. Most theoretical PBC models are based on a signalling process (e.g., Rogoff 1990; Shi and Svensson 2006). These models rely on fiscal policy (spending, taxes, borrowing) acting as a signal of the incumbent's competence. Despite some differences between the models, they agree that voters like more competent politicians and, because competence is unobservable, voters have to infer how competent an incumbent is by monitoring actual fiscal policy.

Empirically, there is evidence of incumbents manipulating budgets (Dubois 2016; Klomp and de Haan 2013a); however, there is no agreement about the specific link between opportunistic manipulation and electoral outcomes. Peltzman (1992) and Brender and Drazen (2008) discover that fiscal deficits make it less likely that incumbents will be re-elected, whereas Alesina et al. (2011) and Enkelmann and Leibrecht (2013) do not. Moreover, Akhmedov and Zhuravskaya (2004), Klomp and de Haan (2013b), and Bojar (2017) find that opportunistic public expenditure behaviour has a positive effect on the ruling party's re-election. Over time, the focus of empirical PBC analyses have shifted from the national level to the local level and from aggregate data to more disaggregated data.

We empirically study whether the signalling process operates as suggested in the PBC literature. In addition to the core assumption—that governments use fiscal policy to signal their competence and/or preferences—the PBC literature typically makes three additional assumptions: (i) voters observe such signals, (ii) they use the information contained in these signals to draw inferences about the competence and/or preferences of the incumbent politicians, and, subsequently, (iii) cast their votes based on their assessment. In our study, we investigate whether these assumptions are fulfilled in practice. To address this question, we use unique survey data from a questionnaire administered in Germany by Gesellschaft für Konsumforschung (GfK) in 2018. Our sample consists of almost 2,000 German voters. In addition to asking interviewees specific questions about the role of municipality budgets in their local voting decisions, we collected a variety of another information. This allows us to test several theory-based hypotheses relevant for the assessment of assumptions (i) to (iii) in the PBC literature.

Descriptive statistics show that the PBC signalling process likely works for just a tiny fraction of German voters. Only a minority of respondents feel well-informed about the local budget and a small percentage considers the media a reliable source of information about the mayor's fiscal policy. Furthermore, voters tend to say that mayors do not have much budgetary influence and consider the municipality's general economic situation more relevant to their voting decisions than the information contained in the local budget. Only a small proportion of respondents consider the budget to have a lot of information relevant for their voting decisions.

To further assess assumptions (i) to (iii) and better understand what types of individuals might be influenced by the signalling process, we employ factor analysis and multivariate regression to test eight hypotheses made in the PBC literature. Objective measures of income and wealth are not associated with being potentially perceptive of the signalling process, whereas the subjective economic situation is. Social class and dependency aspects appear unrelated to the signalling mechanism. The results on unemployment and schooling are counterintuitive; degree of urbanisation does not play a role. We discover no evidence supporting 'pork barrel cycles', as individuals do not like being electorally targeted. Only party preferences and education behave according to the predictions of the extant literature: partisan preferences influence the attention individuals pay to fiscal policy and more educated individuals are more likely to gather relevant information. Finally, we address the question of what type of respondents are unaware of the incumbent's signal. According to the results of ordinal logit models, they can be characterised as unsure about their saving position, non-voters or voters for a minor party, female, more risk averse, and less educated. In contrast, having the Internet at work reduces the likelihood of being unaware of PBC signals.

The remainder of the paper is organised as follows. Section 2 discusses the related literature. Section 3 presents the survey and motivates the research question. Descriptive statistics are discussed in Section 4. Section 5 formulates and tests several PBC-related hypotheses. Section 6 studies those respondents who are unaware of the PBC-signal. Section 7 concludes.

## **2. Literature Review**

The theoretical literature on political business cycles started in the 1970s, when Nordhaus (1975), Tufte (1975), Lindbeck (1976), and Hibbs (1977) built the first models to explain the behaviour of an incumbent politician trying to maximise his/her re-election chances by engaging in expansionary monetary policy before an election. Two key assumptions of these models have been criticised: first, that voters' expectations are adaptive; second, that politicians utilise monetary policy, which is indeed

less convincing in today's world where many central banks are independent. Empirically, the political business cycle did not receive much support either.<sup>1</sup>

Taking these criticisms into account, the next generation of models rests on the assumptions of rational expectation voters and manipulation of fiscal policy. Rogoff and Sibert (1988) propose a model of the political budget cycle (PBC) in which the concept of political competency is connected to asymmetric information. Each politician is assumed to have a different degree of competence (i.e., the ability to provide a given level of public services with a minimal amount of government revenues), which is considered to be private information. Voters want to elect the political candidate who maximises their expected utility but, since only the politician knows his/her competency, they can only observe fiscal policy outcomes. High- and low-competence incumbents have different willingness to spend because conducting expansionary fiscal policy is less costly for highly competent incumbents. Thus, more competent incumbents signal their competence through higher public spending before elections, thereby causing a PBC.

Rogoff (1990) develops a related model stressing the composition of government spending, where incumbents strategically manipulate the electorate by favouring transfers and more visible programmes, rather than (assumed) less popular measures, such as investment projects and tax cuts. Shi and Svensson (2003) call this second generation of models 'adverse-selection-type models', and claim that some of the implications of the signalling models are not in line with the empirical evidence, as PBCs are created by the more competent politicians.

These criticisms were taken up by the latest generation of PBC models—referred to as 'moral-hazard models' (Persson and Tabellini 2000; Shi and Svensson 2006). These models assume that it is not only voters who are unsure about a politician's level of competence, but, *ex ante*, that politicians themselves do not know their own competence levels. The only way for an incumbent to discover his/her competence level is through exerting a hidden effort, that is, making use of policy instruments unobservable to the public (or only observable with a delay). Voters can perceive neither the competence nor the effort, just the resulting economic performance. Before elections, the incumbent excessively increases provision of public goods through deficit financing, hoping that voters will see this as an indication of his/her high level of competence. In these models, independently of their

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<sup>1</sup> Alesina and Perotti (1995), Drazen (2001), and Dubois (2016) survey the extant literature. Franzese and Long Jusko (2006) discuss studies on partisan cycles.

competence level, all incumbent politicians generate excessive pre-election deficits. Over the years, many authors have extended and modified these models.<sup>2</sup>

Empirically, the earlier literature relies on country-level panel data. Block (2002), Brender and Drazen (2003, 2005), Persson and Tabellini (2003), Shi and Svensson (2006), and Alt and Lassen (2006a, 2006b) find evidence that fiscal policy manipulation occurs prior to an election.<sup>3</sup> Causes of PBCs are often attributed to specific characteristics of the sample countries. For instance, Shi and Svensson (2006) suggest that the evidence for PBCs is mainly driven by developing countries, where the number of informed voters is relatively low and the annual income of those in power is relatively high. Brender and Drazen (2005) argue that PBCs are due to what they called the ‘effect of new democracies’, where voters are less familiar with electoral processes and not yet knowledgeable about manipulations engaged in by incumbent politicians. Alt and Lassen (2006a, 2006b) emphasise the importance of the ‘transparency effect’: that is, the degree of transparency of democratic institutions is the main force shaping and inducing fiscal cycles. Hence, political leaders can generate PBCs only in low-transparency countries.

