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# Short-term and long-term effectiveness of refusal conversion in the Swiss Household Panel

## - Master thesis -

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Short-term and long-term effectiveness of refusal conversion

## Abstract

In the survey world of decreasing response rates, refusal conversion is widely used strategy to increase participation. Although often employed, not a lot is known about its effects, especially in longitudinal surveys. Studies so far focused mainly on cross-sectional surveys and the effects that refusal conversion has on non-response bias. This study examines both cross-sectional and longitudinal effects of refusal conversion on participation rates, survey estimates, measures of change over time and data quality, using eleven waves of the Swiss Household Panel (2005-2015). We show that refusal conversion in the Swiss Household Panel brings benefits to the study in terms of increasing short-term and long-term participation rates. We also show that it has significant and persistent longitudinal effects on survey estimates. Finally, we demonstrate that refusal conversion compensates for loss due to attrition and diversifies the group of respondents by including more dynamic households and individuals. Even though the responses from converted respondents might come at the expense of lower data quality, we argue that refusal conversion is beneficial for the Swiss Household Panel.

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## 1. Introduction

### 1.1 Problem Formulation

Nowadays it seems impossible to be part of the survey world and not to encounter the problem of declining response rates. In order to obtain or maintain response rates as high as possible, survey researchers use different techniques such as sending incentives, sending reminders, prolonging the fieldwork period or trying to convert those who initially refused to participate in the survey (Burton, Laurie & Lynn, 2006).

Refusal conversion entails re-approaching those who initially refused to participate in order to convince them to reconsider their decision and eventually to take part in the survey. The importance of refusal conversion research becomes evident if we take into account the fact that the percentage of refusal converted respondents in some surveys tripled in last ten years (Hall, Brown, Nicolaas & Lynn, 2013). According to Curtin, Presser and Singer (2000), in the *US Survey of Consumer Attitudes*, the number of reluctant respondents as a proportion of all respondents more than doubled from 1979 (7%) to 1996 (15%). Similar trend of increase in the number of final respondents obtained by refusal conversion was reported in the *American National Election Study* – by 1992 only 2% of final respondents were refusal converted, while by 2000 the percentage increased to 15% (Stoop, Billet, Koch & Fitzgerald, 2010). In the *European Social Survey*, such a procedure accounted for up to a 12% increase of the total response rate (Billet & Matsuo, 2012). It is argued that by increasing response rates, refusal conversion can improve representativity of the surveyed sample estimated by the R-indicator (Calderwood, Plewis, Ketende & Mostafa, 2016).

Apart from its effects on response rate, refusal conversion is used in studies on nonresponse bias (Stoop, 2012). In general, it is assumed that through increasing response rates refusal conversion would reduce non-response bias (Stoop, 2012). However, the assumption is not an empirically proven fact and the support for it is rather ambiguous (Stoop et al., 2010). Furthermore, studies on relationship between refusal conversion and measurement error show that refusal converted individuals have higher item non-response rates compared to those who initially cooperated (Kreuter, Müller & Trappmann, 2010; Yan and Curtin, 2010; Lipps, 2011). An additional disadvantage of refusal conversion is that prolonged fieldwork efforts increase the costs of the study. Calderwood et al. (2016) mention that costs of an interview achieved by refusal conversion is over three times as high as the

one obtained during regular fieldwork. However, the estimation is based on face-to-face surveys and it is not clear whether this is also the case with telephone surveys where contacting targeted persons is relatively cheap (Stoop, 2012).

Refusal conversion is particularly interesting from the ethical point of view. Interviewing practices are limited by a number of ethical principles that should be followed so that targeted respondents are respected. Those principles prescribe days during the week and time during the day for making contacts, as well as the maximum number of contact attempts.[1] Prescribed principles ensure that the sampled members are provided detailed information about the survey, that they are not harassed and that they are aware that their participation is on a voluntary basis. However, when it comes to the practices directed toward maximizing cooperation (increasing response rates), we can question whether insisting for cooperation upon establishing contact is a kind of moral pressure that interviewers, as agencies' and researchers' representatives, put on the respondents. The question is particularly relevant when it comes to the refusal conversion samples where insistence on participating is present even upon initial refusing to cooperate. Stoop et al. (2010) argue that empirical evidence suggest that the process of refusal conversion should not be considered as unethical since reluctant individuals or initial refusals do not feel harassed by a second request and cooperation rates are rather high after a refusal conversion attempt. The author suggests that additional efforts to interview specific person should be taken as "a sign of seriousness of the study and of a real interest in the opinion of the targeted person" (ibid, p.200) rather than as harassment. It seems that in the repot by AAPOR (Dutwin, Loft, Darling, Holbrook, Johnson, Langley, Lavrakas, Olsen, Peytcheva, Stec, Tripett & Zukerberg, 2014, p.10), the ethical dilemma is solved by differentiating "soft" and "hard" refusals: "a hard refusal means that no further contact will be made whereas a soft refusal may be considered for some type of refusal."

There is not a large body of literature on refusal conversion and even less is known about the effects of refusal conversion in longitudinal surveys. Although there are some studies on refusal conversion in longitudinal surveys (Burton et al., 2006; Haring, Alte, Völzke, Sauer, Wallaschofski, John, Schmidt, 2009; Lips, 2011; Calderwood et al., 2016), they were mostly limited to retention and non-response bias and almost none of them thoroughly examined longitudinal difference between initial participants and converted

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[1] More information about regulations in Switzerland is available on the webpage of Swiss Association of Marketing and Social Research, https://www.vsms-asms.ch

refusal nor how refusal conversion affects the measurement of change over time. One of the main advantages of longitudinal data is that they offer the possibility to observe and analyse change over time. So far it is not known whether refusal conversion improves the measurement of change; in other words, whether initial refusals, who are at the end convinced to take part in the survey, make a difference in our estimates of change.

This study looks at refusal conversion in *the Swiss Household Panel* (SHP), an ongoing Computer Assisted Telephone Interview panel survey, conducted every year since 1999 on a representative sample of households in Switzerland. Since the very beginning, refusal conversion has been part of the measures the SHP takes to increase response rates (Voorpostel, Tillmann, Lebert, Kuhn, Lipps, Ryser, Schmid, Antal, Monsch & Wernli, 2016). However, data on refusal conversion have only been recorded since 2005. So far, data on refusal conversion have been analysed only in 2011 (Lipps, 2011) for the five waves available at the time. The focus of Lipps' study was on the determinants of refusal conversion attempts and outcomes, on the effects that refusal conversion had on sample size, sample composition and data quality, both on the household and the individual level. In our study, we advance on previous work by observing longer time periods. Also, this study goes further with the aim to examine longitudinal effects of refusal conversion in the SHP and to assess the impact that refusal conversion has on observed change across 11 waves of the SHP, from 2005 to 2015.

## 1.2 Research Questions

This study examines the extent to which households and individuals successfully converted at any wave of the SHP affect participation, features of the sample and survey estimates. More precisely, we are interested in the following:

1. *What is the impact of refusal conversion on cross-sectional and longitudinal participation rates in the Swiss Household Panel?*

2. *To what extent does refusal conversion compensate for the loss caused by attrition in the Swiss Household Panel? In other words, are converted refusals different from nonrespondents and those who never needed to be converted in terms of household characteristics and socio-demographic characteristics?*

3. *What is the impact of refusal conversion in the SHP in terms of:*

a. *estimates of variables of interest for researchers (such as variables measuring financial situation, satisfaction with different aspects of life and social trust and interest), both cross-sectionally and longitudinally?*

b. *measures of change over time?*

c. *quality of provided responses?*

## 2. Theoretical and Empirical Background

### 2.1 Refusal conversion – definition and common practice

The encyclopaedia of survey research methods (Lavrakas, 2008) offers the following definition of refusal conversion: "Refusal conversions are the procedures that survey researchers use to gain cooperation from a sampled respondent who has refused an initial survey request. Refusal conversion may include different versions of the survey introductions and other written scripts or materials (e.g. cover letters), study contact rules, incentives, and interviewer characteristics and training. This is a common procedure for many surveys, but it requires careful consideration of the details of the refusal conversion efforts and the potential costs versus the potential benefits of the effort". Hence, refusal conversion entails re-approaching those who initially refused to participate in order to persuade them to take part in the survey.

Although most commonly members that participated after an initial refusal are called converted refusals, in literature they are also referred to as "difficult respondents", "hard-to-get respondents" (Lynn & Clarke, 2002), "reluctant respondents" (Green, 1991), "slow-to-respond participants" (Ullman & Newcomb, 1998). However, the latter categories, besides converted refusals, might include other respondents who never refused to participate, but needed additional or prolonged fieldwork efforts i.e. needed to be approached multiple times or persuaded to participate upon initial hesitation. In this study we will mostly use category "converted refusals"; however, other categories might be used sometimes as well.

According to Groves and Couper (1998, p.30-31), participation in surveys is influenced by three different groups of factors: a. features of the population of the study (economic conditions, survey-taking climate, neighbourhood characteristics, availability) that are outside of researchers' control; b. survey design (topic, mode of administration, respondent selection) that is under researchers' control, and c. specific interaction between the interviewer and the sample members as the occasion when the two other groups of factors come to bear.

In all of these factors lay reasons for refusal as well. If a sampled member refuses to participate due to particular ongoing circumstances when contacted by an interviewer, for example being busy at the moment, he or she might be contacted on a different occasion by the same or a different interviewer under consideration that the circumstances that led to

refusal are no longer relevant (Calderwood et al., 2016). As argued by Stoop, refusing to participate in a survey is not always seen as a permanent state – despite refusing to take part in certain circumstances, in other circumstances the decision might be different as well (Stoop, 2012). When the reason for refusal stems from the mode of administration, offering another mode could result in participation of sampled members that would otherwise remain non-respondents.

Although there are several procedures that could be employed for refusal conversion, the most common one in practice, at least according to the studies reviewed in this paper, entails re-approaching sampled members by different and usually more experienced interviewers since they tend to achieve higher response rates (Groves & Couper, 1998, p. 211-214). Re-approaching with different interviewers is based on the assumption that the initial refusal was a consequence of the interaction with the previous interviewer; therefore, an interaction with a new interviewer will be different and potentially more successful.

Studies published so far have tackled various questions of refusal conversion: success rates (Retzer, Schipani & Cho, 2004; Stoop, 2004; Calderwood et al., 2016); effects on sample composition (Stoop, 2004), relation to nonresponse bias (Lynn and Clarke, 2002; Billet, Philippens, Fitzgerald and Stoop, 2007), measurement error (Keeter, Miller, Kohut, Groves and Presser, 2000; Billet & Matsuo, 2012; Olson, 2013), item non-response (Caroll &Chong, 2006; Olson, 2013), factors that explain conversion success (Fuse and Xie, 2007), effects of elapsed time between the initial refusal and refusal conversion attempt (Beullens, Billet and Loosveldt, 2010) and the effect of incentives (Stoop, 2005). In the following sections, we will focus on the findings related to conversion rates, reduction of bias, measurement error as well as findings related to panel studies since those are the most relevant for our research.

## 2.2 Refusal conversion, conversion rates and response rates

Conversion rates and the contribution of refusal conversion to overall response rates vary among surveys. The effect of refusal conversion on response rates is a combination of the initial refusal rates, the number of re-approached refusals and the number of those who participated after being converted (Stoop et al., 2010).

On the example of the European Social Survey (ESS), Stoop et al. (2010) showed that the need for refusal conversion and the opportunity for it to be successful varied from one

country to another: for example, relatively high rates of initial refusals in Switzerland and the Netherlands (47% in both countries) resulted in a higher effect of refusal conversion on total response rates while on the other hand, low rates of initial refusals in the Czech Republic (11.2%) resulted in a weak contribution of refusal conversion to overall response rates (the increase in total response rates was less than 1%). In general, successful refusal conversion accounted for around 1% to 10% increase in total response rates in the ESS, except for the Netherlands where the increase was almost 18%. Lynn, Clarke, Martin and Sturgis (2002) analysed six UK face-to-face surveys that were conducted between 1995 and 1998 and concluded that the share of interviews completed thanks to refusal conversion among all completed interviews was between 1% and 8%.

However, the extent to which refusal conversion will be successful and therefore contribute to survey response rates depends on many factors, such as the type of survey, the mode of administration and the survey topic (Stoop, 2012). Lynn et al. (2002) showed that proportion of interviews obtained by refusal conversion varies with the survey topic. For example, the proportion of interviews obtained after initial refusal was around 3% in *The Health Survey of England (HSE)*, less than 2% in *The Family Resources Survey (FRS)* and between 2% and 11% in *The British Social Attitudes Survey (BSAS)*.

As judged by Calderwood et al. (2016), converted refusals constitute a "significant minority of completed interviews in many surveys". Higher response rates will contribute to higher precision of survey estimates which does not necessary mean that the nonresponse bias will be reduced. Despite these positive conclusions regarding the effect of refusal conversion on response rates, the situation is not that clear when it comes to the impact that the refusal conversion has on non-response bias. The notion that increased response rates and additional fieldwork efforts reduce nonresponse bias has recently been called into question (Roberts, Vandenplas & Ernst Stähli, 2014). Additional efforts to reach more respondents will result in a reduction of nonresponse bias only when there is an association between survey variables of interest and variables that determine response propensities. In other words, when the same variables determine participation and survey estimates (Groves, 2006; Groves & Peytcheva, 2008, Kreuter et al., 2010).

In the following section, we will discuss the effects that the tendency of survey researches to increase response rates can have on response bias, along with most common approaches to study bias.

**2.3 Refusal conversion and nonresponse bias**

**2.3.1 The Continuum of Resistance Model and The Class Model.** Studies on the effects of prolonged field efforts or refusal conversion on bias of survey estimates implicitly or explicitly rely on two models: *The Continuum of Resistance Model* and *The Class Model*. According to *The Continuum of Resistance Model* (Fitzgerald & Fuller, 1982; Lin & Schaeffer, 1995; Haring, Alte, Völzke, Sauer, Wallaschofski, John and Schmidt, 2009), there is a continuum that differentiates sampled members based on their resistance to participate; on one side of the continuum there are those who accept to participate upon the first contact, easy respondents, while those who do not participate are placed on the other side, nonrespondents. The model assumes that the more effort it takes to make a person participate, the more similar this person is to nonrespondents. Therefore, recruiting those who demand more fieldwork effort should decrease bias because respondents who are similar to nonrespondents are incorporated in the study. Based on a similar logic, *The Class model* (Stinchcombe, Jones & Sheatsley, 1981; Smith, 1984; Haring et al., 2009) distinguishes between different group of participants and non-respondents. The Model differentiates between several types of nonrespondents - unwilling to participate (refusals), difficult to contact (non-contacts), nonrespondents related to characteristics of the survey such as topic and burden or to situational characteristics such as lack of time or illness (Billet et al., 2007). Based on the model, converted refusals are considered as proxies for those who did not participated due to refusal, while reached at the later stage of the fieldwork are considered as proxies for those who did not participate because they were not contacted.

Hence, the most common practice for examining the effects of refusal conversion on bias in surveys is to compare the group of respondents who participated in the survey with the group of respondents who were refusal converted. Although theoretically reasonable, studies showed that hypotheses proposed by the two models are not supported (Fuchs, Bossert & Stukowski, 2013). Stoop (2004, p.50) showed that converted refusals are different from both cooperative respondents and from refusals were not converted. Similarly Billet et al. (2007) and Haring et al. (2009) find no clear support for neither of the two models. We assume that the reason for it lies in multifaceted nature of participation in the surveys, as well as lack of exclusivity of model categories. That is, individuals can belong in the same time to the group of those who are unwilling to participate and the group of those who are busy or ill.

In the following lines, we will present several approaches to studying nonresponse bias in the context of refusal conversion employed in survey research so far.

**2.3.2 Different approaches of studying bias.** There are several approaches to estimate potential reduction of nonresponse bias in surveys. Here we present most relevant ones for our study: refusal rate vs. conversion rate; the R-indicator; using administrative data; estimate of marginal bias; comparing distributions of those initially interviewed, converted refusals and non-converted refusals.

*Refusal rate vs. conversion rate.* The idea of this approach is to calculate the refusal rate as the ratio between eligible sampled members that refused to participate and all eligible sampled members. It is assumed that potential bias is reduced if the groups with high refusal rates have higher conversion rates. Conversely, low refusal rates followed by high conversion rates are likely to increase bias. This approach is employed by both Burton et al. (2006) and Calderwood et al. (2016). Burton et al. (2006) show that women were less likely to refuse and more likely to be converted, which exacerbates the bias in terms of sex. The same was true for those who are divorced or separated, as well as for those not in payed employment. On the contrary, bias was reduced in terms of region and payed employment. Analysing correlation between refusal rates and conversion rates, Calderwood et al. (2016) reported relatively high rates of refusal for individuals with lower educational qualifications, those who are not in labour market, individuals in poor health, lone parents and those who did not vote in the last election. In these groups conversion rates were also high; therefore, potential bias was reduced.

*The Representativity Indicators (R-indicator) approach.* The R indicator measures "the dispersion of estimated response propensies (the probability of taking part in the survey given certain observed attributes) based on available auxiliary data, to assess the extent to which the responding sample of a survey resembles the complete sample of respondents and nonrespondents" (Roberts et al., 2014, p.68). The R indicator compares the representativity of achieved sample with the representativity of the sample that would have been achieved had refusals not been re-approached or had additional fieldwork efforts not been made to approach those difficult to contact. Calderwood et al. (2016) found that the representativity of the sample decreased from 0.775 to 0.769 when converted refusals were excluded, which means that refusal conversion slightly increased the representativity of the sample and

reduced bias in variables of interest. The authors claim that the effect would be even stronger had all refusals been approached instead of only half of them. Analysing the effects of additional fieldwork efforts on the R-indicator and the *Maximal Absolute Bias* (MAS) associated with it, Roberts et al. (2014) concluded that the efforts were reasonably successful since there was no decrease in the R indicator, nor increase in the MAB as response rates increased.

       ***Using administrative data.*** In the study of Kreuter, Müller and Trappmann (2010) data from German panel study *Labour Market and Social Security* (PASS) were merged with administrative data on four different variables: education, age, employment status and welfare benefit recipiency status. They analysed how values for the mentioned variables obtained at each level of fieldwork effort deviate from the values recorded according to the full sample. Since at each level of fieldwork efforts, the observed values were close to the values of the full sample, the authors concluded that increased fieldwork efforts, with refusal conversion as the final phase, resulted in a decrease of nonresponse bias. However, prolonged fieldwork efforts also resulted in an increase in measurement error.

       ***Estimate of marginal bias.*** Several cross-sectional studies calculate estimates of marginal bias that "would have occurred had extended efforts not been made" (Hall et al., 2013). This approach entails calculating the difference in proportions or means in survey estimates between the total responding sample and the sample of easy respondents. The difference is taken for marginal bias and it is considered significant if there is statistically significant difference between easy respondents and difficult respondents. For example, the mean age for all responding households in HSE was 46.7, for easy-to-get respondents 47.9 and for hard-to-get 40.7 (Lynn & Clark, 2002). The calculated marginal bias was therefore 47.9-46.7=1.2. The marginal bias is considered significant if the difference in mean age between *easy-to-get* and *hard-to-get* (in this case, 40.7 – 46.7) is significantly different from zero. Lynn and Clarke (2002) analysed data from several UK surveys and came to a conclusion that extended fieldwork efforts are justified in terms of bias reduction – reaching those who were difficult to contact resulted in reduced bias for health, attitude and financial variables. However, when it comes to converted refusals, bias was reduced only for financial variables. The study has been replicated by Hall et al. (2013) and ten years afterwards the differences were even more prevalent. Depending on the survey, differences were observed between the groups, such as differences in sex and education (Cottler, Zipp, Robins &

Spitznagel, 1987), age, employment and race (Hall et al., 2013), physical health and income (Etter & Perneger, 1997) and self-rating (Green, 1991).

