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Experimental Evidence of the Effect of Monetary Incentives on Cross-Sectional and Longitudinal Response: Experiences from the Socio-Economic Panel (SOEP)

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Abstract

The paper gives an overview of two experiments implemented in the German Socio-Economic Panel (SOEP) considering the effect of monetary incentives on cross-sectional and longitudinal response propensities. We conclude that the overall effects of monetary incentives on response rates are positive compared to the "classic" SOEP setting, where a charity lottery ticket is offered as an incentive. In the cross-section, cash incentives are associated with a higher response rate as well as a lower rate of partial unit non-response (PUNR) and fewer noncontacts on the household level. Separate analyses for German and immigrant households show that a monetary incentive has a positive effect on immigrant households' participation in subsequent waves. Regarding the regions where the households are located, the high cash incentive has a positive effect on response rates in provincial towns and rural areas. The incentive treatment decreases the likelihood of PUNR in the longitudinal setting by motivating members of participating households who had refused to participate in previous waves to respond in subsequent waves.

Keywords: incentive experiment, response rates, partial unit nonresponse, nonresponse bias, conditional incentives.

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Introduction

The problem of decreasing response rates observed in various surveys (Couper and De Leeuw 2003, De Leeuw and De Heer 2002, Singer 2006, Brick and Williams 2003) is also present in the Socio-Economic Panel (SOEP) (e.g., TNS Infratest Sozialforschung 2012a). High rates of non-response may have serious consequences on survey data quality. The currently prevalent understanding of good survey research is based on the "total survey error" approach (Weisberg 2005). The approach focuses on the different errors that can occur in a survey. One important element of the "total survey error" approach is the non-response bias. High rates of non-response are related to biased estimates if there is a relationship between the response propensity and the survey variable, either via shared causes or if the survey variable itself is a cause of the response propensity (Groves et al. 2009). As a consequence, the ability to draw conclusions from the data with respect to the target population may be limited. Longitudinal surveys are especially susceptible to the problems of missing data due to non-response because of the possibility for non-response in multiple phases of the panel and the tendency for sample size to decline over time due to attrition (e.g., Watson & Wooden 2011). The following Table 1 shows the response rates for the SOEP samples since 1984 for the first waves of the samples A, E, F, and H.[6] The table reveals the problems of achieving high response rates among first-time respondents, especially in recent years.[7]

Table 1: Non-response in new samples in the Socio-Economic Panel Study

	Response Rate
Sample A (1984)	0.61
Sample E (1998)	0.54
Sample F (2000)	0.53
Sample H (2006)	0.41

Survey researchers have thought about different ways to increase participation in surveys. One of the possible methods of achieving this is the use of incentives (Dillman 1991). Common incentives in survey methodology are cash or in-kind incentives. The aim is to motivate and reward the respondents. Information material about the study and study results are also used to motivate the respondents. Incentives have already shown positive effects in other face-to-face interviews (Singer 2002, Singer et al. 1999). The SOEP has used non-monetary in-kind incentives since the beginning of the study in 1984: in general, respondents receive a charity-based lottery ticket and information materials about the study. Recently, the use of cash incentives has become part of the SOEP as well. For an overview of the previous use of incentives in the SOEP, see Table 2.

[6] For more information about the various samples see Haisken-DeNew and Frick (2005) or Frick (2006). Only samples A, E, F and H are depicted, because the other SOEP samples are not equivalent to the following experiments in their sampling process.

[7] For more information about the response rates and attrition rates see Kroh (2010).

Table 2: Use of incentives in the Socio-Economic Panel Study

Type of Incentive	Year	Amount	Conditionality
Charity-based lottery ticket (valid for one month)			
	1984-2007	€1.5	conditional
	since 2008	€5	unconditional (but conditional for non-respondents from the prior wave)
Information materials:			
– Information brochure	since 1984		unconditional
– Project information folder	since 2008		unconditional
– "Datenreport": social report for Germany or selected editions of DIW Wochenbericht	since 2009		on request
Small presents for households ("door-opener")	1987-2007	€4	conditional
	& since 2010	€4	conditional
Letter of thanks with a complimentary postage stamp in greeting card form ("portocard")	since 1999	€.55	conditional

In recent years the use of monetary incentives has grown in importance in many surveys in Germany, such as ALLBUS (Koch & Wasmer 2004), ESS (Keil & Van Deth 2012), GIP[8], NEPS (Blossfeld et al. 2011), pairfam (Huinink et al. 2011), PIAAC (Rammstedt 2013), PASS (Trappmann et al. 2010) and SHARE (Börsch-Supan et al. 2013). Facing the decreasing participation rates common among many other of the aforementioned studies, the SOEP decided to test monetary incentives and their effects. Due to the high cost, different monetary incentives and their differing influence on willingness to participate were tested in experimental settings before their actual implementation.