Since Rogoff (1990), many authors assume that voters are not pleased with high-spending governments and thus that incumbents who adopt more expansionary fiscal policies are punished, instead of being rewarded. Therefore, it no longer appears plausible that PBCs primarily work through deficits and the focus of empirical studies has moved from budget deficits to the composition of government budgets. The results of Galli and Rossi (2002), Kneebone and McKenzie (2001), Gonzalez (2002), Khemani (2004), Klačnjak (2008), Vergne (2009), Schneider (2010), Böhm and Markwardt (2011), Katsimi and Sarantides (2012), Brender and Drazen (2013), and Veiga et al. (2017) point towards a scenario where voters prefer balanced fiscal budgets, although, at the same time, rewarding high spending on specific items (e.g., infrastructure and development projects, healthcare, and social programmes) and a decrease in more ‘visible’ taxes (e.g., direct taxes).<sup>4</sup>

It has become common in this research to use data from local governments rather than country-level data, as it is difficult to control for all sources of cross-country heterogeneity. Local- or municipality-level data are supposed to help overcome this shortcoming. Additionally, in line with the ‘transparency effect’, it is widely believed that citizens are more likely to monitor local government policies and actions. Moreover, specific groups of voters could be more easily targeted at the local

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<sup>2</sup> For example, Bohn (2018, 2019), Bove et al. (2017), Brender and Drazen (2009), Candel-Sánchez (2007), Drazen and Eslava (2006, 2010), González et al. (2013), Hanusch (2012a, 2012b), Hindriks and Lockwood (2009), Kammass and Sarantides (2016), Saporiti and Streb (2008), Streb et al. (2005), Streb and Torrens (2013), and Wang and Bohn (2019).

<sup>3</sup> See also Kraemer (1997), Schuknecht (1996, 2000), Chang (2008), Efthyvoulou (2012), Eslava (2011), Klomp and de Haan (2013a), and Dubois (2016).

<sup>4</sup> In contrast, Ehrhart (2013) finds that governments lower indirect taxes rather than direct taxes.



level, which means that the distinction between targeted and non-targeted expenditures (or taxes) and their opportunistic manipulation becomes more relevant. Again, there is a great body of empirical literature in this research strand. For example, Akhmedov and Zhuravskaya (2004), Baleiras and Costa (2004), Binet and Pentecôte (2004), Eslava (2011), Geys (2007), Veiga and Pinho (2007), Veiga and Veiga (2007a), Bartolini and Santolini (2009), Drazen and Eslava (2010), Klein (2010), Bastida et al. (2013), Benito et al. (2013), Aidt and Mooney (2014), Foremny and Riedel (2014), Galindo-Silva (2015), Klein and Sakurai (2015), Baskaran et al. (2016), Stolfi and Hallerberg (2016), Alesina and Paradisi (2017), Kis-Katos and Sjahrir (2017), Foremny et al. (2018), and Repetto (2018) find evidence for PBCs at lower levels of government, with a special emphasis on targeted expenditures and taxes.

In light of the assumption that voters are not pleased with high-spending governments and, therefore, incumbents manipulate the budget composition instead, a natural next step would be to test the link between opportunistic manipulation and favourable electoral outcomes. The literature on this topic is more limited. Studies investigating the relationship at the country level find mixed results. On the one hand, Peltzman (1992) and Brender and Drazen (2008) show that election year deficits lower re-election chances. On the other hand, Mourão and Veiga (2010), de Haan (2013), Klomp and de Haan (2013b), and Bojar (2017) report that opportunistic behaviour in public expenditure has a positive effect on the ruling party's re-election. Kraemer (1997), Alesina et al. (2011), Enkelmann and Leibrecht (2013), and Katsimi and Sarantides (2015) find no significant effects of PBCs.

Using local or regional data to examine whether budget manipulation affects the incumbent's re-election chances, Akhmedov and Zhuravskaya (2004), Veiga and Veiga (2007b), Sakurai and Menezes-Filho (2008), Drazen and Eslava (2010), Aidt et al. (2011), Jones et al. (2012), Litschig and Morrison (2012), Cassette and Farvaque (2014), Balaguer-Coll et al. (2015), Bracco et al. (2015), and Repetto (2018) find a positive relationship between changing the spending composition of the budget (mostly in the way of spending more on capital expenditures, sometimes on current expenditures) and the probability of re-election. Klein (2010) and Chortareas et al. (2016) report a positive effect at the local level too, but in terms of total spending rather than budget composition, whereas Brender (2003) finds no significant impact at all.

Bojar (2017) deviates from the extant literature by shifting the analysis of whether voters reward pre-electoral budget manipulation to the individual level. Employing survey data to account for individual heterogeneity, he constructs a 'social class' index. He discovers that voters react to pre-electoral budget decisions in a status-dependent way: low-status individuals are more sensitive to changes in fiscal policy (especially spending) compared to high-status ones.

A related strand of literature focuses on ‘economic voting’ or how economic conditions, such as unemployment, GDP growth, or inflation, affect government support during elections. Lewis-Beck and Stegmeier (2013) comprehensively survey the economic voting literature, present the main propositions in this field of research, and discuss whether they hold in light of the empirical evidence. While noting some weaknesses in the empirical tests, they conclude that GDP growth and unemployment are significant predictors of the electorate’s voting behaviour. Put differently, favourable economic conditions generate support for the incumbent.

While this conclusion is based on comparing the results of country-level studies, empirical evidence exists at the local level, too. For instance, Cerda and Vergara (2007), Boyne et al. (2009), Bosch (2016), Dassonneville et al. (2016), and Lindgren and Vernby (2016) show that local economic conditions are relevant for local elections. Although each study takes a different approach, all find that local unemployment reduces the re-election probability of local incumbents. Moreover, Coelho et al. (2006), Dahlberg and Möörk (2011), Mechtel and Potrafke (2013), Bee and Moulton (2015), Labonne (2016), and Cahan (2019) find strong evidence of election-motivated employment increases at the local level, suggesting that (un)employment is targeted in order to increase re-election chances.

### **3. Methodological Framework**

We investigate whether three core assumptions underlying the recent PBC literature are fulfilled at an individual level. Note that even though PBCs are heavily researched phenomena, except for Bojar (2017), none of the studies uses individual-level data. Underlying the PBC approach is the idea that fiscal policy is a tool used by governments to signal their competence and/or preferences. Typically, three additional assumptions are made: (i) voters observe the budget-based signals, (ii) use the information contained in these signals to draw inferences about the competence and/or preferences of the incumbent politicians, and (iii) subsequently cast their votes based on their assessments.

In our analysis, which focuses on voters, that is, the potential receivers of the signal, and not on politicians, that is, the senders, we assess the empirical validity of assumptions (i) to (iii) using a unique dataset from a questionnaire that was part of an omnibus survey administered in Germany between 6 February and 2 March 2018 by Gesellschaft für Konsumforschung (GfK). GfK specialises in market research and public opinion surveys. The sample consists of 2,015 persons representative of the German population aged 14 or above. In the present analysis, we only utilise information on voters, that is, respondents who are 18 or older, which reduces the sample to 1,959 observations. Methodologically, the survey is based on quota sampling. The survey questions were asked in face-to-face interviews using pen-pads. GfK quality control encompasses contact checks, address

comparisons, sampling tests, and qualitative checks of the final interviews. In addition to questions about the role of municipality budgets in their local voting decisions, other information about the respondents was collected, allowing us to test several theory-based hypotheses that are highly relevant for the assessment of PBC assumptions (i) to (iii). Hayo et al. (2018) provide a detailed description of the survey and the questionnaire.