***Comparing distributions of those initially interviewed, converted refusals and unconverted refusals.*** Almost all the approaches presented above come from cross-sectional studies. This approach is commonly employed in studies that relied on longitudinal surveys since the information from nonrespondents (from unconverted refusals) is available from previous waves. Therefore, we will describe this approach in more details and present findings from studies that employed it in section *2.5 Refusal conversion in longitudinal surveys*.

## 2.4 Refusal conversion and data quality

The question whether data collected from a sample of converted refusals are of the same quality as data collected from a sample of initial respondents has been discussed in several studies so far. In general, it is assumed that higher levels of item non-response or measurement error would be recorded among converted refusals because they are less motivated to think carefully about the questions and their responses (Groves & Cooper, 1998, p.271), less interested in the topic or surveys in general or because of "a 'reaction' against complying with the recruitment request that they had previously declined" (Olson, 2013, p. 137). Less motivated respondents might be more likely to satisfice rather than optimise when answering questions (Krosnick, Miller and Wedeking, 2003). As noted by Keeter et al. (2000, p.143), "reluctance to participate might translate into reluctance to answer certain questions, either because of an unwillingness to reveal one's opinions or disclose details about one's personal situation or because of a genuine inability to answer questions."

Studies on the relation between reluctance to respond and data quality examined several indicators of quality: sensitive questions such as income (Caroll & Chong, 2006), aggregated item non-response (Tripett, 2002), frequency of "don't know" answers (Blair and Chun, 1992) or satisficing (Yan, Tourangeau & Arens, 2004).

In a meta-analysis of studies that examine relation between participation after refusal conversion and item non-response on income-related questions, Olson (2013) finds that all of the seven examined studies find higher item non-response rate on the income question among those who previously refused to participate. For example, Caroll and Chong (2006) report

that converted refusal are more likely than willing respondents to have missing data poverty income ratio, family income and household income.

Analysing data from three different surveys, Blair and Chun (1992) found that converted refusals are more likely than immediate respondents to answer with "don't know". Moreover, overall duration of the interviews with converted refusals was shorter compared to the duration with cooperating respondents. Similarly, higher missing item data rates were recorded among those successfully converted compared to initial cooperates (Yan & Curtin, 2010). The difference in data quality between the two groups was even more prominent when the answering required more cognitive effort (Triplett, Blair, Hamilton & Kang, 1996). On the other hand, Keeter el al. (2000) find no evidence that amenable and reluctant respondents differ in the number of items to which they declined to provide a substantive response. However, when reluctant respondents were split into those who refused only once and those who refused twice, the difference was statistically significant – double refusers had a greater number of item-nonresponse compared to amenable respondents, 3.5 compared to 2.8 items in average, respectively. Although the findings are mixed, more published studies report trends of higher aggregated item missing rates among reluctant respondents (Olson, 2013)

When it comes to satisficing, there is no indication that converted individuals satisfice more than initial cooperates in German and Dutch samples of the European Social Survey (Stoop et al., 2010, p.197-199). Yan, Tourangeau and Arens (2004) also compared converted refusals and immediate participants in terms of five indicators of satisficing (acquiescence, non-differentiated answers, selection of scale extremes, no-opinion responses and selection of middle answers) and concluded that reluctant respondents are not necessarily poorer reporters than easy respondents.

## 2.5 Refusal conversion in longitudinal surveys

So far most of the research on extended fieldwork efforts and refusal conversion has been done on cross-sectional survey designs. Refusal conversion in longitudinal surveys is different in a few aspects compared to cross-sectional surveys. In longitudinal surveys information from many sampled members is available from one of the previous waves, which enables the analysis of differences between those who did not take part in the survey and those who did so despite previous refusal. Another aspect is that refusal conversion in panel studies can happen in both the current wave or one of the previous waves. Respondents that

refused in one of prior waves of the panel might have been intentionally left to "cooldown" before re-approaching in the following waves or fieldwork timing sometimes might prevent them from being re-approached in the same wave in which they refused. Both scenarios are present in the SHP (Lipps, 2011; Dangubic & Voorpostel, 2017). This makes participation patterns rather complex and difficult to study. Therefore, the lack of studies on refusal conversion in panel surveys is not surprising. Whereas in cross-sectional surveys, no other reason than ethical or budget concerns might prevent refusing sample members from being contacted, the decision to make a conversion attempt in panel surveys needs to be weighted between the interest of maximising response rates in an ongoing wave of the panel and the possibility that insisting on participation in an ongoing wave might jeopardize sampled members' participation in the following panel waves (Calderwood et al, 2016).

Refusal conversion, just as any other method of fighting nonresponse, is particularly relevant when it comes to panel surveys. Namely, maintaining high response over time is crucial for the survival of panel studies (Laurie, Smith, & Scott, 1999). Laurie et al. (1999) mention two main reasons for attrition in panels: geographical mobility and refusal, either wave-specific or "a definite withdrawal from the survey altogether". The latter is judged as the most important reason for nonresponse in panel surveys (Lipps, 2009; Lipps, 2012). Panel sample attrition due to refusal over the years can result in convergence toward plausibly biased sample of highly motivated respondents.

While in cross-sectional surveys sample members' decision to participate is influenced by his or her interaction with the interviewer, in longitudinal surveys refusals are related to "the specific experience of taking part in the survey" (Burton et al., 2006). Therefore, over the years, the reasons for refusing in the panel might change. We can assume that being less interested in the survey topic underlines the decision to leave the panel at the very beginning or not to take part in it at all, while panel experience might be the reason to abandon it at the later waves.

Identifying reasons for refusal in different waves of the BHSP, Laurie et al. (1999) found that the propensity of refusing due to the feeling of "being bothered" increased in later waves of the panel (wave four compared to wave three), while propensity of refusing without specifying a reason decreased. The finding indicates a phenomenon named by Laurie as "panel fatigue" where respondents feel that they have *done their share* and withdraw from the survey. The association of these reasons with conversion success is interesting. The respondents who refused due to survey related reasons (predominately the reason of being bored with the survey) were more likely to refuse to participate again after conversion

attempt or to provide only basic information by telephone interview. On the other hand, personal reasons for refusals and the absence of specific reasons led to a greater likelihood of being converted to the full interview. Two findings here are relevant for our study. First, the propensity to refuse due to panel fatigue increases over the years. Second, the refusal due to fatigue in the panel makes the refusal conversion less likely to be successful. We will come back to this point later in *2.2.3.1 History in the panel and subsequent wave participation* and *2.3 Hypotheses*.

   Despite the advantages of a longitudinal design when it comes to the analysis of refusal conversion and its different nature of participation, studies on this topic are relatively scarce. Some of the previous studies on the issue focused only on one survey wave. For example, Ullman and Newcomb (1996) analysed one wave of a longitudinal study with a sample of students from Los Angeles County schools, while Laurie et al. (1999) analysed the fourth wave of the British Household Panel Survey (BHPS). To the best of our knowledge, only three published studies tackled the effects of refusal conversion longitudinally: Burton et al. (2006) analysed the data available from the BHPS, while ten years later Calderwood et al. (2016) followed the example by analysing data available from *Millennium Cohort Study* (MCS) in the UK. Meanwhile, in 2009, Haring et al. examined the influence of extended recruitment efforts on retention rates and bias using data from the German *Study of health in Pomerania*. In the following subheadings, we give a brief summary of their findings.

   **2.5.1 History in the panel and subsequent wave participation.** From the study of Burton et al. (2006) it is evident that a conversion attempt was more likely to fail when the reason for refusal was the experience with the panel (perception that nothing has changed since last year, that questions are too personal and the survey is a waste of time, that they do not want to be bothered) than when the reason was situational inconvenience that impeded participation (being busy, ill family member, looking after children).

   Studying the association between previous wave participation and conversion propensity, Calderwood et al. (2016) found that previous wave participants were more likely to be converted than those who did not participate in the previous wave. Similarly, those who participated in all previous waves they were eligible for, were less likely to refuse and more likely to be converted to fully productive participation (which entails completion of all the questionnaires) than those who skipped some waves in the panel.

   In the British Household Panel Survey, in general less than a half of those who refused went through the conversion process. However, the process varies over the years

depending on the number of refusals and subjectivity of decision making. Over time, the percentage of those who were converted for a full interview substantially decreased in the BHPS – from 16% of converted for a full interview in the wave 4 to 2% of converted for a full interview in wave 13. However, another possible refusal conversion outcome – a short telephone interview – became more likely over the years which resulted in a relatively similar proportion of failed conversion attempts over the history of the panel.

The fact that a person was successfully converted in a specific wave does not guaranty participation in subsequent waves. In the BHPS, between 27% and 61% converted respondents participate in the following wave. However, the percentage of those who participated at any given subsequent wave upon being converted declined over time.

Burton et al. (2006) showed that in the BHPS, in earlier years of the panel, percentages of those who participated in subsequent was twice as big as the percentage reported 10 years afterwards: 55.9% of those converted in wave 4 participated in wave 5, while only 27.8% of those converted in wave 12 participated in wave 13. Even the percentage of those who stayed for 9 years after being converted in wave 4 (40.4%) is much higher than the percentage of those who stayed one year upon being converted in wave 12. The authors concluded that the longer respondents participate before needed to be refusal converted, the less likely they are to remain a responding panel members later on. In other words, those converted in one of the later waves of the panel are less likely to stay responding panel members compared to those converted in one of the earlier waves.

The shortcoming of this and other panel studies is that the fieldwork agency makes a decision who is to be converted, most often based on a subjective judgement of who is likely to be converted. Such a practice is likely to bring in more respondents with similar characteristics to those who initially took part in the survey (Calderwood et al., 2010). Calderwood et al. (2016) conducted an experiment where they looked at the effects of random intensive re-issuing of all refusals compared to standard non-random re-issuing strategy performed by fieldwork agencies. Random intensive re-issuing in their case meant that 50% of all refusals were selected completely at random for refusal conversion. Intensive re-issuing resulted in higher overall proportion of refusals converted (17.3%) than it was the case in the study of Burton et al. (2006), where the equivalent unconditional conversion rate was 13.5%. However, intensive re-issuing did not have a positive effect on sample size at the subsequent wave and the rates of retention in subsequent waves were similar to those in the study of Burton and colleagues.

In the MCS, around 62% of converted refusals fully participated in the following wave, which demonstrates that refusal conversion does not only lead to a short-term increase in sample size (Calderwood et al., 2016). Similar percentages are reported for BHSP, where in earlier years around 60% of converted refusals participated in the following wave, while over the years the percentage declined and reached around 30% for the last reported wave (Burton et al., 2006).

**2.5.2 Longitudinal approach to nonresponse bias.** It is important to highlight here that refusal and attrition in panel surveys is not a problem in itself; it becomes a problem when specific groups of people who are different leave the survey - when *dropping out* is not at random. In her study on attrition in the SHP, Voorpostel (2010, p.374) showed that "response in the SHP can be concluded to be somewhat selective, both with respect to demographic characteristics as well as with respect to characteristics related to social involvement". Nonrespondents are less socially active and less involved in society, they are more likely to be younger, male, lower educated and unemployed, in poorer health, less likely to be married and home owners (ibid).

Refusal conversion in panel surveys is expected to reduce or eliminate biases created by attrition. As already discussed, when studying the effects of refusal conversion on response bias, unlike cross-sectional designs, longitudinal designs offer the opportunity to not only compare both mentioned groups, but also to compare them with non-respondents - those who dropped out in a certain wave by taking into account available information from the previous waves.

A common approach in studying effects of refusal conversion on nonresponse bias is to compare distributions of those initially interviewed, converted refusals and non-converted refusals. Studies of refusal conversion in both BHSP and MCS employed this approach in estimating bias reduction. As explained by Calderwood et al. (2016, p.231) the rationale is the following: "If (i) the distributions for converted refusals and the initially interviewed are different and the distributions of unconverted refusals and the initially interviewed are the same or (ii) the distributions of both converted and unconverted refusals are different from the distributions for those initially interviewed, this indicates that there is potential bias in the survey estimates for this variable and that the refusal conversion attempts are likely to have led to a reduction in this bias. Conversely, if the distributions of converted refusals and the initially interviewed are similar, and the distributions of unconverted refusals and the initially interviewed are different, this indicates that there is bias in the survey estimates for this

variable and that refusal conversion attempts are unlikely to have led to a reduction in this bias. If the distributions of both converted and unconverted refusals are similar to the distribution of the initially interviewed, this indicates that there is little or no bias in the survey estimates for this variable".

Applying this approach, Burton et al. (2006) conclude that in terms of sex, marital status, employment, political preferences and total income refusal conversion does not seem to reduce refusal bias since converted respondents are more similar to initial respondents than to refusals. On the other hand, bias seems to be reduced in terms of regional distribution, qualifications, the proportion of self-employed, housing tenure and labour income.

In the study of Calderwood et al. (2016), significant differences in distribution between initial respondents and unconverted refusals in terms of education, employment status, ethnic group and family type and absence of significant differences in distribution between converted refusals and initial respondents for the same variables indicates that refusal conversion did nothing or little to remove bias in these variables in MCS. On the other hand, different distributions for all the three groups in terms of household tenure and voting showed that bias was reduces on these variables, while lack of any difference for health variables indicates the absence of bias. In the same study, although ethnicity of initial participant was different for unconverted refusals, it was similar to converted refusals which indicates that the "refusal conversion process may have introduced or exacerbated existing bias for this variable" (ibid, p.232).

By comparing converted individuals with those who always participated and those who dropped out from the SHP, Voorpostel (2010) concluded that refusal converted group "balanced the sample" and helped to reduce the nonresponse bias since it was more likely to include males, less likely higher educated and more likely employed or unemployed people.

**2.5.3 Measures of change.** A distinctive characteristic of panel surveys is that they follow the same individuals over time in order to follow transitions, trends or developments. Although longitudinal studies are designed with the specific aim to observe change over time, surprisingly little attention is payed to the relation between change and panel attrition, while the relation between change and extended fieldwork efforts is almost completely neglected.

Voorpostel and Lipps (2011) found that reported change is likely to be followed by either temporary of permanent non-cooperation of individual household members. Although weak, significant effects are found for change in political interest, change in satisfaction with living arrangements and change in satisfaction with one's finances.

Since converted refusals are successfully prevented from dropping out, we could expect that they will be the group who experience more change compared to initial respondents.

In the study of Burton et al. (2006) the group of those who initially participated was compared to those who were refusal converted in terms of retrospective change in total monthly income and employment transition. Without thorough discussion, the authors concluded that, on these variables, converted refusers were more similar to respondents than to refusers, therefore bias was not reduced. Still, it can be seen from their findings that the income change of converted refusals (143 units), although not as high as the one of refusers (188.7 units), is significantly higher than the income change of the respondents group (127 units). Moreover, the respondents group seemed to be more stable, since a significantly higher percentage of initial respondents (93% compared to 90.2% in converted refusers group) stayed employed throughout the waves. A relevant aspect is that in the study of Burton et al. (2006) measures of change were treated retrospectively. Since we do not have any knowledge on changes succeeding refusal conversion, it would be useful to examine this aspect as well. The findings from the presented study might be a good indication that converted refusals are a more dynamic group and that more change might be observed in this group. This assumption is worth examining.

**2.3 Hypotheses**

In this subchapter, we write expectations for our study. In order to make the reading more comprehensible and with risk of being redundant, we repeat each of the three research questions and write corresponding hypotheses.

*RQ1: What is the impact of refusal conversion on cross-sectional and longitudinal participation rates in the Swiss Household Panel?*

Given that the research question we posed is exploratory in nature, we do not formulate specific hypotheses. In this part of the study, we want to examine what are the conversion rates in each wave of the SHP and how many of refusal converted respondents in one wave of the SHP continue to participate in the following waves. Eventually, we want to compare our results with the findings available from BHPS.

Nevertheless, based on findings so far, we can assume that converted refusals are less motivated for surveys than initial participants. For example, Calderwood et al. (2016) reported that those who were converted were less motivated to complete all units, while Burton et al. (2006) reported higher response rates in the following waves for initial participants compared to converted refusals. Therefore, we assume that:

> *Hypothesis 1: The percentage of respondents who continue to respond in the following waves declines faster over time for converted refusals than for non-converted participants.*

From what has been presented in section *2 Theoretical and empirical background,* we have seen that, in later waves, sampled members mostly refused due to panel fatigue and that those who refused due to their experience with the panel were more difficult to convert. Since in later waves people mostly refuse due to "panel fatigue", and since it is more difficult to convert them, we can assume that refusal conversion at later years of the panel would be less successful in terms of respondents' longitudinal participation. Findings from the BHPS revealed that the successfulness of refusal conversion in terms of retention in subsequent waves changes over time. Examining whether successful conversion in one wave leads to sustained participation over subsequent waves, Burton et al. (2006) report that in earlier years of the panel around 45% of converted respondents do not take part in the following year, while in later years more than 70% drop out in the following year. Also, given that surveys are obtaining a more and more negative image in the general population making it harder to recruit respondents, similar findings are expected in the SHP. Therefore, we except the following:

> *Hypothesis 2: The earlier sampled members are converted in their panel history, the longer they participate later on.*

> *RQ2: To what extent does refusal conversion compensate for the loss caused by attrition in the Swiss Household Panel? In other words, are converted refusals different from nonrespondents and those who never needed to be converted in terms of household characteristics and socio-demographic characteristics?*

We have already seen that attrition is the main threat to longitudinal surveys, especially when respondents do not attrite at random. Non-selective loss of respondents might induce bias in survey estimates. Refusal conversion, as a strategy to prevent drop out, is also considered to be useful in terms of bias reduction. Various studies outlined in section *2.3 Refusal Conversion and Nonresponse Bias* and *2.5.2 Longitudinal approach to nonresponse bias* demonstrated that indeed refusal conversion can help in diversifying the group of respondents and, consequently, in reducing bias. However we have seen that additional fieldwork efforts to regain refusals can exacerbate bias as well. For example, in a study in which socio-demographic characteristics of reluctant and cooperative respondents were compared, Stoop (2005, p.216-217) found that conversion worsened the sample structure compared to the structure of the population.