This paper describes two experiments on the effect of monetary incentives conducted in the Socio-Economic Panel. The first one, called the "cross-sectional experiment", tested different incentives in the first wave of a new SOEP sample. Four different groups with different incentives, each conditional on participation, were fielded in 2009. One of the four groups may be regarded as the "control" group, as the incentive was the charity-based lottery ticket regularly used in the SOEP. We tested the different effects on the response rates in the initial wave and in the second wave. Effects were tested in the second wave to determine whether an incentive has the ability to motivate the respondents to participate in subsequent waves as well, even if the type and amount of the incentive has changed. A high dropout rate in the second wave due to a reduction in the incentive amount after the first wave would indicate that a high cash incentive compels survey researchers to offer high incentives in subsequent waves (a so-termed "lock-in" effect). Another feature of the study was an incentive experiment for a follow-up survey of non-respondents, where information was obtained about households that refused or were unable to participate.

The second experiment used monetary incentives in a sample of experienced panel households; hence it is called the "longitudinal experiment". The households participated in the survey for

[8] For further information on the German internet panel "Society in Change" see http://reforms.uni-mannheim.de/english/internet_panel/home/index.html.

between five and 27 years before cash incentives were offered for the first time. By these means, the influence of incentives on ongoing participation could be tested. The longitudinal experiment is an important addition to the cross-sectional experiment, since the effects on a new panel sample cannot necessarily be transferred to the effects in a longitudinal study. In the following, the two experiments will be described in detail.

Cross-Sectional Experiment

In 2009, four different incentives were implemented. The incentives were cash or in-kind payments, all of which were conditional on participation of at least one person in the household. There were four groups in total (see also Table 3): a first group with "low cash" incentives (€5 per household, and €5 for each individual interview); a second group with "high cash" incentives (€5 per household, and €10 for each individual interview); a third group which could choose between the low cash incentive and a lottery ticket (value €5) for each respondent; and a fourth group, in which each respondent received a lottery ticket (value €5). The experiment was carried out in the first wave of sample "I", which was transferred into the new SOEP-Innovation Sample in 2011 (see Richter and Schupp 2012). While the primary goal in this sample's first wave was to test the different incentive concepts, an additional feature was the use of an onomastic procedure to achieve an overrepresentation of households with a migration background.

The following briefly outlines the sampling steps. The sampling frame included all non-institutionalized households in Germany. Among the survey households, all household members aged 17 years and older were to be questioned. The first stage in the sample design, which is based on the ADM system[9] of sampling, consisted of a selection of 250 sample points. The ADM system forms territorial units, based on the BIK model[10], using data from the official statistics. The territorial units formed represent the basis from which the 250 sample points were drawn. The sampling probabilities were weighted proportionally to the number of households within each unit. The sampling process and the distribution of the sampling points are described in detail in the summary report of the 2009 fieldwork by TNS Infratest (TNS Infratest Sozialforschung 2012b). In the second selection step, the survey households within the sample points were selected. The procedure was carried out with random route methodology[11], using separate and prior address selection.[12] Further, the prior address selection is necessary to achieve the overrepresentation of households with a migration background which was realized by using an onomastic method. The onomastic method is a linguistic analysis of names, where each name is assigned a linguistic and regional origin (Humpert and Schneiderheinze 2000). Using this procedure, households with a foreign background could be explicitly targeted and the percentage of immigrant households in the sample was nearly doubled to 20.1%

[9] For further information about the "ADM"-procedure, see Häder and Gabler (2003) or Arbeitsgemeinschaft ADM-Stichproben and Bureau Wendt (1994).
[10] For further information about the BIK regions, see BIK-Aschpurwis + Behrens Gmbh (2000).
[11] For more information about random route, see Hoffmeyer-Zlotnik (1997) or Schnell (2012).
[12] This is the method that is commonly used for new samples in the SOEP (see samples F in 2000 and H in 2006). Compared to the standard ADM method, this procedure has significant methodological advantages because the interviewer cannot deviate from the selected sample and the households can be contacted in advance and informed about the survey and the incentives.

Finally, 48 addresses were listed for each sample point, totaling nearly 12,000 addresses collected by TNS Infratest. A gross sample of 4,000 households was randomly selected using the onomastic procedure. Shortly after field work commenced, it was apparent that the targeted net sample of 1,500 cases would not be achieved given the response rates observed, and thus another 1,000 households were added, applying the same procedure. The total of 5,000 households was split into four different incentive groups, as shown in Table 3.[13]

Table 3: Incentive splits of the gross sample

Split 1: "low cash" incentive	€5 per household questionnaire, and €5 for each individual interview
Split 2: "high cash" incentive	€5 per household questionnaire, and €10 for each individual interview
Split 3: "choice" incentive	Each household chooses between the low cash incentive and a charity lottery ticket per respondent (value €5)
Split 4: charity lottery ticket incentive ("SOEP classic")	Charity lottery ticket (value €5) per respondent