Despite its advantages, our survey-based approach has a number of potential drawbacks. A general concern about survey analysis is that it measures only stated, not actual, behaviour. However, the questions in our survey are highly subjective and aim to uncover the respondents' perceptions regarding local politicians and own voting behaviour and it is not obvious that respondents could gain anything from strategically manipulating their answers. Nevertheless, if they indeed did so, the bias is likely going to be in the direction of supporting the PBC view. Furthermore, almost all research on PBCs focuses on aggregate indicators, often relying on questionable and untestable identification assumptions (Hayo and Uhl 2017). For instance, the ecological fallacy problem is largely disregarded in empirical PBC research. The survey approach circumvents this issue and directly analyses the behaviour of individuals. In spite of pre-testing, we cannot be sure that individuals understood the questions exactly the way we intended. We also have no information about their objective knowledge of local budgets and politicians. However, inasmuch as our results are biased due to these factors, it is likely going to be in the direction of supporting the PBC view, as subjective knowledge tends to overestimate objective knowledge.

Germany meets the literature's main requirements for a suitable PBC testing ground at the local level. First, Germany is a federation, where state and municipal governments have a relatively strong influence on their budgetary decisions (Galli and Rossi 2002; Foremny and Riedel 2014). Second, Germany belongs to the group of those countries of the European Union that signed agreements to include a balanced budget law in their national legislation (Rose 2006; Benito et al. 2013). In fact, it amended its federal and state constitutions with the so-called debt brake. Third, according to Hayo and Neumeier (2016, 2017), the majority of the German population supports the debt brake, which is very much in line with the idea that voters are fiscal conservatives (Peltzman 1992; Brender and Drazen 2008). Finally, Germany is a well-established democracy (Brender and Drazen 2005) with high institutional quality (Chang 2008), accompanied by a moderate-to-high level of fiscal transparency, media access, and media freedom (Shi and Svensson 2006; Alt and Lassen 2006a, 2006b).

Reflecting the three voter-related assumptions underlying the PBC signalling mechanisms noted above, we included several specifically designed questions in our questionnaire. To address

Assumption (i), we want to learn more about whether, and, if yes, to what degree, voters observe signals from the public budget. Arguably, for the mechanism to work, they have to receive and process the relevant information. Hence, we asked the following question:

**Question 1)** How well do you feel informed about the municipality budget and thereby the policy areas in which the municipality spends its money?

- a) Bad
- b) Fair
- c) Good
- d) Don't know

We also included an auxiliary question on the main information channel. In principle, citizens can inform themselves about the local budget by looking at officially published budget information or asking questions at the town hall. However, understanding the budget is not straightforward and asking questions about it can be tedious. Thus, it seems likely that most citizens obtain their information from the local media. However, do citizens believe that the media information is correct? Only if they do will the PBC signalling process work through the media as an information channel.

**Question 1a)** In your view and in general, how reliable are media reports about decisions made by the mayor that are relevant for the municipality budget?

- a) Unreliable
- b) Not always reliable
- c) Reliable
- d) Don't know

According to Assumption (ii), citizens use the information contained in the signal to draw inferences about the competence and/or preferences of the incumbent politicians. Question 2 measures the relative importance of the local budget compared to the municipality's general economic conditions for people's voting decisions.

**Question 2)**

The likelihood that I vote for the mayor depends more on the general economic situation in the municipality than the expenditure structure of the municipality budget.	-2 <input type="checkbox"/>	-1 <input type="checkbox"/>	0 <input type="checkbox"/>	+1 <input type="checkbox"/>	+2 <input type="checkbox"/>	The likelihood that I vote for the mayor depends more on the expenditure structure of the municipality budget than the general economic situation in the municipality.
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We included auxiliary Question 2a to investigate whether voters think that the mayor has a sufficiently large influence on the local budget. Without that influence, he/she cannot be associated with the contents of the budget.

#### Question 2a)

The mayor has no notable leeway for devising the municipality budget and depends much on decisions made at the state or federal level.						The mayor has a lot of leeway for devising the municipality budget and does not depend much on decisions made at the state or federal level.
	-2	-1	0	+1	+2	
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Finally, Assumption (iii) of the PBC signalling literature is about citizens casting their votes based on their budget assessment, which we assess using the following question:

**Question 3)** Think about your own voting decision: Do you use the budget of your municipality, with its detailed information about how public funds are spent in various policy areas, to learn about the political competence of the incumbent mayor?

For my voting decision, the municipality budget ...

- a) Does not contain relevant information
- b) Contains some relevant information
- c) Contains a lot of relevant information
- d) Don't know

## 4. Descriptive Results

In general, the answers to our survey questions are not supportive of the assumptions made in the PBC literature. Table 1 sets out the distribution of answers to Question 1, measuring subjective budget knowledge. We apply a 5% significance level in our tests, as the sample size is large and we are interested in reasonably low Type I errors. Slightly more than 10% of the voters feel well informed about the local budget and one out of three respondents think that his or her level of knowledge is bad, which means there is little support for Assumption (i).

Using Question 1a, we investigate the media's role in the knowledge acquisition process. We discover that only about 20% of respondents believe that the media is a reliable source of municipality budget information; more than 10% consider the media to be downright unreliable. Put differently, about half the respondents classify the media as not necessarily reliable, which raises serious questions regarding the proper functioning of the PBC signalling mechanism.

Table 1: Absolute and relative frequencies as well as correlations of answers across questions

Question 1	Frequency	%	Question 1a	Frequency	%
Bad	653	33	Unreliable	238	12
Fair	913	46	Not always reliable	977	50
Good	219	11	Reliable	439	22
Don't know	174	9	Don't know	305	16
Question 2	Frequency	%	Question 2a	Frequency	%
(-2) Definitely economic situation	228	12	(-2) Definitely has no leeway	178	9
(-1)	509	26	(-1)	513	26
(0)	874	45	(0)	718	37
(1)	279	14	(1)	305	23
(2) Definitely expenditure structure	69	4	(2) Definitely has leeway	305	5
Question 3	Frequency	%	Correlations	Value	
No relevant information	620	32	Between Q1 and Q1a	0.50**	
Some relevant information	778	40	Between Q2 and Q2a	0.23**	
A lot of relevant information	211	11			
Don't know	350	18			

Notes: Number of observations = 1,959. \* and \*\* indicate significance at a 5% and 1% level, respectively.

In Question 2, we shift the focus to Assumption (ii), which is that voters use the information contained in the budget to draw inferences about the competence and/or preferences of the incumbent politician. Again, we find that a notable number of people do not seem to behave in line with the PBC assumptions: less than 20% of the respondents use information contained in the local budget to decide whether to vote for the mayor, whereas almost 40% consider the general economic situation of the municipality to be more relevant for their voting decision.

But even when respondents do consider the local budget a potentially useful source of information, it is important to discover whether they think the mayors is accountable for the budget, as the signalling mechanism is impaired if local politicians are believed to have no influence on the budget. The answers to Question 2a show that almost 10% of the respondents think that the mayor has no leeway whatsoever to modify the budget, whereas only about half as many believe that local politicians have a lot of leeway. More than 20% lean toward the view that mayors have some leeway, whereas roughly 25% say that mayors have almost no budgetary power. Overall, voters tend to say that mayors do not have much budgetary influence.

Answers to Question 3 allow us to find out whether the information contained in the budget is used to evaluate the performance of politicians and whether it influences voting. The answers paint a picture similar to the one we described when interpreting the results for Question 1. Only about 10% of our respondents consider the budget to have a lot of relevant information for their voting decision, whereas more than 30% find it to contain no relevant information at all.

Regarding the relationship amongst answers to the various questions, we find that the correlation between subjective knowledge and media reliability is positive and significant, with a value of 0.5. This indicates that respondents who feel better informed also tend to consider the media as more reliable in terms of disclosing information about the local budget and vice versa. The correlation between the answers to Questions 2 and 2a is also positive and significant but with lower strength (0.2). Thus, when mayors are considered to have little influence on the budget, voters tend to care more about the general economic situation than the expenditure structure of the local budget and vice versa.