The assumption that refusal conversion reduces bias relies on *The Class Model* and *The Continuum of Resistance Model*, that claim similarity between respondents who participate upon successful conversion and nonrespondents. Therefore, including the group of converted refusals would reduce bias since those similar to nonrespondents and different from immediate respondents are brought in the sample. With the aim to gain a deeper insight in this issue in the SHP, we hypothesize the following:

> *Hypothesis 3: The refusal converted group is similar to the group of those who dropped out and different from the group of those who never needed to be converted in terms of household characteristics and socio-demographics variables.*

> *RQ3: What is the impact of refusal conversion in the SHP in terms of: estimates of variables of interest for researchers (such as variables measuring financial situation, satisfaction with different aspects of life and social trust and interest), both cross-sectionally and longitudinally; measures of change over time and quality of provided responses?*

Several studies examined the effects of refusal conversion on survey estimates (for example, Curtin et al., 2000; Lynn & Clark, 2002). Some of them failed to detect significant influence, while others were more successful. Whether refusal conversion will affect survey estimates, varies from study to study and each study should be approached to separately. Here, we would like to like to find out more about the relation between refusal conversion and survey estimates in the SHP. We expect:

*Hypothesis 4: Refusal conversion in the SHP affects survey estimates of substantial variables (such as variables measuring financial situation, satisfaction with different aspects of life and social trust and interest).*

Our following hypothesis concerns longevity of influence of refusal conversion on survey estimates. Since prospective approach has not been taken in any study so far, there is no precise finding or theory that we can rely on and our approach here is in a way exploratory. However, since findings from many studies reveal that converted refusals are different from immediate participants, we except that it will be possible to observe longitudinal differences between these two groups.

*Hypothesis 5: The effects of refusal conversion on survey estimates (such as variables measuring financial situation, satisfaction with different aspects of life and social trust and interest) are persistent over time.*

It is known from the literature that respondents who are facing more changes in various domains are more likely to drop out (Voorpostel & Lipps, 2011). For example, temporary drop out is associated with change in satisfaction with living arrangements and change in political interest, while permanent drop out is associated with change of partner and employment status, change in satisfaction with one's finances and interest in politics. Since, according to both the Class Model and Continuum of Resistance Model, refusal converted respondents are those who demanded the most effort and are, therefore, most similar to nonrespondents, it can be expected that refusal converted respondents are those who experience more changes over time as well. As they are a group successfully prevented from dropping out, it can be assumed that this group will be a more dynamic one compared to the group of those who always participate and as dynamic as the group of nonrespondents. Therefore, we formulate the following hypothesis:

*Hypothesis 6: The group of refusal converted individuals/households experience more change over time in substantial variables (such as variables measuring financial situation, satisfaction with different aspects of life and social trust and interest) compared to the group of those who always participate.*

Persuading less motivated respondents to participate in the study might mean putting data quality at risk. Even if converted to take part in a survey, it does not mean that refusals will put a lot of effort to complete the questionnaire. It is known from previous research that lower quality data might be recorded from the respondents who are more difficult to persuade to participate in a survey (Groves & Cooper, 1998, p.271). There is empirical evidence that data gathered from the sample of refusal converted respondents contained more "don't know" answers (Blair & Chun, 1992; Stoop, 2010) and more item-nonresponse (Yan & Curtin, 2010). Also, if converted refusals are the group with less trust in people in general, as we assume they are and as we test here, it could be that they are less willing to provide answers to sensitive questions. It is known from previous research that reluctant respondents are less likely to report their income (Caroll & Chong, 2006; Olson, 2013). Therefore, we can expect the following:

> *Hypothesis 7: More item nonresponse and more avoidance of answering sensitive questions will be recorded in the group of converted refusals than in the group of immediate participants.*

Having described out hypotheses, we proceed to the description of data we use and to the analytic strategy of our study.

## 3. Methodology

### 3.1 Data - The Swiss Household Panel

The Swiss Household Panel (SHP) is a nationwide Computer Assisted Telephone Interview (CATI) panel survey among a representative sample of households in Switzerland that is repeated every year since 1999. In the first round of the survey in 1999, 5074 households (7799 individuals) participated. In 2004, a refreshment sample was added with 2538 households (3654 individuals). In 2013, a third refreshment sample with 3989 households (6090 individuals) was added. Each year, a grid and a household questionnaire are completed by a reference person of the household. On the individual level, all individuals aged 14 or more are eligible for the study and are asked to answer an individual questionnaire. With the principal aim to observe social change, precisely, dynamics of changing living conditions and social representations in the population of Switzerland, the questionnaires of the SHP cover a broad range of topics: composition of the household, accommodation, standard of living, financial situation, health and quality of life, social education, employment, participation, integration and networks, politics and values, leisure and media, psychological scales (for more details see Voorpostel et al., 2016). In this study, we use SHP data from 2005 to 2015.

### 3.2 Refusal Conversion in the Swiss Household Panel

In this chapter, we highlight the most relevant aspects of refusal conversion in the SHP for our study, while a detailed description of refusal conversion in the SHP could be found in the paper by Dangubić and Voorpostel (2017). In the SHP, nonresponse or refusal can occur at several steps: nonresponse to the grid, the household questionnaire, the individual questionnaire by the reference person and to the individual questionnaire by the household members other than reference person. Depending whether eligible members refused on grid, household or individual questionnaire, they might be re-contacted in the current or one of the following waves (ibid). Procedure of refusal conversion varied from year to year, sometimes refusals were re-approached with specially designed letters and sometimes they were offered incentives. Until 2010, the decision who should be approached

changed each year, while in 2010 "a new systematic approach was established and has been followed ever since" (ibid, p. 11). As a general rule, every household or individual who refused to participate in the ongoing wave or did not participate in the previous wave is allocated to the refusal conversion phase. Refusals are re-approached by specially trained interviewers, who recorded the highest response rates.

Despite the rule that every refusal should be contacted, in SHP some refusals are too long in the regular fieldwork phase to be allocated to the refusal conversion phase in time (Lipps, 2011). An additional issue is that certain cases, assessed by the fieldwork management as very unlikely to be converted, are dropped from the refusal conversion phase (ibid). Therefore, in the SHP, 80% of the initially refusing households enter the refusal conversion process which is successful in 50% and 67% of cases on the household and individual level respectively (ibid).

Although refusal conversion was practiced since the beginning of the Swiss Household Panel, data on the process of refusal conversion are available from 2005 onwards.

## 3.3 Operationalization

**3.3.1 "Never converted", "ever converted" and "dropped out" groups.** In order to test hypothesis 3, we created three groups of respondents based on their participation patterns: "*never converted", "ever converted"* and "*dropped out*". The approach is similar to the one adopted for the analysis of attrition in the Swiss Household Panel (Voorpostel, 2010; Voorpostel & Lipps, 2011). The *never converted* group consists of the respondents who were present at least in one of the waves of the Swiss Household Panel from 2005 to 2015 without ever needed to be converted during their history in the panel and who have been present in the last two waves of the panel. For those respondents who were present in more than one wave without being converted, we randomly selected one wave of participation and excluded all the other waves. The *ever converted* group consists of all the respondents that were ever successfully converted, conditioned that they have not dropped out in the last two waves of the panel. For this group, only the wave when they were converted is considered. All the other waves of their participation are excluded. For the households or individuals that were converted more than once in their panel history, only one wave is randomly selected. The *dropped out* group consists of participants that did not participate in at least two last waves of the panel. This group includes respondents who were in refusal conversion procedure, but

who dropped out in at least last two waves of the panel (share for these households, reference individuals and individuals are 23%, 18.3% and 13.8% respectively). For this group we took the last wave when they participated. From this group we excluded those participants who became ineligible - who dropped out either because they passed away, they were institutionalized or they emigrated.

When creating the groups of participants, we excluded members of the third sample of the SHP since they filled in the individual questionnaire only in 2014, which does not allow them to be classified in the group of those who dropped out. Including them to either the group of participants who were ever converted or the group of participants who were never converted would unjustifiably increase the number of participants in these groups. Also, we excluded all proxy members. Although proxy questionnaires could be an outcome of refusal conversion when conversion took part on the household level (and household included a proxy member), we did not take these outcomes into consideration in our analysis.

**3.3.2 "Immediate participants" and "converted refusals".** In order to test hypothesis 4, 5, 6 and 7, we created two groups: "immediate participants" and "converted refusals". For these groups we pooled the data for all the wave and divided observations into two groups: the group of those who participated immediately, without being converted and the group of those who participating after being successfully converted. For the hypothesis 5, we created the two groups based only on their participation in 2006, as it will be explained in corresponding section.

**3.3.3 Measures.** For the analysis we used variables measuring refusal conversion, socio-demographic variables, household characteristics, variables measuring health, financial situation, satisfaction with different aspects of life, social trust and interest, as well as measures of change over time and data quality indicators. Our choice of measures was determined by the current findings on attrition and refusal conversion in the SHP (Lipps, 2006; Voorpostel, 2010; Lipps 2011; Voorpostel & Lipps, 2011), as well as findings from other panel studies (Burton et al., 2006; Calderwood et al., 2016). The complete list of variables and their description is presented in Table A1 in Appendix.

**3.4 The analytic approach**

*RQ1: What is the impact of refusal conversion on cross-sectional and longitudinal participation rates in the Swiss Household Panel?*

In order to respond to the first research question, we show the number of sampled members that are approached in refusal conversion phase, the number of successful conversions in the corresponding year as well as the retention rate - number of sampled members that stayed in each subsequent wave of the panel upon being converted in a specific wave, both on the individual and the household level. Along with it, the number of participants that participated without ever needed to be converted and retention rates over time are presented for both the household and the individual level. For this part of the analysis we compare data only descriptively.

*RQ2: To what extent does refusal conversion compensate for the loss caused by attrition in the Swiss Household Panel? In other words, are converted refusals different from nonrespondents and those who never needed to be converted in terms of household characteristics and socio-demographic characteristics?*

In order to test whether refusal conversion compensates for the loss caused by attrition, we split *never converted*, *ever converted* and *dropped out* groups by household characteristics (*household size, household type, type of residence, presence of children in the household, region where household is located, urbanity of household location, household moved from last year and accommodation ownership*) and demographic characteristics (*gender, age, education, occupation, civil status and health*). We tested the differences between all possible combinations of groups by employing multinomial logistic regression and multinomial logistic regression.

*RQ3: What is the impact of refusal conversion in the SHP in terms of: estimates of variables of interest for researchers (such as health, satisfaction, variables related to financial situation and social trust and interest), both cross-sectionally and longitudinally; measures of change over time and quality of provided responses?*

*Effects of refusal conversion on survey estimates.* In order to test whether refusal conversion affects estimates of substantial variables, we differentiate two groups of respondents: the group of those that participated immediately without being converted and the group of those who were successfully converted during the particular wave. Then we run separate regression models for each of the tested survey estimates while clustering different

observations within individuals and controlling for demographic characteristics on individual level. In these analysis, we treat the two groups as independent variables and the survey estimates as dependent variables.

*Longitudinal effects of refusal conversion.* In order to see what happens with survey estimates in years following conversion, we make two groups based on participation in 2006: the group of those who participated after being converted and the group of those who participated without conversion. The reason for choosing year 2006 is that it is the earliest year when there were enough converted respondents to be followed over time. For each year separately we test differences between these two groups using t-test for independent groups. Similar to the approach of Lynn and Clark (2002), Haring et al. (2009) and Lipps (2011), we calculate the discrepancy between the total sample and the sample of immediate participants and declare it significant if the difference between converted and immediate participants is significant.

*Measures of change over time.* In this chapter we look at one-year, three-year and five-year prospective differences for the two groups: the group of those that participated immediately without being converted and the group of those who were successfully converted during the particular wave. Our choice of change periods was not driven by any theory since no similar research has been done so far and we did not have specific hypothesis on precise time periods. We chose these year differences in order to optimize the number of differences available. Namely, using longer difference period, for example, 7 years, would result in neglecting all the waves after 2008 since after that year it would not be possible to look what has happened after 7 years from conversion. We run separate regression analysis for all three change periods for each of the survey estimates with change as dependent variable and conversion group as independent variable, while clustering for different time points in households or individuals. On the individual level, we control for demographic characteristics (education, gender, age and civil status). More details on calculation is provided in the corresponding section.

*Differences in the quality of the provided response.* In order to test whether converting those who refuse to participate results in data of lower quality, we run two separate models. In the first case, we run a negative binomial Poisson model with response groups immediate participants vs converted refusals as independent variable, overall number of item non-response (the number of times a respondent did not answer the question or "don't know" was provided as an answer) as the dependent variable and socio-demographic characteristics as control variables. In the second case, we use binomial logistic regression

with response groups immediate participants vs converted refusals as independent variable, the variable that provides information whether income was provided by respondent or imputed as dependent variable and socio-demographic characteristics as control variables.

In the following section we present our results.

## 4. Results

### 4.1 Cross-sectional and longitudinal participation

In the following lines we present the number of sampled households and individual members that participated in the regular phase of the fieldwork, that were re-approached and converted in the SHP between 2005 and 2015, together with the number or participants that stayed in every subsequent wave of the panel upon being converted in a specific wave. By employment of descriptive statistics only, we observed if the data showed the trend that we expected in the hypothesis H1 - that the participation in the sample of converted respondent has steeper decline than participation in the sample of those that never needed to be converted. We also observed if the earlier the respondents were converted in their panel history, the longer they participate in the study, as we assumed in the hypothesis H2.

*Household level*. When it comes to refusal conversion on the household level, we can consider two criteria for successful refusal conversion; the first if the household was converted to complete the grid questionnaire or the second, if the household was converted to complete also the household questionnaire. Hence, in Table 1, the contribution of refusal conversion to sample size was presented for both questionnaires. As it can be seen, refusal conversion accounts for an increase in the sample size from 1.5% in 2007 to 15% in 2009 when measured as the completion of the household questionnaire and from 1.8 % in 2007 to 18% in 2009 when it comes to the completion of the grid questionnaire. We see here that 2007 is on both levels the least successful year of the conversion. However, there is an indication that the paradata for the mentioned year are not completely reliable. Namely, in 2007, 347 households that refused in the current wave and 1600 households that refused in previous wave were approached. Unfortunately, paradata contain information only about sampled members that refused to participate in 2007 and that received refusal conversion attempt in the same year, therefore leading to a conclusion that the refusal conversion was less successful than it really was. Hence, we can claim that the lowest contribution of refusal conversion procedure to overall sample size in the SHP was in 2005 when completion of grid questionnaire increased sample size for 4.8% and completion of household questionnaire increased sample size for 3.9%.

*Table 1. The effects of refusal conversion on the SHP sample size: household level*

| Conversion Year | Household level: grid | | | Household level: household questionnaire | | |
|---|---|---|---|---|---|---|
| | Sample size before conversion | Number of converted refusals | Sample size after conversion (% increase) | Sample size before conversion | Number of converted refusals | Sample size after conversion (% increase) |
| 2005 | 4229 | 205 | 4434(4.8%) | 4097 | 159 | 4256 (3.9%) |
| 2006 | 3789 | 545 | 4334(14.4%) | 3713 | 508 | 4221 (13.7%) |
| 2007 | 4362 | 79 | 4441(1.8%) | 4246 | 65 | 4311 (1.5%) |
| 2008 | 3797 | 659 | 4456(17,4%) | 3722 | 542 | 4264 (14.6%) |
| 2009 | 3889 | 703 | 4592(18,1%) | 3831 | 575 | 4406 (15.0%) |
| 2010 | 4182 | 492 | 4674(11.8%) | 4134 | 408 | 4542 (9.9%) |
| 2011 | 4280 | 336 | 4616(7,9%) | 4214 | 281 | 4495 (6.7%) |
| 2012 | 4263 | 330 | 4593(7,7%) | 4196 | 265 | 4461 (6.3%) |
| 2013 | 7971 | 561 | 8532(7,0%) | 7855 | 502 | 8357 (6.4%) |
| 2014 | 6799 | 718 | 7517(10,6%) | 6717 | 642 | 7359 (9.6%) |
| 2015 | 6484 | 404 | 6888(6,2%) | 6434 | 353 | 6787 (5.5%) |

In order to inspect the longer-term influence of refusal conversion on participation, we looked at participation in subsequent waves of the households that were converted in one particular year of the panel. For this purpose, we focused only on completion of the household questionnaire since it is the questionnaire that provides most of variables for the analysis on the household level. Table 3 shows how successful attempts of refusal conversion were in each year of the SHP. We can see that over the years there is a great variation in the number of refusals approached in the conversion phase (Table 3) and the number of converted refusals (Table 1): while in 2009 half of the attempts resulted in a successful outcome, in 2005 the percentage was 20%. Such a difference is the consequence of the unsystematic approach over the years and rather subjective decisions of the fieldwork agency of who is to be re-issued in the conversion phase. Also, the reason for such variation are different procedure of refusal conversion itself that changes in the SHP from year to year: for example, in some years households were only contacted and asked to complete the questionnaire, it other years they were offered prepaid incentives (Dangubić & Voorpostel, 2017). We will come back to this aspect in the Discussion.

When it comes to the longevity of participation upon being converted in one specific year, if we take 2005 as an example, we can see that 159 household questionnaires were completed out of 794 households that were re-approached in the refusal conversion phase. In 2006, 105 households (66% of those 159 household questionnaires completed in 2005) participated again. Ten years later, in 2015, 79 households (which is 49.7% of 159 initially converted households in 2005) were still present in the panel.

As time passes, it seems that the decline of participation is becoming steeper. While half of those converted in 2005 dropped out only ten years afterwards, half of those converted in 2013 dropped only two years afterwards. Such pattern is not present when it comes to

participation of households that never needed to be converted (Table 4), where similar and rather high percentage of households that participated in certain year is still present in the following years and participation in the following wave (t+1) is around 90%.

Already here, given the differences in retention rates over time for the converted and not converted group, it seems that the sample of converted members contains respondents that are less motivated to participate in the study and therefore more similar to non-respondents. Also, it seems that the point in history in which conversion occurred is not without importance – the later the conversion takes place, the shorter respondents continue to participate in the study. This aspect has implications for the allocation of financial resources during the fieldwork, which we will discuss later. Here we need to add that these findings seem to be in line with our hypotheses.

***Individual level.*** When it comes to the completion of the individual questionnaire, similar patterns are observed as on the household level. Table 2 shows us that refusal conversion on the individual level increases the sample size from 2.6% in 2005 to 16.8% in 2010. We again leave the year 2007 aside due to lack of its reliability. We can see that the contribution of refusal conversion to the overall sample size is lower on the individual level than on the household level.

*Table 2. The effects of refusal conversion on the SHP sample size: individual level*

| | Individual questionnaire | | |
|---|---|---|---|
| Conversion Year | Sample size before conversion | Number of converted refusals | Sample size after conversion (% increase) |
| 2005 | 6371 | 166 | 6537 (2.6%) |
| 2006 | 6041 | 618 | 6659 (10.2%) |
| 2007 | 6901 | 79 | 6980 (1.1%) |
| 2008 | 6237 | 667 | 6904 (10.7%) |
| 2009 | 6364 | 745 | 7109 (11.7%) |
| 2010 | 7037 | 509 | 7546 (16.8%) |
| 2011 | 7249 | 335 | 7584 (4.6%) |
| 2012 | 7151 | 295 | 7446 (4.1%) |
| 2013 | 6813 | 196 | 7009 (2.9%) |
| 2014 | 11373 | 717 | 12090 (6.3%) |
| 2015 | 10833 | 336 | 11169 (3.1%) |

Table 5 presents conversion rates for all 11 years of the SHP, as well as participation in the years following conversion, while Table 6 shows participation rates for those that never needed to be converted.