The fourth group may be regarded as the "control" group, as this was the regular incentive treatment for the SOEP sample in the years before 2009. The incentive splits were distributed equally across the gross sample, which ultimately consisted of 5,000 addresses in 250 sample points. Each of the 20 addresses in a sample point was linked with one specific incentive. Within the first tranche, i.e., the selection of the first 4,000 households, the groups were divided according to the following system: The first four addresses in each sample point received the low cash incentive, the second four the high cash incentive, the third four addresses could choose, and the last four were given the classic SOEP lottery ticket. Within the second tranche (N=1,000), there were only four addresses in each sample point and therefore each address received a different incentive. The type of incentive was communicated in the first contact letter, where the method of "payment" was also revealed: any cash incentive would be disbursed directly after the interview, whereas lottery tickets had to be sent at a later date as they needed to be personalized. The group that was allowed to choose did so at the time of the interview. The interviews were conducted by a total of 248 interviewers from TNS Infratest. Each respondent was interviewed face-to-face by an interviewer using the CAPI (Computer Assisted Personal Interview) mode. Only household and individual questionnaires were used.[14] Among the 248 interviewers, 102 interviewers had SOEP experience and 146 had no direct experience with the SOEP, but did have experience in conducting other face-to-face surveys. After an evaluation of the survey process, 257 households were excluded from the sample due to ineligibility (221) or field problems (36). The sample realized included 1,495 households, resulting in a response rate of 31.52% (see Tables 4 and 5). A comparison with the other SOEP samples F and H shows a further decline in response rates (see Table 1). The following Table 4 depicts the total number of households and the number for each of the incentive splits. Additionally, the table displays the response rates within the different splits. As previously mentioned, the sample was drawn using an

[13] Note that the variable SPLIT in the dataset "*hbrutt09*" allows to determine the different groups in the SOEP data distributions.

[14] The questionnaires can be found in the appendix to the summary report of the 2009 fieldwork by TNS Infratest (TNS Infratest Sozialforschung 2012b).

onomastic procedure. This allows us to display the number of German and immigrant households and the response rates separately[15] (for the actual comparison, see discussion on Table 5).

Table 4: Household numbers and response rates by incentive splits

		Incentive splits			
	Total	SOEP classic	Low cash	High cash	Choice
Total households (N)	4,743	1,182	1,192	1,178	1,191
Response rate (%)	31.52	29.27	33.14	32.85	30.81
German households (N)	3,784	959	962	933	930
Response rate (%)	33.54	31.18	36.07	34.41	32.47
Immigrant households (N)	959	223	230	245	261
Response rate (%)	23.57	21.08	20.87	26.94	24.90

Source: SOEPv28

Table 5 displays the results of a first analysis. The first row shows the overall response rates and the response rate of the control group that received the classic charity lottery ticket. In addition, the table shows the results of a regression with the household response decision (0/1) as dependent variable and the incentive splits as independent variables by using a dummy variable for each incentive split. The table thus indicates the difference (in *italics*) in response rates for each incentive group compared to the control group and whether this difference is significant or not. Similarly, the second and third row display overall response rates and response rates for the control group.

Table 5: Overall response rates, control group response rates, and differences compared to incentive splits, in %

		Incentive splits			
	Overall	SOEP classic	Low cash	High cash	Choice
Overall response	31.52	29.27	*3.87***	*3.58**	*1.54*
German households	33.54	31.18	*4.89***	*3.23*	*1.30*
Immigrant households	23.57	21.08	*-0.21*	*5.86*	*3.83*

The level of significance is indicated by * for p<.1, ** for p<.05 and *** for p<.01.
Source: SOEPv28

The two cash groups show a significant positive effect of the incentive on response rates (the low cash group differential is significant at the five percent level, the high cash group differential at the ten percent level). The choice group shows no significant difference compared to the control group. Among the German households, only the low cash incentive has a significant positive effect on the

[15] Note that we use the onomastic indicator although it cannot be assumed to work perfectly. In the summary report of the fieldwork for sample I, TNS Infratest reveals a fit of 71.6 percent among the respondent households. Thus the majority of cases in the gross sample with the onomastic indicator are effectively non-German households, but the fit is definitely imperfect. Bearing this in mind, the results for the "immigrant" households can be assumed to lay somewhere between the results for the German population and the results for the true immigrant population.

response rate. The incentives have no detectable significant effects on immigrant household response rates. Regarding overall response rates, the table shows a significant difference (p<.01) between the response rates of German and immigrant households. These findings therefore substantiate experiences from previous surveys including immigrants i.e., that response rates among immigrants are significantly lower (e.g., Deding et al. 2008, Fesken et al. 2004). Regarding the "choice" incentive split, a total of 51.23% of the households chose the cash incentive. However, immigrant households are significantly more likely to choose cash: 56.9% in this group selected the cash incentive versus 50.0% of the German households.

For further analysis, the group of non-respondents and the group of respondents are divided into different subgroups, as shown in Table 6. The first group, "no contact", includes the households that could not be reached despite repeated attempts by the interviewer (the TNS Infratest rule is to make at least ten contact attempts on different days at different times). "Hard refusals" are households that did not want to respond and did not want to be contacted again. The "soft refusals and inability" group refused participation at that moment in time due to different reasons, such as, a visit abroad, illness or language problems. It can be assumed that these reasons are, to a certain extent, an excuse for unwillingness to participate. The households in this third group can be contacted again in a later panel wave. The group of respondents is also divided into two, so that the difference between completed households and households with partial unit non-response becomes visible.