We conclude that the signalling process, as presented in the current PBC literature, seems to work for only approximately 10% of German voters, and a full 30% appear to violate every one of the theory's three assumptions studied here. Hence, our findings raise serious doubts about the signalling mechanism being the driving factor for PBCs at the local level.

## **5. Testing the Signalling Channel Using Multivariate Analysis**

Next, we perform multivariate regression analysis to answer the question of what types of individuals are influenced by the signalling process. We use factor analysis to investigate whether the answers to the five questions can be described by one or more latent variables. With the help of these factors, we can then study the characteristics of those respondents who meet the assumptions of the PBC literature.

Diagnostics in the form of the Kaiser-Meyer-Olkin measure of sampling adequacy (overall value of 0.6) and the LR test of independence ( $\chi^2(10) = 783^{**}$ ) suggest that conducting a factor analysis is statistically appropriate. The scree plot as well as a comparison of the magnitude of the eigenvalues point towards the existence of two distinct statistical factors. To improve separation of the factors, we employ an orthogonal rotation (Varimax method). Employing alternative rotation methods (Oblimin and Promax) does not notably affect the estimation results shown below. Table 2 sets out the respective factor loadings.

We interpret the first factor as representing the information/knowledge dimension of the signalling channel (described by subjective knowledge, relevant information, and media reliability). The second one likely represents respondents' considerations in light of the perceived importance of the local budget and the constraints on the mayor with regard to it (Assumption (ii)). The factor loadings are all positive and, with a minimum of 0.4, sufficiently large. The answers to Questions 1, 1a, and 3 load primarily on the first factor, whereas those to Questions 2 and 2a mainly load on the second factor. When applying the usual rule of thumb for cross-loadings of 0.1, none of the variables in Table 2 can be considered complex.

Table 2: Factor loadings for an orthogonal (Varimax) rotation

Core + auxiliary questions	Factor 1 Information/knowledge dimension	Factor 2 Budget dimension
1: Subjective knowledge	<b>0.69</b>	0.06
1a: Media reliability	<b>0.58</b>	-0.01
2: Budget vs. economic situation	0.08	<b>0.39</b>
2a: Leeway of the mayor	0.03	<b>0.38</b>
3: Budget contains relevant information	<b>0.46</b>	0.06

We use the estimated factors as dependent variables in two multivariate regressions to unveil the characteristics of those individuals who behave in accordance with the signalling mechanism. Employing a variety of socio-demographic, economic, psychological, and political control variables, we test eight theory-based hypotheses that are highly relevant for assessing Assumptions (i) to (iii) in the PBC literature.

*Economic Situation:* This is a standard measure in the PBC literature that is used to proxy for the standard of living, which is associated with different levels of public regulation and social welfare, possibly requiring a change in the composition of the public budget. In addition, wealthier individuals may be against fiscal deficits.

*H1: Relatively well-off individuals are more likely to observe and interpret the signal than those who are relatively worse off.*

We capture the respondents' economic situation with three objective and one subjective indicators. First, we account for households' net per capita income.<sup>5</sup> Second, we employ homeownership as a proxy for the household's real assets (i.e., whether the respondent lives in a self-owned house, self-owned flat, or a rented house/flat). Third, we ask whether our respondents are

<sup>5</sup> As this is personally sensitive information, we have about 25% missing observations. We impute the missing values using a regression approach and five rounds of imputations.



savers or debtors. Fourth, we ask about the respondent's subjective assessment of his/her economic situation.

Because of its use of aggregate data, the empirical literature rarely takes the social class of individuals into account; only the unemployment ratio is used to control for the relative economic situation. A notable exception is Bojar (2017), who shows that conditional on their social status, individuals react differently to fiscal policy measures.<sup>6</sup>

*H2: Higher social status individuals will be more influenced by the signalling mechanism than lower status ones.*

We use three different variables in order to capture the differences in social status of survey participants. A subjective measure is based on participants' self-placement on a five-point scale from lowest to highest social class. Our two objective indicators are the respondent's job type and job status.<sup>7</sup>

*Dependency Measures:* The demographic evolution of the population and population density may have consequences for the public budget. Dependency measures are usually found significant in empirical PBC models. Thus, higher values of the dependency measures may lead individuals to take a closer look at the public budget.

*H3: The higher an individual's the dependency measure, the higher the incentive to engage in the signalling process evoked by local politicians.*

To capture the effect of dependency measures on individuals, we employ five different indicators: number of children, number of children living in the household, household size, family status, and whether the respondent is the head of the household.

*Community Size:* In the empirical PBC literature, this variable is utilised to account for heterogeneity among municipalities and also to proxy for different levels of urbanisation. The underlying reasoning is that there is an agglomeration of infrastructure in urban areas and, thus, higher levels of urbanisation demand higher municipal infrastructure expenditures. Although there is some discrepancy with respect to which budget items are more 'visible' to the electorate, it is often assumed that infrastructure investment has particularly high visibility.

*H4: Larger municipalities put more emphasis on more 'visible' budget items, so citizens from more urban areas should behave more in line with the signalling channel.*

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<sup>6</sup> Bojar (2017) uses net income and education to construct his social status index.

<sup>7</sup> Note that income quartiles as alternative proxies for income or status are never significant.

We employ the size of the respondent's residential community as a proxy.

*Political Preferences:* This is one of the most important variables in empirical PBC research and it has its own branch of research in political economy (partisan cycles). The traditional literature uses ideology, typically in the form of a left-right scale, to account for different preferences with respect to fiscal spending and revenues. Left-wing preferences tend to support higher total spending and higher debt, whereas right-wing supporters prefer lower taxes and low levels of debt. These days, this left-right categorisation has become less useful, as many political parties adopt political programmes featuring aspects traditionally considered part of the 'other side.' Furthermore, it is not clear which budget items supporters of different political parties prefer. Although the implications for the signalling effect are not straightforward, it seems likely that political orientation has an effect on how individuals engage in political matters.

*H5: Political preferences affect how people monitor fiscal policy.*

We collected data on political party preferences and study whether political preferences, including non-voting, are associated with the signalling process.

*Pork Barrel Cycles:* This approach assumes that voters care more about the incumbent's preferences about budget composition than about his/her competence level. Pre-electoral manipulation of the budget occurs even when individuals are fully informed about fiscal policy. Rational voters will support an incumbent who targets them before an election, even if they know such action is electorally motivated. Hence, citizens support governments that systematically target specific budget items before an election period. Therefore, we would generally expect voters to make an effort to receive a signal from the incumbent, irrespective of whether they are being targeted.

*H6: The perception of voters that they are being targeted by politicians should have no effect on their behaviour towards the signalling process.*

We ask the survey participants to position themselves according to the following question and include this variable in our regression:

Especially before elections, the mayor uses public money to increase his/her re-election chances, irrespective of whether these expenditures are in line with the needs of the population in the municipality.	-2	-1	0	+1	+2	During his/her term of office, the mayor ensures that the available public funds are spent according to the actual needs of the population in the municipality.
	□	□	□	□	□	

*Knowledge/Information Set:* This is perhaps the most influential factor in the empirical PBC literature for capturing the size of the political budget cycle and its consequences. Many papers try to account for the knowledge effect by controlling for voters' sophistication and access to free media. Typically, formal education level is used to gauge an individual's sophistication. Access to free media is measured by rough indicators, such as radios and newspapers per capita, Internet access, and media freedom. The widespread view is that the higher the level of sophistication and the better the access to free media, the greater the degree of budget monitoring and the more difficult it is for incumbents to run deficits without being punished during elections.