*Table 3. Outcome at subsequent waves for successful conversion on household level*

| Conversion Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| N attempts | 794 | 1560 | 347 | 1202 | 1146 | 963 | 708 | 728 | 1845 | 1447 | 927 |
| N converted (%) | 159 (20.0%) | 508 (32.6%) | 65 (18.7%) | 542 (45.1%) | 575 (50.2%) | 408 (42.4%) | 281 (39.7%) | 265 (36.40%) | 502 (27.2%) | 642 (44.4%) | 353 (38.1%) |
| **Subsequent wave participation** | | | | | | | | | | | |
| 2006 | 105 (66.0%) | | | | | | | | | | |
| 2007 | 97 (61.0%) | 346 (68.1%) | | | | | | | | | |
| 2008 | 94 (59.1%) | 335 (65.9%) | 39 (60.0%) | | | | | | | | |
| 2009 | 92 (57.9%) | 294 (57.9%) | 38 (58.5%) | 400 (73.8%) | | | | | | | |
| 2010 | 101 (63.5%) | 302 (59.5%) | 44 (67.7%) | 357 (65.9%) | 464 (80.7%) | | | | | | |
| 2011 | 97 (61.0%) | 298 (58.7%) | 43 (66.2%) | 344 (63.5%) | 398 (69.2%) | 306 (75.0%) | | | | | |
| 2012 | 92 (57.9%) | 286 (56.3%) | 38 (58.5%) | 325 (60.0%) | 384 (66.8%) | 262 (64.2%) | 210 (74.7%) | | | | |
| 2013 | 87 (54.7%) | 267 (52.6%) | 36 (55.4%) | 308 (56.8%) | 340 (59.1%) | 242 (59.3%) | 181 (64.4%) | 179 (67.6%) | | | |
| 2014 | 83 (52.2%) | 248 (48.8%) | 38 (58.5%) | 269 (49.6%) | 310 (53.9%) | 211 (51.7%) | 156 (55.5%) | 141 (53.1%) | 313 (62.4%) | | |
| 2015 | 79 (49.7%) | 248 (48.8%) | 38 (58.5%) | 258 (45.8%) | 300 (52.2%) | 197 (50.5%) | 145 (51.6%) | 135 (50.9%) | 255 (50.1%) | 469 (73.1%) | |

*Table 4. Outcome at subsequent waves for household that never needed to be converted*

| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Participated | 2787 | 2633 | 2820 | 2713 | 2694 | 2734 | 2762 | 2781 | 5687 | 5238 | 4908 |
| **Subsequent wave participation** | | | | | | | | | | | |
| 2006 | 2596 (93.2%) | | | | | | | | | | |
| 2007 | 2483 (89.1%) | 2483 (94.3%) | | | | | | | | | |
| 2008 | 2402 (86.2%) | 2401 (91.2%) | 2699 (95.7%) | | | | | | | | |
| 2009 | 2337 (83.9%) | 2336 (88.7%) | 2619 (92.9%) | 2631 (97.0%) | | | | | | | |
| 2010 | 2300 (82.5%) | 2300 (87.4%) | 2576 (91.4%) | 2588 (95.4%) | 2645 (98.2%) | | | | | | |
| 2011 | 2661 (81.1%) | 2261 (85.9%) | 2529 (89.7%) | 2541 (93.7%) | 2598 (96.4%) | 2683 (98.1%) | | | | | |
| 2012 | 2210 (79.3%) | 2209 (83.9%) | 2470 (87.6%) | 2481 (91.5%) | 2537 (94.2%) | 2619 (95.8%) | 2694 (97.5%) | | | | |
| 2013 | 2176 (78.1%) | 2175 (82.6%) | 2425 (86.0%) | 2436 (89.8%) | 2491 (92.5%) | 2570 (94.0%) | 2641 (95.6%) | 2724 (98.0%) | | | |
| 2014 | 2109 (75.7%) | 2109 (80.1%) | 2340 (83.0%) | 2350 (86.6%) | 2401 (89.1%) | 2476 (90.6%) | 2538 (91.9%) | 2614 (94.0%) | 5098 (89.6%) | | |
| 2015 | 2036 (73.1%) | 2041 (77.5%) | 2256 (80.0%) | 2264 (83.5%) | 2314 (85.9%) | 2384 (87.2%) | 2439 (88.3%) | 2509 (90.2%) | 4660 (81.9%) | 4773 (91.1%) | |

*Table 5. Outcome at subsequent waves for successful conversion on individual level*

| Conversion Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| N attempts | 438 | 1061 | 158 | 1219 | 1361 | 945 | 643 | 594 | 500 | 1297 | 732 |
| N converted (%) | 166 (37.9%) | 618 (58.2%) | 79 (50.0%) | 667 (54.7%) | 745 (54.7%) | 509 (53.9%) | 335 (52.1%) | 295 (49.7%) | 196 (39.2%) | 717 (55.3%) | 336 (45.9%) |
| **Subsequent wave participation** | | | | | | | | | | | |
| 2006 | 100 (60.2%) | | | | | | | | | | |
| 2007 | 93 (56.0%) | 422 (68.3%) | | | | | | | | | |
| 2008 | 94 (56.7%) | 390 (63.1%) | 53 (67.1%) | | | | | | | | |
| 2009 | 88 (53.0%) | 352 (57.1%) | 52 (65.8%) | 461 (69.1%) | | | | | | | |
| 2010 | 99 (59.6%) | 371 (60.0%) | 52 (65.8%) | 444 (66.6%) | 614 (82.4%) | | | | | | |
| 2011 | 89 (53.7%) | 368 (59.5%) | 51 (64.6%) | 430 (64.5%) | 533 (71.5%) | 392 (77.0%) | | | | | |
| 2012 | 87 (52.4%) | 342 (55.5%) | 45 (57.0%) | 397 (59.5%) | 491 (65.9%) | 327 (64.2%) | 250 (74.6%) | | | | |
| 2013 | 78 (47.0%) | 318 (51.5%) | 43 (54.4%) | 362 (54.3%) | 433 (58.1%) | 287 (56.4%) | 200 (59.7%) | 196 (66.4%) | | | |
| 2014 | 75 (45.2%) | 288 (46.6%) | 39 (49.4%) | 318 (47.7%) | 391 (52.5%) | 255 (50.1%) | 172 (51.3%) | 153 (51.9%) | 114 (58.2%) | | |
| 2015 | 73 (44.0%) | 290 (46.9%) | 41 (51.9%) | 296 (44.4%) | 377 (50.6%) | 238 (46.8%) | 161 (48.1%) | 136 (46.1%) | 100 (51.0%) | 498 (69.5%) | |

*Table 6. Outcome at subsequent waves for individuals that never needed to be converted*

| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Participated | 5131 | 4866 | 5244 | 5112 | 5022 | 5193 | 5236 | 5172 | 5144 | 9598 | 8790 |
| **Subsequent wave participation** | | | | | | | | | | | |
| 2006 | 4393 (85.6%) | | | | | | | | | | |
| 2007 | 4082 (79.6%) | 4267 (87.7%) | | | | | | | | | |
| 2008 | 3880 (75.6%) | 4059 (83.4%) | 4757 (90.7%) | | | | | | | | |
| 2009 | 3699 (72.1%) | 3867(79.5%) | 4502 (85.9%) | 4726 (92.5%) | | | | | | | |
| 2010 | 3642 (71.0%) | 3812 (78.3%) | 4415 (84.2%) | 4626 (90.5%) | 4791 (95.4%) | | | | | | |
| 2011 | 3547 (69.1%) | 3715 (76.4%) | 4282 (81.7%) | 4474 (87.5%) | 4626 (92.1%) | 4934 (95.0%) | | | | | |
| 2012 | 3426 (66.8%) | 3573 (73.4%) | 4103 (78.2%) | 4288 (83.9%) | 4424 (88.1%) | 4709 (90.7%) | 4895 (93.5%) | | | | |
| 2013 | 3301 (64.3%) | 3443 (70.8%) | 3954 (75.4%) | 4125 (80.7%) | 4255 (84.7%) | 4525 (87.1%) | 4703 (89.2%) | 4857 (93.9%) | | | |
| 2014 | 3140 (61.2%) | 3279 (67.4%) | 3741 (71.3%) | 3893 (76.2%) | 4013 (79.9%) | 4258 (82.0%) | 4408 (84.2%) | 4563 (88.2%) | 4740 (92.2%) | | |
| 2015 | 3009 (58.6%) | 3145 (64.6%) | 3570 (68.1%) | 3717 (72.7%) | 3818 (76.0%) | 4045 (77.9%) | 4185 (79.3%) | 4329 (83.7%) | 4478 (87.1%) | 8321 (86.7%) | |

Depending on the year, refusal conversion attempts resulted in successful conversion in 38% to 58% of the cases on the individual level (Table 5).

Longevity of participation shows similar patterns on both the individual and the household level: it seems that over the years it became more difficult to keep respondents in the panel once they had been converted - the later sampled members were converted in the panel history, the less likely they are to be converted into loyal members. For example, if we consider those successfully converted in 2005, on the household level 50% of them was still present 10 years afterwards, while on the individual level 44% of them still participated in 2015. For those converted in 2011, 2012 or 2013, similar percentages are reached just after a few waves.

Table 6 shows participation of panel members that never needed to be converted. While 58% to 82% of refusals converted at one wave are still present in the following wave (t+1), these rates are around 90% for respondents that never needed to be converted. Results presented above indicate that respondents who were converted upon initial refusal and those who never needed to be converted have different patterns of participation: retention rates are always higher for households and individuals that never needed to be converted. Also, it can be noted that participation decline is steeper over the years and that the earlier the respondent or the household is converted, the more likely that they will participate in the following years.

In the Appendix, we provide tables (Table A2 – Table A4) presenting separately participation of the first and the second sample of the SHP. We see that the trends are similar for both samples. Although year 2005 was only the second wave for the second sample and the members did not still have time to experience "panel fatigue" as the members of the first sample, we assume that the effects are similar because this group started later in time when negative image of surveys was already very strong.

The presented situation both on household and individual level gives us basis to claim that our data show the trend that we have expected with our hypothesis (H1 and H2).


## 4.2 Household characteristics and socio-demographics


In this section, we tested the hypothesis that refusal conversion compensates for the loss caused by attrition in the SHP; that is, the assumption that converted refusals are similar to those who dropped out and different from those who never needing to be converted. To do so, we compared the distribution of households and individuals that dropped out to the

distribution of those that never needed to be converted. Then, we ran multinomial logistic regression model comparing the converted group with the group of those never converted and the group of those who dropped out.

   ***Household level.*** Table 7 shows the distributions of the "never converted", the "ever converted" and the "dropped out" group by characteristics of the household, while Table 8 presents fitted model.

*Table 7: "Never converted", "Ever converted" and "Dropped out" households by household characteristics*

|  | Never converted N=2501 | Ever converted N=1465 | Dropped out N=2251 |
|---|---|---|---|
|  | % | % | % |
| **Household moved** | 6.9 | 18.8 | 13.0 |
| **Urban** | 58.7 | 57.9 | 61.3 |
| **Children in household** | 26.9 | 28.1 | 22.7 |
| **Number of children in the household** |  |  |  |
| 1 child | 35.6 | 43.9 | 46.4 |
| 2 children | 45.5 | 42.2 | 40.5 |
| 3 children | 16.5 | 10.9 | 10.2 |
| 4+ children | 2.4 | 2.9 | 2.9 |
| **Household type** |  |  |  |
| One person HH | 24.8 | 22.5 | 35.2 |
| Couple without children | 35.3 | 36.4 | 27.6 |
| Couple with children | 33.0 | 34.3 | 28.5 |
| One parent with children | 6.9 | 6.7 | 9.1 |
| **Income assessment** |  |  |  |
| Saves money | 53.7 | 50.3 | 47.7 |
| Spends what it earns | 36.0 | 40.0 | 41.4 |
| Eats into its assets and savings | 9.0 | 7.8 | 8.8 |
| Gets into debt | 1.3 | 1.9 | 2.1 |
| **Owner** | 54.0 | 50.9 | 39.9 |
| **Type of residence** |  |  |  |
| Apartment building | 54.4 | 56.2 | 65.1 |
| House | 41.9 | 39.3 | 30.7 |
| Another | 3.7 | 4.6 | 4.2 |
| **Region** |  |  |  |
| Lake Geneva | 17.6 | 17.9 | 18.0 |
| Middleland | 25.4 | 24.9 | 24.2 |
| North-west Switzerland | 14.4 | 15.1 | 13.9 |
| Zurich | 18.4 | 15.5 | 18.1 |
| East Switzerland | 11.2 | 11.9 | 14.4 |
| Central Switzerland | 9.6 | 9.8 | 8.0 |
| Ticino | 3.5 | 4.9 | 3.8 |
| **Household size** |  |  |  |
| 1 individual | 25.2 | 22.3 | 33.5 |
| 2 individuals | 37.4 | 39.4 | 32.7 |
| 3 individuals | 13.2 | 15.1 | 12.4 |
| 4+ individuals | 24.3 | 23.2 | 21.5 |

Converted households moved significantly more often compared to those who dropped out or participated without needed to be converted. The difference is not surprising since dropping out is often consequence of failure to identify location of the households once they moved, therefore low frequencies are the result of unobserved change. Since converted households are usually those who are located and therefore prevented from dropping out, high frequencies are not surprising for this group. The finding is in line with the hypothesis that converted respondents are more dynamic ones which will be tested and discussed later on. Never converted respondents are more stable in terms of their household, probably because they are more often the owners of the place where they live than nonrespondents (54% compared to 40%); hence they move less often.

Not surprisingly, households with more individuals are more likely to be converted, we see from Table 8 that in terms of household size converted households are similar to never converted ones and different from nonresponding ones. We can assume that one of the mechanisms through which refusal conversion works entails finding another household member that is willing to take part in the survey. Relying on the logic explained by Calderwood et al. (2016), here we could claim that loss of households of the small size potentially introduced bias for this variable and that refusal conversion attempts are not likely to have led to a reduction in this bias. As for household income assessment, although percentages indicate that refusal conversion is successful in re-including less affluent household, especially those that spend what they earn and those that get into debt, our model does not detect significant differences here. Similar distribution of the three groups in terms of household type, region and type of residence indicate that there is little or no bias for this variables.

Although our models reveal us plausible mechanisms through which refusal conversion works, on the household level we did not find the support for our assumption that converted households are more similar to never converted and different from dropped out. However, except for the observed difference in terms of household size, we did not find that they are different from nonresponding households either. We will come back to this in the Discussion. In the following lines, we test the hypothesis (H3) on the individual level.

*Individual level.* In this section, we observe what effects refusal conversion had on sample composition on the individual level. Regarding individual level, we can look at sample composition on the sample of reference individuals who fill in the questionnaires on household level and all individuals included in the refusal conversion phase.

*Table 8. Multinomial logistic regressions of converted households (1465) versus "never converted" (N=2501) and "dropped out" (N=2251) on socio-demographic characteristics*

| | Never converted versus Ever converted | | Dropped out versus Ever converted | |
|---|---|---|---|---|
| | Estimate | SE | Estimate | SE |
| **Household moved** | -1.53*** | .23 | -.80*** | .20 |
| **Urban** | -.28+ | .14 | -.28+ | .15 |
| **Household type** | | | | |
| One person HH | -15.22 | .35 | -16.5 | .70 |
| Couple without children | -.64 | .97 | -.14.2 | .29 |
| Couple with children | -.66 | .33 | -1.0 | .33 |
| One parent with children | - | - | - | - |
| **Income assessment** | | | | |
| Saves money | .60 | .47 | .22 | .44 |
| Spends what it earns | .47 | .47 | .23 | .44 |
| Eats into its assets and savings | .94 | .54 | .32 | .52 |
| Gets into debt | - | - | - | - |
| **Owner** | .01 | .17 | -.41* | .18 |
| | - | | | |
| **Type of residence** | | | | |
| Apartment building | -.36 | .39 | -.57 | .39 |
| House | -.12 | .39 | -.56 | .39 |
| Another | - | - | - | - |
| **Region** | | | | |
| Lake Geneva | - | - | - | - |
| Middleland | .24 | .21 | -.04 | .22 |
| North-west Switzerland | -.03 | .23 | -.12 | .24 |
| Zurich | .29 | .24 | .18 | .24 |
| East Switzerland | -.13 | .25 | .06 | .25 |
| Central Switzerland | .06 | .26 | -.40 | .28 |
| Ticino | -.20 | .34 | -.78* | .39 |
| **Household size** | | | | |
| 1 individual | - | - | - | - |
| 2 individuals | -.82 | .53 | -1.04* | .52 |
| 3 individuals | -.17 | .23 | -.47* | .23 |

*** significant at p<0.001 level; ** significant at p<0.01 level; * significant at p<0.05; + significant at p<0.1

Differentiation between all the individuals and reference persons is important since the former provides information of what is obtained for the overall sample once refusal conversion was carried out, while the latter, given that reference person is the gate keeper of the household, provides the information of which reference persons' characteristics make households more approachable. In this section we will provide the analysis only for reference individuals, while the results of the analyses for all individuals is presented in the Appendix (Table A6 and Table A7).

Table 9 shows distributions of socio-demographic characteristics of reference persons among "never converted", "ever converted" and "dropped out" group, while Table 10 presents the results of the model fitted using multinomial logistic regression.

In the subsample of reference individuals, refusal conversion compensates for the attrition of male respondents and younger individuals. We see from Table 9 that the *dropped out* group has higher share of male and younger respondents. Table 10 reveals us that, compared to *never converted* individuals, converted respondents are more likely to be male and younger.

*Table 9: Reference person "Never converted", "Ever converted" and "Dropped out" by demographics, SHP 2005-2015*

|  | Never converted N=2057 | Ever converted N=1053 | Dropped out N=1696 |
|---|---|---|---|
|  | % | % | % |
| **Gender** |  |  |  |
| Male | 34.9 | 36.4 | 36.7 |
| **Age** |  |  |  |
| 14-24 | 2.4 | 5.5 | 7.4 |
| 25-34 | 9.4 | 13.5 | 13.9 |
| 35-44 | 17.4 | 17.1 | 18.6 |
| 45-54 | 27.1 | 22.2 | 22.1 |
| Older than 55 | 43.6 | 41.7 | 38.1 |
| **Education** |  |  |  |
| Primary | 12.4 | 16.3 | 20.3 |
| Secondary | 51.4 | 56.5 | 55.5 |
| Tertiary | 36.2 | 27.2 | 24.2 |
| **Civil Status** |  |  |  |
| Single, never married | 19.6 | 22.0 | 26.2 |
| Married | 60.4 | 59.3 | 49.5 |
| Separated, divorced | 13.7 | 12.4 | 15.1 |
| Widow | 6.4 | 6.4 | 9.2 |
| **Occupation** |  |  |  |
| Employed | 63.5 | 65.2 | 61.4 |
| **Self-assessed health** |  |  |  |
| Very well | 17.8 | 19.2 | 18.5 |
| Well | 66.8 | 63.7 | 60.5 |
| Average or bad | 15.4 | 17.1 | 21.1 |

Turning to distribution of education, more educated reference persons are more likely to participate while less educated are more likely to drop out. While refusal conversion compensates for the loss by bringing in less educated reference individuals, it also brings in somewhat more individuals with tertiary education – those with the highest educational qualifications are more likely to be converted than to drop out (Table 10). As for health status, we see from Table 9 that the share of reference individuals with worse health is higher among the *dropped out* group than among the *never converted* group. Refusal conversion

seems to be successful once again since it includes more reference individuals with worse health condition. Civil status reveals us that married individuals are likely to be converted, which is in line with the finding above that households formed by two or more individuals are more likely to be converted. As it was the case for tertiary education, this group is already well represented. Although the share of single individuals is higher among converted respondents (Table 9), the difference is not significant – singe individuals are more likely to drop out than to be converted.