The following Table 6 displays the response pattern for the control group, "SOEP classic" and the differences between the other incentives and "SOEP classic". Similar to Table 5, the differences were tested using regressions of the response pattern categories with the control group serving as the baseline category and dummy variables for the incentive splits. Each of the five rows thus contains the results of one regression, with the dependent variable shown in the first column.

Table 6: Control group response pattern compared to incentive splits

	Overall		Incentive splits			
	N	%	SOEP classic	Low cash	High cash	Choice
1. No contact	512	10.79	11.51	*-1.86*	*-1.23*	*0.25*
2. Hard refusal	2,608	54.99	57.02	*-3.16*	*-2.61*	*-2.36*
3. Soft refusal and inability	128	2.70	2.20	*1.16**	*0.26*	*0.57*
4. Partial unit non-response	301	6.35	7.02	*-0.73*	*-0.49*	*-1.48*
5. Household complete	1,194	25.17	22.25	*4.60***	*4.07***	*3.02**
Overall	4,743	100.00				

The level of significance is indicated by * for p<.1, ** for p<.05 and *** for p<.01.
Source: SOEPv28

Regarding the differences between each incentive split and the "SOEP classic" incentive, no significant differences were observed for the groups with no contact, hard refusal, soft refusal, and partial unit non-response, except for the positive effect of the low cash incentive on soft refusal. In the "household complete" group, each incentive group differs significantly from the control group "SOEP classic", where the incentives have a significantly positive effect on the number of completed households.

As with Table 5, the analyses in Table 6 can be repeated for German and immigrant households separately. The response pattern of the households with the classic SOEP incentive and the differences between the other incentive groups and the reference group are displayed in Table 7 for the German households and in Table 8 for the immigrant households, again using the same regression concept as in Table 5.

Table 7: Control group response pattern compared to incentive splits in German households

	Overall		Incentive splits			
	N	%	SOEP classic	Low cash	High cash	Choice
1. No contact	371	9.80	9.70	*-0.55*	*-0.27*	*1.27*
2. Hard refusal	2,099	55.47	58.50	*-5.59***	*-3.41*	*-3.12*
3. Soft refusal and inability	45	1.19	0.63	*1.25***	*0.45*	*0.56*
4. Partial unit non-response	250	6.61	6.78	*0.39*	*-0.03*	*-1.08*
5. Household complete	1,019	26.93	24.40	*4.50***	*3.25*	*2.37*
	3,784	100,00				

The level of significance is indicated by * for p<.1, ** for p<.05 and *** for p<.01.
Source: SOEPv28

Table 8: Control group response pattern compared to the incentive splits in immigrant households

	Overall		Incentive splits			
	N	%	SOEP classic	Low cash	High cash	Choice
1. No contact	141	14.70	19.28	*-7.54***	*-5.81**	*-4.72*
2. Hard refusal	509	53.08	50.67	*7.15*	*1.16*	*1.43*
3. Soft refusal and inability	83	8.65	8.97	*0.60*	*-1.21*	*-0.54*
4. Partial unit non-response	51	5.32	8.07	*-5.46***	*-2.36*	*-3.09*
5. Household complete	175	18.25	13.00	*5.26*	*8.22***	*6.92**
	959	100,00				

The level of significance is indicated by * for p<.1, ** for p<.05 and *** for p<.01.
Source: SOEPv28

Among the German households, only a small number of significant differences was observed. The low cash incentive has a significantly negative effect on the hard refusals and a significantly positive effect on the completed households as well as on the "soft refusal and inability" group (p<.05), i.e., the low cash incentive is correlated with fewer hard refusals and with more completed households and more non-respondents due to soft refusal or inability. The other two incentive splits, "high cash" and "choice", show no significant differences compared to the control group, "SOEP classic". Among the immigrant households, both cash incentives show positive effects on the reachability of the households. The "no contact" groups in the splits with cash incentives are significantly smaller (low cash: p<.05, high cash: p<.1) than the "no contact" group in the reference category, "SOEP classic". The low cash incentive also shows a significantly negative effect on partial unit non-response (p<.05) and the high cash incentive shows a significantly positive effect on the completed households (p<.05). The "choice" incentive only shows an effect on the completed households: here the rate of

households that completed the household questionnaire and all of the individual interviews is significantly higher than in the "SOEP classic" incentive group.

Due to the specific sampling procedure, we are aware of the regions from which the households were drawn. The regions are classified by size based on the BIK characteristics[16]. Table 9 displays the number of households in relation to the incentive splits and to four regional groups. The first regional group includes all BIK regions with more than 500,000 inhabitants. The second group includes cities with between 100,000 and 500,000 inhabitants, and the third group of smaller cities includes those with between 20,000 and 100,000 inhabitants. The fourth group includes rural areas with fewer than 20,000 inhabitants. Our classification into four groups is based on the conventional definition of metropolises, cities, towns, and provincial and rural areas[17] used in other classifications. As well as the number of households, the table also shows the effects on the response rates of the different incentives in the four regions with the "SOEP classic" incentive serving as a reference category. With regard to the differences between each incentive split and the "SOEP classic" incentive, no significant differences were observed for the metropolises, cities and towns. In provincial towns and rural areas the high cash incentive shows a significant positive effect on the response rate compared to the classic SOEP incentive.