*H7: More knowledge and media access induce individuals to monitor the local budget and, thus, to be more aware of the signals sent by incumbent politicians.*

We use education level as a proxy for sophistication, a five-item Likert scale variable, ranging from no certified apprenticeship to university degree. To capture the effect of media access, we control for Internet access as well as Internet use, thus accounting for the fact that access does not automatically imply use.

Finally, one can argue that people care about who is elected mayor only when they plan to stay within the municipality. Thus, they economise on budget monitoring costs if fiscal decisions will have little relevance for them in the future.

*H8: If people are planning to move out of the municipality, it is unlikely that they will observe the incumbent's budget signal.*

We proxy voters' commitment to their present location by an ordered variable eliciting the likelihood that an individual moves out of the municipality in the next five years.

*Further Controls:* We include socio-demographic variables to capture individual heterogeneity, specifically age, sex, and regional (Bundesland) dummies. Additionally, we consider psychological factors, namely, risk preferences, time preferences, and hyperbolic discounting.

The two factors—Factor 1 'Information/knowledge dimension' and Factor 2 'Budget dimension'—are used as dependent variables in our regressions. We commence the analysis by estimating a general model based on 64 covariates (including dummy variables for 15 German states). The specification is then simplified by a consistent testing-down procedure (Hendry 2000), with the aim of identifying significant explanatory variables in an efficiently estimated model, while accounting for collinearity and standard-error-reducing complementarity (Hayo 2018). We discuss not only results for significant variables, that is, those that remain in the reduced model, but also comment on theoretically relevant variables that turn out not to be significant. We thus follow Abadie (2020), who

argues that the failure to reject the null can be highly informative, especially when the sample size is fairly large.

Table 3 sets out the results for the two reduced models estimated by ordinary least squares. Detailed descriptions of variables are given in Table A1 in the Appendix. The estimation results for the general model are found in Columns 2 and 3 of Table A2. Diagnostic testing indicates some evidence of heteroscedasticity in the case of Factor 2 and we apply robust standard errors (White 1980). However, all conclusions hold irrespective of whether normal or robust standard errors (SE) are used.<sup>8</sup> Both reduced models are significant at a 1% level, with moderate and low coefficients of determination for Factors 1 and 2, respectively. Estimating the models with fewer variables makes available 105 additional observations, which we utilise in Table 3 for higher estimation efficiency. Note that the estimation results remain almost unchanged, which we interpret as a sign of model stability.

From the 49 covariates (plus 15 state dummies) included in the general model, eight survive the testing-down process for Factor 1 and three for Factor 2. To facilitate interpretation in terms of plausible movements in the variables, dummy variable coefficients are divided by the standard deviation of the dependent variable. Therefore, the coefficients illustrate by how many standard deviations the dependent variable changes when shifting the dummy from 0 to 1. Coefficients of continuous variables are adjusted by multiplying them by their standard deviations and dividing them by the dependent variable's standard deviation. Thus, the 'scaled coefficients' column in Table 3 indicates by how many standard deviations the dependent variable moves when the explanatory variable changes by one standard deviation (or from 0 to 1).

With regard to the respondents' economic situation (*H1*), none of the objective measures appear to be important for the signalling process. In the PBC literature, this is presumed to be an important variable and to account for the income and wealth effect in the demand for public goods. Our results suggest that the assumed relevance of these indicators in the PBC literature may be questionable and the discovery of significant effects using aggregate or regional data may be due to an ecological fallacy issue.

What does matter at the individual level for Factor 1, the information/knowledge dimension, is subjective economic situation. Although the coefficient is significant at the 1% level, it has only a moderate economic effect. An increase in subjective well-being by one standard deviation is associated with an increase in the information/knowledge dimension of 0.15 standard deviations. Neither objective nor subjective economic variables are relevant for Factor 2, the budget dimension.

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<sup>8</sup> All omitted results here and elsewhere are available on request.

This result is in line with the empirical economic voting literature, suggesting that people's perception of their personal economic situation does not significantly affect their voting behaviour (Lewis-Beck and Stegmeier 2013). Thus, we find some evidence supporting *H1*, as better-off individuals are more in line with the signalling process, but this is limited to subjective economic well-being for the information/knowledge dimension and the magnitude of the effect is small.

Table 3: Determinants of individual attitudes towards the signalling process

Dependent variables	Factor 1: Information/knowledge dimension			Factor 2: Budget dimension		
	Coefficient	SE	Scaled coefficient	Coefficient	SE	Scaled coefficient
Subjective well-being	0.12**	0.02	0.15			
Unemployed	0.09*	0.04	0.11			
Student	-0.26*	0.10	-0.34			
Community size	-0.05**	0.01	-0.17	-0.02**	0.005	-0.11
Would not vote	-0.25**	0.05	-0.33			
AfD	-0.19**	0.06	-0.24			
Other party				0.15**	0.06	0.31
Election vs. needs	0.18**	0.02	0.27	0.06**	0.01	0.13
Education	0.06**	0.02	0.08			
State dummies		6 states			3 states	
R <sup>2</sup>		0.22			0.07	
Model significance		F(14,1444)=29.2**			F(6,1456)=18.2**	
Heteroscedasticity		Chi <sup>2</sup> (89)=109			Chi <sup>2</sup> (19)=176**	
Testing-down restriction		F(50,1287)=1.3			F(58,1287)=1.0	
Number of observations		1,459			1,459	

Notes: Estimator: OLS. Normal standard errors are used for Factor 1 and White (1980) robust standard errors are used for Factor 2. \* and \*\* indicate significance at a 5% and 1% level, respectively.

Social class, the basis for *H2*, is significant only for Factor 1. Note that the variable *social class* itself does not survive the testing-down procedure and only *job type* and *job status* matter in a limited way. We discover that unemployed persons have a roughly 0.1 standard deviations higher value for the information/knowledge dimension. Being a student is associated with more than 0.3 standard deviations smaller information/knowledge value. Thus, we do not find evidence supporting *H2*, namely, that individuals with higher social status will be more in accordance with the signalling mechanism than those with lower social status.

Regarding *H3*, the potential relevance of dependency measures, none of our indicators are significant in the general model nor do they survive the testing-down process. Combining our evidence

with that from the PBC literature—and leaving aside the possibility that the latter suffers from an ecological fallacy problem—suggests that dependency measures might be relevant only for the politicians’ side of the signalling process, but not the voters’ side.

Regarding the influence of community size (*H4*), the PBC reasoning is that a higher level of urbanisation causes the electorate to better perceive the fiscal signal, in the form of relatively higher public infrastructure investment. For both Factors 1 and 2, our results point in the opposite direction: in larger communities, individuals care less about the signals, with a reduction of roughly 0.2 and 0.1 standard deviations for Factors 1 and 2, respectively. Arguably, with increasing community size, it becomes more difficult for individuals to monitor what the local government is doing or hold the mayor accountable (Bosch 2016).

*H5* argues that political preferences should matter for the working of the signalling process. Voting for AfD (a nationalist, right-wing party) or not voting at all is associated with acquiring less information/knowledge about government signals by about 0.2 and 0.3 standard deviations. The case of not voting seems consistent with not collecting budget information. The AfD distances itself from the established political parties. It seems plausible that those who vote for it act similarly, that is, they do not involve themselves with local incumbents, who tend to be non-AfD mayors. We also observe that voters who preferred other parties help explain Factor 2, that is, the budget dimension. However, interpretation of this result is not straightforward; it is based on relatively few observations and should not be taken too seriously. Overall, the outcome of analysing *H5* is roughly consistent with the PBC literature.