*Table 10. Multinomial logistic regressions of converted reference persons (1053) versus "never converted" (N=2057) and "dropped out" (N=1696) on socio-demographic characteristics*

| | Never converted versus Ever converted | | Dropped out versus Ever converted | |
|---|---|---|---|---|
| | Estimate | SE | Estimate | SE |
| **Gender** | | | | |
| Male | -.15+ | .08 | .08 | .09 |
| | | | | |
| **Age** | | | | |
| 14-24 (base) | - | - | - | - |
| 25-34 | .39+ | .23 | -.02 | .20 |
| 35-44 | .86*** | .24 | .09 | .21 |
| 45-54 | 1.09*** | .23 | -.00 | .21 |
| 55+ | .93*** | .23 | -.32 | .20 |
| | | | | |
| **Education** | | | | |
| Primary (base) | - | - | - | - |
| Secondary | .19+ | .11 | -18 | .11 |
| Tertiary | .62*** | .13 | -.29* | .13 |
| | | | | |
| **Civil status** | | | | |
| Single | - | - | - | - |
| Married | -.20+ | 12 | -.30* | .12 |
| Separated/Divorced | -.14 | .15 | .10 | .16 |
| Widow | -.21 | .20 | .24 | .20 |
| | | | | |
| **Occupation** | | | | |
| Employed | -.19* | .06 | -.21* | .10 |
| | | | | |
| **Self-assessed health** | | | | |
| Very well | - | - | - | - |
| Well | .10 | .10 | .02 | .10 |
| Average or bad | -.08+ | .13 | .23+ | .13 |

Overall, we see from the Table 10 that the group of converted respondents shows greater resemblance to group of those who dropped out than to the group of those who were never converted. In general, we could claim that plausible nonresponse bias associated with the characteristics we examined is likely to be reduced since conversion included different respondents.

Before proceeding to the next section, we can say that our hypothesis (H3) was confirmed on the individual level, while on the household level we do not have enough support in our data to claim so.


## 4.3 Substantial variables, measures of change and data quality


**4.3.1 The effects of refusal conversion on survey estimates.** So far we have looked at the three groups in order to test whether the assumption made based on The Continuum of Resistance Model and The Class Model stands. However, it can be argued that the groups we created are not without shortcomings. We used the advantage offered by longitudinal studies to analyse the information available for sampled members that can be characterized as non-respondents from the time when they were still participating in the study. Hence, the "dropped out" group was made based on non participation in the last two waves and compared to those who never needed to be converted and those who were converted at a certain point in their history of the panel. However, our group of non-respondents in not an exclusive one. Namely, respondents that were successfully converted at a certain point in time and then dropped out in at least two last waves are classified in the group of nonrespondents. Therefore, the difference between converted refusals and non-respondents might be underestimated.

We find that better approach to examine influence of refusal conversion on the survey estimates in the SHP is by separating groups of those who participated immediately without being converted and those who participated upon being converted. We can imagine a situation in which a researcher wants to study certain survey estimates provided by the SHP and use all the available data without paying attention who at the end dropped out. There, he would have all the information for the group of those who dropped out from the waves when they were still in and use it as all the other available data from other participants. Therefore, we find it important to test whether the conversion process in the SHP makes significant difference in terms of survey estimates when all participants regardless of their participation patterns, thus is, all the available information are taken into account. However, in the Appendix (Table A8 – Table A10) we present the average survey estimates for the three groups created in the previous section.

Here we test the hypothesis H4 that refusal conversion has significant influence on survey estimates (variables measuring financial situation, satisfaction with different aspects

of life, social trust and interest). For the analysis we ran several separate regression models where participation with or without conversion was independent variable and survey estimate of interest as dependent variable, while clustering different time points in households or individuals. In addition, on the individual level, we controlled for socio-demographic characteristics.

*Household level.* Table 11 presents parameters of regression analyses that tests the influence of refusal conversion on average survey estimates in the sample of households. We see that refusal conversion brings in households that are different when it comes to all the tested estimates.

*Table 11: Influence of refusal conversion on average survey estimates of the sample of households: non-converted vs converted participants*

| N=10117 clusters of households | Coefficient | Standard error | t | Significance |
|---|---|---|---|---|
| **Household income** | -9925.2 | 1814.9 | -5.47 | 0.000 |
| **Satisfaction with household finances** | -.142 | .039 | -3.67 | 0.000 |
| **Improvement in standard of living** | -.060 | .022 | -2.79 | 0.005 |
| **Minimum income to make ends** | -221.4 | 49.8 | -4.44 | 0.000 |
| **Manageable financial situation** | -.264 | .041 | -6.46 | 0.000 |

Note: separate model fitted for each dependent variable using regression analysis; different time points clustered into households. Converted households were coded 1.

Households that re-entered in the SHP have in general a worse financial situation, they report a lower yearly household income and a lower minimal income needed to make ends meet. The financial situation is less manageable in converted households; its members are less satisfied with their household finances and they are more likely to experience a deterioration of their standard of living.

*Individual level.* Table 12 shows the coefficients of models fitted for each survey estimate of interest, while controlling for education, age, gender and employment. Refusal conversion significantly affects survey estimates measuring financial situation and satisfaction with it - converted respondents have lower personal yearly income and they are less satisfied with their financial situation. Significant influence of refusal conversion is recorded for estimates of general trust in people and interest in politics – converted refusals are less interested in politics and they report lower levels of social trust. These effects show us that the group of converted individuals is significantly different from the group of those who immediately participated even when the influence of education, age, gender and

employment is netted out. On the contrary, we failed to record significant effects of refusal conversion on satisfaction with health and satisfaction with life in general.

*Table 12: Influence of refusal conversion on average survey estimates of the sample*

|  | Coefficient | Standard error | t | Significance |
|---|---|---|---|---|
| Total yearly income | -1214.1 | 594.3 | -2.04 | 0.041 |
| Non-imputed total yearly income | -1671.5 | 627.9 | -2.66 | 0.008 |
| Interest in politics | -.233 | .045 | -5.12 | 0.000 |
| General trust in people | -.413 | .038 | -10.77 | 0.000 |
| Satisfaction with finances | -.151 | .036 | -4.16 | 0.000 |
| Satisfaction with health | .016 | .031 | 0.53 | 0.596 |
| Satisfaction with living together/alone | .051 | .028 | 1.80 | 0.072 |
| Satisfaction with life in general | .004 | .025 | 0.17 | 0.861 |

Note: separate model fitted for each dependent variable using regression analysis; we clustered different time points clustered into individuals and controlled for education, age, gender and employment. Converted participants were coded 1.

Our hypothesis that refusal conversion affects survey estimates in the sample is confirmed for the estimates of financial situation and satisfaction with it, as well as for the estimates of social trust and interest. However, in our study we did not observe significant effect on the estimates of satisfaction with health and with life in general. In the following section we test the hypothesis that the effects of refusal conversion are persistent over time.

**4.3.2 Longitudinal effects of refusal conversion on survey estimates.** In the previous section we looked at differences between immediate participants and converted refusals in a cross-sectional way, by pooling together the data of eleven waves of the SHP we tested if there is a significant difference in the mean survey estimates. In this section, we examine our third research question and the hypothesis (H5) that refusal conversion has longitudinal effect on survey estimates; in other words, that the difference between converted refusals and immediate participants is persistent over time.

We present the results of *total yearly household income*, *minimal income to make ends meet*, *satisfaction with household finances* for the household level and *total yearly personal income, interest in politics* and *general trust in people* for the individual level. For all these estimates we present the means for immediate participants, converted refusals and the both groups combined. We then calculate the difference in average survey estimate with and without converted refusals. As already described, this approach was taken by Lynn and Clark (2002) and Haring et al. (2009) when estimating nonresponse bias.

***Household level.*** Households converted in 2006 have, in average, lower total yearly household income than immediate participants; the difference being around 10 thousand

Swiss francs (Table 13). Households re-included in 2006 show a substantial decrease in mean total yearly household income in most of the years following conversion, between -858 and -1847 CHF. Although in 2010 and 2015 the difference is not statistically significant, a decreasing trend is still recorded. Not surprisingly, the effect is the strongest in the year of conversion. It might be that in 2006 a relatively large sample of converted refusals (507) was enough to make a significant change. Knowing that less affluent households or individuals are more likely to drop out from the survey, we can assume that over time we preserve those with higher income among converted refusals. Therefore, the difference becomes smaller over the years (from 2011 on, the difference is significant only at p<0.1 level).
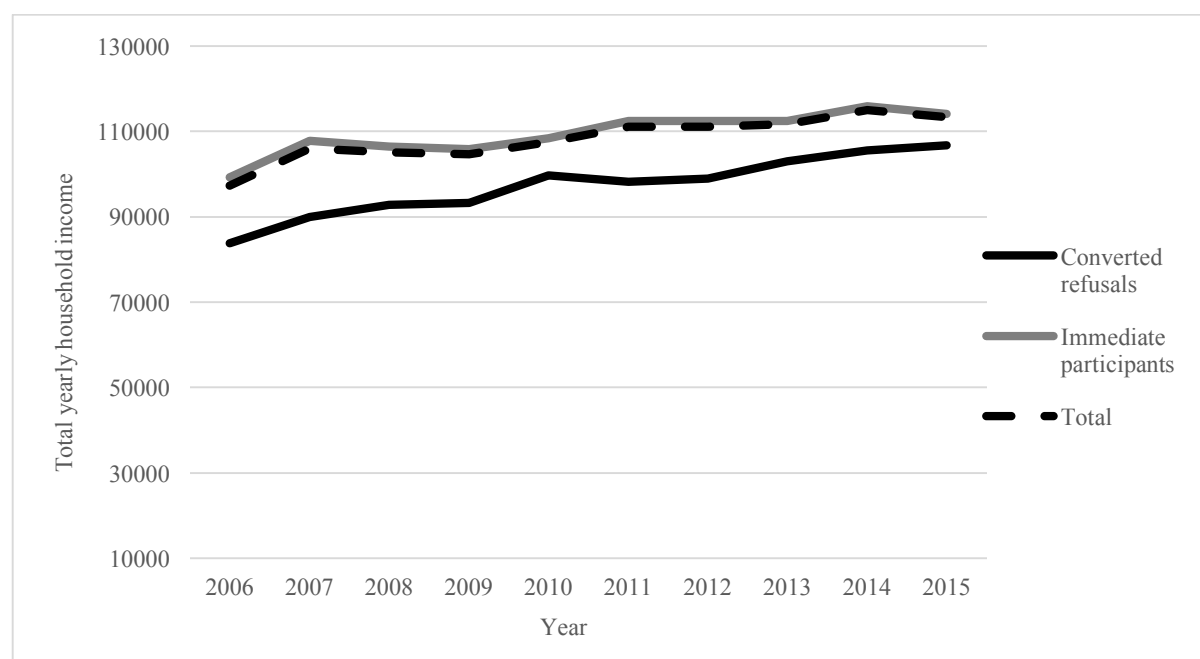
*Table 13: Long-term influence of refusal conversion on average estimate of yearly household income in the sample*

| Year | Total | | Immediate participants | | Converted refusals | | Difference [a] |
|---|---|---|---|---|---|---|---|
| | N | Mean | N | Mean | N | Mean | |
| 2006 | 4219 | 97339.7 | 3712 | 99187.2 | 507 | 83813.1 | -1847.5*** |
| 2007 | 3635 | 106034.9 | 3288 | 107733.6 | 347 | 89939.3 | -1698.7* |
| 2008 | 3470 | 105041.3 | 3128 | 106377.4 | 342 | 92821.7 | -1336.1* |
| 2009 | 3276 | 104626.9 | 2973 | 105787.9 | 303 | 93235.7 | -1161.0** |
| 2010 | 3263 | 107521.5 | 2957 | 108333.4 | 306 | 99676.1 | -811.9 |
| 2011 | 3148 | 111158.7 | 2854 | 112492.4 | 294 | 98211.6 | -1333.7+ |
| 2012 | 3051 | 111124.5 | 2767 | 112378.2 | 284 | 98910.1 | -1253.7+ |
| 2013 | 2960 | 111634.6 | 2694 | 112492.7 | 266 | 102943.2 | -858.1+ |
| 2014 | 2810 | 115001.6 | 2563 | 115908.3 | 247 | 105593 | -906.7+ |
| 2015 | 2724 | 113372.5 | 2477 | 114036.8 | 247 | 106711.2 | -664.3 |

*** significant at p<0.001 level; ** significant at p<0.01 level; * significant at p<0.05; + significant at p<0.1

[a] difference column is calculated as a difference between the total mean and the mean for immediate participants; declared as significant where the difference between the mean of immediate participants and the mean of converted refusals is significantly different from 0. For the analysis t-test was used.

The findings presented above are observable on the Graph 1, where the black line demonstrates average yearly household income for the group of respondents that was converted in 2006. The grey line represents the average yearly household income for the group of respondents that in 2006 participated immediately, without being converted. The dashed line shows average yearly household income for the both groups combined. We see that the income for immediate participants is higher than the income for converted refusals and that adding converted refusals *pulls down* the line of those that participated without conversion. Similar trends are observable on the following graphs in this section.

*Graph 1: Long-term influence of refusal conversion on the estimate of total yearly household income*

Turning to the estimation of the minimal monthly income to make ends meet (Table 14 and Graph 2), we see that by having converted households in 2006 in a long run we obtained different households in the sample. Those households that are converted in 2006 have significantly lower estimates of monthly income to make ends meet compared to those who participated immediately in 2006; inclusion of those households decreased the total estimate by between -30.9 and -69.6 CHF over the years. The difference is rather persistent, it is significant in all years except 2015.

*Table 14: Long-term influence of refusal conversion on average estimate of minimal monthly income to make ends meet in the sample*

| Minimum monthly income to make ends meet | | | | | | |
|---|---|---|---|---|---|---|
| Year | Total | | Immediate participants | | Converted refusals | | Difference [a] |
| | N | Mean | N | Mean | N | Mean | |
| 2006 | 3855 | 5122.6 | 3415 | 5184.2 | 440 | 4645.0 | -61.6*** |
| 2007 | 3314 | 5228.2 | 3014 | 5259.1 | 300 | 4917.9 | -30.9* |
| 2008 | 3219 | 5309.9 | 2914 | 5379.5 | 305 | 4644.5 | -69.6*** |
| 2009 | 3032 | 5402.3 | 2762 | 5456.5 | 270 | 4848.1 | -54.2*** |
| 2010 | 3064 | 5385.1 | 2783 | 5425.0 | 281 | 4990.2 | -39.9** |
| 2011 | 2975 | 5500.1 | 2699 | 5533.9 | 276 | 5169.6 | -33.8* |
| 2012 | 2881 | 5556.9 | 2619 | 5603.7 | 262 | 5089.4 | -46.8** |
| 2013 | 2766 | 5578.8 | 2517 | 5634.2 | 249 | 5018.2 | -55.4** |
| 2014 | 2642 | 5514.8 | 2407 | 5556.4 | 235 | 5088.3 | -41.6** |
| 2015 | 2551 | 5531.3 | 2320 | 5554.9 | 231 | 5294.6 | -23.6 |

*** significant at $p<0.001$ level; ** significant at $p<0.01$ level; * significant at $p<0.05$; + significant at $p<0.1$

[a] difference column is calculated as a difference between the total mean and the mean for immediate participants; declared as significant where the difference between the mean of immediate participants and the mean of converted refusals is significantly different from 0. For the analysis t-test was used.
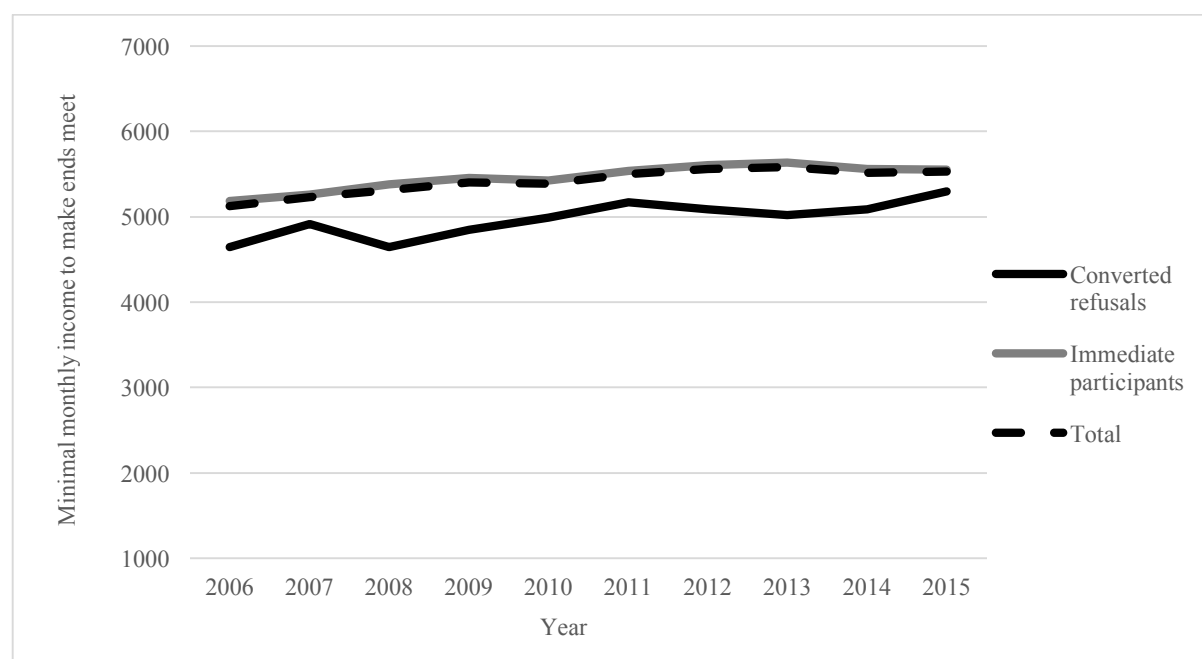
*Graph 2: Long-term influence of refusal conversion on average estimate of minimal monthly income to make ends meet in the sample*
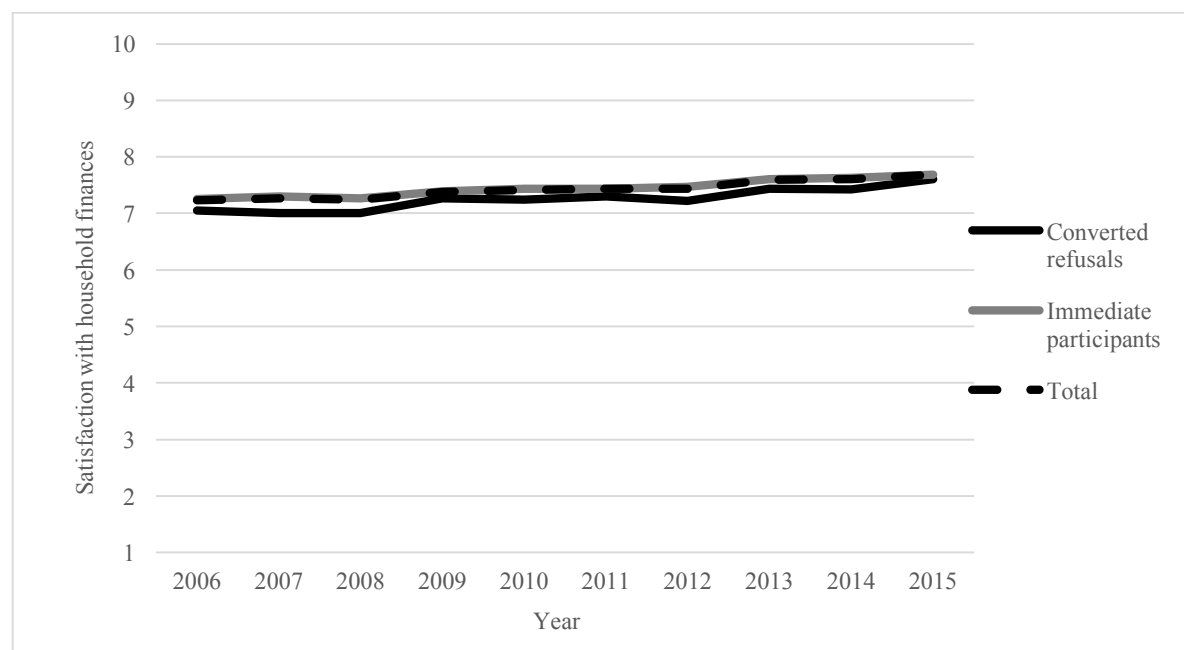
Table 15 and Graph 3 present long-term influence of refusal conversion on average estimate of satisfaction with household finances in the sample. Fewer financial resources are reflected in lower satisfaction with finances for converted households in six out of the ten examined years. Re-injection of refusing households decreases the overall satisfaction mean by .02 to .03 points.