Table 9: Response rates by size of region compared to incentive splits

		Incentive splits			
	Overall	SOEP classic	Low cash	High cash	Choice
1. Metropolises (N=1,695)	28.14	26.13	*3.66*	*1.49*	*2.87*
2. Cities (N=1,459)	32.21	30.22	*5.12*	*3.66*	*-0.82*
3. Towns (N=998)	34.77	32.65	*3.06*	*2.13*	*3.23*
4. Provincial towns and rural areas (N=591)	34.01	30.26	*2.63*	*12.18***	*0.82*
Overall response	31.52				

The level of significance is indicated by * for p<.1, ** for p<.05 and *** for p<.01.
Source: SOEPv28

Table 9 shows differences in the response rates based on regional classification. Response rates decrease as the number of inhabitants in a region increases. Other surveys produce similar results (e.g., Groves and Couper 1998, Robinson and Godbey 1997). Inhabitants in large cities, in particular, are more difficult to contact.

The respondents were interviewed again in 2010, but the four incentive types from 2009 were not used a second time. In 2010, each participating household received the low cash incentive. The aim was primarily to explore the so called "lock-in" effect among the respondents from the different 2009 incentive groups. Table 10 displays the response rates for 2010 in relation to the incentive splits from 2009. The households addressed represent the 1,495 households that responded in 2009. After

[16] See BIK-Aschpurwis + Behrens Gmbh (2000).
[17] The classification of "metropolises", "cities", "towns", and "provincial and rural areas" is based on the definitions produced by the International Statistical Conference in 1887 (Schmidt-Lauber 2010). These definitions are commonly used in the classification of regions.

excluding the ineligibles (due to deceased respondents, respondents who have gone abroad, or households that no longer exist), the new gross sample consists of 1,478 households.

Table 10: Control group response rates in 2010 compared to 2009 incentive splits

		Incentive splits			
	Overall	SOEP classic	Low cash	High cash	Choice
Overall response	71.92	68.91	*2.44*	*7.06***	*2.16*
German households	73.52	72.11	*-0.39*	*5.49*	*0.56*
Immigrant households	62.95	48.94	*19.18***	*19.25***	*14.56*

The level of significance is indicated by * for p<.1, ** for p<.05 and *** for p<.01.
Source: SOEPv28

First, it is clear that the response rate of 71.9% is not as high as in other ongoing SOEP samples (see Kroh 2010). Further, Table 10 shows that the households that received the high cash incentive in 2009 were significantly more likely to participate in 2010 than the households that were in the "SOEP classic" group in 2009. Thus, a lock-in effect is not evident. In contrast, high incentives offered in one wave also have a positive effect in the subsequent wave. The other two splits show no significant differences compared to the "SOEP classic" group. The split in German and immigrant households reveals differences between the two groups. There is an effect (p<.05) of the two cash incentives on response rates among the immigrant households, while incentives do not have a significant impact on response rates among the German households. Again, overall response rates are higher among the German households. We have omitted the analysis of the effects of the incentive groups from 2009 on the five response pattern groups for 2010 because those groups show no significant differences with regards to overall response rates and response rates among the German households. Additionally, the number of immigrant households in the gross sample is so small that significance tests for differences in response patterns are not very meaningful for 2010.

A first finding is that the two cash incentives demonstrate some significant effects on the response rates. All significant effects of incentives on response rates that are observed are positive compared to the classic SOEP incentive.

Experiment in the Non-response Study

Another addition to sample I in 2009 was a follow-up survey for non-respondents. Since the number of non-respondents was higher in recent SOEP samples, it is more important to gain information about them. A brief follow-up survey was implemented for all 3,248 households that did not respond to the main survey for different reasons. 33 households stated that they did not want to be contacted again. Therefore, the gross sample for the follow-up survey included 3,215 households, of which 2,499 were refusals, 204 were unable to participate, and 512 could not be contacted in the main survey.

The households that refused to participate in the main survey were divided into three groups (see Table 11). The first group served as control group and, therefore, no incentive was offered. Within

the other two groups cash incentives were offered (€5 in group two and €15 in group three). The hard and soft refusals were disproportionately distributed among the three groups according to a 2:2:1 ratio. We expected a higher response rate for the third group. The households that were unable to participate or could not be contacted were divided equally between two of the three groups only (the control group and the group with the €5 incentive) due to small group sizes. If they had been split into three groups, the number of households would have become too small to draw valid statistical conclusions. The households were randomly assigned to the groups.

The distribution of the different types of non-respondent across the three incentive groups as well as the corresponding response rates of the follow-up survey are displayed in Table 11.