With respect to *H6*, ‘pork barrel’ models predict that individuals do not care that they are being manipulated by politicians as long as their preferences are taken into account (Drazen and Eslava 2006). In contrast, our findings for both dimensions of the signalling process suggest that voters care more about fiscal policies when they feel that incumbents’ actions are not strongly motivated by re-election considerations. A one standard deviation higher value of this indicator is associated with 0.3 and 0.1 higher standard deviations of Factors 1 and 2, respectively.

*H7* postulates that more knowledge and media access induce individuals to monitor the local budget. Regarding media access, we find no evidence that the availability and use of the Internet affects the working of the signalling process. Again, this stands in clear contrast to the extant PBC literature. However, consistent with theory, respondents’ education level is positively related to Factor 1, albeit a one standard deviation change in education affects Factor 1 by only 0.1 standard deviations, which is the smallest effect of all variables in the model. Thus, while we can corroborate the statistical importance of education for the working of the signalling process, its actual influence

appears rather irrelevant. Moreover, it does not seem to play a role for Factor 2. Hence, we find some evidence that sophisticated voters care more about fiscal policy, but the magnitude of the effect is tiny and restricted to the information/knowledge dimension.

Finally, we evaluate *H8*, namely, that people who are planning to move out of the municipality are less likely to observe the incumbent's budget signal. In short, we find no evidence that this influence is relevant for either Factor 1 or Factor 2. This raises further questions about the practical relevance of the PBC signalling process.

## 6. Unawareness of the Signalling Process

Despite its rather negative results, the analysis in the previous section may have even given the signalling channel an undue advantage, as it is based on respondents who were actually able to provide answers to our questions. However, roughly 10% to 20% of the respondent were unable to do so and, instead, resorted to the 'don't know' option available in Q1, Q1a, and Q3. To investigate whether our conjecture of overestimating the empirical relevance of the signalling channel is correct, we construct an ordered indicator variable. The variable is 0 when the respondent did not choose the option 'don't know' in any of the three aforementioned questions. It increases by 1 for each question receiving a 'don't know' answer. Thus, the ordering of the variable ranges from 0 to 3.

We interpret this variable as an indicator of the extent to which individuals are unaware of the signals sent by local politicians. This 'unawareness' indicator is then used as a dependent variable in an ordinal logit model. Out of the 64 covariates included in the general model, nine variables (plus a state dummy) survive the testing-down procedure. The two last columns in Table A2 give the results for the general model and Table 4 shows the coefficients and average marginal effects for the reduced model.

Respondents' economic situation (*H1*) matters with respect to perception of their saving position. If respondents know whether they are either savers or debtors, the probability that they are unaware of the fiscal signal decreases compared to those who are unsure. Focusing on the extreme categories, perceiving oneself as a saver increases the probability of not having any 'don't know' answers by 12 percentage points (pp) and decreases the probability of having three 'don't know' answers (being completely unaware of any kind of signal) by 3 pp. For debtors, the effects go in the same direction, but with values of 8 pp and 2 pp, respectively, they are of a lower magnitude. We interpret this finding as indicating a lack of economic literacy: respondents who do not even understand their own financial situation are unlikely going to inform themselves about the municipality budget.

Table 4: Ordered logistic regression explaining signal unawareness

Ordered logit regression			Average marginal effects in %			
			Number of 'don't know' answers			
	Coefficient	SE	0	1	2	3
Saver	-0.69**	0.15	12**	-6**	-4**	-3**
Borrower	-0.52**	0.18	8**	-4**	-2**	-2**
Community size	0.04*	0.02	-2	1	1	1
Other party	0.64**	0.22	-12**	5**	4*	3*
Would not vote	0.84**	0.14	-16**	7**	5**	4**
Education	-0.18**	0.06	3**	-1**	-1**	-1**
Internet at work	-0.54**	0.14	9**	-4**	-2**	-2**
Risk aversion	-0.19*	0.08	2*	-1*	-1*	-1*
Female	-0.27*	0.12	-5*	2*	1*	1*
Cut point 1	0.57*					
Cut point 2	1.65**					
Cut point 3	2.63**					
State dummies	1 state					
Pseudo-R <sup>2</sup>	0.05					
Model significance	Chi <sup>2</sup> (10)=133**					
Number of observations	1,785					

Notes: Estimator: ordered logit. To obtain per cent values, average marginal effects are multiplied by 100. White (1980) robust standard errors are used. Coding of dependent variable: 0=0 'don't know' answers, 1=1 'don't know' answer, 2=2 'don't know' answers, 3=3 'don't know' answers. \* and \*\* indicate significance at a 5% and 1% level, respectively.

Our dependency measures (*H2*) and social status indicators (*H3*) have no significant influence on awareness of signal. Community size survives the testing-down procedure, but the marginal effects are significant only at the 10% level. In any case, the direction of the effect is incommensurate with *H4*.

Political party preferences (*H5*) seem to be relevant for signal unawareness. Respondents who do not intend to vote have a 16 pp lower probability of not choosing 'don't know' and a 4 pp higher likelihood of completely neglecting the signal. Voting for minor parties has the same direction of effect as not voting, but with smaller magnitudes (12 pp and 3, respectively). Whether respondents believe they are being targeted by local politicians or not (*H6*) is not associated with unawareness.

Education and having Internet access at work (*H7*) help describe respondents who select 'don't know' answers. Having Internet access at work is associated with an increase of 9 pp in the probability of not giving any 'don't know' answers and a decrease of 2 pp in the probability of giving three 'don't know' answers. Education has the same effect as Internet access, but with a lower



magnitude. A one standard deviation increase in education raises the likelihood that ‘don’t know’ is never chosen by 3 pp and decreases the likelihood of answering ‘don’t know’ three times by 1 pp.

We think that this result has interesting implications for the PBC literature. In that literature, it is assumed that more sophisticated voters with access to free media are able to monitor local politicians and, thus, make opportunistic behaviour less likely. While our analysis supports the PBC notion that more education and access to media put voters in a better position to potentially receive the signals, the results in Section 5 suggest that these characteristics do not seem to be effective in converting that signal into an assessment of the local incumbent.

We also find that risk-loving respondents have a higher likelihood of not giving any ‘don’t know’ answers, whereas risk-averse respondents have a higher probability of answering ‘don’t know’ to all three questions. This could be interpreted as a tendency of risk-averse persons not to answer questions when they are not entirely sure of the answer. Finally, female respondents are 5 pp less likely than males to give no ‘don’t know’ answers and 1 pp more likely to be fully unaware of the signal. This result is consistent with studies showing that women are less likely to be interested in acquiring information about the economy (Holbrook and Garand 1996; Paldam and Nannestad 2000; Dettrey and Palmer 2013; Hayo and Neuenkirch 2018).

## 7. Conclusion

We empirically investigate core assumptions underlying the current PBC literature by taking a closer look at the question of whether it is likely that voters perceive and react to a competency/preference signal sent out by mayors via composition of the municipal budget. Three assumptions are commonly made in this strand of literature: (i) voters observe such signals, (ii) use the information contained in these signals to draw inferences about the competence and/or preferences of the incumbent politicians, and (iii) subsequently cast their votes based on the outcome of their assessment.

We employ a unique dataset from a representative survey of the German population conducted in 2018 that contains almost 2,000 voters. Interviewees were asked questions about the role played by municipality budgets in their local voting decisions. We collected additional information about the respondents, so as to be able to test several theory-based hypotheses that are highly relevant for assessing assumptions (i) to (iii).

In general, the results of descriptive statistics and multivariate regressions are not very supportive of the PBC assumptions. First, only 11% of voters feel well informed about the local budget, whereas one out of three respondents think that his/her level of knowledge is bad. The role of the media in the knowledge acquisition process does not provide a more promising picture, as only 22%

of respondents believe the media to be a reliable source of information about the local budget, whereas 12% even think that the media is unreliable.