*Table 15: Long-term influence of refusal conversion on average estimate of satisfaction with household finances in sample*

| Satisfaction with household finances | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Total | | Immediate participants | | Converted refusals | | Difference [a] |
| | N | Mean | N | Mean | N | Mean | |
| 2006 | 4213 | 7.23 | 3707 | 7.25 | 506 | 7.05 | -.02* |
| 2007 | 3616 | 7.27 | 3270 | 7.3 | 346 | 7 | -.03** |
| 2008 | 3433 | 7.24 | 3099 | 7.26 | 334 | 7.01 | -.02* |
| 2009 | 3210 | 7.38 | 2919 | 7.39 | 291 | 7.27 | -.01 |
| 2010 | 3238 | 7.41 | 2937 | 7.43 | 301 | 7.24 | -.02+ |
| 2011 | 3165 | 7.43 | 2867 | 7.44 | 298 | 7.3 | -.01 |
| 2012 | 3061 | 7.44 | 2776 | 7.47 | 285 | 7.22 | -.03* |
| 2013 | 2971 | 7.59 | 2704 | 7.6 | 267 | 7.44 | -.01 |
| 2014 | 2819 | 7.61 | 2573 | 7.63 | 246 | 7.42 | -.02+ |
| 2015 | 2732 | 7.69 | 2484 | 7.69 | 248 | 7.61 | .0 |

*** significant at p<0.001 level; ** significant at p<0.01 level; * significant at p<0.05; + significant at p<0.1

[a] difference column is calculated as a difference between the total mean and the mean for immediate participants; declared as significant where the difference between the mean of immediate participants and the mean of converted refusals is significantly different from 0. For the analysis t-test was used.

*Graph 3: Long-term influence of refusal conversion on average estimate of satisfaction with household finances in the sample*

So far, we can claim that refusal conversion has significant effect on survey estimates on the household level. In the following lines, we present our results for the individual level.
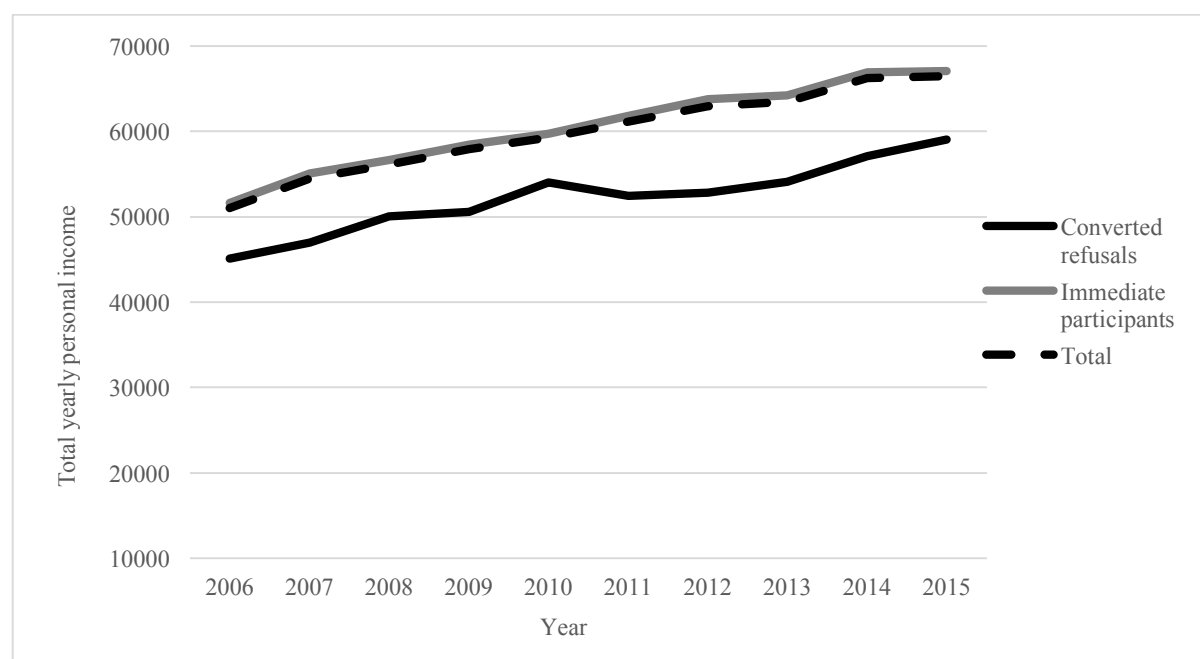
***Individual level***. When it comes to the estimate of yearly personal income, those converted in 2006 have an on average lower income compared to those who participated immediately in almost all the years after conversion (Table 16 and Graph 4).

*Table 16: Long-term influence of refusal conversion on average estimate of yearly personal income in sample*

| Yearly personal income | | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Total | | Immediate participants | | Converted refusals | | Difference [a] |
|  | N | Mean | N | Mean | N | Mean | |
| 2006 | 6659 | 50993.6 | 6041 | 51595.1 | 618 | 45114.8 | -601.5** |
| 2007 | 5532 | 54444.8 | 5110 | 55060.4 | 422 | 46990.4 | -615.6+ |
| 2008 | 5175 | 56138.8 | 4785 | 56633.8 | 390 | 50065.4 | -495.0+ |
| 2009 | 4828 | 57896.6 | 4476 | 58471.4 | 352 | 50586.4 | -574.8* |
| 2010 | 4887 | 59296.9 | 4516 | 59727.9 | 371 | 54050.8 | -431.0 |
| 2011 | 4766 | 61118.3 | 4398 | 61844.5 | 368 | 52438.8 | -726.2** |
| 2012 | 4570 | 62979.6 | 4228 | 63801.2 | 342 | 52823.1 | -821.6* |
| 2013 | 4360 | 63500.8 | 4042 | 64240.6 | 318 | 54097.3 | -739.8* |
| 2014 | 4125 | 66219.7 | 3837 | 66905.6 | 288 | 57082.5 | -685.9* |
| 2015 | 3996 | 66456.3 | 3706 | 67038.6 | 290 | 59014.3 | -582.3* |

\*\*\* significant at p<0.001 level; \*\* significant at p<0.01 level; \* significant at p<0.05; + significant at p<0.1

[a] difference column is calculated as a difference between the total mean and the mean for immediate participants; declared as significant where the difference between the mean of immediate participants and the mean of converted refusals is significantly different from 0. For the analysis t-test was used.

*Graph 4: Long-term influence of refusal conversion on average estimate of yearly personal income in the sample*

The difference between the groups is statistically significant in all the years except 2010. The inclusion of the group of converted refusals in 2006 decreases the total mean income for up to a thousand francs.
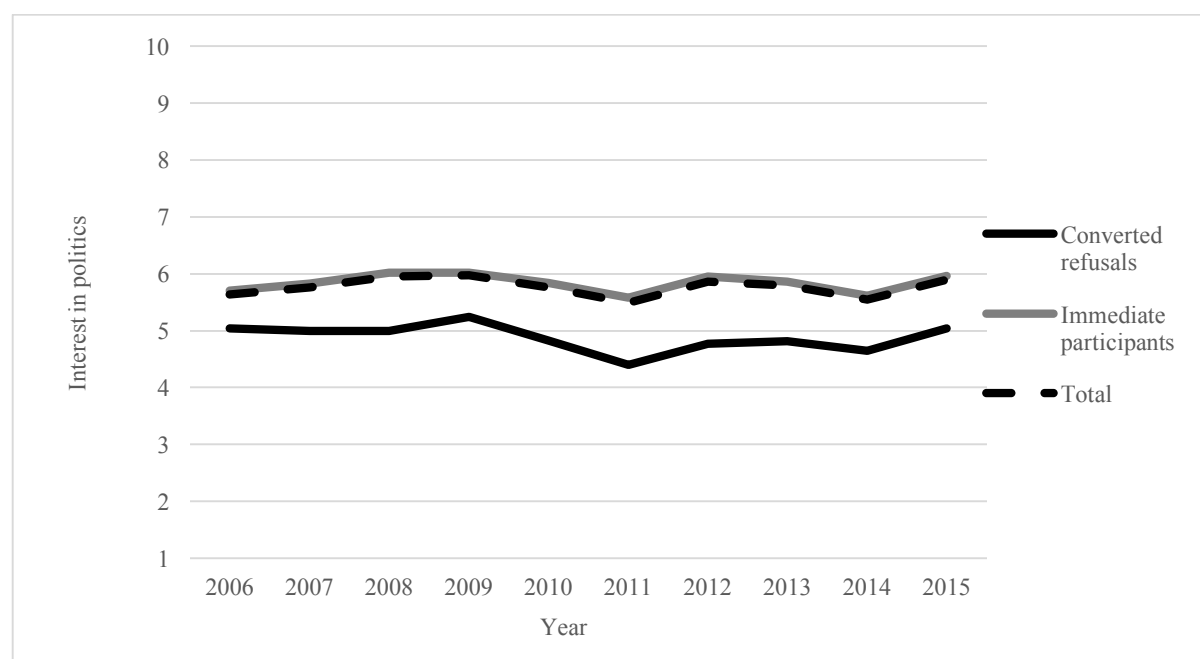
Long-term influence of refusal conversion on the estimates of interest in politics is presented in Table 17 and Graph 5. Again, as it was the case with income, it could be seen that there is a significant difference between converted refusals and immediate participants in all the years following conversion; however, taking the groups together, refusal conversion accounts for a decrease up to one decimal point in total mean.

*Table 17: Long-term influence of refusal conversion on average estimate of interest in politics in sample*

| | Interest in politics | | | | | | |
|---|---|---|---|---|---|---|---|
| Year | Total | | Immediate participants | | Converted refusals | | Difference [a] |
| | N | Mean | N | Mean | N | Mean | |
| 2006 | 6651 | 5.64 | 6035 | 5.70 | 616 | 5.04 | -.06*** |
| 2007 | 5529 | 5.76 | 5107 | 5.83 | 422 | 5.00 | -.07*** |
| 2008 | 5169 | 5.95 | 4779 | 6.02 | 390 | 5.01 | -.07*** |
| 2009 | 4824 | 5.97 | 4472 | 6.02 | 352 | 5.24 | -.05*** |
| 2010 | 4887 | 5.76 | 4516 | 5.84 | 371 | 4.83 | -.08*** |
| 2011 | 4765 | 5.49 | 4397 | 5.58 | 368 | 4.40 | -.09*** |
| 2012 | 4567 | 5.86 | 4225 | 5.95 | 342 | 4.77 | -.09*** |
| 2013 | 4355 | 5.79 | 4037 | 5.86 | 318 | 4.81 | -.07*** |
| 2014 | 4121 | 5.55 | 3833 | 5.61 | 288 | 4.65 | -.06*** |
| 2015 | 3989 | 5.90 | 3700 | 5.96 | 289 | 5.04 | -.06*** |

*** significant at p<0.001 level; ** significant at p<0.01 level; * significant at p<0.05; + significant at p<0.1

[a] difference column is calculated as a difference between the total mean and the mean for immediate participants; declared as significant where the difference between the mean of immediate participants and the mean of converted refusals is significantly different from 0. For the analysis t-test was used.

*Graph 4: Long-term influence of refusal conversion on average estimate of interest in politics in the sample*

Re-including those who refused to participate means diversifying the group of respondents by individuals with, in average, lower levels of general trust in people (Table 18). Refusal conversion has longitudinally significant effects on the average estimate of general trust in people – converted refusals decrease total mean for up to one decimal point. Although small, this effect is significant at $p<.001$ level in all the years.

*Table 18: Long-term influence of refusal conversion on average estimate of general trust in people in sample*

| General trust in people | | | | | | |
|---|---|---|---|---|---|---|
| Year | Total | | Immediate participants | | Converted refusals | | Difference [a] |
| | N | Mean | N | Mean | N | Mean | |
| 2006 | 6635 | 6.13 | 6021 | 6.18 | 614 | 5.65 | -.05*** |
| 2007 | 5515 | 6.26 | 5094 | 6.31 | 421 | 5.64 | -.05*** |
| 2008 | 5156 | 6.32 | 4768 | 6.37 | 388 | 5.73 | -.05*** |
| 2009 | 4820 | 6.40 | 4469 | 6.44 | 351 | 5.87 | -.04*** |
| 2010 | 4875 | 6.39 | 4505 | 6.42 | 370 | 6.01 | -.03*** |
| 2011 | 4761 | 6.44 | 4394 | 6.47 | 367 | 6.16 | -.03*** |
| 2012 | 4568 | 6.42 | 4226 | 6.46 | 342 | 6.01 | -.04*** |
| 2013 | 4351 | 6.35 | 4032 | 6.38 | 319 | 5.90 | -.03*** |
| 2014 | 4123 | 6.49 | 3836 | 6.52 | 287 | 6.09 | -.03*** |
| 2015 | 3995 | 6.54 | 3706 | 6.57 | 289 | 6.13 | -.03*** |

*** significant at $p<0.001$ level; ** significant at $p<0.01$ level; * significant at $p<0.05$; + significant at $p<0.1$

[a] difference column is calculated as a difference between the total mean and the mean for immediate participants; declared as significant where the difference between the mean of immediate participants and the mean of converted refusals is significantly different from 0. For the analysis t-test was used.
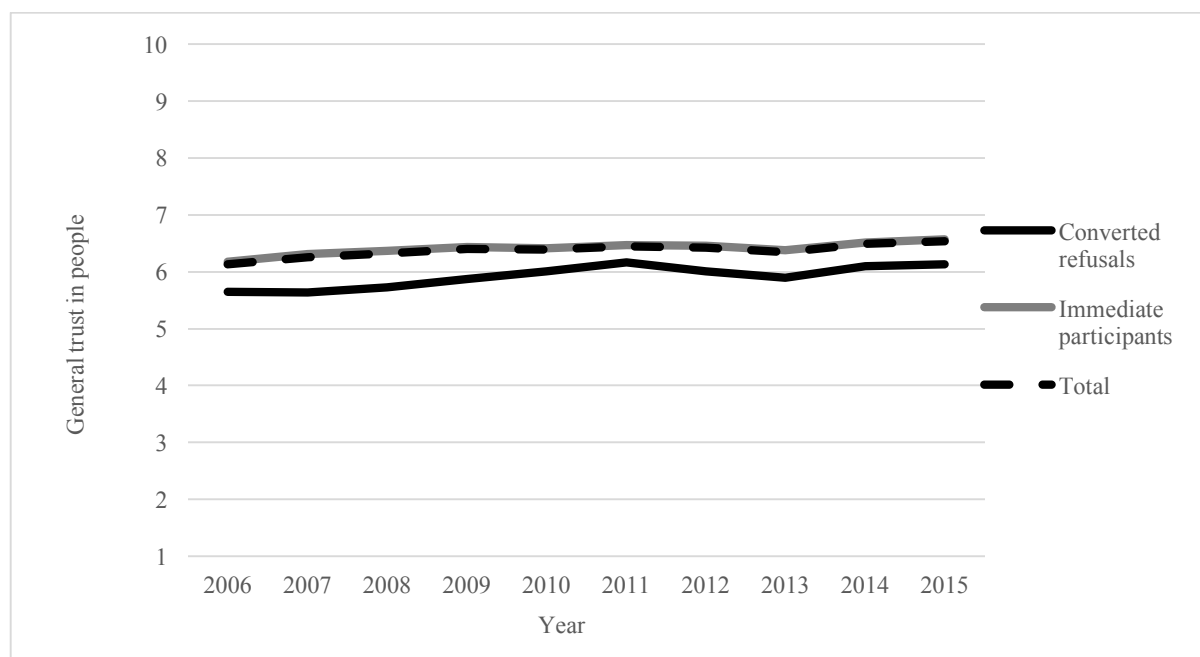
*Graph 6: Long-term influence of refusal conversion on average estimate of general trust in people in the sample*

Based on our results on both the household and the individual level, we can claim that we confirmed our hypothesis (H5) that refusal conversion affects survey estimates longitudinally, or stated differently, that the difference between converted refusals and immediate participants is persistent over time. We will come back to our findings in the Discussion. Meanwhile, we proceed to the effects of refusal conversion on measures of change.

**4.3.3 The effects of refusal conversion on measures of change.** We hypothesized that refusal conversion brings in the SHP households and individuals who are more dynamic, who experience more change over time compared to immediate respondents. In order to test the hypothesis, we created measures of change for three different periods: one-year change, three-year change and five-year change. Thus, when it comes to the group of successfully converted individuals, one-year change was calculated as absolute difference between the first wave following refusal conversion and the wave in which the conversion took part (for example, $|w_{2006} - w_{2005}|$). Three-year change was calculated as absolute difference between the third wave following refusal conversion and the wave in which the conversion took part (for example, $|w_{2008} - w_{2005}|$), while the same logic has been applied for five-year change (for example, $|w_{2010} - w_{2005}|$). The same differences were calculated for the group of immediate participants. For the comparison on the household level it should be noted that we selected only those households that were represented by the same reference person in both

time points of interest since it does not seem reasonable to examine, for example, the difference in satisfaction with finances if it has been expressed by different person. We ran separate regression analyses for all three change periods for each of the survey estimates presented in Table 19.