Table 11: Follow-up response rates by response pattern from the main survey and by incentives splits

Non-respondents in the main survey	Overall	Incentive splits in the follow-up survey		
		No incentive	€5	€15
Hard and soft refusals (N)	2,499	999	999	501
Response rate (%)	14.05	12.31	13.91	17.76
Unable to respond	204	102	102	-
Response rate (%)	11.76	11.76	11.76	-
No contact (N)	512	256	256	-
Response rate (%)	16.41	14.84	17.97	-
Overall (N)	3,215	1,357	1,357	501
Response rate (%)	14.28	12.75	14.52	17.76

Source: SOEPv28

Table 12 shows the effects of the different incentives on the response rates. The incentives were tested using two regressions, with the "no incentive" group serving as control group. First, we used the response rate of the hard and soft refusals as a dependent variable and the three incentive splits as an independent variable by using dummy variables for each incentive split. Second, we estimated a regression model with the overall response rate as a dependent variable (taking into account all types of non-response) and the control group and the €5 incentive group as an independent variable (the households which received the €15 incentive were excluded).

Table 12: Control group response rates in the follow-up survey compared to incentive splits by different response pattern in the main surveys

	Overall		Incentive splits in the follow-up survey		
	N	%	No incentive	€5	€15
Hard and soft refusal	2,499	14.05	12.31	*1.60*	*5.45****
Hard and soft refusal, inability and no contact	2,714	13.63	12.75	*1.77*	-

The level of significance is indicated by * for p<.1, ** for p<.05 and *** for p<.01.
Source: SOEPv28

The €5 incentive shows no significant effect on the refusals and on the overall response rate in the non-response study. The €15 incentive shows a significant positive effect ($p<.01$) on the response rate of the hard and soft refusals of the main survey.

Longitudinal Experiment

In 2011, the SOEP tested the effect of monetary incentives in a sample of experienced panel households. These households participated in the survey for between 5 and 27 years before they were offered cash incentives for the first time. The longitudinal experiment is an important addition to the cross-sectional experiment, since the effects of incentives in a panel study could be influenced by panel conditioning effects. The introduction of an incentive in an ongoing panel has shown positive effects on retention rates due to higher respondent loyalty (e.g., Laurie 2007). However, since a panel will have already suffered from attrition after wave 1, it may differ from an initial sample, such as sample I in the cross-sectional experiment. Therefore, respondents may react differently to an incentive (Laurie and Lynn 2009).

To conduct the experiment, a sample of 1,618 households was drawn and a random assignment was implemented dividing the sample into a control group and a treatment group.[18] The households of the control group received the standard non-monetary incentives, "SOEP classic" (i.e., a lottery ticket sent with the letter announcing the next wave). The treatment group was also offered a conditional monetary incentive as a top-up. This cash top-up component is equivalent to the "high cash" set-up in the cross-sectional experiment, where each household receives €5 for the completed household interview and each respondent is given €10 for the personal or youth interview (see also Table 3). The cash incentive was paid by the interviewer immediately after the interview. For the random assignment, the households were categorized based on three dimensions: single-respondent vs. multi-respondent households; partial unit non-response households (PUNR) vs. households with no non-respondents; and an interview mode variation (face-to-face vs. mail). In addition, the cases for each interviewer were equally divided according to these types of household—e.g., if an interviewer was assigned two face-to-face single households, one was assigned to the treatment and the other to the control group. This design avoids interviewer and mode effects as confounding factors of the estimated treatment effect of monetary incentives.

Although the experiment was conducted in 2011, the distribution of the control and treatment group had to be made based on data collected in 2009 since a finalized sample for 2010 was not available at the time of the interviewer assignment. Each of the six groups described above was evenly distributed among treatment and control. Based on the 2009 data, the treatment and control groups consisted of 1,618 households. However, several developments over time changed the gross sample: eleven households had dropped out in 2010 due to a hard refusal and an additional three households became ineligible during this time. Due to these changes, the six groups are not uniformly distributed across the control and treatment groups (see Table 13).[19] In 2010, the distribution of PUNRs was also

[18] The variable BBINCKONTR in the dataset "*bbhbrutto*" allows to identify households of the control and treatment groups.

[19] In 2010, there were 92 households (46 in the control and 46 in the treatment group), that did not participate due to soft refusals. Those households were re-contacted in 2011 and are, therefore, included in the sample.

slightly different than in 2009 and in 2011, several households had changed from single-respondent to multi-respondent households (and vice versa).

The actual distribution across the control and the treatment groups in relation to the household characteristics can be seen in Table 13 (columns 1, 2, and 3) with the information on single-respondent or multi-respondent household from 2011, the information on partial unit non-response from 2010, and the information on the interview mode based on the interviewer assignment in 2009 by TNS Infratest. The table also displays the response rates in the control group (column 4) and their differences compared to the response rates of the treatment group. Similar to the analyses for the cross-sectional experiment, the significance levels of these differences are calculated on the basis of several regression models in which the response rate for each of the six groups serves as the dependent variable and the two incentive groups serve as independent variables. The control group serves as the reference category in these regression models. The results of the regression show no significant effects of the incentive treatment on the response rates, as differences in response rates between the treatment group and the control group do not reach conventional levels of statistical significance.