Second, when we shift focus to use of the information contained in the budget for drawing inferences about the competence and/or preferences of the incumbent politician, we find that a notable number of people do not seem to behave in line with RBC Assumption (ii). Only 18% of the respondents utilise information contained in the local budget in deciding whether to vote for the mayor, whereas 38% consider the general economic situation of the municipality more relevant to the voting decision. In addition, roughly 36% of the respondents think that the mayor does not have much leeway to modify the budget, whereas only about 28% believe the opposite.

Third, we assess Assumption (iii): whether the information contained in the budget is used to evaluate politicians' performance and whether it influences voting accordingly. The answers we obtain paint a picture similar to the one we described when interpreting the results for Assumption (i): only 11% of our respondents consider the budget to have a lot of relevant information for their voting decision, whereas 32% find no information in the budget relevant to how they will vote.

Fourth, employing a variety of socio-demographic, economic, psychological, and political control variables, we test several theory-based hypotheses that are highly relevant for evaluating assumptions (i) to (iii) in the PBC literature. Using factor analysis, we find that the signalling mechanism can be decomposed into two dimensions: an information/knowledge dimension of the voting process (described by subjective knowledge, relevant information, and media reliability) and the reflection of respondents' voting decisions in light of their perception of the budget (described by budget vs. economic situation and leeway of the mayor). We then use the estimated factors as dependent variables in two multivariate regressions. Individuals tend to pay more attention to the signal sent by local politicians if they live in smaller municipalities, are more satisfied with their economic situation, are more educated, and do not feel that they are being electorally targeted. Only more extreme political preferences matter in signal processing, in that AfD voters or non-voters (voters of minority parties) conform less (more) to the PBC assumptions.

Theory-based hypotheses do not perform much better than the direct tests of assumptions (i) to (iii). Objective measures of economic well-being, which are typically used in the literature, do not appear to be related to signal reception; neither are social class or dependency relevant for the two dimensions of the signalling mechanism. Considering unemployment and schooling as social class indicators contradicts the theoretical conjecture and the rate of urbanisation does not play its expected role either. Pork barrel cycles are also rejected by the regression results: individuals do not like being electorally targeted and they engage more with the local politicians when they do not feel manipulated. However, we do find support for some predictions of the PBC literature, namely, that

partisan preferences influence the attention individuals pay to fiscal policy and that more educated individuals tend to gather more information about fiscal matters.

Reflecting the fact that we conducted the previous analysis with respondents who were actually able to answer our questions, we then studied voters who gave ‘don’t know’ answers. Employing an ordinal logit estimator, we find that voters unlikely to perceive any signals sent by local incumbents are unsure of their saving position, female, more risk averse, less educated, do not have Internet access at work, and decide not to vote or, if they do, support a minor party. All in all, these characteristics support the view that this group of people is unlikely going to react to a fiscal policy signal and that the share of Germans who act in accordance with the signalling view is even smaller than reported above.

To conclude, our analysis suggests that the voting decision of the German population at the local level is a much more complex and interlinked process than is assumed in the PBC signalling literature, that is, where a signal is sent from local incumbents to voters through the manipulation of the budget structure. We believe our findings raise serious doubts about the empirical relevance of the signalling mechanism as the driving factor for PBCs at the local level.

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## Appendix

Table A1: Descriptive Statistics

<i>Variable</i>	<i>Description</i>	<i>Min</i>	<i>Max</i>	<i>Mean</i>	<i>Std. Dev.</i>
Factor 1	Factor based on answers to questions: 1, 1a, 2, 2a, and 3 (see Table3).	-1.40	1.66	0	0.77
Factor 2	Factor based on answers to questions: 1, 1a, 2, 2a, and 3 (see Table3).	-1.17	1.35	0	0.49
Nosignal	Ordinal variable based on answers to questions: 1, 1a, and 3. Ranging from 0 (no 'don't know' answers) to 3 (three 'don't know' answers).	0	3	0.42	0.83
Election vs. needs	5-point Likert scale	-2	2	-0.13	1.17
CDU/CSU	Dummy variables computed based on the question: Which party would you vote for if federal elections were held this Sunday?	0	1	0.24	0.43
SPD		0	1	0.17	0.38
AfD		0	1	0.11	0.31
FDP		0	1	0.06	0.25
Linkspartei		0	1	0.08	0.27
Grüne		0	1	0.10	0.30
Other party		0	1	0.06	0.24
Would not vote	CDU/CSU (reference category)	0	1	0.17	0.38
Number of children	Number of children of the interviewed person	0	6	1.17	1.16
Subjective well-being	Respondent's subjective assessment of his/her economic situation, ranging from -2 (Absolutely dissatisfied) to 2 (Absolutely satisfied).	-2	2	0.33	0.93
Don't know	Dummy variables based on the wealth of the interviewed person with 'don't know' as reference category	0	1	0.14	0.35
Saver		0	1	0.65	0.48
Borrower		0	1	0.21	0.41

Move municipality	Likelihood that an interviewed moves out of the municipality in the next five years, ranging from 1 (very likely) to 3 (unlikely)	1	3	2.85	0.44
Risk aversion	Continuous variable that varies between -1 (maximum risk aversion) and +1 (maximum risk propensity); see Hayo et al. (2018)	-1	1	0.11	0.68
Time preference	Respondent's marginal rate of substitution between two future consecutive periods; see Hayo et al. (2018)	0	200	103.2	86.48
Hyperbolic discounting	Measure of the degree of the respondent's short-run impatience; see Hayo et al. (2018)	-66.67	200	10.86	38.41
Age	Age in years of the interviewed person	18	94	51.56	17.54
Female	Dummy variable taking value 1 if respondent is female (0 otherwise)	0	1	0.53	0.5
HHSize	Total number of people living in the household	1	5	2.25	1.09
Children in HH	Number of children living in the household	0	4	0.27	0.65
HH head	Dummy variable taking the value 1 if respondent is the head of the household she lives in (0 otherwise)	0	1	0.65	0.48
Bluecollar	Dummy variables based on the current occupation of the interviewed person with Bluecollar as reference category	0	1	0.13	0.33
Whitecollar		0	1	0.36	0.48
Publicservant		0	1	0.02	0.13
Selfemployed		0	1	0.06	0.24
Farmer		0	1	0.00	0.05
Notworking		0	1	0.43	0.5
Single	Dummy variables based on the family status of the interviewed person with Single as reference category	0	1	0.21	0.41
Partner		0	1	0.11	0.32
Married		0	1	0.49	0.50
Widowed		0	1	0.19	0.39
Noreponse		0	1	0.00	0.04
Educ	Educational background of the respondent, ranging from 1 (no certified apprenticeship) to 5 (university degree)	1	5	2.92	1.02
Fulltime	Dummy variables based on the occupational situation of the interviewed person with Fulltime as reference category	0	1	0.45	0.50