*Household level.* Table 19 shows us the comparison of immediate participants and converted respondents in terms of measures of change over time. We see that refusal conversion brings in households that change more in absolute terms in almost all the tested variables. Households that participated upon being converted change more after one year, three years or five years in terms of improvement or deterioration in standard of living, satisfaction with finances and manageability of financial situation. These households also change more in terms of an estimation of the minimum monthly income necessary to make ends meet; the coefficient is not significant for three-year change, however, the sign of it stays the same. When it comes to household income, even though it is not significant, we see that the direction of change follows our expectation - converted households change more in the first two change periods tested. However, significantly less change within 5 years is recorded for these households..

*Table 19: Coefficients of refusal conversion influence on 1-year, 3-year and 5-year change of survey estimates, household level*

| Change in… | 1-year change $(\|w_{t+1} - w_t\|)$ | 3-year change $(\|w_{t+3} - w_t\|)$ | 5-year change $(\|w_{t+5} - w_t\|)$ |
|---|---|---|---|
| …improvement or deterioration in standard of living | .11*** | .15*** | .11* |
| …satisfaction with finances | .13*** | .13** | .14** |
| …menageability of financial situation | .10*** | .14** | .21*** |
| …household income | 459.7 | 1143.4 | -3181.1+ |
| …minimum income to make ends | 87.9* | 35.59 | 214.8+ |

*** significant at p<0.001 level; ** significant at p<0.01 level; * significant at p<0.05; + significant at p<0.1

*Individual level.* The analysis of measures of change on individual level was the same as on the household level. The only difference here is that we controlled for education, gender, age and civil status. In the analysis, change in one of the survey estimates was treated as dependent variable and being converted as independent variable.

Significant positive coefficients (Table 20) on the majority of survey estimates demonstrate that refusal conversion brings in individuals that change more in absolute terms in the years following conversion.

*Table 20: Coefficients of refusal conversion influence on 1-year, 3-year and 5-year change of survey estimates, individual level*

| Change in… | 1-year change ($|w_{t+1} - w_t|$) | 3-year change ($|w_{t+3} - w_t|$) | 5-year change ($|w_{t+5} - w_t|$) |
|---|---|---|---|
| …employment | .009* | .013+ | .011 |
| …club membership | -.003 | .013 | .002 |
| …life satisfaction | .121*** | .115*** | .070* |
| …satisfaction with finances | .158*** | .121*** | .095* |
| …satisfaction with living together/alone | .073** | .089** | .021 |
| ...interest in politics | .149*** | .142*** | .168*** |
| …income | 949.48 | -405.61 | -2129.63** |
| …satisfaction with health | .117*** | .068* | .076* |

*** significant at p<0.001 level; ** significant at p<0.01 level; * significant at p<0.05; + significant at p<0.1

*Controlled for education, gender, age and civil status.

Satisfaction with health, with finances, with life, with living together and interest in politics change significantly more for converted refusals during all three calculated periods. Significant absolute change for the first two periods tells us that refusal conversion phase brings to the SHP, at least for the subsequent three waves, group of those with more transitions on labour market. When it comes to income, there is no statistically significant difference in change in income between the two concerned groups for the first two years. However, after five years, converted refusals are characterized by less change in income. We have observed similar pattern om the household level as well.

Converted refusals are almost always a different group in terms of change. Given the unexpected effect of income, we could say that the hypothesis is partially confirmed: converted refusals are a more dynamic group on many indicators since across various periods they change more in absolute terms compared to the group of immediate participants.

**4.3.4 The effects of refusal conversion on data quality.** In this section, we tested the hypothesis (H7) that participation from refusal converted respondents comes at a cost of worse quality of the data. Analysis was performed on the individuals who participated without being converted and those who participated after conversion during. We used two indicators of data quality, aggregated item nonresponse and responding to sensitive questions. We calculated item nonresponse as the number of items for which either "Don't know" or "No answer" was given. For the second indicator, willingness to respond sensitive questions, we used the imputed income variable which reveals whether a respondent provided an answer on the question of his or her income. Since revealing income is considered sensitive question,

we expected that converted respondents will be less likely to reveal their income; therefore that income in this group will be imputed more often.

We fitted two different models: the first one, negative binomial Poisson regression, testing the effect of refusal conversion on aggregated item nonresponse (Table 21), and the second, binomial logistic regression (Table 22), testing the effect of refusal conversion on aggregated item nonresponse. For both analyses, we controlled for clustering of time points in individuals and demographic characteristics.

*Table 21: Negative binomial Poisson regression of immediate participants versus converted refusals on item non-response; N observations = 87183, N of clusters = 17743*

| | Item non-response | | |
|---|---|---|---|
| | Coefficient | Standard error | Significance |
| Women | .253 | .02 | 0.000 |
| | | | |
| Age (compared to 14-24) | | | |
| 25-34 | .181 | .03 | 0.000 |
| 35-44 | .219 | .03 | 0.000 |
| 45-54 | .280 | .03 | 0.000 |
| 55+ | .404 | .02 | 0.000 |
| | | | |
| Employed | -.110 | .02 | 0.000 |
| | | | |
| Education (compared to compulsory) | | | |
| Secondary | -.269 | .02 | 0.000 |
| Tertiary | -.425 | .02 | 0.000 |
| | | | |
| Converted vs immediate participants | .278 | .02 | 0.000 |

Being converted is positively associated with the number of missing values, revealing worse data quality of data provided upon conversion. When controlled for sex, age, employment and education, being converted increases item non-response for 0.28 units.

*Table 22: Binomial logistic regression of immediate participants versus converted refusals on imputed income, N observations = 87183, N of clusters = 17743*

| | Imputed income | | |
|---|---|---|---|
| | Coefficient | Standard error | Significance |
| Women | .104 | .06 | 0.067 |
| | | | |
| Age (compared to 14-24) | | | |
| 25-34 | .076 | .10 | .424 |
| 35-44 | .288 | .09 | .001 |
| 45-54 | .600 | .08 | .001 |
| 55+ | .807 | .07 | .001 |
| | | | |
| Employed | .089 | .06 | .123 |
| | | | |
| Education (compared to compulsory) | | | |
| Secondary | -.099 | .06 | .128 |
| Tertiary | -.133 | .08 | .108 |
| | | | |
| Converted vs immediate participants | .684*** | .05 | .000 |

However, overall, the mean number of item non-response is not big – while immediate participants leave in average 1.09 questions unanswered, converted refusals miss to answer 1.78 questions in average.

The second analysis shows that the group of converted respondents is less likely to reveal their income, hence for them income was imputed more often. Income was imputed for 12% of the observations coming from the refusal conversion phase and only for 6.5% of observations coming from the regular phase of the fieldwork.

Here our hypothesis that the group of converted refusals will report data of poorer quality has been confirmed since more item-nonresponse was recorded in the group of converted refusals and since they revealed their income less often.

In the following chapter we discuss our findings in light of our research questions.

## 5. Discussion

In this chapter we offer the summary of the main findings and discuss potential shortcomings of the approach we took.

The first aim of our study was to assess the *impact of refusal conversion on cross-sectional and longitudinal participation rates in the Swiss Household Panel.*

We have seen that between 20% and 50% of households re-approached in the refusal conversion phase complete household questionnaire, while between 37% and 58% individuals re-approached complete individual questionnaire. These rates account for an increase in sample sizes between 5% and 18% on the household level and between 4% and 15% on the individual level. The numbers are considerable given that high retention rates are essential for the survival of panel surveys in a long run.

Once converted, the percentage of households or individuals who respond at subsequent waves declines over time considerably compared to the percentage of households and individuals that do not need to be re-approached in order to participate. The same is the case with BHPS although the decrease in the SHP is not that steep as it is in the study of Burton et al. (2006). The finding is a bit surprising since BHPS employs face-to-face mode, which is known to have higher response rates compared to other modes. The reason might be the differences in included refusals in two studies; while the study of BHPS examined only sampled members who refused and were converted in the same wave, our study included all converted refusals, regardless of the wave when they refused, in the same or in one of the previous waves of the SHP. The majority of households or individuals approached in the refusal conversion phase of the SHP actually refused in previous waves. Starting from 2010, households that refuse at contact are not re-approached in two years in a row and then re-contacted in a third year in refusal conversion phase. There is indication from available research that elapsed time positively contributes to success of refusal conversion attempt (Beullens et al., 2010). The fact that in the SHP not all approached refusals are current-wave refusals might explain its higher retention rates compared to the BHPS.

The importance of participation history in the panel is shown in both studies. Namely, it is noticeable that the earlier the participant are converted, the more likely they are to participate in the survey for a longer time period. In other words, the later they are converted in their participation history, the more likely they are to drop out in one of the subsequent waves. This might be due to fact that over time people more often refuse due to their

experience with the panel or panel fatigue, as Laurie et al. (2004) name it, which makes them less likely to be persuaded to take part in the survey again.

The second aim of our study was to assess the extent to which refusal conversion compensates for the loss caused by attrition in the Swiss Household Panel. We wanted to examine if converted refusals were different from nonrespondents and those who never needed to be converted in terms of household characteristics and socio-demographics.

On the household level we did not have enough support for our hypothesis that converted households are more similar to those that dropped out and different from those never needing to be converted. In the SHP we lose households of smaller size, non-owners, whose inhabitants move often or leave in apartments. Refusal conversion does not completely compensate for this loss.

The analytical approach we chose here might had influenced our results. In this paper, when studying differences between the three groups and potential of refusal conversion to compensate for the bias induced by attrition, we excluded those respondents who left the panel due to death, emigration or institutionalisation. However, we did not differentiate between the respondents who dropped out because it was not possible to locate them after movement or to contact them and those dropped out because they refused. These two groups are sometimes differentiated in literature and it is shown that they are sources of different nonresponse bias (for example, Lynn & Clarke, 2002). Converted refusals are expected to compensate for the bias that was induced due to refusal. Here, it seems that we had bias that was introduced by difficulty to contact or locate. Similar problems we have when we analyse all individuals instead of reference persons only (Table A6 and Table A7 in the Appendix).

Theoretically, to justify our approach, we could claim that the distinction between non-contact and refusal is not always that clear. For example, an individual that at first hesitated to participate in the study, made a vague appointment for the interview and then never picked up because he or she recognized the fieldwork agency number would be coded as non-contact in the SHP. However, we could equally assume that this individual was "implicit refusal" or was "too polite to refuse directly". Practically, refusal conversion in the SHP sometimes includes households that are coded as noncontacts or with invalid telephone number (Dangubić & Voorpostel, 2017). Although the lack of clear documentation impedes us from knowing why this is the case, the SHP practice itself justifies our methodological approach. Personally, our interest in this study was whether refusal conversion can compensate for loss due to attrition, regardless of what caused attrition itself. We do not

claim that it would be less useful to know whether refusal conversion compensates more for the attrition caused by refusal than for the attrition caused by non-contact.

On the individual level, we have seen that refusal conversion compensates for those who attrite in the SHP. Converted respondents are similar to nonrespondents and different from never converted respondents, especially when it comes to male individuals, those below 25 years, with lower educational qualifications and of poorer health. This could be a good indication that potential bias caused by attrition is reduced in the SHP to the extent to which these characteristics determine survey estimates.

The third aim of our study was to examine the effects that refusal conversion has on estimates of substantial variables (both cross sectionally and longitudinally), measures of change over time and data quality.

We showed that refusal conversion in the SHP significantly affects the estimates of substantial variables, such as measures of financial situation, interest in politics and general trust in people. For these measures, differences between immediate and converted participants are stable even when controlled for socio-demographics which shows that there is something in these indicators that makes them genuinely associated with participation in surveys. On the contrary, we did not observe effects of refusal conversion on estimates of satisfaction with health and satisfaction with life in general. Comparing never converted and converted participants with the dropouts (Tables A9 and Table A10 in the Appendix) indicates that our estimates might be biased in terms of satisfaction with life in general since we lose those less satisfied.

In order to test whether refusal conversion affects survey estimates longitudinally we selected those estimates for which cross-sectional effects were significant: estimates of personal and household income, minimal monthly income to make ends meet, satisfaction with finances, interest in politics and general trust in people and analysed. In general, we have seen that the differences in survey estimates between converted refusals and immediate participants are persistent over the years; in other words, we have seen that refusal conversion has longitudinal effects on survey estimates.

However, our findings have several weak points. Although the difference between converted refusals and immediate participants is persistent, the effect that converted refusals have on total survey estimates is sometimes rather small; that is the case with estimates of political interest and general trust in people were converted refusals decrease total survey estimates by up to one decimal point. Furthermore, in some years the difference is not

observed at all, for example, converted refusals did not bring significant change in terms of satisfaction with finances in 4 out of 6 years. Moreover, sometimes the observed effect is only a trend with significance at 10% level, as in the case of household income in later years.

Despite these shortcomings, it could be argued that the refusal conversion is still effective procedure in the SHP. First, given the relatively small number of refusal converted respondents in each year and considerably bigger sample of those who participated immediately, it is not surprising that the significant effects are sometimes small or missing. There is enough indication that the refusal converted group is different than the group of immediate participants; therefore, we can assume that having more participants from the refusal conversion phase in a specific year would yield more significant influences on the total survey estimates. Second, the examples we provided are rather isolated cases of refusal conversion in a single year of the panel. It can be assumed that cumulative effects of refusal conversion over the years would be more significant. Third, given that attrition is the main threat to panel studies, having more individuals in the sample seems to be a good strategy even when difference in estimates is small.

In this paper, we made a step further compared to the studies available so far by examining the association between converted and immediate respondents on the one hand and measurement of change over time on the other hand. The results indicate that converted refusals are almost always a distinctively different group in terms of change and, in the majority of cases, a group that changes more, both on the household and the individual level. Although not thoroughly discussed, some indication that converted refusals could be a more dynamic group is visible in the study of Burton et al. (2006) were more transition on labour market and more change in income was recorded for converted refusals. However, the difference between our study and the one of Burton et al. (2006) is that we take prospective approach by calculating change in the years following conversion, while Burton et al. took a retrospective approach by observing what preceded refusal conversion. Although a retrospective approach is useful in revealing possible antecedents of refusal, the only way to find out what is *gained* by the process of refusal conversion is to make a prospective approach, as it is the case here.

Studies on attrition in the SHP showed that change could be related to drop out (Voorpostel & Lipps, 2011). However, as stated by the authors, one of the limitations of the study was that change could not be measured at the time when sample members dropped out, but only before. Assuming that converted refusals are successfully prevented dropouts, it would be useful to examine the group of current-wave refusals in the SHP and indeed test

whether more change is captured between the two waves, the last wave of participation and the current wave when they intended to leave the survey and refused to participate.

When it comes to data quality, we examined whether data from refusal conversion phase of the SHP come at the expense of data quality, operationalized both by willingness to respond to sensitive questions (income imputation) and willingness to respond to all questions (item nonresponse). The findings here are in line with other studies that report more missing items among converted respondents than among initial respondents (for example, Triplett, 2002; Yan & Curtin, 2010; Lipps, 2011, Olson, 2013). We can think of two alternative explanations of our results. The first that converted refusals, initially less *motivated* to participate, are later less motivated to fill in the questionnaire, as suggested by Keeter et al. (2000). The second that converted refusals are less *capable* of completing all the questions. We have seen that converted refusals are in general less educated than initial participants, therefore the difference in provided substantial answers might actually be the difference in their cognitive capabilities.

Beside item non-response, we have seen that converted refusals are also less likely to respond to sensitive questions, that is, to reveal their income, leading to more frequent imputation of it. The fining is in line will the studies described in the introduction (Caroll and Chong, 2006; Olson, 2013). It is not sure whether higher item non-response and more frequently imputed income are a consequence of refusals' general lack of motivation for participating in surveys and therefore general avoidance to answer the questions (especially if they carry cognitive burden such as calculating one's income) or a consequence of hesitation to reveal sensitive personal information such as income due to fact that they are a less trusting group of people in general. From the study of Green (1991) we also know that reluctant respondents have lower self-rating. Maybe participants' lower income stimulated their lower self-esteem and led to hiding one's income as a way to protect oneself.

The approach we chose in this study is to look at refusal conversion process in general, most often by pooling the data of all available years. However, it should be noted that this approach does not let us conclude how successful conversion was in terms of rebalancing sample or how it influences survey estimates in any specific years. Since the process of converting refusals is different in each year (sometimes it is accompanied with incentives or specially designed fliers intended to motivate sample members to take part), additional analysis would be necessary to judge when and under which conditions refusal conversion was particularly successful. It should be noted that this study is focused rather on

outcomes than on mechanisms underlying refusal conversion process. Current knowledge would be enriched by the study of different situational and personal factors that influence successful conversions.

In our analysis, we did not differentiate current-wave and previous-wave refusals, aware of the fact that this factor could interfere our results. The reason for such a decision is that the refusal conversion procedure in the Swiss Household Panel has changed from year to year and while in 2005 only current-wave refusals were approached, in later years mostly previous wave refusals received conversion refusal attempt, therefore the frequencies of current wave refusals would be quite low. Another reason is that possibility of refusing on several levels (at contact, after completing grid, after completing household questionnaire), different "cool down" periods and different strategies of re-approaching from wave to wave make quite quickly the whole issue difficult to disentangle.

Additional limitation is that not all previous wave refusals refused in the same wave. While some refusals partially participated in the previous wave, some were present for the last two or three waves. Moreover, not all individuals treated as refusals refused for themselves. In cases where the reference individual refused on the household level, all members of the household were treated as refusals and approached in refusal conversion phase in the current or one of the following waves of the panel. So rather than trying to respond to the question "are refusals different from participants?", we tried to respond to the question "in refusal conversion, did we obtain individuals and households different from those who initially participated without additional fieldwork efforts?".

## 6. Conclusion

In this paper, we tried to contribute to the relatively understudied topic of refusal conversion and its lack of the literature in longitudinal surveys. We focused on the effects that refusal conversion has on participation, sample composition, survey estimates both cross-sectionally and longitudinally, measurement of change over time and data quality.

We can undoubtedly claim that refusal conversion in the Swiss Household Panel brings benefits to the study concerning increased sample size, both cross-sectionally and longitudinally.

We found out that the history of the panel influences effectiveness of refusal conversion in terms of turning converted refusals into loyal panel members. These finding carry implications for allocation of resources during panel history. Namely, they imply that it might be more useful to allocate more resources for refusal conversion in the beginning of the panel. This could be particularly relevant for the future fourth sample of the SHP. It might be better to put more effort in refusal conversion in the first waves since it might create loyal respondents and keep them in for a longer period. Maybe re-issuing all refusals in the earlier waves of the panel might be worthwhile decision.

Not only that refusal conversion in the SHP brings *more* respondents, but it also brings *different* respondents: younger, mail, with lower qualifications, less affluent. Our findings suggest that refusal conversion is successful strategy in compensating for loss caused by non-selective attrition and plausibly in reducing non-response bias. In cases where it was not that successful, maybe a more tailored design in approaching refusals would be useful. Specially designed strategies for groups at risks (lower interest in politics, less affluent financial situation, lower education, single individuals, one-person-households) in refusal conversion phase might be more effective. Conducting an experiment in an ongoing wave of the SHP where half of refusals would be approached based on the common procedure established in 2010, while half of refusals would be approached in a tailored way where the priority would be to convert refusals as different as possible from households or individuals who initially participated would be beneficial for the SHP.