Table 13: Distribution of household characteristics and response rates across treatment and control groups

Household characteristics	Observations (N)			Response rate (%)	Difference (Δ%)
	Overall	Control group	Treatment group	Control group	Treatment group
Single-respondent household, face-to-face	401	199	202	93.47	*0.59*
Single-respondent household, mail	177	85	92	72.94	*8.58*
Multi-respondent household, face-to-face, no PUNR	519	260	259	94.62	*1.14*
Multi-respondent household, mail, no PUNR	160	84	76	88.10	*1.38*
Multi-respondent household, face-to-face, with PUNR	170	85	85	91.76	*0.00*
Multi-respondent household, mail, with PUNR	177	88	89	73.86	*-6.45*
∑	1,604	801	803	88.76	*0. 78*

The level of significance is indicated by * for p<.1, ** for p<.05 and *** for p<.01.
Source: SOEPv28

For a more detailed analysis, we split the respondents and non-respondents into five groups, as we did in the analyses for the cross-sectional experiment.[20] Table 14 displays the distribution of the five groups in relation to the control and treatment groups. Given that the "no contact" group is naturally very small (since all households already participated in the SOEP), we cannot test the effects of the incentive on "no contact".

[20] It is important to distinguish between the household characteristic PUNR in Table 13, which is derived from the 2010 household set-up, and the result code "partial unit non-response" from the 2011 field work as one of the five groups.

Table 14: Control group response pattern and differences compared to the treatment group

	Overall		Control group (%)	Treatment group (Δ%)
	N	%		
1. No contact	2	0.12	0.12	-
2. Hard refusal	120	7.48	7.49	*-0.02*
3. Soft refusal and inability	52	3.24	3.62	*-0.76*
4. Partial unit non-response	270	16.83	18.48	*-3.28**
5. Household complete	1,160	72.32	70.29	*4.06**
	1,604	100.00		

The level of significance is indicated by * for p<.1, ** for p<.05 and *** for p<.01.
Source: SOEPv28.

The incentive treatment has a significantly negative effect on partial unit non-response (p<.1). Furthermore, the differences between the control and treatment groups are negative for "hard refusal" and for "soft refusal and inability". Only the difference for the "household complete" category is positive. Compared to the control group, there are 4.1% more completed households in the treatment group. Therefore, as a net effect, it can be assumed that the treatment motivated households from the "partial unit non-response" group to "defect" to the completed households group.

To test the effect of the incentive for the different household characteristics, we estimated regressions for each of the four response pattern categories as a dependent variable and the control and treatment group as an independent variable. Tables 15, 16, and 17 display the results for the three characteristics, face-to-face vs. mail, multi-respondent vs. single-respondent households, and no PUNR households vs. PUNR households. Each of the three tables provides estimates from eight regression models as we used the control groups of the corresponding contrasting group characteristics as a reference category to increase readability. Table 15 presents the following information: In the first four regression models, the control group in the face-to-face mode serves as a reference category. The difference between the treatment group and the control group for households with the face-to-face treatment characteristic is displayed in the fourth column. In the second four regressions, the control group in mail mode serves as a reference category. The results are displayed in the last column of the table. The different regressions have the advantage that the sample size is always as large as possible and that the regression models also reflect the difference between the group characteristics.

Table 15: Control group response pattern in 2011 and differences compared to the treatment group in relation to interview mode

	Overall		Face-to-face		Mail	
	N	%	Control group	Treatment group	Control group	Treatment group
1. No contact	2	0.12	0.18	-	0.00	-
2. Hard refusal	120	7.48	3.31	*-0.38*	16.34	*0.78*
3. Soft refusal and inability	52	3.24	2.76	*-0.19*	5.45	*-1.95*
4. Partial unit non-response	270	16.83	15.44	*-2.44*	24.90	*-5.06*
5. Household complete	1,160	72.32	78.31	*3.19*	53.31	*5.84*
	1,604	100.00				

The level of significance is indicated by * for p<.1, ** for p<.05 and *** for p<.01.
Source: SOEPv28.

Table 15 shows no significant treatment effects, but the differences between the interview modes are substantial, as revealed by regressions not displayed here. The mail mode leads to significantly more hard (p<.01) and soft refusals (p<.05) and to significantly more households with "partial unit non-response" (p<.01). Furthermore, the mail mode results in a significantly smaller number of completed households than the face-to-face mode (p<.01).

The following Table 16 displays the equivalent regression models for the differentiation between multi-respondent households and single-respondent households. Among the single-respondent households, partial unit non-response is, of course, impossible, therefore regressions are not estimated in this case.

Table 16: Control group response pattern in 2011 and differences compared to the treatment group in relation to multi-respondent vs. single-respondent household

	Overall		Multi-respondent household		Single-respondent household	
	N	%	Control group	Treatment group	Control group	Treatment group
1. No contact	2	0.12	0.00	-	0.35	-
2. Hard refusal	120	7.48	6.96	*1.48*	8.45	*-2.67*
3. Soft refusal and inability	52	3.24	3.48	*-1.12*	3.87	*-0.13*
4. Partial unit non-response	270	16.83	28.63	*-4.66***	-	-
5. Household complete	1,160	72.32	60.93	*4.30*	87.32	*2.81*
	1,604	100.00				

The level of significance is indicated by * for p<.1, ** for p<.05 and *** for p<.01.
Source: SOEPv28

In Table 16, the only significant difference that emerges is between the households with partial unit non-response among the multi-respondent households (p<.05). The cash top-up component leads to a smaller group of households with partial unit non-response. It appears that a remarkable number

of respondents from that group defects to the group of hard refusals and complete households due to the incentive.