Parttime		0	1	0.13	0.34
Unemployed		0	1	0.03	0.16
Nonworking		0	1	0.30	0.46
Housewife		0	1	0.04	0.19
Apprenticeship		0	1	0.02	0.14
School		0	1	0.04	0.20
Renting		0	1	0.49	0.50
Own house	Dummy variables based on the housing conditions of the interviewed person with Renting as reference category	0	1	0.44	0.50
Own flat		0	1	0.07	0.25
Community size	Number of residents in the respondent's community, ranging from 1 (-1,999) to 10 (500,000+)	1	10	6.00	2,61
SocialClass	Indicator combining information about respondents' relative income and occupational status, ranging from 1 (lower class) to 5 (upper class)	1	5	3.19	1.00
Internet home		0	1	0.81	0.40
Internet work		0	1	0.29	0.46
Internet school/uni		0	1	0.05	0.21
Internet mobile	Dummy variables based on the access of the interviewed person to internet (more than one answer is allowed)	0	1	0.48	0.50
Internet other		0	1	0.07	0.26
No internet		0	1	0.15	0.36
Internet use	Internet use of the interviewed person, ranging from 1 (never) to 7 (daily)	1	7	5.48	2.20
HHIncomepercapita	Per capita household income. We added 508 observations through 5 rounds of imputations using: Age, Sex, Household size, Children living at home under 15, Respondent head of the household, Current occupation head of the household, Family status, Education of respondent, Occupational situation of respondent, Current occupation of respondent, Education of head of the household, Occupational situation head of the household, Housing conditions, Social class, Community size, State, and Income level of household (partially interviewer estimates). Statistics for imputation 5.	62.38	4500	1290.	613.83
				4	

Table A2: General Model

Variables	Factor 1: OLS		Factor 2: OLS		Nosignal: Ordinal Logit	
	Coefficients	Standard errors	Coefficients	Standard errors	Coefficients	Standard errors
HHIncomepercapita	0.00	(0.00)	0.00	(0.00)	-0.00	(0.00)
Own house	0.00	(0.05)	-0.02	(0.03)	-0.09	(0.15)
Own flat	0.10	(0.08)	-0.05	(0.06)	-0.02	(0.25)
Saver	0.04	(0.06)	0.05	(0.04)	-0.61**	(0.17)
Borrower	0.05	(0.07)	0.02	(0.05)	-0.50**	(0.19)
Subjective well-being	0.12**	(0.02)	-0.02	(0.02)	0.02	(0.07)
SocialClass	-0.06	(0.03)	-0.04	(0.02)	-0.04	(0.11)
Whitecollar	0.04	(0.07)	0.03	(0.05)	0.30	(0.21)
Publicservant	0.24	(0.16)	0.04	(0.11)	0.05	(0.56)
Selfemployed	0.11	(0.10)	-0.01	(0.07)	-0.11	(0.34)
Farmer	-0.21	(0.40)	0.03	(0.28)	0.87	(0.95)
Notworking	0.56*	(0.24)	-0.00	(0.17)	-0.07	(0.84)
Parttime	-0.00	(0.07)	0.01	(0.05)	-0.44*	(0.22)
Unemployed	-0.61*	(0.27)	-0.00	(0.19)	-0.12	(0.90)
Nonworking	-0.39	(0.24)	0.03	(0.17)	-0.27	(0.85)
Housewife	-0.50*	(0.26)	-0.06	(0.18)	-0.07	(0.89)
Apprenticeship	-0.57	(0.29)	0.20	(0.21)	1.30	(0.91)
School	-0.63*	(0.27)	-0.10	(0.19)	0.52	(0.92)
Number of children	0.01	(0.02)	-0.01	(0.02)	-0.02	(0.07)
Children in HH	-0.06	(0.04)	-0.03	(0.03)	0.07	(0.13)
HHSIZE	0.02	(0.04)	0.03	(0.03)	-0.06	(0.11)
Partner	-0.11	(0.07)	0.04	(0.05)	-0.10	(0.23)
Married	0.03	(0.07)	0.05	(0.05)	-0.00	(0.21)
Widowed	0.06	(0.08)	0.01	(0.05)	-0.37	(0.24)
Noresponse	0.87	(0.74)	-0.25	(0.52)	1.58	(1.00)
HH head	0.03	(0.06)	0.02	(0.04)	0.04	(0.17)
Community size	-0.06**	(0.01)	-0.02*	(0.01)	0.08*	(0.03)
SPD	0.01	(0.06)	0.05	(0.04)	0.03	(0.20)
AfD	-0.22**	(0.07)	0.03	(0.05)	0.43	(0.22)
FDP	-0.08	(0.07)	0.06	(0.05)	-0.25	(0.30)
Linkspartei	-0.07	(0.08)	0.05	(0.06)	0.40	(0.25)
Grüne	0.00	(0.07)	-0.01	(0.05)	-0.19	(0.24)
Other party	-0.10	(0.09)	0.16*	(0.06)	0.68**	(0.26)

Would not vote	-0.26**	(0.07)	-0.01	(0.04)	0.86**	(0.19)
Election vs. needs	0.17**	(0.02)	0.06**	(0.01)	0.07	(0.05)
Educ	0.07*	(0.03)	-0.00	(0.02)	-0.15*	(0.09)
Internet home	-0.02	(0.11)	-0.17*	(0.08)	-0.44	(0.30)
Internet work	0.02	(0.06)	-0.04	(0.04)	-0.66**	(0.18)
Internet school/uni	-0.08	(0.13)	0.02	(0.10)	-0.36	(0.37)
Internet mobile	0.04	(0.05)	-0.02	(0.03)	-0.02	(0.15)
Internet other	0.02	(0.08)	0.08	(0.05)	-0.01	(0.25)
No internet	0.06	(0.14)	-0.03	(0.10)	-0.06	(0.39)
Internet use	0.03	(0.02)	0.02	(0.01)	0.01	(0.06)
Move municipality	-0.04	(0.05)	-0.03	(0.03)	0.08	(0.14)
Age	0.00	(0.00)	-0.00	(0.00)	0.00	(0.01)
Female	-0.07	(0.05)	0.03	(0.03)	0.39**	(0.14)
Risk aversion	0.01	(0.03)	-0.01	(0.02)	-0.16	(0.10)
Time preference	0.00	(0.00)	0.00	(0.00)	-0.00	(0.00)
Hyperbolic discounting	0.00	(0.00)	-0.00	(0.00)	0.00	(0.00)
Schleswig	-0.33**	(0.11)	-0.04	(0.08)	0.22	(0.37)
Hamburg	-0.07	(0.13)	-0.16	(0.09)	-0.11	(0.44)
Bremen	0.36	(0.27)	0.53**	(0.19)	0.76	(0.57)
Berlin	-0.20*	(0.10)	-0.05	(0.07)	0.34	(0.31)
LowerSaxony	-0.08	(0.08)	-0.02	(0.05)	0.59*	(0.24)
Hesse	0.23**	(0.08)	0.06	(0.06)	0.60*	(0.25)
Palatinate	-0.34**	(0.11)	-0.09	(0.08)	0.75*	(0.34)
Saarland	-0.39*	(0.17)	-0.11	(0.12)	0.51	(0.51)
Baden	-0.01	(0.08)	0.15**	(0.06)	0.75**	(0.26)
Bavaria	-0.08	(0.07)	0.15**	(0.05)	0.34	(0.22)
Mecklenburg	-0.27*	(0.16)	-0.16	(0.11)	0.99**	(0.38)
SaxonyAnhalt	-0.32**	(0.12)	-0.04	(0.08)	0.23	(0.41)
Brandenburg	-0.41**	(0.10)	0.08	(0.07)	-0.17	(0.40)
Thuringia	-0.34**	(0.11)	-0.02	(0.08)	0.10	(0.35)
Saxony	-0.06	(0.09)	-0.12*	(0.06)	0.09	(0.29)
/cut1					0.62	(0.83)
/cut2					1.74*	(0.84)
/cut3					2.74**	(0.84)
Observations	1,354		1,354		1,785	

Notes: Table shows coefficients estimated for the general model. Columns 1 and 2, dependent variables are the factors obtained in Section 5. \* and \*\* indicate significance at a 5% and 1% level, respectively. White (1980) robust standard errors are used.