Had not refusal conversion been carried out, many survey estimates in the SHP would have been different. Additional efforts to recruit refusals bring us less affluent respondents and those with lower social trust and interest. Not only that refusal conversion affects survey estimates cross-sectionally, but it also brings in households and individuals that make significant longitudinal effects on survey estimates. In further research, it would be useful to

examine other estimates than the ones we used here. Also, we would benefit from knowledge if the effects would be stronger had we used the group of all *ever converted* respondents and not just those converted in 2006.

Our results on the association between refusal conversion and measures of change suggest that refusal conversion positively contributes to the SHP in its aim to measure social change. Re-injecting refusals to the respondent pool mostly means re-including households and individuals that experience more change over time. One limitation of our study is that we focused only on absolute change, while the direction of change has not been examined. In the future, it would be useful to examine in which way is refusal conversion exactly related with change. Could it be that refusals, generally less interested in politics and with lower income, are successfully converted at times when their interest in politics or their income increase?

In the SHP data from refusal conversion come at the expense of data quality; converted refusals are less likely to provide a substantial response or to respond to sensitive questions. Although converted respondents are more prone to respond that they do not know, not to respond at all or to hide their income, it is unknown here whether they provide worse data quality also by satisficing more or by distorting their responses from the true values. By conducting experiments on satisficing or associating respondent-provided data with available administrative data we would gain deeper insight of how data quality is affected by persuading respondents to participate after they initially refused.

No data is perfect and maybe by refusal conversion we gained the best we could. Although converted refusals increase the number of missing values in our data, we can argue that poorer quality of their responses should not prevent additional efforts since they are different enough to bring significantly variety to our responding group.

Researchers on conversion want to know if refusal conversion is *justified* or *successful*. Both terms are quite vague and make the question difficult to answer. We still do not have criteria for successful refusal conversion, it is not specified what response or conversion rates are satisfying, what level of bias even after conversion is tolerable, what data quality is *good enough* and at what costs. Question of justification and costs is the question that should be approached and answered for every study separately. Here we can only say that studying refusal conversion is important, not only because it will enrich our methodological knowledge, but also because maybe exactly those survey estimates for which bias was reduced due to refusal conversion will contribute one day to positive social change.

Whether refusal conversion is ethical or not, it is still difficult to tell. Not approaching those who explicitly stated that they do not want to be re-approached means showing respect

for respondents. However, does persuading amenable individuals mean using too much power? If the ends justify the means, then hoping that we will contribute positively to the society justifies being persuasive from time to time.

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## 8. Appendix

Table A1. Description of variables used in the study

| *Refusal conversion related variables* |
| --- |
| The number of sampled members that received refusal conversion attempt |
| The number of converted participants |
| *Refusal conversion rate*: the number of individuals successfully converted divided with the number of conversion attempts made |

| *Demographic variables* |
| --- |
| Gender (male vs female) |
| Age (14-24; 25-34; 35-44; 45-54; 55+) |
| Education (Primary; Secondary; Tertiary) |
| Civil status (Single; Married or registered partnership; Separated, divorced or dissolved partnership; Widowed) |
| Employment (Employed vs non-employed or not in labour market) |

| *Household characteristics* |
| --- |
| Household size (1 individual; 2 individuals; 3 individuals; 4+ individuals) |
| Household type (One person household; Couple with children; Couple without children, One parent with children) |
| Type of residence (Apartment building; House; Another) |
| Presence of children in the household (Yes; No) |
| Region where household is located (Lake Geneva, Middleland; North-west Switzerland; Zurich; East Switzerland; Central Switzerland; Ticino) |
| Urbanity of household location (Urban; Non-urban) |
| Household moved from last year (Yes; No) |
| Accommodation ownership (Yes; No) |

| *Health related variables* |
| --- |
| Self-assessed health status (Very well, Well, Average or worse)[2] |

| *Variables related to financial situation* |
| --- |
| Total personal yearly income |

---

[2]Originally the variable has 5 categories; here it was reduced to three due to small percentage of those who report bad health.

*Total household yearly income*

*Minimum income needed to make ends*

*Income assessment (saves money, spends what it earns, eats into its assets and savings, gets into debts)*

*Manageable financial situation (0-10)*

*Improvement in standard of living (0-10)*

**Satisfaction**

*Satisfaction with health (0-10)*

*Satisfaction with life in general (0-10)*

*Satisfaction with health (0-10)*

*Satisfaction with living arrangements (0-10)*

*Satisfaction with living together or alone (0-10)*

*Satisfaction with household finances (0-10)*

**Social trust and interest**

*Interest in politics (0-10)*

*General trust in people (0-10)*

**Measures of change over time**

*Absolute change in interest in politics*

*Absolute change in satisfaction with finances*

*Absolute change in satisfaction with life in general*

*Absolute change in satisfaction with health*

*Absolute change in total yearly household income*

*Absolute change in total yearly personal income*

*Absolute change in minimal monthly income to make ends meet*

*Absolute change in improvement in standard of living*

*Absolute change in manageability of financial situation*

*Absolute change in satisfaction with living arrangements*

*Absolute change in satisfaction with living together/alone*

**Data quality indicators**

*The number of item non-response and "don't know" answers for the whole individual questionnaire*

*Imputed income (Yes; No)*

Table A2. Outcome at subsequent waves for successful conversion on household level, SHP I

| Conversion Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| N attempts | 306 | 753 | 150 | 458 | 843 | 480 | 445 | 381 | 286 | 340 | 350 |
| N converted (%) | 70 (22.9%) | 286 (38.0%) | 26 (17.3%) | 220 (48.0%) | 429 (50.9%) | 216 (45.0%) | 177 (39.8%) | 157 (41.2%) | 122 (42.7%) | 103 (30.3%) | 139 (39.7%) |
| Subsequent wave participation | | | | | | | | | | | |
| 2006 | 52 (74.3%) | | | | | | | | | | |
| 2007 | 50 (71.4%) | 201 (70.3%) | | | | | | | | | |
| 2008 | 48 (68.6%) | 206 (72.0%) | 19 (73.1%) | | | | | | | | |
| 2009 | 44 (62.9%) | 178 (62.2%) | 18 (69.2%) | 169 (76.8%) | | | | | | | |
| 2010 | 49 (70.0%) | 178 (62.2%) | 19 (73.1%) | 162 (73.6%) | 361 (84.2%) | | | | | | |
| 2011 | 44 (62.9%) | 179 (62.6%) | 20 (76.9%) | 154 (70.0%) | 314 (73.2%) | 163 (75.5%) | | | | | |
| 2012 | 43 (61.4%) | 174 (60.8%) | 19 (73.1%) | 153 (69.6%) | 301 (70.2%) | 144 (66.7%) | 133 (75.1%) | | | | |
| 2013 | 41 (58.6%) | 162 (56.6%) | 19 (73.1%) | 142 (64.6%) | 265 (61.8%) | 134 (62.0%) | 113 (63.8%) | 108 (68.8%) | | | |
| 2014 | 37 (52.9%) | 149 (52.1%) | 18 (69.2%) | 131 (59.6%) | 246 (57.3%) | 118 (54.6%) | 99 (55.9%) | 88 (56.1%) | 63 (51.6%) | | |
| 2015 | 37 (52.9%) | 149 (52.1%) | 19 (73.1%) | 124 (56.4%) | 237 (55.2%) | 109 (50.5%) | 99 (55.9%) | 87 (55.4%) | 53 (43.4%) | 69 (67.0%) | |

Table A3. Outcome at subsequent waves for successful conversion on individual level, SHP I

| Conversion Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| N attempts | 189 | 601 | 56 | 481 | 1003 | 505 | 412 | 330 | 248 | 229 | 293 |
| N converted (%) | 76 (40.2%) | 350 (58.2%) | 33 (58.9%) | 268 (55.7%) | 577 (57.5%) | 262 (51.9%) | 210 (51.0%) | 182 (55.2%) | 105 (42.34%) | 109 (47.6%) | 139 (47.4%) |
| Subsequent wave participation | | | | | | | | | | | |
| 2006 | 51 (67.1%) | | | | | | | | | | |
| 2007 | 47 (61.8%) | 247 (70.6%) | | | | | | | | | |
| 2008 | 47 (61.8%) | 248 (70.9%) | 26 (78.8%) | | | | | | | | |
| 2009 | 42 (55.3%) | 216 (61.7%) | 25 (75.8%) | 204 (76.1%) | | | | | | | |
| 2010 | 48 (63.2%) | 222 (63.4%) | 27 (81.8%) | 198 (73.9%) | 488 (84.5%) | | | | | | |
| 2011 | 41 (54.0%) | 219 (62.6%) | 27 (81.8%) | 191 (71.3%) | 427 (74.0%) | 208 (79.4%) | | | | | |
| 2012 | 43 (56.6%) | 209 (59.7%) | 25 (75.8%) | 185 (69.0%) | 392 (67.9%) | 178 (67.9%) | 165 (78.6%) | | | | |
| 2013 | 37 (48.7%) | 193 (55.1%) | 24 (72.7%) | 169 (63.1%) | 346 (60.0%) | 161 (61.5%) | 132 (62.9%) | 125 (68.7%) | | | |
| 2014 | 35 (46.1%) | 177 (50.6%) | 22 (66.7%) | 153 (57.1%) | 321 (55.6%) | 143 (54.6%) | 116 (55.2%) | 103 (56.6%) | 59 (56.2%) | | |
| 2015 | 36 (47.4%) | 178 (50.9%) | 22 (66.7%) | 140 (52.2%) | 305 (52.9%) | 133 (50.8%) | 116 (55.2%) | 92 (50.6%) | 55 (52.4%) | 62 (56.9%) | |

Table A4. Outcome at subsequent waves for successful conversion on household level, SHP II

| Conversion Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| N attempts | 488 | 807 | 197 | 744 | 303 | 483 | 263 | 347 | 238 | 273 | 271 |
| N converted (%) | 89 (18.2%) | 222 (27.5%) | 39 (19.8%) | 322 (43.3%) | 146 (48.2%) | 192 (39.8%) | 104 (39.5%) | 108 (31.1%) | 100 (42.0%) | 87 (31.9%) | 87 (32.1%) |
| **Subsequent wave participation** | | | | | | | | | | | |
| 2006 | 53 (59.6%) | | | | | | | | | | |
| 2007 | 47 (52.8%) | 145 (65.3%) | | | | | | | | | |
| 2008 | 46 (51.7%) | 129 (58.1%) | 20 (51.3%) | | | | | | | | |
| 2009 | 48 (53.9%) | 116 (52.3%) | 20 (51.3%) | 231 (71.7%) | | | | | | | |
| 2010 | 52 (58.4%) | 124 (55.9%) | 25 (64.1%) | 195 (60.6%) | 103 (70.6%) | | | | | | |
| 2011 | 53 (59.6%) | 119 (53.6%) | 23 (59.0%) | 190 (59.0%) | 84 (57.7%) | 143 (74.5%) | | | | | |
| 2012 | 49 (55.1%) | 112 (50.5%) | 19 (48.7%) | 172 (53.4%) | 83 (56.9%) | 118 (61.5%) | 77 (74.0%) | | | | |
| 2013 | 46 (51.7%) | 105 (47.3%) | 17 (43.6%) | 166 (51.6%) | 75 (51.4%) | 108 (56.3%) | 68 (65.4%) | 71 (65.7%) | | | |
| 2014 | 46 (51.7%) | 99 (44.6%) | 20 (51.3%) | 138 (42.9%) | 64 (43.8%) | 93 (48.4%) | 57 (54.8%) | 53 (49.1%) | 65 (65.0%) | | |
| 2015 | 42 (47.2%) | 99 (44.6%) | 19 (48.7%) | 124 (38.5%) | 63 (43.2%) | 88 (45.8%) | 46 (44.2%) | 48 (44.4%) | 52 (52.0%) | 58 (66.7%) | |

Table A5. Outcome at subsequent waves for successful conversion on individual level, SHP II

| Conversion Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| N attempts | 249 | 458 | 102 | 737 | 356 | 440 | 229 | 264 | 208 | 180 | 187 |
| N converted (%) | 90 (36.1%) | 268 (58.5%) | 46 (45.1%) | 399 (54.1%) | 168 (47.2%) | 247 (56.1%) | 125 (54.6%) | 113 (42.8%) | 91 (43.8%) | 77 (42.8%) | 78 (41.7%) |
| **Subsequent wave participation** | | | | | | | | | | | |
| 2006 | 49 (54.4%) | | | | | | | | | | |
| 2007 | 46 (51.1%) | 175 (65.3%) | | | | | | | | | |
| 2008 | 47 (52.2%) | 142 (53.0%) | 27 (58.7%) | | | | | | | | |
| 2009 | 46 (51.1%) | 136 (50.8%) | 27 (58.7%) | 257 (64.4%) | | | | | | | |
| 2010 | 51 (56.7%) | 149 (55.6%) | 25 (54.4%) | 246 (61.7%) | 126 (75.0%) | | | | | | |
| 2011 | 48 (53.3%) | 149 (55.6%) | 24 (52.2%) | 239 (59.9%) | 106 (63.1%) | 184 (74.5%) | | | | | |
| 2012 | 44 (48.9%) | 133 (49.6%) | 20 (43.5%) | 212 (53.1%) | 99 (58.9%) | 149 (60.3%) | 85 (68.0%) | | | | |
| 2013 | 41 (45.6%) | 125 (46.6%) | 19 (41.3%) | 193 (48.4%) | 87 (51.8%) | 126 (51.0%) | 68 (54.4%) | 71 (62.8%) | | | |
| 2014 | 40 (44.4%) | 111 (41.4%) | 17 (37.0%) | 165 (41.4%) | 70 (41.7%) | 112 (45.3%) | 56 (44.8%) | 50 (44.2%) | 55 (60.4%) | | |
| 2015 | 37 (41.1%) | 112 (41.8%) | 19 (41.3%) | 156 (39.1%) | 72 (42.9%) | 105 (42.5%) | 45 (36.0%) | 44 (38.9%) | 45 (49.5%) | 50 (64.9%) | |

*Table A6: "Never converted", "Ever converted" and "Dropped out" individuals by demographic characteristics*

| | Never converted N=5283 | Ever converted N=1893 | Dropped out N=4493 |
|---|---|---|---|
| | % | % | % |
| **Gender** | | | |
| Male | 45.9 | 43.5 | 47.6 |
| | | | |
| **Age** | | | |
| 14-24 | 23.1 | 12.7 | 26.5 |
| 25-34 | 10.2 | 13.4 | 14.3 |
| 35-44 | 14.5 | 17.6 | 15.0 |
| 45-54 | 19.6 | 19.1 | 16.7 |
| Older than 55 | 32.8 | 37.1 | 27.6 |
| | | | |
| **Education** | | | |
| Primary | 24.6 | 20.0 | 27.5 |
| Secondary | 43.4 | 51.9 | 48.8 |
| Tertiary | 32.1 | 28.1 | 23.7 |
| | | | |
| **Civil Status** | | | |
| Single, never married | 37.0 | 28.6 | 43.7 |
| Married | 50.8 | 55.5 | 40.4 |
| Separated, divorced | 8.8 | 10.6 | 9.9 |
| Widow | 3.5 | 5.4 | 5.9 |
| | | | |
| **Occupation** | | | |
| Employed | 54.2 | 61.3 | 55.4 |
| | | | |
| **Self-assessed health** | | | |
| Very well | 20.8 | 20.0 | 21.4 |
| Well | 65.8 | 63.6 | 60.9 |
| Average or bad | 13.4 | 16.4 | 17.7 |

*Table A6: "Never converted", "Ever converted" and "Dropped out" individuals by demographic characteristics*

*Table A7. Multinomial logistic regressions of converted individuals (N=1893) versus "never converted" (N=5283) and "dropped out" (N=4493) on socio-demographic characteristics*

| | Never converted versus Ever converted | | Dropped out versus Ever converted | |
|---|---|---|---|---|
| | Estimate | SE | Estimate | SE |
| **Gender** | | | | |
| Male | .02 | .06 | .18** | .06 |
| | | | | |
| **Age** | | | | |
| 14-24 (base) | - | - | - | - |
| 25-34 | -.84*** | .12 | -.50*** | .12 |
| 35-44 | -.69*** | .13 | -.61*** | .13 |
| 45-54 | -.42** | .13 | -.59*** | .14 |
| 55+ | -.61*** | .12 | -.86*** | .13 |
| | | | | |
| **Education** | | | | |
| Primary (base) | - | - | - | - |
| Secondary | -.04 | .08 | -.03 | .08 |
| Tertiary | .37*** | .09 | -.09 | .09 |
| | | | | |
| **Civil status** | | | | |
| Single | - | - | - | - |
| Married | -0.8 | .09 | -.31** | .09 |
| Separated/Divorced | -.16 | .12 | -.04 | .12 |
| Widow | -.45 | .16 | .21 | .15 |
| | | | | |
| **Occupation** | | | | |
| Employed | -.26*** | .07 | -.07 | .07 |
| | | | | |
| **Self-assessed health** | | | | |
| Very well | - | - | - | - |
| Well | .04 | .07 | -.01 | .07 |
| Average or bad | -.14 | .09 | -.07 | .07 |

*Table A8: "Never converted", "Ever converted" and "Dropped out" households by survey estimates*

| | Never converted N=2501 | Ever converted N=1465 | Dropped out N=2251 |
|---|---|---|---|
| | Mean | Mean | Mean |
| Household income | 110251.9 | 103259.9 | 92919.3 |
| Satisfaction with household finances | 7.41 | 7.29 | 7.02 |
| Improvement in standard of living | 5.13 | 5.12 | 5.06 |
| Minimum income to make ends | 5394.2 | 5164.4 | 4941.0 |
| Manageable financial situation | 7.48 | 7.21 | 7.00 |

*Table A9: Reference person "Never converted", "Ever converted" and "Dropped out" by demographics*

| | Never converted N=2057 | Ever converted N=1053 | Dropped out N=1696 |
|---|---|---|---|
| | Mean | Mean | Mean |
| Total personal yearly income | 59044.53 | 54124.4 | 54558.5 |
| Interest in politics | 5.80 | 5.41 | 5.06 |
| General trust in people | 6.43 | 6.01 | 5.78 |
| Satisfaction with finances | 7.36 | 7.18 | 7.02 |
| Satisfaction with health | 7.89 | 7.83 | 7.73 |
| Satisfaction with life in general | 7.96 | 7.96 | 7.77 |
| Satisfaction with living together/alone | 8.29 | 8.41 | 8.14 |

*Table A10: "Never converted", "Ever converted" and "Dropped out" respondents by demographics*

|  | Never converted N= | Ever converted N= | Dropped out N= |
|---|---|---|---|
|  | Mean | Mean | Mean |
| Total personal yearly income | 51607.6 | 53264.3 | 49395.5 |
| Interest in politics | 5.61 | 5.33 | 4.94 |
| General trust in people | 6.34 | 5.91 | 5.68 |
| Satisfaction with finances | 7.29 | 7.11 | 6.85 |
| Satisfaction with health | 7.92 | 7.88 | 7.89 |
| Satisfaction with life in general | 8.08 | 8.06 | 7.89 |
| Satisfaction with living together/alone | 8.37 | 8.48 | 8.20 |