Table 17 displays the differentiation between households with vs. without partial unit non-response before conducting the experiment (PUNR vs. no PUNR) in 2010. The table shows the distribution after the single-respondent households were excluded (N=1,026), response rates, and the results of the regressions.

Table 17: Control group response pattern in 2011 and differences compared to the treatment group in relation to households with partial unit non-response vs. households with no partial unit non-response 2010

	Overall		No PUNR 2010		PUNR 2010	
	N	%	Control group	Treatment group	Control group	Treatment group
1. No contact	0	0.00	0.00	-	0.00	-
2. Hard refusal	79	7.70	2.62	*0.67*	15.61	*2.78*
3. Soft refusal and inability	30	2.92	4.36	*-1.97*	1.73	*0.56*
4. Partial unit non-response	270	26.32	5.81	*-2.83*	73.99	*-9.62****
5. Household complete	647	63.06	87.21	*4.13**	8.67	*6.27**
	1,026	100.00				

The level of significance is indicated by * for p<.1, ** for p<.05 and *** for p<.01.
Source: SOEPv28

Among the households with "PUNR" in 2010, the cash top-up component has a significantly negative effect on the partial unit non-response group in 2011 (p<.01) and a significantly positive effect on the number of completed households (p<.1). However, the differences in the "hard refusals" and the "soft refusals and inabilities" are also positive. Therefore, the significantly smaller number of households with partial unit non-response not only leads to more completed households but also to more refusals. In the households without PUNR in 2010, the cash top-up incentive has a positive effect on the complete households.

A comparison of households with vs. without PUNR in 2010 based on additional regressions not displayed here reveals a significantly higher number of hard refusals (p<.01) and a smaller number of soft refusals (p<.1) among the households with PUNR in 2010. As expected, households with PUNR in 2010 revealed more frequent partial unit non-response in the subsequent wave of the panel than households without PUNR in 2010.

Conclusion

The present paper describes two incentive experiments conducted in the SOEP. First, results are presented on the potential effects of incentives on response rates. Since the decline in response rates is a matter of international concern, and incentives are increasingly being recommended as survey design features to help improve response rates, it is important to test whether the SOEP really benefits from incentives.

The results of the experiments provide useful information regarding the effects of monetary incentives on cross-sectional and longitudinal response. Whenever we find significant effects of monetary incentives on response rates, they are positive compared to the classic SOEP incentive, i.e., a charity lottery-ticket. The two cash incentives in the cross-sectional experiment led to higher response rates. A detailed analysis of five response pattern categories revealed that both cash incentives, and the choice incentive, resulted in a higher rate of completed households. Separate analyses for German and immigrant households highlighted differences between these subsamples. While only the low cash incentive has an effect on German households' response rates, both cash incentives influenced immigrant households' participation. Specifically, both cash incentives resulted in a decline in the number of immigrant households that could not be contacted. Additionally, the low cash incentive reduced partial unit non-response, and both the high cash and the choice incentive increased the rate of completed households (i.e., every eligible member participating). The separate analyses for German and immigrant households also show that a monetary incentive has a positive effect on the immigrant households' participation in subsequent waves. This is of particular importance as immigrants' response rates are particularly low (e. g., Deding et al. 2008, Fesken et al. 2004).

With regard to the regions where the households are located, the high cash incentive has a positive effect on response rates in provincial towns and rural areas. This could mean that incentives improve the response rates of an already overrepresented subsample as both previous studies (e.g., Groves and Couper 1998, Robinson and Godbey 1997) and also our own analyses revealed higher participation rates among sample units from rural areas and lower contact rates among residents of large cities.

A follow-up survey among the non-respondents of the cross-sectional experiment showed that an incentive of €15 has a significant positive effect on the response rate of households that refused to participate in the main survey.

The longitudinal experiment revealed that the incentive treatment decreased the rates of partial unit non-response. This brings us to the conclusion that monetary incentives motivate refusing members of participating households from a previous wave to participate in the current wave. Nevertheless, no significant effects of the incentive treatment on households that refused in the previous wave could be observed. In addition, the significantly smaller number of households with partial unit non-response resulting from the incentive not only leads to a higher number of completed households but also to more refusals. Therefore, it is questionable as to whether the observed incentive effects are desirable. The impact of incentives on refusing members of participating households must be analyzed further, as an improvement in response rates is only beneficial if it is not associated with a decline in survey data quality. This would be the case if incentives were to improve participation without improving respondents' motivation to provide high quality responses. Further analyses are required to test whether converted refusals provide data that is of the same quality as of loyal panel members.

As well as incentive effects, the longitudinal experiment revealed a substantial difference between the two interview modes, mail and face-to-face. The mail mode leads to significantly more refusals and to significantly fewer completed households, as already observed in a meta-analysis of different studies comparing the effects of the interview mode on response rates (Hox and De Leeuw 1994).

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